Direzione Progettazione e Realizzazione Lavori

S.G.C. E78 GROSSETO–FANO

Tratto Siena Bettolle (A1)
Adeguamento a 4 corsie del tratto Siena–Ruffolo (Lotto 0)

PROGETTO DEFINITIVO

COD. FI-81

R.T.I. di PROGETTAZIONE: Mandataria — PRO ITER Progetto Infrastrutture Territorio s.r.l. — Mandante — erre.vi.a. s.r.l. Ricerca Viabilità Ambiente — sinèrgo — DVisionArchitecture

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VISTO: IL RESP. DEL PROCEDIMENTO
Ing. Raffaele Franco Carso

ORDINE DEGLI INGEGNERI DELLA PROVINCIA DI MILANO — DOTT.ING. FORMICHI RICCARDO — Sez.A Settori: a) civile e ambientale b) industriale c) dell'informazione — n° A 18045

ORDINE DEGLI INGEGNERI DELLA PROVINCIA DI MILANO — DOTT ING ALBERTO RINALDI — Sez. A Settori a) b) c) — n° A 16951

PROTOCOLLO	DATA

06 - Opere d'arte
06.02 Opere d'arte maggiori - Viadotti
06.02.01 - Viadotto Tressa carreggiata Est (VI.01)
Relazione di calcolo sottostrutture

CODICE PROGETTO (PROGETTO / LIV. PROG. / N. PROG.)	NOME FILE	REVISIONE	SCALA
DPFI0081 / D / 20	T00VI01STRRE02B.pdf — CODICE ELAB. T00VI01STRRE02	B	-

REV.	DESCRIZIONE	DATA	REDATTO	VERIFICATO	APPROVATO
D					
C					
B	Revisione per istruttoria ANAS	Maggio 2021	PISTONE	MARTIGNONI	RINALDI
A	Emissione	Ottobre 2020	PISTONE	MARTIGNONI	RINALDI

INDICE

1 PREMESSA

La presente relazione tratta gli aspetti tecnico-stradali legati all’intervento in oggetto che riguarda la progettazione definitiva dell’adeguamento, da due a quattro corsie, del tronco stradale della SS n. 223 “di Paganico” nel tratto compreso tra lo svincolo con la Tangenziale Ovest di Siena (km 63.561 del tratto Grosseto-Siena) e lo svincolo di Ruffolo (km 2.800 del tratto Siena-Bettolle), comprensivo degli svincoli di inizio e fine intervento, al fine di realizzare un’arteria assimilabile ad una strada di tipo extraurbano principale (tipo B, a carreggiate separate – v. D.M. 05/11/2001), garantendo la continuità dell’Itinerario Internazionale E78 – S.G.C. “Grosseto – Fano”.

1.1 Descrizione dell’intervento

Le opere geotecniche accessorie al completamento dell’opera sono:

- Spalla, per spalla 1 – 2, fondata su 5x3 pali trivellati Ø1200 di lunghezza L=32.0m;
- Pila tipo 1, per le pile 1 – 2 – 3, fondata su 11 pali trivellati Ø1200 a quinconce di lunghezza L=27.0m;
- Pila tipo 2, per le pile 4 – 5 fondata su 4x2 pali trivellati Ø1200 di lunghezza L=27.0m.

Per le spalle si prevede la realizzazione di una fondazione di spessore pari a 1.50m e dimensione in pianta pari a 16.20x9.00m. Dall’estradosso della fondazione si eleveranno i muri d’ala della spalla per un’altezza variabile da 8.43m a 9.33m a seconda della spalla.

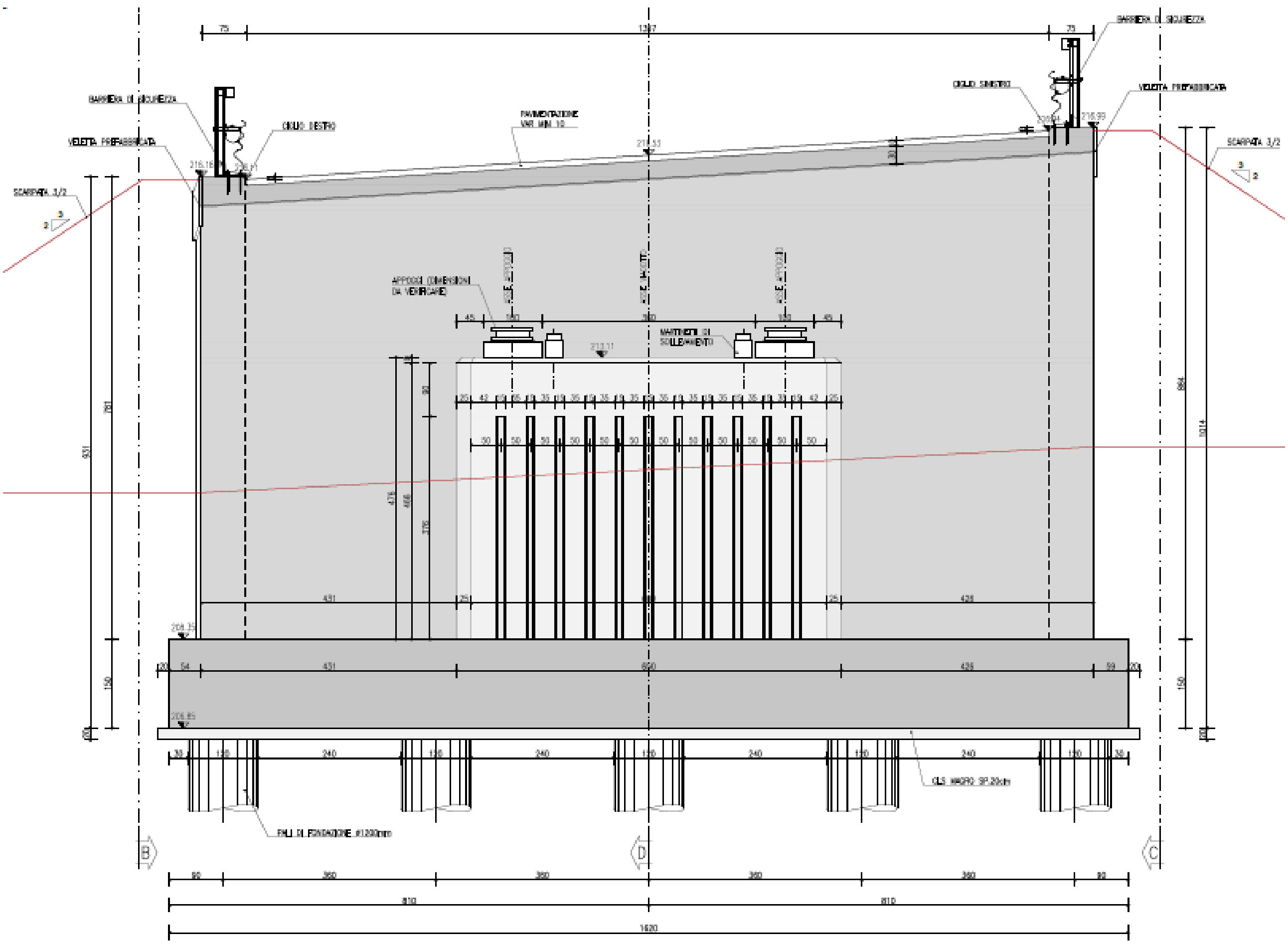


Figura 1: Spalla 1 – carpenteria elevazioni

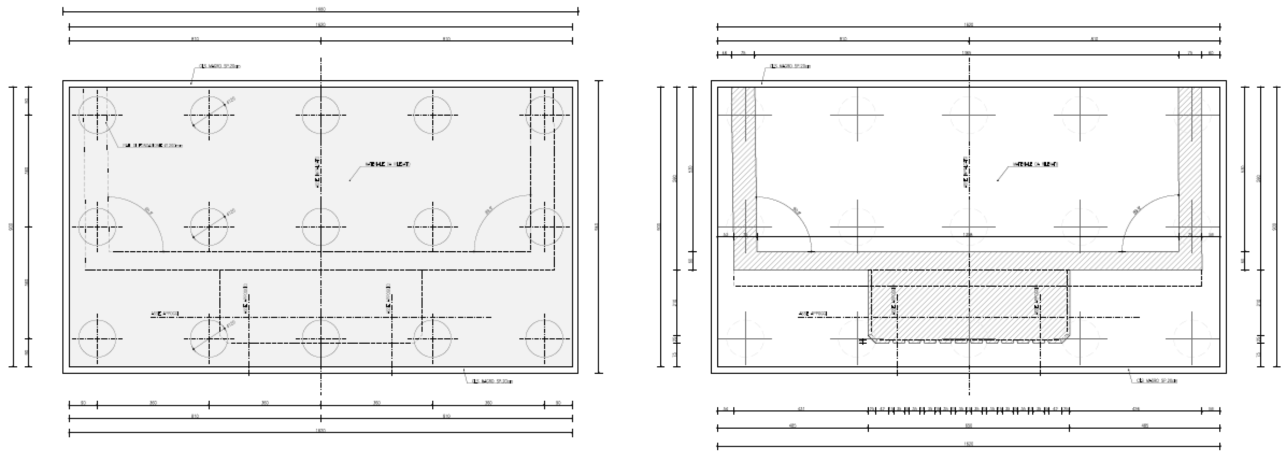


Figura 2: Spalla 1 – carpenteria fondazioni

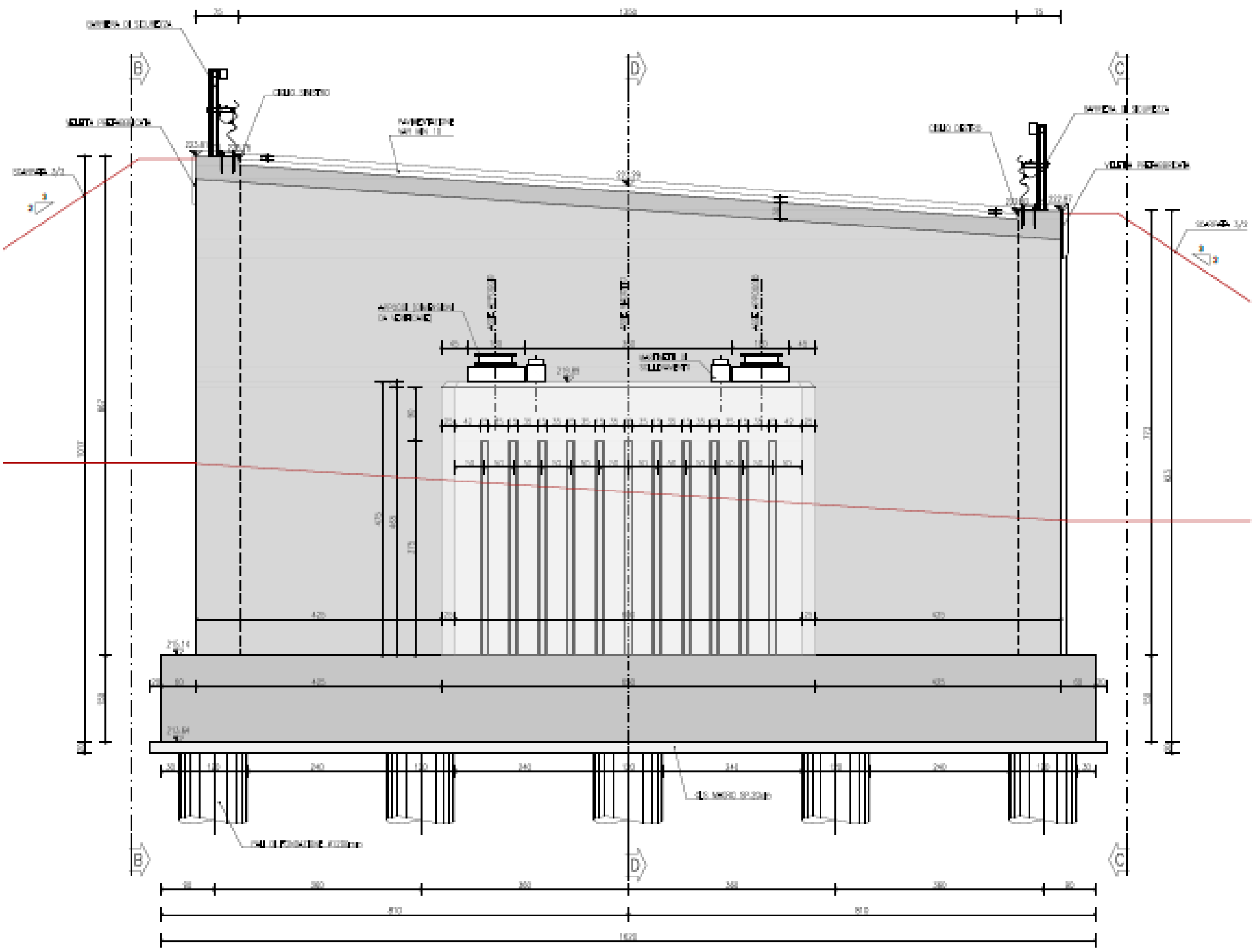


Figura 3: Spalla 2 – carpenteria elevazioni

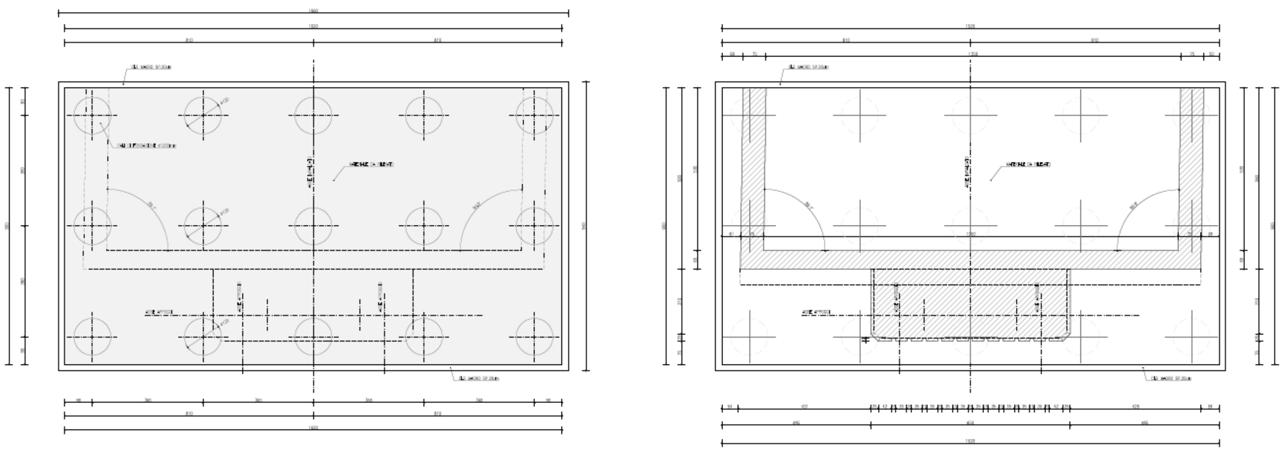


Figura 4: Spalla 2 – carpenteria fondazioni

Per le pile tipo 1 si prevede la realizzazione di una fondazione di spessore pari a 2.00m e dimensione in pianta pari a 13.20x8.60m. Dall'estradosso della fondazione si eleverà il fusto della pila per un'altezza variabile da 7.50m a 8.50m a seconda della pila.

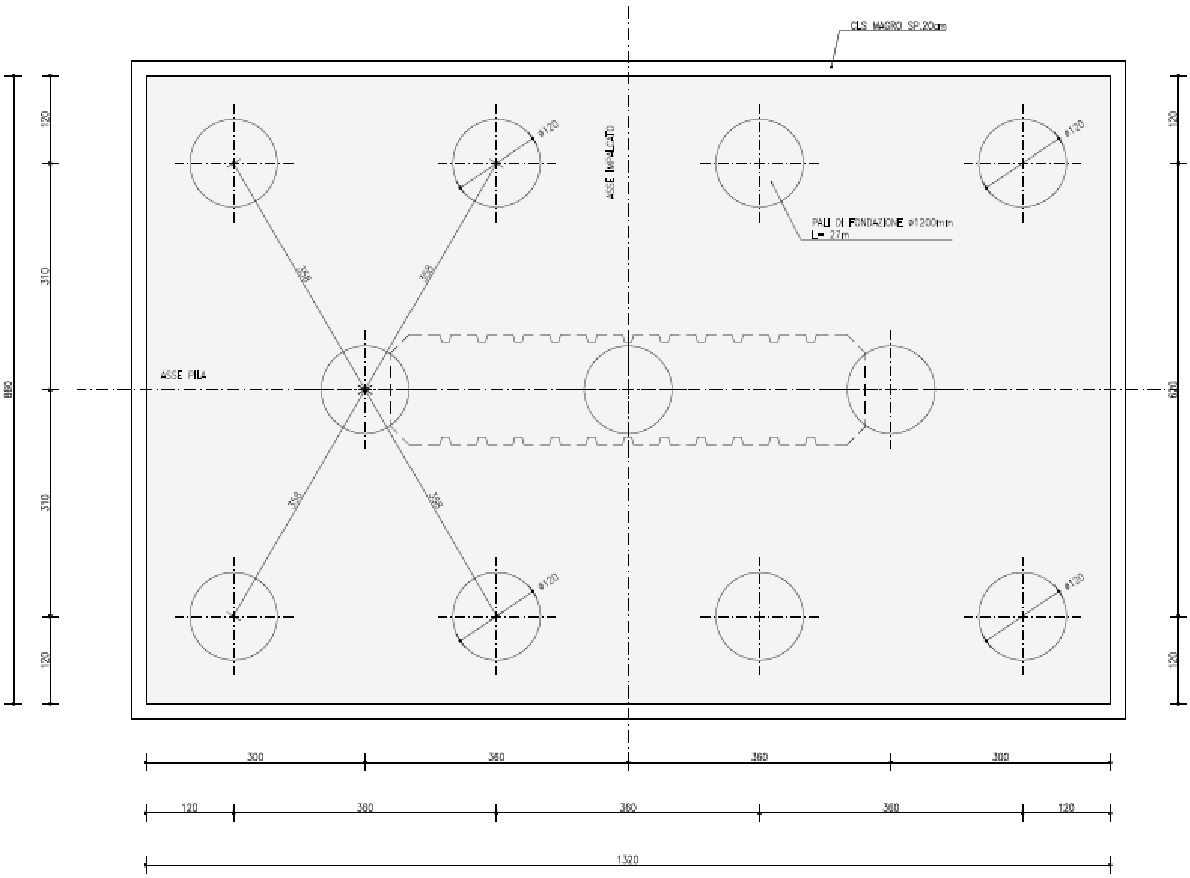


Figura 5: Pila tipo 1 – carpenteria pianta

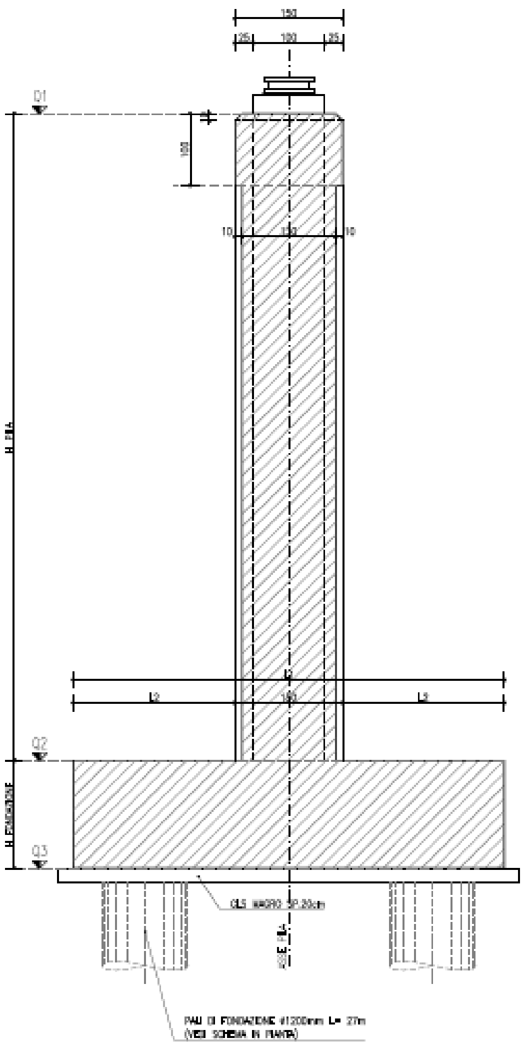


Figura 6: Area intervento – Pile – carpenteria elevazioni

Per le pile tipo 2 si prevede la realizzazione di una fondazione di spessore pari a 1.50m e dimensione in pianta pari a 14.00x6.00m. Dall'estradosso della fondazione si eleverà il fusto della pila per un'altezza variabile da 7.50m a 8.00m a seconda della pila.

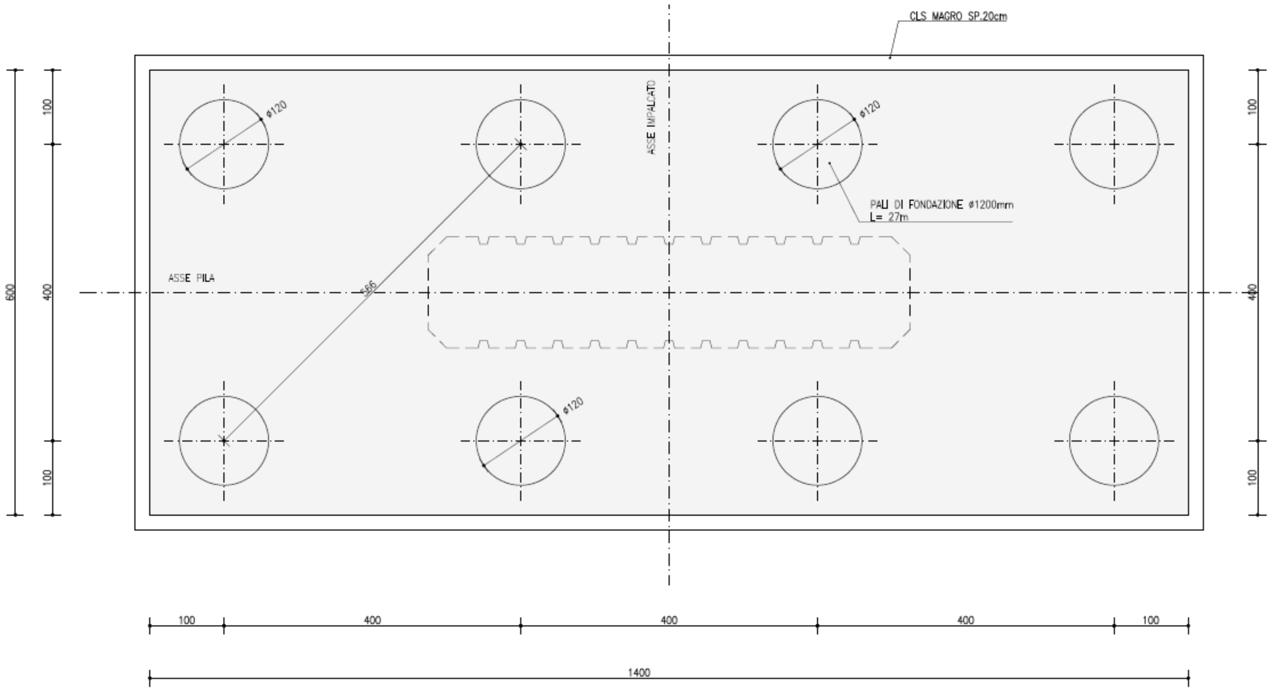


Figura 7: Pila tipo 2 – carpenteria pianta

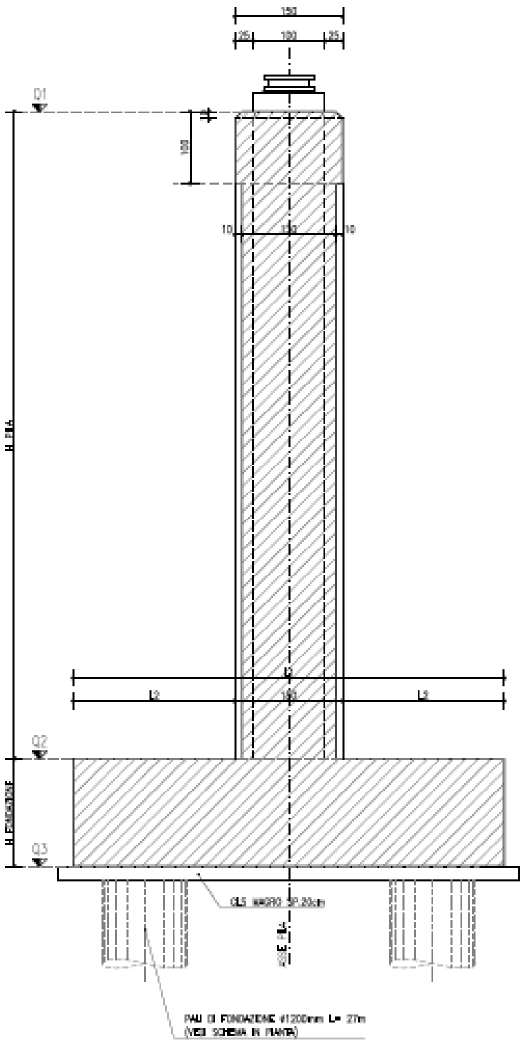


Figura 8: Pile – carpenteria elevazioni

1.2 Inquadramento geografico

L’area di intervento è situata nel Comune di Siena.

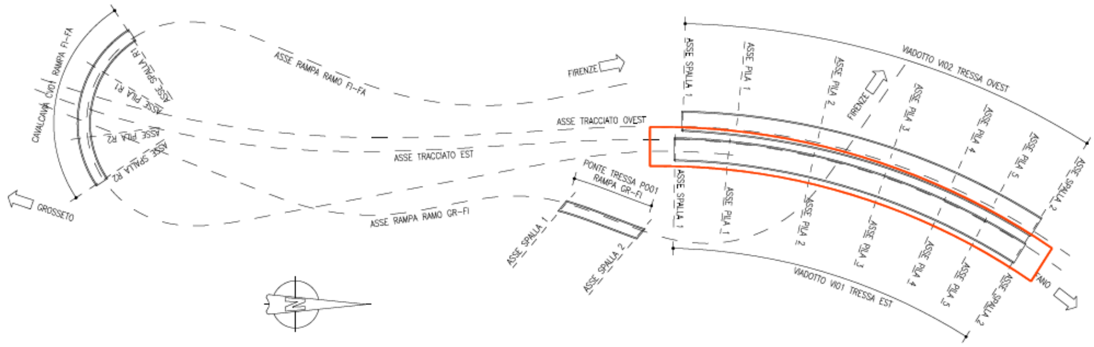


Figura 9: Area intervento – Pianta chiave

1.3 Inquadramento geologico e geomorfologico

In merito a tali aspetti si rimanda al [1] indicato negli elaborati di riferimento riportati a seguire.

2 DOCUMENTAZIONE DI RIFERIMENTO

2.1 Elaborati a carattere generale

[1] E78 Grosseto Fano – Tratto Siena – Bettolle (A1) – Adeguamento a 4 corsie del tratto Siena – Ruffolo (Lotto 0) – Progetto definitivo – Geologia e geotecnica – Geologia – Relazione geologica e idrogeologica – Elaborato: T00GE01GEORE01A

[2] E78 Grosseto Fano – Tratto Siena – Bettolle (A1) – Adeguamento a 4 corsie del tratto Siena – Ruffolo (Lotto 0) – Progetto definitivo – Geologia e geotecnica – Geotecnica – Relazione geotecnica generale – Elaborato: T00GE04GETRE01A

[3] E78 Grosseto Fano – Tratto Siena – Bettolle (A1) – Adeguamento a 4 corsie del tratto Siena – Ruffolo (Lotto 0) – Progetto definitivo – Geologia e geotecnica – Sismica – Relazione sismica – Elaborato: T00GE05GETRE02A

2.2 Elaborati specifici

[4] E78 Grosseto Fano – Tratto Siena – Bettolle (A1) – Adeguamento a 4 corsie del tratto Siena – Ruffolo (Lotto 0) – Progetto definitivo – Opere d’arte – Generale – Tabella materiali – Elaborato: T00GE00STRDC01A

[5] E78 Grosseto Fano – Tratto Siena – Bettolle (A1) – Adeguamento a 4 corsie del tratto Siena – Ruffolo (Lotto 0) – Progetto definitivo – Opere d’arte – Opere d’arte maggiori – Viadotti – Viadotto Tressa carreggiata Est (VI.01) – Relazione di calcolo impalcato – Elaborato: T00VI01STRRE01A

[6] E78 Grosseto Fano – Tratto Siena – Bettolle (A1) – Adeguamento a 4 corsie del tratto Siena – Ruffolo (Lotto 0) – Progetto definitivo – Opere d’arte – Opere d’arte maggiori – Viadotti – Viadotto Tressa carreggiata Est (VI.01) – Planimetria impalcato, fondazioni, sezione longitudinale e trasversale – Tav.1 – Elaborato: T00VI01STRDI01A

[7] E78 Grosseto Fano – Tratto Siena – Bettolle (A1) – Adeguamento a 4 corsie del tratto Siena – Ruffolo (Lotto 0) – Progetto definitivo – Opere d’arte – Opere d’arte maggiori – Viadotti – Viadotto Tressa carreggiata Est (VI.01) – Planimetria impalcato, fondazioni, sezione longitudinale e trasversale – Tav.2 – Elaborato: T00VI01STRDI02A

[8] E78 Grosseto Fano – Tratto Siena – Bettolle (A1) – Adeguamento a 4 corsie del tratto Siena – Ruffolo (Lotto 0) – Progetto definitivo – Opere d’arte – Opere d’arte maggiori – Viadotti – Viadotto Tressa carreggiata Est (VI.01) – Carpenteria impalcato – Tav.1 – Elaborato: T00VI01STRCP01A

[9] E78 Grosseto Fano – Tratto Siena – Bettolle (A1) – Adeguamento a 4 corsie del tratto Siena – Ruffolo (Lotto 0) – Progetto definitivo – Opere d’arte – Opere d’arte maggiori – Viadotti – Viadotto Tressa carreggiata Est (VI.01) – Carpenteria impalcato – Tav.2 – Elaborato: T00VI01STRCP02A

[10] E78 Grosseto Fano – Tratto Siena – Bettolle (A1) – Adeguamento a 4 corsie del tratto Siena – Ruffolo (Lotto 0) – Progetto definitivo – Opere d’arte – Opere d’arte maggiori – Viadotti – Viadotto Tressa carreggiata Est (VI.01) – Carpenteria impalcato – Tav.3 – Elaborato: T00VI01STRCP03A

[11] E78 Grosseto Fano – Tratto Siena – Bettolle (A1) – Adeguamento a 4 corsie del tratto Siena – Ruffolo (Lotto 0) – Progetto definitivo – Opere d’arte – Opere d’arte maggiori – Viadotti – Viadotto Tressa carreggiata Est (VI.01) – Carpenteria impalcato – Tav.4 –

Elaborato: T00VI01STRCP04A

[12] E78 Grosseto Fano – Tratto Siena – Bettolle (A1) – Adeguamento a 4 corsie del tratto Siena – Ruffolo (Lotto 0) – Progetto definitivo – Opere d’arte – Opere d’arte maggiori – Viadotti – Viadotto Tressa carreggiata Est (VI.01) – Carpenteria impalcato – Tav.5 – Elaborato: T00VI01STRCP05A

[13] E78 Grosseto Fano – Tratto Siena – Bettolle (A1) – Adeguamento a 4 corsie del tratto Siena – Ruffolo (Lotto 0) – Progetto definitivo – Opere d’arte – Opere d’arte maggiori – Viadotti – Viadotto Tressa carreggiata Est (VI.01) – Predalles impalcato – Elaborato: T00VI01STRCP06A

[14] E78 Grosseto Fano – Tratto Siena – Bettolle (A1) – Adeguamento a 4 corsie del tratto Siena – Ruffolo (Lotto 0) – Progetto definitivo – Opere d’arte – Opere d’arte maggiori – Viadotti – Viadotto Tressa carreggiata Est (VI.01) – Carpenteria spalla 1 – Elaborato: T00VI01STRCP07A

[15] E78 Grosseto Fano – Tratto Siena – Bettolle (A1) – Adeguamento a 4 corsie del tratto Siena – Ruffolo (Lotto 0) – Progetto definitivo – Opere d’arte – Opere d’arte maggiori – Viadotti – Viadotto Tressa carreggiata Est (VI.01) – Carpenteria spalla 2 – Elaborato: T00VI01STRCP08A

[16] E78 Grosseto Fano – Tratto Siena – Bettolle (A1) – Adeguamento a 4 corsie del tratto Siena – Ruffolo (Lotto 0) – Progetto definitivo – Opere d’arte – Opere d’arte maggiori – Viadotti – Viadotto Tressa carreggiata Est (VI.01) – Carpenteria pile – Elaborato: T00VI01STRCP09A

[17] E78 Grosseto Fano – Tratto Siena – Bettolle (A1) – Adeguamento a 4 corsie del tratto Siena – Ruffolo (Lotto 0) – Progetto definitivo – Opere d’arte – Opere d’arte maggiori – Viadotti – Viadotto Tressa carreggiata Est (VI.01) – Schema di vincoli, appoggi, giunti, dettagli e finiture – Elaborato: T00VI01STRDC01A

[18] E78 Grosseto Fano – Tratto Siena – Bettolle (A1) – Adeguamento a 4 corsie del tratto Siena – Ruffolo (Lotto 0) – Progetto definitivo – Opere d’arte – Opere d’arte maggiori – Viadotti – Viadotto Tressa carreggiata Est (VI.01) – Metodi costruttivi (Fasi costruttive, sistemi di varo, interferenze con sottoservizi, controllo falda) – Elaborato: T00VI01STRDI03A

[19] E78 Grosseto Fano – Tratto Siena – Bettolle (A1) – Adeguamento a 4 corsie del tratto Siena – Ruffolo (Lotto 0) – Progetto definitivo – Opere d’arte – Opere d’arte maggiori – Viadotti – Viadotto Tressa carreggiata Est (VI.01) – Opere provvisionali – Elaborato: T00VI01STRDI04A

[20] E78 Grosseto Fano – Tratto Siena – Bettolle (A1) – Adeguamento a 4 corsie del tratto Siena – Ruffolo (Lotto 0) – Progetto definitivo – Opere d’arte – Opere d’arte maggiori – Viadotti – Viadotto Tressa carreggiata Est (VI.01) – Demolizione Viadotto esistente – pianta e sezioni tipo – Elaborato: T00VI01STRDI05A

3 NORMATIVA DI RIFERIMENTO

3.1 Normativa tecnica di riferimento

3.1.1 Materiali

[21] UNI EN 206-1 marzo 2006 – "Calcestruzzo - Parte 1: Specificazione, prestazione, produzione e conformità";
[22] UNI EN 197-1 marzo 2006 – "Cemento - Parte 1: Composizione, specificazioni e criteri di conformità per cementi comuni";
[23] UNI EN 197-2 marzo 2001 – "Cemento - Valutazione della conformità";
[24] UNI 11104 marzo 2004 – "Calcestruzzo: specificazione, prestazione, produzione e conformità", Istruzioni complementari per l'applicazione delle EN 206-1";
[25] Consiglio Superiore dei Lavori Pubblici, 07/02/2003 – "Linee guida per il calcestruzzo strutturale, Linee guida per il calcestruzzo strutturale ad alta resistenza, Linee guida per il calcestruzzo preconfezionato";
[26] Consiglio Superiore dei Lavori Pubblici, 05/04/2013 – "Linee guida per la messa in opera del calcestruzzo strutturale e per la valutazione delle caratteristiche meccaniche del calcestruzzo indurito mediante prove non distruttive";
[27] D.M. 16/02/2007 – "Classificazione di resistenza al fuoco di prodotti ed elementi costruttivi di opere da costruzione";
[28] "Regolamento UE n°305/2011 del Parlamento Europeo e del Consiglio del 9 marzo 2011 che fissa condizioni armonizzate per la commercializzazione dei prodotti da costruzione e che abroga la direttiva 89/106/CEE del Consiglio"

3.1.2 Costruzioni in c.a. e acciaio

3.1.2.1 Eurocodice 0 - "Criteri generali di progettazione strutturale"

[29] UNI EN 1990:2006;

3.1.2.2 Eurocodice 1 - "Azioni sulle strutture"

[30] UNI EN 1991-1-1:2004 – "Parte 1-1: Azioni in generale - Pesi per unità di volume, pesi propri e sovraccarichi per gli edifici";
[31] UNI EN 1991-1-2:2004 – "Parte 1-2: Azioni in generale - Azioni sulle strutture esposte al fuoco";
[32] UNI EN 1991-1-3:2004 – "Parte 1-3: Azioni in generale - Carichi da neve";
[33] UNI EN 1991-1-4:2005 – "Parte 1-4: Azioni in generale - Azioni del vento";
[34] UNI EN 1991-1-5:2004 – "Parte 1-5: Azioni in generale - Azioni termiche";
[35] UNI EN 1991-2:2005 – "Parte 2: Carichi da traffico sui ponti";

3.1.2.3 Eurocodice 2 - "Progettazione delle strutture in calcestruzzo"

[36] UNI EN 1992-1-1:2005 – "Parte 1-1: Regole generali e regole per gli edifici";
[37] UNI EN 1992-1-2:2005 – "Parte 1-2: Regole generali - Progettazione strutturale contro l'incendio";
[38] UNI EN 1992-2:2006 – "Parte 2: Ponti di calcestruzzo - Progettazione e dettagli costruttivi";

3.1.2.4 Eurocodice 3 - "Progettazione delle strutture in acciaio"

[39] UNI EN 1993-1-1:2005 – "Parte 1-1: Regole generali e regole per gli edifici";
[40] UNI EN 1993-1-2:2005 – "Parte 1-2: Regole generali - Progettazione strutturale contro l'incendio";
[41] UNI EN 1993-1-5:2007 – "Parte 1-5: Elementi strutturali a lastra";
[42] UNI EN 1993-1-8:2005 – "Parte 1-8: Progettazione dei collegamenti";
[43] UNI EN 1993-1-9:2005 – "Parte 1-9: Fatica";
[44] UNI EN 1993-1-10:2005 – "Parte 1-10: Resilienza del materiale e proprietà attraverso lo spessore";

[45] UNI EN 1993-2:2007 – "Parte 2: Ponti di acciaio";
[46] UNI EN 1993-3-1:2007 – "Parte 3-1: Torri, pali e ciminiere - Torri e pali";
[47] UNI EN 1993-5:2007 – "Parte 5: Pali e palancole"

3.1.2.5 Eurocodice 4 - "Progettazione delle strutture composte acciaio-calcestruzzo"

[48] UNI EN 1994-1-1:2005 – "Parte 1-1: Regole generali e regole per gli edifici";
[49] UNI EN 1994-1-2:2005 – "Parte 1-2: Regole generali - Progettazione strutturale contro l'incendio";
[50] UNI EN 1994-2:2006 – "Parte 2: Regole generali e regole per i ponti";

3.1.3 Geotecnica

3.1.3.1 Eurocodice 7 - "Progettazione geotecnica"

[51] UNI EN 1997-1:2005 – "Parte 1: Regole generali";

3.1.4 Sismica

3.1.4.1 Eurocodice 8 - "Progettazione delle strutture per la resistenza sismica"

[52] UNI EN 1998-1:2005 – "Parte 1: Regole generali, azioni sismiche e regole per gli edifici";
[53] UNI EN 1998-2:2009 – "Parte 2: Ponti";
[54] UNI EN 1998-5:2003 – "Parte 5: Fondazioni, opere di sostegno e geotecniche"

3.2 Normativa tecnica nazionale

[55] D.M. Min. II. TT. 17/01/2018 – "Aggiornamento delle norme tecniche per le costruzioni";
[56] Circolare LL.PP. n°7 21/01/2019 - "Istruzioni per l'applicazione dell'Aggiornamento delle norme tecniche per le costruzioni di cui al D.M. 17 gennaio 2018";
[57] CNR DT 207/2008 - "Istruzioni per la valutazione delle azioni e degli effetti del vento sulle costruzioni";
[58] D.M. 31/07/2012 – "Approvazione delle Appendici nazionali recanti i parametri tecnici per l'applicazione degli Eurocodici";
[59] D.P.R. n°380 06/06/2001 – "Testo unico delle disposizioni legislative e regolamentari in materia di edilizia";

3.3 Bibliografia e altri riferimenti

[60] Lancellotta R. [1991] " Geotecnica" – Edizioni Zanichelli.
[61] Migliacci – F. Mola – "Progetto agli stati limite delle strutture in c.a." - Masson Italia Editori 1985
[62] C. Cestelli Guidi - "Geotecnica e tecnica delle fondazioni" - Ulrico Hoepli Editore 1987
[63] R. Lancellotta – "Geotecnica" - Edizioni Zanichelli 1987
[64] Bowles J.E.: "Foundations Analysis and Design" 4th edition - McGraw-Hill – New York, 1988
[65] Bustamante M., Gianeselli L. [1982] - "Pile bearing capacity prediction by means of static penetrometer CPT" -.Pr. of the 2th European symposium on penetration testing, Amsterdam.
[66] H.G. Poulos, E.H. Davis. "Analisi e progettazione di fondazioni su pali";
[67] S. Rampello, L. Callisto L. Masini. "Spinta delle terre sulle strutture di sostegno";
[68] L.C. Reese, W.R.Cox, F.D. Koop [1974] - "Analysis of lateralli loaded piles in sand" – Paper N° OCT 2080, Proceedings, Fifth Annual Offshore Technology Conference, Houston, Texas, 1975;
[69] L.C. Reese, W.R.Cox, F.D. Koop [1975] - "Field testing and analysis of laterally loaded piles in stiff clay" – Paper N° OCT 2313, Proceedings, Seventh Offshore Technology Conference, Houston, Texas, 1975;
[70] L.C. Reese, R.C. Welch [1975] - "Lateral loading of deep foundations in stiff clay" – Journal of the geotechnical Division, ASCE, Vol. 101, No GT7, Proocedings Paper 11456,

1975, pp. 633 – 649.
[71] R.C. Welch, L.C. Reese [1972] - "Laterally loaded Behavior of drilled shafts" – Research Report N° 3-5-65-89, conducted for Texas Highway Department and U.S. Department of Transportation, Federal Highway AD.M.inistration, Bureau of Public Roads, by Center for Highway Research, The University of Austin.

4 MATERIALI

4.1 Calcestruzzo

4.1.1 Calcestruzzo per magrone – C12/15

Classe minima	C12/15		
Classe di esposizione ambientale	X0		
Resistenza caratteristica a compressione cubica a 28 gg	R_{ck}	15.00	MPa
Resistenza caratteristica a compressione cilindrica	$f_{ck} = R_{ck}*0.83 =$	12.45	MPa
Resistenza media a compressione cilindrica	$f_{cm} = f_{ck}+8 =$	20.45	MPa
Modulo elastico	$E_c = 22000*(f_{cm}/10)^{0.3} =$	27267	MPa
Valore medio di resistenza a trazione semplice	$f_{ctm} = 0.3*(f_{ck})^{2/3} =$	1.61	MPa
Resistenza di calcolo a trazione semplice	$f_{ctk} = 0.7*f_{ctm} =$	1.13	MPa
Stato limite ultimo			
Coefficiente parziale di sicurezza	$\gamma_C =$	1.5	
Coefficiente riduttivo per resistenze di lunga durata	$\alpha_{CC} =$	0.85	
Resistenza di calcolo a compressione	$f_{cd} = \alpha_{CC}*f_{ck} / \gamma_C =$	7.06	MPa
Resistenza di calcolo a trazione semplice	$f_{ctd} = f_{ctk} / \gamma_C =$	0.75	MPa
Valore ultimo della deformazione a compressione	$\varepsilon_{cu} =$	3.5	‰
Stato limite di esercizio			
Tensione max di compressione – Comb. Rara	$\sigma_c = 0.60*f_{ck} =$	7.47	MPa
Tensione max di compressione – Comb. Quasi Permanente	$\sigma_c = 0.45*f_{ck} =$	5.60	MPa

4.1.2 Calcestruzzo per pali di fondazione – C28/35

Classe minima	C28/35		
Classe di esposizione ambientale	XC2		
Resistenza caratteristica a compressione cubica a 28 gg	R_{ck}	35.00	MPa
Resistenza caratteristica a compressione cilindrica	$f_{ck} = R_{ck}*0.83 =$	29.05	MPa
Resistenza media a compressione cilindrica	$f_{cm} = f_{ck}+8 =$	37.05	MPa
Modulo elastico	$E_c = 22000*(f_{cm}/10)^{0.3} =$	32588	MPa
Valore medio di resistenza a trazione semplice	$f_{ctm} = 0.3*(f_{ck})^{2/3} =$	2.83	MPa
Resistenza di calcolo a trazione semplice	$f_{ctk} = 0.7*f_{ctm} =$	1.98	MPa
Stato limite ultimo			
Coefficiente parziale di sicurezza	$\gamma_C =$	1.5	
Coefficiente riduttivo per resistenze di lunga durata	$\alpha_{CC} =$	0.85	
Resistenza di calcolo a compressione	$f_{cd} = \alpha_{CC}*f_{ck} / \gamma_C =$	16.46	MPa
Resistenza di calcolo a trazione semplice	$f_{ctd} = f_{ctk} / \gamma_C =$	1.32	MPa
Valore ultimo della deformazione a compressione	$\varepsilon_{cu} =$	3.5	‰
Stato limite di esercizio			
Tensione max di compressione – Comb. Rara	$\sigma_c = 0.60*f_{ck} =$	17.43	MPa
Tensione max di compressione – Comb. Quasi Permanente	$\sigma_c = 0.45*f_{ck} =$	13.07	MPa

4.1.3 Calcestruzzo per elevazioni pile e spalle – C32/40

Classe minima	C32/40	
Classe di esposizione ambientale	XC2 – XD1 – XF4	
Resistenza caratteristica a compressione cubica a 28 gg	R_{ck}	40.00 MPa
Resistenza caratteristica a compressione cilindrica	$f_{ck} = R_{ck}*0.83 =$	33.20 MPa
Resistenza media a compressione cilindrica	$f_{cm} = f_{ck}+8 =$	41.20 MPa
Modulo elastico	$E_c = 22000*(f_{cm}/10)^{0.3} =$	33643 MPa
Valore medio di resistenza a trazione semplice	$f_{ctm} = 0.3*(f_{ck})^{2/3} =$	3.10 MPa
Resistenza di calcolo a trazione semplice	$f_{ctk} = 0.7*f_{ctm} =$	2.17 MPa
Stato limite ultimo		
Coefficiente parziale di sicurezza	$\gamma_C =$	1.5
Coefficiente riduttivo per resistenze di lunga durata	$\alpha_{CC} =$	0.85
Resistenza di calcolo a compressione	$f_{cd} = \alpha_{CC}*f_{ck} / \gamma_C =$	18.81 MPa
Resistenza di calcolo a trazione semplice	$f_{ctd} = f_{ctk} / \gamma_C =$	1.45 MPa
Valore ultimo della deformazione a compressione	$\varepsilon_{cu} =$	3.5 ‰
Stato limite di esercizio		
Tensione max di compressione – Comb. Rara	$\sigma_c = 0.60*f_{ck} =$	19.92 MPa
Tensione max di compressione – Comb. Quasi Permanente	$\sigma_c = 0.45*f_{ck} =$	14.94 MPa

4.2 Acciaio

4.2.1 Acciaio in barre per calcestruzzo armato – B450C

Classe	B450C	
Tensione caratteristica di rottura a trazione	f_{tk}	$\geq$ 540 MPa
Tensione caratteristica di snervamento a trazione	f_{yk}	$\geq$ 450 MPa
Modulo elastico	$E_s =$	210000 MPa
Stato limite ultimo		
Coefficiente parziale di sicurezza	$\gamma_s =$	1.15
Resistenza di calcolo	$f_{yd} = f_{yk} / \gamma_S =$	391.30 MPa
Valore ultimo della deformazione a trazione	$\varepsilon_{cu} =$	10 ‰
Stato limite di esercizio		
Tensione max di trazione	$\sigma_s = 0.80*f_{yk} =$	360.00 MPa

4.3 Durabilità dei materiali

4.3.1 Conglomerati cementizi

Le classi di esposizione e le conseguenti limitazioni sulla composizione del calcestruzzo sono state ricavate ai sensi della normativa UNI EN 206-1 e UNI 11104, delle istruzioni contenute nella C.M. n°7 per l'applicazione delle [55].
A seconda dell'esposizione ambientale, per opere con V_N = 50 anni la circolare al punto C4.1.6.1.3 impone il rispetto dei limiti di copriferro riportati nella tabella successiva e, per strutture con V_N = 100 anni, una maggiorazione di copriferro pari a Δc_{min} = +10 mm. Per classi di resistenza inferiori a C_{min} i valori sono da aumentare di Δc_{min} = +5 mm. Per produzioni di elementi sottoposte a controllo di qualità che preveda anche la verifica dei copriferri, i valori della tabella possono essere ridotti di Δc_{min} = -5 mm.
A tali valori di tabella vanno aggiunte le tolleranze di posa, pari a Δc_{dev} = +10 mm o minore, secondo indicazioni di norme di comprovata validità.

Tabella 1: Copriferri minimi in mm (V_N = 50 anni)

			barre da c.a. elementi a piastra		barre da c.a. altri elementi		cavi da c.a.p. elementi a piastra		cavi da c.a.p. altri elementi	
C_{min}	C_o	ambiente	$C \geq C_o$	$C_{min} \leq C < C_o$	$C \geq C_o$	$C_{min} \leq C < C_o$	$C \geq C_o$	$C_{min} \leq C < C_o$	$C \geq C_o$	$C_{min} \leq C < C_o$
C25/30	C35/45	ordinario	15	20	20	25	25	30	30	35
C30/37	C40/50	aggressivo	25	30	30	35	35	40	40	45
C35/45	C45/55	molto ag.	35	40	40	45	45	50	50	50

Tabella 2: Condizioni ambientali e classi di esposizioni

Condizioni ambientali	Classe di esposizione
Ordinarie	X0, XC1, XC2, XC3, XF1
Aggressive	XC4, XD1, XS1, XA1, XA2, XF2, XF3
Molto aggressive	XD2, XD3, XS2, XS3, XA3, XF4

Elementi gettati in opera – Pali di fondazione

- Classe di esposizione

Corrosione indotta da carbonatazione	XC2 Parti di strutture di contenimento liquidi, fondazioni. Calcestruzzo armato ordinario o precompresso prevalentemente immerso in acqua o terreno non aggressivo.

- Condizioni ambientali: Ordinarie

- Requisiti minimi calcestruzzi

Rapporto acqua/cemento	< 0.55
Classe di resistenza	> C25/30
Dosaggio cemento	> 320 kg/m^3

- Copriferro nominale netto:

$c_{nom} = c_{min} + \Delta c_{min} + \Delta c_{dev} = 25 + 0 + 10 = 35$ mm $\rightarrow$ c = 75 mm

Elementi gettati in opera – Elevazioni pile e spalle

- Classe di esposizione

Corrosione indotta da carbonatazione	XC4 Superfici non a contatto con acqua non compresa nella classe XC2. Calcestruzzi a vista in ambienti urbani. Calcestruzzo armato ordinario in esterni con superfici soggette ad alternanze di asciutto ed umido.
Attacco dei cicli di gelo/disgelo con o senza disgelanti	XF2 Elementi come parti di ponti che in altro modo sarebbero classificati come XF1 ma che sono esposti direttamente o indirettamente agli agenti disgelanti
Corrosione indotta da cloruri	XD1 Calcestruzzo armato ordinario in superfici o parti di ponte e viadotti esposti a spruzzi d'acqua contenenti cloruri

- Condizioni ambientali Aggressive

- Requisiti minimi calcestruzzi

Rapporto acqua/cemento	< 0.50
Classe di resistenza	> C30/37
Dosaggio cemento	> 340 kg/m^3

- Copriferro nominale netto:

$c_{nom} = c_{min} + \Delta c_{min} + \Delta c_{dev} = 30 + 0 + 10 = 40$ mm → c = 40 mm

5 CARATTERIZZAZIONE GEOTECNICA

5.1 Parametri geotecnici

I parametri geotecnici costitutivi dei terreni che interessano le opere in oggetto, utilizzati nelle analisi svolte, sono stati desunti dal [2]. La tabella seguente riporta i parametri di progetto utilizzati nei calcoli.

Unità geotecniche	**Peso di volume naturale**	**Peso di volume saturo**	**Coesione efficace**	**Angolo di resistenza a taglio**	**Coesione non drenata**	**Modulo di elastictà**
	γ_N [kN/m^3]	**γ_{SAT} [kN/m^3]**	**c’ [kPa]**	**φ [°]**	**c_u [kPa]**	**E [MPa]**
Unità FAA	20.0	21.0	30	28.0	200	20
Unità FAAa	19.5	20.5	20	24.0	75	10
Unità b	19.5	20.5	15	30.0	75	10

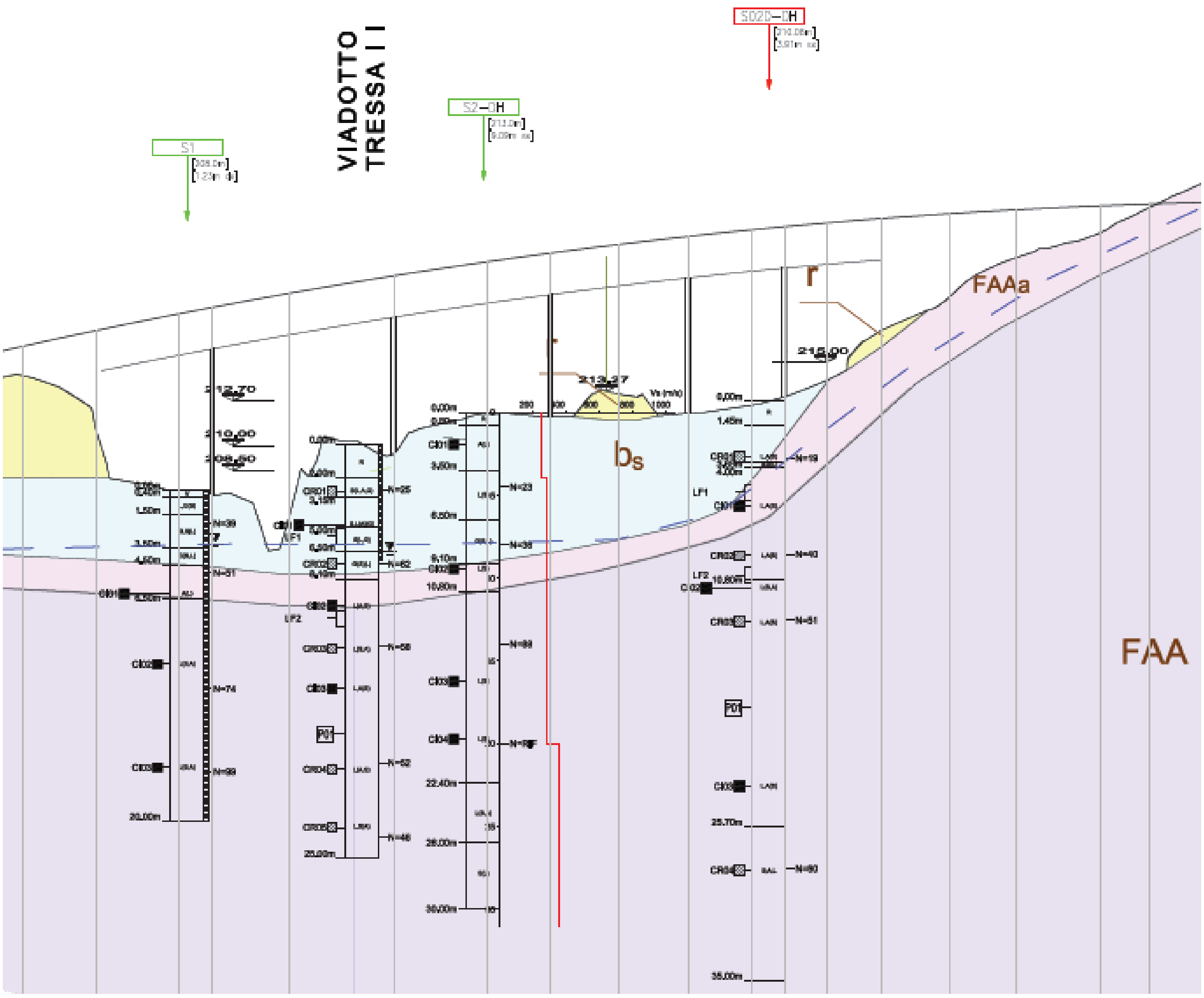


Figura 10: Profilo geotecnico

6 CRITERI DI CALCOLO

6.1 Descrizione dei criteri di calcolo

Le opere oggetto della presente relazione sono state progettate e calcolate secondo i metodi della scienza delle costruzioni, adottando per le verifiche il criterio degli stati limite (S.L.).
I criteri generali di sicurezza, le azioni di calcolo e le caratteristiche dei materiali sono stati assunti in conformità con il D.M. 17.01.2018 – “Aggiornamento delle norme tecniche per le costruzioni” e relativa circolare esplicativa (Circolare 21.01.2019 n. 7/C.S.LL.PP.).
Con riferimento alle NTC, per le opere in oggetto si considerano i seguenti parametri di calcolo:

6.1.1 Opere definitive

Vita nominale	V_N = 50 anni (§ 2.4.1 “Costruzioni con livelli di prestazioni ordinari”)
Classe d’uso	IV (§ 2.4.2, “Costruzioni con funzioni pubbliche o strategiche importanti, anche con riferimento alla gestione della protezione civile in caso di calamità. Industrie con attività particolarmente pericolose per l’ambiente. Reti viarie di tipo A o B, di cui al DM 5/11/2001, n. 6792, “Norme funzionali e geometriche per la costruzione delle strade”, e di tipo C quando appartenenti ad itinerari di collegamento tra capoluoghi di provincia non altresì serviti da strade di tipo A o B. Ponti e reti ferroviarie di importanza critica per il mantenimento delle vie di comunicazione, particolarmente dopo un evento sismico. Dighe connesse al funzionamento di acquedotti e a impianti di produzione di energia elettrica”)
Coefficiente d’uso	C_U = 2.0
Periodo di riferimento	$V_R = V_N \cdot C_U$ = 100 anni

6.1.2 Opere provvisorie

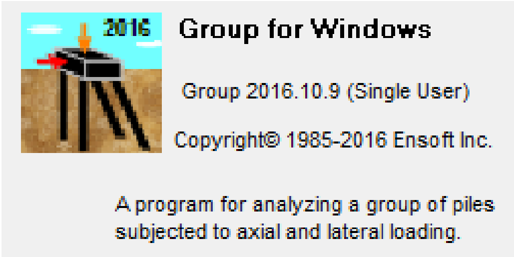
Vita nominale	V_N = 10 anni (§ 2.4.1 “Costruzioni temporanee e provvisorie”)
Classe d’uso	II Costruzioni il cui uso preveda normali affollamenti, senza contenuti pericolosi per l’ambiente e senza funzioni pubbliche e sociali essenziali. Industrie con attività non pericolose per l’ambiente. Ponti, opere infrastrutturali, reti viarie non ricadenti in Classe d’uso III o in Classe d’uso IV, reti ferroviarie la cui interruzione non provochi situazioni di emergenza. Dighe il cui collasso non provochi conseguenze rilevanti.”)
Coefficiente d’uso	C_U = 1.0
Periodo di riferimento	$V_R = V_N \cdot C_U$ = 10 anni → < 35 anni

6.2 Software di calcolo

Sono stati utilizzati i programmi di calcolo elencati nel seguito.
La scrivente ha esaminato preliminarmente la documentazione a corredo dei software per valutarne l’affidabilità e soprattutto l’idoneità al caso specifico. Tale documentazione, contiene una esauriente descrizione delle basi teoriche e degli algoritmi impiegati, l’individuazione dei campi d’impiego, nonché casi prova interamente risolti e commentati.
Il sottoscritto, inoltre, ha verificato l’affidabilità dei codici di calcolo attraverso un numero significativo di casi prova in cui i risultati dell’analisi numerica sono stati confrontati con soluzioni teoriche.

6.2.1 Calcolo palificate

Titolo:



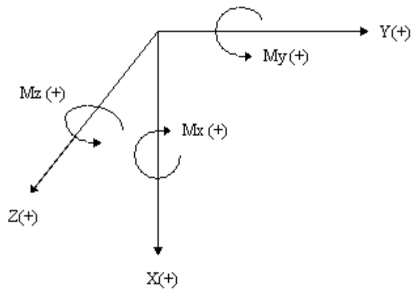
Caratteristiche: Programma per l’analisi di palificate soggette a carichi verticali e laterali
Autore: ENSOFT, INC. – Austin, Texas
Distribuzione: ENSOFT, INC.
Versione: 2016

6.2.1.1 Ipotesi generali di calcolo

Il programma consente di definire sia un modello bidimensionale, utilizzabile dove tale semplificazione risulti accettabile, sia tridimensionale. E’ possibile schematizzare pali verticali o inclinati, e si possono assumere vincoli del tipo a incastro, a cerniera o elastici tra la testa del palo e la fondazione. Il calcolo della palificata viene condotto ipotizzando che il plinto di fondazione sia infinitamente rigido.
Dove non diversamente specificato dall’utente, il programma è in grado di generare internamente curve di risposta non lineare del terreno, carico/cedimento (curve t-z) per condizioni di carico assiale, torsione/rotazione (M–θ) per condizioni di carico torsionali, e carico/spostamento orizzontale (curve P-y).
In particolare, le curve P-y di risposta del terreno, che esprimono la resistenza del terreno in funzione della profondità e dello spostamento del palo, possono essere ricavate in relazione alla tipologia di terreni e alle proprietà geomeccaniche che li caratterizzano, in accordo alle procedure proposte da:

- Reese, Cox e Koop [68] per sabbie
- Welch e Reese [71] per argille tenere
- Reese, Cox e Koop [69] per argille dure sotto falda
- Welch-Reese [71] e Reese-Welch [70] per argille dure sopra falda

Per quanto riguarda le curve carico/cedimento relative a condizioni di carico assiale, il programma genera internamente, in base alla natura del terreno, le curve di trasferimento del carico assiale in funzione dello spostamento verticale del palo; tali curve sono implementate sulla base di dati ricavati da numerosi studi effettuati su pali strumentati, realizzati in terreni di diversa natura.
L’effetto gruppo può essere simulato dal programma mediante la definizione di coefficienti riduttivi che intervengono sia sulle curve carico cedimento del palo, sia sulle curve P-y.
Nei calcoli delle palificate si considera un sistema di riferimento cartesiano, con l’asse Y parallelo all’asse longitudinale degli appoggi, l’asse Z ortogonale all’asse longitudinale degli appoggi e asse X ortogonale agli assi Z e Y e diretto verso il basso.



6.2.2 Verifica sezioni strutturali generiche

Titolo:

Caratteristiche:	Programma per la verifica delle sezioni generiche
Autore:	Aztec Informatica - Casole Bruzio, Cosenza
Distribuzione:	Aztec Informatica S.r.l.
Versione:	10.03a

6.2.3 Calcolo paratie di sostegno

Titolo:

PARATIE plus™ by CeAS

Version 18.1.3
paratieplus.com
Developed by
Ce.A.S. s.r.l. (ITALY)
with the scientific supervision of
Roberto Nova - professor of SOIL MECHANICS
at Politecnico di Milano (ITALY)
User Interface created in assistance with
eFarm Group s.r.l.

Caratteristiche:	Programma nonlineare ad elementi finiti per l'analisi di strutture di sostegno flessibili
Autore:	Ce.A.S. s.r.l. – Milano
Distribuzione:	Harpaceas s.r.l. - Milano
Versione:	18.1.3

L'analisi strutturale delle paratie è stata svolta mediante il codice di calcolo PARATIE PLUS® 18.0 distribuito dalla Harpaceas.
PARATIE® è un codice agli elementi finiti che simula il problema di uno scavo sostenuto da diaframmi flessibili e permette di valutare il comportamento della parete di sostegno durante tutte le fasi intermedie e nella configurazione finale. Il problema e visto ad un problema piano in cui viene analizzata una "fetta" di parete di larghezza unitaria e quindi risulta idoneo a studiare problemi in cui vi siano importanti effetti tridimensionali.
La modellazione numerica dell'interazione terreno-struttura e del tipo "trave su suolo elastico", dove le pareti di sostegno vengono rappresentate con elementi finiti trave il cui comportamento e definito dalla rigidezza flessionale EJ, mentre il terreno viene simulato attraverso elementi elastoplastici monodimensionali (molle) connessi ai nodi delle paratie: ad ogni nodo convergono uno o al massimo due elementi terreno.

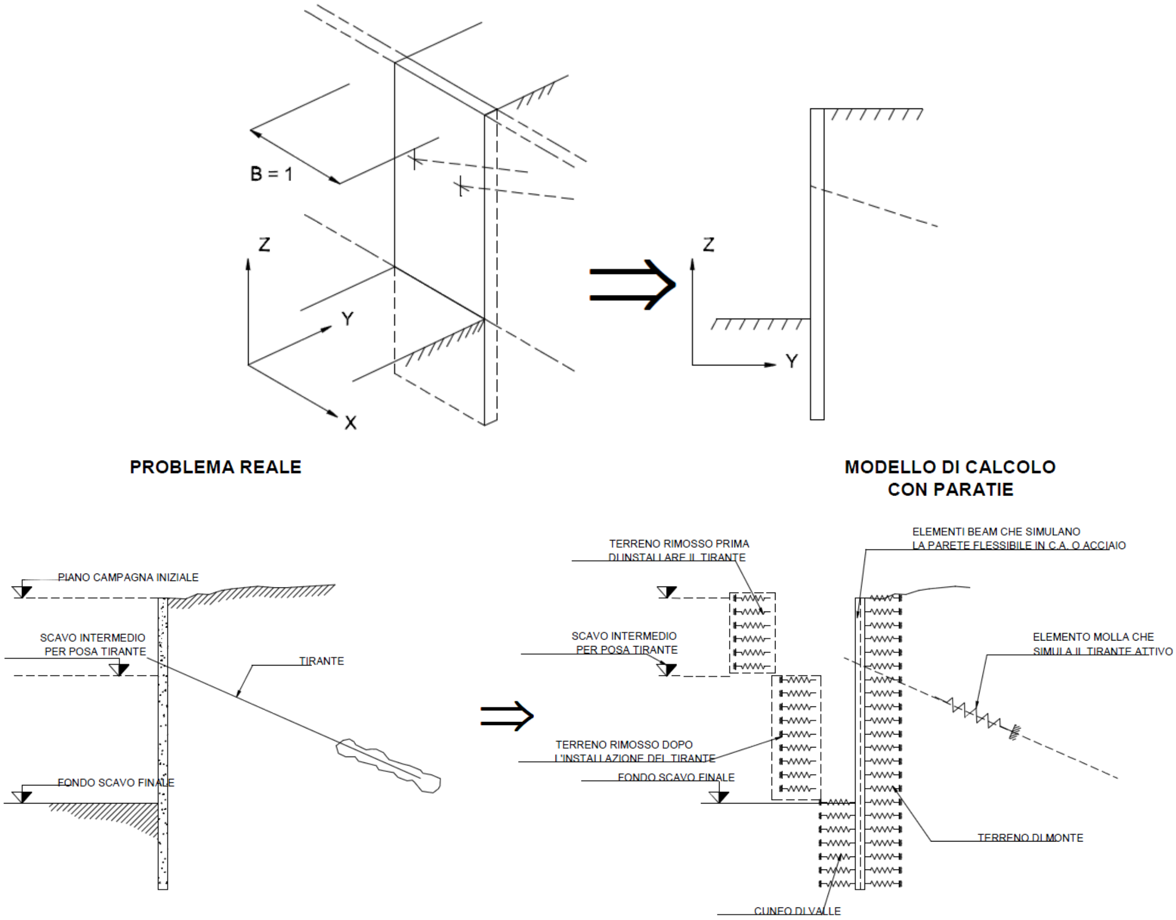


Figura 11: Schema teorico del modello di calcolo

Il limite di questo schema sta nell'ammettere che ogni porzione di terreno, schematizzata da una "molla", abbia comportamento del tutto indipendente dalle porzioni adiacenti; l'interazione fra le varie regioni di terreno e affidata alla rigidezza flessionale della parete.
La realizzazione dello scavo sostenuto da una o due paratie, eventualmente tirantate, viene seguita in tutte le varie fasi attraverso un'analisi statica incrementale. Poiché il comportamento degli elementi finiti e di tipo elasto-plastico, ogni configurazione dipende in generale dalle configurazioni precedenti e lo sviluppo di deformazioni plastiche ad un certo passo condiziona la risposta della struttura nei passi successivi. La soluzione ad ogni nuova configurazione (step) viene raggiunta attraverso un calcolo iterativo alla Newton-Raphson (Bathe (1996)).
L'analisi ha lo scopo di indagare la risposta strutturale in termini di deformazioni laterali subite dalla parete durante le varie fasi di scavo e di conseguenza la variazione delle pressioni orizzontali nel terreno. Per far questo, in ogni nodo sono definiti due soli gradi di libertà, lo spostamento orizzontale e la rotazione attorno all'asse X ortogonale al piano della struttura (positiva se antioraria).
Con questa impostazione gli sforzi verticali nel terreno sono indipendenti, ovvero non sono influenzati dal comportamento deformativo orizzontale, ma solo basati sulle classiche ipotesi di distribuzione geostatica.

6.2.3.1 Ipotesi generali di calcolo

Le analisi vengono svolte considerando le seguenti ipotesi:

Stato piano nelle deformazioni (paratia di lunghezza infinita);

Terreno modellato come un letto di molle con legame costitutivo elastico-perfettamente plastico con criterio di rottura di Mohr-Coulomb;

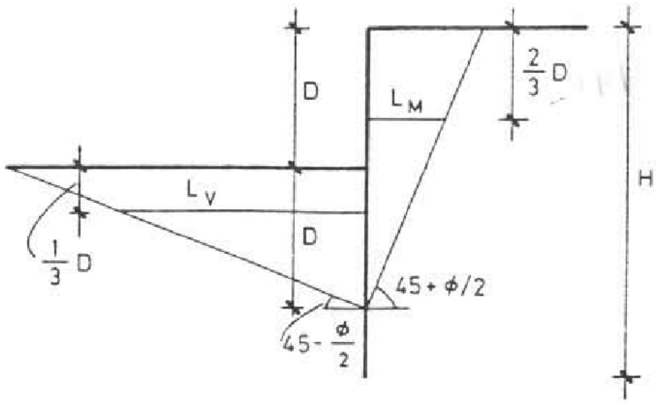
Struttura discretizzata in elementi perfettamente elastici, nel caso di elementi discreti (pali), rigidezza flessionale pari a quella di una sezione rettangolare a inerzia equivalente;

Falda introdotta definendo le quote piezometriche di valle e di monte (modificabili nell'analisi);

Deformabilità del terreno con molle di rigidezza secondo il seguente modello (Becci & Nova, 1987):

$$K = E \cdot \frac{\Delta}{L}$$

E	Modulo di rigidezza del terreno (E_{VC}, E_{UR} a seconda della storia tensionale)
Δ	Passo di discretizzazione della struttura
$L_M = \frac{2}{3} \cdot min(H; 2 \cdot D) \cdot tan\left(45 - \frac{\varphi}{2}\right)$	Grandezza geometrica caratteristica zona attiva di monte
$L_V = \frac{2}{3} \cdot min(H - D; D) \cdot tan\left(45 + \frac{\varphi}{2}\right)$	Grandezza geometrica caratteristica zona attiva di valle



Sovraccarichi a monte ed a valle della paratia trasformati in spinte sul paramento in accordo a quanto previsto dalla teoria elastica (semispazio elastico omogeneo).

7 CRITERI DI VERIFICA

7.1 Combinazioni di carico

Le opere oggetto della presente relazione Come riportato al §2.5.3 delle [55], si sono considerate le seguenti combinazioni delle azioni:

$\gamma_{G1} \cdot G_1 + \gamma_{G2} \cdot G_2 + \gamma_P \cdot P + \gamma_{Q1} \cdot Q_{k1} + \sum_{j=2}^{n} \gamma_{Qj} \cdot \Psi_{0j} \cdot Q_{kj}$	Combinazione fondamentale SLU
$G_1 + G_2 + P + Q_{k1} + \Psi_{02} \cdot Q_{k2} + \sum_{j=3}^{n} \Psi_{0j} \cdot Q_{kj}$	Combinazione caratteristica rara SLE
$G_1 + G_2 + P + \Psi_{11} \cdot Q_{k1} + \sum_{j=2}^{n} \Psi_{2j} \cdot Q_{kj}$	Combinazione frequente SLE
$G_1 + G_2 + P + \sum_{j=1}^{n} \Psi_{2j} \cdot Q_{kj}$	Combinazione quasi permanente SLE
$E + G_1 + G_2 + P + \sum_{j=1}^{n} \Psi_{2j} \cdot Q_{kj}$	Combinazione sismica SLE e SLU
$G_1 + G_2 + P + A_d + \sum_{j=1}^{n} \Psi_{2j} \cdot Q_{kj}$	Combinazione eccezionale SLU
G_1	Masse dei pesi propri strutturali
G_2	Masse dei carichi permanenti non strutturali
P	Precompressione e pretensione
Q_{ki}	Masse dei carichi accidentali
E	Azione sismica
A_d	Azione eccezionale

A I coefficienti di contemporaneità delle azioni e i coefficienti parziali da adottare per gli SLU sono riportati nel seguito.

Tab. 2.6.I – *Coefficienti parziali per le azioni o per l'effetto delle azioni nelle verifiche SLU*

		Coefficiente γ_F	EQU	A1	A2
Carichi permanenti G_1	Favorevoli	γ_{G1}	0,9	1,0	1,0
	Sfavorevoli		1,1	1,3	1,0
Carichi permanenti non strutturali G_2(1)	Favorevoli	γ_{G2}	0,8	0,8	0,8
	Sfavorevoli		1,5	1,5	1,3
Azioni variabili Q	Favorevoli	γ_{Qi}	0,0	0,0	0,0
	Sfavorevoli		1,5	1,5	1,3

Tab. 2.5.I – *Valori dei coefficienti di combinazione*

Categoria/Azione variabile	Ψ_{0j}	Ψ_{1j}	Ψ_{2j}
Categoria A - Ambienti ad uso residenziale	0,7	0,5	0,3
Categoria B - Uffici	0,7	0,5	0,3
Categoria C - Ambienti suscettibili di affollamento	0,7	0,7	0,6
Categoria D - Ambienti ad uso commerciale	0,7	0,7	0,6
Categoria E – Aree per immagazzinamento, uso commerciale e uso industriale Biblioteche, archivi, magazzini e ambienti ad uso industriale	1,0	0,9	0,8
Categoria F - Rimesse , parcheggi ed aree per il traffico di veicoli (per autoveicoli di peso ≤ 30 kN)	0,7	0,7	0,6

Categoria G – Rimesse, parcheggi ed aree per il traffico di veicoli (per autoveicoli di peso > 30 kN)	0,7	0,5	0,3
Categoria H - Coperture accessibili per sola manutenzione	0,0	0,0	0,0
Categoria I – Coperture praticabili	da valutarsi caso per caso		
Categoria K – Coperture per usi speciali (impianti, eliporti, ...)			
Vento	0,6	0,2	0,0
Neve (a quota ≤ 1000 m s.l.m.)	0,5	0,2	0,0
Neve (a quota > 1000 m s.l.m.)	0,7	0,5	0,2
Variazioni termiche	0,6	0,5	0,0

7.2 Verifica di resistenza Stati Limite Ultimi strutturali (SLU STR)

7.2.1 Sezioni in cemento armato

Come riportato al §2.3 delle [55], per ogni stato limite ultimo deve essere rispettata la condizione:

$$E_d \leq R_d$$

$E_d = E(\gamma_F \cdot F_k; X_k/\gamma_M \,; a_d)$ Valore di progetto dell’azione o dell’effetto dell’azione

$R_d = R(\gamma_F \cdot F_k; X_k/\gamma_M \,; a_d)$ Valore di progetto della resistenza del sistema geotecnico

$\gamma_F \cdot F_k$ Azioni di progetto

X_k/γ_M Proprietà del materiale di progetto

a_d Geometria di progetto

γ_M Coefficiente parziale di sicurezza del materiale

7.2.1.1 Verifica a presso/tenso flessione

Come previsto al §4.1.2.1.2.4 delle [55] con riferimento alla generica sezione, la verifica di resistenza allo SLU si esegue controllando che:

$$M_{Rd} = M_{Rd}(N_{Ed}) \geq M_{Ed}$$

M_{Rd} Valore di calcolo del momento resistente corrispondente a N_{Ed}

N_{Ed} Valore di calcolo della componente assiale (sforzo normale)

M_{Ed} Valore di calcolo della componente flettente dell’azione

7.2.1.2 Verifica a taglio

Secondo quanto previsto §4.1.2.1.3 delle [55], indicato con V_{Ed} il valore di calcolo dello sforzo di taglio agente allo SLU, si verifica in generale che risulti:

$$V_{Ed} < V_{Rd}$$

Elementi senza armature resistenti a taglio

$$V_{Rd,c} = max\left\{\left(0.18 \cdot k \cdot \frac{\sqrt[3]{100 \cdot \rho_l \cdot f_{ck}}}{\gamma_c} + 0.15 \cdot \sigma_{cp}\right) \cdot b_w \cdot d; \left(v_{min} + 0.15 \cdot \sigma_{cp}\right) \cdot b_w \cdot d\right\}$$ Resistenza di calcolo a taglio

$k = 1 + \sqrt{\frac{200}{d} \leq 2}$

$v_{min} = 0.035 \cdot \sqrt{k^3} \cdot \sqrt{f_{ck}}$

$\rho_l = \frac{A_{sl}}{b_w \cdot d} \leq 0.02$	Rapporto percentuale armatura in zona tesa A_{sl}
$\sigma_{cp} = \frac{N_{Ed}}{A_c} \leq 0.2 \cdot f_{cd}$	Tensione media di compressione nella sezione
d	Altezza utile della sezione (mm)
b_w	Larghezza minima della sezione (mm)

Elementi provvisti di armature resistenti a taglio

$V_{Rd} = min\left(V_{Rd,s}; V_{Rd,max}\right)$	Resistenza di calcolo a taglio
$V_{Rd,s} = 0.9 \cdot d \cdot \frac{A_{sw}}{s} \cdot f_{yd} \cdot (\cot \alpha + \cot \theta) \cdot \sin \alpha$	Resistenza a taglio-trazione
$V_{Rd,max} = 0.9 \cdot d \cdot b_w \cdot \alpha_c \cdot f'_{cd} \cdot \frac{(\cot \alpha + \cot \theta)}{1 + cot^2 \theta}$	Resistenza a taglio-compressione
θ	Inclinazione puntoni di calcestruzzo rispetto all’asse dell’elemento $(1 \leq \cot \theta \leq 2.5)$
α	Inclinazione dell’armatura trasversale rispetto all’asse dell’elemento
A_{sw}	Area dell’armatura trasversale
s	Interasse tra due armature trasversali consecutive
$f'_{cd} = 0.5 \cdot f_{cd}$	Resistenza a compressione ridotta del calcestruzzo d’anima
α_c	Coefficienti maggiorativi pari a:
1	per membrature non compresse
$1 + \sigma_{cp}/f_{cd}$	per $0 \leq \sigma_{cp} < 0.25 \cdot f_{cd}$

1.25	per $0.25 \cdot f_{cd} \leq \sigma_{cp} < 0.50 \cdot f_{cd}$
$2.5 \cdot (1 - \sigma_{cp}/f_{cd})$	per $0.50 \cdot f_{cd} \leq \sigma_{cp} < f_{cd}$

7.2.2 Sezioni in acciaio

Nelle verifiche strutturali delle paratie armate con profili in acciaio si considera reagente la sola armatura dei profili in acciaio.
I criteri per la verifica della resistenza delle sezioni sono riportati ai §4.2, §4.3 del [55] e relative istruzioni, gli Eurocodici [39], [41] e [47], i quali sono riportati nel seguito.

7.2.2.1 Verifica a flessione

$M_{c,Rd} > M_{Ed}$

M_{Ed}		Momento flettente sollecitante
$M_{c,Rd} =$	$M_{pl,Rd} = W_{pl} \cdot f_{yd}$	Momento resistente sezione classe 1 e 2
	$M_{el,Rd} = W_{el} \cdot f_{yd}$	Momento resistente sezione classe 3
	$= W_{eff} \cdot f_{yd}$	Momento resistente sezione classe 4
W_{pl}		Modulo resistente plastico sezione
W_{el}		Modulo resistente elastico sezione
W_{eff}		Modulo resistente efficace sezione
$f_{yd} = \frac{f_{yk}}{\gamma_{M0}}$		Resistenza di progetto acciaio
f_{yk}		Resistenza caratteristica acciaio
γ_{M0}		Coefficiente di sicurezza resistenza acciaio

7.2.2.2 Verifica a taglio

$V_{c,Rd} > V_{Ed}$

V_{Ed}	Taglio sollecitante
$V_{c,Rd} = A_v \cdot \frac{f_{yd}}{\sqrt{3}}$	Taglio resistente sezione
A_v	Area resistente di taglio

7.2.2.3 Verifica a flessione e taglio

Se il taglio di calcolo V_{Ed} associato al momento flettente di calcolo M_{Ed} è inferiore a metà della resistenza di calcolo a taglio $V_{Ed} \leq 0.5 * V_{c,Rd}$ si può trascurare l'influenza del taglio sulla resistenza a flessione.
Se invece non si verifica questa condizione si ha:

$f_{yd}' = f_{yd} \cdot (1 - \rho)$	Resistenza di progetto ridotta acciaio

$$\rho = \left(\frac{2 \cdot V_{Ed}}{V_{c,Rd}} - 1\right)^2$$

7.2.3 Risultati verifiche PARATIE®

Le verifiche strutturali vengono eseguite automaticamente in PARATIE® e riportate negli allegati di calcolo, a cui si rimanda per ulteriori dettagli, espressi con i seguenti tassi di sfruttamento delle armature:

$TSM = M_{Ed}/M_{c,Rd} < 1.00$ Tasso di sfruttamento a momento
$TSV = V_{Ed}/V_{c,Rd} < 1.00$ Tasso di sfruttamento a taglio

7.3 Verifiche Stati Limite Ultimi geotecnici (SLU GEO)

Le verifiche devono essere effettuate con riferimento almeno ai seguenti stati limite, quando pertinenti:

- collasso per rotazione intorno a un punto dell’opera (atto di moto rigido)
- instabilità globale del complesso opera di sostegno-terreno
- collasso per carico limite dell’insieme fondazione-terreno di posa
- collasso per scorrimento sul piano di posa
- sfilamento di uno o più ancoraggi

Gli approcci previsti nelle [55] per le verifiche allo SLU, tenendo conto dei valori dei coefficienti parziali, sono i seguenti:

Stabilità globale	Approccio 1	(SLU, SLV, SLC)	Combinazione 2	A2+M2+R2
Altre verifiche	Approccio 2	(SLU, SLV, SLC)		A1+M1+R3

Tab. 6.8.I - *Coefficienti parziali per le verifiche di sicurezza di opere di materiali sciolti e di fronti di scavo*

COEFFICIENTE	R2
γ_R	1,1

Tab. 6.5.I - *Coefficienti parziali γ_R per le verifiche agli stati limite ultimi di muri di sostegno*

Verifica	Coefficiente parziale (R3)
Capacità portante della fondazione	$\gamma_R = 1,4$
Scorrimento	$\gamma_R = 1,1$
Ribaltamento	$\gamma_R = 1,15$
Resistenza del terreno a valle	$\gamma_R = 1,4$

Figura 12: Coefficienti parziali di sicurezza per le verifiche geotecniche (NTC 2018)

Tab. 6.2.II – *Coefficienti parziali per i parametri geotecnici del terreno*

Parametro	Grandezza alla quale applicare il coefficiente parziale	Coefficiente parziale γ_M	(M1)	(M2)
Tangente dell’angolo di resistenza al taglio	$\tan \varphi'_k$	$\gamma_{\varphi'}$	1,0	1,25
Coesione efficace	c'_k	$\gamma_{c'}$	1,0	1,25
Resistenza non drenata	c_{uk}	γ_{cu}	1,0	1,4
Peso dell’unità di volume	γ_γ	γ_γ	1,0	1,0

Figura 13: Coefficienti parziali di sicurezza per i parametri di resistenza del terreno (NTC 2018)

7.3.1 Verifica collasso per rotazione rigida

7.3.1.1 Risultati verifiche PARATIE®

La verifica al collasso per rotazione rigida al piede viene implicitamente svolta nella combinazione statica A2+M2+R2 e sismica SLU SLV nell’analisi di interazione terreno struttura implementata all’interno di PARATIE®.
Nella successione delle fasi di scavo infatti, si verificano le condizioni di equilibrio del sistema per le quali la resistenza passiva R_p al piede della paratia è tale per cui:

$$\frac{R_{p,mob,k}}{\gamma_R} < R_{p,disp,k}$$

$R_{p,mob,k}$	Resistenza passiva mobilitata caratteristica nella fase di scavo
$R_{p,mob,k}$	Resistenza passiva disponibile caratteristica nella fase di scavo
γ_R	Coefficiente sicurezza resistenza passiva (tab. 6.5.I [55])

Le verifiche vengono eseguite automaticamente in PARATIE® e riportate negli allegati di calcolo, a cui si rimanda per ulteriori dettagli, espresse con il seguente parametro di % mobilitazione della spinta passiva:

$$\frac{Spinta\ reale\ efficace}{Spinta\ passiva} = \frac{\frac{R_{p,mob,k}}{\gamma_R}}{R_{p,disp,k}} < 1.00$$

7.3.2 Verifica di stabilità globale insieme terreno-opera (SLU GEO)

7.3.2.1 Risultati verifiche PARATIE®

Si fa ricorso ad un modello semplificato basato sulla nota teoria dell’equilibrio limite nell’ambito della quale i terreni sono stati caratterizzati mediante un legame costitutivo rigido-plastico con criterio di rottura di Mohr-Coulomb (analisi in termini di sforzi efficaci).
Tale approccio consente di definire un fattore di sicurezza di stabilità globale FS, convenzionalmente valutato come rapporto tra le forze di taglio τ_f potenzialmente mobilitabili lungo la superficie di rottura analizzata e le forze di taglio τ effettivamente mobilitate sotto l’azione delle forze agenti sull’ammasso (pesi propri, carichi esterni, ecc.):

$$FS = \frac{\tau_f}{\tau}$$

La resistenza al taglio agente lungo la superficie di scivolamento necessaria all’equilibrio è calcolata attraverso l’equazione della statica. Il coefficiente di sicurezza è inteso come il fattore per il quale possono essere divisi i parametri di resistenza meccanica del materiale per portare il pendio alle condizioni di equilibrio limite, implicitamente assunto costante lungo tutta la superficie di scivolamento.
Come prescritto dalla normativa la verifica viene effettuata secondo la Combinazione 2 (A2+M2+R2).

7.3.3 Verifiche di resistenza dei tiranti di ancoraggio (SLU STR-GEO)

Con riferimento con quanto prescritto al §6.6 delle [55] e nelle Raccomandazioni AICAP 2012, la verifica a sfilamento della fondazione dell’ancoraggio si esegue confrontando la massima azione di progetto P_d, considerando tutti gli stati limite, con la resistenza di progetto R_{ad}, determinata applicando alla resistenza caratteristica R_{ak} i fattori parziali γ_R:

$P_d < R_{ad}$

$P_d = N_{MAX}$ Tiro massimo di progetto ancoraggio allo SLU

N_{MAX}	Tiro massimo di calcolo statico e sismico derivato dalla analisi SLU
$R_{ad} = R_{ak}/\gamma_R$	Resistenza di progetto dell'ancoraggio
$R_{ak} = \pi \cdot \emptyset \cdot \tau_{lim} \cdot L_B$	Resistenza caratteristica di calcolo dell'ancoraggio
$\gamma_R = 1.10$	Coefficiente di sicurezza sulle resistenze (tiranti temporanei)
$\emptyset$	Diametro nominale di perforazione
τ_{lim}	Attrito unitario limite del bulbo di fondazione
L_B	Lunghezza del bulbo di fondazione

	SIMBOLO γ_R	COEFFICIENTE PARZIALE
Temporanei	$\gamma_{Ra,t}$	1,1
Permanenti	$\gamma_{Ra,p}$	1,2

Figura 14: Coefficienti parziali per la resistenza di ancoraggi

7.3.3.1 Resistenza di progetto da tiranti di prova

Il valore di R_{ak} si può determinare da risultati di prove di progetto su ancoraggi di prova come il minore tra i valori derivanti dall'applicazione dei fattori di correlazione al valor medio e al valor minimo delle resistenze $R_{a,m}$ misurate.

$$R_{ak} = min\left\{\frac{(R_{am})_{medio}}{\xi_{a1}};\frac{(R_{am})_{min}}{\xi_{a2}}\right\}$$

$(R_{ak})_{medio}$	Resistenza di calcolo dedotta dai valori medi misurati dalle prove
$(R_{ak})_{min}$	Resistenza di calcolo dedotta dai valori minimi misurati dalle prove

Tab. 6.6.II - *Fattori di correlazione per derivare la resistenza caratteristica da prove di progetto, in funzione del numero degli ancoraggi di prova*

Numero degli ancoraggi di prova	1	2	> 2
ξ_{a1}	1,5	1,4	1,3
ξ_{a2}	1,5	1,3	1,2

Figura 15: Fattori di correlazione in funzione del numero di prove

7.3.3.2 Resistenza di progetto con metodi analitici

R_{ak} può essere valutata con metodi di calcolo analitici, dai valori caratteristici dei parametro geotecnici dedotti dai risultati di prove in sito o in laboratorio: è il minore dei valori derivanti dall'applicazione dei fattori di correlazione al valor medio e al valor minimo di $R_{a,c}$ ottenute dal calcolo:

$$R_{ak} = min\left\{\frac{(R_{ac})_{medio}}{\xi_{a3}};\frac{(R_{ac})_{min}}{\xi_{a4}}\right\}$$

$(R_{ac})_{medio}$	Resistenza di calcolo dedotta dai valori medi del terreno
$(R_{ac})_{min}$	Resistenza di calcolo dedotta dai valori minimi del terreno

Tab. 6.6.III - *Fattori di correlazione per derivare la resistenza caratteristica dalle prove geotecniche, in funzione del numero n di profili di indagine*

Numero di profili di indagine	1	2	3	4	≥ 5
ξ_{a3}	1,80	1,75	1,70	1,65	1,60
ξ_{a4}	1,80	1,70	1,65	1,60	1,55

Figura 16: Fattori di correlazione in funzione del numero di profili di indagine

Nella valutazione analitica della resistenza allo sfilamento degli ancoraggi non si applicano coefficienti parziali di sicurezza sui valori caratteristici della resistenza del terreno; si fa quindi riferimento ai coefficienti parziali di sicurezza M1.

7.3.3.3 Attrito limite

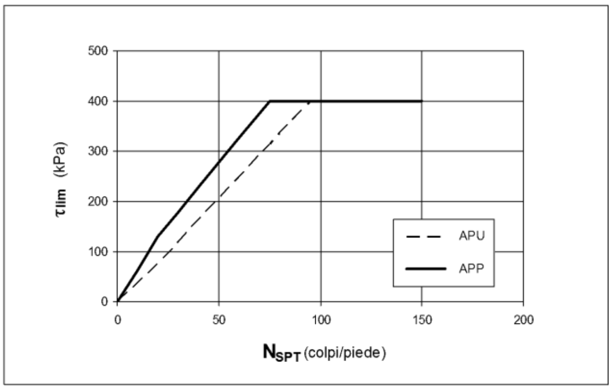
Il valore dell’attrito unitario limite τ_{LIM} per bulbi di fondazione iniettati in pressione è condizionato dalla natura e grado di addensamento/compattezza dei terreni di fondazione, nonché, in misura assai rilevante, dalle modalità esecutive delle fondazioni stesse.
Secondo le raccomandazioni AICAP 2012 sui tiranti di ancoraggio e il metodo di Bustamante e Doix, nelle figure seguenti sono riportati i valori di riferimento per iniezioni ad alta pressione (APP) e iniezioni a bassa pressione o a gravità (APU).
Nel caso APP, nella valutazione della portata laterale limite si terrà conto di un diametro D’ di calcolo maggiorato rispetto a quello nominale di perforazione D, valutato mediante l'espressione seguente:

$D' = \alpha \cdot D$

D	Diametro nominale di perforazione
α	Coefficiente empirico (cfr. tabella seguente)

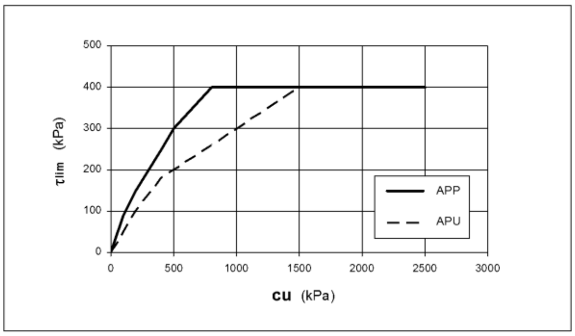
	tipo di terreno	tipo di iniezione	
		APP	APU
coefficiente α (D* = α D)	ghiaia	**1,6-1,8**	**1,2-1,4**
	limo	**1,4-1,6**	**1,1-1,2**
	argilla (N_{SPT}<20colpi/piede)	**1,6-2,0**	**1,1-1,2**
	argilla (N_{SPT}>30colpi/piede)	**1.2**	**1**

Figura 17: Coefficiente α



APP	N_{SPT} (colpi/piede)	$\tau_{lim, AP}$ (kPa)
	Nspt<20	6.5Nspt
	20<Nspt<75	130+4.9(Nspt-20)
	Nspt>75	400
APU	**N_{SPT}** (colpi/piede)	**$\tau_{lim, AP}$** (kPa)
	Nspt<20	6.5Nspt
	20<Nspt<90	130+4.9(Nspt-20)
	Nspt>90	400

Figura 18: Terreni granulari - $\tau_{LIM,AP}$ = f (NSPT)



APP	cu (kPa)	$\tau_{lim, AP}$ (kPa)
	cu<100	0.9cu
	100<cu<200	90+0.6(cu-100)
	200<cu<500	150+0.5(cu-200)
	500<cu<800	300+0.333(cu-500)
	cu>800	400
APU	**cu** (kPa)	**$\tau_{lim, AP}$** (kPa)
	cu<200	0.5cu
	200<cu<400	100+0.4(cu-200)
	400<cu<1500	180+0.2(cu-400)
	cu>1500	400

Figura 19: Terreni coesivi - $\tau_{LIM,AP}$ = f (Cu)

Tab. 6.5 - Scelta dei valori di q_s in funzione del terreno e della tecnica esecutiva

Terreno	Tipo di iniezione		Figura corrispondente
	IRS ($p_i \geq p_l$)	IGU ($p_i < p_l$)	
Ghiaia Ghiaia sabbiosa Sabbia ghiaiosa Sabbia grossa Sabbia media Sabbia fine Sabbia limosa	SG.1	SG.2	Fig. 6.6
Limo Argilla	AL.1	AL.2	Fig. 6.7
Marna Calcari marnosi Calcari alterati o fratturati	MC.1	MC.2	Fig. 6.8
Roccia alterata e/o fratturata	≥ R.1	≥ R.2	Fig. 6.9

IRS: *iniezione ad alta pressione a più stadi e ripetuta*
IGU: *iniezione a bassa pressione in unica soluzione*
p_l: *pressione limite dalla prova pressiometrica Menard*
p_i: *pressione di iniezione*

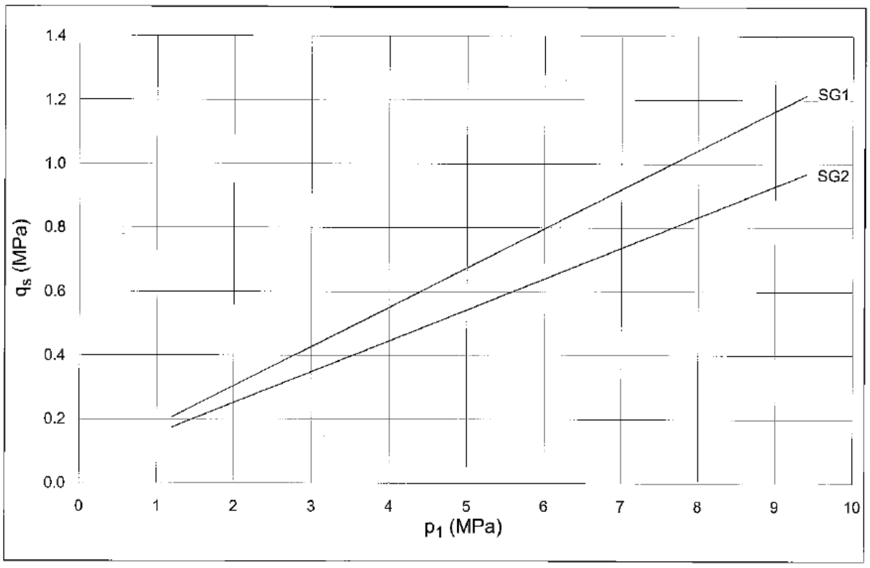


Fig. 6.9 - Resistenza unitaria limite per rocce tenere e fratturate

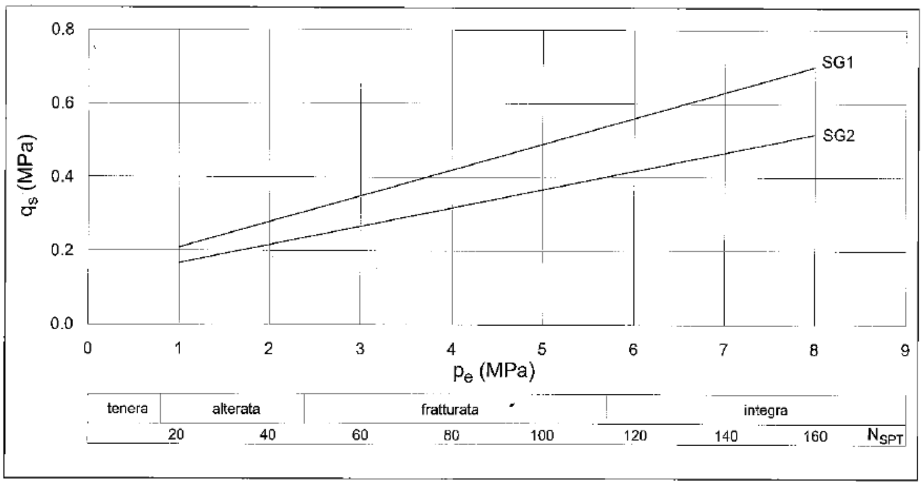


Fig. 6.8 - Resistenza unitaria limite per le marne ed i calcari

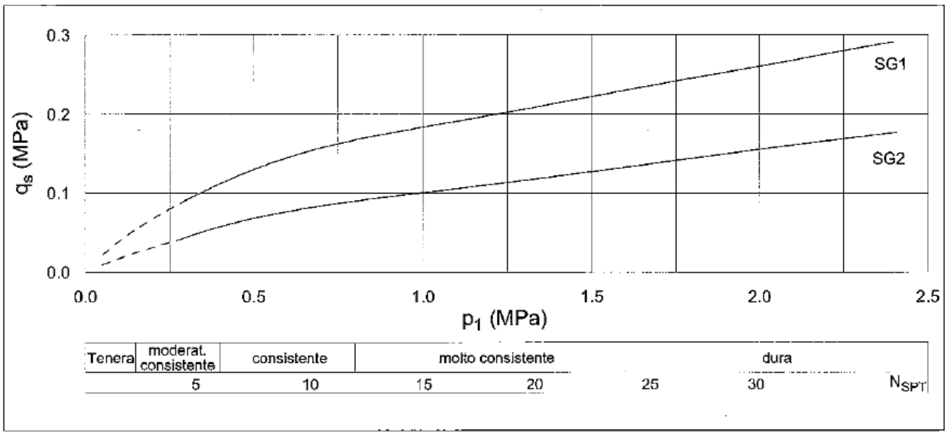


Fig. 6.7 - Resistenza unitaria limite per terreni a grana fine

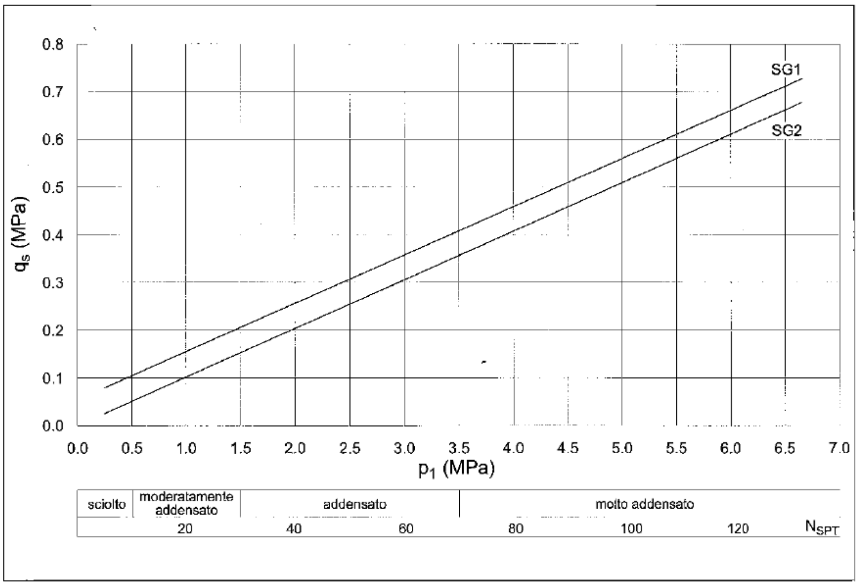


Fig. 6.6 - Resistenza unitaria limite per terreni incoerenti

Figura 20: Tabelle di correlazione AICAP 2012 in funzione di NSPT (sabbie, ghiaie) o letture pressiometriche (rocce)

7.3.3.4 Verifica di stabilità della fondazione dell’ancoraggio (lunghezza libera)

Per far si che il bulbo di fondazione sia ubicato in una porzione di terreno stabile non soggetto a movimenti, la lunghezza libera del tirante deve essere tale da superare la superficie di scivolamento del terreno. Questa superficie, definita convenzionalmente dall’intersezione con un piano inclinato di 45-φ/2 sulla verticale, parallelo al piano passante per il piede della paratia e da esso distante 0.20*H1, determina la seguente lunghezza libera critica statica $L_{L,s}$:

$$L_{L,s} = 0.20 \cdot \frac{H1}{\cos\left(45 - \alpha - \frac{\varphi}{2}\right)} + \frac{(H1 + H2 + HT) \cdot \sin\left(45 - \frac{\varphi}{2}\right)}{\sin\left(45 + \alpha + \frac{\varphi}{2}\right)}$$ Lunghezza libera critica statica

α	Inclinazione orizzontale del tirante
φ	Angolo di attrito medio dei terreni (definisce la geometria del cuneo di spinta)
$H1$	Altezza fuori scavo della paratia
$H2$	Altezza entro scavo della paratia (infissione)
HT	Profondità del tirante da testa paratia

Secondo il §7.11.6.4 delle [55], in condizioni sismiche la lunghezza libera critica $L_{L,e}$ dei tiranti deve essere:

$L_L > L_{L,e} > L_{L,s}$

7.3.3.5 Verifica di resistenza strutturale dei tiranti di ancoraggio

Con riferimento al criterio della gerarchia delle resistenze prescritto nelle [55], nelle Raccomandazioni AICAP 2012 si ha la verifica della seguente condizione:

$R_{ak} \cdot \gamma_{Rd} \leq R_{td}$

R_{ak}	Resistenza a sfilamento massima dell’ancoraggio
$\gamma_{Rd} = 1.00$	Coefficiente di sovraresistenza ancoraggio
R_{td}	Resistenza di progetto dell’armatura dell’ancoraggio

Tirante a trefoli Y1670/1860

$R_{td} = n \cdot A_{tref} \cdot \frac{f_{p(1)k}}{\gamma_s}$	Resistenza a snervamento di progetto dell’armatura attiva
$f_{p(1)k} = 1670MPa$	Tensione a snervamento caratteristica al 1% di deformazione totale
n	Numero di trefoli
$A_{tref} = 139mm^2$	Area della sezione resistente del singolo trefolo
$\gamma_s = 1.15$	Coefficiente di sicurezza per l’armatura dell’ancoraggio

7.3.3.6 Risultati verifiche PARATIE®

Le verifiche specifiche degli ancoraggi vengono eseguite automaticamente in PARATIE® e riportate negli allegati di calcolo, a cui si rimanda per ulteriori dettagli, espresse con i seguenti parametri:

Nome tirante		
Stage		
Sollecitazione	N_{Ed}	Azione sollecitante di calcolo sull’ancoraggio
Resistenza GEO	$R_{ad} = \frac{R_{ak}}{\xi_a \cdot \gamma_R}$	Resistenza di progetto dell’ancoraggio
Resistenza STR	R_{td}	Resistenza di calcolo a trazione dell’armatura attiva
Ratio GEO	N_{Ed}/R_{ad}	Tasso sfruttamento della resistenza GEO ancoraggio
Ratio STR	N_{Ed}/R_{td}	Tasso sfruttamento della resistenza dell’armatura attiva
Resistenza		Controllo del superamento delle verifiche di resistenza
Gerarchia Resistenze	$R_{td} > R_{ad}$	Controllo della verifica della gerarchia delle resistenze

7.3.4 Verifica di capacità portante al carico limite dei pali (SLU GEO)

I valori caratteristici delle resistenze R_k sono ottenuti applicando i fattori di correlazione ξ_3 e ξ_4 funzione del numero di verticali d’indagine rappresentative, riportati nella tabella seguente, alle resistenze di calcolo R_{cal}.

$R_{c,k} = min\left\{\frac{(R_{c,cal})_{media}}{\xi_3}; \frac{(R_{c,cal})_{min}}{\xi_4}\right\}$ Valore caratteristico della resistenza a compressione

$R_{t,k} = min\left\{\frac{(R_{t,cal})_{media}}{\xi_3};\frac{(R_{t,cal})_{min}}{\xi_4}\right\}$ Valore caratteristico della resistenza a trazione

Tab. 6.4.IV - *Fattori di correlazione ξ per la determinazione della resistenza caratteristica in funzione del numero di verticali indagate*

Numero di verticali indagate	1	2	3	4	5	7	≥ 10
ξ_3	1,70	1,65	1,60	1,55	1,50	1,45	1,40
ξ_4	1,70	1,55	1,48	1,42	1,34	1,28	1,21

7.3.4.1 Calcolo della capacità portante di progetto

La resistenza di progetto di un palo soggetto a carichi assiali può essere espressa dalle seguenti relazioni:

$R_{d,c} = R_{c,d} + R_{b,d} = \frac{R_{c,cal}}{\xi \cdot \gamma_s} + \frac{R_{b,cal}}{\xi \cdot \gamma_b} - W' \cdot \gamma_G$ Resistenza di progetto a compressione

$R_{d,c} = R_{c,t} + W' = \frac{R_{t,cal}}{\xi \cdot \gamma_t} + W' \cdot \gamma_G$ Resistenza di progetto a trazione

$R_{c,cal}$ Resistenza di calcolo laterale a compressione

$R_{t,cal}$ Resistenza di calcolo laterale a trazione

$R_{b,cal}$ Resistenza di calcolo di base

W' Peso efficace del palo

Per il calcolo della capacità portante a compressione, il coefficiente parziale amplificativo del peso del palo (γ_G) è stato assunto pari ad 1.3 nelle combinazioni STR e GEO e pari ad 1 nella combinazione SLV.
Per il calcolo della capacità portante a trazione $N_{Rd,t}$ il coefficiente γ_G è stato assunto unitario in tutte le combinazioni.

7.3.4.2 Portata laterale

La portata laterale limite di calcolo $R_{c,cal}$ viene valutata con la seguente relazione:

$R_{c,cal} = R_{t,cal} = \pi \cdot D \cdot \sum_i \tau_{lim,i} \cdot h_i$ Resistenza di progetto a compressione

D Diametro del palo

$\tau_{lim,i}$ Tensione di adesione laterale limite nello strato i-esimo

h_i Altezza dello strato i-esimo

Resistenza da prove SPT

Per il calcolo della capacità portante dei pali, disponendo di prove penetrometriche statiche SPT, si può fare riferimento agli studi di Reese-Wright (1977) e quanto indicato nelle raccomandazioni AGI sui pali di fondazione.
Per i terreni coesivi secondo AGI (1984), operando in condizioni non drenate (NDR) e tensioni totali, si utilizza l’equazione:

$\tau_{lim} = \alpha \cdot c_u \leq 100kPa$

c_u Resistenza al taglio non drenata (kPA)

α Coefficiente riduttivo, assunto per pali trivellati:

$\alpha = 0.9$ Per $c_u \leq 25kPa$

$\alpha = 0.8$ Per $25kPa < c_u \leq 50kPa$

$\alpha = 0.6$ Per $50kPa < c_u \leq 75kPa$

$\alpha = 0.4$ Per $c_u > 75kPa$

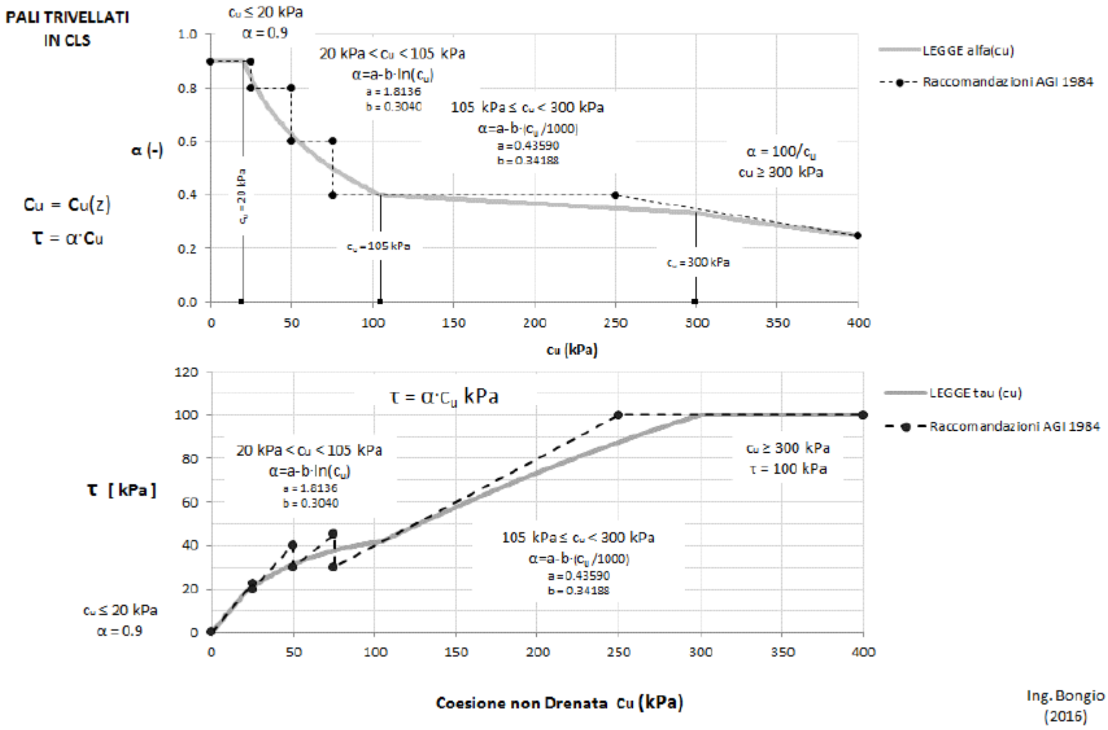


Figura 21: Curve di interpolazione dei coefficienti α secondo AGI

Per i terreni granulari secondo AGI (1984), operando in condizioni drenate (DR) e tensioni efficaci, l'attrito laterale è valutato mediante l'espressione:

$$\tau_{lim} = c_a + K \cdot \sigma'_{v0} \cdot tan(\delta) < f(N_{SPT})$$

$c_a = \alpha \cdot c'$	Adesione efficace palo-terreno (aliquota della coesione efficace)
$K = 1 - sen(0.7 \cdot \varphi) \leq 0.5$	Rapporto tra pressione orizzontale e pressione verticale efficace in prossimità del palo
$\delta = 0.7 \cdot \varphi$	
σ'_{v0}	Pressione geostatica verticale efficace
φ	Angolo di resistenza al taglio del terreno naturale
N_{SPT}	Numero di colpi/piede in prova SPT
$f(N_{SPT})$	$= 3 \cdot N_{SPT}$ Per $N_{SPT} \leq 53$
	$= 142 + 0.32 \cdot N_{SPT}$ Per $N_{SPT} > 53$

Secondo le norme AGI si raccomanda comunque di limitare cautelativamente la τ_{lim} a 150-200 kPa, per il caso in oggetto si pone il limite a 100 kPa.

Tab. 5.1 – Valori indicativi di k e μ dell'eq. |4| per terreni incoerenti

Tipo di palo		Valori di k	Valori di μ
BATTUTO	Acciaio	0.5 ÷ 1	tg 20°
	Calcestruzzo prefabbricato	1 ÷ 2	tg (3/4 φ')
	Calcestruzzo gettato in opera	1 ÷ 3	tg φ'
	TRIVELLATO	0.4 ÷ 0.7 (*)	tg φ'

(*) Decrescente con la profondità.

Figura 22: Valori dei coefficienti k e μ secondo AGI

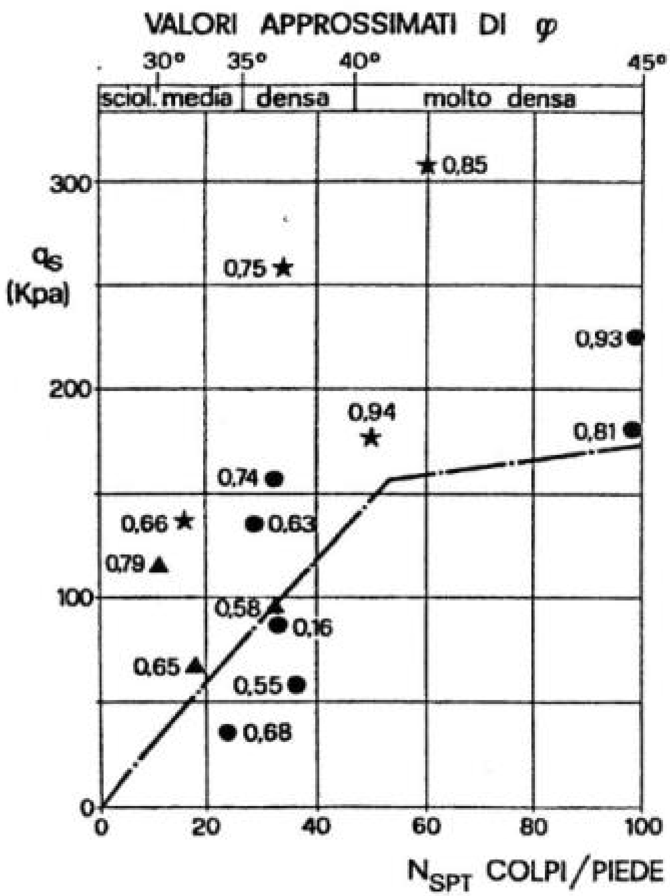


Figura 23: Valori limite di τ_{LIM} con indagini SPT secondo AGI

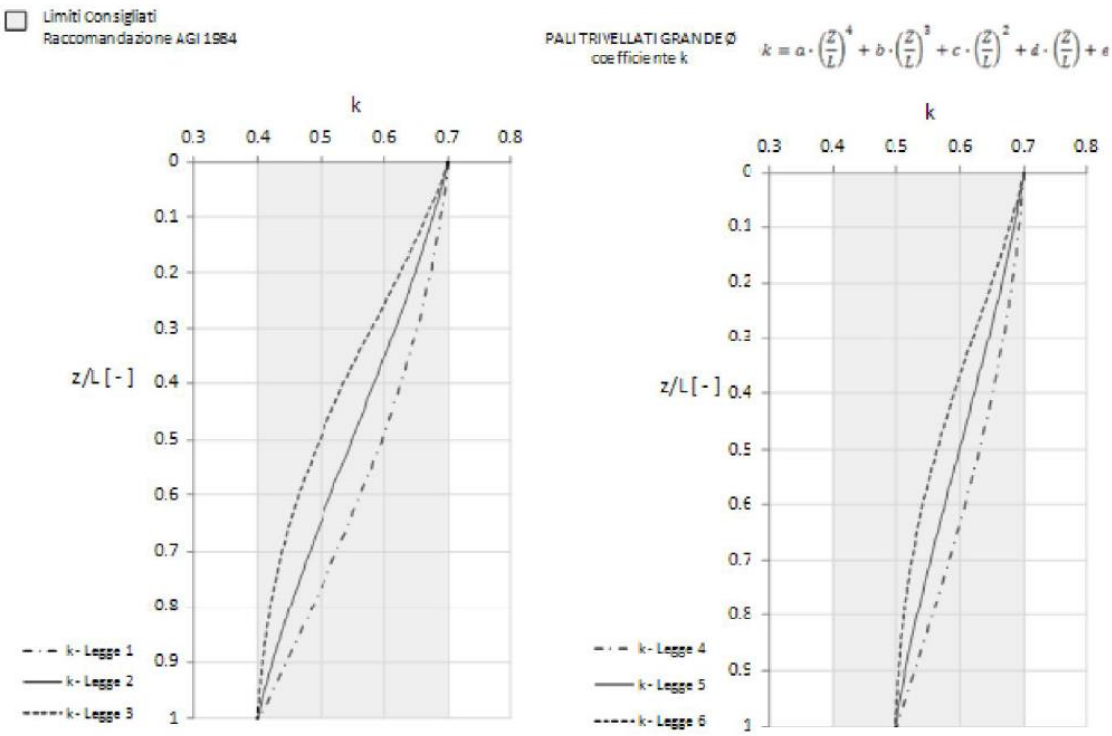


Figura 24: Curve di interpolazione dei coefficienti k secondo AGI

7.3.4.3 Portata di base

Per la valutazione della portata di base limite $R_{b,cal}$ si impiegano le seguenti relazioni:

$$R_{b,cal} = A_b \cdot q_{b,lim}$$

A_b	Area della base del palo
$q_{b,lim}$	Resistenza limite specifica di base

<u>Resistenza da prove SPT</u>

Per i terreni coesivi, operando in condizioni non drenate (NDR) e tensioni totali, la valutazione della capacità limite di base viene calcolata in condizioni non drenate mediante l’equazione:

$$q_{b,lim} = \sigma_{v0} + 9 \cdot c_u$$

σ_{v0}	Pressione verticale di base
c_u	Resistenza la taglio non drenata (kPa)

I valori di q_b sono interamente mobilizzati ad una profondità critica z_c (Meyerhof, Sastry [1978]), secondo l’espressione z_c=m*D con D pari al diametro del palo e m variabile tra 4 e 8.

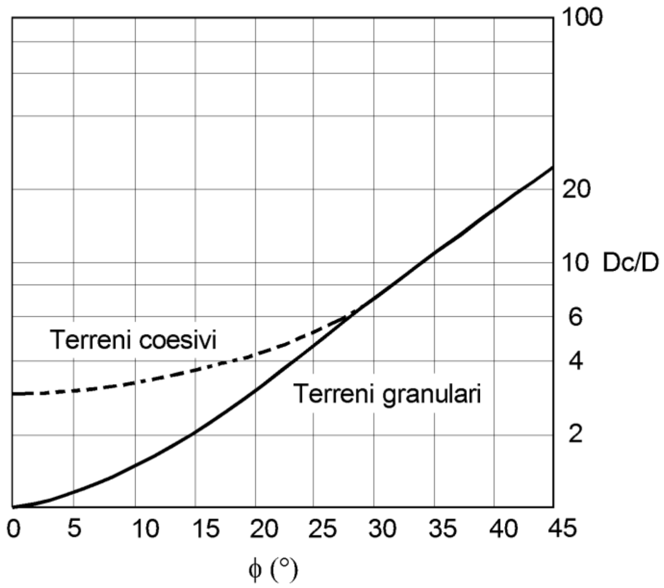


Figura 25: Profondità critica $z_c/D = f(D_r)$ secondo Meyerhof (1976)

Per i terreni granulari, operando in condizioni drenate (DR) e tensioni efficaci, la valutazione della capacità limite di base viene calcolata facendo riferimento non più alle condizioni di rottura, bensì riferendosi ad una "portata critica" corrispondente ad una "condizione di servizio limite" basata su considerazioni di cedimenti ammissibili, ed in genere riferita all'insorgere di deformazioni plastiche nei terreni di fondazione.
Nel caso di pali di grande diametro soggetti ad azioni assiali, in accordo con la teoria di Berezantzev, le deformazione plastiche alla punta (pari a circa 0.1 volte il diametro D del palo, stato limite ultimo di capacità portante) insorgono per pressioni di base pari a:

$$q_{b,lim} = N_q^* \cdot \sigma'_{v0} + N_c^* \cdot c'$$

σ'_{v0}	Pressione verticale efficace di base
N_q^*	Coefficiente pressione verticale di base (attrito)
c'	Coefficiente efficace di base
$N_c^* = \dfrac{(N_q^* - 1)}{tan(\varphi)}$	Coefficiente pressione verticale di base (coesione)

Disponendo di prove SPT, per pali trivellati la portata critica di base massima secondo Reese-Wright et al. (1978) è data da:

$$\mathrm{q_{b,lim}} = 66.7 \cdot N_{SPT} \leq 4000kPa$$

Nel caso in oggetto è stato posto un valore limite calcolato ad una profondità L pari a 15 volte il diametro del palo.

I valori di q_{cr} sono interamente mobilitati ad una "profondità critica" z_c con m variabile fra 4 e 21.

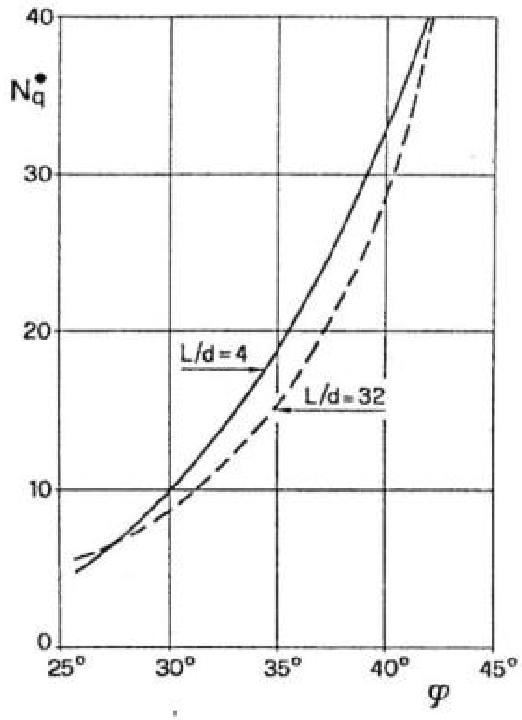


Figura 26: Valori limite di N_q* secondo AGI

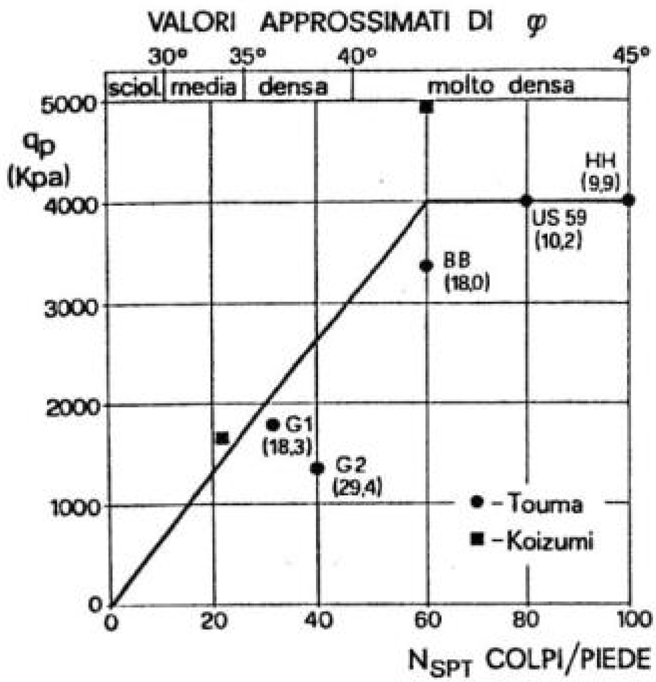


Figura 27: Valori limite di $q_{b,lim}$ con indagini SPT secondo AGI

7.3.4.4 Calcolo curve di cedimento

Per valutare le deformazioni verticali δ che il palo subisce per effetto dei carichi verticali, si considerano le curve di trasferimento carico/cedimento per la resistenza laterale R_c (a compressione, uguale a R_t per le azioni di trazione) e la resistenza di punta R_b dei pali trivellati di Reese & Wang, riportate nelle figure seguenti.
Nella curva di mobilitazione della resistenza laterale è diagrammato il rapporto tra resistenza laterale unitaria τ e massima resistenza laterale unitaria mobilitabile τ_{us} con il grado di spostamento

definito dal rapporto δ/D. Nella curva di mobilitazione della resistenza di base è diagrammato il rapporto tra resistenza di base unitaria q e massima di base unitaria mobilitabile q_{us} con il grado di spostamento definito dal rapporto δ/D.
Se si impone un cedimento, è possibile calcolare le resistenze unitarie mobilitate di base e laterale per un generico strato di terreno. Integrando su tutto il diametro D e su tutta la lunghezza L si ottengono delle curve di cedimento totale $R_{ct} + R_b$ vs δ.

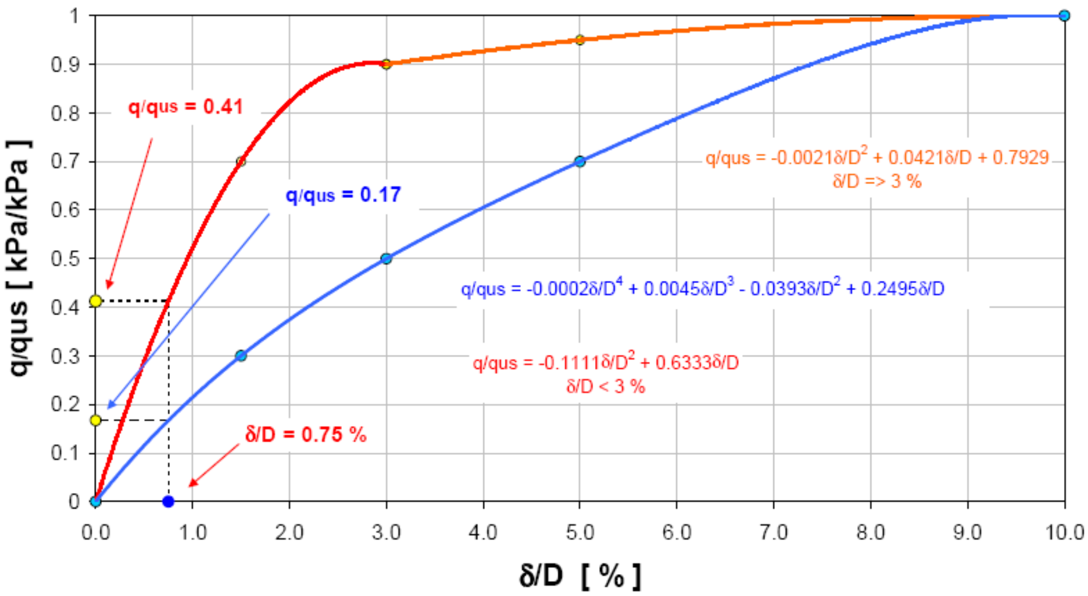


Figura 28: Curve di trasferimento della resistenza di base dei pali (Reese & Wang, 1990)

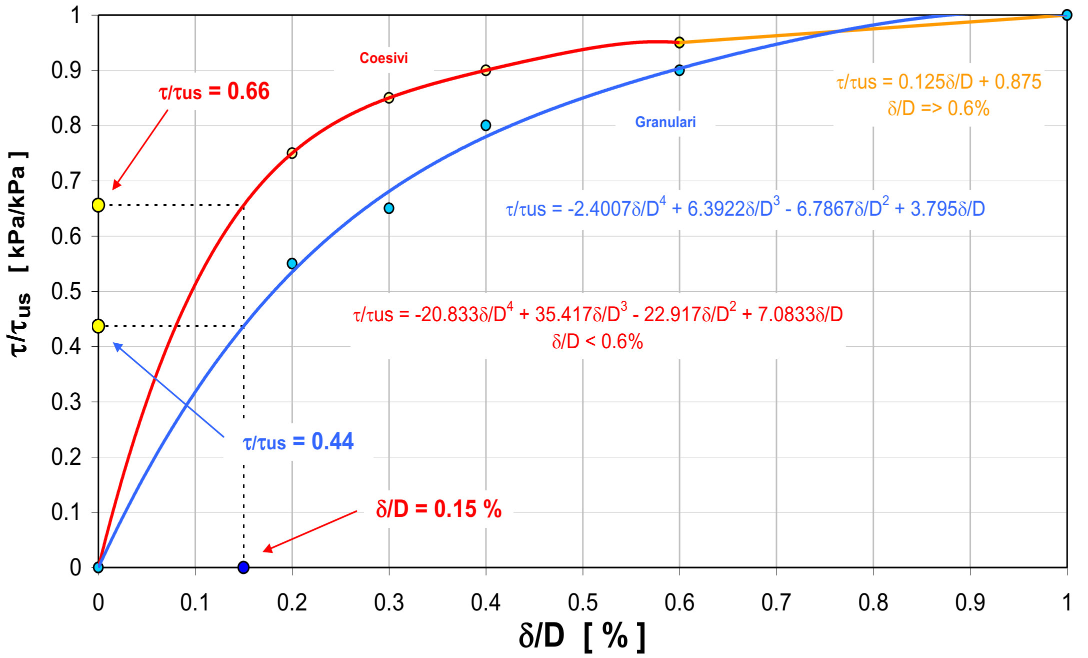


Figura 29: Curve di trasferimento della resistenza laterale dei pali (Reese & Wang, 1990)

Per la creazione delle curve di cedimento caratteristiche, riferite ai parametri geotecnici medi, vengono valutati diametri equivalenti differenziati per la capacità portante di base e la capacità portante laterale secondo le relazioni:

$$D'_s = S_{lat}/\pi$$

$$D'_h = \left(A_b \cdot \frac{4}{\pi}\right)^{0.5}$$

7.3.5 Stima spostamenti dell’opera e del terreno (SLE STR)

La stima degli spostamenti orizzontali delle strutture sono condotte per ogni fase di scavo.
Per valutare la compatibilità degli spostamenti dell’opera di sostegno ed il terreno circostante si verifica che la deformabilità della paratia sia contenuta entro limiti accettabili dallo stato dei luoghi.

7.4 Verifiche agli Stati Limite di Esercizio

Come riportato al §6.2.4.3 e §5.1.4.2 del [55], la verifica della sicurezza nei riguardi degli stati limite di esercizio si esprime controllando aspetti di funzionalità e stato tensionale. Si dovrà verificare che sia:

$E_d \leq C_d$

$E_d = E(\gamma_F \cdot F_k; X_k/\gamma_M\, ; a_d)$ Valore di progetto dell’azione o dell’effetto dell’azione

$C_d = C(\gamma_F \cdot F_k; X_k/\gamma_M\, ; a_d)$ Valore nominale o funzione di certe proprietà dei materiali legate agli effetti progettuali delle azioni considerate

Le verifiche agli SLE si risolvono nel controllare che i valori di tensione nei materiali siano inferiori ai limiti di normativa.

Calcestruzzo compresso
Combinazione rara $\sigma_c < 0.60 \cdot f_{ck}$
Combinazione quasi permanente $\sigma_c < 0.45 \cdot f_{ck}$

Acciaio teso
Combinazione rara $\sigma_s < 0.80 \cdot f_{yk}$

7.4.1 Verifiche agli Stati Limite di Fessurazione

Viene eseguita la verifica allo stato limite di apertura delle fessure con riferimento al §4.1.2.2.4 del [55]. Prima di procedere alle verifiche a fessurazione è necessario definire delle apposite combinazioni di carico ed effettuare una valutazione relativa al grado di protezione delle armature metalliche contro la corrosione (in termini di condizioni ambientali e sensibilità delle armature stesse alla corrosione). Si distinguono i seguenti casi:

Combinazioni di azioni	Frequente (FR) Quasi Permanente (QP)
Condizioni ambientali	Ordinarie Aggressive Molto aggressive
Sensibilità delle armature alla corrosione	Sensibili (acciai da precompresso) Poco sensibili (acciai ordinari)
Apertura delle fessure	$w_1 = 0.200mm$ $w_2 = 0.300mm$ $w_3 = 0.400mm$

Tabella 3: Stati limite di fessurazione

Gruppi di Esigenze	Condizioni ambientali	Combinazione di azioni	Armatura			
			Sensibile		Poco sensibile	
			Stato limite	w_k	Stato limite	w_k
A	Ordinarie	frequente	apertura fessure	$\leq w_2$	apertura fessure	$\leq w_3$
		quasi permanente	apertura fessure	$\leq w_1$	apertura fessure	$\leq w_2$
B	Aggressive	frequente	apertura fessure	$\leq w_1$	apertura fessure	$\leq w_2$
		quasi permanente	decompressione	-	apertura fessure	$\leq w_1$
C	Molto aggressive	frequente	formazione fessure	-	apertura fessure	$\leq w_1$
		quasi permanente	decompressione	-	apertura fessure	$\leq w_1$

Il calcolo, condotto con riferimento alla procedura analitica prevista al §C4.1.2.2.4 del [56], prevede i seguenti passaggi:

- Valutazione della distanza media tra le fessure (Δ_{sm});
- Valutazione della deformazione media delle barre d’armatura (ε_{sm});
- Valutazione dell’ampiezza delle fessure (valore medio w_m e valore di calcolo w_d).

Elemento strutturale	**Classi di esposizione**	**Condizioni ambientali**	**Combinazione di azioni**	**Stato limite**	$\mathbf{w_d}$
Pali	XC2	Ordinarie	Frequente	Apertura fessure	$\leq w_3 = 0.40$ mm
			Quasi permanente	Apertura fessure	$\leq w_2 = 0.30$ mm
Platea fondazione	XC2	Ordinarie	Frequente	Apertura fessure	$\leq w_3 = 0.40$ mm
			Quasi permanente	Apertura fessure	$\leq w_2 = 0.30$ mm
Elevazione pile e spalle	XC4-XF4	Aggressive	Frequente	Apertura fessure	$\leq w_2 = 0.30$ mm
			Quasi permanente	Apertura fessure	$\leq w_1 = 0.20$ mm

8 ANALISI DEI CARICHI

8.1 Azioni permanenti strutturali (G_1)

8.1.1 Pesi propri

Si considerano i seguenti pesi specifici.
Elementi in c.a. $\gamma_{cls} = 25.0\, kN/m^3$
Elementi in acciaio $\gamma_s = 78.5\, kN/m^3$

8.2 Azioni permanenti non strutturali (G_2)

8.2.1 Pesi propri

I pesi propri dei terreni sono riportati al §5.1.

8.3 Spinta del terreno

I valori delle spinte vengono computate automaticamente dai software utilizzati secondo le metodologie seguenti, per ulteriori approfondimenti si rimanda direttamente al manuale degli stessi.

8.3.1 Spinta a riposo

Per piano campagna orizzontale si fa riferimento alla seguente correlazione (Jaky, 1944 e Schmidt, 1966):
$k_0 = 1 - \sin\varphi' \cdot OCR^\alpha$
$OCR = 1$ Grado di sovraconsolidazione
$\alpha = 0.5$

Per pendio inclinato (β) si può considerare che la spinta a riposo sia parallela al p.c. e che il coefficiente k_o valga:
$k_0 = (1 - \sin\varphi' \cdot OCR^\alpha) \cdot (1 + \sin\beta)$
$\beta = 0$ Angolo di inclinazione tra profilo e piano orizzontale

8.3.2 Spinta attiva

Il coefficiente di spinta attiva (K_a) viene valutato ricorrendo alla correlazione generale di Mueller-Breslau basata sulla teoria di Coulomb e riferita a superfici di rottura piane. In questo caso l’approssimazione (rispetto a quanto si sarebbe ottenuto considerando superfici di rottura di geometria complessa) risulta molto contenuta e a favore di sicurezza.
La spinta attiva statica totale sulla parete S_{ah} si calcola secondo le seguenti relazioni:

$S_{ah} = \int_0^H \sigma_h(z)dz$ Spinta attiva statica totale sulla paratia

$$K_a = \frac{sen^2(\Psi + \varphi)}{sen^2\Psi \cdot sen(\Psi - \delta) \cdot \left[1 + \sqrt{\frac{sen(\varphi + \delta) \cdot sen(\varphi - \beta)}{sen(\Psi - \delta) \cdot sen(\Psi + \beta)}}\right]^2}$$
Coefficiente di spinta attiva

$\sigma_h(z) = \sigma_v(z) \cdot K_a - 2 \cdot c \cdot \sqrt{K_a}$ Pressione orizzontale di spinta del terreno

$\sigma_v(z)$ Pressione verticale del terreno

H Altezza della parete di spinta

φ	Angolo di resistenza al taglio del terreno
$\delta = 0.50 \cdot \varphi$	Attrito tra terreno e paratia
Ψ	Angolo tra la parete di spinta e il piano orizzontale
β	Angolo di inclinazione tra profilo e piano orizzontale
c	Coesione del terreno

Nel caso in cui a monte della parete sia presente la falda il diagramma delle pressioni sulla parete risulta modificato a causa della sottospinta che l'acqua esercita sul terreno. Il peso di volume del terreno al di sopra della linea di falda non subisce variazioni, viceversa al di sotto del livello di falda va considerato il peso di volume di galleggiamento:

$\gamma' = \gamma_{sat} - \gamma_w$	Peso di volume alleggerito del terreno
γ_{sat}	Peso di volume saturo del terreno (dipendente dall’indice dei pori)
γ_w	Peso di volume dell’acqua
$S_{ah} = \int_0^H \sigma'_h(z) dz + E_{ws}$	Spinta attiva statica totale efficace del terreno
$\sigma'_h(z) = \sigma'_v(z) \cdot K_a - 2 \cdot c \cdot \sqrt{K_a}$	Pressione orizzontale di spinta efficace del terreno
$\sigma'_v(z)$	Pressione verticale efficace del terreno
E_{ws}	Spinta idrostatica

8.3.3 Spinta passiva

Per il calcolo del coefficiente di spinta passiva si fa riferimento a superfici di rottura di tipo complesso (spirale logaritmica) come suggerito da Caquot & Kerisel (1948), secondo le seguenti ipotesi:

φ	Angolo di resistenza al taglio del terreno
$\delta = 0.50 \cdot \varphi$	Attrito tra terreno e paratia
β	Angolo di inclinazione tra profilo e piano orizzontale

La spinta passiva a statica totale sulla parete S_{ph} si calcola secondo le seguenti relazioni:

$S_{ph} = \int_0^H \sigma_h(z) dz$	Spinta passiva statica totale sulla paratia

$$K_p = \frac{sen^2(\Psi - \varphi)}{sen^2\Psi \cdot sen(\Psi + \delta) \cdot \left[1 - \sqrt{\frac{sen(\varphi + \delta) \cdot sen(\varphi - \beta)}{sen(\Psi - \delta) \cdot sen(\Psi + \beta)}}\right]^2}$$ Coefficiente di spinta passiva

$\sigma_h(z) = \sigma_v(z) \cdot K_p - 2 \cdot c \cdot \sqrt{K_p}$ Pressione orizzontale di spinta del terreno

$\sigma_v(z)$ Pressione verticale del terreno

H Altezza della parete di spinta

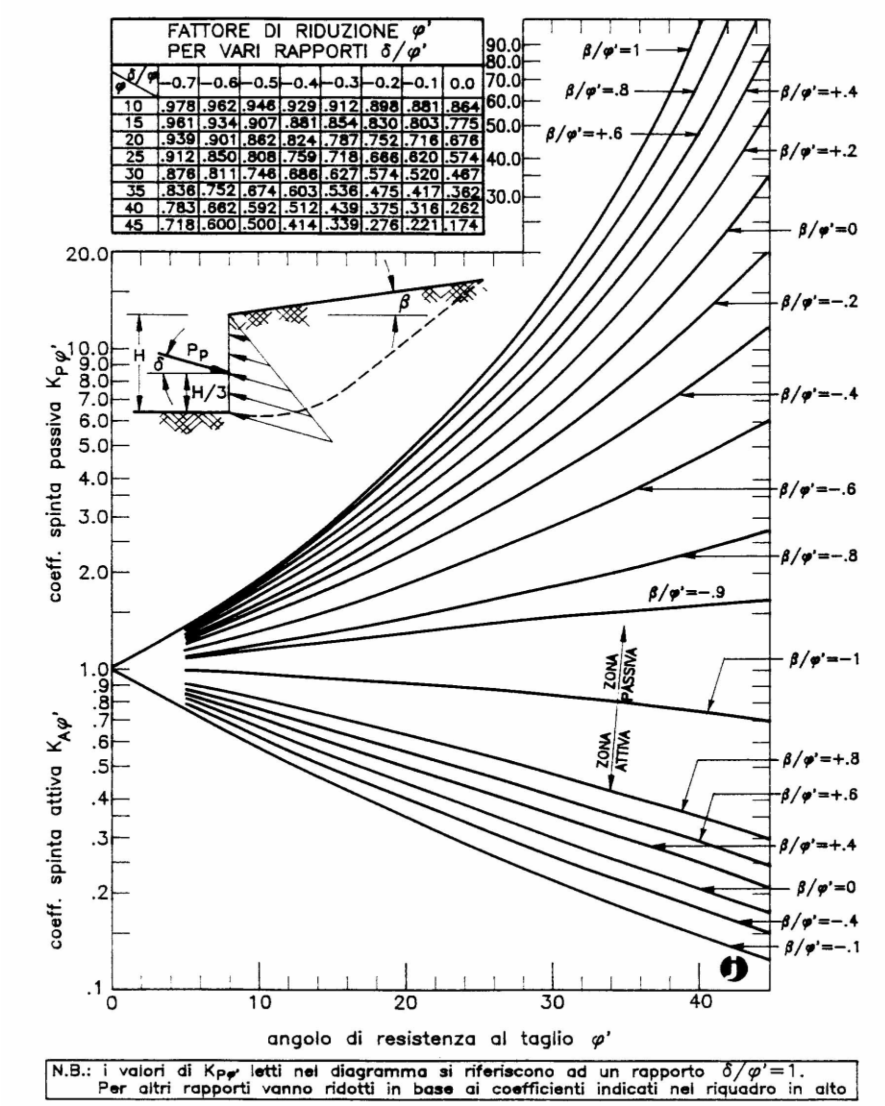
La spinta passiva statica totale efficace sulla parete S_{ph} si calcola secondo le seguenti relazioni:

$S_{ph} = \int_0^H \sigma'_h(z)dz + E_{ws}$ Spinta passiva statica totale efficace del terreno

$\sigma'_h(z) = \sigma'_v(z) \cdot K_p - 2 \cdot c \cdot \sqrt{K_p}$ Pressione orizzontale di spinta efficace del terreno

$\sigma'_v(z)$ Pressione verticale efficace del terreno

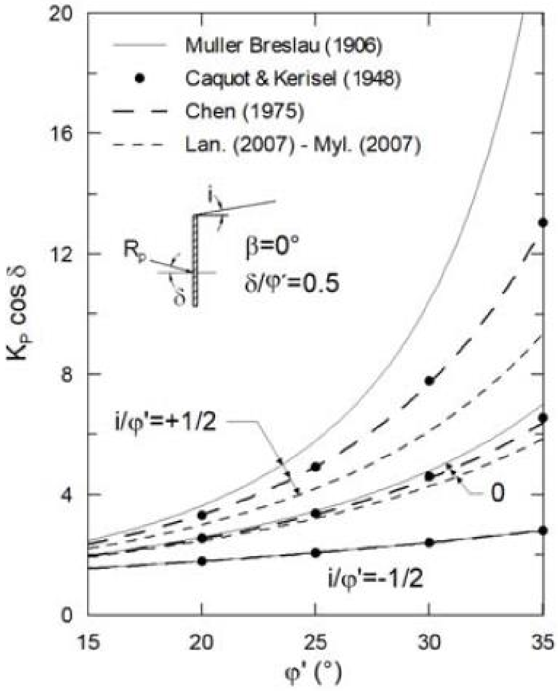
E_{ws} Spinta idrostatica



φ \ δ/φ	-0.7	-0.6	-0.5	-0.4	-0.3	-0.2	-0.1	0.0
10	.978	.962	.946	.929	.912	.898	.881	.864
15	.961	.934	.907	.881	.854	.830	.803	.775
20	.939	.901	.862	.824	.787	.752	.716	.676
25	.912	.850	.808	.759	.718	.666	.620	.574
30	.876	.811	.746	.686	.627	.574	.520	.467
35	.836	.752	.674	.603	.536	.475	.417	.362
40	.783	.662	.592	.512	.439	.375	.316	.262
45	.718	.600	.500	.414	.339	.276	.221	.174

Figura 30: Coefficienti di spinta attiva e passiva (Caquot-Kerisel, 1948)

I coefficienti di spinta e le relative spinte vengono calcolati automaticamente dal programma di calcolo utilizzando la formulazione di Lancellotta (2007), i valori così determinati sono a favore di sicurezza, come si evince dal grafico di raffronto seguente.



Nel calcolo dei coefficienti di spinta si è deciso di tenere conto sia dell’inclinazione del terreno a valle e a monte (angolo β), che della dipendenza della spinta dell’angolo di attrito terra-muro (angolo δ).
L’angolo β utilizzato in queste valutazioni viene stimato dal programma in base alla geometria irregolare dello scavo, in rapporto alla posizione dello strato, rispetto al piano campagna (o fondo scavo) locale, valutando una superficie piana inclinata equivalente.

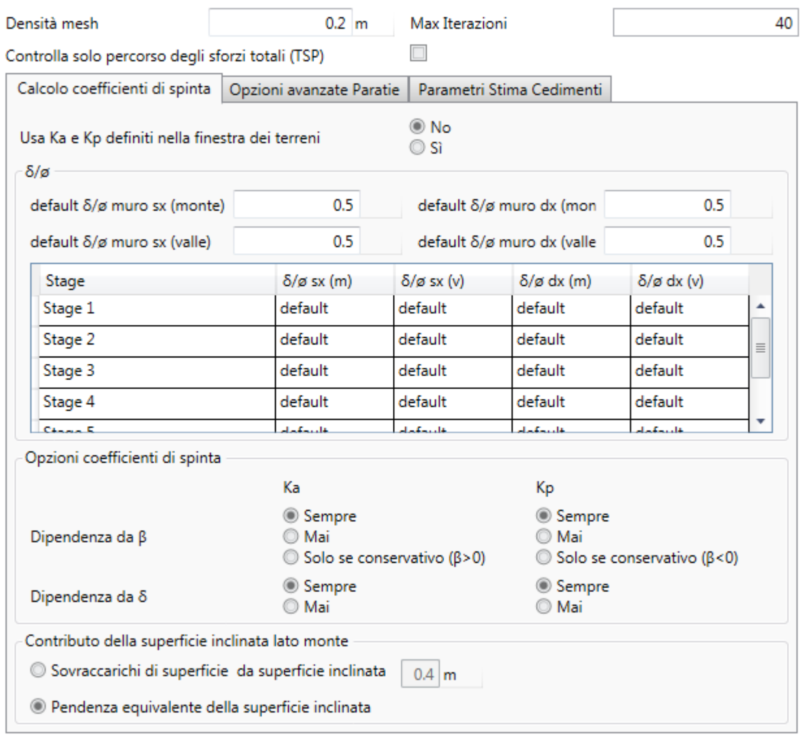


Figura 31: Parametri adottati per il calcolo dei coefficienti di spinta

8.3.4 Pressioni idrostatiche

Nel caso in cui a monte della parete sia presente la falda il diagramma delle pressioni sulla parete risulta modificato a causa della sottospinta che l'acqua esercita sul terreno. Il peso di volume del terreno al di sopra della linea di falda non subisce variazioni. Viceversa al di sotto del livello di falda va considerato il peso di volume di galleggiamento

$\gamma_a = \gamma_{sat} - \gamma_w$	Peso di volume alleggerito del terreno
γ_{sat}	Peso di volume saturo del terreno (dipendente dall'indice dei pori)
γ_w	Peso di volume dell'acqua
$S_h = \int_0^H \sigma'_h(z)dz + E_{ws}$	Spinta attiva statica (attiva o a riposo) totale efficace del terreno
$\sigma'_h(z) = \sigma'_v(z) \cdot K - 2 \cdot c \cdot \sqrt{K}$	Pressione orizzontale di spinta efficace del terreno
$\sigma'_v(z)$	Pressione verticale efficace del terreno
E_{ws}	Spinta idrostatica

Al diagramma delle pressioni, avente al di sotto della linea di falda una pendenza minore, va quindi sommato il diagramma triangolare legato alla pressione idrostatica.

8.3.5 Pressioni idrodinamiche

Le distribuzioni di forze delle spinte idrodinamiche E_{wd} sulla parete sono descritte dalle seguenti relazioni:

$E_{wd}(z) = \frac{7}{12} \cdot k_h \cdot \gamma \cdot H^2$	Spinta idrodinamica
$q_{wd}(z) = \frac{7}{8} \cdot k_h \cdot \gamma \cdot \sqrt{H' \cdot z}$	Pressione idrodinamica
k_h	Coefficiente sismico orizzontale
H'	Altezza di muro soggeta a spinta dell'acqua

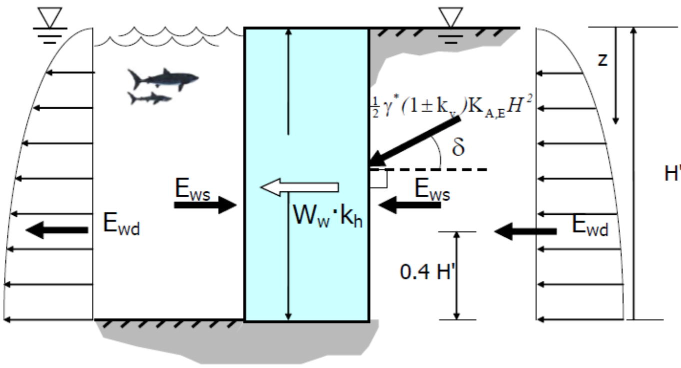


Figura 32: Schema di calcolo delle forze idrodinamiche sulla parete

8.4 Scarichi agli appoggi

Dalla relazione di calcolo dell'impalcato [5] si desumono gli scarichi agli appoggi nelle varie combinazioni di carico.

	Spalla 1					
	UL			M		
	V	Long.	Trasv.	V	Long.	Trasv.
Permanenti	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
Fase 1 - Strutturali	865	0	0	940	0	0
Fase 2 - Permanenti portati	540	0	0	530	0	0
Ritiro	-7	0	0	-4	0	0
Attrito appoggi MAX	0	109	0	0	110	0
Attrito appoggi MIN	0	-109	0	0	-110	0
Effetti ambientali						
Variazione termica MAX	250	0	0	200	0	0
Variazione termica MIN	-250	0	0	-200	0	0
Vento da esterno curva	-45	0	120	195	0	0
Vento da interno curva	200	0	120	-50	0	0
Peso stuttura						
Fondazione	7290					
Spinta terreno						
Riempimento	17061	7789				
Riempimento (sisma x+)	18035	7434				
Riempimento (sisma x-)	16087	7434				
Accidentali da traffico						
Max squilibrio Trint	-410	0	0	2050	0	0
Max carico Trint	650	0	0	2190	0	0
Max squilibrio Trest	2050	0	0	-450	0	0
Max carico Trest	2250	0	0	640	0	0
Frenamento/avviamento MAX	0	0	0	0	0	0
Frenamento/avviamento MIN	0	0	0	0	0	0
Sisma						
Sisma X	200	0	360	150	0	0
Sisma Y	50	0	1800	50	0	0
Sisma Z	50	0	0	50	0	0

Figura 33: Spalla 1 – Scarichi caratteristici agli appoggi

	Spalla 2					
	UL			M		
	V	Long.	Trasv.	V	Long.	Trasv.
Permanenti	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
Fase 1 - Strutturali	900	0	0	890	0	0
Fase 2 - Permanenti portati	460	0	0	450	0	0
Ritiro	-5	0	0	-5	0	0
Attrito appoggi MAX	0	102	0	0	101	0
Attrito appoggi MIN	0	-102	0	0	-101	0
Effetti ambientali						
Variazione termica MAX	300	0	0	250	0	0
Variazione termica MIN	-300	0	0	-250	0	0
Vento da esterno curva	-25	0	125	180	0	0
Vento da interno curva	190	0	120	-30	0	0
Peso stuttura						
Fondazione	7290					
Spinta terreno						
Riempimento	14516	8602				
Riempimento (sisma x+)	15345	8210				
Riempimento (sisma x-)	13687	8210				
Accidentali da traffico						
Max squilibrio Trint	-340	0	0	1890	0	0
Max carico Trint	560	0	0	2030	0	0
Max squilibrio Trest	1900	0	0	-350	0	0
Max carico Trest	2050	0	0	560	0	0
Frenamento/avviamento MAX	0	0	0	0	0	0
Frenamento/avviamento MIN	0	0	0	0	0	0
Sisma						
Sisma X	300	0	450	300	0	0
Sisma Y	50	0	250	50	0	0
Sisma Z	75	0	0	50	0	0

Figura 34: Spalla 2 – Scarichi caratteristici agli appoggi

	Pila 1					
	UL (S)			M (S)		
	V	Long.	Trasv.	V	Long.	Trasv.
Permanenti	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
Fase 1 - Strutturali	3570	0	0	3450	0	0
Fase 2 - Permanenti portati	1480	0	0	1250	0	0
Ritiro	-25	0	0	2	0	0
Attrito appoggi MAX	0	273	0	0	260	0
Attrito appoggi MIN	0	-273	0	0	-260	0
Effetti ambientali						
Variazione termica MAX	50	0	0	450	0	0
Variazione termica MIN	-50	0	0	-450	0	0
Vento da esterno curva	-55	0	485	705	0	0
Vento da interno curva	760	0	480	-90	0	0
Peso stuttura						
Fondazione	7721					
Spinta terreno						
Riempimento						
Riempimento (sisma x+)						
Riempimento (sisma x-)						
Accidentali da traffico						
Max squilibrio Trint	-490	0	0	3650	0	0
Max carico Trint	1420	0	0	3950	0	0
Max squilibrio Trest	3790	0	0	-640	0	0
Max carico Trest	4070	0	0	1390	0	0
Frenamento/avviamento MAX	0	0	0	0	0	0
Frenamento/avviamento MIN	0	0	0	0	0	0
Sisma						
Sisma X	500	2650	450	500	2650	0
Sisma Y	100	700	3100	100	700	0
Sisma Z	250	0	0	150	0	0

Figura 35: Pila 1 – Scarichi caratteristici agli appoggi

	Pila 2					
	F			UT		
	V	Long.	Trasv.	V	Long.	Trasv.
Permanenti	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
Fase 1 - Strutturali	3650	0	0	3570	0	0
Fase 2 - Permanenti portati	1770	0	0	1640	0	0
Ritiro	-14	0	0	63	0	0
Attrito appoggi MAX	0	290	0	0	283	0
Attrito appoggi MIN	0	-290	0	0	-283	0
Effetti ambientali						
Variazione termica MAX	260	0	0	200	0	0
Variazione termica MIN	-260	0	0	-200	0	0
Vento da esterno curva	-70	80	520	755	55	0
Vento da interno curva	800	45	520	-110	90	0
Peso stuttura						
Fondazione	7601					
Spinta terreno						
Riempimento						
Riempimento (sisma x+)						
Riempimento (sisma x-)						
Accidentali da traffico						
Max squilibrio Trint	-540	0	0	3840	0	0
Max carico Trint	1480	0	0	4150	0	0
Max squilibrio Trest	3950	0	0	-690	0	0
Max carico Trest	4250	0	0	1460	0	0
Frenamento/avviamento MAX	0	450	0	0	450	0
Frenamento/avviamento MIN	0	-450	0	0	-450	0
Sisma						
Sisma X	350	2600	700	350	2650	0
Sisma Y	100	550	3000	120	370	0
Sisma Z	300	0	0	250	0	0

Figura 36: Pila 2 – Scarichi caratteristici agli appoggi

	Pila 3					
	UL (S)			M (S)		
	V	Long.	Trasv.	V	Long.	Trasv.
Permanenti	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
Fase 1 - Strutturali	2950	0	0	2990	0	0
Fase 2 - Permanenti portati	1330	0	0	1300	0	0
Ritiro	-45	0	0	19	0	0
Attrito appoggi MAX	0	243	0	0	244	0
Attrito appoggi MIN	0	-243	0	0	-244	0
Effetti ambientali						
Variazione termica MAX	200	0	0	150	0	0
Variazione termica MIN	-200	0	0	-150	0	0
Vento da esterno curva	-75	0	430	655	0	0
Vento da interno curva	680	0	420	-95	0	0
Peso stuttura						
Fondazione	7481					
Spinta terreno						
Riempimento						
Riempimento (sisma x+)						
Riempimento (sisma x-)						
Accidentali da traffico						
Max squilibrio Trint	-560	0	0	3550	0	0
Max carico Trint	1350	0	0	3840	0	0
Max squilibrio Trest	3620	0	0	-640	0	0
Max carico Trest	3860	0	0	1350	0	0
Frenamento/avviamento MAX	0	0	0	0	0	0
Frenamento/avviamento MIN	0	0	0	0	0	0
Sisma						
Sisma X	350	3000	1450	350	3000	0
Sisma Y	250	700	3500	250	400	0
Sisma Z	250	0	0	250	0	0

Figura 37: Pila 3 – Scarichi caratteristici agli appoggi

	Pila 4					
	UL			M		
	V	Long.	Trasv.	V	Long.	Trasv.
Permanenti	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
Fase 1 - Strutturali	2230	0	0	2235	0	0
Fase 2 - Permanenti portati	1095	0	0	1040	0	0
Ritiro	9	0	0	55	0	0
Attrito appoggi MAX	0	206	0	0	203	0
Attrito appoggi MIN	0	-206	0	0	-203	0
Effetti ambientali						
Variazione termica MAX	250	0	0	100	0	0
Variazione termica MIN	-250	0	0	-100	0	0
Vento da esterno curva	-55	0	340	515	0	0
Vento da interno curva	540	0	340	-80	0	0
Peso stuttura						
Fondazione	5075					
Spinta terreno						
Riempimento						
Riempimento (sisma x+)						
Riempimento (sisma x-)						
Accidentali da traffico						
Max squilibrio Trint	-490	0	0	3160	0	0
Max carico Trint	1220	0	0	3420	0	0
Max squilibrio Trest	3260	0	0	-600	0	0
Max carico Trest	3520	0	0	1200	0	0
Frenamento/avviamento MAX	0	0	0	0	0	0
Frenamento/avviamento MIN	0	0	0	0	0	0
Sisma						
Sisma X	350	2050	900	350	2200	0
Sisma Y	200	350	2000	200	300	0
Sisma Z	100	0	0	120	0	0

Figura 38: Pila 4 – Scarichi caratteristici agli appoggi

	Pila 5					
	UL			M		
	V	Long.	Trasv.	V	Long.	Trasv.
Permanenti	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
Fase 1 - Strutturali	2000	0	0	2180	0	0
Fase 2 - Permanenti portati	810	0	0	820	0	0
Ritiro	-30	0	0	-16	0	0
Attrito appoggi MAX	0	178	0	0	185	0
Attrito appoggi MIN	0	-178	0	0	-185	0
Effetti ambientali						
Variazione termica MAX	200	0	0	500	0	0
Variazione termica MIN	-200	0	0	-500	0	0
Vento da esterno curva	-60	0	300	455	0	0
Vento da interno curva	470	0	300	-60	0	0
Peso stuttura						
Fondazione	4955					
Spinta terreno						
Riempimento						
Riempimento (sisma x+)						
Riempimento (sisma x-)						
Accidentali da traffico						
Max squilibrio Trint	-520	0	0	2950	0	0
Max carico Trint	1080	0	0	3170	0	0
Max squilibrio Trest	2920	0	0	-520	0	0
Max carico Trest	3150	0	0	1100	0	0
Frenamento/avviamento MAX	0	0	0	0	0	0
Frenamento/avviamento MIN	0	0	0	0	0	0
Sisma						
Sisma X	700	2500	600	700	2300	0
Sisma Y	100	250	700	100	450	0
Sisma Z	75	0	0	75	0	0

Figura 39: Pila 5 – Scarichi caratteristici agli appoggi

9 AZIONE SISMICA (E)

A Le azioni sismiche di progetto, in base alle quali valutare il rispetto dei diversi stati limite considerati, si definiscono a partire dalla "pericolosità sismica di base" del sito di costruzione, che costituisce l'elemento di conoscenza primario per la determinazione delle azioni sismiche. La pericolosità sismica del sito è definita in termini di:

a_g Accelerazione orizzontale massima del terreno
F_0 Valore massimo del fattore di amplificazione dello spettro in accelerazione orizzontale
$T_C{}^*$ Periodo di inizio del tratto a velocità costante dello spettro in accelerazione orizzontale

L'accelerazione orizzontale massima attesa a_g è riferita in condizioni di campo libero su sito di riferimento rigido con superficie topografica orizzontale di categoria A, nonché di ordinate dello spettro di risposta elastico in accelerazione ad essa corrispondente $S_e(T)$, con riferimento a prefissate probabilità di eccedenza P_{VR} nel periodo di riferimento V_R per ogni stato limite considerato.
I valori dei parametri a_g, F_0 e T_C* relativi alla pericolosità sismica su reticolo di riferimento nell'intervallo di riferimento sono forniti nelle tabelle riportate nell'ALLEGATO B del [55].
Una trattazione più approfondita è contenuta nella documentazione di riferimento [3].

9.1 Stati limite di progetto sismici

Le azioni di riferimento sono calcolate sulla base delle effettive coordinate geografiche in accordo alla griglia di riferimento con cui è stato suddiviso il territorio nazionale.

Comune:	Siena (SI)	
Coordinate:	Longitudine:	11.330855
	Latitudine:	43.27905

Dato il periodo di riferimento della struttura V_R = 50 anni, si individuano i seguenti stati limite:

STATO LIMITE	T_R [anni]	a_g [g]	F_0 [-]	T_C^* [s]
SLO	60	0.064	2.518	0.258
SLD	101	0.079	2.509	0.264
SLV	949	0.174	2.516	0.283
SLC	1950	0.212	2.556	0.290

9.2 Definizione dell'azione sismica

In accordo a quanto contenuto nel [55] si ricorre ad un metodo pseudostatico dove l'azione sismica è rappresentata da una forza statica equivalente pari al prodotto delle forze di gravità per un opportuno coefficiente sismico.
I coefficienti sismici sono stimati come:

$k_h = \beta_s \cdot \frac{a_{max}}{g}$ Coefficiente sismico orizzontale

$k_v = \pm 0.5 \cdot k_h$ Coefficiente sismico verticale

$a_{max} = S_T \cdot S_S \cdot a_g$ Massima accelerazione orizzontale attesa al suolo

S_T Coefficiente di amplificazione topografica (cfr. tabelle seguenti)

S_S Coefficiente di amplificazione stratigrafica (cfr. tabelle seguenti)

β_s Coefficiente di riduzione dell’accelerazione massima attesa al sito (cfr. tabelle seguenti)

Categoria topografica	Ubicazione dell’opera o dell’intervento	S_T
T1	-	1,0
T2	In corrispondenza della sommità del pendio	1,2
T3	In corrispondenza della cresta del rilievo	1,2
T4	In corrispondenza della cresta del rilievo	1,4

Categoria sottosuolo	S_S	C_C
A	1,00	1,00
B	$1,00 \leq 1,40 - 0,40 \cdot F_o \cdot \frac{a_g}{g} \leq 1,20$	$1,10 \cdot (T_C^*)^{-0,20}$
C	$1,00 \leq 1,70 - 0,60 \cdot F_o \cdot \frac{a_g}{g} \leq 1,50$	$1,05 \cdot (T_C^*)^{-0,33}$
D	$0,90 \leq 2,40 - 1,50 \cdot F_o \cdot \frac{a_g}{g} \leq 1,80 \cdot$	$1,25 \cdot (T_C^*)^{-0,50}$
E	$1,00 \leq 2,00 - 1,10 \cdot F_o \cdot \frac{a_g}{g} \leq 1,60$	$1,15 \cdot (T_C^*)^{-0,40}$

	Categoria di sottosuolo	
	A	**B, C, D, E**
	β_s	β_s
$0,2 < a_g(g) \leq 0,4$	0,30	0,28
$0,1 < a_g(g) \leq 0,2$	0,27	0,24
$a_g(g) \leq 0,1$	0,20	0,20

9.2.1 Accelerazione di riferimento

Nella tabella seguente sono riassunte le azioni sismiche per differenti i periodi di ritorno.

T_R [anni]	a_g [g]	F_0 [-]	T_C^* [s]
30	0.048	2.503	0.246
50	0.059	2.535	0.255
72	0.069	2.501	0.261
101	0.079	2.510	0.264
140	0.091	2.481	0.268
201	0.104	2.476	0.269
475	0.141	2.484	0.277
975	0.176	2.518	0.283
2475	0.226	2.571	0.292

L’accelerazione ottenuta deve essere moltiplicata per il coefficiente di amplificazione locale, funzione della categoria di suolo e di coefficiente di amplificazione topografica, per definire l’azione sismica di calcolo.

9.2.2 Categoria di suolo

Le prove di geofisica di superficie, tipo MASW, in corrispondenza dell’area di intervento riportate in [3] relazione sismica hanno evidenziato profili di velocità caratteristici di terreni appartenenti alla categoria C.
Sulla base dei risultati delle indagini eseguite e del locale contesto geologico è possibile adottare, per l’area oggetto di intervento, la categoria di suolo tipo “C”, ovvero: “Depositi di terreni a grana grossa mediamente addensati o terreni a grana fina mediamente consistenti con profondità del substrato superiori a 30 m, caratterizzati da un miglioramento delle proprietà meccaniche con la profondità e da valori di velocità equivalente compresi tra 180 m/s e 360 m/s”.

9.2.3 Categoria topografica

La categoria topografica di riferimento è la T1, contrassegnante aree con superfici pianeggianti, pendii e rilievi isolati con inclinazione media $\leq$ 15°.

9.3 Azioni inerziali masse

Con riferimento a §3.2.4 del [55], si ritiene trascurabile in fase sismica il contributo delle azioni accidentali, pertanto vengono considerati i contributi dei soli carichi permanenti:

$$G = G_1 + G_2 + \sum_j \Psi_{2j} \cdot Q_{kj}$$

G	Massa totale efficace
G_1	Masse dei pesi propri strutturali
G_2	Masse dei carichi permanenti non strutturali (permanenti, terreno)
Q_{kj}	Masse dei carichi accidentali
Ψ_{2j}	

Le azioni inerziali orizzontali E_x e verticali E_y delle masse efficaci sono determinate incrementando i pesi propri G con accelerazioni verticali e orizzontali definite dai coefficienti di amplificazione dinamica k_h e k_v:

$E_x = G \cdot k_h$	Azione inerziale orizzontale
$E_y = G \cdot k_v$	Azione inerziale verticale
$G = G_1 + G_2$	Masse efficaci sismiche

9.4 Paratie

La deformabilità della parete viene tenuta in conto mediante dei coefficienti riduttivi correlati al massimo spostamento u_s che l’opera di altezza complessiva H, può ammettere senza riduzioni di resistenza ($u_{s,max}$) e tale per cui sia verificata l’ipotesi di riduzione dell’azione sismica per duttilità strutturale ($u_{s,min}$).

$k_h = \alpha \cdot \beta \cdot \frac{a_{max}}{g}$	Coefficiente sismico orizzontale
$k_v = \pm 0.5 \cdot k_h$	Coefficiente sismico verticale (generalmente trascurato per il calcolo delle paratie)
$a_{max} = S_T \cdot S_S \cdot a_g$	Massima accelerazione orizzontale attesa al suolo

S_T	Coefficiente di amplificazione topografica
S_S	Coefficiente di amplificazione stratigrafica
α	Coefficiente di asincronicità del moto parete (cfr. tabelle seguenti)
β	Coefficiente di duttilità strutturale parete (cfr. tabelle seguenti)
$u_{s,max} = 0.005 \cdot H$	Massimo spostamento parete ammissibile senza riduzioni di resistenza
$u_{s,min} = \frac{1.8}{e^{\beta/0.135}}$	Minimo spostamento parete per riduzione duttilità β (interpolazione grafico)

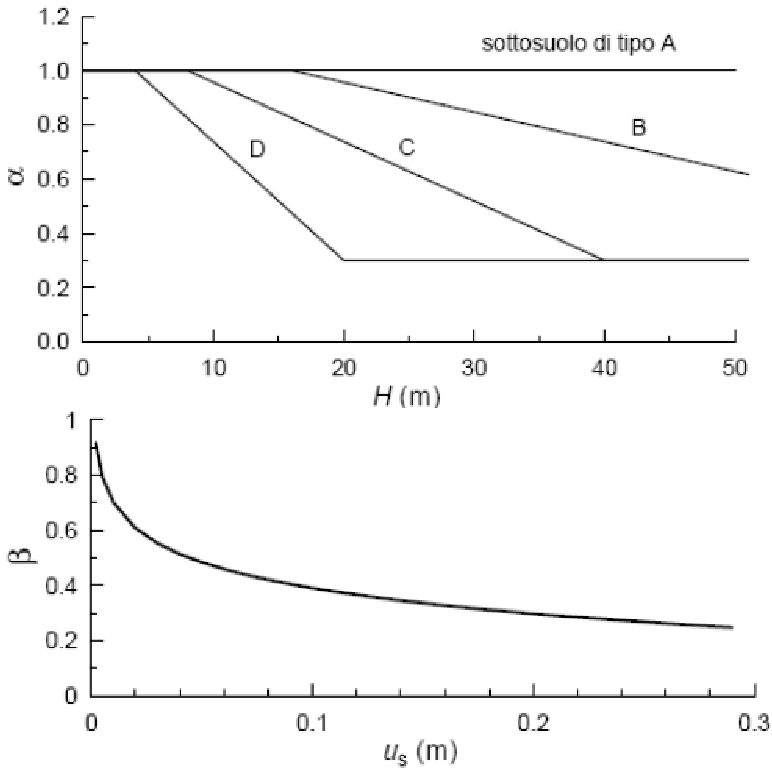


Figura 40: Coefficienti α, β di riduzione dell'accelerazione sismica attesa in sito (NTC 2018)

9.5 Muri di sostegno

Per tener conto dell'incremento di spinta dovuta al sisma si fa riferimento al metodo di Mononobe-Okabe (cui fa riferimento la Normativa Italiana).
La Normativa Italiana suggerisce di tener conto di un incremento di spinta dovuto al sisma nel modo seguente.
Detta ε l'inclinazione del terrapieno rispetto all'orizzontale e β l'inclinazione della parete rispetto alla verticale, si calcola la spinta S' considerando un'inclinazione del terrapieno e della parte pari a

$$\varepsilon' = \varepsilon + \theta$$

$$\beta' = \beta + \theta$$

dove

$\theta = arctg\left(\frac{k_h}{1 \pm k_v}\right)$ Essendo k_h il coefficiente sismico orizzontale e k_v il coefficiente sismico verticale definito in funzione di k_h

I coefficienti k_h e k_v i coefficienti sono determinati così come indicato al precedente §9.2
In presenza di falda a monte, θ assume le seguenti espressioni:

Terreno a bassa permeabilità

$$\theta = arctg\left[\left(\frac{\gamma_{sat}}{\gamma_{sat}-\gamma_w}\right)\cdot\left(\frac{k_h}{1\pm k_v}\right)\right]$$

Terreno a permeabilità elevata

$$\theta = arctg\left[\left(\frac{\gamma}{\gamma_{sat}-\gamma_w}\right)\cdot\left(\frac{k_h}{1\pm k_v}\right)\right]$$

Detta S la spinta calcolata in condizioni statiche l'incremento di spinta da applicare è espresso da

$$\Delta S = AS' - S$$

dove il coefficiente A vale

$$A = \frac{cos^2(\beta+\theta)}{cos^2\beta\cdot cos\theta}$$

In presenza di falda a monte, nel coefficiente A si tiene conto dell'influenza dei pesi di volume nel calcolo di θ.
Adottando il metodo di Mononobe-Okabe per il calcolo della spinta, il coefficiente A viene posto pari a 1.
Tale incremento di spinta è applicato a metà altezza della parete di spinta nel caso di forma rettangolare del diagramma di incremento sismico, allo stesso punto di applicazione della spinta statica nel caso in cui la forma del diagramma di incremento sismico è uguale a quella del diagramma statico.
Oltre a questo incremento bisogna tener conto delle forze d'inerzia orizzontali e verticali che si destano per effetto del sisma. Tali forze vengono valutate come

$$F_{IH} = k_h\cdot W \qquad\qquad F_{IV} = \pm k_v\cdot W$$

dove W è il peso della struttura, del terreno soprastante la mensola di monte ed i relativi sovraccarichi e va applicata nel baricentro dei pesi.
Il metodo di Culmann tiene conto automaticamente dell'incremento di spinta. Basta inserire nell'equazione risolutiva la forza d'inerzia del cuneo di spinta. La superficie di rottura nel caso di sisma risulta meno inclinata della corrispondente superficie in assenza di sisma.

10 ANALISI FONDAZIONE SPALLE

A favore di sicurezza, le analisi saranno svolte modellando la spalla 1, che presenta le condizioni di carico più gravose per le fondazioni.

10.1 Geometria

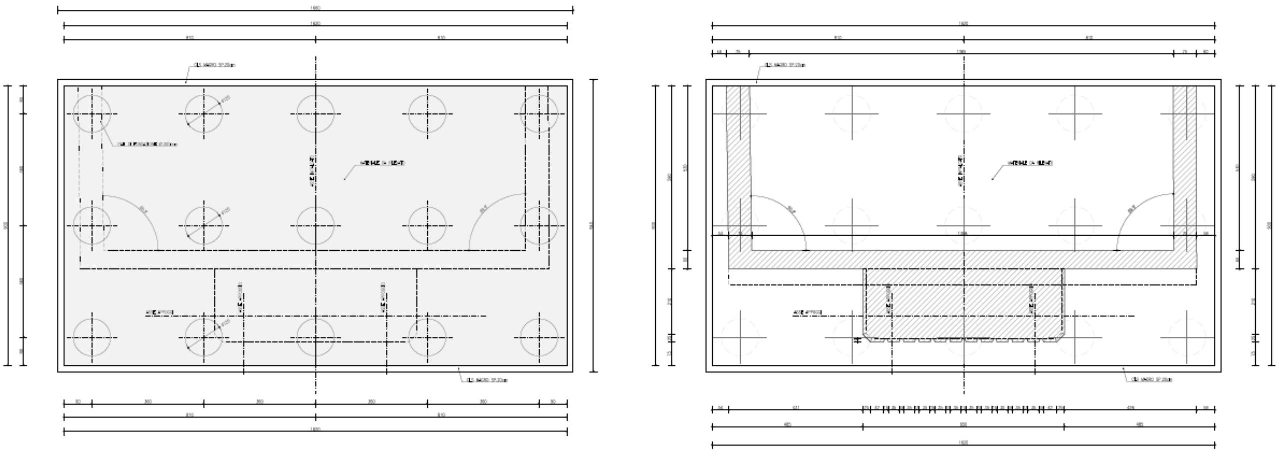


Figura 41: Spalla – geometria fondazione

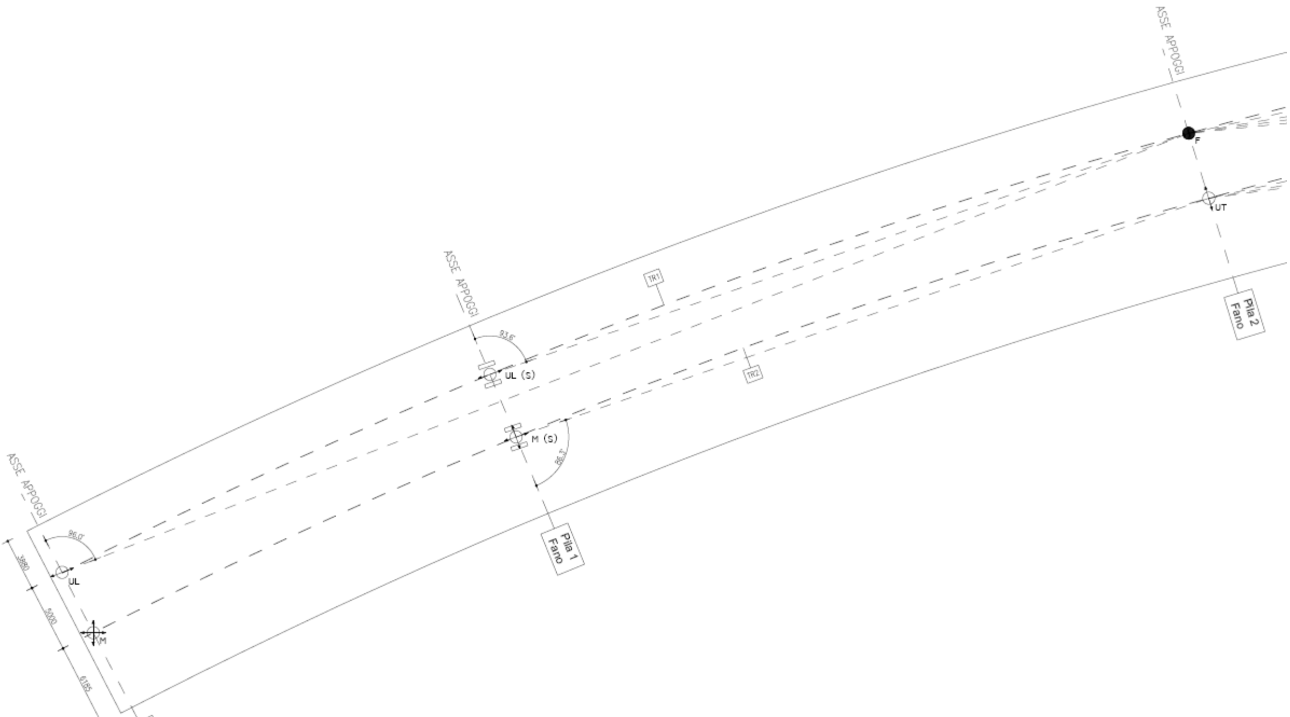


Figura 42: Schema appoggi spalla

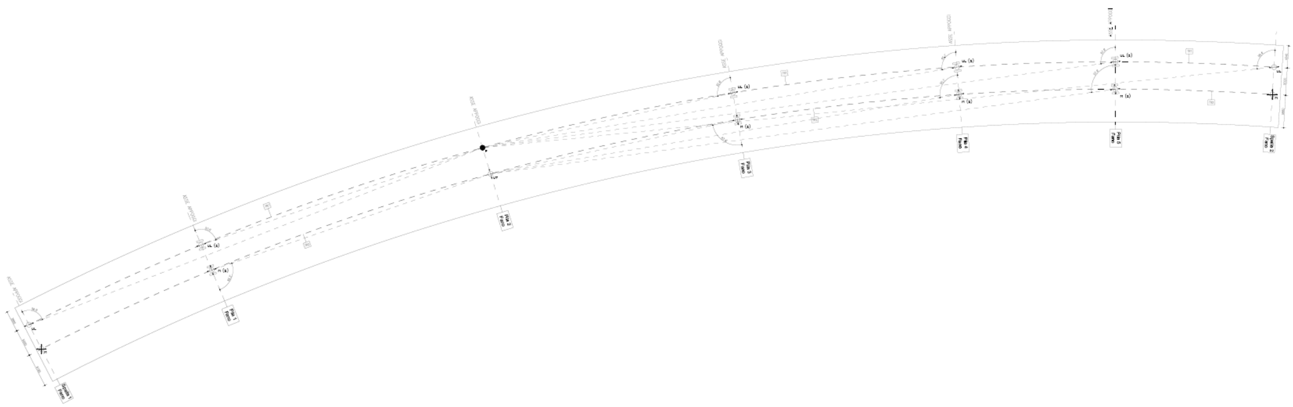
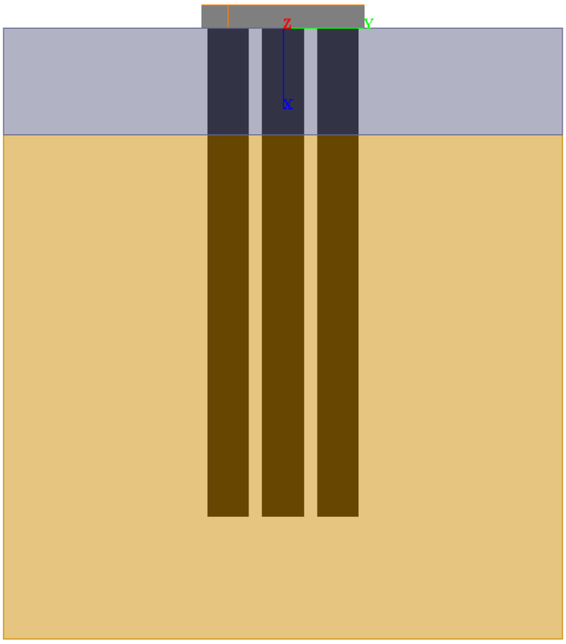
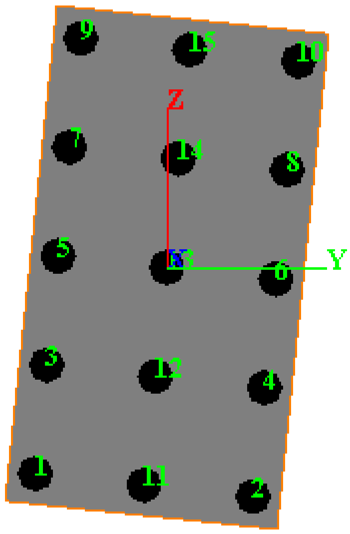


Figura 43: Schema appoggi impalcato

10.2 Modello di calcolo





Pali				Fondazione	
N° totale	**Maglia trasv x long**	**Interasse (m) trasv x long**	**L (m)**	**H (m)**	**Dimensioni (m) trasv x long**
15	5 x 3	3.60 x 3.60	32.0	1.50	16.20 x 9.00

10.3 Sollecitazioni sulla palificata

Per il calcolo della palificata, oltre agli scarichi sugli appoggi, sono stati considerati i contributi dovuti ai pesi propri e alla spinta a riposo del terreno di riempimento. Il peso proprio della fondazione è funzione della sua geometria. Il peso proprio del terreno di riempimento è stato considerato per un’altezza *H* pari alla media dei due muri d’ala (*H*≈8.20m) e agente su una larghezza *L*=13.5m.

$P_{P-fond} \cong 5500kN$
$P_{P-riemp} \cong 17100kN$
$S_{0-riemp} \cong 7800kN$

Nella tabella seguente si riportano i carichi concentrati equivalenti sulla palificata rispetto all’origine.

Comb.	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
SLU $stat_{MAX}$	46722.6	11948.5	1397.2	2603.1	2860.6	-62792.4
SLU $stat_{MIN}$	37482.6	11291.1	1397.2	2402.7	5212.0	-31921.8
SLU $sism_{MAX}$	28598.9	7612.8	2682.5	7299.2	14297.1	-28071.2
SLU $sism_{MIN}$	25830.5	7174.6	-1133.5	-4834.4	-10011.6	-23623.9
SLE $stat_{MAX}$	32499.7	7965.7	931.4	1735.4	1713.8	-43655.9
SLE $stat_{MIN}$	25809.7	7527.4	931.4	1601.8	3436.6	-21546.4

10.4 Sollecitazioni sui pali

Nella tabella seguente è indicato il numero del palo in cui agiscono le sollecitazioni maggiori, lo sforzo normale minimo e massimo (con relativi momenti flettenti e taglio associati) e il momento flettente con le relative sollecitazioni associate. Per ulteriori approfondimenti si vedano i relativi allegati di calcolo.

	Palo	N [kN]	M [kNm]	V [kN]
N_{MAX}	10	5749.7	2082.3	774.1
N_{MIN}	1	-58.3	1134.8	408.3
M_{MAX}	2	5242.2	2296.3	832.4
V_{MAX}	2	5242.2	2296.3	832.4

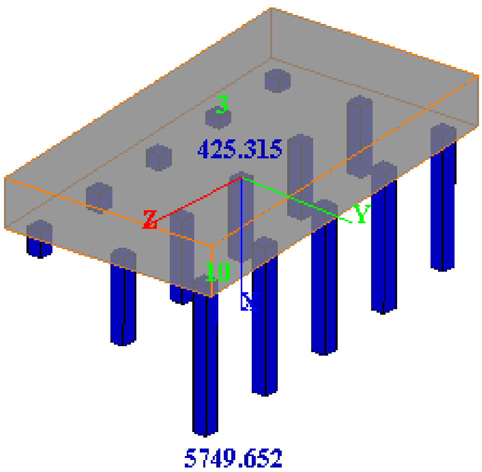


Figura 44: Spalla – inviluppo massime azioni verticali sui pali

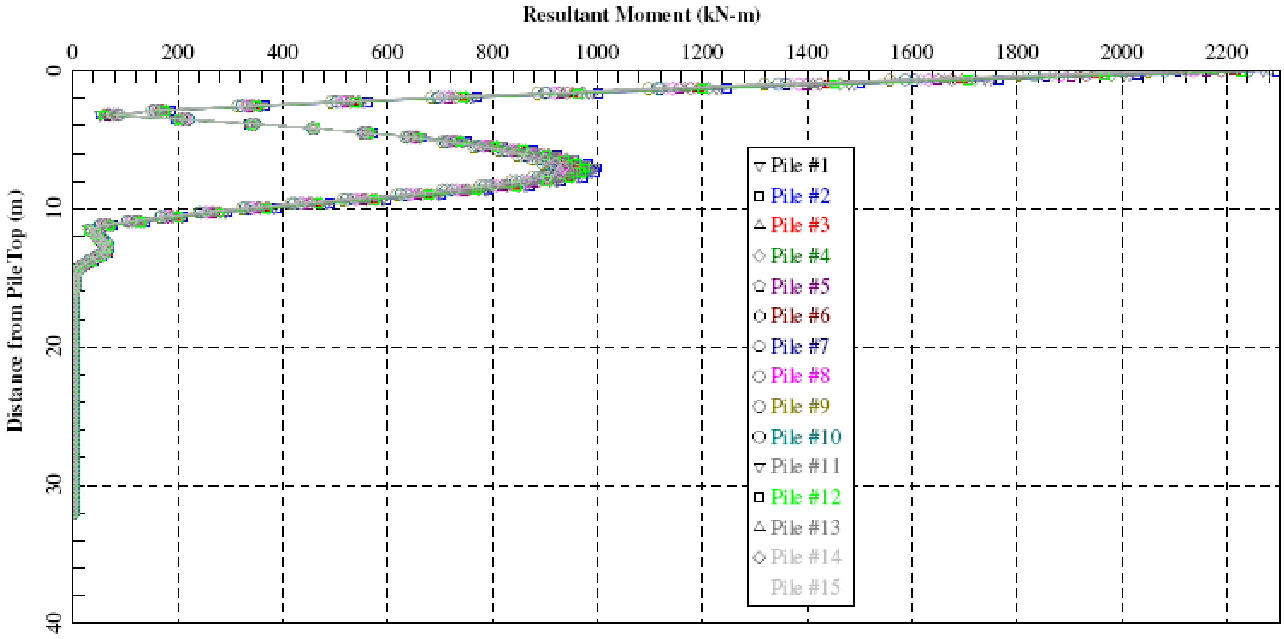


Figura 45: Spalla – inviluppo massimo momento totale sui pali

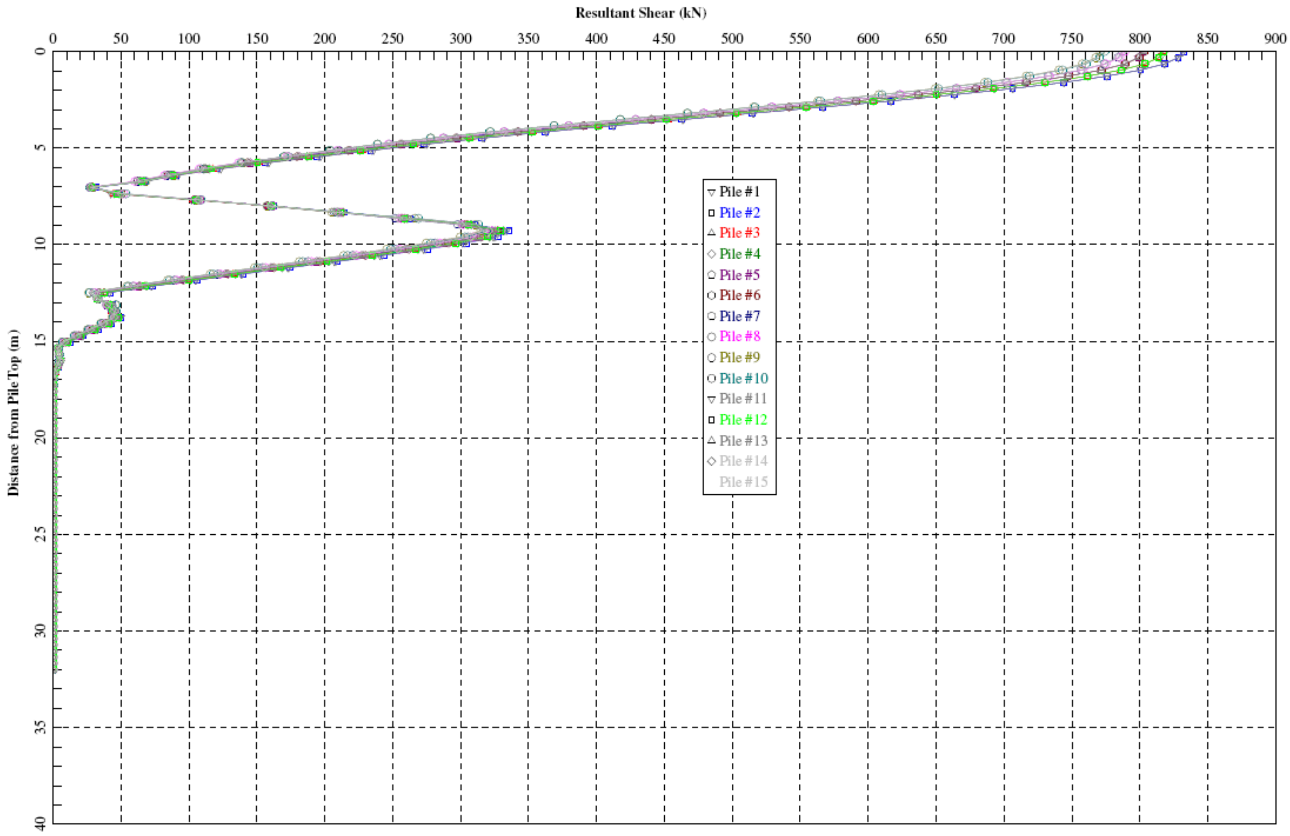


Figura 46: Spalla – inviluppo massimo taglio totale sui pali

10.5 Verifiche strutturali pali

Per le verifiche di resistenza si considera un sezione circolare di diametro Ø1200 armata nel modo seguente:

Armatura longitudinale	$30\emptyset30$
Armatura a taglio (spirale)	$\emptyset14/20$
Incidenza	$\approx 150kg/m^3$

Nome sezione:	pali spalla	
Tipo sezione	Circolare	
Diametro	120.0	[cm]

Caratteristiche geometriche

Area sezione	11291.57	[cmq]
Inerzia in direzione X	10146105.5	[cm^4]
Inerzia in direzione Y	10146105.5	[cm^4]
Inerzia in direzione XY	0.0	[cm^4]
Ascissa baricentro sezione	X_G = 60.00	[cm]
Ordinata baricentro sezione	Y_G = 60.00	[cm]

Elenco ferri

Simbologia adottata

Posizione riferita all'origine

N°	numero d'ordine
X	Ascissa posizione ferro espresso in [cm]
Y	Ordinata posizione ferro espresso in [cm]
d	Diametro ferro espresso in [mm]
ω	Area del ferro espresso in [cmq]

N°	X	Y	d	ω
1	109.60	60.00	30	7.07
2	108.52	70.31	30	7.07
3	105.31	80.17	30	7.07
4	100.13	89.15	30	7.07
5	93.19	96.86	30	7.07
6	84.80	102.95	30	7.07
7	75.33	107.17	30	7.07
8	65.18	109.33	30	7.07
9	54.82	109.33	30	7.07
10	44.67	107.17	30	7.07
11	35.20	102.95	30	7.07
12	26.81	96.86	30	7.07
13	19.87	89.15	30	7.07
14	14.69	80.17	30	7.07
15	11.48	70.31	30	7.07
16	10.40	60.00	30	7.07
17	11.48	49.69	30	7.07
18	14.69	39.83	30	7.07
19	19.87	30.85	30	7.07
20	26.81	23.14	30	7.07
21	35.20	17.05	30	7.07
22	44.67	12.83	30	7.07
23	54.82	10.67	30	7.07
24	65.18	10.67	30	7.07
25	75.33	12.83	30	7.07
26	84.80	17.05	30	7.07
27	93.19	23.14	30	7.07
28	100.13	30.85	30	7.07
29	105.31	39.83	30	7.07
30	108.52	49.69	30	7.07

Materiale impiegato : Calcestruzzo armato

Caratteristiche calcestruzzo

Resistenza caratteristica calcestruzzo	35.000	[MPa]
Coeff. omogeneizzazione acciaio/calcestruzzo	15.00	
Coeff. omogeneizzazione calcestruzzo teso/compresso	1.00	

Forma diagramma tensione-deformazione - PARABOLA-RETTANGOLO

Caratteristiche acciaio per calcestruzzo

Tensione ammissibile acciaio	450.000	[MPa]
Tensione snervamento acciaio	450.000	[MPa]
Modulo elastico E	205942.924	[MPa]
Fattore di incrudimento acciaio	1.00	

Combinazioni

Simbologia adottata

N°	numero d'ordine della combinazione
N	sforzo normale espresso in[kN]
M_Y	momento lungo Y espresso in [kNm]
M_X	momento lungo X espresso in [kNm]
M_t	momento torcente espresso in [kNm]
T_Y	taglio lungo Y espresso in [kN]
T_X	taglio lungo X espresso in [kN]
VD	verifica di dominio
VT	verifica tensionale (SLER - Combinazione rara, SLEF - Combinazione frequente, SLEQP - Combinazione quasi permanente, TAMM - Verifica a tensioni ammissibili)

N°	N	M_Y	M_X	M_t	T_Y	T_X	VD	VT

1	5749.7000	2082.3000	0.0000	0.0000	0.0000	774.1000	SI	NO
2	-58.3000	1134.8000	0.0000	0.0000	0.0000	408.3000	SI	NO
3	5242.2000	2296.3000	0.0000	0.0000	0.0000	832.4000	SI	NO
4	5242.2000	2296.3000	0.0000	0.0000	0.0000	832.4000	SI	NO
5	3590.2000	1496.3000	0.0000	0.0000	0.0000	0.0000	NO	SLER
6	3590.2000	1496.3000	0.0000	0.0000	0.0000	0.0000	NO	SLEQP
7	3590.2000	1496.3000	0.0000	0.0000	0.0000	0.0000	NO	SLEF

Risultati analisi

Caratteristiche asse neutro

Simbologia adottata

N° numero d'ordine della combinazione
Xc posizione asse neutro espresso in [cm]
α inclinazione asse neutro rispetto all'orizzontale, espressa in [°]
(xi; yi) - (xf; yf) Punti di intersezione dell'asse neutro con il perimetro della sezione, espressi in [cm]

N°	Xc	α	(xi; yi)	(xf; yf)
5	71.71	0.00	(-1399.67; 48.29)	(1519.67; 48.29)
6	71.71	0.00	(-1399.67; 48.29)	(1519.67; 48.29)
7	71.71	0.00	(-1399.67; 48.29)	(1519.67; 48.29)

Risultati tensionali

Simbologia adottata

N° numero d'ordine della combinazione
$\sigma_{c\text{-}max}$ Tensione massima nel calcestruzzo espresso in [MPa]
$\sigma_{c\text{-}min}$ Tensione minima nel calcestruzzo espresso in [MPa]
$\sigma_{f\text{-}max}$ Tensione massima nel ferro espresso in [MPa]
$\sigma_{f\text{-}min}$ Tensione minima nel ferro espresso in [MPa]
τ_c Tensione tangenziale nel calcestruzzo espresso in [MPa]

N°	$\sigma_{c\text{-}max}$	$\sigma_{c\text{-}min}$	τ_c	$\sigma_{f\text{-}max}$	$\sigma_{f\text{-}min}$
5	10.088	0.000	0.000	128.804	-79.387
6	10.088	0.000	0.000	128.804	-79.387
7	10.088	0.000	0.000	128.804	-79.387

Sollecitazioni ultime

Simbologia adottata

N° numero d'ordine della combinazione
N_u Sforzo normale ultimo, espresso in [kN]
M_{Xu} Momento ultimo in direzione X, espresso in [kNm]
M_{Yu} Momento ultimo in direzione Y, espresso in [kNm]
FS Fattore di sicurezza

Combinazione n° 1

N_u	M_{Xu}	M_{Yu}	FS
11764.4800	0.0000	4260.6008	2.05
21351.1244	0.0000	2082.3000	3.71
5749.7000	0.0000	4519.6100	2.17

Combinazione n° 2

N_u	M_{Xu}	M_{Yu}	FS
-175.3177	0.0000	3412.5310	3.01
-5890.9726	0.0000	1134.8000	101.05
-58.3000	0.0000	3445.0193	3.04

Combinazione n° 3

N_u	M_{Xu}	M_{Yu}	FS
10222.0057	0.0000	4477.6605	1.95
20698.3967	0.0000	2296.3000	3.95
5242.2000	0.0000	4477.7578	1.95

Combinazione n° 4

N_u	M_{Xu}	M_{Yu}	FS
10222.0057	0.0000	4477.6605	1.95
20698.3967	0.0000	2296.3000	3.95
5242.2000	0.0000	4477.7578	1.95

Risultati taglio

Simbologia adottata

N° indice della combinazione
Dir Direzione di azione del taglio
V_{Rd} Resistenza di calcolo dell'elemento privo di armatura trasversali a taglio, espresso in [kN]
V_{Rcd} Resistenza di calcolo a "taglio compressione", espresso in [kN]
V_{Rsd} resistenza di calcolo a "taglio trazione", espresso in [kN]
nb Numero bracci staffe
Diametro e passo staffe, riportate nell'ultima colonna, sono i più cautelativi ottenuti dalla verifica a taglio nelle due direzioni.

N°	Dir	T	V_{Rd}	V_{Rcd}	V_{Rsd}	nb	Diametro e passo staffe
1	X	774.1000	--	3509.3232	1400.6899	2	ϕ14.00 - 20.00 [cm]

1	Y	0.0000	--	3509.3232	1400.6899	2	ϕ14.00 - 20.00 [cm]
2	X	408.3000	--	2807.4585	1400.6899	2	ϕ14.00 - 20.00 [cm]
2	Y	0.0000	--	2807.4585	1400.6899	2	ϕ14.00 - 20.00 [cm]
3	X	832.4000	--	3509.3232	1400.6899	2	ϕ14.00 - 20.00 [cm]
3	Y	0.0000	--	3509.3232	1400.6899	2	ϕ14.00 - 20.00 [cm]
4	X	832.4000	--	3509.3232	1400.6899	2	ϕ14.00 - 20.00 [cm]
4	Y	0.0000	--	3509.3232	1400.6899	2	ϕ14.00 - 20.00 [cm]

Risultati fessurazione

Simbologia adottata

N° numero d'ordine della combinazione
M_X Momento di prima fessurazione in direzione X, espresso in [kNm]
M_Y Momento di prima fessurazione in direzione Y, espresso in [kNm]
σ_f Tensione nell'acciaio, espressa in [MPa]
σ_c Tensione nel calcestruzzo, espressa in [MPa]
A_{eff} Area efficace a trazione, espressa in [cmq]
ε Deformazione media acciaio teso, espressa in [°]
S_{rm} Distanza media tra le fessure, espresso in [mm]
w Ampiezza delle fessure, espressa in [mm]

N°	M_X	M_Y	σ_f	σ_c	A_{eff}	ε	S_{rm}	w
6	0.0000	767.5844	-40.725	-3.485	5164.39	0.0231	611	0.1414
7	0.0000	767.5844	-40.725	-3.485	5164.39	0.0231	611	0.1414

10.6 Verifiche di capacità portante al carico limite pali

NOME: SPALLA 1	VERIFICA DI CAPACITA' PORTANTE	Rev. 01.0

DATI GEOMETRICI

D (m)	1.20	Diametro
L (m)	32.00	Lunghezza
A_b (m^2)	1.13	Area base
S_{lat} (m)	3.77	Superficie laterale

PARAMETRI CALCOLO

	SI	Resistenza di punta
ξ	1.40	Coeff. N° indagini
SET	1	Set parametri (ND/DR/RC)
W' (kN)	582.5	Peso efficace palo

Terreni granulari (DR):
δ/φ 0.70 tan(δ) Resistenza laterale

Terreni rocciosi (RC):
σ_c (MPa) 10
$\tau_{lim,MAX}$ (kPa) 215 < 300 < 585 OK

CALCOLO RESISTENZE

R_{cal} (kN)	R_k (kN)	α	γ	
9594.0	6852.9	1.000	1.35	Resistenza laterale compressione (c)
9573.1	6837.9	0.889	1.25	Resistenza laterale trazione (t)
2835.1	2025.0	1.000	1.15	Resistenza di base (b)

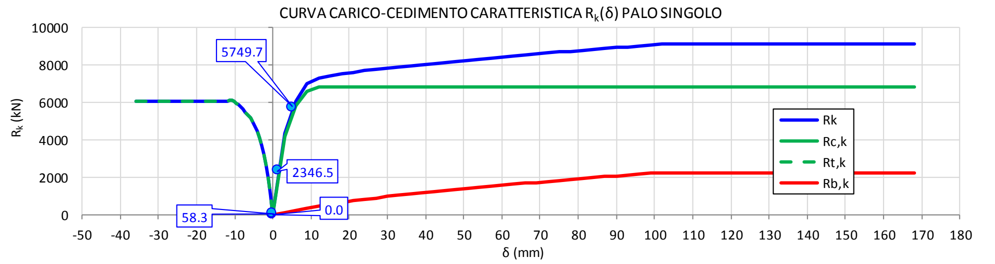
Tutti terreni (DR) (ND) (RC):

	DR	ND	RC
$\tau_{lim,MAX}$ (kPa)	100	100	300
$q_{b,lim}$ (kPa)	2000	2500	10000

VERIFICA RESISTENZA, CALCOLO CEDIMENTI

R_d (kN)	E_d (kN)	E_d/R_d		δ (mm)	K_{sec} (kN/mm)	Calcola	γ_G	
6701.9	5749.7	85.8%	VERIFICA OK	+5.2	1105.6	SI	1.30	Compressione SLU (A1+M1+R3)
6052.8	0.0	0.0%	VERIFICA OK	+0.0	0.0	SI	1.00	Trazione SLU (A1+M1+R3)
6876.6	2346.5	34.1%	VERIFICA OK	+1.3	1841.4	SI	1.00	Compressione SLV (A1+M1+R3)
6052.8	-58.3	1.0%	VERIFICA OK	-0.0	1917.7	SI	1.00	Trazione SLV (A1+M1+R3)

CURVA CARICO-CEDIMENTO CARATTERISTICA $R_k(\delta)$ PALO SINGOLO



δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)	δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)	δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)	δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)
-36.0	6091.5	6091.5	0.0	-3.0	3746.7	3746.7	0.0	42.0	8107.7	6852.9	1254.8	99.0	9078.3	6852.9	2225.4
-30.0	6091.5	6091.5	0.0	-2.4	3257.9	3257.9	0.0	45.0	8166.5	6852.9	1313.6	102.0	9114.8	6852.9	2261.9
-24.0	6091.5	6091.5	0.0	-1.8	2661.4	2661.4	0.0	48.0	8223.6	6852.9	1370.7	105.0	9114.8	6852.9	2261.9
-18.0	6091.5	6091.5	0.0	-1.2	1935.8	1935.8	0.0	51.0	8279.5	6852.9	1426.6	108.0	9114.8	6852.9	2261.9
-12.0	6091.5	6091.5	0.0	-0.6	1057.3	1057.3	0.0	54.0	8334.4	6852.9	1481.5	111.0	9114.8	6852.9	2261.9
-11.4	6124.2	6124.2	0.0	0.0	0.0	0.0	0.0	57.0	8388.5	6852.9	1535.6	114.0	9114.8	6852.9	2261.9
-10.8	6110.3	6110.3	0.0	3.0	4350.8	4215.1	135.7	60.0	8441.9	6852.9	1589.0	117.0	9114.8	6852.9	2261.9
-10.2	6059.7	6059.7	0.0	6.0	6084.8	5823.6	261.2	63.0	8494.8	6852.9	1641.9	120.0	9114.8	6852.9	2261.9
-9.6	5981.8	5981.8	0.0	9.0	6996.2	6618.8	377.4	66.0	8547.3	6852.9	1694.4	123.0	9114.8	6852.9	2261.9
-9.0	5883.4	5883.4	0.0	12.0	7338.1	6852.9	485.2	69.0	8599.4	6852.9	1746.5	126.0	9114.8	6852.9	2261.9
-8.4	5769.4	5769.4	0.0	15.0	7438.2	6852.9	585.3	72.0	8651.1	6852.9	1798.2	129.0	9114.8	6852.9	2261.9
-7.8	5642.4	5642.4	0.0	18.0	7531.5	6852.9	678.6	75.0	8702.4	6852.9	1849.5	132.0	9114.8	6852.9	2261.9
-7.2	5502.9	5502.9	0.0	21.0	7618.6	6852.9	765.7	78.0	8753.2	6852.9	1900.3	135.0	9114.8	6852.9	2261.9
-6.6	5348.9	5348.9	0.0	24.0	7700.2	6852.9	847.3	81.0	8803.3	6852.9	1950.5	138.0	9114.8	6852.9	2261.9
-6.0	5176.6	5176.6	0.0	27.0	7777.0	6852.9	924.1	84.0	8852.7	6852.9	1999.8	141.0	9114.8	6852.9	2261.9
-5.4	4979.7	4979.7	0.0	30.0	7849.6	6852.9	996.7	87.0	8901.0	6852.9	2048.1	144.0	9114.8	6852.9	2261.9
-4.8	4749.9	4749.9	0.0	33.0	7918.4	6852.9	1065.5	90.0	8948.0	6852.9	2095.1	156.0	9114.8	6852.9	2261.9
-4.2	4476.7	4476.7	0.0	36.0	7984.1	6852.9	1131.2	93.0	8993.5	6852.9	2140.6	168.0	9114.8	6852.9	2261.9
-3.6	4147.3	4147.3	0.0	39.0	8047.0	6852.9	1194.2	96.0	9037.0	6852.9	2184.1				

COEFFICIENTI RIDUZIONE PORTATA

Interasse X (m) 3.60
Interasse Y (m) 3.60
Palo di verifica n° 8

Palo n°	X (m)	Y (m)	D (m)	list (m)	Base i/D	Compressione α (rad)	Compressione l_i (m)	Compressione $\alpha_T \cdot l_i$ (m)	Trazione α (rad)	Trazione l_i (m)	Trazione $\alpha_T \cdot l_i$ (m)
1	-3.60	-7.20	1.20	8.05	6.71	0.000	0.000	0.000	0.000	0.000	0.000
2	-3.60	-3.60	1.20	5.09	4.24	0.000	0.000	0.000	0.000	0.000	0.000
3	-3.60	0.00	1.20	3.60	3.00	0.000	0.000	0.000	0.524	0.314	0.209
4	-3.60	3.60	1.20	5.09	4.24	0.000	0.000	0.000	0.000	0.000	0.000
5	-3.60	7.20	1.20	8.05	6.71	0.000	0.000	0.000	0.000	0.000	0.000
6	0.00	-7.20	1.20	7.20	6.00	0.000	0.000	0.000	0.000	0.000	0.000
7	0.00	-3.60	1.20	3.60	3.00	0.000	0.000	0.000	0.524	0.314	0.209
8	0.00	0.00	1.20								
9	0.00	3.60	1.20	3.60	3.00	0.000	0.000	0.000	0.524	0.314	0.209
10	0.00	7.20	1.20	7.20	6.00	0.000	0.000	0.000	0.000	0.000	0.000
11	3.60	-7.20	1.20	8.05	6.71	0.000	0.000	0.000	0.000	0.000	0.000
12	3.60	-3.60	1.20	5.09	4.24	0.000	0.000	0.000	0.000	0.000	0.000
13	3.60	0.00	1.20	3.60	3.00	0.000	0.000	0.000	0.524	0.314	0.209
14	3.60	3.60	1.20	5.09	4.24	0.000	0.000	0.000	0.000	0.000	0.000
15	3.60	7.20	1.20	8.05	6.71	0.000	0.000	0.000	0.000	0.000	0.000
				α_q	1.000		$\alpha_{T,eq}$	1.000		$\alpha_{T,eq}$	0.889

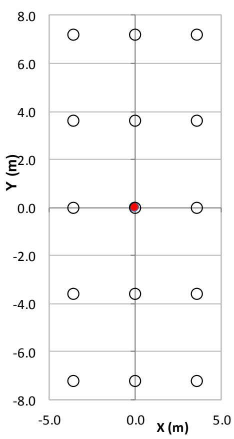


Figura 47: Condizioni DR - Riepilogo calcolo capacità portante

NOME: SPALLA 1	VERIFICA DI CAPACITA' PORTANTE	Rev. 01.0

DATI GEOMETRICI

D (m)	1.20	Diametro
L (m)	32.00	Lunghezza
A_b (m^2)	1.13	Area base
S_{lat} (m)	3.77	Superficie laterale

PARAMETRI CALCOLO

	SI	Resistenza di punta
ξ	1.40	Coeff. N° indagini
SET	2	Set parametri (ND/DR/RC)
W' (kN)	582.5	Peso efficace palo

Terreni granulari (DR):
δ/φ 0.70 tan(δ) Resistenza laterale

Terreni rocciosi (RC):
σ_c (MPa) 10
$\tau_{lim,MAX}$ (kPa) 215 < 300 < 585 OK

Tutti terreni (DR) (ND) (RC):

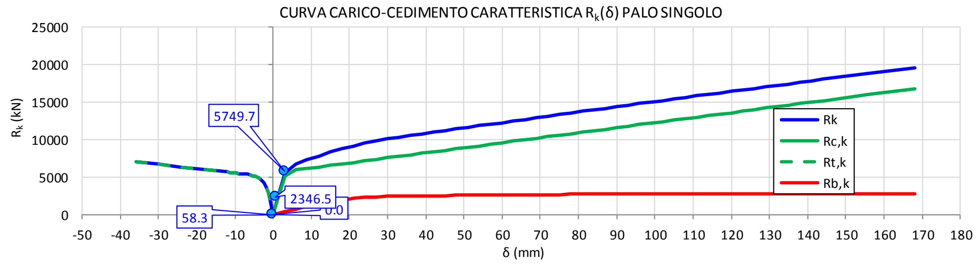
	DR	ND	RC
$\tau_{lim,MAX}$ (kPa)	100	100	300
$q_{b,lim}$ (kPa)	2000	2500	10000

CALCOLO RESISTENZE

R_{cal} (kN)	R_k (kN)	α	γ	
8991.2	6422.3	1.000	1.35	Resistenza laterale compressione (c)
8970.3	6407.4	0.889	1.25	Resistenza laterale trazione (t)
2827.4	2019.6	1.000	1.15	Resistenza di base (b)

VERIFICA RESISTENZA, CALCOLO CEDIMENTI

R_d (kN)	E_d (kN)	E_d/R_d		δ (mm)	K_{sec} (kN/mm)	Calcola	γ_G	
6323.4	5749.7	90.9%	VERIFICA OK	+3.2	1803.6	SI	1.30	Compressione SLU (A1+M1+R3)
5708.3	0.0	0.0%	VERIFICA OK	+0.0	0.0	SI	1.00	Trazione SLU (A1+M1+R3)
6498.2	2346.5	36.1%	VERIFICA OK	+0.7	3270.7	SI	1.00	Compressione SLV (A1+M1+R3)
5708.3	-58.3	1.0%	VERIFICA OK	-0.0	3354.0	SI	1.00	Trazione SLV (A1+M1+R3)



δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)	δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)	δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)	δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)
-36.0	7135.9	7135.9	0.0	-3.0	4627.1	4627.1	0.0	42.0	11015.0	8429.3	2585.8	99.0	15062.3	12242.5	2819.8
-30.0	6779.1	6779.1	0.0	-2.4	4281.4	4281.4	0.0	45.0	11234.7	8630.0	2604.8	102.0	15267.9	12443.2	2824.7
-24.0	6422.3	6422.3	0.0	-1.8	3744.1	3744.1	0.0	48.0	11453.7	8830.7	2623.0	105.0	15472.8	12643.9	2828.8
-18.0	6065.5	6065.5	0.0	-1.2	2925.7	2925.7	0.0	51.0	11671.9	9031.4	2640.5	108.0	15676.9	12844.6	2832.2
-12.0	5708.7	5708.7	0.0	-0.6	1719.3	1719.3	0.0	54.0	11889.4	9232.1	2657.3	111.0	15880.2	13045.3	2834.9
-11.4	5673.0	5673.0	0.0	0.0	0.0	0.0	0.0	57.0	12106.1	9432.8	2673.3	114.0	16082.9	13246.0	2836.8
-10.8	5637.4	5637.4	0.0	3.0	5633.5	5205.4	428.0	60.0	12322.1	9633.5	2688.6	117.0	16284.7	13446.7	2838.0
-10.2	5601.7	5601.7	0.0	6.0	6837.5	6020.7	816.8	63.0	12537.3	9834.2	2703.2	120.0	16485.9	13647.4	2838.5
-9.6	5566.0	5566.0	0.0	9.0	7387.9	6221.6	1166.3	66.0	12751.8	10034.9	2717.0	123.0	16675.5	13848.1	2827.4
-9.0	5530.3	5530.3	0.0	12.0	7898.8	6422.3	1476.5	69.0	12965.6	10235.6	2730.0	126.0	16876.2	14048.8	2827.4
-8.4	5494.6	5494.6	0.0	15.0	8370.5	6623.0	1747.4	72.0	13178.6	10436.3	2742.3	129.0	17076.9	14249.5	2827.4
-7.8	5459.0	5459.0	0.0	18.0	8802.8	6823.7	1979.1	75.0	13390.9	10637.0	2753.9	132.0	17277.6	14450.2	2827.4
-7.2	5423.3	5423.3	0.0	21.0	9196.0	7024.4	2171.6	78.0	13602.4	10837.7	2764.7	135.0	17478.3	14650.9	2827.4
-6.6	5420.9	5420.9	0.0	24.0	9549.8	7225.1	2324.7	81.0	13813.2	11038.4	2774.8	138.0	17679.0	14851.6	2827.4
-6.0	5351.7	5351.7	0.0	27.0	9864.4	7425.8	2438.6	84.0	14023.2	11239.0	2784.2	141.0	17879.7	15052.3	2827.4
-5.4	5251.4	5251.4	0.0	30.0	10139.7	7626.5	2513.2	87.0	14232.5	11439.7	2792.8	144.0	18080.4	15253.0	2827.4
-4.8	5137.6	5137.6	0.0	33.0	10375.8	7827.2	2548.6	90.0	14441.1	11640.4	2800.6	156.0	18883.2	16055.8	2827.4
-4.2	5010.6	5010.6	0.0	36.0	10573.4	8027.9	2545.5	93.0	14648.9	11841.1	2807.8	168.0	19686.0	16858.6	2827.4
-3.6	4852.3	4852.3	0.0	39.0	10794.6	8228.6	2566.0	96.0	14856.0	12041.8	2814.1				

COEFFICIENTI RIDUZIONE PORTATA

Interasse X (m) 3.60
Interasse Y (m) 3.60
Palo di verifica n° 8

					Base	Compressione			Trazione		
Palo n°	X (m)	Y (m)	D (m)	dist (m)	i/D	α (rad)	l_i (m)	$\alpha_T \cdot l_i$ (m)	α (rad)	l_i (m)	$\alpha_T \cdot l_i$ (m)
1	-3.60	-7.20	1.20	8.05	6.71	0.000	0.000	0.000	0.000	0.000	0.000
2	-3.60	-3.60	1.20	5.09	4.24	0.000	0.000	0.000	0.000	0.000	0.000
3	-3.60	0.00	1.20	3.60	3.00	0.000	0.000	0.000	0.524	0.314	0.209
4	-3.60	3.60	1.20	5.09	4.24	0.000	0.000	0.000	0.000	0.000	0.000
5	-3.60	7.20	1.20	8.05	6.71	0.000	0.000	0.000	0.000	0.000	0.000
6	0.00	-7.20	1.20	7.20	6.00	0.000	0.000	0.000	0.000	0.000	0.000
7	0.00	-3.60	1.20	3.60	3.00	0.000	0.000	0.000	0.524	0.314	0.209
8	0.00	0.00	1.20								
9	0.00	3.60	1.20	3.60	3.00	0.000	0.000	0.000	0.524	0.314	0.209
10	0.00	7.20	1.20	7.20	6.00	0.000	0.000	0.000	0.000	0.000	0.000
11	3.60	-7.20	1.20	8.05	6.71	0.000	0.000	0.000	0.000	0.000	0.000
12	3.60	-3.60	1.20	5.09	4.24	0.000	0.000	0.000	0.000	0.000	0.000
13	3.60	0.00	1.20	3.60	3.00	0.000	0.000	0.000	0.524	0.314	0.209
14	3.60	3.60	1.20	5.09	4.24	0.000	0.000	0.000	0.000	0.000	0.000
15	3.60	7.20	1.20	8.05	6.71	0.000	0.000	0.000	0.000	0.000	0.000
				α_q	1.000		$\alpha_{T,eq}$	1.000		$\alpha_{T,eq}$	0.889

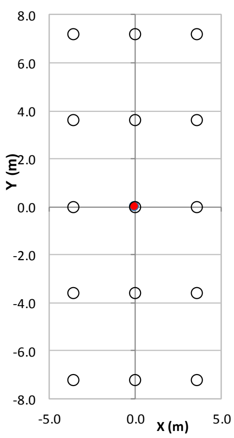
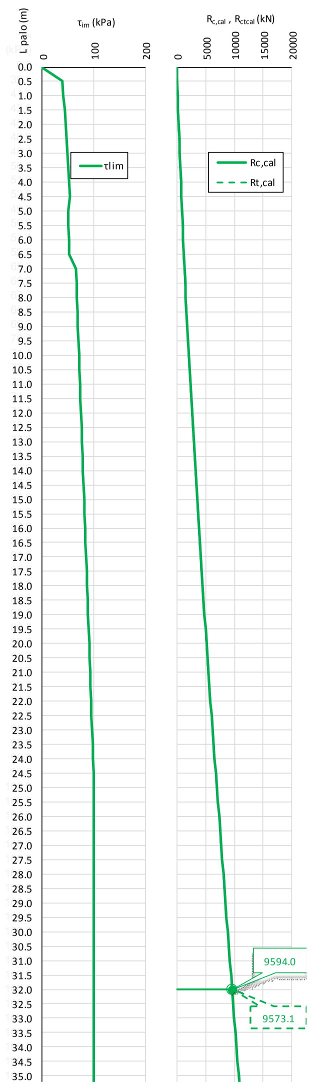


Figura 48: Condizioni ND - Riepilogo calcolo capacità portante

NOME: SPALLA 1

VERIFICA DI CAPACITA' PORTANTE – Capacità portante laterale $R_{c,cal}$, $R_{t,cal}$

Terreno	Falda		L palo (m)	z terreno da p.c. (m)	γ_{sat} (kN/m³)	σ'_{v0} (kPa)	K	ϕ (°)	N_{SPT} (n° colpi)	c' (kPa)	$\tau_{lim,D}$ (kPa)	$R_{c,cal}$ (kN)	$R_{t,cal}$ (kN)	DR / ND / RC
UNITA b		PALO	0.0	6.0	20.5	123.0						0.0	0.0	
		PALO	0.5	6.5	20.5	133.3	0.50	30.0	30	15.0	39.1	73.7	65.5	DR
		PALO	1.0	7.0	20.5	143.5	0.50	30.0	30	15.0	41.0	151.0	142.4	DR
		PALO	1.5	7.5	20.5	153.8	0.50	30.0	30	15.0	43.0	232.1	223.1	DR
		PALO	2.0	8.0	20.5	164.0	0.50	30.0	30	15.0	45.0	316.9	307.4	DR
		PALO	2.5	8.5	20.5	174.3	0.50	30.0	30	15.0	46.9	405.4	395.5	DR
		PALO	3.0	9.0	20.5	184.5	0.50	30.0	30	15.0	48.9	497.6	487.3	DR
		PALO	3.5	9.5	20.5	194.8	0.50	30.0	30	15.0	50.9	593.5	582.8	DR
	SI	PALO	4.0	10.0	20.5	200.0	0.50	30.0	30	15.0	51.9	691.3	680.4	DR
	SI	PALO	4.5	10.5	20.5	205.3	0.50	30.0	30	15.0	52.9	791.0	779.9	DR
UNITA FAAa	SI	PALO	5.0	11.0	20.5	210.5	0.50	24.0	50	20.0	49.8	884.8	874.4	DR
	SI	PALO	5.5	11.5	20.5	215.8	0.50	24.0	50	20.0	50.6	980.1	969.5	DR
	SI	PALO	6.0	12.0	20.5	221.0	0.50	24.0	50	20.0	51.4	1076.9	1066.2	DR
	SI	PALO	6.5	12.5	20.5	226.3	0.50	24.0	50	20.0	52.2	1175.2	1164.3	DR
UNITA FAA	SI	PALO	7.0	13.0	21.0	231.8	0.50	28.0	50	30.0	65.3	1298.2	1284.6	DR
	SI	PALO	7.5	13.5	21.0	237.3	0.50	28.0	50	30.0	66.2	1423.1	1409.2	DR
	SI	PALO	8.0	14.0	21.0	242.8	0.50	28.0	50	30.0	67.2	1549.8	1535.7	DR
	SI	PALO	8.5	14.5	21.0	248.3	0.50	28.0	50	30.0	68.2	1678.4	1664.1	DR
	SI	PALO	9.0	15.0	21.0	253.8	0.50	28.0	50	30.0	69.2	1808.8	1794.3	DR
	SI	PALO	9.5	15.5	21.0	259.3	0.50	28.0	50	30.0	70.2	1941.0	1926.3	DR
	SI	PALO	10.0	16.0	21.0	264.8	0.50	28.0	50	30.0	71.1	2075.1	2060.2	DR
	SI	PALO	10.5	16.5	21.0	270.3	0.50	28.0	50	30.0	72.1	2211.0	2195.9	DR
	SI	PALO	11.0	17.0	21.0	275.8	0.50	28.0	50	30.0	73.1	2348.8	2333.5	DR
	SI	PALO	11.5	17.5	21.0	281.3	0.50	28.0	50	30.0	74.1	2488.4	2472.9	DR
	SI	PALO	12.0	18.0	21.0	286.8	0.50	28.0	50	30.0	75.1	2629.9	2614.2	DR
	SI	PALO	12.5	18.5	21.0	292.3	0.50	28.0	50	30.0	76.0	2773.2	2757.3	DR
	SI	PALO	13.0	19.0	21.0	297.8	0.50	28.0	50	30.0	77.0	2918.4	2902.3	DR
	SI	PALO	13.5	19.5	21.0	303.3	0.50	28.0	50	30.0	78.0	3065.4	3049.1	DR
	SI	PALO	14.0	20.0	21.0	308.8	0.50	28.0	50	30.0	79.0	3214.3	3197.7	DR
	SI	PALO	14.5	20.5	21.0	314.3	0.50	28.0	50	30.0	79.9	3365.0	3348.2	DR
	SI	PALO	15.0	21.0	21.0	319.8	0.50	28.0	50	30.0	80.9	3517.5	3500.6	DR
	SI	PALO	15.5	21.5	21.0	325.3	0.50	28.0	50	30.0	81.9	3671.9	3654.7	DR
	SI	PALO	16.0	22.0	21.0	330.8	0.50	28.0	50	30.0	82.9	3828.1	3810.8	DR
	SI	PALO	16.5	22.5	21.0	336.3	0.50	28.0	50	30.0	83.9	3986.2	3968.7	DR
	SI	PALO	17.0	23.0	21.0	341.8	0.50	28.0	50	30.0	84.8	4146.2	4128.4	DR
	SI	PALO	17.5	23.5	21.0	347.3	0.50	28.0	50	30.0	85.8	4307.9	4290.0	DR
	SI	PALO	18.0	24.0	21.0	352.8	0.50	28.0	50	30.0	86.8	4471.6	4453.4	DR
	SI	PALO	18.5	24.5	21.0	358.3	0.50	28.0	50	30.0	87.8	4637.0	4618.6	DR
	SI	PALO	19.0	25.0	21.0	363.8	0.50	28.0	50	30.0	88.8	4804.3	4785.7	DR
	SI	PALO	19.5	25.5	21.0	369.3	0.50	28.0	50	30.0	89.7	4973.5	4954.7	DR
	SI	PALO	20.0	26.0	21.0	374.8	0.50	28.0	50	30.0	90.7	5144.5	5125.5	DR
	SI	PALO	20.5	26.5	21.0	380.3	0.50	28.0	50	30.0	91.7	5317.4	5298.1	DR
	SI	PALO	21.0	27.0	21.0	385.8	0.50	28.0	50	30.0	92.7	5492.1	5472.6	DR
	SI	PALO	21.5	27.5	21.0	391.3	0.50	28.0	50	30.0	93.7	5668.6	5649.0	DR
	SI	PALO	22.0	28.0	21.0	396.8	0.50	28.0	50	30.0	94.6	5847.0	5827.2	DR
	SI	PALO	22.5	28.5	21.0	402.3	0.50	28.0	50	30.0	95.6	6027.2	6007.2	DR
	SI	PALO	23.0	29.0	21.0	407.8	0.50	28.0	50	30.0	96.6	6209.3	6189.1	DR
	SI	PALO	23.5	29.5	21.0	413.3	0.50	28.0	50	30.0	97.6	6393.2	6372.8	DR
	SI	PALO	24.0	30.0	21.0	418.8	0.50	28.0	50	30.0	98.6	6579.0	6558.4	DR
	SI	PALO	24.5	30.5	21.0	424.3	0.50	28.0	50	30.0	99.5	6766.6	6745.8	DR
	SI	PALO	25.0	31.0	21.0	429.8	0.50	28.0	50	30.0	100.0	6955.1	6934.2	DR
	SI	PALO	25.5	31.5	21.0	435.3	0.50	28.0	50	30.0	100.0	7143.6	7122.7	DR
	SI	PALO	26.0	32.0	21.0	440.8	0.50	28.0	50	30.0	100.0	7332.1	7311.2	DR
	SI	PALO	26.5	32.5	21.0	446.3	0.50	28.0	50	30.0	100.0	7520.6	7499.7	DR
	SI	PALO	27.0	33.0	21.0	451.8	0.50	28.0	50	30.0	100.0	7709.1	7688.1	DR
	SI	PALO	27.5	33.5	21.0	457.3	0.50	28.0	50	30.0	100.0	7897.6	7876.6	DR
	SI	PALO	28.0	34.0	21.0	462.8	0.50	28.0	50	30.0	100.0	8086.1	8065.1	DR
	SI	PALO	28.5	34.5	21.0	468.3	0.50	28.0	50	30.0	100.0	8274.6	8253.6	DR
	SI	PALO	29.0	35.0	21.0	473.8	0.50	28.0	50	30.0	100.0	8463.1	8442.1	DR
	SI	PALO	29.5	35.5	21.0	479.3	0.50	28.0	50	30.0	100.0	8651.6	8630.6	DR
	SI	PALO	30.0	36.0	21.0	484.8	0.50	28.0	50	30.0	100.0	8840.1	8819.1	DR
	SI	PALO	30.5	36.5	21.0	490.3	0.50	28.0	50	30.0	100.0	9028.6	9007.6	DR
	SI	PALO	31.0	37.0	21.0	495.8	0.50	28.0	50	30.0	100.0	9217.1	9196.1	DR
	SI	PALO	31.5	37.5	21.0	501.3	0.50	28.0	50	30.0	100.0	9405.6	9384.6	DR
	SI	PALO	32.0	38.0	21.0	506.8	0.50	28.0	50	30.0	100.0	9594.0	9573.1	DR
	SI		32.5	38.5	21.0	512.3	0.50	28.0	50	30.0	100.0	9782.5	9761.6	DR
	SI		33.0	39.0	21.0	517.8	0.50	28.0	50	30.0	100.0	9971.0	9950.1	DR
	SI		33.5	39.5	21.0	523.3	0.50	28.0	50	30.0	100.0	10159.5	10138.6	DR
	SI		34.0	40.0	21.0	528.8	0.50	28.0	50	30.0	100.0	10348.0	10327.1	DR
	SI		34.5	40.5	21.0	534.3	0.50	28.0	50	30.0	100.0	10536.5	10515.6	DR
	SI		35.0	41.0	21.0	539.8	0.50	28.0	50	30.0	100.0	10725.0	10704.1	DR



VERIFICA DI CAPACITA' PORTANTE – Capacità portante di base $R_{b,cal}$

L palo (m)	ϕ (°)	N_{SPT} (n° colpi)	c' (kPa)	N^*_q	N_c	$q_{b,lim,D}$ (kPa)	$R_{b,cal}$ (kN)	DR / ND / RC
0.0							0.0	
0.5	30.0	30	15.0	9.0	13.9	1407.1	1742.1	DR
1.0	30.0	30	15.0	9.0	13.9	1499.3	1858.0	DR
1.5	30.0	30	15.0	9.0	13.9	1591.6	1973.9	DR
2.0	30.0	30	15.0	9.0	13.9	1683.8	2089.9	DR
2.5	30.0	30	15.0	9.0	13.9	1776.1	2205.8	DR
3.0	30.0	30	15.0	9.0	13.9	1868.3	2321.7	DR
3.5	30.0	30	15.0	9.0	13.9	1960.6	2437.6	DR
4.0	30.0	30	15.0	9.0	13.9	2000.0	2488.1	DR
4.5	30.0	30	15.0	9.0	13.9	2000.0	2494.1	DR
5.0	24.0	50	20.0	5.0	9.0	1232.2	1631.6	DR
5.5	24.0	50	20.0	5.0	9.0	1258.4	1667.3	DR
6.0	24.0	50	20.0	5.0	9.0	1284.7	1702.9	DR
6.5	24.0	50	20.0	5.0	9.0	1310.9	1738.5	DR
7.0	28.0	50	30.0	7.0	11.3	1960.8	2479.7	DR
7.5	28.0	50	30.0	7.0	11.3	1999.3	2529.5	DR
8.0	28.0	50	30.0	7.0	11.3	2000.0	2536.5	DR
8.5	28.0	50	30.0	7.0	11.3	2000.0	2542.7	DR
9.0	28.0	50	30.0	7.0	11.3	2000.0	2548.9	DR
9.5	28.0	50	30.0	7.0	11.3	2000.0	2555.2	DR
10.0	28.0	50	30.0	7.0	11.3	2000.0	2561.4	DR
10.5	28.0	50	30.0	7.0	11.3	2000.0	2567.6	DR
11.0	28.0	50	30.0	7.0	11.3	2000.0	2573.8	DR
11.5	28.0	50	30.0	7.0	11.3	2000.0	2580.0	DR
12.0	28.0	50	30.0	7.0	11.3	2000.0	2586.3	DR
12.5	28.0	50	30.0	7.0	11.3	2000.0	2592.5	DR
13.0	28.0	50	30.0	7.0	11.3	2000.0	2598.7	DR
13.5	28.0	50	30.0	7.0	11.3	2000.0	2604.9	DR
14.0	28.0	50	30.0	7.0	11.3	2000.0	2611.1	DR
14.5	28.0	50	30.0	7.0	11.3	2000.0	2617.4	DR
15.0	28.0	50	30.0	7.0	11.3	2000.0	2623.6	DR
15.5	28.0	50	30.0	7.0	11.3	2000.0	2629.8	DR
16.0	28.0	50	30.0	7.0	11.3	2000.0	2636.0	DR
16.5	28.0	50	30.0	7.0	11.3	2000.0	2642.2	DR
17.0	28.0	50	30.0	7.0	11.3	2000.0	2648.5	DR
17.5	28.0	50	30.0	7.0	11.3	2000.0	2654.7	DR
18.0	28.0	50	30.0	7.0	11.3	2000.0	2660.9	DR
18.5	28.0	50	30.0	7.0	11.3	2000.0	2667.1	DR
19.0	28.0	50	30.0	7.0	11.3	2000.0	2673.3	DR
19.5	28.0	50	30.0	7.0	11.3	2000.0	2679.6	DR
20.0	28.0	50	30.0	7.0	11.3	2000.0	2685.8	DR
20.5	28.0	50	30.0	7.0	11.3	2000.0	2692.0	DR
21.0	28.0	50	30.0	7.0	11.3	2000.0	2698.2	DR
21.5	28.0	50	30.0	7.0	11.3	2000.0	2704.4	DR
22.0	28.0	50	30.0	7.0	11.3	2000.0	2710.7	DR
22.5	28.0	50	30.0	7.0	11.3	2000.0	2716.9	DR
23.0	28.0	50	30.0	7.0	11.3	2000.0	2723.1	DR
23.5	28.0	50	30.0	7.0	11.3	2000.0	2729.3	DR
24.0	28.0	50	30.0	7.0	11.3	2000.0	2735.5	DR
24.5	28.0	50	30.0	7.0	11.3	2000.0	2741.8	DR
25.0	28.0	50	30.0	7.0	11.3	2000.0	2748.0	DR
25.5	28.0	50	30.0	7.0	11.3	2000.0	2754.2	DR
26.0	28.0	50	30.0	7.0	11.3	2000.0	2760.4	DR
26.5	28.0	50	30.0	7.0	11.3	2000.0	2766.6	DR
27.0	28.0	50	30.0	7.0	11.3	2000.0	2772.9	DR
27.5	28.0	50	30.0	7.0	11.3	2000.0	2779.1	DR
28.0	28.0	50	30.0	7.0	11.3	2000.0	2785.3	DR
28.5	28.0	50	30.0	7.0	11.3	2000.0	2791.5	DR
29.0	28.0	50	30.0	7.0	11.3	2000.0	2797.7	DR
29.5	28.0	50	30.0	7.0	11.3	2000.0	2804.0	DR
30.0	28.0	50	30.0	7.0	11.3	2000.0	2810.2	DR
30.5	28.0	50	30.0	7.0	11.3	2000.0	2816.4	DR
31.0	28.0	50	30.0	7.0	11.3	2000.0	2822.6	DR
31.5	28.0	50	30.0	7.0	11.3	2000.0	2828.8	DR
32.0	28.0	50	30.0	7.0	11.3	2000.0	2835.1	DR
32.5	28.0	50	30.0	7.0	11.3	2000.0	2841.3	DR
33.0	28.0	50	30.0	7.0	11.3	2000.0	2847.5	DR
33.5	28.0	50	30.0	7.0	11.3	2000.0	2853.7	DR
34.0	28.0	50	30.0	7.0	11.3	2000.0	2859.9	DR
34.5	28.0	50	30.0	7.0	11.3	2000.0	2866.2	DR
35.0	28.0	50	30.0	7.0	11.3	2000.0	2872.4	DR

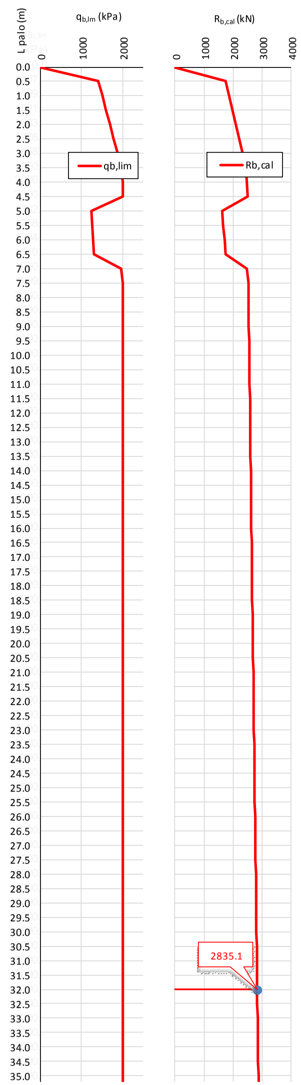
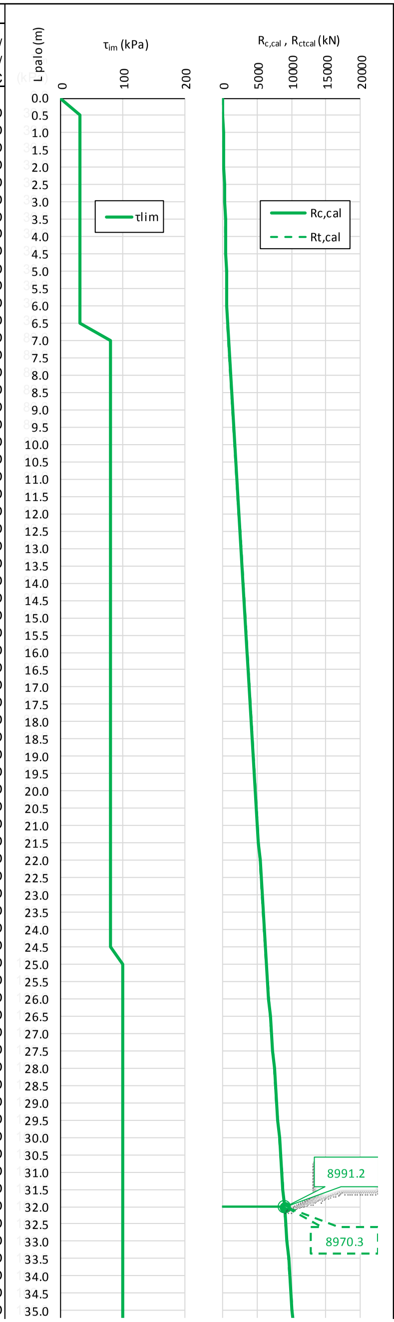


Figura 49: Condizioni DR - Dettaglio calcolo capacità portante laterale

NOME: SPALLA 1

VERIFICA DI CAPACITA' PORTANTE — Capacità portante laterale $R_{c,cal}$, $R_{t,cal}$

Terreno	Falda		L palo (m)	z terreno da p.c. (m)	γ_{sat} (kN/m³)	σ'_{v0} (kPa)	c_u (kPa)	$\tau_{lim,ND}$ (kPa)	$R_{c,cal}$ (kN)	$R_{t,cal}$ (kN)	DR / ND / RC
UNITA b		PALO	0.0	6.0	20.5	123.0			0.0	0.0	
		PALO	0.5	6.5	20.5	133.3	75.0	30.0	56.5	50.3	ND
		PALO	1.0	7.0	20.5	143.5	75.0	30.0	113.1	106.8	ND
		PALO	1.5	7.5	20.5	153.8	75.0	30.0	169.6	163.4	ND
		PALO	2.0	8.0	20.5	164.0	75.0	30.0	226.2	219.9	ND
		PALO	2.5	8.5	20.5	174.3	75.0	30.0	282.7	276.5	ND
		PALO	3.0	9.0	20.5	184.5	75.0	30.0	339.3	333.0	ND
		PALO	3.5	9.5	20.5	194.8	75.0	30.0	395.8	389.6	ND
	SI	PALO	4.0	10.0	20.5	200.0	75.0	30.0	452.4	446.1	ND
	SI	PALO	4.5	10.5	20.5	205.3	75.0	30.0	508.9	502.7	ND
UNITA FAAa	SI	PALO	5.0	11.0	20.5	210.5	75.0	30.0	565.5	559.2	ND
	SI	PALO	5.5	11.5	20.5	215.8	75.0	30.0	622.0	615.8	ND
	SI	PALO	6.0	12.0	20.5	221.0	75.0	30.0	678.6	672.3	ND
	SI	PALO	6.5	12.5	20.5	226.3	75.0	30.0	735.1	728.8	ND
UNITA FAA	SI	PALO	7.0	13.0	21.0	231.8	200.0	80.0	885.9	869.2	ND
	SI	PALO	7.5	13.5	21.0	237.3	200.0	80.0	1036.7	1020.0	ND
	SI	PALO	8.0	14.0	21.0	242.8	200.0	80.0	1187.5	1170.8	ND
	SI	PALO	8.5	14.5	21.0	248.3	200.0	80.0	1338.3	1321.6	ND
	SI	PALO	9.0	15.0	21.0	253.8	200.0	80.0	1489.1	1472.4	ND
	SI	PALO	9.5	15.5	21.0	259.3	200.0	80.0	1639.9	1623.2	ND
	SI	PALO	10.0	16.0	21.0	264.8	200.0	80.0	1790.7	1774.0	ND
	SI	PALO	10.5	16.5	21.0	270.3	200.0	80.0	1941.5	1924.7	ND
	SI	PALO	11.0	17.0	21.0	275.8	200.0	80.0	2092.3	2075.5	ND
	SI	PALO	11.5	17.5	21.0	281.3	200.0	80.0	2243.1	2226.3	ND
	SI	PALO	12.0	18.0	21.0	286.8	200.0	80.0	2393.9	2377.1	ND
	SI	PALO	12.5	18.5	21.0	292.3	200.0	80.0	2544.7	2527.9	ND
	SI	PALO	13.0	19.0	21.0	297.8	200.0	80.0	2695.5	2678.7	ND
	SI	PALO	13.5	19.5	21.0	303.3	200.0	80.0	2846.3	2829.5	ND
	SI	PALO	14.0	20.0	21.0	308.8	200.0	80.0	2997.1	2980.3	ND
	SI	PALO	14.5	20.5	21.0	314.3	200.0	80.0	3147.9	3131.1	ND
	SI	PALO	15.0	21.0	21.0	319.8	200.0	80.0	3298.7	3281.9	ND
	SI	PALO	15.5	21.5	21.0	325.3	200.0	80.0	3449.5	3432.7	ND
	SI	PALO	16.0	22.0	21.0	330.8	200.0	80.0	3600.3	3583.5	ND
	SI	PALO	16.5	22.5	21.0	336.3	200.0	80.0	3751.1	3734.3	ND
	SI	PALO	17.0	23.0	21.0	341.8	200.0	80.0	3901.9	3885.1	ND
	SI	PALO	17.5	23.5	21.0	347.3	200.0	80.0	4052.7	4035.9	ND
	SI	PALO	18.0	24.0	21.0	352.8	200.0	80.0	4203.5	4186.7	ND
	SI	PALO	18.5	24.5	21.0	358.3	200.0	80.0	4354.2	4337.5	ND
	SI	PALO	19.0	25.0	21.0	363.8	200.0	80.0	4505.0	4488.3	ND
	SI	PALO	19.5	25.5	21.0	369.3	200.0	80.0	4655.8	4639.1	ND
	SI	PALO	20.0	26.0	21.0	374.8	200.0	80.0	4806.6	4789.9	ND
	SI	PALO	20.5	26.5	21.0	380.3	200.0	80.0	4957.4	4940.7	ND
	SI	PALO	21.0	27.0	21.0	385.8	200.0	80.0	5108.2	5091.5	ND
	SI	PALO	21.5	27.5	21.0	391.3	200.0	80.0	5259.0	5242.3	ND
	SI	PALO	22.0	28.0	21.0	396.8	200.0	80.0	5409.8	5393.1	ND
	SI	PALO	22.5	28.5	21.0	402.3	200.0	80.0	5560.6	5543.9	ND
	SI	PALO	23.0	29.0	21.0	407.8	200.0	80.0	5711.4	5694.7	ND
	SI	PALO	23.5	29.5	21.0	413.3	200.0	80.0	5862.2	5845.5	ND
	SI	PALO	24.0	30.0	21.0	418.8	200.0	80.0	6013.0	5996.3	ND
	SI	PALO	24.5	30.5	21.0	424.3	200.0	80.0	6163.8	6147.0	ND
	SI	PALO	25.0	31.0	21.0	429.8	250.0	100.0	6352.3	6331.4	ND
	SI	PALO	25.5	31.5	21.0	435.3	250.0	100.0	6540.8	6519.9	ND
	SI	PALO	26.0	32.0	21.0	440.8	250.0	100.0	6729.3	6708.3	ND
	SI	PALO	26.5	32.5	21.0	446.3	250.0	100.0	6917.8	6896.8	ND
	SI	PALO	27.0	33.0	21.0	451.8	250.0	100.0	7106.3	7085.3	ND
	SI	PALO	27.5	33.5	21.0	457.3	250.0	100.0	7294.8	7273.8	ND
	SI	PALO	28.0	34.0	21.0	462.8	250.0	100.0	7483.3	7462.3	ND
	SI	PALO	28.5	34.5	21.0	468.3	250.0	100.0	7671.8	7650.8	ND
	SI	PALO	29.0	35.0	21.0	473.8	250.0	100.0	7860.3	7839.3	ND
	SI	PALO	29.5	35.5	21.0	479.3	250.0	100.0	8048.8	8027.8	ND
	SI	PALO	30.0	36.0	21.0	484.8	250.0	100.0	8237.3	8216.3	ND
	SI	PALO	30.5	36.5	21.0	490.3	250.0	100.0	8425.8	8404.8	ND
	SI	PALO	31.0	37.0	21.0	495.8	250.0	100.0	8614.2	8593.3	ND
	SI	PALO	31.5	37.5	21.0	501.3	250.0	100.0	8802.7	8781.8	ND
	SI	PALO	32.0	38.0	21.0	506.8	250.0	100.0	8991.2	8970.3	ND
	SI		32.5	38.5	21.0	512.3	250.0	100.0	9179.7	9158.8	ND
	SI		33.0	39.0	21.0	517.8	250.0	100.0	9368.2	9347.3	ND
	SI		33.5	39.5	21.0	523.3	250.0	100.0	9556.7	9535.8	ND
	SI		34.0	40.0	21.0	528.8	250.0	100.0	9745.2	9724.3	ND
	SI		34.5	40.5	21.0	534.3	250.0	100.0	9933.7	9912.8	ND
	SI		35.0	41.0	21.0	539.8	250.0	100.0	10122.2	10101.3	ND



VERIFICA DI CAPACITA' PORTANTE — Capacità portante di base $R_{b,cal}$

L palo (m)	σ_{v0} (kPa)	c_u (kPa)	$q_{b,lim,ND}$ (kPa)	$R_{b,cal}$ (kN)	DR / ND / RC
0.0	0.0			0.0	
0.5	10.3	75.0	685.3	775.0	ND
1.0	20.5	75.0	695.5	786.6	ND
1.5	30.8	75.0	705.8	798.2	ND
2.0	41.0	75.0	716.0	809.8	ND
2.5	51.3	75.0	726.3	821.4	ND
3.0	61.5	75.0	736.5	833.0	ND
3.5	71.8	75.0	746.8	844.6	ND
4.0	82.0	75.0	757.0	856.1	ND
4.5	92.3	75.0	767.3	867.7	ND
5.0	102.5	75.0	777.5	879.3	ND
5.5	112.8	75.0	787.8	890.9	ND
6.0	123.0	75.0	798.0	902.5	ND
6.5	133.3	75.0	808.3	914.1	ND
7.0	143.8	200.0	1943.8	2198.3	ND
7.5	154.3	200.0	1954.3	2210.2	ND
8.0	164.8	200.0	1964.8	2222.1	ND
8.5	175.3	200.0	1975.3	2234.0	ND
9.0	185.8	200.0	1985.8	2245.8	ND
9.5	196.3	200.0	1996.3	2257.7	ND
10.0	206.8	200.0	2006.8	2269.6	ND
10.5	217.3	200.0	2017.3	2281.5	ND
11.0	227.8	200.0	2027.8	2293.3	ND
11.5	238.3	200.0	2038.3	2305.2	ND
12.0	248.8	200.0	2048.8	2317.1	ND
12.5	259.3	200.0	2059.3	2329.0	ND
13.0	269.8	200.0	2069.8	2340.8	ND
13.5	280.3	200.0	2080.3	2352.7	ND
14.0	290.8	200.0	2090.8	2364.6	ND
14.5	301.3	200.0	2101.3	2376.5	ND
15.0	311.8	200.0	2111.8	2388.3	ND
15.5	322.3	200.0	2122.3	2400.2	ND
16.0	332.8	200.0	2132.8	2412.1	ND
16.5	343.3	200.0	2143.3	2424.0	ND
17.0	353.8	200.0	2153.8	2435.8	ND
17.5	364.3	200.0	2164.3	2447.7	ND
18.0	374.8	200.0	2174.8	2459.6	ND
18.5	385.3	200.0	2185.3	2471.5	ND
19.0	395.8	200.0	2195.8	2483.3	ND
19.5	406.3	200.0	2206.3	2495.2	ND
20.0	416.8	200.0	2216.8	2507.1	ND
20.5	427.3	200.0	2227.3	2519.0	ND
21.0	437.8	200.0	2237.8	2530.8	ND
21.5	448.3	200.0	2248.3	2542.7	ND
22.0	458.8	200.0	2258.8	2554.6	ND
22.5	469.3	200.0	2269.3	2566.5	ND
23.0	479.8	200.0	2279.8	2578.3	ND
23.5	490.3	200.0	2290.3	2590.2	ND
24.0	500.8	200.0	2300.8	2602.1	ND
24.5	511.3	200.0	2311.3	2614.0	ND
25.0	521.8	250.0	2500.0	2827.4	ND
25.5	532.3	250.0	2500.0	2827.4	ND
26.0	542.8	250.0	2500.0	2827.4	ND
26.5	553.3	250.0	2500.0	2827.4	ND
27.0	563.8	250.0	2500.0	2827.4	ND
27.5	574.3	250.0	2500.0	2827.4	ND
28.0	584.8	250.0	2500.0	2827.4	ND
28.5	595.3	250.0	2500.0	2827.4	ND
29.0	605.8	250.0	2500.0	2827.4	ND
29.5	616.3	250.0	2500.0	2827.4	ND
30.0	626.8	250.0	2500.0	2827.4	ND
30.5	637.3	250.0	2500.0	2827.4	ND
31.0	647.8	250.0	2500.0	2827.4	ND
31.5	658.3	250.0	2500.0	2827.4	ND
32.0	668.8	250.0	2500.0	2827.4	ND
32.5	679.3	250.0	2500.0	2827.4	ND
33.0	689.8	250.0	2500.0	2827.4	ND
33.5	700.3	250.0	2500.0	2827.4	ND
34.0	710.8	250.0	2500.0	2827.4	ND
34.5	721.3	250.0	2500.0	2827.4	ND
35.0	731.8	250.0	2500.0	2827.4	ND

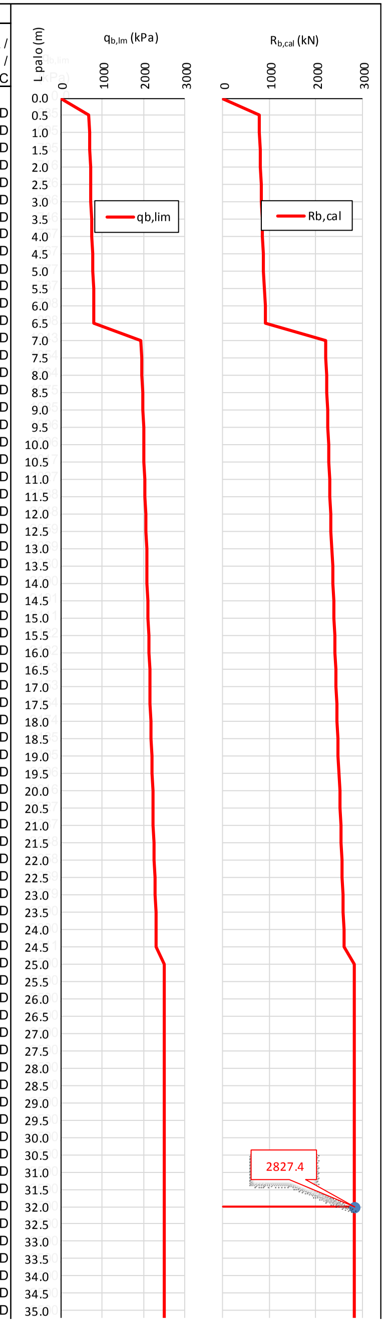


Figura 50: Condizioni ND - Dettaglio calcolo capacità portante di base

11 ANALISI FONDAZIONE PILA TIPO 1

A favore di sicurezza, le analisi saranno svolte modellando la pila 2, che presenta le condizioni di carico più gravose per le fondazioni.

11.1 Geometria

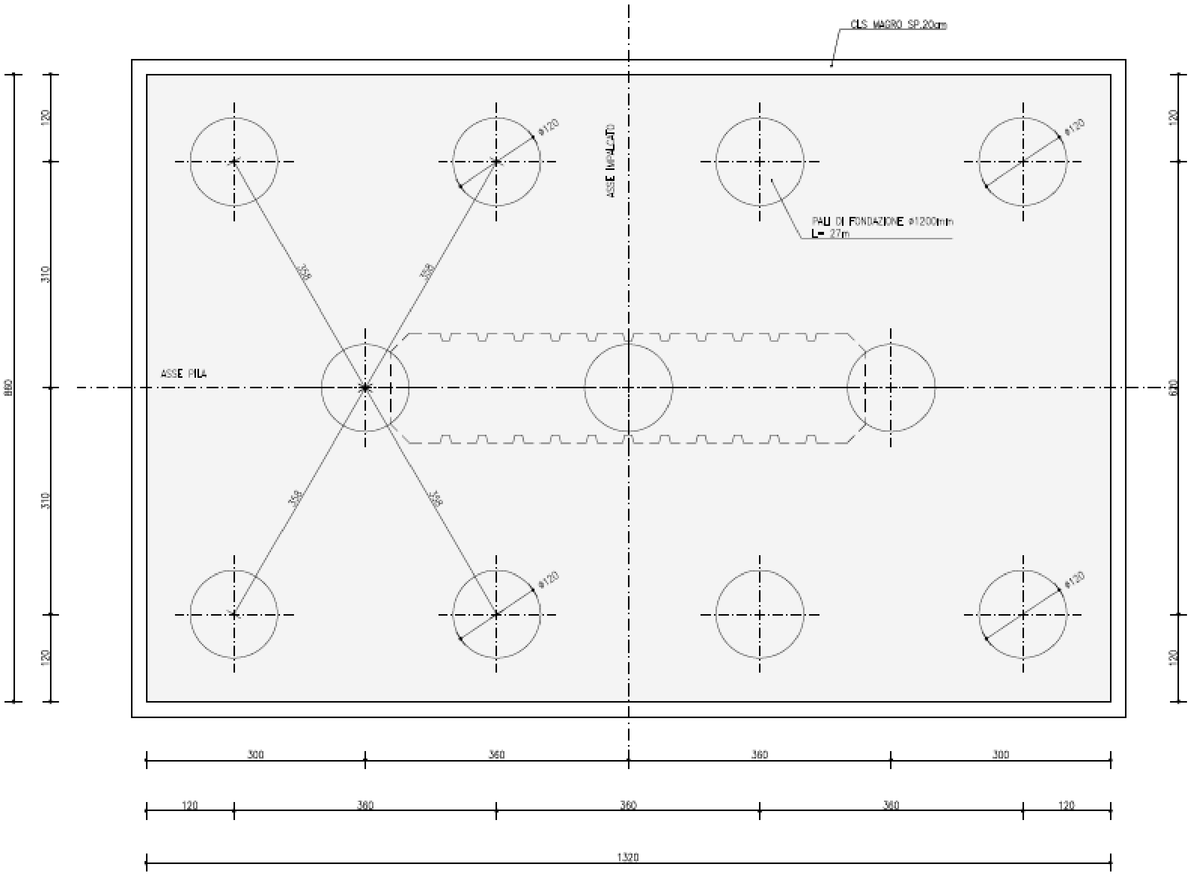


Figura 51: Pila tipo 1 – geometria pianta

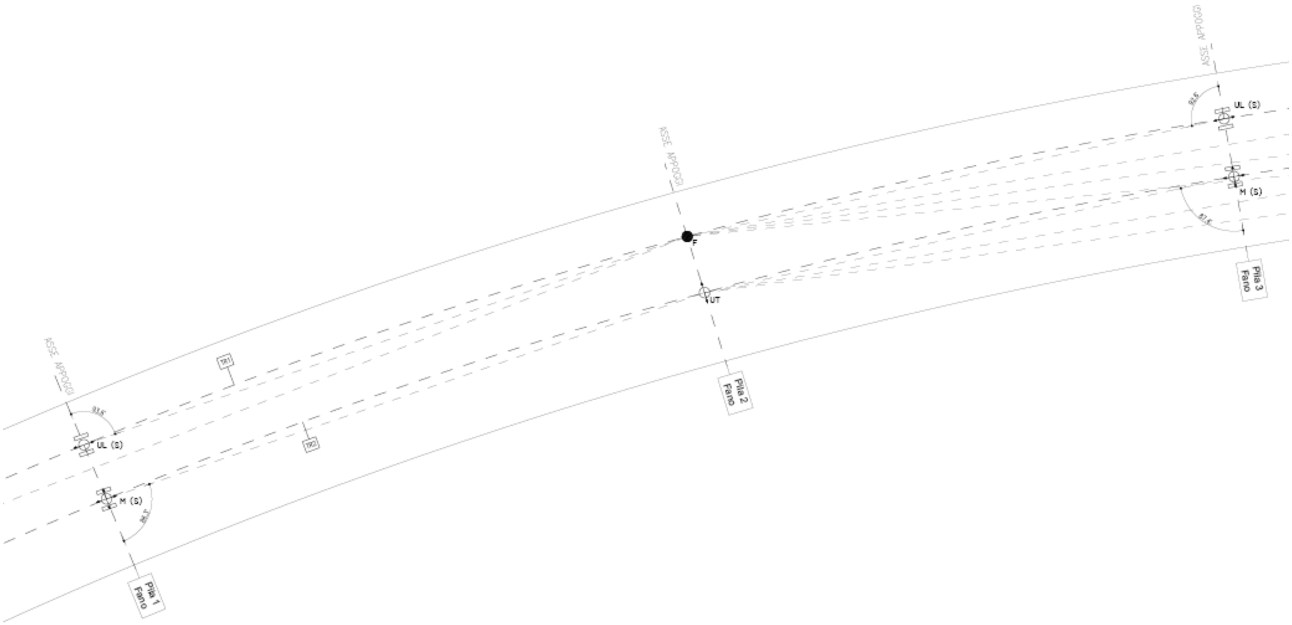


Figura 52: Schema appoggi pila tipo 1

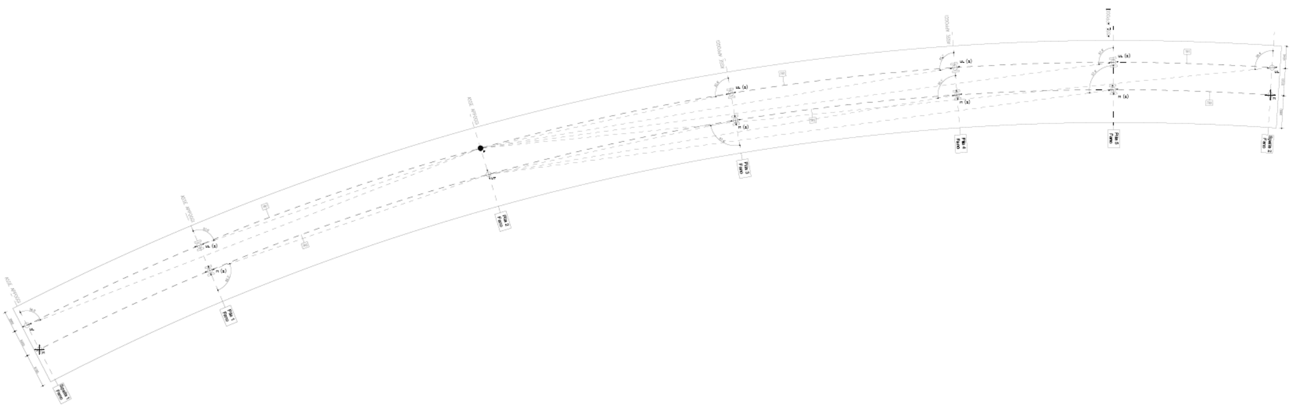
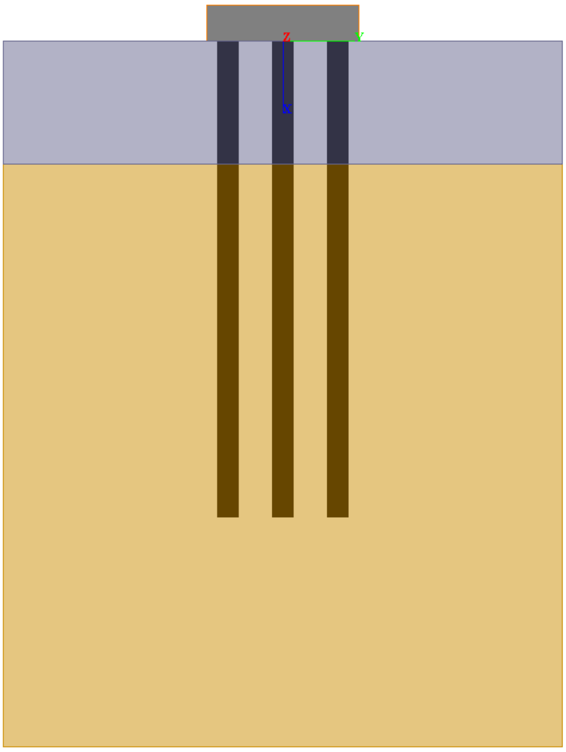
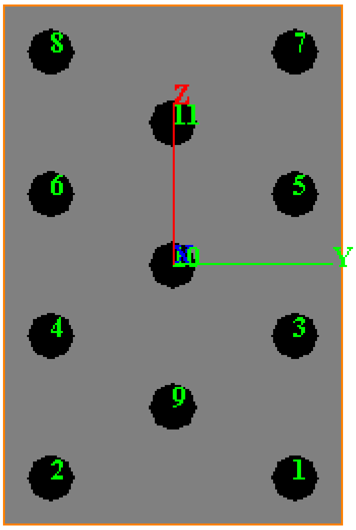


Figura 53: Schema appoggi impalcato

11.2 Modello di calcolo





Pali				Fondazione	
N° totale	Maglia trasv x long	Interasse (m) trasv x long	L (m)	H (m)	Dimensioni (m) trasv x long
11	4x3 quinconce	3.60 x 3.10	27.0	2.00	13.20 x 8.60

11.3 Sollecitazioni sulla palificata

Per il calcolo della palificata, oltre agli scarichi sugli appoggi, sono stati considerati i contributi dovuti ai pesi propri delle sottostrutture. Il peso proprio della fondazione è funzione della sua geometria così come il peso dell'elevazione.

$P_{P-pila} \cong 7100kN$

Nella tabella seguente si riportano i carichi concentrati equivalenti sulla palificata rispetto all'origine.

Comb.	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
SLU stat$_{MAX}$	39544.7	2328.6	780.0	11.3	8589.8	-21888.4
SLU stat$_{MIN}$	22561.7	-1923.6	780.0	63.7	8289.8	18081.4
SLU sism$_{MAX}$	19211.0	6098.4	3210.0	-27.5	30529.0	-57324.7
SLU sism$_{MIN}$	17349.0	-6098.4	-3210.0	27.5	-29864.0	57324.7
SLE stat$_{MAX}$	28695.0	1642.4	520.0	7.5	5733.0	-15438.3
SLE stat$_{MIN}$	16410.0	-1372.4	520.0	42.5	5545.5	12900.3

11.4 Sollecitazioni sui pali

Nella tabella seguente è indicato il numero del palo in cui agiscono le sollecitazioni maggiori, lo sforzo normale minimo e massimo (con relativi momenti flettenti e taglio associati) e il momento flettente con le relative sollecitazioni associate. Per ulteriori approfondimenti si vedano i relativi allegati di calcolo.

	Palo	N [kN]	M [kNm]	V [kN]
N_{MAX}	7	5068.7	538.1	222.7
N_{MIN}	7	-1808.5	1034.0	420.5
M_{MAX}	8	2103.5	1035.5	417.2
V_{MAX}	7	-1808.5	1034.0	420.5

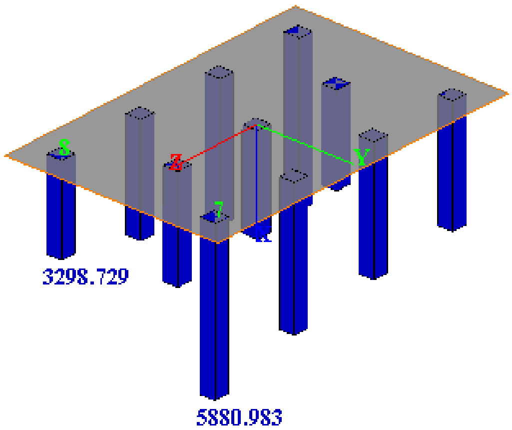


Figura 54: Pila tipo 1 – inviluppo massime azioni verticali sui pali

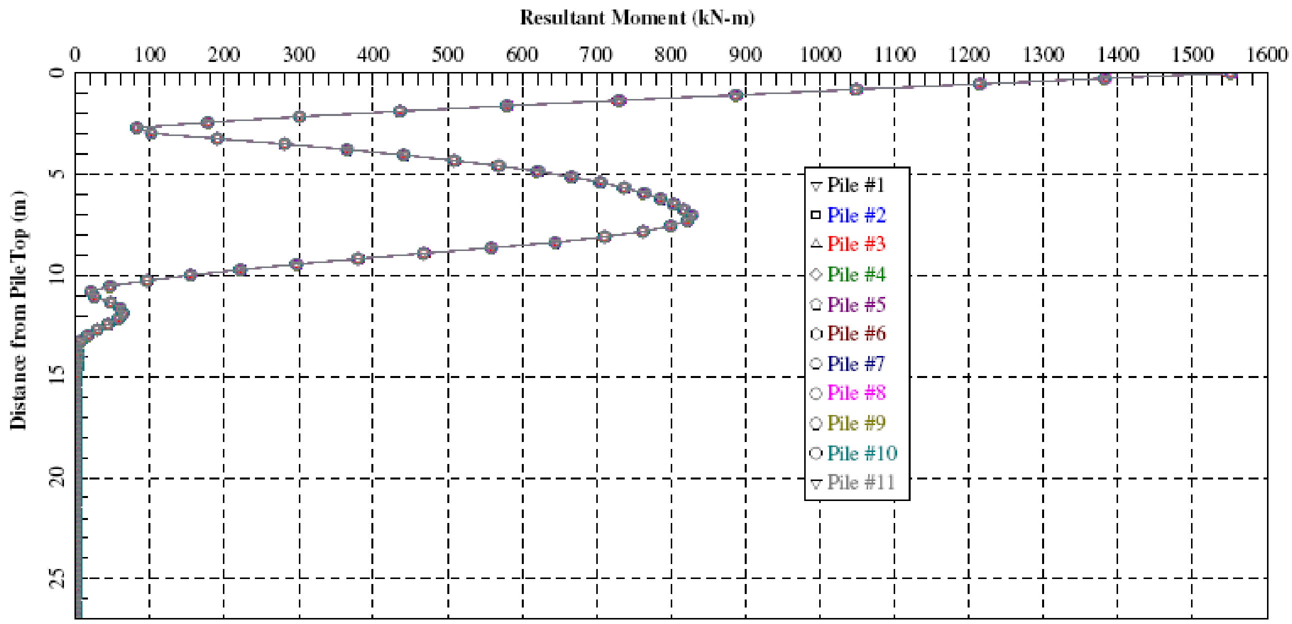


Figura 55: Pila tipo 1 – inviluppo massimo momento totale sui pali

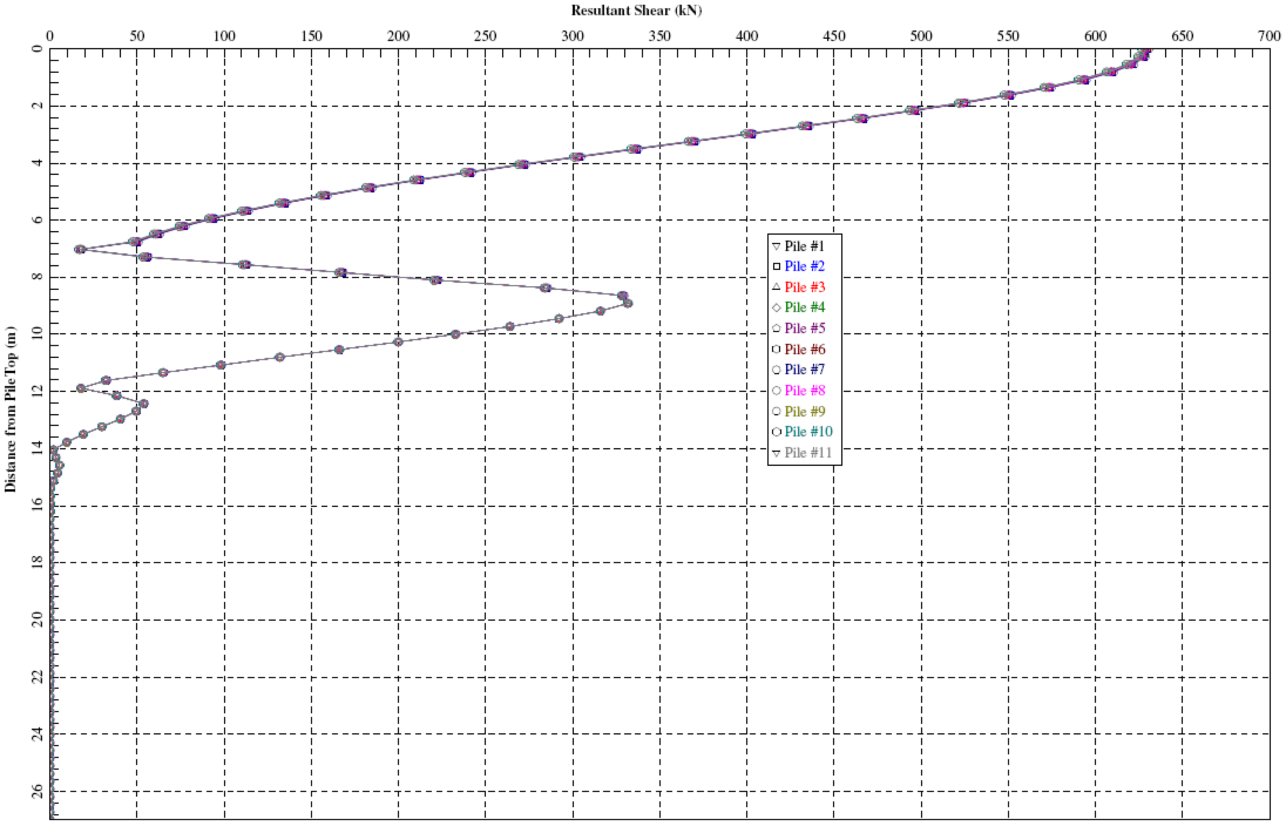


Figura 56: Pila tipo 1 – inviluppo massimo taglio totale sui pali

11.5 Verifiche strutturali pali

Per le verifiche di resistenza si considera un sezione circolare di diametro Ø1200 armata nel modo seguente:

Armatura longitudinale	$30\emptyset24$
Armatura a taglio (spirale)	$\emptyset12/20$
Incidenza	$\approx 130kg/m^3$

Nome sezione: pila tipo 1
Tipo sezione Circolare
Diametro 120.0 [cm]

Caratteristiche geometriche

Area sezione	11291.57	[cmq]
Inerzia in direzione X	10146105.5	[cm^4]
Inerzia in direzione Y	10146105.5	[cm^4]
Inerzia in direzione XY	0.0	[cm^4]
Ascissa baricentro sezione	X_G = 60.00	[cm]
Ordinata baricentro sezione	Y_G = 60.00	[cm]

Elenco ferri

Simbologia adottata

Posizione riferita all'origine
N° numero d'ordine
X Ascissa posizione ferro espresso in [cm]
Y Ordinata posizione ferro espresso in [cm]
d Diametro ferro espresso in [mm]
ω Area del ferro espresso in [cmq]

N°	**X**	**Y**	**d**	**ω**
1	110.10	60.00	24	4.52
2	109.01	70.42	24	4.52
3	105.77	80.38	24	4.52
4	100.53	89.45	24	4.52
5	93.52	97.23	24	4.52
6	85.05	103.39	24	4.52
7	75.48	107.65	24	4.52
8	65.24	109.83	24	4.52

9	54.76	109.83	24	4.52
10	44.52	107.65	24	4.52
11	34.95	103.39	24	4.52
12	26.48	97.23	24	4.52
13	19.47	89.45	24	4.52
14	14.23	80.38	24	4.52
15	10.99	70.42	24	4.52
16	9.90	60.00	24	4.52
17	10.99	49.58	24	4.52
18	14.23	39.62	24	4.52
19	19.47	30.55	24	4.52
20	26.48	22.77	24	4.52
21	34.95	16.61	24	4.52
22	44.52	12.35	24	4.52
23	54.76	10.17	24	4.52
24	65.24	10.17	24	4.52
25	75.48	12.35	24	4.52
26	85.05	16.61	24	4.52
27	93.52	22.77	24	4.52
28	100.53	30.55	24	4.52
29	105.77	39.62	24	4.52
30	109.01	49.58	24	4.52

Materiale impiegato : Calcestruzzo armato
Caratteristiche calcestruzzo

Resistenza caratteristica calcestruzzo	35.000	[MPa]
Coeff. omogeneizzazione acciaio/calcestruzzo	15.00	
Coeff. omogeneizzazione calcestruzzo teso/compresso	1.00	
Forma diagramma tensione-deformazione - PARABOLA-RETTANGOLO		

Caratteristiche acciaio per calcestruzzo

Tensione ammissibile acciaio	450.000	[MPa]
Tensione snervamento acciaio	450.000	[MPa]
Modulo elastico E	205942.924	[MPa]
Fattore di incrudimento acciaio	1.00	

Combinazioni
Simbologia adottata

N°	numero d'ordine della combinazione
N	sforzo normale espresso in[kN]
M_Y	momento lungo Y espresso in [kNm]
M_X	momento lungo X espresso in [kNm]
M_t	momento torcente espresso in [kNm]
T_Y	taglio lungo Y espresso in [kN]
T_X	taglio lungo X espresso in [kN]
VD	verifica di dominio
VT	verifica tensionale (SLER - Combinazione rara, SLEF - Combinazione frequente, SLEQP - Combinazione quasi permanente, TAMM - Verifica a tensioni ammissibili)

N°	N	M_Y	M_X	M_t	T_Y	T_X	VD	VT
1	5068.7000	538.1000	0.0000	0.0000	0.0000	222.7000	SI	NO
2	-1808.5000	1034.0000	0.0000	0.0000	0.0000	420.5000	SI	NO
3	2103.5000	1035.5000	0.0000	0.0000	0.0000	417.2000	SI	NO
4	-1808.5000	1034.0000	0.0000	0.0000	0.0000	420.5000	SI	NO
5	2103.5000	1035.5000	0.0000	0.0000	0.0000	0.0000	NO	SLER
6	2103.5000	1035.5000	0.0000	0.0000	0.0000	0.0000	NO	SLEQP
7	2103.5000	1035.5000	0.0000	0.0000	0.0000	0.0000	NO	SLEF

Risultati analisi

Caratteristiche asse neutro
Simbologia adottata

N°	numero d'ordine della combinazione
Xc	posizione asse neutro espresso in [cm]
α	inclinazione asse neutro rispetto all'orizzontale, espressa in [°]
(xi; yi) - (xf; yf)	Punti di intersezione dell'asse neutro con il perimetro della sezione, espressi in [cm]

N°	Xc	α	(xi; yi)	(xf; yf)
5	62.30	0.00	(-1208.23; 57.70)	(1328.23; 57.70)
6	62.30	0.00	(-1208.23; 57.70)	(1328.23; 57.70)
7	62.30	0.00	(-1208.23; 57.70)	(1328.23; 57.70)

Risultati tensionali
Simbologia adottata

N°	numero d'ordine della combinazione
σ_{c-max}	Tensione massima nel calcestruzzo espresso in [MPa]
σ_{c-min}	Tensione minima nel calcestruzzo espresso in [MPa]
σ_{f-max}	Tensione massima nel ferro espresso in [MPa]
σ_{f-min}	Tensione minima nel ferro espresso in [MPa]
τ_c	Tensione tangenziale nel calcestruzzo espresso in [MPa]

N°	σ_{c-max}	σ_{c-min}	τ_c	σ_{f-max}	σ_{f-min}

5	8.106	0.000	0.000	101.738	-92.744
6	8.106	0.000	0.000	101.738	-92.744
7	8.106	0.000	0.000	101.738	-92.744

Sollecitazioni ultime

Simbologia adottata

N° numero d'ordine della combinazione
N_u Sforzo normale ultimo, espresso in [kN]
M_{Xu} Momento ultimo in direzione X, espresso in [kNm]
M_{Yu} Momento ultimo in direzione Y, espresso in [kNm]
FS Fattore di sicurezza

Combinazione n° 1

N_u	M_{Xu}	M_{Yu}	FS
18590.2212	0.0000	1973.5629	3.67
22637.4543	0.0000	538.1000	4.47
5068.7000	0.0000	3565.3031	6.63

Combinazione n° 2

N_u	M_{Xu}	M_{Yu}	FS
-2399.1178	0.0000	1371.6825	1.33
-3143.7356	0.0000	1034.0000	1.74
-1808.5000	0.0000	1631.1238	1.58

Combinazione n° 3

N_u	M_{Xu}	M_{Yu}	FS
7645.5120	0.0000	3763.6927	3.63
21313.8157	0.0000	1035.5000	10.13
2103.5000	0.0000	2990.5025	2.89

Combinazione n° 4

N_u	M_{Xu}	M_{Yu}	FS
-2399.1178	0.0000	1371.6825	1.33
-3143.7356	0.0000	1034.0000	1.74
-1808.5000	0.0000	1631.1238	1.58

Risultati taglio

Simbologia adottata

N° indice della combinazione
Dir Direzione di azione del taglio
V_{Rd} Resistenza di calcolo dell'elemento privo di armatura trasversali a taglio, espresso in [kN]
V_{Rcd} Resistenza di calcolo a “taglio compressione”, espresso in [kN]
V_{Rsd} resistenza di calcolo a “taglio trazione”, espresso in [kN]
nb Numero bracci staffe
Diametro e passo staffe, riportate nell'ultima colonna, sono i più cautelativi ottenuti dalla verifica a taglio nelle due direzioni.

N°	Dir	T	V_{Rd}	V_{Rcd}	V_{Rsd}	nb	Diametro e passo staffe
1	X	222.7000	--	3509.3232	1029.0783	2	ϕ12.00 - 20.00 [cm]
1	Y	0.0000	--	3509.3232	1029.0783	2	ϕ12.00 - 20.00 [cm]
2	X	420.5000	--	2807.4585	1029.0783	2	ϕ12.00 - 20.00 [cm]
2	Y	0.0000	--	2807.4585	1029.0783	2	ϕ12.00 - 20.00 [cm]
3	X	417.2000	--	3124.6560	1029.0783	2	ϕ12.00 - 20.00 [cm]
3	Y	0.0000	--	3124.6560	1029.0783	2	ϕ12.00 - 20.00 [cm]
4	X	420.5000	--	2807.4585	1029.0783	2	ϕ12.00 - 20.00 [cm]
4	Y	0.0000	--	2807.4585	1029.0783	2	ϕ12.00 - 20.00 [cm]

Risultati fessurazione

Simbologia adottata

N° numero d'ordine della combinazione
M_X Momento di prima fessurazione in direzione X, espresso in [kNm]
M_Y Momento di prima fessurazione in direzione Y, espresso in [kNm]
σ_f Tensione nell'acciaio, espressa in [MPa]
σ_c Tensione nel calcestruzzo, espressa in [MPa]
A_{eff} Area efficace a trazione, espressa in [cmq]
ε Deformazione media acciaio teso, espressa in [°]
S_{rm} Distanza media tra le fessure, espresso in [mm]
w Ampiezza delle fessure, espressa in [mm]

N°	M_X	M_Y	σ_f	σ_c	A_{eff}	ε	S_{rm}	w
6	0.0000	626.0688	-56.074	-4.539	6230.27	0.0270	695	0.1879
7	0.0000	626.0688	-56.074	-4.539	6230.27	0.0270	695	0.1879

11.6 Verifiche di capacità portante al carico limite pali

NOME: PILA 2	VERIFICA DI CAPACITA' PORTANTE	Rev. 01.0

DATI GEOMETRICI

D (m)	1.20	Diametro
L (m)	27.00	Lunghezza
A_b (m^2)	1.13	Area base
S_{lat} (m)	3.77	Superficie laterale

PARAMETRI CALCOLO

	SI	Resistenza di punta
ξ	1.40	Coeff. N° indagini
SET	1	Set parametri (ND/DR/RC)
W' (kN)	514.6	Peso efficace palo

Terreni granulari (DR): δ/φ 0.70 tan(δ) Resistenza laterale

Terreni rocciosi (RC): σ_c (MPa) 10

$\tau_{lim,MAX}$ (kPa) 215 < 300 < 585 OK

CALCOLO RESISTENZE

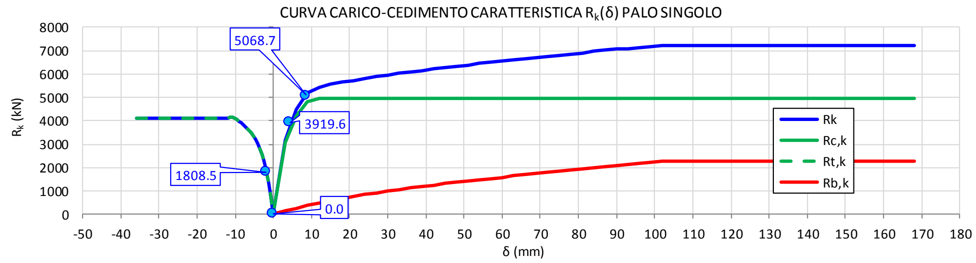
R_{cal} (kN)	R_k (kN)	α	γ	
6953.0	4966.4	1.000	1.35	Resistenza laterale compressione (c)
6921.7	4944.1	0.830	1.25	Resistenza laterale trazione (t)
2722.0	1944.3	0.997	1.15	Resistenza di base (b)

Tutti terreni (DR) (ND) (RC):

	DR	ND	RC
$\tau_{lim,MAX}$ (kPa)	100	100	300
$q_{b,lim}$ (kPa)	2000	2500	10000

VERIFICA RESISTENZA, CALCOLO CEDIMENTI

R_d (kN)	E_d (kN)	E_d/R_d		δ (mm)	K_{sec} (kN/mm)	Calcola	γ_G	
5089.9	5068.7	99.6%	VERIFICA OK	+8.5	599.5	SI	1.30	Compressione SLU (A1+M1+R3)
4469.9	0.0	0.0%	VERIFICA OK	+0.0	0.0	SI	1.00	Trazione SLU (A1+M1+R3)
5244.3	3919.6	74.7%	VERIFICA OK	+4.4	892.7	SI	1.00	Compressione SLV (A1+M1+R3)
4469.9	-1808.5	40.5%	VERIFICA OK	-1.8	999.9	SI	1.00	Trazione SLV (A1+M1+R3)



δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)	δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)	δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)	δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)
-36.0	4124.7	4124.7	0.0	-3.0	2537.0	2537.0	0.0	42.0	6217.2	4966.4	1250.8	99.0	7184.7	4966.4	2218.3
-30.0	4124.7	4124.7	0.0	-2.4	2206.0	2206.0	0.0	45.0	6275.8	4966.4	1309.4	102.0	7221.1	4966.4	2254.7
-24.0	4124.7	4124.7	0.0	-1.8	1802.1	1802.1	0.0	48.0	6332.8	4966.4	1366.4	105.0	7221.1	4966.4	2254.7
-18.0	4124.7	4124.7	0.0	-1.2	1310.8	1310.8	0.0	51.0	6388.5	4966.4	1422.1	108.0	7221.1	4966.4	2254.7
-12.0	4124.7	4124.7	0.0	-0.6	715.9	715.9	0.0	54.0	6443.2	4966.4	1476.8	111.0	7221.1	4966.4	2254.7
-11.4	4146.9	4146.9	0.0	0.0	0.0	0.0	0.0	57.0	6497.1	4966.4	1530.7	114.0	7221.1	4966.4	2254.7
-10.8	4137.4	4137.4	0.0	3.0	3190.0	3054.7	135.3	60.0	6550.4	4966.4	1583.9	117.0	7221.1	4966.4	2254.7
-10.2	4103.2	4103.2	0.0	6.0	4480.9	4220.5	260.4	63.0	6603.1	4966.4	1636.7	120.0	7221.1	4966.4	2254.7
-9.6	4050.4	4050.4	0.0	9.0	5173.0	4796.8	376.2	66.0	6655.4	4966.4	1689.0	123.0	7221.1	4966.4	2254.7
-9.0	3983.8	3983.8	0.0	12.0	5450.1	4966.4	483.6	69.0	6707.4	4966.4	1741.0	126.0	7221.1	4966.4	2254.7
-8.4	3906.6	3906.6	0.0	15.0	5549.9	4966.4	583.5	72.0	6758.9	4966.4	1792.5	129.0	7221.1	4966.4	2254.7
-7.8	3820.6	3820.6	0.0	18.0	5642.8	4966.4	676.4	75.0	6810.1	4966.4	1843.6	132.0	7221.1	4966.4	2254.7
-7.2	3726.1	3726.1	0.0	21.0	5729.7	4966.4	763.2	78.0	6860.7	4966.4	1894.3	135.0	7221.1	4966.4	2254.7
-6.6	3621.9	3621.9	0.0	24.0	5811.0	4966.4	844.6	81.0	6910.6	4966.4	1944.2	138.0	7221.1	4966.4	2254.7
-6.0	3505.2	3505.2	0.0	27.0	5887.6	4966.4	921.2	84.0	6959.8	4966.4	1993.4	141.0	7221.1	4966.4	2254.7
-5.4	3371.9	3371.9	0.0	30.0	5959.9	4966.4	993.5	87.0	7008.0	4966.4	2041.6	144.0	7221.1	4966.4	2254.7
-4.8	3216.3	3216.3	0.0	33.0	6028.5	4966.4	1062.1	90.0	7054.9	4966.4	2088.4	156.0	7221.1	4966.4	2254.7
-4.2	3031.3	3031.3	0.0	36.0	6094.0	4966.4	1127.6	93.0	7100.2	4966.4	2133.8	168.0	7221.1	4966.4	2254.7
-3.6	2808.2	2808.2	0.0	39.0	6156.8	4966.4	1190.3	96.0	7143.6	4966.4	2177.2				

COEFFICIENTI RIDUZIONE PORTATA

Interasse X (m) 3.10
Interasse Y (m) 3.60
Palo di verifica n° 6

					Base	Compressione			Trazione		
Palo n°	X (m)	Y (m)	D (m)	list (m)	i/D	α (rad)	l_i (m)	$\alpha_T \cdot l_i$ (m)	α (rad)	l_i (m)	$\alpha_T \cdot l_i$ (m)
1	-3.10	-5.40	1.20	6.23	5.19	0.000	0.000	0.000	0.000	0.000	0.000
2	-3.10	-1.80	1.20	3.58	2.99	0.010	0.006	0.006	0.530	0.318	0.211
3	-3.10	1.80	1.20	3.58	2.99	0.010	0.006	0.006	0.530	0.318	0.211
4	-3.10	5.70	1.20	6.49	5.41	0.000	0.000	0.000	0.000	0.000	0.000
5	0.00	-3.60	1.20	3.60	3.00	0.000	0.000	0.000	0.524	0.314	0.209
6	0.00	0.00	1.20								
7	0.00	3.60	1.20	3.60	3.00	0.000	0.000	0.000	0.524	0.314	0.209
8	3.10	-5.40	1.20	6.23	5.19	0.000	0.000	0.000	0.000	0.000	0.000
9	3.10	-1.80	1.20	3.58	2.99	0.010	0.006	0.006	0.530	0.318	0.211
10	3.10	1.80	1.20	3.58	2.99	0.010	0.006	0.006	0.530	0.318	0.211
11	3.10	5.70	1.20	6.49	5.41	0.000	0.000	0.000	0.000	0.000	0.000
				α_q	0.997		$\alpha_{r,eq}$	1.000		$\alpha_{r,eq}$	0.830

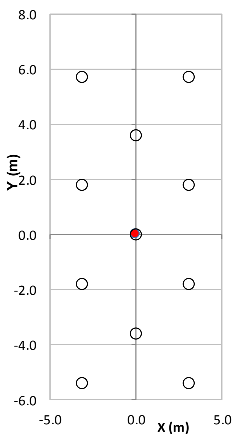


Figura 57: Condizioni DR - Riepilogo calcolo capacità portante

NOME: PILA 2	VERIFICA DI CAPACITA' PORTANTE	Rev. 01.0

DATI GEOMETRICI

D (m)	1.20	Diametro
L (m)	27.00	Lunghezza
A_b (m^2)	1.13	Area base
S_{lat} (m)	3.77	Superficie laterale

PARAMETRI CALCOLO

	SI	Resistenza di punta
ξ	1.40	Coeff. N° indagini
SET	2	Set parametri (ND/DR/RC)
W' (kN)	514.6	Peso efficace palo

Terreni granulari (DR):
δ/φ 0.70 tan(δ) Resistenza laterale

Terreni rocciosi (RC):
σ_c (MPa) 10
$\tau_{lim,MAX}$ (kPa) 215 < 300 < 585 OK

CALCOLO RESISTENZE

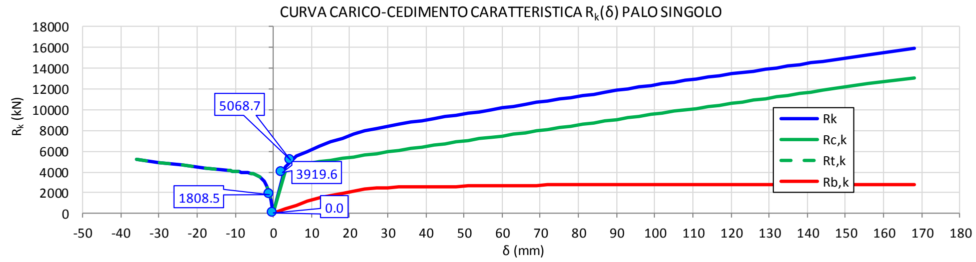
R_{cal} (kN)	R_k (kN)	α	γ	
6992.6	4994.7	1.000	1.35	Resistenza laterale compressione (c)
6960.7	4971.9	0.830	1.25	Resistenza laterale trazione (t)
2818.4	2013.2	0.997	1.15	Resistenza di base (b)

Tutti terreni (DR) (ND) (RC):

	DR	ND	RC
$\tau_{lim,MAX}$ (kPa)	100	100	300
$q_{b,lim}$ (kPa)	2000	2500	10000

VERIFICA RESISTENZA, CALCOLO CEDIMENTI

R_d (kN)	E_d (kN)	E_d/R_d		δ (mm)	K_{sec} (kN/mm)	Calcola	γ_G	
5165.5	5068.7	98.1%	VERIFICA OK	+4.5	1124.9	SI	1.30	Compressione SLU (A1+M1+R3)
4492.1	0.0	0.0%	VERIFICA OK	+0.0	0.0	SI	1.00	Trazione SLU (A1+M1+R3)
5319.9	3919.6	73.7%	VERIFICA OK	+2.2	1789.6	SI	1.00	Compressione SLV (A1+M1+R3)
4492.1	-1808.5	40.3%	VERIFICA OK	-1.0	1891.4	SI	1.00	Trazione SLV (A1+M1+R3)



δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)	δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)	δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)	δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)
-36.0	5185.2	5185.2	0.0	-3.0	3362.2	3362.2	0.0	42.0	9133.1	6555.6	2577.5	99.0	12332.0	9521.2	2810.8
-30.0	4926.0	4926.0	0.0	-2.4	3111.1	3111.1	0.0	45.0	9308.1	6711.7	2596.4	102.0	12492.9	9677.3	2815.7
-24.0	4666.7	4666.7	0.0	-1.8	2720.6	2720.6	0.0	48.0	9482.4	6867.7	2614.6	105.0	12653.2	9833.4	2819.8
-18.0	4407.5	4407.5	0.0	-1.2	2125.9	2125.9	0.0	51.0	9655.9	7023.8	2632.1	108.0	12812.7	9989.5	2823.2
-12.0	4148.2	4148.2	0.0	-0.6	1249.3	1249.3	0.0	54.0	9828.7	7179.9	2648.8	111.0	12971.4	10145.5	2825.9
-11.4	4122.3	4122.3	0.0	0.0	0.0	0.0	0.0	57.0	10000.8	7336.0	2664.8	114.0	13129.4	10301.6	2827.8
-10.8	4096.3	4096.3	0.0	3.0	4475.0	4048.3	426.7	60.0	10172.1	7492.1	2680.0	117.0	13286.7	10457.7	2829.0
-10.2	4070.4	4070.4	0.0	6.0	5496.5	4682.4	814.2	63.0	10342.7	7648.2	2694.5	120.0	13443.2	10613.8	2829.4
-9.6	4044.5	4044.5	0.0	9.0	6001.2	4838.6	1162.5	66.0	10512.5	7804.3	2708.3	123.0	13588.3	10769.9	2818.4
-9.0	4018.6	4018.6	0.0	12.0	6466.5	4994.7	1471.8	69.0	10681.6	7960.3	2721.3	126.0	13744.4	10926.0	2818.4
-8.4	3992.6	3992.6	0.0	15.0	6892.7	5150.8	1741.9	72.0	10850.0	8116.4	2733.6	129.0	13900.5	11082.0	2818.4
-7.8	3966.7	3966.7	0.0	18.0	7279.7	5306.9	1972.8	75.0	11017.6	8272.5	2745.1	132.0	14056.5	11238.1	2818.4
-7.2	3940.8	3940.8	0.0	21.0	7627.6	5463.0	2164.6	78.0	11184.5	8428.6	2755.9	135.0	14212.6	11394.2	2818.4
-6.6	3939.0	3939.0	0.0	24.0	7936.4	5619.1	2317.3	81.0	11350.7	8584.7	2766.0	138.0	14368.7	11550.3	2818.4
-6.0	3888.8	3888.8	0.0	27.0	8206.0	5775.2	2430.8	84.0	11516.1	8740.8	2775.3	141.0	14524.8	11706.4	2818.4
-5.4	3815.8	3815.8	0.0	30.0	8436.5	5931.2	2505.2	87.0	11680.7	8896.9	2783.9	144.0	14680.9	11862.5	2818.4
-4.8	3733.2	3733.2	0.0	33.0	8627.8	6087.3	2540.5	90.0	11844.7	9052.9	2791.7	156.0	15305.2	12486.8	2818.4
-4.2	3640.9	3640.9	0.0	36.0	8780.8	6243.4	2537.4	93.0	12007.8	9209.0	2798.8	168.0	15929.6	13111.2	2818.4
-3.6	3525.8	3525.8	0.0	39.0	8957.3	6399.5	2557.8	96.0	12170.3	9365.1	2805.2				

COEFFICIENTI RIDUZIONE PORTATA

Interasse X (m) 3.10 Palo di verifica n° 6
Interasse Y (m) 3.60

					Base	Compressione			Trazione		
Palo n°	X (m)	Y (m)	D (m)	list (m)	i/D	α (rad)	l_i (m)	$\alpha_T \cdot l_i$ (m)	α (rad)	l_i (m)	$\alpha_T \cdot l_i$ (m)
1	-3.10	-5.40	1.20	6.23	5.19	0.000	0.000	0.000	0.000	0.000	0.000
2	-3.10	-1.80	1.20	3.58	2.99	0.010	0.006	0.006	0.530	0.318	0.211
3	-3.10	1.80	1.20	3.58	2.99	0.010	0.006	0.006	0.530	0.318	0.211
4	-3.10	5.70	1.20	6.49	5.41	0.000	0.000	0.000	0.000	0.000	0.000
5	0.00	-3.60	1.20	3.60	3.00	0.000	0.000	0.000	0.524	0.314	0.209
6	0.00	0.00	1.20								
7	0.00	3.60	1.20	3.60	3.00	0.000	0.000	0.000	0.524	0.314	0.209
8	3.10	-5.40	1.20	6.23	5.19	0.000	0.000	0.000	0.000	0.000	0.000
9	3.10	-1.80	1.20	3.58	2.99	0.010	0.006	0.006	0.530	0.318	0.211
10	3.10	1.80	1.20	3.58	2.99	0.010	0.006	0.006	0.530	0.318	0.211
11	3.10	5.70	1.20	6.49	5.41	0.000	0.000	0.000	0.000	0.000	0.000
				α_q	0.997		$\alpha_{T,eq}$	1.000		$\alpha_{T,eq}$	0.830

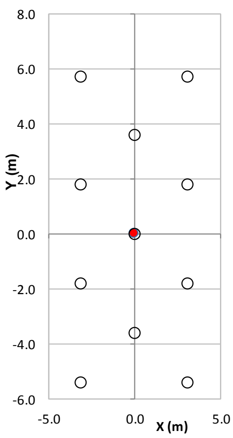


Figura 58: Condizioni ND - Riepilogo calcolo capacità portante

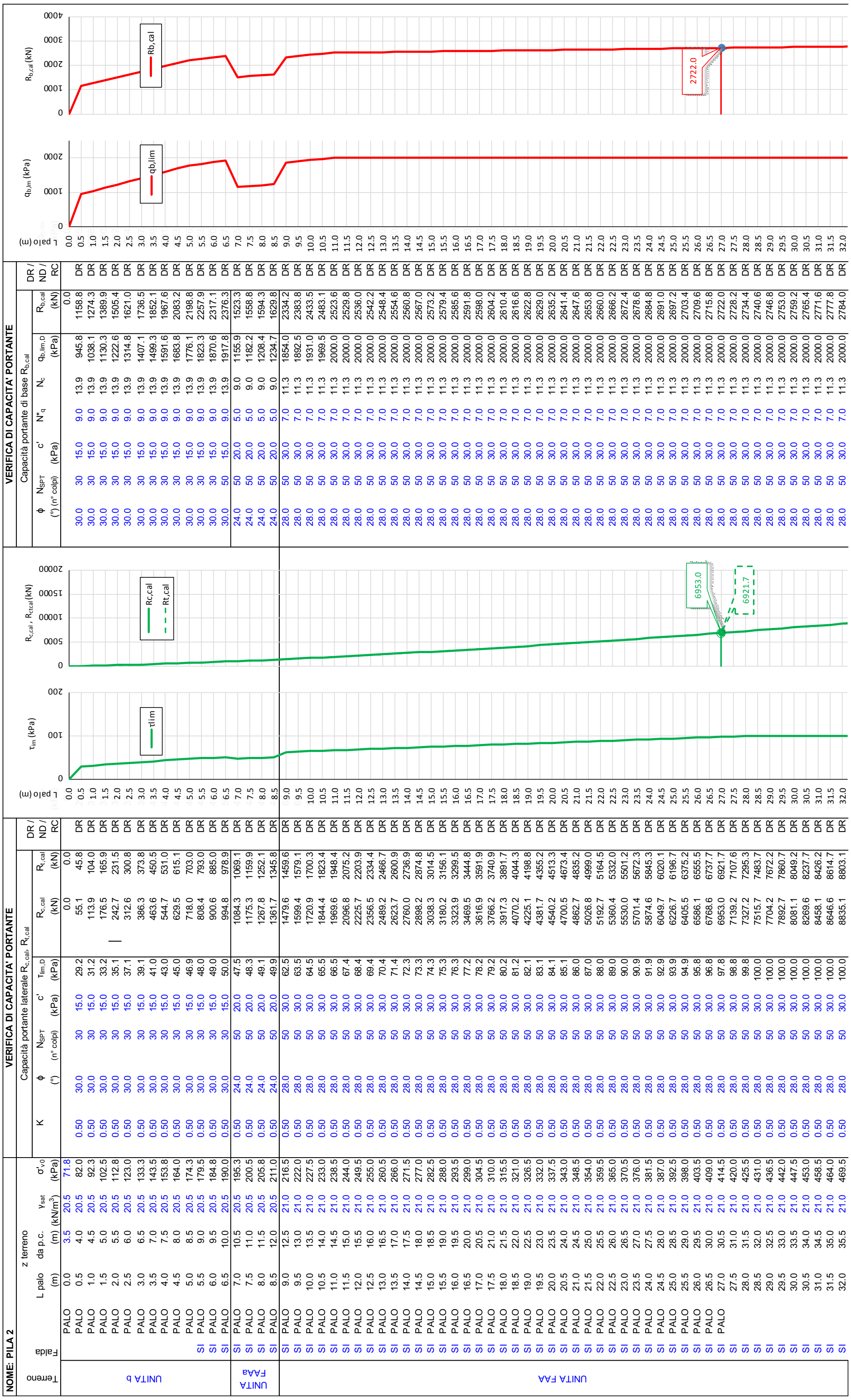
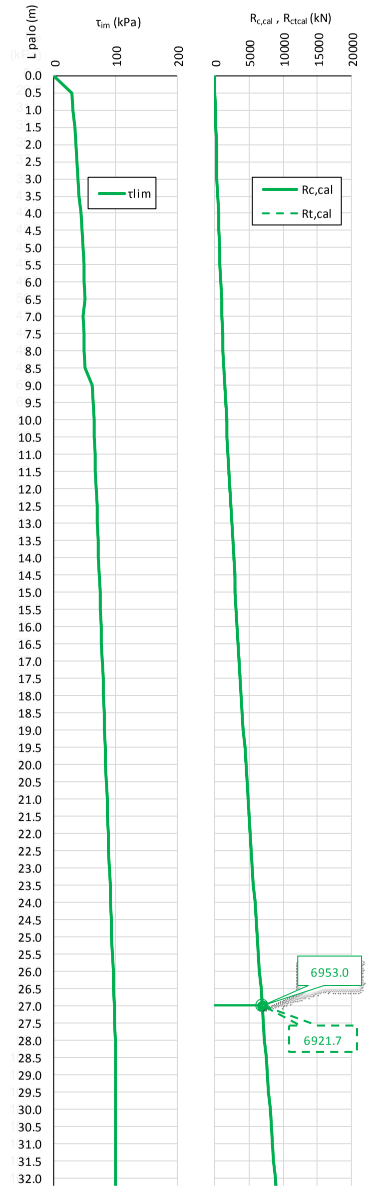


Figura 59: Condizioni DR - Dettaglio calcolo capacità portante laterale

NOME: PILA 2

VERIFICA DI CAPACITA' PORTANTE – Capacità portante laterale $R_{c,cal}$, $R_{t,cal}$

Terreno	Falda		L palo (m)	z terreno da p.c. (m)	γ_{sat} (kN/m³)	σ'_{v0} (kPa)	c_u (kPa)	$\tau_{lim,ND}$ (kPa)	$R_{c,cal}$ (kN)	$R_{t,cal}$ (kN)	DR / ND / RC
UNITA b		PALO	0.0	3.5	20.5	71.8			0.0	0.0	
		PALO	0.5	4.0	20.5	82.0	75.0		55.1	45.8	DR
		PALO	1.0	4.5	20.5	92.3	75.0		113.9	104.0	DR
		PALO	1.5	5.0	20.5	102.5	75.0		176.5	165.9	DR
		PALO	2.0	5.5	20.5	112.8	75.0		242.7	231.5	DR
		PALO	2.5	6.0	20.5	123.0	75.0		312.6	300.8	DR
		PALO	3.0	6.5	20.5	133.3	75.0		386.3	373.8	DR
		PALO	3.5	7.0	20.5	143.5	75.0		463.6	450.5	DR
		PALO	4.0	7.5	20.5	153.8	75.0		544.7	531.0	DR
		PALO	4.5	8.0	20.5	164.0	75.0		629.5	615.1	DR
		PALO	5.0	8.5	20.5	174.3	75.0		718.0	703.0	DR
	SI	PALO	5.5	9.0	20.5	179.5	75.0		808.4	793.0	DR
	SI	PALO	6.0	9.5	20.5	184.8	75.0		900.6	885.0	DR
	SI	PALO	6.5	10.0	20.5	190.0	75.0		994.8	978.9	DR
UNITA FAAa	SI	PALO	7.0	10.5	20.5	195.3	75.0		1084.3	1069.1	DR
	SI	PALO	7.5	11.0	20.5	200.5	75.0		1175.3	1159.9	DR
	SI	PALO	8.0	11.5	20.5	205.8	75.0		1267.8	1252.1	DR
	SI	PALO	8.5	12.0	20.5	211.0	75.0		1361.7	1345.8	DR
UNITA FAA	SI	PALO	9.0	12.5	21.0	216.5	200.0		1479.6	1459.6	DR
	SI	PALO	9.5	13.0	21.0	222.0	200.0		1599.4	1579.1	DR
	SI	PALO	10.0	13.5	21.0	227.5	200.0		1720.9	1700.3	DR
	SI	PALO	10.5	14.0	21.0	233.0	200.0		1844.4	1823.4	DR
	SI	PALO	11.0	14.5	21.0	238.5	200.0		1969.6	1948.4	DR
	SI	PALO	11.5	15.0	21.0	244.0	200.0		2096.8	2075.2	DR
	SI	PALO	12.0	15.5	21.0	249.5	200.0		2225.7	2203.9	DR
	SI	PALO	12.5	16.0	21.0	255.0	200.0		2356.5	2334.4	DR
	SI	PALO	13.0	16.5	21.0	260.5	200.0		2489.2	2466.7	DR
	SI	PALO	13.5	17.0	21.0	266.0	200.0		2623.7	2600.9	DR
	SI	PALO	14.0	17.5	21.0	271.5	200.0		2760.0	2736.9	DR
	SI	PALO	14.5	18.0	21.0	277.0	200.0		2898.2	2874.8	DR
	SI	PALO	15.0	18.5	21.0	282.5	200.0		3038.3	3014.5	DR
	SI	PALO	15.5	19.0	21.0	288.0	200.0		3180.2	3156.1	DR
	SI	PALO	16.0	19.5	21.0	293.5	200.0		3323.9	3299.5	DR
	SI	PALO	16.5	20.0	21.0	299.0	200.0		3469.5	3444.8	DR
	SI	PALO	17.0	20.5	21.0	304.5	200.0		3616.9	3591.9	DR
	SI	PALO	17.5	21.0	21.0	310.0	200.0		3766.2	3740.9	DR
	SI	PALO	18.0	21.5	21.0	315.5	200.0		3917.3	3891.7	DR
	SI	PALO	18.5	22.0	21.0	321.0	200.0		4070.2	4044.3	DR
	SI	PALO	19.0	22.5	21.0	326.5	200.0		4225.1	4198.8	DR
	SI	PALO	19.5	23.0	21.0	332.0	200.0		4381.7	4355.2	DR
	SI	PALO	20.0	23.5	21.0	337.5	200.0		4540.2	4513.3	DR
	SI	PALO	20.5	24.0	21.0	343.0	200.0		4700.5	4673.4	DR
	SI	PALO	21.0	24.5	21.0	348.5	200.0		4862.7	4835.2	DR
	SI	PALO	21.5	25.0	21.0	354.0	250.0		5026.8	4999.0	DR
	SI	PALO	22.0	25.5	21.0	359.5	250.0		5192.7	5164.5	DR
	SI	PALO	22.5	26.0	21.0	365.0	250.0		5360.4	5332.0	DR
	SI	PALO	23.0	26.5	21.0	370.5	250.0		5530.0	5501.2	DR
	SI	PALO	23.5	27.0	21.0	376.0	250.0		5701.4	5672.3	DR
	SI	PALO	24.0	27.5	21.0	381.5	250.0		5874.6	5845.3	DR
	SI	PALO	24.5	28.0	21.0	387.0	250.0		6049.7	6020.1	DR
	SI	PALO	25.0	28.5	21.0	392.5	250.0		6226.7	6196.7	DR
	SI	PALO	25.5	29.0	21.0	398.0	250.0		6405.5	6375.2	DR
	SI	PALO	26.0	29.5	21.0	403.5	250.0		6586.1	6555.5	DR
	SI	PALO	26.5	30.0	21.0	409.0	250.0		6768.6	6737.7	DR
	SI	PALO	27.0	30.5	21.0	414.5	250.0		6953.0	6921.7	DR
	SI		27.5	31.0	21.0	420.0	250.0		7139.2	7107.6	DR
	SI		28.0	31.5	21.0	425.5	250.0		7327.2	7295.3	DR
	SI		28.5	32.0	21.0	431.0	250.0		7515.7	7483.7	DR
	SI		29.0	32.5	21.0	436.5	250.0		7704.2	7672.2	DR
	SI		29.5	33.0	21.0	442.0	250.0		7892.7	7860.7	DR
	SI		30.0	33.5	21.0	447.5	250.0		8081.1	8049.2	DR
	SI		30.5	34.0	21.0	453.0	250.0		8269.6	8237.7	DR
	SI		31.0	34.5	21.0	458.5	250.0		8458.1	8426.2	DR
	SI		31.5	35.0	21.0	464.0	250.0		8646.6	8614.7	DR
	SI		32.0	35.5	21.0	469.5	250.0		8835.1	8803.1	DR



VERIFICA DI CAPACITA' PORTANTE – Capacità portante di base $R_{b,cal}$

L palo (m)	σ_{v0} (kPa)	c_u (kPa)	$q_{b,lim,ND}$ (kPa)	$R_{b,cal}$ (kN)	DR / ND / RC
0.0	0.0			0.0	
0.5	10.3	75.0		1158.8	DR
1.0	20.5	75.0		1274.3	DR
1.5	30.8	75.0		1389.9	DR
2.0	41.0	75.0		1505.4	DR
2.5	51.3	75.0		1621.0	DR
3.0	61.5	75.0		1736.5	DR
3.5	71.8	75.0		1852.1	DR
4.0	82.0	75.0		1967.6	DR
4.5	92.3	75.0		2083.2	DR
5.0	102.5	75.0		2198.8	DR
5.5	112.8	75.0		2257.9	DR
6.0	123.0	75.0		2317.1	DR
6.5	133.3	75.0		2376.3	DR
7.0	143.5	75.0		1523.3	DR
7.5	153.8	75.0		1558.8	DR
8.0	164.0	75.0		1594.3	DR
8.5	174.3	75.0		1629.8	DR
9.0	184.8	200.0		2334.2	DR
9.5	195.3	200.0		2383.8	DR
10.0	205.8	200.0		2433.5	DR
10.5	216.3	200.0		2483.1	DR
11.0	226.8	200.0		2523.6	DR
11.5	237.3	200.0		2529.8	DR
12.0	247.8	200.0		2536.0	DR
12.5	258.3	200.0		2542.2	DR
13.0	268.8	200.0		2548.4	DR
13.5	279.3	200.0		2554.6	DR
14.0	289.8	200.0		2560.8	DR
14.5	300.3	200.0		2567.0	DR
15.0	310.8	200.0		2573.2	DR
15.5	321.3	200.0		2579.4	DR
16.0	331.8	200.0		2585.6	DR
16.5	342.3	200.0		2591.8	DR
17.0	352.8	200.0		2598.0	DR
17.5	363.3	200.0		2604.2	DR
18.0	373.8	200.0		2610.4	DR
18.5	384.3	200.0		2616.6	DR
19.0	394.8	200.0		2622.8	DR
19.5	405.3	200.0		2629.0	DR
20.0	415.8	200.0		2635.2	DR
20.5	426.3	200.0		2641.4	DR
21.0	436.8	200.0		2647.6	DR
21.5	447.3	250.0		2653.8	DR
22.0	457.8	250.0		2660.0	DR
22.5	468.3	250.0		2666.2	DR
23.0	478.8	250.0		2672.4	DR
23.5	489.3	250.0		2678.6	DR
24.0	499.8	250.0		2684.8	DR
24.5	510.3	250.0		2691.0	DR
25.0	520.8	250.0		2697.2	DR
25.5	531.3	250.0		2703.4	DR
26.0	541.8	250.0		2709.6	DR
26.5	552.3	250.0		2715.8	DR
27.0	562.8	250.0		2722.0	DR
27.5	573.3	250.0		2728.2	DR
28.0	583.8	250.0		2734.4	DR
28.5	594.3	250.0		2740.6	DR
29.0	604.8	250.0		2746.8	DR
29.5	615.3	250.0		2753.0	DR
30.0	625.8	250.0		2759.2	DR
30.5	636.3	250.0		2765.4	DR
31.0	646.8	250.0		2771.6	DR
31.5	657.3	250.0		2777.8	DR
32.0	667.8	250.0		2784.0	DR

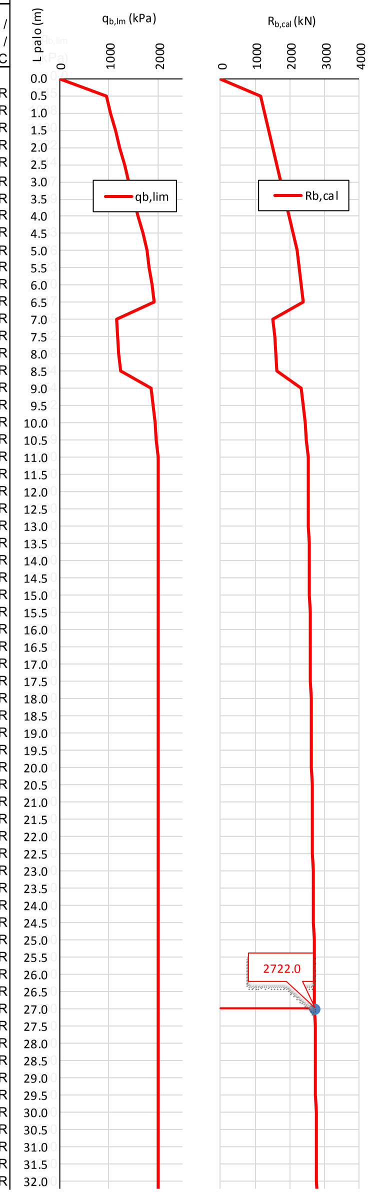


Figura 60: Condizioni ND - Dettaglio calcolo capacità portante di base

12 ANALISI FONDAZIONE PILA TIPO 2

A favore di sicurezza, le analisi saranno svolte modellando la pila 4, che presenta le condizioni di carico più gravose per le fondazioni.

12.1 Geometria

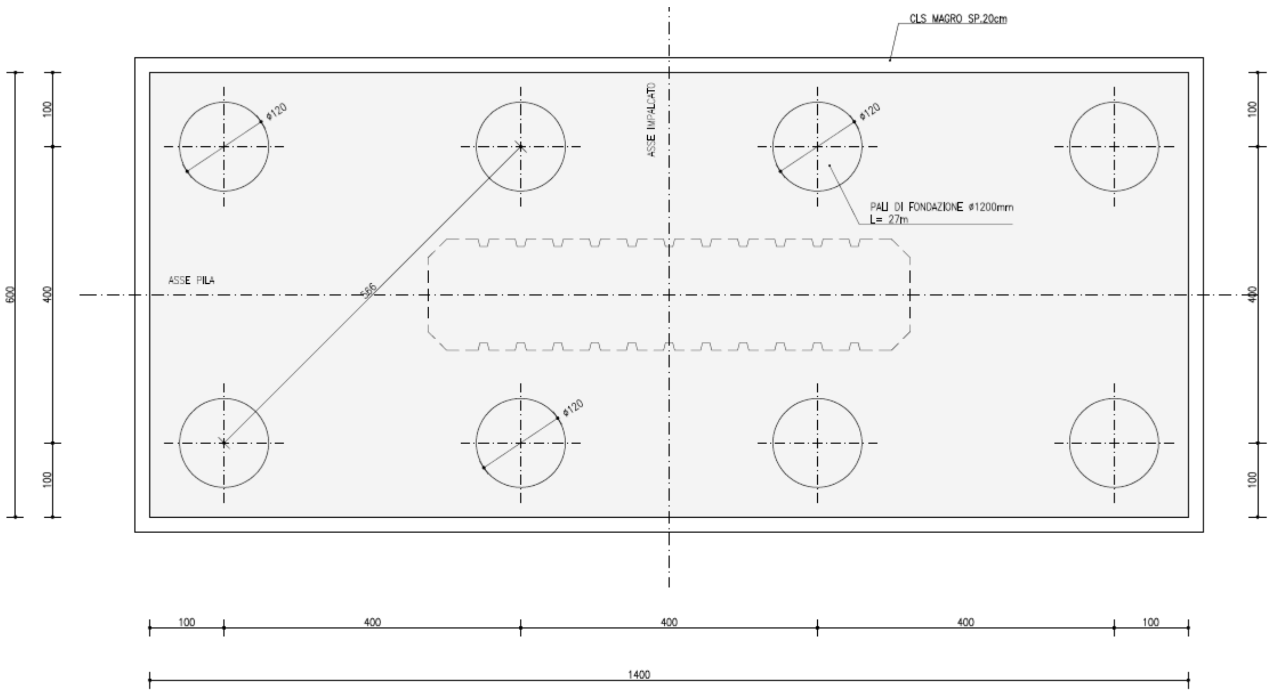


Figura 61: Pila tipo 2 – geometria pianta

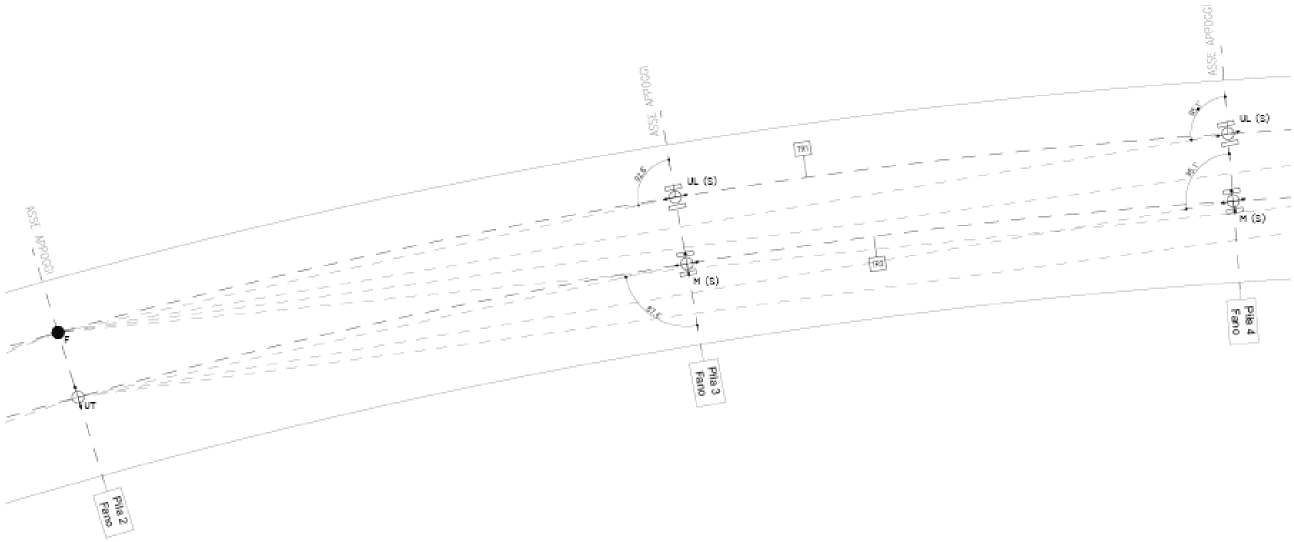


Figura 62: Schema appoggi pila tipo 2

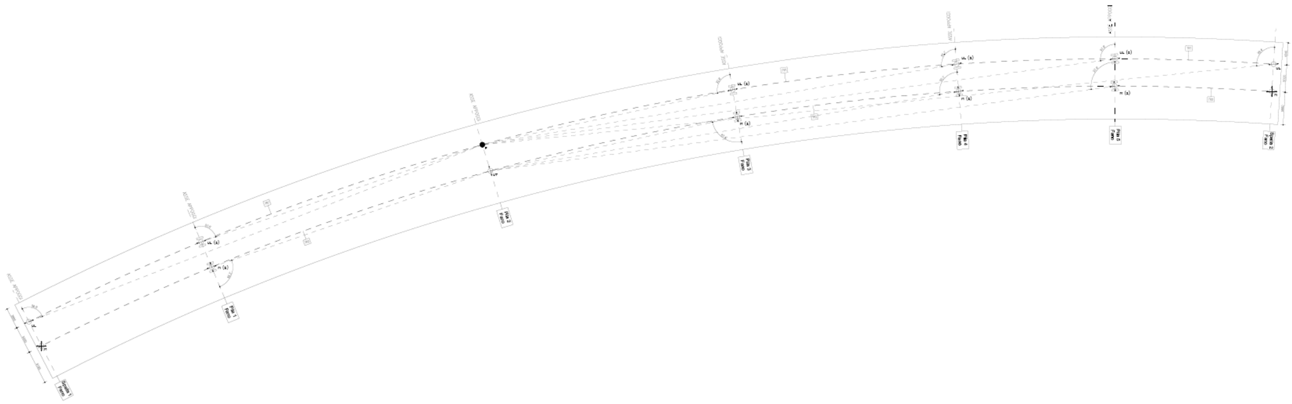
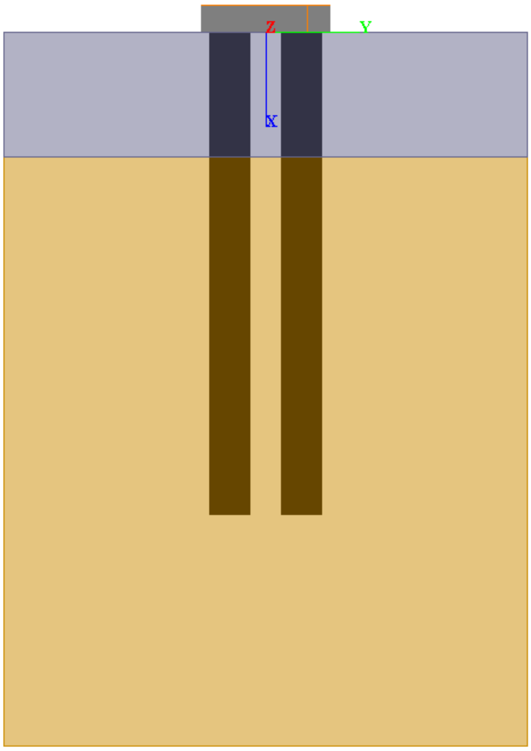
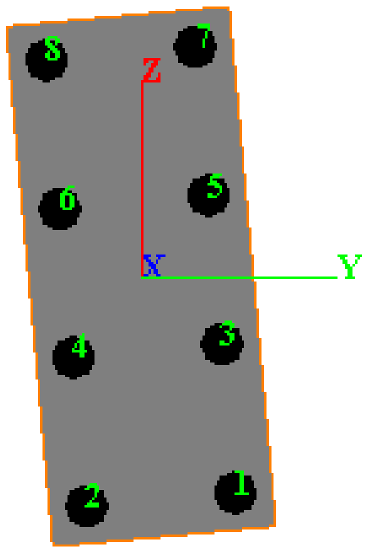


Figura 63: Schema appoggi impalcato

12.2 Modello di calcolo





Pali				Fondazione	
N° totale	Maglia trasv x long	Interasse (m) trasv x long	L (m)	H (m)	Dimensioni (m) trasv x long
8	4x2	4.00 x 4.00	27.0	1.50	14.00 x 6.00

12.3 Sollecitazioni sulla palificata

Per il calcolo della palificata, oltre agli scarichi sugli appoggi, sono stati considerati i contributi dovuti ai pesi propri delle sottostrutture. Il peso proprio della fondazione è funzione della sua geometria così come il peso dell’elevazione.

$P_{P-pila} \cong 5100kN$

Nella tabella seguente si riportano i carichi concentrati equivalenti sulla palificata rispetto all’origine.

Comb.	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
SLU stat$_{MAX}$	27634.8	612.2	510.0	-126.1	5799.2	-5617.8
SLU stat$_{MIN}$	13959.3	-612.2	510.0	-102.8	4712.4	5707.5
SLU sism$_{MAX}$	12625.0	4853.1	2270.0	-181.0	21174.1	-45280.1
SLU sism$_{MIN}$	10853.0	-4853.1	-2270.0	181.0	-21154.2	45281.9
SLE stat$_{MAX}$	20084.0	408.1	340.0	-84.1	3866.9	-3745.2
SLE stat$_{MIN}$	10164.0	-408.1	340.0	-68.5	3144.8	3805.3

12.4 Sollecitazioni sui pali

Nella tabella seguente è indicato il numero del palo in cui agiscono le sollecitazioni maggiori, lo sforzo normale minimo e massimo (con relativi momenti flettenti e taglio associati) e il momento flettente con le relative sollecitazioni associate. Per ulteriori approfondimenti si vedano i relativi allegati di calcolo.

	Palo	N [kN]	M [kNm]	V [kN]
N_{MAX}	7	4160.4	228.3	101.9
N_{MIN}	7	-2033.1	952.9	452.5
M_{MAX}	8	2727.2	959.5	447.9
V_{MAX}	7	-2033.1	952.9	452.5

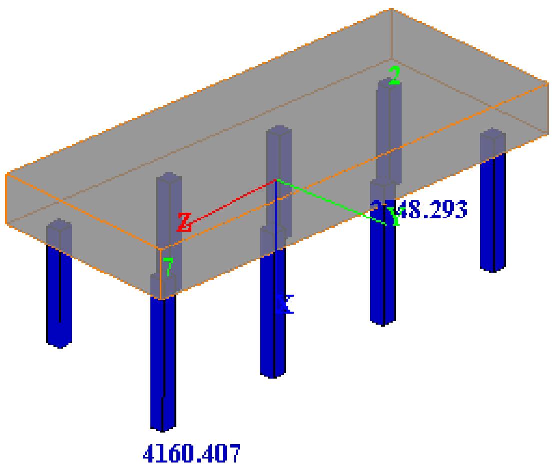


Figura 64: Pila tipo 2 – inviluppo massime azioni verticali sui pali

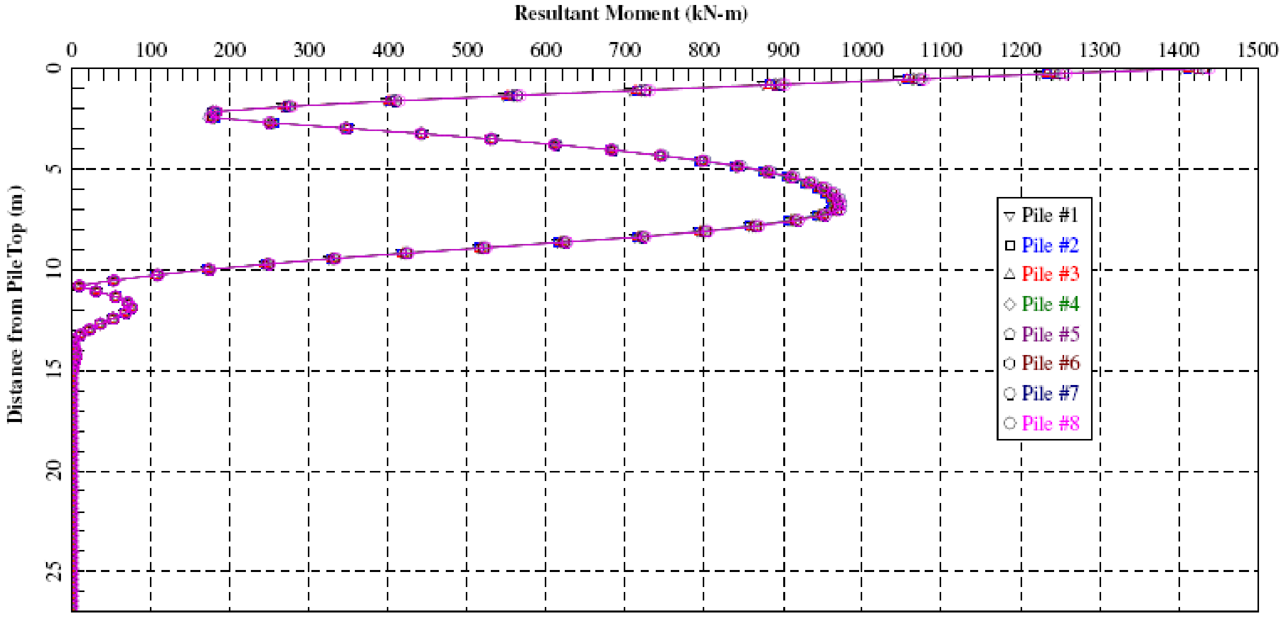


Figura 65: Pila tipo 2 – inviluppo massimo momento totale sui pali

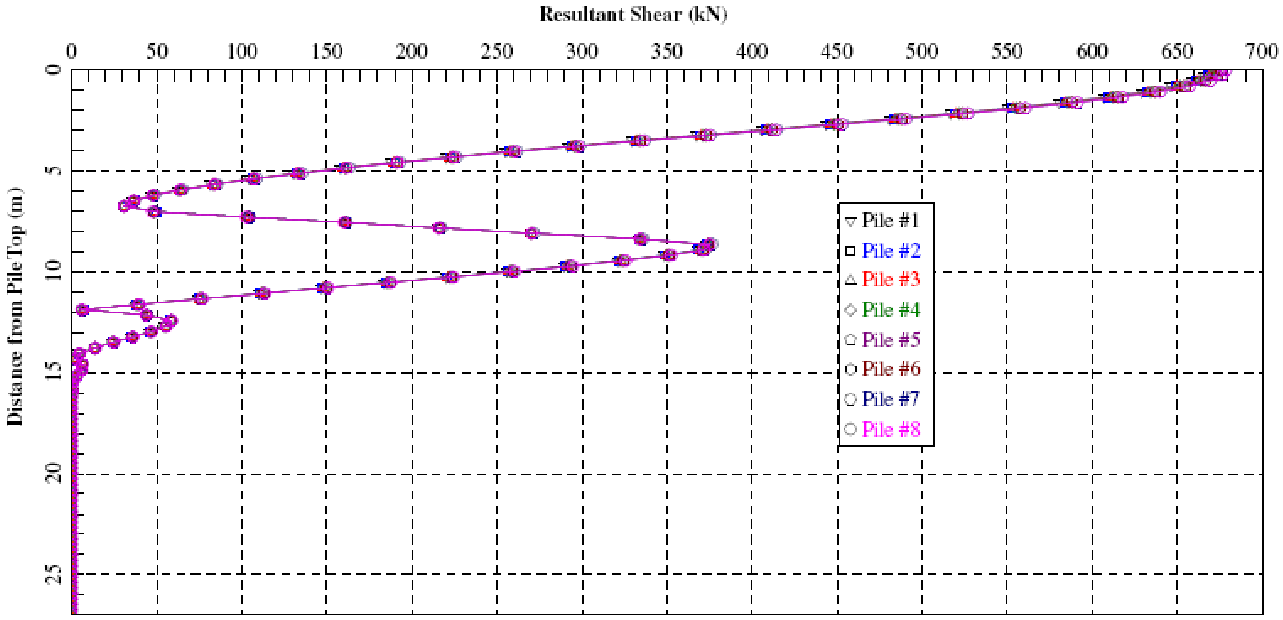


Figura 66: Pila tipo 2 – inviluppo massimo taglio totale sui pali

12.5 Verifiche strutturali

Per le verifiche di resistenza si considera un sezione circolare di diametro Ø1200 armata nel modo seguente:

Armatura longitudinale	$30\varnothing24$
Armatura a taglio (spirale)	$\varnothing12/20$
Incidenza	$\approx 130 kg/m^3$

Nome sezione:	pila tipo 2	
Tipo sezione	Circolare	
Diametro	120.0	[cm]

Caratteristiche geometriche

Area sezione	11291.57	[cmq]
Inerzia in direzione X	10146105.5	[cm^4]
Inerzia in direzione Y	10146105.5	[cm^4]

Inerzia in direzione XY	0.0	[cm^4]
Ascissa baricentro sezione	X_G = 60.00	[cm]
Ordinata baricentro sezione	Y_G = 60.00	[cm]

Elenco ferri

Simbologia adottata

Posizione riferita all'origine

N°	numero d'ordine
X	Ascissa posizione ferro espresso in [cm]
Y	Ordinata posizione ferro espresso in [cm]
d	Diametro ferro espresso in [mm]
ω	Area del ferro espresso in [cmq]

N°	X	Y	d	ω
1	110.10	60.00	24	4.52
2	109.01	70.42	24	4.52
3	105.77	80.38	24	4.52
4	100.53	89.45	24	4.52
5	93.52	97.23	24	4.52
6	85.05	103.39	24	4.52
7	75.48	107.65	24	4.52
8	65.24	109.83	24	4.52
9	54.76	109.83	24	4.52
10	44.52	107.65	24	4.52
11	34.95	103.39	24	4.52
12	26.48	97.23	24	4.52
13	19.47	89.45	24	4.52
14	14.23	80.38	24	4.52
15	10.99	70.42	24	4.52
16	9.90	60.00	24	4.52
17	10.99	49.58	24	4.52
18	14.23	39.62	24	4.52
19	19.47	30.55	24	4.52
20	26.48	22.77	24	4.52
21	34.95	16.61	24	4.52
22	44.52	12.35	24	4.52
23	54.76	10.17	24	4.52
24	65.24	10.17	24	4.52
25	75.48	12.35	24	4.52
26	85.05	16.61	24	4.52
27	93.52	22.77	24	4.52
28	100.53	30.55	24	4.52
29	105.77	39.62	24	4.52
30	109.01	49.58	24	4.52

Materiale impiegato : Calcestruzzo armato

Caratteristiche calcestruzzo

Resistenza caratteristica calcestruzzo	35.000	[MPa]
Coeff. omogeneizzazione acciaio/calcestruzzo	15.00	
Coeff. omogeneizzazione calcestruzzo teso/compresso	1.00	

Forma diagramma tensione-deformazione - PARABOLA-RETTANGOLO

Caratteristiche acciaio per calcestruzzo

Tensione ammissibile acciaio	450.000	[MPa]
Tensione snervamento acciaio	450.000	[MPa]
Modulo elastico E	205942.924	[MPa]
Fattore di incrudimento acciaio	1.00	

Combinazioni

Simbologia adottata

N°	numero d'ordine della combinazione
N	sforzo normale espresso in[kN]
M_Y	momento lungo Y espresso in [kNm]
M_X	momento lungo X espresso in [kNm]
M_t	momento torcente espresso in [kNm]
T_Y	taglio lungo Y espresso in [kN]
T_X	taglio lungo X espresso in [kN]
VD	verifica di dominio
VT	verifica tensionale (SLER - Combinazione rara, SLEF - Combinazione frequente, SLEQP - Combinazione quasi permanente, TAMM - Verifica a tensioni ammissibili)

N°	N	M_Y	M_X	M_t	T_Y	T_X	VD	VT
1	4153.5000	228.3000	0.0000	0.0000	0.0000	101.9000	SI	NO
2	-2033.1000	952.9000	0.0000	0.0000	0.0000	452.5000	SI	NO
3	2727.2000	959.5000	0.0000	0.0000	0.0000	447.9000	SI	NO
4	-2033.1000	952.9000	0.0000	0.0000	0.0000	452.5000	SI	NO
5	2727.2000	959.5000	0.0000	0.0000	0.0000	0.0000	NO	SLER
6	2727.2000	959.5000	0.0000	0.0000	0.0000	0.0000	NO	SLEQP
7	2727.2000	959.5000	0.0000	0.0000	0.0000	0.0000	NO	SLEF

Risultati analisi

Caratteristiche asse neutro

Simbologia adottata

N° numero d'ordine della combinazione
Xc posizione asse neutro espresso in [cm]
α inclinazione asse neutro rispetto all'orizzontale, espressa in [°]
(xi; yi) - (xf; yf) Punti di intersezione dell'asse neutro con il perimetro della sezione, espressi in [cm]

N°	Xc	α	(xi; yi)	(xf; yf)
5	75.66	0.00	(-1480.19; 44.34)	(1600.19; 44.34)
6	75.66	0.00	(-1480.19; 44.34)	(1600.19; 44.34)
7	75.66	0.00	(-1480.19; 44.34)	(1600.19; 44.34)

Risultati tensionali

Simbologia adottata

N° numero d'ordine della combinazione
$\sigma_{c\text{-}max}$ Tensione massima nel calcestruzzo espresso in [MPa]
$\sigma_{c\text{-}min}$ Tensione minima nel calcestruzzo espresso in [MPa]
$\sigma_{f\text{-}max}$ Tensione massima nel ferro espresso in [MPa]
$\sigma_{f\text{-}min}$ Tensione minima nel ferro espresso in [MPa]
τ_c Tensione tangenziale nel calcestruzzo espresso in [MPa]

N°	$\sigma_{c\text{-}max}$	$\sigma_{c\text{-}min}$	τ_c	$\sigma_{f\text{-}max}$	$\sigma_{f\text{-}min}$
5	7.407	0.000	0.000	96.159	-50.158
6	7.407	0.000	0.000	96.159	-50.158
7	7.407	0.000	0.000	96.159	-50.158

Sollecitazioni ultime

Simbologia adottata

N° numero d'ordine della combinazione
N_u Sforzo normale ultimo, espresso in [kN]
M_{Xu} Momento ultimo in direzione X, espresso in [kNm]
M_{Yu} Momento ultimo in direzione Y, espresso in [kNm]
FS Fattore di sicurezza

Combinazione n° 1

N_u	M_{Xu}	M_{Yu}	FS
20989.0761	0.0000	1153.6791	5.05
23396.7831	0.0000	228.3000	5.63
4153.5000	0.0000	3425.1635	15.00

Combinazione n° 2

N_u	M_{Xu}	M_{Yu}	FS
-2668.5897	0.0000	1250.7496	1.31
-3319.3513	0.0000	952.9000	1.63
-2033.1000	0.0000	1533.3876	1.61

Combinazione n° 3

N_u	M_{Xu}	M_{Yu}	FS
10335.9768	0.0000	3636.4659	3.79
21520.9661	0.0000	959.5000	7.89
2727.2000	0.0000	3139.2895	3.27

Combinazione n° 4

N_u	M_{Xu}	M_{Yu}	FS
-2668.5897	0.0000	1250.7496	1.31
-3319.3513	0.0000	952.9000	1.63
-2033.1000	0.0000	1533.3876	1.61

Risultati taglio

Simbologia adottata

N° indice della combinazione
Dir Direzione di azione del taglio
V_{Rd} Resistenza di calcolo dell'elemento privo di armatura trasversali a taglio, espresso in [kN]
V_{Rcd} Resistenza di calcolo a “taglio compressione”, espresso in [kN]
V_{Rsd} resistenza di calcolo a “taglio trazione”, espresso in [kN]
nb Numero bracci staffe
Diametro e passo staffe, riportate nell'ultima colonna, sono i più cautelativi ottenuti dalla verifica a taglio nelle due direzioni.

N°	Dir	T	V_{Rd}	V_{Rcd}	V_{Rsd}	nb	Diametro e passo staffe
1	X	101.9000	--	3433.7859	1029.0783	2	ϕ12.00 - 20.00 [cm]
1	Y	0.0000	--	3433.7859	1029.0783	2	ϕ12.00 - 20.00 [cm]
2	X	452.5000	--	2807.4585	1029.0783	2	ϕ12.00 - 20.00 [cm]
2	Y	0.0000	--	2807.4585	1029.0783	2	ϕ12.00 - 20.00 [cm]
3	X	447.9000	--	3218.7069	1029.0783	2	ϕ12.00 - 20.00 [cm]
3	Y	0.0000	--	3218.7069	1029.0783	2	ϕ12.00 - 20.00 [cm]
4	X	452.5000	--	2807.4585	1029.0783	2	ϕ12.00 - 20.00 [cm]
4	Y	0.0000	--	2807.4585	1029.0783	2	ϕ12.00 - 20.00 [cm]

Risultati fessurazione

Simbologia adottata

N° numero d'ordine della combinazione

M_X	Momento di prima fessurazione in direzione X, espresso in [kNm]
M_Y	Momento di prima fessurazione in direzione Y, espresso in [kNm]
σ_f	Tensione nell'acciaio, espressa in [MPa]
σ_c	Tensione nel calcestruzzo, espressa in [MPa]
A_{eff}	Area efficace a trazione, espressa in [cmq]
ε	Deformazione media acciaio teso, espressa in [°]
S_{rm}	Distanza media tra le fessure, espresso in [mm]
w	Ampiezza delle fessure, espressa in [mm]

N°	M_X	M_Y	σ_f	σ_c	A_{eff}	ε	S_{rm}	w
6	0.0000	773.0750	-40.413	-3.497	5051.08	0.0146	673	0.0984
7	0.0000	773.0750	-40.413	-3.497	5051.08	0.0146	673	0.0984

12.6 Verifiche di capacità portante al carico limite pali

NOME: PILA 4	VERIFICA DI CAPACITA' PORTANTE	Rev. 01.0

DATI GEOMETRICI

D (m)	1.20	Diametro
L (m)	27.00	Lunghezza
A_b (m^2)	1.13	Area base
S_{lat} (m)	3.77	Superficie laterale

PARAMETRI CALCOLO

	SI	Resistenza di punta
ξ	1.40	Coeff. N° indagini
SET	1	Set parametri (ND/DR/RC)
W' (kN)	537.2	Peso efficace palo

Terreni granulari (DR):
δ/φ 0.70 tan(δ) Resistenza laterale

Terreni rocciosi (RC):
σ_c (MPa) 10
$\tau_{lim,MAX}$ (kPa) 215 < 300 < 585 OK

CALCOLO RESISTENZE

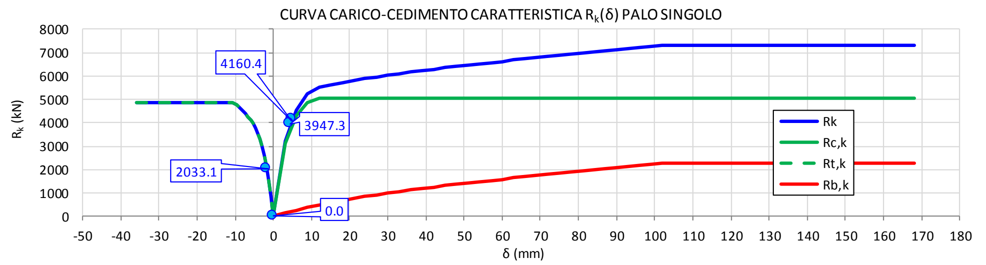
R_{cal} (kN)	R_k (kN)	α	γ	
7055.4	5039.6	1.000	1.35	Resistenza laterale compressione (c)
7048.5	5034.6	0.963	1.25	Resistenza laterale trazione (t)
2741.8	1958.4	1.000	1.15	Resistenza di base (b)

Tutti terreni (DR) (ND) (RC):

	DR	ND	RC
$\tau_{lim,MAX}$ (kPa)	100	100	300
$q_{b,lim}$ (kPa)	2000	2500	10000

VERIFICA RESISTENZA, CALCOLO CEDIMENTI

R_d (kN)	E_d (kN)	E_d/R_d		δ (mm)	K_{sec} (kN/mm)	Calcola	γ_G	
5134.5	4160.4	81.0%	VERIFICA OK	+4.8	858.1	SI	1.30	Compressione SLU (A1+M1+R3)
4564.9	0.0	0.0%	VERIFICA OK	+0.0	0.0	SI	1.00	Trazione SLU (A1+M1+R3)
5295.7	3947.3	74.5%	VERIFICA OK	+4.3	912.3	SI	1.00	Compressione SLV (A1+M1+R3)
4564.9	-2033.1	44.5%	VERIFICA OK	-1.7	1194.7	SI	1.00	Trazione SLV (A1+M1+R3)



δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)	δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)	δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)	δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)
-36.0	4852.9	4852.9	0.0	-3.0	2985.0	2985.0	0.0	42.0	6294.4	5039.6	1254.8	99.0	7265.0	5039.6	2225.4
-30.0	4852.9	4852.9	0.0	-2.4	2595.5	2595.5	0.0	45.0	6353.2	5039.6	1313.6	102.0	7301.5	5039.6	2261.9
-24.0	4852.9	4852.9	0.0	-1.8	2120.3	2120.3	0.0	48.0	6410.3	5039.6	1370.7	105.0	7301.5	5039.6	2261.9
-18.0	4852.9	4852.9	0.0	-1.2	1542.2	1542.2	0.0	51.0	6466.2	5039.6	1426.6	108.0	7301.5	5039.6	2261.9
-12.0	4852.9	4852.9	0.0	-0.6	842.3	842.3	0.0	54.0	6521.1	5039.6	1481.5	111.0	7301.5	5039.6	2261.9
-11.4	4879.0	4879.0	0.0	0.0	0.0	0.0	0.0	57.0	6575.2	5039.6	1535.6	114.0	7301.5	5039.6	2261.9
-10.8	4867.9	4867.9	0.0	3.0	3235.4	3099.8	135.7	60.0	6628.6	5039.6	1589.0	117.0	7301.5	5039.6	2261.9
-10.2	4827.6	4827.6	0.0	6.0	4543.9	4282.7	261.2	63.0	6681.5	5039.6	1641.9	120.0	7301.5	5039.6	2261.9
-9.6	4765.5	4765.5	0.0	9.0	5244.9	4867.5	377.4	66.0	6734.0	5039.6	1694.4	123.0	7301.5	5039.6	2261.9
-9.0	4687.2	4687.2	0.0	12.0	5524.8	5039.6	485.2	69.0	6786.1	5039.6	1746.5	126.0	7301.5	5039.6	2261.9
-8.4	4596.4	4596.4	0.0	15.0	5624.9	5039.6	585.3	72.0	6837.8	5039.6	1798.2	129.0	7301.5	5039.6	2261.9
-7.8	4495.2	4495.2	0.0	18.0	5718.2	5039.6	678.6	75.0	6889.1	5039.6	1849.5	132.0	7301.5	5039.6	2261.9
-7.2	4384.0	4384.0	0.0	21.0	5805.3	5039.6	765.7	78.0	6939.9	5039.6	1900.3	135.0	7301.5	5039.6	2261.9
-6.6	4261.3	4261.3	0.0	24.0	5886.9	5039.6	847.3	81.0	6990.0	5039.6	1950.5	138.0	7301.5	5039.6	2261.9
-6.0	4124.1	4124.1	0.0	27.0	5963.7	5039.6	924.1	84.0	7039.4	5039.6	1999.8	141.0	7301.5	5039.6	2261.9
-5.4	3967.2	3967.2	0.0	30.0	6036.3	5039.6	996.7	87.0	7087.7	5039.6	2048.1	144.0	7301.5	5039.6	2261.9
-4.8	3784.2	3784.2	0.0	33.0	6105.1	5039.6	1065.5	90.0	7134.7	5039.6	2095.1	156.0	7301.5	5039.6	2261.9
-4.2	3566.5	3566.5	0.0	36.0	6170.8	5039.6	1131.2	93.0	7180.2	5039.6	2140.6	168.0	7301.5	5039.6	2261.9
-3.6	3304.1	3304.1	0.0	39.0	6233.7	5039.6	1194.2	96.0	7223.7	5039.6	2184.1				

COEFFICIENTI RIDUZIONE PORTATA

Interasse X (m) 4.00
Interasse Y (m) 4.00
Palo di verifica n° 2

					Base	Compressione			Trazione		
Palo n°	X (m)	Y (m)	D (m)	list (m)	i/D	α (rad)	l_i (m)	$\alpha_T \cdot l_i$ (m)	α (rad)	l_i (m)	$\alpha_T \cdot l_i$ (m)
1	-2.00	-6.00	1.20	4.00	3.33	0.000	0.000	0.000	0.349	0.209	0.163
2	-2.00	-2.00	1.20								
3	-2.00	2.00	1.20	4.00	3.33	0.000	0.000	0.000	0.349	0.209	0.163
4	-2.00	6.00	1.20	8.00	6.67	0.000	0.000	0.000	0.000	0.000	0.000
5	2.00	-6.00	1.20	5.66	4.71	0.000	0.000	0.000	0.000	0.000	0.000
6	2.00	-2.00	1.20	4.00	3.33	0.000	0.000	0.000	0.349	0.209	0.163
7	2.00	2.00	1.20	5.66	4.71	0.000	0.000	0.000	0.000	0.000	0.000
8	2.00	6.00	1.20	8.94	7.45	0.000	0.000	0.000	0.000	0.000	0.000
				α_q	1.000		$\alpha_{T,eq}$	1.000		$\alpha_{T,eq}$	0.963

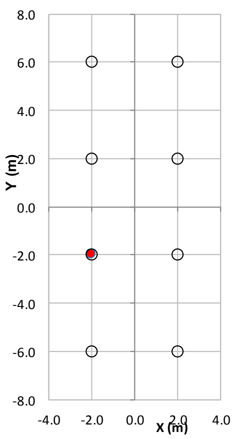


Figura 67: Condizioni DR - Riepilogo calcolo capacità portante

NOME: PILA 4	VERIFICA DI CAPACITA' PORTANTE	Rev. 01.0

DATI GEOMETRICI

D (m)	1.20	Diametro
L (m)	27.00	Lunghezza
A_b (m^2)	1.13	Area base
S_{lat} (m)	3.77	Superficie laterale

PARAMETRI CALCOLO

	SI	Resistenza di punta
ξ	1.40	Coeff. N° indagini
SET	2	Set parametri (ND/DR/RC)
W' (kN)	537.2	Peso efficace palo

Terreni granulari (DR):
δ/φ 0.70 tan(δ) Resistenza laterale

Terreni rocciosi (RC):
σ_c (MPa) 10
$\tau_{lim,MAX}$ (kPa) 215 < 300 < 585 OK

CALCOLO RESISTENZE

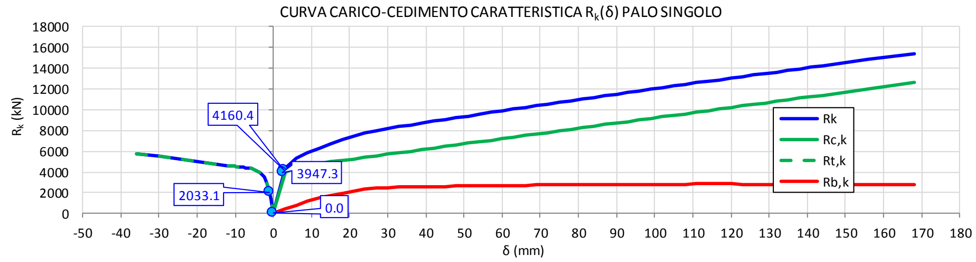
R_{cal} (kN)	R_k (kN)	α	γ	
6729.3	4806.6	1.000	1.35	Resistenza laterale compressione (c)
6722.3	4801.7	0.963	1.25	Resistenza laterale trazione (t)
2827.4	2019.6	1.000	1.15	Resistenza di base (b)

Tutti terreni (DR) (ND) (RC):

	DR	ND	RC
$\tau_{lim,MAX}$ (kPa)	100	100	300
$q_{b,lim}$ (kPa)	2000	2500	10000

VERIFICA RESISTENZA, CALCOLO CEDIMENTI

R_d (kN)	E_d (kN)	E_d/R_d		δ (mm)	K_{sec} (kN/mm)	Calcola	γ_G	
4977.3	4160.4	83.6%	VERIFICA OK	+2.7	1534.5	SI	1.30	Compressione SLU (A1+M1+R3)
4378.5	0.0	0.0%	VERIFICA OK	+0.0	0.0	SI	1.00	Trazione SLU (A1+M1+R3)
5138.5	3947.3	76.8%	VERIFICA OK	+2.4	1647.6	SI	1.00	Compressione SLV (A1+M1+R3)
4378.5	-2033.1	46.4%	VERIFICA OK	-1.0	2105.0	SI	1.00	Trazione SLV (A1+M1+R3)



δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)	δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)	δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)	δ (mm)	R_k (kN)	$R_{c,k}/R_{t,k}$ (kN)	$R_{b,k}$ (kN)
-36.0	5785.8	5785.8	0.0	-3.0	3751.6	3751.6	0.0	42.0	8894.5	6308.7	2585.8	99.0	11982.4	9162.7	2819.8
-30.0	5496.5	5496.5	0.0	-2.4	3471.4	3471.4	0.0	45.0	9063.7	6458.9	2604.8	102.0	12137.5	9312.9	2824.7
-24.0	5207.2	5207.2	0.0	-1.8	3035.7	3035.7	0.0	48.0	9232.1	6609.1	2623.0	105.0	12291.9	9463.1	2828.8
-18.0	4917.9	4917.9	0.0	-1.2	2372.1	2372.1	0.0	51.0	9399.9	6759.3	2640.5	108.0	12445.5	9613.3	2832.2
-12.0	4628.6	4628.6	0.0	-0.6	1394.0	1394.0	0.0	54.0	9566.8	6909.5	2657.3	111.0	12598.4	9763.5	2834.9
-11.4	4599.7	4599.7	0.0	0.0	0.0	0.0	0.0	57.0	9733.1	7059.7	2673.3	114.0	12750.5	9913.7	2836.8
-10.8	4570.8	4570.8	0.0	3.0	4323.9	3895.9	428.0	60.0	9898.6	7210.0	2688.6	117.0	12901.9	10063.9	2838.0
-10.2	4541.8	4541.8	0.0	6.0	5322.8	4506.0	816.8	63.0	10063.3	7360.2	2703.2	120.0	13052.6	10214.1	2838.5
-9.6	4512.9	4512.9	0.0	9.0	5822.7	4656.4	1166.3	66.0	10227.3	7510.4	2717.0	123.0	13191.7	10364.3	2827.4
-9.0	4484.0	4484.0	0.0	12.0	6283.1	4806.6	1476.5	69.0	10390.6	7660.6	2730.0	126.0	13342.0	10514.5	2827.4
-8.4	4455.0	4455.0	0.0	15.0	6704.3	4956.8	1747.4	72.0	10553.1	7810.8	2742.3	129.0	13492.2	10664.7	2827.4
-7.8	4426.1	4426.1	0.0	18.0	7086.2	5107.1	1979.1	75.0	10714.9	7961.0	2753.9	132.0	13642.4	10814.9	2827.4
-7.2	4397.2	4397.2	0.0	21.0	7428.8	5257.3	2171.6	78.0	10875.9	8111.2	2764.7	135.0	13792.6	10965.1	2827.4
-6.6	4395.2	4395.2	0.0	24.0	7732.2	5407.5	2324.7	81.0	11036.2	8261.4	2774.8	138.0	13942.8	11115.3	2827.4
-6.0	4339.2	4339.2	0.0	27.0	7996.3	5557.7	2438.6	84.0	11195.8	8411.6	2784.2	141.0	14093.0	11265.6	2827.4
-5.4	4257.8	4257.8	0.0	30.0	8221.1	5707.9	2513.2	87.0	11354.6	8561.8	2792.8	144.0	14243.2	11415.8	2827.4
-4.8	4165.6	4165.6	0.0	33.0	8406.7	5858.1	2548.6	90.0	11512.7	8712.0	2800.6	156.0	14844.0	12016.6	2827.4
-4.2	4062.5	4062.5	0.0	36.0	8553.8	6008.3	2545.5	93.0	11670.0	8862.2	2807.8	168.0	15444.9	12617.4	2827.4
-3.6	3934.2	3934.2	0.0	39.0	8724.5	6158.5	2566.0	96.0	11826.6	9012.4	2814.1				

COEFFICIENTI RIDUZIONE PORTATA

Interasse X (m) 4.00 Palo di verifica n° 2
Interasse Y (m) 4.00

Palo n°	X (m)	Y (m)	D (m)	list (m)	Base i/D	α (rad)	Compressione l_i (m)	$\alpha_T \cdot l_i$ (m)	α (rad)	Trazione l_i (m)	$\alpha_T \cdot l_i$ (m)
1	-2.00	-6.00	1.20	4.00	3.33	0.000	0.000	0.000	0.349	0.209	0.163
2	-2.00	-2.00	1.20								
3	-2.00	2.00	1.20	4.00	3.33	0.000	0.000	0.000	0.349	0.209	0.163
4	-2.00	6.00	1.20	8.00	6.67	0.000	0.000	0.000	0.000	0.000	0.000
5	2.00	-6.00	1.20	5.66	4.71	0.000	0.000	0.000	0.000	0.000	0.000
6	2.00	-2.00	1.20	4.00	3.33	0.000	0.000	0.000	0.349	0.209	0.163
7	2.00	2.00	1.20	5.66	4.71	0.000	0.000	0.000	0.000	0.000	0.000
8	2.00	6.00	1.20	8.94	7.45	0.000	0.000	0.000	0.000	0.000	0.000
				α_q	1.000		$\alpha_{T,eq}$	1.000		$\alpha_{T,eq}$	0.963

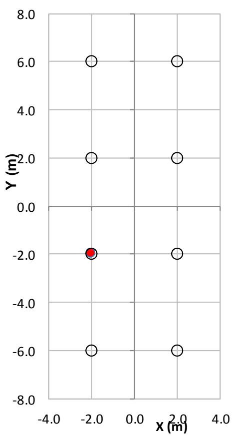
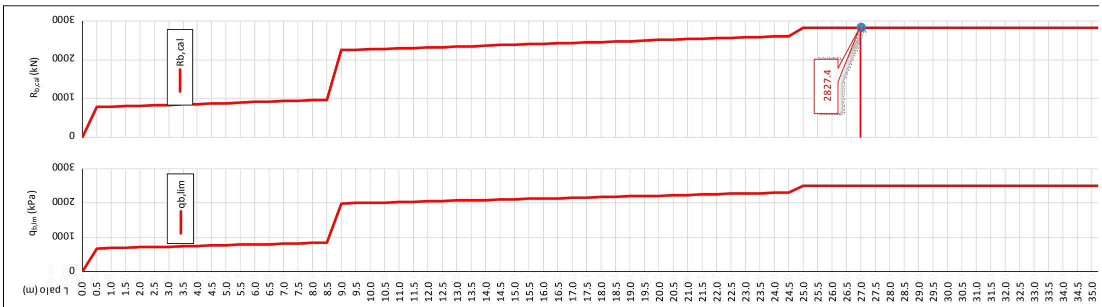
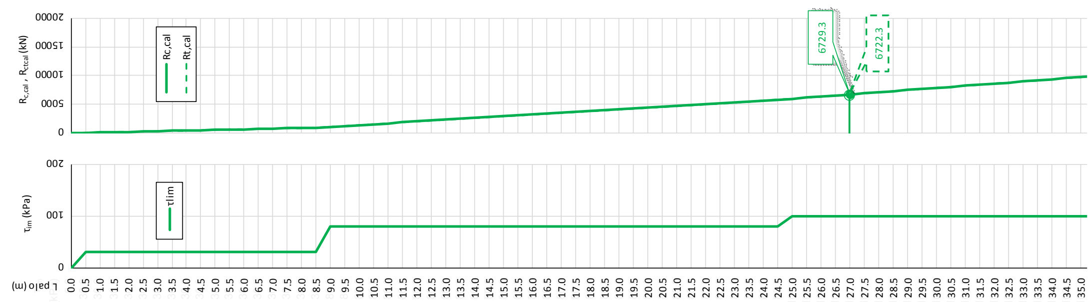


Figura 68: Condizioni ND - Riepilogo calcolo capacità portante



VERIFICA DI CAPACITA' PORTANTE – Capacità portante di base $R_{b,cal}$

L palo (m)	φ (°)	N_{SPT} (n° colpi)	c' (kPa)	N'_q	N_c	$q_{b,lim,D}$ (kPa)	$R_{b,cal}$ (kN)	DR / ND / RC
0.0							0.0	
0.5	30.0	30	15.0	9.0	13.9		775.0	ND
1.0	30.0	30	15.0	9.0	13.9		786.6	ND
1.5	30.0	30	15.0	9.0	13.9		798.2	ND
2.0	30.0	30	15.0	9.0	13.9		809.8	ND
2.5	30.0	30	15.0	9.0	13.9		821.4	ND
3.0	30.0	30	15.0	9.0	13.9		833.0	ND
3.5	30.0	30	15.0	9.0	13.9		844.6	ND
4.0	30.0	30	15.0	9.0	13.9		856.1	ND
4.5	30.0	30	15.0	9.0	13.9		867.7	ND
5.0	30.0	30	15.0	9.0	13.9		879.3	ND
5.5	30.0	30	15.0	9.0	13.9		890.9	ND
6.0	30.0	30	15.0	9.0	13.9		902.5	ND
6.5	30.0	30	15.0	9.0	13.9		914.1	ND
7.0	30.0	30	15.0	9.0	13.9		925.7	ND
7.5	24.0	50	20.0	5.0	9.0		937.3	ND
8.0	24.0	50	20.0	5.0	9.0		948.9	ND
8.5	24.0	50	20.0	5.0	9.0		960.5	ND
9.0	28.0	50	30.0	7.0	11.3		2244.7	ND
9.5	28.0	50	30.0	7.0	11.3		2256.6	ND
10.0	28.0	50	30.0	7.0	11.3		2268.4	ND
10.5	28.0	50	30.0	7.0	11.3		2280.3	ND
11.0	28.0	50	30.0	7.0	11.3		2292.2	ND
11.5	28.0	50	30.0	7.0	11.3		2304.1	ND
12.0	28.0	50	30.0	7.0	11.3		2316.0	ND
12.5	28.0	50	30.0	7.0	11.3		2327.8	ND
13.0	28.0	50	30.0	7.0	11.3		2339.7	ND
13.5	28.0	50	30.0	7.0	11.3		2351.6	ND
14.0	28.0	50	30.0	7.0	11.3		2363.5	ND
14.5	28.0	50	30.0	7.0	11.3		2375.3	ND
15.0	28.0	50	30.0	7.0	11.3		2387.2	ND
15.5	28.0	50	30.0	7.0	11.3		2399.1	ND
16.0	28.0	50	30.0	7.0	11.3		2411.0	ND
16.5	28.0	50	30.0	7.0	11.3		2422.8	ND
17.0	28.0	50	30.0	7.0	11.3		2434.7	ND
17.5	28.0	50	30.0	7.0	11.3		2446.6	ND
18.0	28.0	50	30.0	7.0	11.3		2458.5	ND
18.5	28.0	50	30.0	7.0	11.3		2470.3	ND
19.0	28.0	50	30.0	7.0	11.3		2482.2	ND
19.5	28.0	50	30.0	7.0	11.3		2494.1	ND
20.0	28.0	50	30.0	7.0	11.3		2506.0	ND
20.5	28.0	50	30.0	7.0	11.3		2517.8	ND
21.0	28.0	50	30.0	7.0	11.3		2529.7	ND
21.5	28.0	50	30.0	7.0	11.3		2541.6	ND
22.0	28.0	50	30.0	7.0	11.3		2553.5	ND
22.5	28.0	50	30.0	7.0	11.3		2565.3	ND
23.0	28.0	50	30.0	7.0	11.3		2577.2	ND
23.5	28.0	50	30.0	7.0	11.3		2589.1	ND
24.0	28.0	50	30.0	7.0	11.3		2601.0	ND
24.5	28.0	50	30.0	7.0	11.3		2612.8	ND
25.0	28.0	50	30.0	7.0	11.3		2827.4	ND
25.5	28.0	50	30.0	7.0	11.3		2827.4	ND
26.0	28.0	50	30.0	7.0	11.3		2827.4	ND
26.5	28.0	50	30.0	7.0	11.3		2827.4	ND
27.0	28.0	50	30.0	7.0	11.3		2827.4	ND
27.5	28.0	50	30.0	7.0	11.3		2827.4	ND
28.0	28.0	50	30.0	7.0	11.3		2827.4	ND
28.5	28.0	50	30.0	7.0	11.3		2827.4	ND
29.0	28.0	50	30.0	7.0	11.3		2827.4	ND
29.5	28.0	50	30.0	7.0	11.3		2827.4	ND
30.0	28.0	50	30.0	7.0	11.3		2827.4	ND
30.5	28.0	50	30.0	7.0	11.3		2827.4	ND
31.0	28.0	50	30.0	7.0	11.3		2827.4	ND
31.5	28.0	50	30.0	7.0	11.3		2827.4	ND
32.0	28.0	50	30.0	7.0	11.3		2827.4	ND
32.5	28.0	50	30.0	7.0	11.3		2827.4	ND
33.0	28.0	50	30.0	7.0	11.3		2827.4	ND
33.5	28.0	50	30.0	7.0	11.3		2827.4	ND
34.0	28.0	50	30.0	7.0	11.3		2827.4	ND
34.5	28.0	50	30.0	7.0	11.3		2827.4	ND
35.0	28.0	50	30.0	7.0	11.3		2827.4	ND



NOME: PILA 4

VERIFICA DI CAPACITA' PORTANTE – Capacità portante laterale $R_{c,cal}$, $R_{t,cal}$

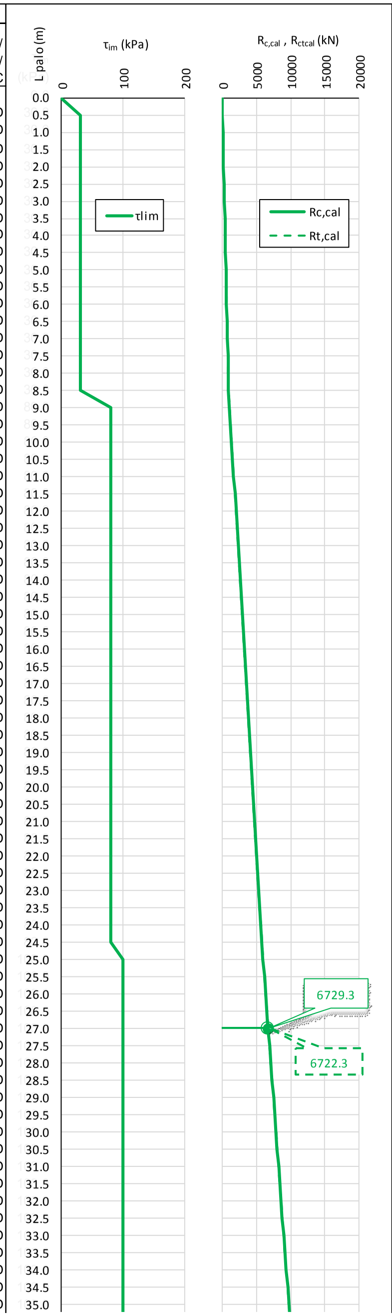
Terreno	Falda		L palo (m)	z terreno da p.c. (m)	γ_{sat} (kN/m³)	σ'_{v0} (kPa)	K	φ (°)	N_{SPT} (n° colpi)	c' (kPa)	$\tau_{lim,D}$ (kPa)	$R_{c,cal}$ (kN)	$R_{t,cal}$ (kN)	DR / ND / RC
UNITA b		PALO	0.0	3.0	20.5	61.5						0.0	0.0	
		PALO	0.5	3.5	20.5	71.8	0.50	30.0	30	15.0		56.5	54.5	ND
		PALO	1.0	4.0	20.5	82.0	0.50	30.0	30	15.0		113.1	111.0	ND
		PALO	1.5	4.5	20.5	92.3	0.50	30.0	30	15.0		169.6	167.6	ND
		PALO	2.0	5.0	20.5	102.5	0.50	30.0	30	15.0		226.2	224.1	ND
		PALO	2.5	5.5	20.5	112.8	0.50	30.0	30	15.0		282.7	280.6	ND
		PALO	3.0	6.0	20.5	123.0	0.50	30.0	30	15.0		339.3	337.2	ND
		PALO	3.5	6.5	20.5	133.3	0.50	30.0	30	15.0		395.8	393.7	ND
		PALO	4.0	7.0	20.5	143.5	0.50	30.0	30	15.0		452.4	450.3	ND
		PALO	4.5	7.5	20.5	153.8	0.50	30.0	30	15.0		508.9	506.8	ND
		PALO	5.0	8.0	20.5	164.0	0.50	30.0	30	15.0		565.5	563.4	ND
		PALO	5.5	8.5	20.5	174.3	0.50	30.0	30	15.0		622.0	619.9	ND
		PALO	6.0	9.0	20.5	184.5	0.50	30.0	30	15.0		678.6	676.5	ND
		PALO	6.5	9.5	20.5	194.8	0.50	30.0	30	15.0		735.1	733.0	ND
		PALO	7.0	10.0	20.5	205.0	0.50	30.0	30	15.0		791.7	789.6	ND
UNITA FAAa	SI	PALO	7.5	10.5	20.5	210.3	0.50	24.0	50	20.0		848.2	846.1	ND
	SI	PALO	8.0	11.0	20.5	215.5	0.50	24.0	50	20.0		904.8	902.7	ND
	SI	PALO	8.5	11.5	20.5	220.8	0.50	24.0	50	20.0		961.3	959.2	ND
UNITA FAA	SI	PALO	9.0	12.0	21.0	226.3	0.50	28.0	50	30.0		1112.1	1106.5	ND
	SI	PALO	9.5	12.5	21.0	231.8	0.50	28.0	50	30.0		1262.9	1257.3	ND
	SI	PALO	10.0	13.0	21.0	237.3	0.50	28.0	50	30.0		1413.7	1408.1	ND
	SI	PALO	10.5	13.5	21.0	242.8	0.50	28.0	50	30.0		1564.5	1558.9	ND
	SI	PALO	11.0	14.0	21.0	248.3	0.50	28.0	50	30.0		1715.3	1709.7	ND
	SI	PALO	11.5	14.5	21.0	253.8	0.50	28.0	50	30.0		1866.1	1860.5	ND
	SI	PALO	12.0	15.0	21.0	259.3	0.50	28.0	50	30.0		2016.9	2011.3	ND
	SI	PALO	12.5	15.5	21.0	264.8	0.50	28.0	50	30.0		2167.7	2162.1	ND
	SI	PALO	13.0	16.0	21.0	270.3	0.50	28.0	50	30.0		2318.5	2312.9	ND
	SI	PALO	13.5	16.5	21.0	275.8	0.50	28.0	50	30.0		2469.3	2463.7	ND
	SI	PALO	14.0	17.0	21.0	281.3	0.50	28.0	50	30.0		2620.1	2614.5	ND
	SI	PALO	14.5	17.5	21.0	286.8	0.50	28.0	50	30.0		2770.9	2765.3	ND
	SI	PALO	15.0	18.0	21.0	292.3	0.50	28.0	50	30.0		2921.7	2916.1	ND
	SI	PALO	15.5	18.5	21.0	297.8	0.50	28.0	50	30.0		3072.5	3066.9	ND
	SI	PALO	16.0	19.0	21.0	303.3	0.50	28.0	50	30.0		3223.3	3217.7	ND
	SI	PALO	16.5	19.5	21.0	308.8	0.50	28.0	50	30.0		3374.1	3368.5	ND
	SI	PALO	17.0	20.0	21.0	314.3	0.50	28.0	50	30.0		3524.9	3519.3	ND
	SI	PALO	17.5	20.5	21.0	319.8	0.50	28.0	50	30.0		3675.7	3670.1	ND
	SI	PALO	18.0	21.0	21.0	325.3	0.50	28.0	50	30.0		3826.5	3820.9	ND
	SI	PALO	18.5	21.5	21.0	330.8	0.50	28.0	50	30.0		3977.3	3971.7	ND
	SI	PALO	19.0	22.0	21.0	336.3	0.50	28.0	50	30.0		4128.1	4122.5	ND
	SI	PALO	19.5	22.5	21.0	341.8	0.50	28.0	50	30.0		4278.8	4273.3	ND
	SI	PALO	20.0	23.0	21.0	347.3	0.50	28.0	50	30.0		4429.6	4424.1	ND
	SI	PALO	20.5	23.5	21.0	352.8	0.50	28.0	50	30.0		4580.4	4574.9	ND
	SI	PALO	21.0	24.0	21.0	358.3	0.50	28.0	50	30.0		4731.2	4725.7	ND
	SI	PALO	21.5	24.5	21.0	363.8	0.50	28.0	50	30.0		4882.0	4876.4	ND
	SI	PALO	22.0	25.0	21.0	369.3	0.50	28.0	50	30.0		5032.8	5027.2	ND
	SI	PALO	22.5	25.5	21.0	374.8	0.50	28.0	50	30.0		5183.6	5178.0	ND
	SI	PALO	23.0	26.0	21.0	380.3	0.50	28.0	50	30.0		5334.4	5328.8	ND
	SI	PALO	23.5	26.5	21.0	385.8	0.50	28.0	50	30.0		5485.2	5479.6	ND
	SI	PALO	24.0	27.0	21.0	391.3	0.50	28.0	50	30.0		5636.0	5630.4	ND
	SI	PALO	24.5	27.5	21.0	396.8	0.50	28.0	50	30.0		5786.8	5781.2	ND
	SI	PALO	25.0	28.0	21.0	402.3	0.50	28.0	50	30.0		5975.3	5968.3	ND
	SI	PALO	25.5	28.5	21.0	407.8	0.50	28.0	50	30.0		6163.8	6156.8	ND
	SI	PALO	26.0	29.0	21.0	413.3	0.50	28.0	50	30.0		6352.3	6345.3	ND
	SI	PALO	26.5	29.5	21.0	418.8	0.50	28.0	50	30.0		6540.8	6533.8	ND
	SI	PALO	27.0	30.0	21.0	424.3	0.50	28.0	50	30.0		6729.3	6722.3	ND
	SI		27.5	30.5	21.0	429.8	0.50	28.0	50	30.0		6917.8	6910.8	ND
	SI		28.0	31.0	21.0	435.3	0.50	28.0	50	30.0		7106.3	7099.3	ND
	SI		28.5	31.5	21.0	440.8	0.50	28.0	50	30.0		7294.8	7287.8	ND
	SI		29.0	32.0	21.0	446.3	0.50	28.0	50	30.0		7483.3	7476.3	ND
	SI		29.5	32.5	21.0	451.8	0.50	28.0	50	30.0		7671.8	7664.8	ND
	SI		30.0	33.0	21.0	457.3	0.50	28.0	50	30.0		7860.3	7853.3	ND
	SI		30.5	33.5	21.0	462.8	0.50	28.0	50	30.0		8048.8	8041.8	ND
	SI		31.0	34.0	21.0	468.3	0.50	28.0	50	30.0		8237.3	8230.3	ND
	SI		31.5	34.5	21.0	473.8	0.50	28.0	50	30.0		8425.8	8418.8	ND
	SI		32.0	35.0	21.0	479.3	0.50	28.0	50	30.0		8614.2	8607.3	ND
	SI		32.5	35.5	21.0	484.8	0.50	28.0	50	30.0		8802.7	8795.8	ND
	SI		33.0	36.0	21.0	490.3	0.50	28.0	50	30.0		8991.2	8984.3	ND
	SI		33.5	36.5	21.0	495.8	0.50	28.0	50	30.0		9179.7	9172.8	ND
	SI		34.0	37.0	21.0	501.3	0.50	28.0	50	30.0		9368.2	9361.2	ND
	SI		34.5	37.5	21.0	506.8	0.50	28.0	50	30.0		9556.7	9549.7	ND
	SI		35.0	38.0	21.0	512.3	0.50	28.0	50	30.0		9745.2	9738.2	ND

Figura 69: Condizioni DR - Dettaglio calcolo capacità portante laterale

NOME: PILA 4

VERIFICA DI CAPACITA' PORTANTE – Capacità portante laterale $R_{c,cal}$, $R_{t,cal}$

Terreno	Falda		L palo (m)	z terreno da p.c. (m)	γ_{sat} (kN/m³)	σ'_{v0} (kPa)	c_u (kPa)	$\tau_{lim,ND}$ (kPa)	$R_{c,cal}$ (kN)	$R_{t,cal}$ (kN)	DR / ND / RC
UNITA b		PALO	0.0	3.0	20.5	61.5			0.0	0.0	
		PALO	0.5	3.5	20.5	71.8	75.0	30.0	56.5	54.5	ND
		PALO	1.0	4.0	20.5	82.0	75.0	30.0	113.1	111.0	ND
		PALO	1.5	4.5	20.5	92.3	75.0	30.0	169.6	167.6	ND
		PALO	2.0	5.0	20.5	102.5	75.0	30.0	226.2	224.1	ND
		PALO	2.5	5.5	20.5	112.8	75.0	30.0	282.7	280.6	ND
		PALO	3.0	6.0	20.5	123.0	75.0	30.0	339.3	337.2	ND
		PALO	3.5	6.5	20.5	133.3	75.0	30.0	395.8	393.7	ND
		PALO	4.0	7.0	20.5	143.5	75.0	30.0	452.4	450.3	ND
		PALO	4.5	7.5	20.5	153.8	75.0	30.0	508.9	506.8	ND
		PALO	5.0	8.0	20.5	164.0	75.0	30.0	565.5	563.4	ND
		PALO	5.5	8.5	20.5	174.3	75.0	30.0	622.0	619.9	ND
		PALO	6.0	9.0	20.5	184.5	75.0	30.0	678.6	676.5	ND
		PALO	6.5	9.5	20.5	194.8	75.0	30.0	735.1	733.0	ND
		PALO	7.0	10.0	20.5	205.0	75.0	30.0	791.7	789.6	ND
UNITA FAAa	SI	PALO	7.5	10.5	20.5	210.3	75.0	30.0	848.2	846.1	ND
	SI	PALO	8.0	11.0	20.5	215.5	75.0	30.0	904.8	902.7	ND
	SI	PALO	8.5	11.5	20.5	220.8	75.0	30.0	961.3	959.2	ND
UNITA FAA	SI	PALO	9.0	12.0	21.0	226.3	200.0	80.0	1112.1	1106.5	ND
	SI	PALO	9.5	12.5	21.0	231.8	200.0	80.0	1262.9	1257.3	ND
	SI	PALO	10.0	13.0	21.0	237.3	200.0	80.0	1413.7	1408.1	ND
	SI	PALO	10.5	13.5	21.0	242.8	200.0	80.0	1564.5	1558.9	ND
	SI	PALO	11.0	14.0	21.0	248.3	200.0	80.0	1715.3	1709.7	ND
	SI	PALO	11.5	14.5	21.0	253.8	200.0	80.0	1866.1	1860.5	ND
	SI	PALO	12.0	15.0	21.0	259.3	200.0	80.0	2016.9	2011.3	ND
	SI	PALO	12.5	15.5	21.0	264.8	200.0	80.0	2167.7	2162.1	ND
	SI	PALO	13.0	16.0	21.0	270.3	200.0	80.0	2318.5	2312.9	ND
	SI	PALO	13.5	16.5	21.0	275.8	200.0	80.0	2469.3	2463.7	ND
	SI	PALO	14.0	17.0	21.0	281.3	200.0	80.0	2620.1	2614.5	ND
	SI	PALO	14.5	17.5	21.0	286.8	200.0	80.0	2770.9	2765.3	ND
	SI	PALO	15.0	18.0	21.0	292.3	200.0	80.0	2921.7	2916.1	ND
	SI	PALO	15.5	18.5	21.0	297.8	200.0	80.0	3072.5	3066.9	ND
	SI	PALO	16.0	19.0	21.0	303.3	200.0	80.0	3223.3	3217.7	ND
	SI	PALO	16.5	19.5	21.0	308.8	200.0	80.0	3374.1	3368.5	ND
	SI	PALO	17.0	20.0	21.0	314.3	200.0	80.0	3524.9	3519.3	ND
	SI	PALO	17.5	20.5	21.0	319.8	200.0	80.0	3675.7	3670.1	ND
	SI	PALO	18.0	21.0	21.0	325.3	200.0	80.0	3826.5	3820.9	ND
	SI	PALO	18.5	21.5	21.0	330.8	200.0	80.0	3977.3	3971.7	ND
	SI	PALO	19.0	22.0	21.0	336.3	200.0	80.0	4128.1	4122.5	ND
	SI	PALO	19.5	22.5	21.0	341.8	200.0	80.0	4278.8	4273.3	ND
	SI	PALO	20.0	23.0	21.0	347.3	200.0	80.0	4429.6	4424.1	ND
	SI	PALO	20.5	23.5	21.0	352.8	200.0	80.0	4580.4	4574.9	ND
	SI	PALO	21.0	24.0	21.0	358.3	200.0	80.0	4731.2	4725.7	ND
	SI	PALO	21.5	24.5	21.0	363.8	200.0	80.0	4882.0	4876.4	ND
	SI	PALO	22.0	25.0	21.0	369.3	200.0	80.0	5032.8	5027.2	ND
	SI	PALO	22.5	25.5	21.0	374.8	200.0	80.0	5183.6	5178.0	ND
	SI	PALO	23.0	26.0	21.0	380.3	200.0	80.0	5334.4	5328.8	ND
	SI	PALO	23.5	26.5	21.0	385.8	200.0	80.0	5485.2	5479.6	ND
	SI	PALO	24.0	27.0	21.0	391.3	200.0	80.0	5636.0	5630.4	ND
	SI	PALO	24.5	27.5	21.0	396.8	200.0	80.0	5786.8	5781.2	ND
	SI	PALO	25.0	28.0	21.0	402.3	250.0	100.0	5975.3	5968.3	ND
	SI	PALO	25.5	28.5	21.0	407.8	250.0	100.0	6163.8	6156.8	ND
	SI	PALO	26.0	29.0	21.0	413.3	250.0	100.0	6352.3	6345.3	ND
	SI	PALO	26.5	29.5	21.0	418.8	250.0	100.0	6540.8	6533.8	ND
	SI	PALO	27.0	30.0	21.0	424.3	250.0	100.0	6729.3	6722.3	ND
	SI		27.5	30.5	21.0	429.8	250.0	100.0	6917.8	6910.8	ND
	SI		28.0	31.0	21.0	435.3	250.0	100.0	7106.3	7099.3	ND
	SI		28.5	31.5	21.0	440.8	250.0	100.0	7294.8	7287.8	ND
	SI		29.0	32.0	21.0	446.3	250.0	100.0	7483.3	7476.3	ND
	SI		29.5	32.5	21.0	451.8	250.0	100.0	7671.8	7664.8	ND
	SI		30.0	33.0	21.0	457.3	250.0	100.0	7860.3	7853.3	ND
	SI		30.5	33.5	21.0	462.8	250.0	100.0	8048.8	8041.8	ND
	SI		31.0	34.0	21.0	468.3	250.0	100.0	8237.3	8230.3	ND
	SI		31.5	34.5	21.0	473.8	250.0	100.0	8425.8	8418.8	ND
	SI		32.0	35.0	21.0	479.3	250.0	100.0	8614.2	8607.3	ND
	SI		32.5	35.5	21.0	484.8	250.0	100.0	8802.7	8795.8	ND
	SI		33.0	36.0	21.0	490.3	250.0	100.0	8991.2	8984.3	ND
	SI		33.5	36.5	21.0	495.8	250.0	100.0	9179.7	9172.8	ND
	SI		34.0	37.0	21.0	501.3	250.0	100.0	9368.2	9361.2	ND
	SI		34.5	37.5	21.0	506.8	250.0	100.0	9556.7	9549.7	ND
	SI		35.0	38.0	21.0	512.3	250.0	100.0	9745.2	9738.2	ND



VERIFICA DI CAPACITA' PORTANTE – Capacità portante di base $R_{b,cal}$

L palo (m)	σ_{v0} (kPa)	c_u (kPa)	$q_{b,lim,ND}$ (kPa)	$R_{b,cal}$ (kN)	DR / ND / RC
0.0	0.0			0.0	
0.5	10.3	75.0	685.3	775.0	ND
1.0	20.5	75.0	695.5	786.6	ND
1.5	30.8	75.0	705.8	798.2	ND
2.0	41.0	75.0	716.0	809.8	ND
2.5	51.3	75.0	726.3	821.4	ND
3.0	61.5	75.0	736.5	833.0	ND
3.5	71.8	75.0	746.8	844.6	ND
4.0	82.0	75.0	757.0	856.1	ND
4.5	92.3	75.0	767.3	867.7	ND
5.0	102.5	75.0	777.5	879.3	ND
5.5	112.8	75.0	787.8	890.9	ND
6.0	123.0	75.0	798.0	902.5	ND
6.5	133.3	75.0	808.3	914.1	ND
7.0	143.5	75.0	818.5	925.7	ND
7.5	153.8	75.0	828.8	937.3	ND
8.0	164.0	75.0	839.0	948.9	ND
8.5	174.3	75.0	849.3	960.5	ND
9.0	184.8	200.0	1984.8	2244.7	ND
9.5	195.3	200.0	1995.3	2256.6	ND
10.0	205.8	200.0	2005.8	2268.4	ND
10.5	216.3	200.0	2016.3	2280.3	ND
11.0	226.8	200.0	2026.8	2292.2	ND
11.5	237.3	200.0	2037.3	2304.1	ND
12.0	247.8	200.0	2047.8	2316.0	ND
12.5	258.3	200.0	2058.3	2327.8	ND
13.0	268.8	200.0	2068.8	2339.7	ND
13.5	279.3	200.0	2079.3	2351.6	ND
14.0	289.8	200.0	2089.8	2363.5	ND
14.5	300.3	200.0	2100.3	2375.3	ND
15.0	310.8	200.0	2110.8	2387.2	ND
15.5	321.3	200.0	2121.3	2399.1	ND
16.0	331.8	200.0	2131.8	2411.0	ND
16.5	342.3	200.0	2142.3	2422.8	ND
17.0	352.8	200.0	2152.8	2434.7	ND
17.5	363.3	200.0	2163.3	2446.6	ND
18.0	373.8	200.0	2173.8	2458.5	ND
18.5	384.3	200.0	2184.3	2470.3	ND
19.0	394.8	200.0	2194.8	2482.2	ND
19.5	405.3	200.0	2205.3	2494.1	ND
20.0	415.8	200.0	2215.8	2506.0	ND
20.5	426.3	200.0	2226.3	2517.8	ND
21.0	436.8	200.0	2236.8	2529.7	ND
21.5	447.3	200.0	2247.3	2541.6	ND
22.0	457.8	200.0	2257.8	2553.5	ND
22.5	468.3	200.0	2268.3	2565.3	ND
23.0	478.8	200.0	2278.8	2577.2	ND
23.5	489.3	200.0	2289.3	2589.1	ND
24.0	499.8	200.0	2299.8	2601.0	ND
24.5	510.3	200.0	2310.3	2612.8	ND
25.0	520.8	250.0	2500.0	2827.4	ND
25.5	531.3	250.0	2500.0	2827.4	ND
26.0	541.8	250.0	2500.0	2827.4	ND
26.5	552.3	250.0	2500.0	2827.4	ND
27.0	562.8	250.0	2500.0	2827.4	ND
27.5	573.3	250.0	2500.0	2827.4	ND
28.0	583.8	250.0	2500.0	2827.4	ND
28.5	594.3	250.0	2500.0	2827.4	ND
29.0	604.8	250.0	2500.0	2827.4	ND
29.5	615.3	250.0	2500.0	2827.4	ND
30.0	625.8	250.0	2500.0	2827.4	ND
30.5	636.3	250.0	2500.0	2827.4	ND
31.0	646.8	250.0	2500.0	2827.4	ND
31.5	657.3	250.0	2500.0	2827.4	ND
32.0	667.8	250.0	2500.0	2827.4	ND
32.5	678.3	250.0	2500.0	2827.4	ND
33.0	688.8	250.0	2500.0	2827.4	ND
33.5	699.3	250.0	2500.0	2827.4	ND
34.0	709.8	250.0	2500.0	2827.4	ND
34.5	720.3	250.0	2500.0	2827.4	ND
35.0	730.8	250.0	2500.0	2827.4	ND

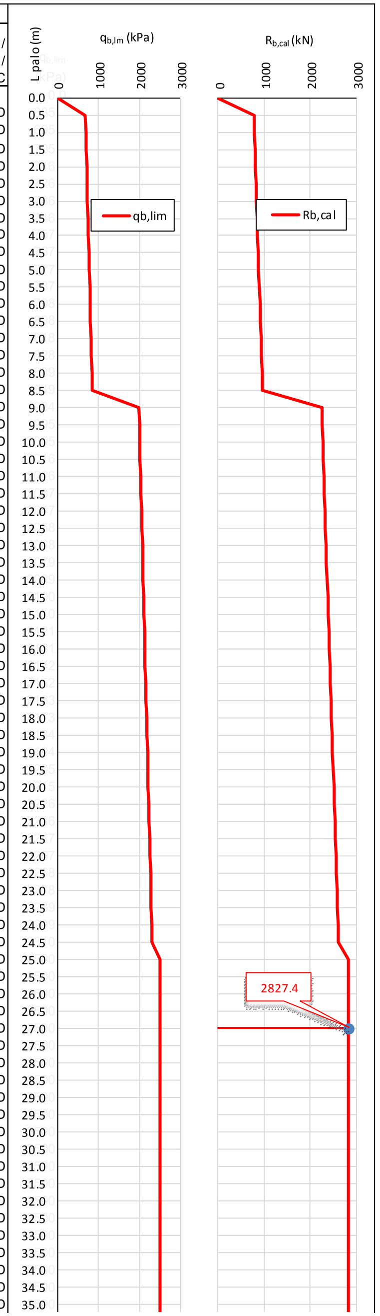


Figura 70: Condizioni ND - Dettaglio calcolo capacità portante di base

13 ANALISI ELEVAZIONI SPALLE

A favore di sicurezza, le analisi saranno svolte modellando la spalla 1, che presenta le condizioni di carico più gravose per le fondazioni.

13.1 Geometria

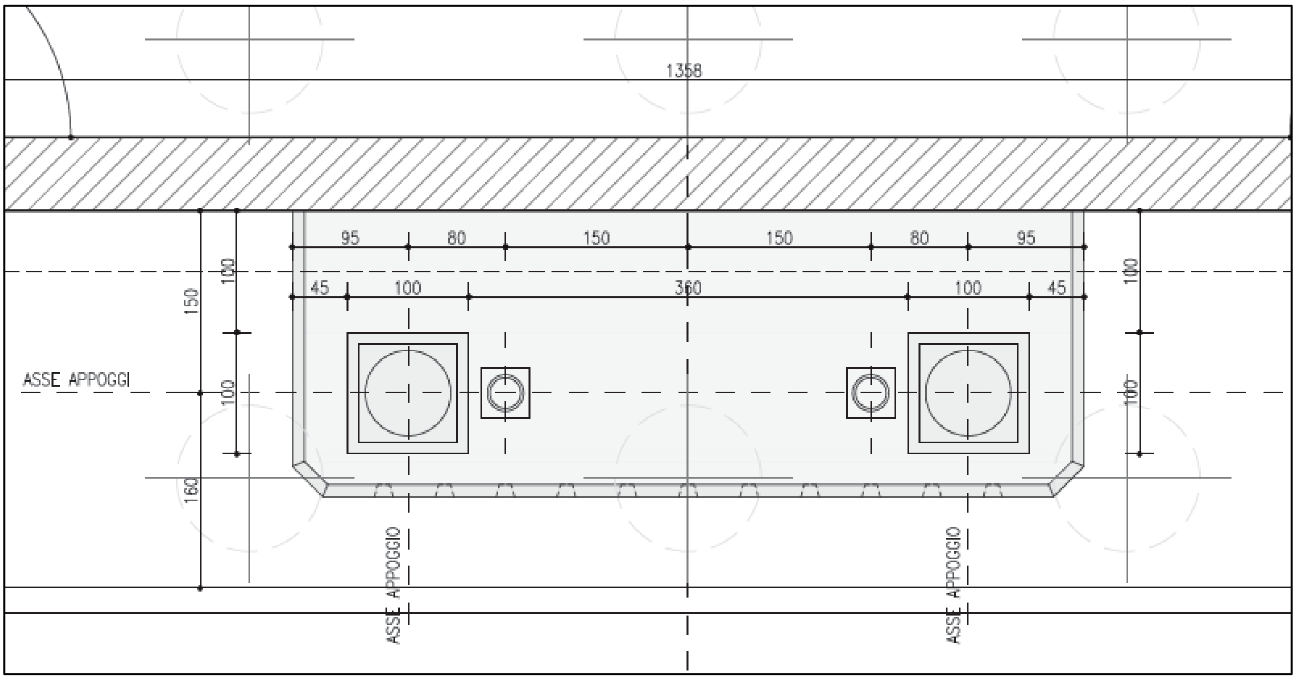


Figura 71: Elevazioni spalle – geometria pianta

13.2 Sollecitazioni alla base dell’elevazione appoggi

Nella tabella seguente sono riportate le sollecitazioni relative a ciascuna combinazione di interesse. Per ulteriori approfondimenti si vedano i relativi allegati di calcolo.

	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
SLU – N_{MAX}	36881.1	11948.5	1397.1	-4199.7	12715.7	68441.7
SLU – N_{MIN}	18540.5	7174.6	-1133.5	-3869.7	-1829.1	48598.5
SLU – M_{MAX}	27641.1	11291.1	1397.1	-4222.6	12572.3	74671.8
SLU – V_{MAX}	36881.1	11948.5	1397.1	-4199.7	12715.7	68441.7
SLE	18519.7	7527.4	931.4	-2815.1	8516.0	51152.0

13.3 Verifiche strutturali

Per le verifiche di resistenza si considera un sezione rettangolare con spigoli smussati di 0.25m a 45° di dimensione pari 6.50x2.45m armata nel modo seguente:

Armatura a flessione	$(1+1)\emptyset 24/10$
Armatura a taglio (spirale)	$\emptyset 14/10$
Incidenza	$\approx 150 kg/m^3$

Nome sezione:	elevazione appoggio	
Tipo sezione	Sezione generica	
Dimensione massima direzione X	650.0	[cm]
Dimensione massima direzione Y	245.0	[cm]

Coordinate dei vertici :

Nr. poligono	Nr. vertici	X[cm]	Y[cm]
	1	0.00	0.00
	2	650.00	0.00
	3	650.00	200.00
	4	625.00	245.00
	5	25.00	245.00
	6	0.00	200.00

Caratteristiche geometriche

Area sezione	158125.00	[cmq]
Inerzia in direzione X	5494075520.8	[cm^4]
Inerzia in direzione Y	783361931.4	[cm^4]
Inerzia in direzione XY	0.0	[cm^4]
Ascissa baricentro sezione	X_G = 325.00	[cm]
Ordinata baricentro sezione	Y_G = 121.74	[cm]

Elenco ferri

Simbologia adottata

Posizione riferita all'origine

N°	numero d'ordine
X	Ascissa posizione ferro espresso in [cm]
Y	Ordinata posizione ferro espresso in [cm]
d	Diametro ferro espresso in [mm]
ω	Area del ferro espresso in [cmq]

N°	X	Y	d	ω
1	6.60	6.60	24	4.52
2	16.55	6.60	24	4.52
3	26.50	6.60	24	4.52
4	36.45	6.60	24	4.52
5	46.40	6.60	24	4.52
6	56.35	6.60	24	4.52
7	66.30	6.60	24	4.52
8	76.25	6.60	24	4.52
9	86.20	6.60	24	4.52
10	96.15	6.60	24	4.52
11	106.10	6.60	24	4.52
12	116.05	6.60	24	4.52
13	126.00	6.60	24	4.52
14	135.95	6.60	24	4.52
15	145.90	6.60	24	4.52
16	155.85	6.60	24	4.52
17	165.80	6.60	24	4.52
18	175.75	6.60	24	4.52
19	185.70	6.60	24	4.52
20	195.65	6.60	24	4.52
21	205.60	6.60	24	4.52
22	215.55	6.60	24	4.52
23	225.50	6.60	24	4.52
24	235.45	6.60	24	4.52
25	245.40	6.60	24	4.52
26	255.35	6.60	24	4.52
27	265.30	6.60	24	4.52
28	275.25	6.60	24	4.52
29	285.20	6.60	24	4.52
30	295.15	6.60	24	4.52
31	305.10	6.60	24	4.52
32	315.05	6.60	24	4.52
33	325.00	6.60	24	4.52
34	334.95	6.60	24	4.52
35	344.90	6.60	24	4.52
36	354.85	6.60	24	4.52
37	364.80	6.60	24	4.52
38	374.75	6.60	24	4.52
39	384.70	6.60	24	4.52
40	394.65	6.60	24	4.52
41	404.60	6.60	24	4.52
42	414.55	6.60	24	4.52
43	424.50	6.60	24	4.52
44	434.45	6.60	24	4.52
45	444.40	6.60	24	4.52
46	454.35	6.60	24	4.52
47	464.30	6.60	24	4.52
48	474.25	6.60	24	4.52
49	484.20	6.60	24	4.52
50	494.15	6.60	24	4.52
51	504.10	6.60	24	4.52
52	514.05	6.60	24	4.52

53	524.00	6.60	24	4.52
54	533.95	6.60	24	4.52
55	543.90	6.60	24	4.52
56	553.85	6.60	24	4.52
57	563.80	6.60	24	4.52
58	573.75	6.60	24	4.52
59	583.70	6.60	24	4.52
60	593.65	6.60	24	4.52
61	603.60	6.60	24	4.52
62	613.55	6.60	24	4.52
63	623.50	6.60	24	4.52
64	633.45	6.60	24	4.52
65	643.40	6.60	24	4.52
66	618.40	238.40	24	4.52
67	608.45	238.40	24	4.52
68	598.51	238.40	24	4.52
69	588.56	238.40	24	4.52
70	578.62	238.40	24	4.52
71	568.67	238.40	24	4.52
72	558.73	238.40	24	4.52
73	548.78	238.40	24	4.52
74	538.83	238.40	24	4.52
75	528.89	238.40	24	4.52
76	518.94	238.40	24	4.52
77	509.00	238.40	24	4.52
78	499.05	238.40	24	4.52
79	489.11	238.40	24	4.52
80	479.16	238.40	24	4.52
81	469.21	238.40	24	4.52
82	459.27	238.40	24	4.52
83	449.32	238.40	24	4.52
84	439.38	238.40	24	4.52
85	429.43	238.40	24	4.52
86	419.48	238.40	24	4.52
87	409.54	238.40	24	4.52
88	399.59	238.40	24	4.52
89	389.65	238.40	24	4.52
90	379.70	238.40	24	4.52
91	369.76	238.40	24	4.52
92	359.81	238.40	24	4.52
93	349.86	238.40	24	4.52
94	339.92	238.40	24	4.52
95	329.97	238.40	24	4.52
96	320.03	238.40	24	4.52
97	310.08	238.40	24	4.52
98	300.14	238.40	24	4.52
99	290.19	238.40	24	4.52
100	280.24	238.40	24	4.52
101	270.30	238.40	24	4.52
102	260.35	238.40	24	4.52
103	250.41	238.40	24	4.52
104	240.46	238.40	24	4.52
105	230.52	238.40	24	4.52
106	220.57	238.40	24	4.52
107	210.62	238.40	24	4.52
108	200.68	238.40	24	4.52
109	190.73	238.40	24	4.52
110	180.79	238.40	24	4.52
111	170.84	238.40	24	4.52
112	160.89	238.40	24	4.52
113	150.95	238.40	24	4.52
114	141.00	238.40	24	4.52
115	131.06	238.40	24	4.52
116	121.11	238.40	24	4.52
117	111.17	238.40	24	4.52
118	101.22	238.40	24	4.52
119	91.27	238.40	24	4.52
120	81.33	238.40	24	4.52
121	71.38	238.40	24	4.52
122	61.44	238.40	24	4.52
123	51.49	238.40	24	4.52
124	41.55	238.40	24	4.52
125	31.60	238.40	24	4.52
126	6.60	193.40	24	4.52
127	6.60	184.50	24	4.52
128	6.60	175.61	24	4.52
129	6.60	166.71	24	4.52

130	6.60	157.82	24	4.52
131	6.60	148.92	24	4.52
132	6.60	140.03	24	4.52
133	6.60	131.13	24	4.52
134	6.60	122.24	24	4.52
135	6.60	113.34	24	4.52
136	6.60	104.45	24	4.52
137	6.60	95.55	24	4.52
138	6.60	86.66	24	4.52
139	6.60	77.76	24	4.52
140	6.60	68.87	24	4.52
141	6.60	59.97	24	4.52
142	6.60	51.08	24	4.52
143	6.60	42.18	24	4.52
144	6.60	33.29	24	4.52
145	6.60	24.39	24	4.52
146	6.60	15.50	24	4.52
147	643.40	15.50	24	4.52
148	643.40	24.39	24	4.52
149	643.40	33.29	24	4.52
150	643.40	42.18	24	4.52
151	643.40	51.08	24	4.52
152	643.40	59.97	24	4.52
153	643.40	68.87	24	4.52
154	643.40	77.76	24	4.52
155	643.40	86.66	24	4.52
156	643.40	95.55	24	4.52
157	643.40	104.45	24	4.52
158	643.40	113.34	24	4.52
159	643.40	122.24	24	4.52
160	643.40	131.13	24	4.52
161	643.40	140.03	24	4.52
162	643.40	148.92	24	4.52
163	643.40	157.82	24	4.52
164	643.40	166.71	24	4.52
165	643.40	175.61	24	4.52
166	643.40	184.50	24	4.52
167	643.40	193.40	24	4.52
168	641.03	202.56	24	4.52
169	634.83	213.72	24	4.52
170	628.63	224.87	24	4.52
171	622.44	236.03	24	4.52
172	27.56	236.03	24	4.52
173	21.37	224.87	24	4.52
174	15.17	213.72	24	4.52
175	8.97	202.56	24	4.52

Materiale impiegato : Calcestruzzo armato
Caratteristiche calcestruzzo

Resistenza caratteristica calcestruzzo	40.000	[MPa]
Coeff. omogeneizzazione acciaio/calcestruzzo	15.00	
Coeff. omogeneizzazione calcestruzzo teso/compresso	1.00	

Forma diagramma tensione-deformazione - PARABOLA-RETTANGOLO

Caratteristiche acciaio per calcestruzzo

Tensione ammissibile acciaio	450.000	[MPa]
Tensione snervamento acciaio	450.000	[MPa]
Modulo elastico E	205942.924	[MPa]
Fattore di incrudimento acciaio	1.00	

Combinazioni
Simbologia adottata

N°	numero d'ordine della combinazione
N	sforzo normale espresso in[kN]
M_Y	momento lungo Y espresso in [kNm]
M_X	momento lungo X espresso in [kNm]
M_t	momento torcente espresso in [kNm]
T_Y	taglio lungo Y espresso in [kN]
T_X	taglio lungo X espresso in [kN]
VD	verifica di dominio
VT	verifica tensionale (SLER - Combinazione rara, SLEF - Combinazione frequente, SLEQP - Combinazione quasi permanente, TAMM - Verifica a tensioni ammissibili)

N°	N	M_Y	M_X	M_t	T_Y	T_X	VD	VT
1	36881.1000	12715.7000	68441.7000	-4199.7000	11948.5000	1397.1000	SI	NO
2	18540.5000	-1829.1000	48598.5000	-3869.7000	7174.6000	-1133.5000	SI	NO
3	27641.1000	12572.3000	74671.8000	-4222.6000	11291.1000	1397.1000	SI	NO
4	36881.1000	12715.7000	68441.7000	-4199.7000	11948.5000	1397.1000	SI	NO
5	18519.7000	8516.0000	51152.0000	-2815.1000	7527.4000	931.4000	NO	SLER
6	18519.7000	8516.0000	51152.0000	-2815.1000	7527.4000	931.4000	NO	SLEQP

7	18519.7000	8516.0000	51152.0000	-2815.1000	7527.4000	931.4000	NO	SLEF

Risultati analisi

Caratteristiche asse neutro

Simbologia adottata

N°	numero d'ordine della combinazione
Xc	posizione asse neutro espresso in [cm]
α	inclinazione asse neutro rispetto all'orizzontale, espressa in [°]
(xi; yi) - (xf; yf)	Punti di intersezione dell'asse neutro con il perimetro della sezione, espressi in [cm]

N°	Xc	α	(xi; yi)	(xf; yf)
5	276.46	-43.71	(0.00; 460.00)	(1078.12; -570.61)
6	276.46	-43.71	(0.00; 460.00)	(1078.12; -570.61)
7	276.46	-43.71	(0.00; 460.00)	(1078.12; -570.61)

Risultati tensionali

Simbologia adottata

N°	numero d'ordine della combinazione
$\sigma_{c\text{-}max}$	Tensione massima nel calcestruzzo espresso in [MPa]
$\sigma_{c\text{-}min}$	Tensione minima nel calcestruzzo espresso in [MPa]
$\sigma_{f\text{-}max}$	Tensione massima nel ferro espresso in [MPa]
$\sigma_{f\text{-}min}$	Tensione minima nel ferro espresso in [MPa]
τ_c	Tensione tangenziale nel calcestruzzo espresso in [MPa]

N°	$\sigma_{c\text{-}max}$	$\sigma_{c\text{-}min}$	τ_c	$\sigma_{f\text{-}max}$	$\sigma_{f\text{-}min}$
5	6.814	0.000	0.264	99.163	-119.488
6	6.814	0.000	0.264	99.163	-119.488
7	6.814	0.000	0.264	99.163	-119.488

Sollecitazioni ultime

Simbologia adottata

N°	numero d'ordine della combinazione
N_u	Sforzo normale ultimo, espresso in [kN]
M_{Xu}	Momento ultimo in direzione X, espresso in [kNm]
M_{Yu}	Momento ultimo in direzione Y, espresso in [kNm]
FS	Fattore di sicurezza

Combinazione n° 1

N_u	M_{Xu}	M_{Yu}	FS
131772.5419	244535.4608	45431.9451	3.57
152608.2845	283201.1633	12715.7000	4.14
226501.9954	68441.7000	78092.3406	6.14
298698.9974	68441.7000	12715.7000	8.10
36881.1000	178918.2654	12715.7000	2.61
36881.1000	164635.1501	30587.3638	2.41
36881.1000	68441.7000	67648.4806	5.32

Combinazione n° 2

N_u	M_{Xu}	M_{Yu}	FS
103926.0031	272411.6320	-10252.7468	5.61
105786.4183	277288.1664	-1829.1000	5.71
293737.4859	48598.5000	-28978.4653	15.84
309473.8777	48598.5000	-1829.1000	16.69
18540.5000	140144.3626	-1829.1000	2.88
18540.5000	139779.8453	-5260.8890	2.88
18540.5000	48598.5000	-51957.8675	28.41

Combinazione n° 3

N_u	M_{Xu}	M_{Yu}	FS
84118.4965	227244.1961	38260.5241	3.04
99312.8311	268291.3437	12572.3000	3.59
200120.7364	74671.8000	91023.0756	7.24
296148.3843	74671.8000	12572.3000	10.71
27641.1000	158491.3672	12572.3000	2.12
27641.1000	150432.2239	25327.8888	2.01
27641.1000	74671.8000	58637.7726	4.66

Combinazione n° 4

N_u	M_{Xu}	M_{Yu}	FS
131772.5419	244535.4608	45431.9451	3.57
152608.2845	283201.1633	12715.7000	4.14
226501.9954	68441.7000	78092.3406	6.14
298698.9974	68441.7000	12715.7000	8.10
36881.1000	178918.2654	12715.7000	2.61
36881.1000	164635.1501	30587.3638	2.41
36881.1000	68441.7000	67648.4806	5.32

Risultati taglio

Simbologia adottata

N°	indice della combinazione
Dir	Direzione di azione del taglio
V_{Rd}	Resistenza di calcolo dell'elemento privo di armatura trasversali a taglio, espresso in [kN]
V_{Rcd}	Resistenza di calcolo a “taglio compressione”, espresso in [kN]
V_{Rsd}	resistenza di calcolo a “taglio trazione”, espresso in [kN]
nb	Numero bracci staffe

Diametro e passo staffe, riportate nell'ultima colonna, sono i più cautelativi ottenuti dalla verifica a taglio nelle due direzioni.

N°	Dir	T	V_{Rd}	V_{Rcd}	V_{Rsd}	nb	Diametro e passo staffe
1	X	1397.1000	--	51573.6043	6559.7684	2	ϕ14.00 - 10.00 [cm]
1	Y	11948.5000	--	51971.9637	17537.8932	2	ϕ14.00 - 10.00 [cm]
2	X	-1133.5000	--	48762.4976	6559.7684	2	ϕ14.00 - 10.00 [cm]
2	Y	7174.6000	--	49139.1437	17537.8932	2	ϕ14.00 - 10.00 [cm]
3	X	1397.1000	--	50157.3679	6559.7684	2	ϕ14.00 - 10.00 [cm]
3	Y	11291.1000	--	50544.7881	17537.8932	2	ϕ14.00 - 10.00 [cm]
4	X	1397.1000	--	51573.6043	6559.7684	2	ϕ14.00 - 10.00 [cm]
4	Y	11948.5000	--	51971.9637	17537.8932	2	ϕ14.00 - 10.00 [cm]

Risultati fessurazione

Simbologia adottata

N°	numero d'ordine della combinazione
M_X	Momento di prima fessurazione in direzione X, espresso in [kNm]
M_Y	Momento di prima fessurazione in direzione Y, espresso in [kNm]
σ_f	Tensione nell'acciaio, espressa in [MPa]
σ_c	Tensione nel calcestruzzo, espressa in [MPa]
A_{eff}	Area efficace a trazione, espressa in [cmq]
ε	Deformazione media acciaio teso, espressa in [°]
S_{rm}	Distanza media tra le fessure, espresso in [mm]
w	Ampiezza delle fessure, espressa in [mm]

N°	M_X	M_Y	σ_f	σ_c	A_{eff}	ε	S_{rm}	w
6	40410.1786	6727.6564	-94.396	-6.475	119765.56	0.0348	1333	0.2939
7	40410.1786	6727.6564	-94.396	-6.475	119765.56	0.0348	1333	0.2939

14 ANALISI ELEVAZIONI PILE

A favore di sicurezza, le analisi saranno svolte modellando la pila 2, che presenta le condizioni di carico più gravose per le fondazioni.

14.1 Geometria

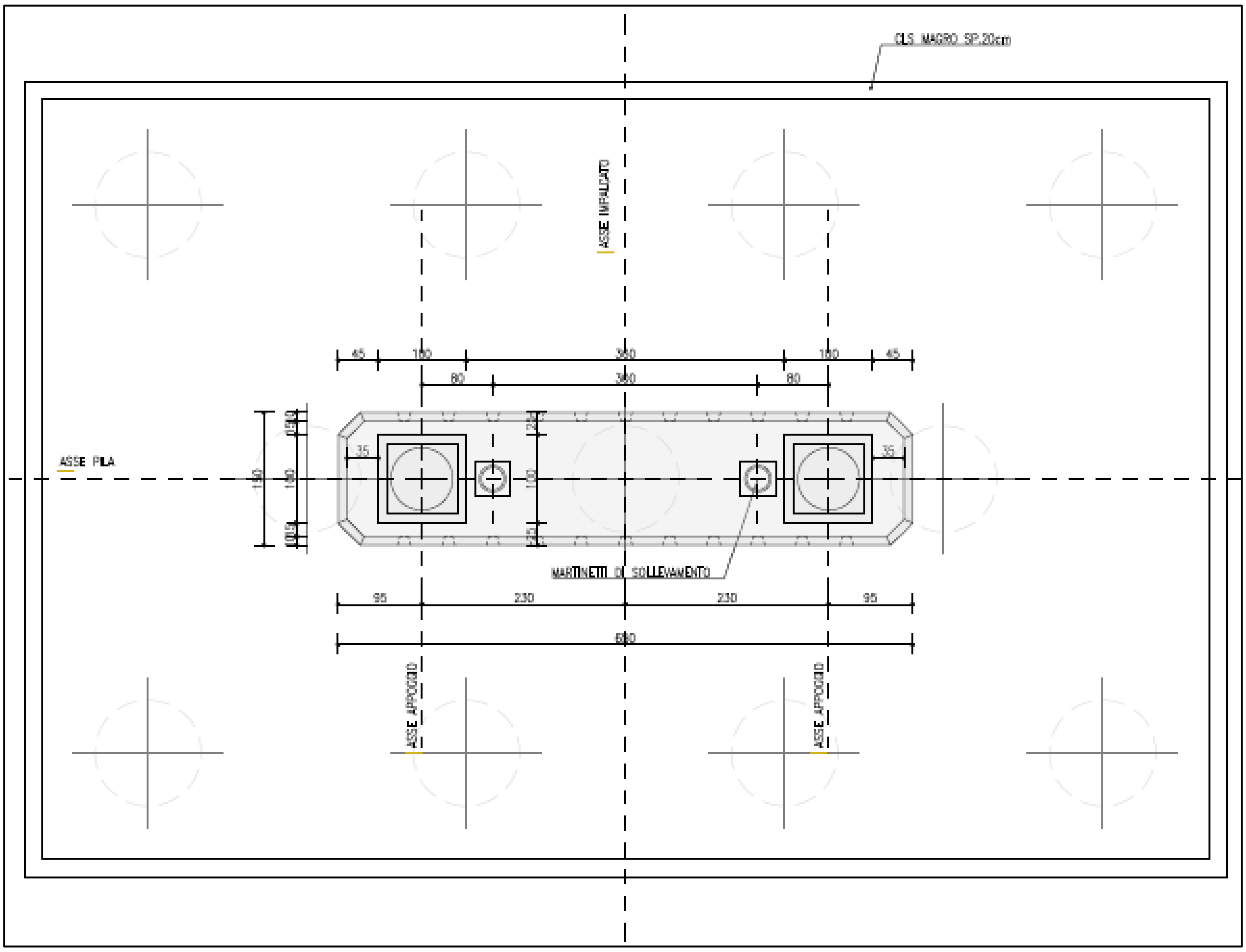


Figura 72: Elevazioni pile– geometria pianta

14.2 Sollecitazioni alla base del fusto

Nella tabella seguente sono riportate le sollecitazioni relative a ciascuna combinazione di interesse. Per ulteriori approfondimenti si vedano i relativi allegati di calcolo.

	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
SLU – N_{MAX}	31882.1	2328.6	780.0	11.3	7029.8	-17231.3
SLU – N_{MIN}	11673.0	-6098.4	-3210.0	27.5	-23444.0	45127.9
SLU – M_{MAX}	13535.0	6098.4	3210.0	-27.5	24109.0	-45127.9
SLU – V_{MAX}	11673.0	-6098.4	-3210.0	27.5	-23444.0	45127.9
SLE	23019.0	1642.4	520.0	7.5	4693.0	-12153.5

14.3 Verifiche strutturali

Per le verifiche di resistenza si considera un sezione rettangolare con spigoli smussati di

0.25m a 45° di dimensione pari 6.50x1.50m armata nel modo seguente:

Armatura a flessione	$(1+1)\emptyset 24/10$
Armatura a taglio (spirale)	$\emptyset 14/10$
Incidenza	$\approx 130 kg/m^3$

Nome sezione:	fusto pila	
Tipo sezione	Sezione generica	
Dimensione massima direzione X	650.0	[cm]
Dimensione massima direzione Y	150.0	[cm]

Coordinate dei vertici :

Nr. poligono	**Nr. vertici**	**X[cm]**	**Y[cm]**
	1	25.00	0.00
	2	625.00	0.00
	3	650.00	25.00
	4	650.00	125.00
	5	625.00	150.00
	6	25.00	150.00
	7	0.00	125.00
	8	0.00	25.00

Caratteristiche geometriche

Area sezione	96250.00 [cmq]	
Inerzia in direzione X	3307421875.0	[cm^4]
Inerzia in direzione Y	177213541.7	[cm^4]
Inerzia in direzione XY	0.0 [cm^4]	
Ascissa baricentro sezione	X_G = 325.00	[cm]
Ordinata baricentro sezione	Y_G = 75.00 [cm]	

Elenco ferri

Simbologia adottata

Posizione riferita all'origine

N°	numero d'ordine
X	Ascissa posizione ferro espresso in [cm]
Y	Ordinata posizione ferro espresso in [cm]
d	Diametro ferro espresso in [mm]
ω	Area del ferro espresso in [cmq]

N°	X	Y	d	ω
1	618.40	143.40	24	4.52
2	608.45	143.40	24	4.52
3	598.51	143.40	24	4.52
4	588.56	143.40	24	4.52
5	578.62	143.40	24	4.52
6	568.67	143.40	24	4.52
7	558.73	143.40	24	4.52
8	548.78	143.40	24	4.52
9	538.83	143.40	24	4.52
10	528.89	143.40	24	4.52
11	518.94	143.40	24	4.52
12	509.00	143.40	24	4.52
13	499.05	143.40	24	4.52
14	489.11	143.40	24	4.52
15	479.16	143.40	24	4.52
16	469.21	143.40	24	4.52
17	459.27	143.40	24	4.52
18	449.32	143.40	24	4.52
19	439.38	143.40	24	4.52
20	429.43	143.40	24	4.52
21	419.48	143.40	24	4.52
22	409.54	143.40	24	4.52
23	399.59	143.40	24	4.52
24	389.65	143.40	24	4.52
25	379.70	143.40	24	4.52
26	369.76	143.40	24	4.52
27	359.81	143.40	24	4.52
28	349.86	143.40	24	4.52
29	339.92	143.40	24	4.52
30	329.97	143.40	24	4.52
31	320.03	143.40	24	4.52
32	310.08	143.40	24	4.52
33	300.14	143.40	24	4.52
34	290.19	143.40	24	4.52
35	280.24	143.40	24	4.52
36	270.30	143.40	24	4.52
37	260.35	143.40	24	4.52

38	250.41	143.40	24	4.52
39	240.46	143.40	24	4.52
40	230.52	143.40	24	4.52
41	220.57	143.40	24	4.52
42	210.62	143.40	24	4.52
43	200.68	143.40	24	4.52
44	190.73	143.40	24	4.52
45	180.79	143.40	24	4.52
46	170.84	143.40	24	4.52
47	160.89	143.40	24	4.52
48	150.95	143.40	24	4.52
49	141.00	143.40	24	4.52
50	131.06	143.40	24	4.52
51	121.11	143.40	24	4.52
52	111.17	143.40	24	4.52
53	101.22	143.40	24	4.52
54	91.27	143.40	24	4.52
55	81.33	143.40	24	4.52
56	71.38	143.40	24	4.52
57	61.44	143.40	24	4.52
58	51.49	143.40	24	4.52
59	41.55	143.40	24	4.52
60	31.60	143.40	24	4.52
61	31.60	6.60	24	4.52
62	41.55	6.60	24	4.52
63	51.49	6.60	24	4.52
64	61.44	6.60	24	4.52
65	71.38	6.60	24	4.52
66	81.33	6.60	24	4.52
67	91.27	6.60	24	4.52
68	101.22	6.60	24	4.52
69	111.17	6.60	24	4.52
70	121.11	6.60	24	4.52
71	131.06	6.60	24	4.52
72	141.00	6.60	24	4.52
73	150.95	6.60	24	4.52
74	160.89	6.60	24	4.52
75	170.84	6.60	24	4.52
76	180.79	6.60	24	4.52
77	190.73	6.60	24	4.52
78	200.68	6.60	24	4.52
79	210.62	6.60	24	4.52
80	220.57	6.60	24	4.52
81	230.52	6.60	24	4.52
82	240.46	6.60	24	4.52
83	250.41	6.60	24	4.52
84	260.35	6.60	24	4.52
85	270.30	6.60	24	4.52
86	280.24	6.60	24	4.52
87	290.19	6.60	24	4.52
88	300.14	6.60	24	4.52
89	310.08	6.60	24	4.52
90	320.03	6.60	24	4.52
91	329.97	6.60	24	4.52
92	339.92	6.60	24	4.52
93	349.86	6.60	24	4.52
94	359.81	6.60	24	4.52
95	369.76	6.60	24	4.52
96	379.70	6.60	24	4.52
97	389.65	6.60	24	4.52
98	399.59	6.60	24	4.52
99	409.54	6.60	24	4.52
100	419.48	6.60	24	4.52
101	429.43	6.60	24	4.52
102	439.38	6.60	24	4.52
103	449.32	6.60	24	4.52
104	459.27	6.60	24	4.52
105	469.21	6.60	24	4.52
106	479.16	6.60	24	4.52
107	489.11	6.60	24	4.52
108	499.05	6.60	24	4.52
109	509.00	6.60	24	4.52
110	518.94	6.60	24	4.52
111	528.89	6.60	24	4.52
112	538.83	6.60	24	4.52
113	548.78	6.60	24	4.52
114	558.73	6.60	24	4.52

115	568.67	6.60	24	4.52
116	578.62	6.60	24	4.52
117	588.56	6.60	24	4.52
118	598.51	6.60	24	4.52
119	608.45	6.60	24	4.52
120	618.40	6.60	24	4.52
121	6.60	118.40	24	4.52
122	6.60	108.76	24	4.52
123	6.60	99.11	24	4.52
124	6.60	89.47	24	4.52
125	6.60	79.82	24	4.52
126	6.60	70.18	24	4.52
127	6.60	60.53	24	4.52
128	6.60	50.89	24	4.52
129	6.60	41.24	24	4.52
130	6.60	31.60	24	4.52
131	643.40	31.60	24	4.52
132	643.40	41.24	24	4.52
133	643.40	50.89	24	4.52
134	643.40	60.53	24	4.52
135	643.40	70.18	24	4.52
136	643.40	79.82	24	4.52
137	643.40	89.47	24	4.52
138	643.40	99.11	24	4.52
139	643.40	108.76	24	4.52
140	643.40	118.40	24	4.52
141	25.00	140.67	24	4.52
142	19.78	135.44	24	4.52
143	14.56	130.22	24	4.52
144	9.33	125.00	24	4.52
145	640.67	125.00	24	4.52
146	635.44	130.22	24	4.52
147	630.22	135.44	24	4.52
148	625.00	140.67	24	4.52
149	625.00	9.33	24	4.52
150	630.22	14.56	24	4.52
151	635.44	19.78	24	4.52
152	640.67	25.00	24	4.52
153	9.33	25.00	24	4.52
154	14.56	19.78	24	4.52
155	19.78	14.56	24	4.52
156	25.00	9.33	24	4.52

Materiale impiegato : Calcestruzzo armato
Caratteristiche calcestruzzo

Resistenza caratteristica calcestruzzo	40.000	[MPa]
Coeff. omogeneizzazione acciaio/calcestruzzo	15.00	
Coeff. omogeneizzazione calcestruzzo teso/compresso	1.00	

Forma diagramma tensione-deformazione - PARABOLA-RETTANGOLO

Caratteristiche acciaio per calcestruzzo

Tensione ammissibile acciaio	450.000	[MPa]
Tensione snervamento acciaio	450.000	[MPa]
Modulo elastico E	205942.924	[MPa]
Fattore di incrudimento acciaio	1.00	

Combinazioni
Simbologia adottata

N°	numero d'ordine della combinazione
N	sforzo normale espresso in[kN]
M_Y	momento lungo Y espresso in [kNm]
M_X	momento lungo X espresso in [kNm]
M_t	momento torcente espresso in [kNm]
T_Y	taglio lungo Y espresso in [kN]
T_X	taglio lungo X espresso in [kN]
VD	verifica di dominio
VT	verifica tensionale (SLER - Combinazione rara, SLEF - Combinazione frequente, SLEQP - Combinazione quasi permanente, TAMM - Verifica a tensioni ammissibili)

N°	N	M_Y	M_X	M_t	T_Y	T_X	VD	VT
1	31882.1000	7029.8000	-17231.3000	11.3000	2328.6000	780.0000	SI	NO
2	11673.0000	-23444.0000	45127.9000	27.5000	-6098.4000	-3210.0000	SI	NO
3	13535.0000	24109.0000	-45127.9000	-27.5000	6098.4000	3210.0000	SI	NO
4	11673.0000	-23444.0000	45127.9000	27.5000	-6098.4000	-3210.0000	SI	NO
5	23019.0000	4693.0000	-12153.5000	7.5000	1642.4000	520.0000	NO	SLER
6	23019.0000	4693.0000	-12153.5000	7.5000	1642.4000	520.0000	NO	SLEQP
7	23019.0000	4693.0000	-12153.5000	7.5000	1642.4000	520.0000	NO	SLEF

Risultati analisi

Caratteristiche asse neutro

Simbologia adottata

N° numero d'ordine della combinazione
Xc posizione asse neutro espresso in [cm]
α inclinazione asse neutro rispetto all'orizzontale, espressa in [°]
(xi; yi) - (xf; yf) Punti di intersezione dell'asse neutro con il perimetro della sezione, espressi in [cm]

N°	Xc	α	(xi; yi)	(xf; yf)
5	218.33	8.56	(-234.94; -109.94)	(1491.07; 150.00)
6	218.33	8.56	(-234.94; -109.94)	(1491.07; 150.00)
7	218.33	8.56	(-234.94; -109.94)	(1491.07; 150.00)

Risultati tensionali

Simbologia adottata

N° numero d'ordine della combinazione
σ_{c-max} Tensione massima nel calcestruzzo espresso in [MPa]
σ_{c-min} Tensione minima nel calcestruzzo espresso in [MPa]
σ_{f-max} Tensione massima nel ferro espresso in [MPa]
σ_{f-min} Tensione minima nel ferro espresso in [MPa]
τ_c Tensione tangenziale nel calcestruzzo espresso in [MPa]

N°	σ_{c-max}	σ_{c-min}	τ_c	σ_{f-max}	σ_{f-min}
5	4.724	0.000	-0.024	68.423	-3.843
6	4.724	0.000	-0.024	68.423	-3.843
7	4.724	0.000	-0.024	68.423	-3.843

Sollecitazioni ultime

Simbologia adottata

N° numero d'ordine della combinazione
N_u Sforzo normale ultimo, espresso in [kN]
M_{Xu} Momento ultimo in direzione X, espresso in [kNm]
M_{Yu} Momento ultimo in direzione Y, espresso in [kNm]
FS Fattore di sicurezza

Combinazione n° 1

N_u	M_{Xu}	M_{Yu}	FS
135891.0241	-73444.9425	29963.1053	4.26
167243.3421	-90389.9116	7029.8000	5.25
146875.4672	-17231.3000	32385.1051	4.61
196123.4510	-17231.3000	7029.8000	6.15
31882.1000	-141512.0116	7029.8000	8.21
31882.1000	-74982.1857	30590.2497	4.35
31882.1000	-17231.3000	36665.2286	5.22

Combinazione n° 2

N_u	M_{Xu}	M_{Yu}	FS
12253.2696	47371.2263	-24609.4108	1.05
23329.9176	90193.6252	-23444.0000	2.00
12397.1668	45127.9000	-24898.4134	1.06
161371.4328	45127.9000	-23444.0000	13.82
11673.0000	55267.4570	-23444.0000	1.22
11673.0000	46837.0345	-24331.8975	1.04
11673.0000	45127.9000	-24489.9032	1.04

Combinazione n° 3

N_u	M_{Xu}	M_{Yu}	FS
14458.1688	-48205.8954	25753.3794	1.07
30101.3138	-100362.6952	24109.0000	2.22
14690.5019	-45127.9000	26167.2191	1.09
160000.5925	-45127.9000	24109.0000	11.82
13535.0000	-58361.0610	24109.0000	1.29
13535.0000	-47399.1020	25322.3604	1.05
13535.0000	-45127.9000	25531.6582	1.06

Combinazione n° 4

N_u	M_{Xu}	M_{Yu}	FS
12253.2696	47371.2263	-24609.4108	1.05
23329.9176	90193.6252	-23444.0000	2.00
12397.1668	45127.9000	-24898.4134	1.06
161371.4328	45127.9000	-23444.0000	13.82
11673.0000	55267.4570	-23444.0000	1.22
11673.0000	46837.0345	-24331.8975	1.04
11673.0000	45127.9000	-24489.9032	1.04

Risultati taglio

Simbologia adottata

N° indice della combinazione
Dir Direzione di azione del taglio
V_{Rd} Resistenza di calcolo dell'elemento privo di armatura trasversali a taglio, espresso in [kN]
V_{Rcd} Resistenza di calcolo a "taglio compressione", espresso in [kN]

V_{Rsd} resistenza di calcolo a “taglio trazione”, espresso in [kN]
nb Numero bracci staffe
Diametro e passo staffe, riportate nell'ultima colonna, sono i più cautelativi ottenuti dalla verifica a taglio nelle due direzioni.

N°	**Dir**	**T**	**V_{Rd}**	**V_{Rcd}**	**V_{Rsd}**	**nb**	**Diametro e passo staffe**
1	X	780.0000	--	32207.7203	3919.5971	2	ϕ14.00 - 10.00 [cm]
1	Y	2328.6000	--	33132.9341	17472.8376	2	ϕ14.00 - 10.00 [cm]
2	X	-3210.0000	--	29184.7177	3919.5971	2	ϕ14.00 - 10.00 [cm]
2	Y	-6098.4000	--	30023.0914	17472.8376	2	ϕ14.00 - 10.00 [cm]
3	X	3210.0000	--	29463.2472	3919.5971	2	ϕ14.00 - 10.00 [cm]
3	Y	6098.4000	--	30309.6220	17472.8376	2	ϕ14.00 - 10.00 [cm]
4	X	-3210.0000	--	29184.7177	3919.5971	2	ϕ14.00 - 10.00 [cm]
4	Y	-6098.4000	--	30023.0914	17472.8376	2	ϕ14.00 - 10.00 [cm]

Risultati fessurazione

Simbologia adottata

N° numero d'ordine della combinazione
M_X Momento di prima fessurazione in direzione X, espresso in [kNm]
M_Y Momento di prima fessurazione in direzione Y, espresso in [kNm]
σ_f Tensione nell'acciaio, espressa in [MPa]
σ_c Tensione nel calcestruzzo, espressa in [MPa]
A_{eff} Area efficace a trazione, espressa in [cmq]
ε Deformazione media acciaio teso, espressa in [°]
S_{rm} Distanza media tra le fessure, espresso in [mm]
w Ampiezza delle fessure, espressa in [mm]

N°	**M_X**	**M_Y**	**σ_f**	**σ_c**	**A_{eff}**	**ε**	**S_{rm}**	**w**
6	-65348.3357	25233.8618	-20.663	-2.251	4108.72	0.0000	0	0.0000
7	-65348.3357	25233.8618	-20.663	-2.251	4108.72	0.0000	0	0.0000

15 ANALISI PARATIA PROVVISIONALE

15.1 Geometria

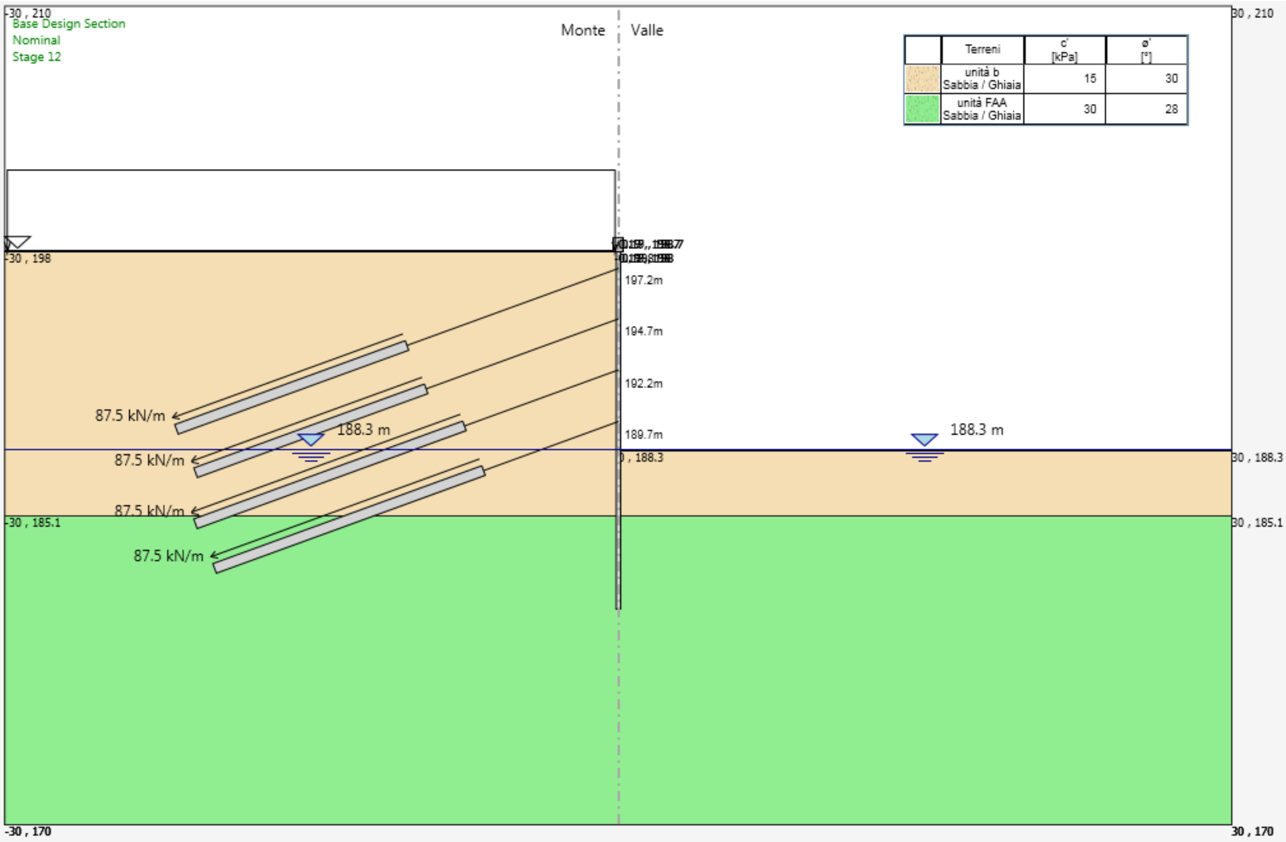


Figura 73: Schema geometrico e stratigrafico del modello di calcolo

15.2 Fasi costruttive

Fase 1)	Inizializzazione condizione geostatica
Fase 2)	Realizzazione della paratia e del cordolo di testa
Fase 3)	Scavo fino a -1.30m da testa paratia
Fase 4)	Realizzazione del I ordine di tiranti a -0.70m da testa paratia
Fase 5)	Scavo fino a -3.80m da testa paratia
Fase 6)	Realizzazione del II ordine di tiranti a -3.30m da testa paratia
Fase 7)	Scavo fino a -6.30m da testa paratia
Fase 8)	Realizzazione del III ordine di tiranti a -5.80m da testa paratia
Fase 9)	Scavo fino a -8.80m da testa paratia
Fase 10)	Realizzazione del IV ordine di tiranti a -8.30m da testa paratia
Fase 11)	Scavo fino a -9.70m da testa paratia (fondo scavo)
Fase 12)	Applicazione dell’azione sismica

15.3 Risultati delle analisi e verifiche di resistenza

Nel seguito si riportano i risultati di maggior interesse. Per ulteriori approfondimenti si vedano i relativi allegati di calcolo. Per le verifiche di resistenza si considera la seguente geometria:

Micropali

Diametro perforazione $\emptyset 220$

Interasse	$i = 0.40m$			
Tubolare				
Diametro	$168.3mm$			
Spessore armatura	$12.5mm$			
Tiranti	**I ordine**	**II ordine**	**III ordine**	**IV ordine**
Interasse	$i = 2.00m$	$i = 2.00m$	$i = 2.00m$	$i = 2.00m$
Inclinazione	$\alpha = 20°$	$\alpha = 20°$	$\alpha = 20°$	$\alpha = 20°$
N° trefoli	3	3	4	4
$L_L + L_B$	$11.0m + 12.0m$	$10.0m + 12.0m$	$8.0m + 14.0m$	$7.0m + 14.0m$
Pretiro	$T_0 = 175kN$	$T_0 = 175kN$	$T_0 = 175kN$	$T_0 = 175kN$

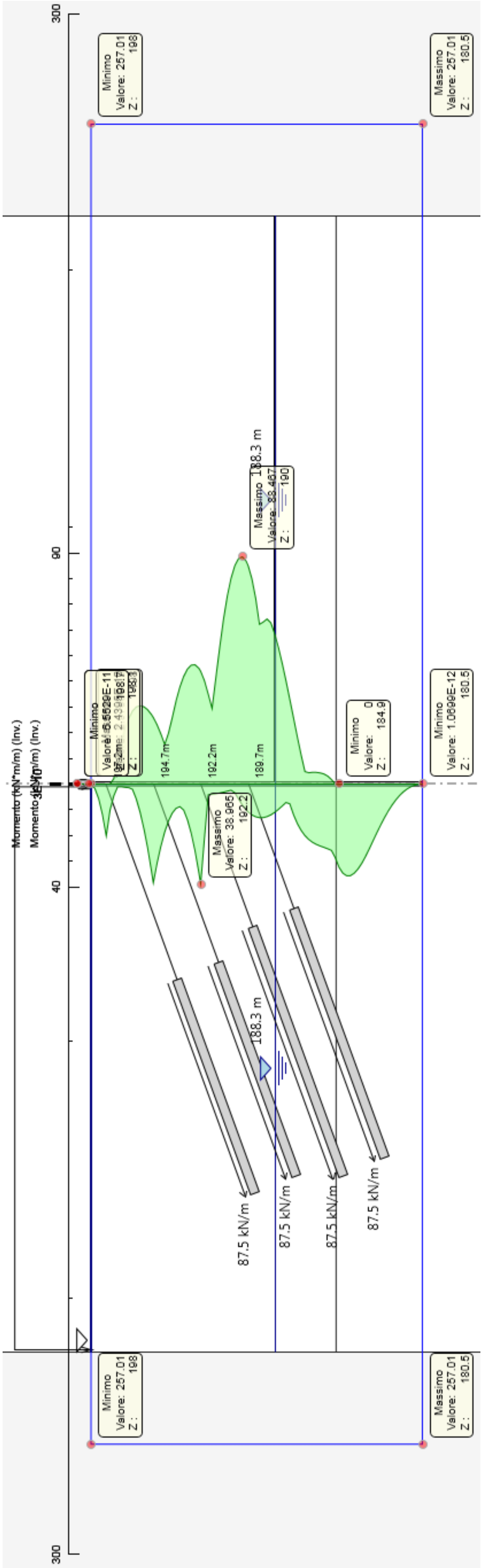


Figura 74: Inviluppo SLU – Momento flettente vs momento resistente

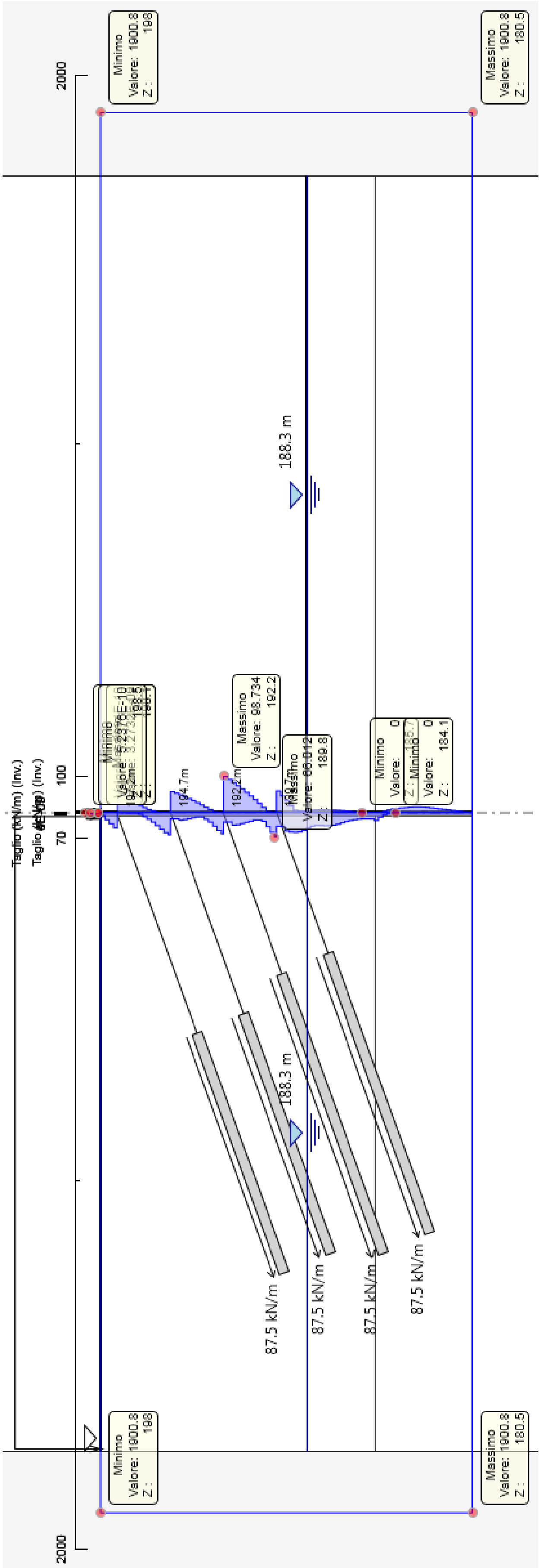


Figura 75: Inviluppo SLU – Azione tagliante vs taglio resistente

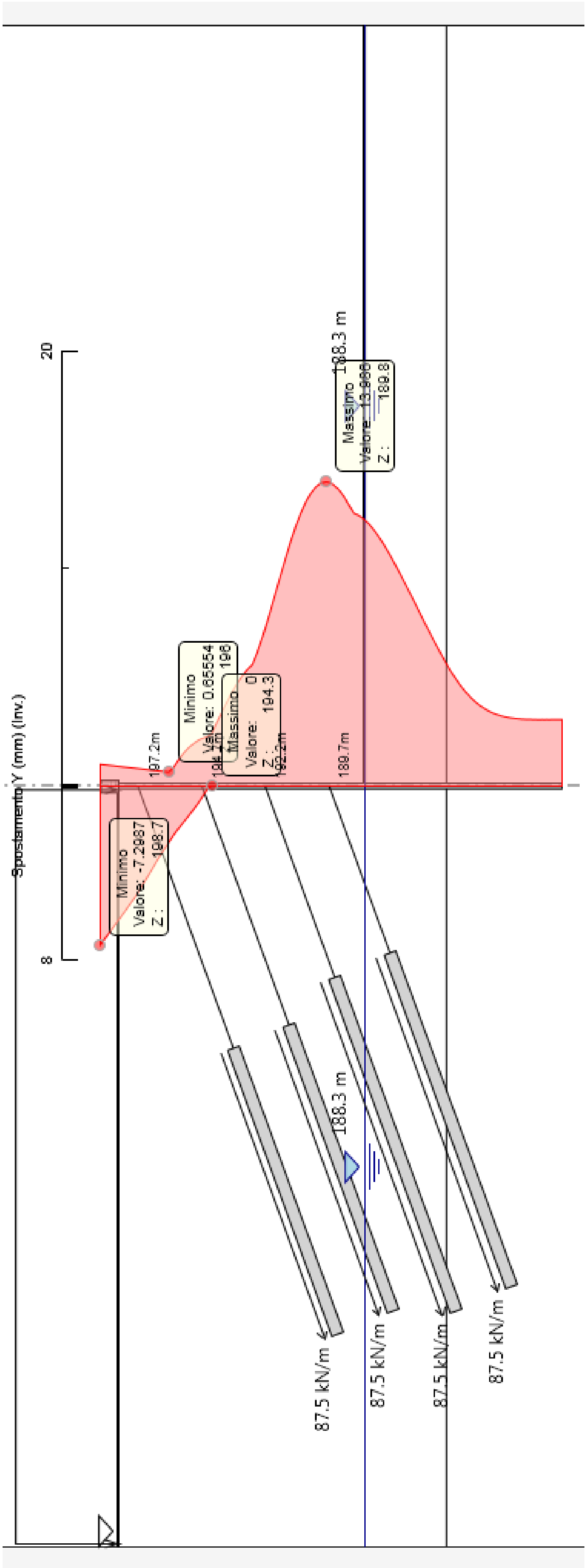


Figura 76: Inviluppo SLE – Spostamenti

Tirante	Stage	Sollecitazione (kN)	Resistenza GEO (kN)	Resistenza STR (kN)	Sfruttamento GEO	Sfruttamento STR	Resistenza
I-ordine	Stage 5	227.5	266.56	605.56	0.853	0.376	✔
I-ordine	Stage 6	228.38	266.56	605.56	0.857	0.377	✔
I-ordine	Stage 7	223.66	266.56	605.56	0.839	0.369	✔
I-ordine	Stage 8	218.51	266.56	605.56	0.82	0.361	✔
I-ordine	Stage 9	220.9	266.56	605.56	0.829	0.365	✔
I-ordine	Stage 10	216.93	266.56	605.56	0.814	0.358	✔
I-ordine	Stage 11	217.79	266.56	605.56	0.817	0.36	✔
I-ordine	Stage 12	217.75	266.56	605.56	0.817	0.36	✔
I-ordine	Stage 13	207.66	266.56	605.56	0.779	0.343	✔
II-ordine	Stage 7	227.5	266.56	605.56	0.853	0.376	✔
II-ordine	Stage 8	244.9	266.56	605.56	0.919	0.404	✔
II-ordine	Stage 9	235.3	266.56	605.56	0.883	0.389	✔
II-ordine	Stage 10	233.16	266.56	605.56	0.875	0.385	✔
II-ordine	Stage 11	234.85	266.56	605.56	0.881	0.388	✔
II-ordine	Stage 12	233.45	266.56	605.56	0.876	0.386	✔
II-ordine	Stage 13	224.21	266.56	605.56	0.841	0.37	✔
III-ordine	Stage 9	227.5	310.99	807.41	0.732	0.282	✔
III-ordine	Stage 10	303.85	310.99	807.41	0.977	0.376	✔
III-ordine	Stage 11	283.62	310.99	807.41	0.912	0.351	✔
III-ordine	Stage 12	285.08	310.99	807.41	0.917	0.353	✔
III-ordine	Stage 13	271.86	310.99	807.41	0.874	0.337	✔
IV-ordine	Stage 11	227.5	310.97	807.41	0.732	0.282	✔
IV-ordine	Stage 12	266.98	310.97	807.41	0.859	0.331	✔
IV-ordine	Stage 13	252.94	310.97	807.41	0.813	0.313	✔

Figura 77: Combinazione STR (R3) – Verifiche di resistenza dei tiranti

16 ALLEGATI DI CALCOLO

16.1 Spalle: allegati *GROUP v2016*

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GROUP for Windows, Version 2016.10.11

Serial Number : 197566553

Analysis of A Group of Piles
Subjected to Axial and Lateral Loading

===

This program is licensed to :

Errevia S.R.L.
Trezzano S/N, Italy

Path to file locations : W:\INCARICHI\801-899\877 - ANAS AQ Toscana\01.E78\DOC PRODOTTA\DI LAVORO\STRUTTURE\CALCOLI\05_viadotto Tressa Est (VI01)\02_spalle\01_spalla 1\
Name of input data file : spalla 1 - 5x3_R00.gp10r
Name of output echo file : spalla 1 - 5x3_R00.gp10e
Name of output results file : spalla 1 - 5x3_R00.gp10o
Name of output summary file : spalla 1 - 5x3_R00.gp10t
Name of plot output file : spalla 1 - 5x3_R00.gp10p
Name of runtime file : spalla 1 - 5x3_R00.gp10r

Time and Date of Analysis

Date: November 02, 2020 Time: 13:14:20

***** INPUT INFORMATION *****

New Group

ANALYSIS TYPE = 3D ANALYSIS

ADJUST DEPTH FOR BATTER PILES

GENERATE LOAD-DISP (AND T-R) CURVES BASED ON SOIL PROFILE

EXTEND INTERPOLATION FOR L-DP (AND T-R) CURVES

UNITS SYSTEM = METR

* TABLE B * PILE CAP OPTIONS

LENGTH,YY (M) = 10.64
WIDTH, ZZ (M) = 17.04
THICKNESS,XX (M) = 2.000

* PILE CAP DIMENSIONS ARE NOT CONSIDERED
FOR THE PILE GROUP ANALYSIS

* TABLE C * LOAD AND CONTROL PARAMETERS

** LOAD CASES **

NUMBER OF LOAD CASES : 6

LOAD CASE : 1
CASE NAME : R statico MAX
LOAD TYPE : Dead, DL
SCALE FACTOR : 1.0000

* CONCENTRATED LOADS *

NL	VERT.LOAD	HR.LOAD Y	HR.LOAD Z	MOMENT X	MOMENT Y	MOMENT Z	COORD X	COORD Y	COORD Z
	KN	KN	KN	KN- M	KN- M	KN- M	M	M	M
1	5.68E+03	1.64E+02	1.80E+02	0.00	0.00	0.00	-6.35	3.14	2.18
2	5.61E+03	1.65E+02	0.00	0.00	0.00	0.00	-6.35	2.62	-2.79
3	9.84E+03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	2.56E+04	0.00	0.00	0.00	0.00	0.00	0.00	-0.37	3.91E-02
5	0.00	1.16E+04	1.22E+03	0.00	0.00	0.00	-3.24	0.80	-8.33E-02

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VER.LOAD X, KN	HOR.LOAD Y, KN	HOR.LOAD Z, KN
46722.6	11948.5	1397.15

MOMENT X, KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
2603.06	2860.59	-62792.4

* THE LOADING IS STATIC *

* CONTROL PARAMETERS *
TOLERANCE ON CONVERGENCE OF PILE CAP MOVEMENT = 1.00000E-04
TOLERANCE ON DETERMINATION OF PILE DEFLECTIONS = 1.00000E-04 M
MAX NO OF ITERATIONS ALLOWED FOR FOUNDATION ANALYSIS = 100
MAXIMUM NO OF ITERATIONS ALLOWED FOR PILE ANALYSIS = 100
FACTOR TO APPLY THE LOAD IN INCREMENTS = 1.0000
MINIMUM FACTOR FOR LOAD INCREMENTS = 1.0000
PRINT RESULTS ONLY AT PILE CAP

LOAD CASE : 2
CASE NAME : R statico MIN
LOAD TYPE : Dead, DL

SCALE FACTOR : 1.0000

* CONCENTRATED LOADS *

NL	VERT.LOAD	HR.LOAD Y	HR.LOAD Z	MOMENT X	MOMENT Y	MOMENT Z	COORD X	COORD Y	COORD Z
	KN	KN	KN	KN- M	KN- M	KN- M	M	M	M
1	9.73E+02	-1.64E+02	1.80E+02	0.00	0.00	0.00	-6.35	3.14	2.18
2	1.08E+03	-1.65E+02	0.00	0.00	0.00	0.00	-6.35	2.62	-2.79
3	9.84E+03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	2.56E+04	0.00	0.00	0.00	0.00	0.00	0.00	-0.37	3.91E-02
5	0.00	1.16E+04	1.22E+03	0.00	0.00	0.00	-3.24	0.80	-8.33E-02

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VER.LOAD X, KN	HOR.LOAD Y, KN	HOR.LOAD Z, KN
37482.6	11291.1	1397.15

MOMENT X, KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
2402.68	5212.02	-31921.8

* THE LOADING IS STATIC *

* CONTROL PARAMETERS *
TOLERANCE ON CONVERGENCE OF PILE CAP MOVEMENT = 1.00000E-04
TOLERANCE ON DETERMINATION OF PILE DEFLECTIONS = 1.00000E-04 M
MAX NO OF ITERATIONS ALLOWED FOR FOUNDATION ANALYSIS = 100
MAXIMUM NO OF ITERATIONS ALLOWED FOR PILE ANALYSIS = 100
FACTOR TO APPLY THE LOAD IN INCREMENTS = 1.0000
MINIMUM FACTOR FOR LOAD INCREMENTS = 1.0000
PRINT RESULTS ONLY AT PILE CAP

LOAD CASE : 3
CASE NAME : R sismico MAX
LOAD TYPE : Dead, DL
SCALE FACTOR : 1.0000

* CONCENTRATED LOADS *

NL	VERT.LOAD	HR.LOAD Y	HR.LOAD Z	MOMENT X	MOMENT Y	MOMENT Z	COORD X	COORD Y	COORD Z
	KN	KN	KN	KN- M	KN- M	KN- M	M	M	M
1	1.63E+03	1.09E+02	1.91E+03	0.00	0.00	0.00	-6.35	3.14	2.18
2	1.65E+03	1.10E+02	0.00	0.00	0.00	0.00	-6.35	2.62	-2.79
3	7.29E+03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.80E+04	0.00	0.00	0.00	0.00	0.00	0.00	-0.37	3.91E-02
5	0.00	7.39E+03	7.74E+02	0.00	0.00	0.00	-3.24	0.80	-8.33E-02

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VER.LOAD X, KN	HOR.LOAD Y, KN	HOR.LOAD Z, KN
28598.9	7612.80	2682.47

MOMENT X, KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
7299.22	14297.1	-28071.2

* THE LOADING IS STATIC *

* CONTROL PARAMETERS *
TOLERANCE ON CONVERGENCE OF PILE CAP MOVEMENT = 1.00000E-04
TOLERANCE ON DETERMINATION OF PILE DEFLECTIONS = 1.00000E-04 M
MAX NO OF ITERATIONS ALLOWED FOR FOUNDATION ANALYSIS = 100
MAXIMUM NO OF ITERATIONS ALLOWED FOR PILE ANALYSIS = 100
FACTOR TO APPLY THE LOAD IN INCREMENTS = 1.0000
MINIMUM FACTOR FOR LOAD INCREMENTS = 1.0000
PRINT RESULTS ONLY AT PILE CAP

LOAD CASE : 4
CASE NAME : R sismico MIN
LOAD TYPE : Dead, DL
SCALE FACTOR : 1.0000

* CONCENTRATED LOADS *

NL	VERT.LOAD	HR.LOAD Y	HR.LOAD Z	MOMENT X	MOMENT Y	MOMENT Z	COORD X	COORD Y	COORD Z
	KN	KN	KN	KN- M	KN- M	KN- M	M	M	M
1	1.17E+03	-1.09E+02	-1.91E+03	0.00	0.00	0.00	-6.35	3.14	2.18
2	1.29E+03	-1.10E+02	0.00	0.00	0.00	0.00	-6.35	2.62	-2.79
3	7.29E+03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.61E+04	0.00	0.00	0.00	0.00	0.00	0.00	-0.37	3.91E-02
5	0.00	7.39E+03	7.74E+02	0.00	0.00	0.00	-3.24	0.80	-8.33E-02

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VER.LOAD X, KN	HOR.LOAD Y, KN	HOR.LOAD Z, KN
25830.5	7174.56	-1133.53

MOMENT X, KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
-4834.41	-10011.6	-23623.9

* THE LOADING IS STATIC *

* CONTROL PARAMETERS *
TOLERANCE ON CONVERGENCE OF PILE CAP MOVEMENT = 1.00000E-04
TOLERANCE ON DETERMINATION OF PILE DEFLECTIONS = 1.00000E-04 M
MAX NO OF ITERATIONS ALLOWED FOR FOUNDATION ANALYSIS = 100
MAXIMUM NO OF ITERATIONS ALLOWED FOR PILE ANALYSIS = 100
FACTOR TO APPLY THE LOAD IN INCREMENTS = 1.0000
MINIMUM FACTOR FOR LOAD INCREMENTS = 1.0000
PRINT RESULTS ONLY AT PILE CAP

LOAD CASE : 5
CASE NAME : SLE statico MAX
LOAD TYPE : Dead, DL
SCALE FACTOR : 1.0000

* CONCENTRATED LOADS *

NL	VERT.LOAD	HR.LOAD Y	HR.LOAD Z	MOMENT X	MOMENT Y	MOMENT Z	COORD X	COORD Y	COORD Z
	KN	KN	KN	KN- M	KN- M	KN- M	M	M	M

1	4.10E+03	1.09E+02	1.20E+02	0.00	0.00	0.00	-6.35	3.14	2.18
2	4.05E+03	1.10E+02	0.00	0.00	0.00	0.00	-6.35	2.62	-2.79
3	7.29E+03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.71E+04	0.00	0.00	0.00	0.00	0.00	0.00	-0.37	3.91E-02
5	0.00	7.75E+03	8.11E+02	0.00	0.00	0.00	-3.24	0.80	-8.33E-02

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VER.LOAD X, KN	HOR.LOAD Y, KN	HOR.LOAD Z, KN
32499.7	7965.65	931.431

MOMENT X, KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
1735.38	1713.83	-43655.9

* THE LOADING IS STATIC *

* CONTROL PARAMETERS *
TOLERANCE ON CONVERGENCE OF PILE CAP MOVEMENT = 1.00000E-04
TOLERANCE ON DETERMINATION OF PILE DEFLECTIONS = 1.00000E-04 M
MAX NO OF ITERATIONS ALLOWED FOR FOUNDATION ANALYSIS = 100
MAXIMUM NO OF ITERATIONS ALLOWED FOR PILE ANALYSIS = 100
FACTOR TO APPLY THE LOAD IN INCREMENTS = 1.0000
MINIMUM FACTOR FOR LOAD INCREMENTS = 1.0000
PRINT RESULTS ONLY AT PILE CAP

LOAD CASE : 6
CASE NAME : SLE statico MIN
LOAD TYPE : Dead, DL
SCALE FACTOR : 1.0000

* CONCENTRATED LOADS *

NL	VERT.LOAD	HR.LOAD Y	HR.LOAD Z	MOMENT X	MOMENT Y	MOMENT Z	COORD X	COORD Y	COORD Z
	KN	KN	KN	KN- M	KN- M	KN- M	M	M	M
1	6.93E+02	-1.09E+02	1.20E+02	0.00	0.00	0.00	-6.35	3.14	2.18
2	7.66E+02	-1.10E+02	0.00	0.00	0.00	0.00	-6.35	2.62	-2.79
3	7.29E+03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.71E+04	0.00	0.00	0.00	0.00	0.00	0.00	-0.37	3.91E-02
5	0.00	7.75E+03	8.11E+02	0.00	0.00	0.00	-3.24	0.80	-8.33E-02

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VER.LOAD X, KN	HOR.LOAD Y, KN	HOR.LOAD Z, KN
25809.7	7527.41	931.431

MOMENT X, KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
1601.78	3436.60	-21546.4

* THE LOADING IS STATIC *

* CONTROL PARAMETERS *
TOLERANCE ON CONVERGENCE OF PILE CAP MOVEMENT = 1.00000E-04
TOLERANCE ON DETERMINATION OF PILE DEFLECTIONS = 1.00000E-04 M

MAX NO OF ITERATIONS ALLOWED FOR FOUNDATION ANALYSIS = 100
MAXIMUM NO OF ITERATIONS ALLOWED FOR PILE ANALYSIS = 100
FACTOR TO APPLY THE LOAD IN INCREMENTS = 1.0000
MINIMUM FACTOR FOR LOAD INCREMENTS = 1.0000
PRINT RESULTS ONLY AT PILE CAP

* TABLE D * ARRANGEMENT OF PILE GROUPS

GROUP	CONN.Z-Z	CONN.Y-Y	PILE PROP	P-Y CURVE	L-S CURVE	T-R CURVE	R-F-L SET
1	FIX	FIX	1	0	1 G	1 G	0
2	FIX	FIX	1	0	1 G	1 G	0
3	FIX	FIX	1	0	1 G	1 G	0
4	FIX	FIX	1	0	1 G	1 G	0
5	FIX	FIX	1	0	1 G	1 G	0
6	FIX	FIX	1	0	1 G	1 G	0
7	FIX	FIX	1	0	1 G	1 G	0
8	FIX	FIX	1	0	1 G	1 G	0
9	FIX	FIX	1	0	1 G	1 G	0
10	FIX	FIX	1	0	1 G	1 G	0
11	FIX	FIX	1	0	1 G	1 G	0
12	FIX	FIX	1	0	1 G	1 G	0
13	FIX	FIX	1	0	1 G	1 G	0
14	FIX	FIX	1	0	1 G	1 G	0
15	FIX	FIX	1	0	1 G	1 G	0

GROUP	CorX, M	CorY, M	CorZ, M	ALPHA,DEG	BETA,DEG	THETA,DEG	GROUND, M	SPz, KN- M	SPy, KN- M
1	0.000	-4.330	-6.786	0.000	90.00	0.000	0.000	0.000	0.000
2	0.000	2.830	-7.536	0.000	90.00	0.000	0.000	0.000	0.000
3	0.000	-3.955	-3.205	0.000	90.00	0.000	0.000	0.000	0.000
4	0.000	3.205	-3.955	0.000	90.00	0.000	0.000	0.000	0.000
5	0.000	-3.580	0.375	0.000	90.00	0.000	0.000	0.000	0.000
6	0.000	3.580	-0.375	0.000	90.00	0.000	0.000	0.000	0.000
7	0.000	-3.205	3.955	0.000	90.00	0.000	0.000	0.000	0.000
8	0.000	3.955	3.205	0.000	90.00	0.000	0.000	0.000	0.000
9	0.000	-2.830	7.536	0.000	90.00	0.000	0.000	0.000	0.000
10	0.000	4.330	6.786	0.000	90.00	0.000	0.000	0.000	0.000
11	0.000	-0.750	-7.161	0.000	90.00	0.000	0.000	0.000	0.000
12	0.000	-0.375	-3.580	0.000	90.00	0.000	0.000	0.000	0.000
13	0.000	0.000	0.000	0.000	90.00	0.000	0.000	0.000	0.000
14	0.000	0.375	3.580	0.000	90.00	0.000	0.000	0.000	0.000
15	0.000	0.750	7.161	0.000	90.00	0.000	0.000	0.000	0.000

* TABLE E * PILE GEOMETRY AND PROPERTIES
PILE TYPE = 1 - DRIVEN PILE
= 2 - DRILLED SHAFT

PROP	SECTS	INC	PILE TYPE	LENGTH, M
1	1	100	2	24.000

* PILE SECTIONS *

PROP	SECT	FROM, M	TO, M	CROSS SECT
1	1	0.00000	24.0000	1

* PILE CROSS SECTIONS *

CROSS SECTION : 1
SECTION NAME : palo_D1200
TYPE : ELASTIC
CROSS SECTION TYPE : GENERAL SECTION
EQUIVALENT DIAMETER : 1200.00 MM
YOUNG MODULUS : 3.14472E+07 KN/ M**2

* PILE CROSS SECTIONS PROPERTIES *

ELASTIC SECTIONS

SECT	DIAM,MM	AREA,MM**2	Iz,MM**4	Iy,MM**4	GJ, KN- M**2	Mn, KN- M	Vn, KN
1	1200.0	1.1310E+06	1.0179E+11	1.0179E+11	1.3337E+06	0.0000	0.0000

* TABLE F * SOIL DATA

SOILS INFORMATION

GROUND SURFACE = 0.00000 M

2 LAYER(S) OF SOIL

LAYER 1
THE SOIL IS A SAND

		TOP OF LAYER	BOTTOM OF LAYER
X COORDINATE	(M)	0.00000	7.00000
EFFECTIVE UNIT WEIGHT	(KN/ M**3)	10.5000	10.5000
FRICTION ANGLE	(DEGREES)	30.0000	30.0000
P-Y SUBGRADE MODULUS	(KN/ M**3)	9377.12 (K)	9377.12 (K)
ULTIMATE UNIT SIDE FRICTION	(KN/ M**2)	12.6000 (S)	62.6987 (S)
ULTIMATE UNIT TIP RESISTANCE	(KN/ M**2)	0.00000	0.00000

LAYER 2
THE SOIL IS A SOFT CLAY

		TOP OF LAYER	BOTTOM OF LAYER
X COORDINATE	(M)	7.00000	40.0000
EFFECTIVE UNIT WEIGHT	(KN/ M**3)	11.0000	11.0000
UNDRAINED COHESION, C	(KN/ M**2)	150.000	150.000
STRAIN AT 50% STRESS		5.00000E-03 (E)	5.00000E-03 (E)
ULTIMATE UNIT SIDE FRICTION	(KN/ M**2)	82.5000 (S)	82.5000 (S)
ULTIMATE UNIT TIP RESISTANCE	(KN/ M**2)	1350.00 (T)	1350.00 (T)

Notes : Program estimated values for listed parameters
if zero input values were entered:
(E) STRAIN AT 50% STRESS
(K) P-Y SUBGRADE MODULUS for Static Loading
(S) ULTIMATE UNIT SIDE FRICTION for Drilled Shafts
(T) ULTIMATE UNIT TIP RESISTANCE for Drilled Shafts

* TABLE H * AXIAL LOAD VS DISPLACEMENT

AXIAL LOAD-DISPLACEMENT CURVES GENERATED INTERNALLY

NUM OF CURVES 1

CURVE 1 NUM OF POINTS 19

DISPLACEMENT, M	AXIAL LOAD, KN
-0.0529394	-5531.15
-0.0275775	-5620.20
-0.0149658	-5823.18
-4.41132E-03	-4840.68
-2.59919E-03	-3455.92
-5.50298E-04	-792.520
-2.75149E-04	-396.260
-5.50298E-05	-79.2520
-5.50298E-06	-7.92520
0.00000	0.00000
5.73219E-06	8.37214
5.73219E-05	83.7214
2.86609E-04	418.607
5.73219E-04	837.214
2.69721E-03	3625.75
4.60207E-03	5153.84
0.0155572	6696.52
0.0284031	6843.17
0.0539225	6987.37

* TABLE I * TORS. MOM. VS ANGLE ROT.

TORQUE-ROTATION CURVES GENERATED INTERNALLY

NUM OF CURVES 1

CURVE 1 NUM OF POINTS 19

ROT. ANGLE,Rad.	TORS.MOMEN, KN- M
-0.11884	-3311.34
-0.0771140	-3364.65
-0.0569594	-3440.30
-0.0378540	-3335.77
-0.0302731	-2956.57
-0.0120412	-1510.05
-6.83047E-03	-929.761
-1.40557E-03	-199.550
-1.40557E-04	-19.9550
0.00000	0.00000
1.40557E-04	19.9550
1.40557E-03	199.550
6.83047E-03	929.761
0.0120412	1510.05
0.0302731	2956.57
0.0378540	3335.77
0.0569594	3440.30
0.0771140	3364.65
0.11884	3311.34

* TABLE J * MOMENT CURVATURE SETS

USER DEFINED MOMENT CURVATURE

NUM OF SETS : 1

CURVE SET 1 NUM OF CURVES 1

CURVE 1 AXIAL LOAD 0.000E+00 KN

POINT	MOMENT	CURVATURE
	KN- M	RADIAN/ M
1	0.00000	0.00000

```
=============================================================================

          GROUP for Windows, Version 2016.10.11

          Serial Number : 197566553

          Analysis of A Group of Piles
          Subjected to Axial and Lateral Loading
```



```
=============================================================================


-----------------------------------------------------------------------------
          Time and Date of Analysis
-----------------------------------------------------------------------------

    Date:  November 02, 2020     Time:  13:14:20



    *****    COMPUTATION RESULTS    *****


New Group


    *****    LOAD CASES RESULTS    *****


LOAD CASE :     1
CASE NAME : R statico MAX
LOAD TYPE : Dead, DL


* TABLE L *    COMPUTATION ON PILE CAP


* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *


    VERT. LOAD,  KN    HOR. LOAD Y,  KN    HOR. LOAD Z,  KN
       46722.6           11948.5             1397.15

    MOMENT X , KN- M    MOMENT Y, KN- M    MOMENT Z, KN- M
       2603.06            2860.59            -62792.4


* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *


    VERTICAL , M      HORIZONTAL Y, M      HORIZONTAL Z, M
```



```
    2.95744E-03         0.0103156        8.32789E-04

  ANGLE ROT. X,RAD    ANGLE ROT. Y,RAD    ANGLE ROT. Z,RAD
    6.24429E-05       -2.82103E-05       -7.84332E-04


THE GLOBAL STRUCTURAL COORDINATE SYSTEM
---------------------------------------

 * PILE TOP DISPLACEMENTS *

PILE GROUP   DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
**********  ***********  ***********  ***********  ***********  ***********  ***********
    1     -2.4767E-04    0.010739  5.6238E-04  6.2443E-05 -2.8210E-05 -7.8433E-04
    2      5.3900E-03    0.010786  1.0095E-03  6.2443E-05 -2.8210E-05 -7.8433E-04
    3     -5.4517E-05    0.010516  5.8580E-04  6.2443E-05 -2.8210E-05 -7.8433E-04
    4      5.5831E-03    0.010563  1.0329E-03  6.2443E-05 -2.8210E-05 -7.8433E-04
    5      1.3863E-04    0.010292  6.0922E-04  6.2443E-05 -2.8210E-05 -7.8433E-04
    6      5.7763E-03    0.010339  1.0564E-03  6.2443E-05 -2.8210E-05 -7.8433E-04
    7      3.3178E-04    0.010069  6.3264E-04  6.2443E-05 -2.8210E-05 -7.8433E-04
    8      5.9694E-03    0.010115  1.0798E-03  6.2443E-05 -2.8210E-05 -7.8433E-04
    9      5.2493E-04  9.8451E-03  6.5605E-04  6.2443E-05 -2.8210E-05 -7.8433E-04
   10      6.1626E-03  9.8919E-03  1.1032E-03  6.2443E-05 -2.8210E-05 -7.8433E-04
   11      2.5711E-03    0.010763  7.8595E-04  6.2443E-05 -2.8210E-05 -7.8433E-04
   12      2.7643E-03    0.010539  8.0937E-04  6.2443E-05 -2.8210E-05 -7.8433E-04
   13      2.9574E-03    0.010316  8.3279E-04  6.2443E-05 -2.8210E-05 -7.8433E-04
   14      3.1506E-03    0.010092  8.5621E-04  6.2443E-05 -2.8210E-05 -7.8433E-04
   15      3.3437E-03  9.8685E-03  8.7963E-04  6.2443E-05 -2.8210E-05 -7.8433E-04

 MINIMUM   -2.4767E-04  9.8451E-03  5.6238E-04  6.2443E-05 -2.8210E-05 -7.8433E-04
 Pile N.        1          9          1          1          1          1
 MAXIMUM    6.1626E-03    0.010786  1.1032E-03  6.2443E-05 -2.8210E-05 -7.8433E-04
 Pile N.       10          2         10          1          1          1

 * PILE TOP REACTIONS *

PILE GROUP   FOR. X, KN   FOR. Y, KN   FOR. Z, KN MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
**********  ***********  ***********  ***********  ***********  ***********  ***********
    1         -356.68      830.25      65.118      8.8651     -219.16      2145.3
    2          5264.8      824.76      108.85      8.8651     -357.79      2156.6
    3         -78.514      814.96      67.974      8.8651     -227.53      2089.4
    4          5292.0      809.84      112.04      8.8651     -366.80      2100.4
    5          202.48      799.52      70.882      8.8651     -235.98      2033.2
    6          5319.2      794.77      115.30      8.8651     -375.89      2043.8
    7          484.58      783.87      73.827      8.8651     -244.41      1975.8
    8          5346.4      779.54      118.61      8.8651     -385.01      1986.6
    9          766.69      768.07      76.829      8.8651     -252.93      1918.2
   10          5373.6      764.12      121.98      8.8651     -394.21      1928.9
   11          3460.2      826.31      87.007      8.8651     -288.53      2151.5
   12          3679.6      811.14      90.022      8.8651     -297.23      2095.6
   13          3834.5      795.91      93.096      8.8651     -305.99      2039.1
   14          3989.5      780.50      96.219      8.8651     -314.75      1981.8
   15          4144.4      764.92      99.402      8.8651     -323.62      1924.2

 MINIMUM      -356.68      764.12      65.118      8.8651     -394.21      1918.2
 Pile N.        1          10          1          1          10          9
 MAXIMUM       5373.6      830.25      121.98      8.8651     -219.16      2156.6
 Pile N.       10          1           10          1          1           2
```



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 THE PILE COORDINATE SYSTEM (LOCAL AXES)
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 * PILE TOP DISPLACEMENTS *

PILE GROUP   DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
**********  ***********  ***********  ***********  ***********  ***********  ***********
    1     -2.4767E-04    0.010739  5.6238E-04  6.2443E-05 -2.8210E-05 -7.8433E-04
    2      5.3900E-03    0.010786  1.0095E-03  6.2443E-05 -2.8210E-05 -7.8433E-04
    3     -5.4517E-05    0.010516  5.8580E-04  6.2443E-05 -2.8210E-05 -7.8433E-04
    4      5.5831E-03    0.010563  1.0329E-03  6.2443E-05 -2.8210E-05 -7.8433E-04
    5      1.3863E-04    0.010292  6.0922E-04  6.2443E-05 -2.8210E-05 -7.8433E-04
    6      5.7763E-03    0.010339  1.0564E-03  6.2443E-05 -2.8210E-05 -7.8433E-04
    7      3.3178E-04    0.010069  6.3264E-04  6.2443E-05 -2.8210E-05 -7.8433E-04
    8      5.9694E-03    0.010115  1.0798E-03  6.2443E-05 -2.8210E-05 -7.8433E-04
    9      5.2493E-04  9.8451E-03  6.5605E-04  6.2443E-05 -2.8210E-05 -7.8433E-04
   10      6.1626E-03  9.8919E-03  1.1032E-03  6.2443E-05 -2.8210E-05 -7.8433E-04
   11      2.5711E-03    0.010763  7.8595E-04  6.2443E-05 -2.8210E-05 -7.8433E-04
   12      2.7643E-03    0.010539  8.0937E-04  6.2443E-05 -2.8210E-05 -7.8433E-04
   13      2.9574E-03    0.010316  8.3279E-04  6.2443E-05 -2.8210E-05 -7.8433E-04
   14      3.1506E-03    0.010092  8.5621E-04  6.2443E-05 -2.8210E-05 -7.8433E-04
   15      3.3437E-03  9.8685E-03  8.7963E-04  6.2443E-05 -2.8210E-05 -7.8433E-04

 MINIMUM   -2.4767E-04  9.8451E-03  5.6238E-04  6.2443E-05 -2.8210E-05 -7.8433E-04
 Pile N.        1          9          1          1          1          1
 MAXIMUM    6.1626E-03    0.010786  1.1032E-03  6.2443E-05 -2.8210E-05 -7.8433E-04
 Pile N.       10          2         10          1          1          1

 * PILE TOP REACTIONS *

PILE GROUP   AXIAL, KN   LAT. y, KN   LAT. z, KN MOM x, KN- M MOM y, KN- M MOM z, KN- M
**********  ***********  ***********  ***********  ***********  ***********  ***********
    1         -356.68      830.25      65.118      8.8651     -219.16      2145.3
    2          5264.8      824.76      108.85      8.8651     -357.79      2156.6
    3         -78.514      814.96      67.974      8.8651     -227.53      2089.4
    4          5292.0      809.84      112.04      8.8651     -366.80      2100.4
    5          202.48      799.52      70.882      8.8651     -235.98      2033.2
    6          5319.2      794.77      115.30      8.8651     -375.89      2043.8
    7          484.58      783.87      73.827      8.8651     -244.41      1975.8
    8          5346.4      779.54      118.61      8.8651     -385.01      1986.6
    9          766.69      768.07      76.829      8.8651     -252.93      1918.2
   10          5373.6      764.12      121.98      8.8651     -394.21      1928.9
   11          3460.2      826.31      87.007      8.8651     -288.53      2151.5
   12          3679.6      811.14      90.022      8.8651     -297.23      2095.6
   13          3834.5      795.91      93.096      8.8651     -305.99      2039.1
   14          3989.5      780.50      96.219      8.8651     -314.75      1981.8
   15          4144.4      764.92      99.402      8.8651     -323.62      1924.2

 MINIMUM      -356.68      764.12      65.118      8.8651     -394.21      1918.2
 Pile N.        1          10          1          1          10          9
 MAXIMUM       5373.6      830.25      121.98      8.8651     -219.16      2156.6
 Pile N.       10          1           10          1          1           2

PILE GROUP   STRESS, KN/ M**2
**********  ****************
    1      1.3027E+04
    2      1.7541E+04
    3      1.2459E+04
    4      1.7248E+04
    5      1.2244E+04
```



```
    6      1.6953E+04
    7      1.2164E+04
    8      1.6656E+04
    9      1.2083E+04
   10      1.6357E+04
   11      1.5855E+04
   12      1.5730E+04
   13      1.5545E+04
   14      1.5356E+04
   15      1.5166E+04

 MINIMUM    1.2083E+04
 Pile N.        9
 MAXIMUM    1.7541E+04
 Pile N.        2

 * EFFECTS FOR LATERALLY LOADED PILE *

 * MINIMUM VALUES AND LOCATIONS *

   PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR   SOIL REACT  SOIL REACT    TOTAL    FLEX. RIG.
FLEX. RIG.
          y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS     z-DIR      y-DIR
            M          M        KN- M      KN- M        KN         KN       KN/ M      KN/ M    KN/ M**2   KN- M**2   KN- M**2
  ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
    1 -8.4541E-05 -6.0705E-06    -2145.3    -219.16    -358.26    -26.238    -226.66    -19.716     315.37  3.2009E+06
3.2009E+06
   x( M)    10.560     10.560     0.0000     0.0000     9.3600     9.3600     13.440     13.440     20.160     0.0000     0.0000
    2 -8.5490E-05 -1.0418E-05    -2156.6    -357.79    -359.45    -44.592    -245.72    -35.454     4655.1  3.2009E+06
3.2009E+06
   x( M)    10.560     10.560     0.0000     0.0000     9.3600     9.3600     13.440     13.440     19.920     0.0000     0.0000
    3 -8.3091E-05 -6.4733E-06    -2089.4    -227.53    -355.78    -28.182    -135.09    -12.572     69.421  3.2009E+06
3.2009E+06
   x( M)    10.560     10.560     0.0000     0.0000     9.3600     9.3600     13.440     13.440     20.160     0.0000     0.0000
    4 -8.3529E-05 -1.0800E-05    -2100.4    -366.80    -355.14    -46.658    -158.08    -24.096     4679.1  3.2009E+06
3.2009E+06
   x( M)    10.560     10.560     0.0000     0.0000     9.3600     9.3600     13.440     13.440     19.920     0.0000     0.0000
    5 -8.0916E-05 -6.8030E-06    -2033.2    -235.98    -350.83    -29.928    -112.01    -9.6879     179.03  3.2009E+06
3.2009E+06
   x( M)    10.560     10.560     0.0000     0.0000     9.3600     9.3600     11.040     11.280     20.160     0.0000     0.0000
    6 -8.0887E-05 -1.1042E-05    -2043.8    -375.89    -348.46    -48.296    -111.11    -17.057     4703.2  3.2009E+06
3.2009E+06
   x( M)    10.560     10.560     0.0000     0.0000     9.3600     9.3600     11.040     13.440     19.920     0.0000     0.0000
    7 -7.6822E-05 -6.7894E-06    -1975.8    -244.41    -338.63    -30.433    -109.09    -9.9691     428.46  3.2009E+06
3.2009E+06
   x( M)    10.560     10.560     0.0000     0.0000     9.3600     9.3600     11.040     11.280     19.920     0.0000     0.0000
    8 -7.7323E-05 -1.1020E-05    -1986.6    -385.01    -338.28    -49.010    -108.75    -16.012     4727.2  3.2009E+06
3.2009E+06
   x( M)    10.560     10.560     0.0000     0.0000     9.3600     9.3600     11.040     11.280     19.920     0.0000     0.0000
    9 -7.2839E-05 -6.7377E-06    -1918.2    -252.93    -326.60    -30.812    -106.14    -10.219     677.90  3.2009E+06
3.2009E+06
   x( M)    10.320     10.560     0.0000     0.0000     9.3600     9.3600     11.040     11.280     19.920     0.0000     0.0000
   10 -7.3678E-05 -1.0919E-05    -1928.9    -394.21    -327.61    -49.450    -106.18    -16.321     4751.3  3.2009E+06
3.2009E+06
   x( M)    10.560     10.560     0.0000     0.0000     9.3600     9.3600     11.040     11.280     19.680     0.0000     0.0000
   11 -8.5188E-05 -8.2701E-06    -2151.5    -288.53    -359.45    -35.541    -247.41    -28.638     3059.5  3.2009E+06
3.2009E+06
   x( M)    10.560     10.560     0.0000     0.0000     9.3600     9.3600     13.440     13.440     19.920     0.0000     0.0000
   12 -8.3485E-05 -8.6773E-06    -2095.6    -297.23    -356.01    -37.596    -144.22    -17.718     3253.4  3.2009E+06
```

```
3.2009E+06
   x( M)    10.560    10.560    0.0000    0.0000    9.3600    9.3600    13.440    13.440    19.920    0.0000    0.0000
   13 -8.0856E-05 -8.9310E-06   -2039.1   -305.99   -349.38   -39.171   -111.52   -12.777    3390.4  3.2009E+06
3.2009E+06
   x( M)    10.560    10.560    0.0000    0.0000    9.3600    9.3600    11.040    13.440    19.920    0.0000    0.0000
   14 -7.6984E-05 -8.8873E-06   -1981.8   -314.75   -338.04   -39.684   -108.83   -12.989    3527.4  3.2009E+06
3.2009E+06
   x( M)    10.560    10.560    0.0000    0.0000    9.3600    9.3600    11.040    11.280    19.920    0.0000    0.0000
   15 -7.3221E-05 -8.8107E-06   -1924.2   -323.62   -326.89   -40.093   -106.12   -13.267    3664.5  3.2009E+06
3.2009E+06
   x( M)    10.560    10.560    0.0000    0.0000    9.3600    9.3600    11.040    11.280    19.680    0.0000    0.0000

   Min. -8.5490E-05 -1.1042E-05   -2156.6   -394.21   -359.45   -49.450   -247.41   -35.454    69.421  3.2009E+06
3.2009E+06
  Pile N.     2         6         2        10         2        10        11         2         3         1         1
```

* MAXIMUM VALUES AND LOCATIONS *

```
   PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR   SOIL REACT  SOIL REACT    TOTAL    FLEX. RIG.
FLEX. RIG.
          y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS      z-DIR     y-DIR
            M          M        KN- M      KN- M       KN         KN       KN/ M      KN/ M    KN/ M**2   KN- M**2  KN- M**2
  ****** ********** ********** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
    1   0.010739  5.6832E-04    1035.0    68.811    830.23    65.116    233.21    32.664  1.3027E+04  3.2009E+06
3.2009E+06
   x( M)    0.0000    0.4800    7.2000    7.6800    0.0000    0.0000    9.1200    9.1200    0.0000    0.0000    0.0000
    2   0.010786  1.0131E-03    1041.4    118.43    825.19    108.92    222.00    50.262  1.7541E+04  3.2009E+06
3.2009E+06
   x( M)    0.0000    0.2400    7.2000    7.6800    0.0000    0.0000    9.1200    9.1200    0.0000    0.0000    0.0000
    3   0.010516  5.9145E-04    1013.9    71.752    814.95    67.974    250.34    38.930  1.2459E+04  3.2009E+06
3.2009E+06
   x( M)    0.0000    0.4800    7.2000    7.6800    0.0000    0.0000    9.1200    9.1200    0.0000    0.0000    0.0000
    4   0.010563  1.0364E-03    1020.0    121.49    810.26    112.12    226.21    56.073  1.7248E+04  3.2009E+06
3.2009E+06
   x( M)    0.0000    0.2400    7.2000    7.6800    0.0000    0.0000    9.1200    9.1200    0.0000    0.0000    0.0000
    5   0.010292  6.1457E-04    992.54    74.675    799.54    70.883    249.62    43.476  1.2244E+04  3.2009E+06
3.2009E+06
   x( M)    0.0000    0.4800    7.2000    7.6800    0.0000    0.0000    9.1200    9.1200    0.0000    0.0000    0.0000
    6   0.010339  1.0597E-03    998.18    124.49    795.18    115.37    212.91    58.283  1.6953E+04  3.2009E+06
3.2009E+06
   x( M)    0.0000    0.2400    7.2000    7.6800    0.0000    0.0000    9.1200    9.1200    0.0000    0.0000    0.0000
    7   0.010069  6.3770E-04    970.28    77.412    783.90    73.831    190.83    37.665  1.2164E+04  3.2009E+06
3.2009E+06
   x( M)    0.0000    0.4800    7.2000    7.6800    0.0000    0.0000    9.1200    9.1200    0.0000    0.0000    0.0000
    8   0.010115  1.0831E-03    975.96    127.36    779.94    118.68    189.28    52.681  1.6656E+04  3.2009E+06
3.2009E+06
   x( M)    0.0000    0.2400    7.2000    7.6800    0.0000    0.0000    7.2000    9.1200    0.0000    0.0000    0.0000
    9  9.8451E-03  6.6082E-04    947.95    80.158    768.12    76.836    187.45    30.388  1.2083E+04  3.2009E+06
3.2009E+06
   x( M)    0.0000    0.4800    7.2000    7.6800    0.0000    0.0000    7.2000    9.1200    0.0000    0.0000    0.0000
   10  9.8919E-03  1.1064E-03    953.59    130.23    764.51    122.06    186.80    44.366  1.6357E+04  3.2009E+06
3.2009E+06
   x( M)    0.0000    0.2400    6.9600    7.6800    0.0000    0.0000    7.2000    9.1200    0.0000    0.0000    0.0000
   11   0.010763  7.9013E-04    1038.8    93.668    826.59    87.045    228.93    42.167  1.5855E+04  3.2009E+06
3.2009E+06
   x( M)    0.0000    0.2400    7.2000    7.6800    0.0000    0.0000    9.1200    9.1200    0.0000    0.0000    0.0000
   12   0.010539  8.1347E-04    1017.5    96.681    811.43    90.063    238.96    48.522  1.5730E+04  3.2009E+06
3.2009E+06
   x( M)    0.0000    0.2400    7.2000    7.6800    0.0000    0.0000    9.1200    9.1200    0.0000    0.0000    0.0000
```



```
   13   0.010316  8.3681E-04    995.83    99.627    796.20    93.140    225.49    50.919  1.5545E+04  3.2009E+06
3.2009E+06
   x( M)    0.0000    0.2400    7.2000    7.6800    0.0000    0.0000    9.1200    9.1200    0.0000    0.0000    0.0000
   14   0.010092  8.6015E-04    973.56    102.42    780.79    96.266    189.51    44.368  1.5356E+04  3.2009E+06
3.2009E+06
   x( M)    0.0000    0.2400    7.2000    7.6800    0.0000    0.0000    7.2000    9.1200    0.0000    0.0000    0.0000
   15  9.8685E-03  8.8348E-04    951.23    105.23    765.22    99.453    187.09    36.496  1.5166E+04  3.2009E+06
3.2009E+06
   x( M)    0.0000    0.2400    6.9600    7.6800    0.0000    0.0000    7.2000    9.1200    0.0000    0.0000    0.0000

   Max.   0.010786  1.1064E-03    1041.4    130.23    830.23    122.06    250.34    58.283  1.7541E+04  3.2009E+06
3.2009E+06
  Pile N.     2        10         2        10         1        10         3         6         2         1         1
```

LOAD CASE :   2
CASE NAME : R statico MIN
LOAD TYPE : Dead, DL

* TABLE L *   COMPUTATION ON PILE CAP

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VERT. LOAD, KN	HOR. LOAD Y, KN	HOR. LOAD Z, KN
37482.6	11291.1	1397.15

MOMENT X , KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
2402.68	5212.02	-31921.8

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL , M	HORIZONTAL Y, M	HORIZONTAL Z, M
1.92813E-03	8.23188E-03	8.49477E-04

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
4.92214E-05	-6.30647E-06	-3.96991E-04

THE GLOBAL STRUCTURAL COORDINATE SYSTEM
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* PILE TOP DISPLACEMENTS *

PILE GROUP	DISP. X, M	DISP. Y, M	DISP. Z, M	ROT. X,RAD	ROT. Y,RAD	ROT. Z,RAD
1	2.5177E-04	8.5659E-03	6.3632E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
2	3.0993E-03	8.6028E-03	9.8879E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
3	3.7807E-04	8.3897E-03	6.5478E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
4	3.2256E-03	8.4266E-03	1.0072E-03	4.9221E-05	-6.3065E-06	-3.9699E-04
5	5.0438E-04	8.2134E-03	6.7324E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
6	3.3519E-03	8.2503E-03	1.0257E-03	4.9221E-05	-6.3065E-06	-3.9699E-04
7	6.3069E-04	8.0372E-03	6.9170E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
8	3.4782E-03	8.0741E-03	1.0442E-03	4.9221E-05	-6.3065E-06	-3.9699E-04

9	7.5699E-04	7.8610E-03	7.1016E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
10	3.6045E-03	7.8979E-03	1.0626E-03	4.9221E-05	-6.3065E-06	-3.9699E-04
11	1.6755E-03	8.5843E-03	8.1256E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
12	1.8018E-03	8.4081E-03	8.3102E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
13	1.9281E-03	8.2319E-03	8.4948E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
14	2.0544E-03	8.0556E-03	8.6794E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
15	2.1807E-03	7.8794E-03	8.8640E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
MINIMUM	2.5177E-04	7.8610E-03	6.3632E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
Pile N.	1	9	1	1	1	1
MAXIMUM	3.6045E-03	8.6028E-03	1.0626E-03	4.9221E-05	-6.3065E-06	-3.9699E-04
Pile N.	10	2	10	1	1	1

* PILE TOP REACTIONS *

PILE GROUP	FOR. X, KN	FOR. Y, KN	FOR. Z, KN	MOM X, KN- M	MOM Y, KN- M	MOM Z, KN- M
1	367.72	779.83	69.482	6.9880	-215.20	2144.2
2	3948.3	778.29	106.19	6.9880	-328.50	2154.0
3	552.19	771.33	72.405	6.9880	-224.28	2119.2
4	4049.6	770.01	109.61	6.9880	-339.02	2128.2
5	736.67	755.98	74.743	6.9880	-231.41	2071.9
6	4150.9	754.12	111.98	6.9880	-345.86	2076.3
7	912.66	738.50	76.873	6.9880	-237.56	2015.3
8	4252.3	737.38	114.27	6.9880	-352.47	2022.4
9	1078.5	720.68	78.985	6.9880	-243.71	1958.5
10	4353.6	720.13	116.50	6.9880	-358.93	1967.3
11	2284.4	779.21	87.914	6.9880	-271.98	2150.0
12	2450.2	770.89	91.094	6.9880	-281.89	2125.2
13	2616.0	755.17	93.453	6.9880	-288.93	2075.4
14	2781.9	738.51	95.724	6.9880	-295.69	2022.8
15	2947.7	721.10	97.917	6.9880	-302.12	1967.7
MINIMUM	367.72	720.13	69.482	6.9880	-358.93	1958.5
Pile N.	1	10	1	1	10	9
MAXIMUM	4353.6	779.83	116.50	6.9880	-215.20	2154.0
Pile N.	10	1	10	1	1	2

THE PILE COORDINATE SYSTEM (LOCAL AXES)
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* PILE TOP DISPLACEMENTS *

PILE GROUP	DISP. x, M	DISP. y, M	DISP. z, M	ROT. x,RAD	ROT. y,RAD	ROT. z,RAD
1	2.5177E-04	8.5659E-03	6.3632E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
2	3.0993E-03	8.6028E-03	9.8879E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
3	3.7807E-04	8.3897E-03	6.5478E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
4	3.2256E-03	8.4266E-03	1.0072E-03	4.9221E-05	-6.3065E-06	-3.9699E-04
5	5.0438E-04	8.2134E-03	6.7324E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
6	3.3519E-03	8.2503E-03	1.0257E-03	4.9221E-05	-6.3065E-06	-3.9699E-04
7	6.3069E-04	8.0372E-03	6.9170E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
8	3.4782E-03	8.0741E-03	1.0442E-03	4.9221E-05	-6.3065E-06	-3.9699E-04
9	7.5699E-04	7.8610E-03	7.1016E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
10	3.6045E-03	7.8979E-03	1.0626E-03	4.9221E-05	-6.3065E-06	-3.9699E-04
11	1.6755E-03	8.5843E-03	8.1256E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
12	1.8018E-03	8.4081E-03	8.3102E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
13	1.9281E-03	8.2319E-03	8.4948E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
14	2.0544E-03	8.0556E-03	8.6794E-04	4.9221E-05	-6.3065E-06	-3.9699E-04

15	2.1807E-03	7.8794E-03	8.8640E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
MINIMUM	2.5177E-04	7.8610E-03	6.3632E-04	4.9221E-05	-6.3065E-06	-3.9699E-04
Pile N.	1	9	1	1	1	1
MAXIMUM	3.6045E-03	8.6028E-03	1.0626E-03	4.9221E-05	-6.3065E-06	-3.9699E-04
Pile N.	10	2	10	1	1	1

* PILE TOP REACTIONS *

PILE GROUP	AXIAL, KN	LAT. y, KN	LAT. z, KN	MOM x, KN- M	MOM y, KN- M	MOM z, KN- M
1	367.72	779.83	69.482	6.9880	-215.20	2144.2
2	3948.3	778.29	106.19	6.9880	-328.50	2154.0
3	552.19	771.33	72.405	6.9880	-224.28	2119.2
4	4049.6	770.01	109.61	6.9880	-339.02	2128.2
5	736.67	755.98	74.743	6.9880	-231.41	2071.9
6	4150.9	754.12	111.98	6.9880	-345.86	2076.3
7	912.66	738.50	76.873	6.9880	-237.56	2015.3
8	4252.3	737.38	114.27	6.9880	-352.47	2022.4
9	1078.5	720.68	78.985	6.9880	-243.71	1958.5
10	4353.6	720.13	116.50	6.9880	-358.93	1967.3
11	2284.4	779.21	87.914	6.9880	-271.98	2150.0
12	2450.2	770.89	91.094	6.9880	-281.89	2125.2
13	2616.0	755.17	93.453	6.9880	-288.93	2075.4
14	2781.9	738.51	95.724	6.9880	-295.69	2022.8
15	2947.7	721.10	97.917	6.9880	-302.12	1967.7
MINIMUM	367.72	720.13	69.482	6.9880	-358.93	1958.5
Pile N.	1	10	1	1	10	9
MAXIMUM	4353.6	779.83	116.50	6.9880	-215.20	2154.0
Pile N.	10	1	10	1	1	2

PILE GROUP	STRESS, KN/ M**2
1	1.3028E+04
2	1.6335E+04
3	1.3050E+04
4	1.6284E+04
5	1.2941E+04
6	1.6078E+04
7	1.2769E+04
8	1.5861E+04
9	1.2587E+04
10	1.5637E+04
11	1.4794E+04
12	1.4804E+04
13	1.4665E+04
14	1.4510E+04
15	1.4341E+04
MINIMUM	1.2587E+04
Pile N.	9
MAXIMUM	1.6335E+04
Pile N.	2

* EFFECTS FOR LATERALLY LOADED PILE *

* MINIMUM VALUES AND LOCATIONS *

PILE   DISPL.   DISPL.   MOMENT   MOMENT   SHEAR   SHEAR   SOIL REACT SOIL REACT   TOTAL   FLEX. RIG.

FLEX. RIG.
y-DIR z-DIR z-DIR y-DIR y-DIR z-DIR y-DIR z-DIR STRESS z-DIR y-DIR
M M KN- M KN- M KN KN KN/ M KN/ M KN/ M**2 KN- M**2 KN- M**2
****** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
1 -6.9873E-05 -5.9395E-06 -2144.2 -215.20 -309.35 -26.659 -136.46 -12.698 325.13 3.2009E+06
3.2009E+06
x(M) 10.560 10.560 0.0000 0.0000 9.3600 9.3600 13.200 13.200 19.920 0.0000 0.0000
2 -7.1957E-05 -9.3883E-06 -2154.0 -328.50 -312.24 -41.290 -137.26 -19.480 3491.0 3.2009E+06
3.2009E+06
x(M) 10.560 10.560 0.0000 0.0000 9.3600 9.3600 13.200 13.200 19.680 0.0000 0.0000
3 -8.6098E-05 -7.7464E-06 -2119.2 -224.28 -356.75 -32.479 -177.83 -17.107 488.25 3.2009E+06
3.2009E+06
x(M) 10.080 10.320 0.0000 0.0000 8.8800 9.1200 12.960 12.960 21.360 0.0000 0.0000
4 -8.5947E-05 -1.1746E-05 -2128.2 -339.02 -354.94 -49.072 -172.93 -25.193 3580.6 3.2009E+06
3.2009E+06
x(M) 10.080 10.320 0.0000 0.0000 8.8800 9.1200 12.960 12.960 21.360 0.0000 0.0000
5 -9.4370E-05 -9.1567E-06 -2071.9 -231.41 -385.82 -37.612 -167.15 -16.853 651.36 3.2009E+06
3.2009E+06
x(M) 10.080 10.080 0.0000 0.0000 8.8800 8.8800 12.960 12.960 21.360 0.0000 0.0000
6 -8.4748E-05 -1.2095E-05 -2076.3 -345.86 -352.94 -50.823 -164.59 -25.045 3670.2 3.2009E+06
3.2009E+06
x(M) 10.080 10.080 0.0000 0.0000 8.8800 8.8800 12.960 12.960 21.360 0.0000 0.0000
7 -8.7143E-05 -8.8216E-06 -2015.3 -237.56 -362.97 -36.990 -165.81 -17.687 806.97 3.2009E+06
3.2009E+06
x(M) 10.080 10.080 0.0000 0.0000 8.8800 8.8800 12.960 12.960 21.360 0.0000 0.0000
8 -8.2189E-05 -1.2245E-05 -2022.4 -352.47 -346.65 -52.098 -156.73 -24.940 3759.8 3.2009E+06
3.2009E+06
x(M) 10.080 10.080 0.0000 0.0000 8.8800 8.8800 12.960 12.960 21.120 0.0000 0.0000
9 -8.0673E-05 -8.5182E-06 -1958.5 -243.71 -342.81 -36.514 -162.27 -18.317 953.59 3.2009E+06
3.2009E+06
x(M) 10.080 10.080 0.0000 0.0000 8.8800 8.8800 12.960 12.960 21.360 0.0000 0.0000
10 -7.8557E-05 -1.2190E-05 -1967.3 -358.93 -336.73 -52.721 -149.56 -24.920 3849.4 3.2009E+06
3.2009E+06
x(M) 10.080 10.080 0.0000 0.0000 8.8800 9.1200 12.960 12.960 21.360 0.0000 0.0000
11 -7.1589E-05 -7.7188E-06 -2150.0 -271.98 -311.73 -34.075 -143.91 -16.915 2019.8 3.2009E+06
3.2009E+06
x(M) 10.560 10.560 0.0000 0.0000 9.3600 9.3600 13.200 13.200 19.680 0.0000 0.0000
12 -8.8355E-05 -1.0056E-05 -2125.2 -281.89 -363.26 -41.702 -176.07 -21.281 2166.5 3.2009E+06
3.2009E+06
x(M) 10.080 10.080 0.0000 0.0000 8.8800 8.8800 12.960 12.960 21.360 0.0000 0.0000
13 -9.1545E-05 -1.1052E-05 -2075.4 -288.93 -375.73 -45.627 -165.63 -20.930 2313.1 3.2009E+06
3.2009E+06
x(M) 10.080 10.080 0.0000 0.0000 8.8800 8.8800 12.960 12.960 21.120 0.0000 0.0000
14 -9.1810E-05 -1.1690E-05 -2022.8 -295.69 -379.17 -48.496 -155.62 -20.583 2459.7 3.2009E+06
3.2009E+06
x(M) 10.080 10.080 0.0000 0.0000 8.8800 8.8800 12.960 12.960 21.120 0.0000 0.0000
15 -8.8187E-05 -1.1755E-05 -1967.7 -302.12 -369.82 -49.521 -147.73 -20.513 2606.3 3.2009E+06
3.2009E+06
x(M) 10.080 10.080 0.0000 0.0000 8.8800 8.8800 12.960 12.960 21.360 0.0000 0.0000

Min. -9.4370E-05 -1.2245E-05 -2154.0 -358.93 -385.82 -52.721 -177.83 -25.193 325.13 3.2009E+06
3.2009E+06
Pile N. 5 8 2 10 5 10 3 4 1 1 1

* MAXIMUM VALUES AND LOCATIONS *

PILE DISPL. DISPL. MOMENT MOMENT SHEAR SHEAR SOIL REACT SOIL REACT TOTAL FLEX. RIG.
FLEX. RIG.
y-DIR z-DIR z-DIR y-DIR y-DIR z-DIR y-DIR z-DIR STRESS z-DIR y-DIR

M M KN- M KN- M KN KN KN/ M KN/ M KN/ M**2 KN- M**2 KN- M**2
****** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
1 8.5659E-03 6.3632E-04 882.77 73.195 779.86 69.485 190.26 19.978 1.3028E+04 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.2000 7.4400 0.0000 0.0000 7.2000 8.8800 0.0000 0.0000 0.0000
2 8.6028E-03 9.8879E-04 888.76 113.25 778.61 106.24 208.74 34.038 1.6335E+04 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.2000 7.4400 0.0000 0.0000 8.8800 8.8800 0.0000 0.0000 0.0000
3 8.3897E-03 6.5478E-04 899.39 79.327 771.37 72.410 601.98 65.429 1.3050E+04 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.4400 7.6800 0.0000 0.0000 8.6400 8.6400 0.0000 0.0000 0.0000
4 8.4266E-03 1.0072E-03 902.83 120.98 770.33 109.66 575.00 94.226 1.6284E+04 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.4400 7.4400 0.0000 0.0000 8.6400 8.6400 0.0000 0.0000 0.0000
5 8.2134E-03 6.7324E-04 889.68 82.974 756.04 74.750 857.60 98.752 1.2941E+04 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.4400 7.6800 0.0000 0.0000 8.6400 8.6400 0.0000 0.0000 0.0000
6 8.2503E-03 1.0257E-03 884.83 123.63 754.44 112.04 590.41 101.43 1.6078E+04 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.2000 7.4400 0.0000 0.0000 8.6400 8.6400 0.0000 0.0000 0.0000
7 8.0372E-03 6.9170E-04 866.74 84.845 738.56 76.881 704.60 85.943 1.2769E+04 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.4400 7.6800 0.0000 0.0000 8.6400 8.6400 0.0000 0.0000 0.0000
8 8.0741E-03 1.0442E-03 865.98 126.11 737.70 114.33 573.74 103.33 1.5861E+04 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.2000 7.4400 0.0000 0.0000 8.6400 8.6400 0.0000 0.0000 0.0000
9 7.8610E-03 7.1016E-04 844.75 86.763 720.76 78.995 574.69 74.225 1.2587E+04 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.2000 7.6800 0.0000 0.0000 8.6400 8.6400 0.0000 0.0000 0.0000
10 7.8979E-03 1.0626E-03 846.25 128.43 720.45 116.56 530.11 100.11 1.5637E+04 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.2000 7.4400 0.0000 0.0000 8.6400 8.6400 0.0000 0.0000 0.0000
11 8.5843E-03 8.1256E-04 886.67 93.323 779.39 87.937 210.76 28.506 1.4794E+04 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.2000 7.4400 0.0000 0.0000 8.8800 8.8800 0.0000 0.0000 0.0000
12 8.4081E-03 8.3102E-04 903.22 100.49 771.08 91.120 644.05 87.868 1.4804E+04 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.4400 7.6800 0.0000 0.0000 8.6400 8.6400 0.0000 0.0000 0.0000
13 8.2319E-03 8.4948E-04 889.02 103.74 755.38 93.481 771.55 110.83 1.4665E+04 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.4400 7.6800 0.0000 0.0000 8.6400 8.6400 0.0000 0.0000 0.0000
14 8.0556E-03 8.6794E-04 872.35 106.66 738.72 95.755 830.43 125.57 1.4510E+04 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.4400 7.6800 0.0000 0.0000 8.6400 8.6400 0.0000 0.0000 0.0000
15 7.8794E-03 8.8640E-04 852.24 109.00 721.32 97.951 790.26 125.79 1.4341E+04 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.4400 7.6800 0.0000 0.0000 8.6400 8.6400 0.0000 0.0000 0.0000

Max. 8.6028E-03 1.0626E-03 903.22 128.43 779.86 116.56 857.60 125.79 1.6335E+04 3.2009E+06
3.2009E+06
Pile N. 2 10 12 10 1 10 5 15 2 1 1

LOAD CASE : 3
CASE NAME : R sismico MAX
LOAD TYPE : Dead, DL

* TABLE L * COMPUTATION ON PILE CAP

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VERT. LOAD, KN	HOR. LOAD Y, KN	HOR. LOAD Z, KN
28598.9	7612.80	2682.47

MOMENT X , KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
7299.22	14297.1	-28071.2

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL , M	HORIZONTAL Y, M	HORIZONTAL Z, M
1.39629E-03	5.46477E-03	1.70702E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.25894E-04	2.38355E-05	-2.72618E-04

THE GLOBAL STRUCTURAL COORDINATE SYSTEM
----

* PILE TOP DISPLACEMENTS *

PILE GROUP	DISP. X, M	DISP. Y, M	DISP. Z, M	ROT. X,RAD	ROT. Y,RAD	ROT. Z,RAD
1	5.3976E-05	6.3191E-03	1.1618E-03	1.2589E-04	2.3835E-05	-2.7262E-04
2	1.9883E-03	6.4135E-03	2.0633E-03	1.2589E-04	2.3835E-05	-2.7262E-04
3	2.4156E-04	5.8683E-03	1.2091E-03	1.2589E-04	2.3835E-05	-2.7262E-04
4	2.1759E-03	5.9627E-03	2.1106E-03	1.2589E-04	2.3835E-05	-2.7262E-04
5	4.2914E-04	5.4176E-03	1.2563E-03	1.2589E-04	2.3835E-05	-2.7262E-04
6	2.3634E-03	5.5120E-03	2.1578E-03	1.2589E-04	2.3835E-05	-2.7262E-04
7	6.1672E-04	4.9668E-03	1.3035E-03	1.2589E-04	2.3835E-05	-2.7262E-04
8	2.5510E-03	5.0612E-03	2.2050E-03	1.2589E-04	2.3835E-05	-2.7262E-04
9	8.0431E-04	4.5160E-03	1.3507E-03	1.2589E-04	2.3835E-05	-2.7262E-04
10	2.7386E-03	4.6105E-03	2.2522E-03	1.2589E-04	2.3835E-05	-2.7262E-04
11	1.0211E-03	6.3663E-03	1.6126E-03	1.2589E-04	2.3835E-05	-2.7262E-04
12	1.2087E-03	5.9155E-03	1.6598E-03	1.2589E-04	2.3835E-05	-2.7262E-04
13	1.3963E-03	5.4648E-03	1.7070E-03	1.2589E-04	2.3835E-05	-2.7262E-04
14	1.5839E-03	5.0140E-03	1.7542E-03	1.2589E-04	2.3835E-05	-2.7262E-04
15	1.7714E-03	4.5633E-03	1.8015E-03	1.2589E-04	2.3835E-05	-2.7262E-04
MINIMUM	5.3976E-05	4.5160E-03	1.1618E-03	1.2589E-04	2.3835E-05	-2.7262E-04
Pile N.	1	9	1	1	1	1
MAXIMUM	2.7386E-03	6.4135E-03	2.2522E-03	1.2589E-04	2.3835E-05	-2.7262E-04
Pile N.	10	2	10	1	1	1

* PILE TOP REACTIONS *

PILE GROUP	FOR. X, KN	FOR. Y, KN	FOR. Z, KN	MOM X, KN- M	MOM Y, KN- M	MOM Z, KN- M
1	78.835	600.79	119.15	17.873	-346.16	1655.9
2	2695.0	607.28	216.41	17.873	-641.91	1681.6
3	352.81	553.63	124.82	17.873	-363.99	1516.3
4	2941.3	559.56	222.05	17.873	-659.10	1537.2

5	626.78	504.12	129.98	17.873	-379.37	1365.5
6	3187.5	511.30	227.58	17.873	-676.13	1391.6
7	894.33	455.29	135.37	17.873	-395.90	1218.6
8	3433.8	462.65	233.03	17.873	-692.98	1244.8
9	1140.6	406.49	140.84	17.873	-412.82	1071.8
10	3658.9	413.90	238.49	17.873	-709.86	1097.5
11	1425.3	604.10	167.94	17.873	-494.31	1668.8
12	1671.5	556.36	173.53	17.873	-511.53	1525.2
13	1917.8	507.95	179.02	17.873	-528.55	1379.8
14	2164.1	459.16	184.43	17.873	-545.18	1232.6
15	2410.3	410.20	189.83	17.873	-561.73	1084.7
MINIMUM	78.835	406.49	119.15	17.873	-709.86	1071.8
Pile N.	1	9	1	1	10	9
MAXIMUM	3658.9	607.28	238.49	17.873	-346.16	1681.6
Pile N.	10	2	10	1	1	2

THE PILE COORDINATE SYSTEM (LOCAL AXES)
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* PILE TOP DISPLACEMENTS *

PILE GROUP	DISP. x, M	DISP. y, M	DISP. z, M	ROT. x,RAD	ROT. y,RAD	ROT. z,RAD
1	5.3976E-05	6.3191E-03	1.1618E-03	1.2589E-04	2.3835E-05	-2.7262E-04
2	1.9883E-03	6.4135E-03	2.0633E-03	1.2589E-04	2.3835E-05	-2.7262E-04
3	2.4156E-04	5.8683E-03	1.2091E-03	1.2589E-04	2.3835E-05	-2.7262E-04
4	2.1759E-03	5.9627E-03	2.1106E-03	1.2589E-04	2.3835E-05	-2.7262E-04
5	4.2914E-04	5.4176E-03	1.2563E-03	1.2589E-04	2.3835E-05	-2.7262E-04
6	2.3634E-03	5.5120E-03	2.1578E-03	1.2589E-04	2.3835E-05	-2.7262E-04
7	6.1672E-04	4.9668E-03	1.3035E-03	1.2589E-04	2.3835E-05	-2.7262E-04
8	2.5510E-03	5.0612E-03	2.2050E-03	1.2589E-04	2.3835E-05	-2.7262E-04
9	8.0431E-04	4.5160E-03	1.3507E-03	1.2589E-04	2.3835E-05	-2.7262E-04
10	2.7386E-03	4.6105E-03	2.2522E-03	1.2589E-04	2.3835E-05	-2.7262E-04
11	1.0211E-03	6.3663E-03	1.6126E-03	1.2589E-04	2.3835E-05	-2.7262E-04
12	1.2087E-03	5.9155E-03	1.6598E-03	1.2589E-04	2.3835E-05	-2.7262E-04
13	1.3963E-03	5.4648E-03	1.7070E-03	1.2589E-04	2.3835E-05	-2.7262E-04
14	1.5839E-03	5.0140E-03	1.7542E-03	1.2589E-04	2.3835E-05	-2.7262E-04
15	1.7714E-03	4.5633E-03	1.8015E-03	1.2589E-04	2.3835E-05	-2.7262E-04
MINIMUM	5.3976E-05	4.5160E-03	1.1618E-03	1.2589E-04	2.3835E-05	-2.7262E-04
Pile N.	1	9	1	1	1	1
MAXIMUM	2.7386E-03	6.4135E-03	2.2522E-03	1.2589E-04	2.3835E-05	-2.7262E-04
Pile N.	10	2	10	1	1	1

* PILE TOP REACTIONS *

PILE GROUP	AXIAL, KN	LAT. y, KN	LAT. z, KN	MOM x, KN- M	MOM y, KN- M	MOM z, KN- M
1	78.835	600.79	119.15	17.873	-346.16	1655.9
2	2695.0	607.28	216.41	17.873	-641.91	1681.6
3	352.81	553.63	124.82	17.873	-363.99	1516.3
4	2941.3	559.56	222.05	17.873	-659.10	1537.2
5	626.78	504.12	129.98	17.873	-379.37	1365.5
6	3187.5	511.30	227.58	17.873	-676.13	1391.6
7	894.33	455.29	135.37	17.873	-395.90	1218.6
8	3433.8	462.65	233.03	17.873	-692.98	1244.8
9	1140.6	406.49	140.84	17.873	-412.82	1071.8
10	3658.9	413.90	238.49	17.873	-709.86	1097.5

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    11        1425.3     604.10     167.94     17.873     -494.31     1668.8
    12        1671.5     556.36     173.53     17.873     -511.53     1525.2
    13        1917.8     507.95     179.02     17.873     -528.55     1379.8
    14        2164.1     459.16     184.43     17.873     -545.18     1232.6
    15        2410.3     410.20     189.83     17.873     -561.73     1084.7

  MINIMUM        78.835     406.49     119.15     17.873     -709.86     1071.8
  Pile N.       1          9          1          1          10          9
  MAXIMUM       3658.9     607.28     238.49     17.873     -346.16     1681.6
  Pile N.       10         2          10         1          1           2

 PILE GROUP   STRESS, KN/ M**2
 **********  ****************

    1       1.0041E+04
    2       1.2993E+04
    3          9503.7
    4       1.2460E+04
    5          8908.4
    6       1.1938E+04
    7          8343.4
    8       1.1434E+04
    9          7779.0
    10       1.0940E+04
    11       1.1520E+04
    12       1.0961E+04
    13       1.0406E+04
    14          9858.3
    15          9331.6

  MINIMUM        7779.0
  Pile N.       9
  MAXIMUM     1.2993E+04
  Pile N.       2
```

* EFFECTS FOR LATERALLY LOADED PILE *

* MINIMUM VALUES AND LOCATIONS *

```
  PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR       SHEAR    SOIL REACT  SOIL REACT    TOTAL    FLEX. RIG.
FLEX. RIG.
           y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR      STRESS      z-DIR      y-DIR
             M          M        KN- M      KN- M       KN          KN        KN/ M       KN/ M      KN/ M**2   KN- M**2   KN- M**2
 ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
    1 -5.6854E-05 -1.1059E-05    -1655.9    -346.16    -275.03    -53.854    -115.82    -23.477    69.705  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     9.1200     12.960     12.960     21.120     0.0000     0.0000
    2 -5.5030E-05 -1.9108E-05    -1681.6    -641.91    -266.63    -93.215    -112.62    -41.246    2382.9  3.2009E+06
3.2009E+06
   x( M)     10.080     10.320     0.0000     0.0000     9.1200     9.1200     12.960     12.960     21.120     0.0000     0.0000
    3 -6.1604E-05 -1.3792E-05    -1516.3    -363.99    -300.67    -67.523    -103.61    -23.829    311.95  3.2009E+06
3.2009E+06
   x( M)     9.8400     9.8400     0.0000     0.0000     8.8800     8.8800     12.960     12.960     20.880     0.0000     0.0000
    4 -5.1071E-05 -1.9605E-05    -1537.2    -659.10    -252.77    -98.380    -103.17    -42.429    2600.6  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     9.1200     9.1200     12.960     12.960     20.640     0.0000     0.0000
    5 -4.8113E-05 -1.2157E-05    -1365.5    -379.37    -249.57    -63.257    -87.579    -22.340    554.20  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     8.8800     10.560     10.800     20.880     0.0000     0.0000
    6 -4.6494E-05 -2.0009E-05    -1391.6    -676.13    -237.54    -103.43    -96.894    -45.294    2818.4  3.2009E+06
```



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3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     9.1200     12.960     12.960     20.640     0.0000     0.0000
    7 -4.2409E-05 -1.2345E-05    -1218.6    -395.90    -232.70    -67.921    -83.115    -24.396    790.76  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     8.8800     10.560     10.560     20.640     0.0000     0.0000
    8 -4.1358E-05 -2.0101E-05    -1244.8    -692.98    -220.87    -108.08    -78.656    -38.947    3036.1  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     9.1200     10.800     10.800     20.880     0.0000     0.0000
    9 -3.8312E-05 -1.3001E-05    -1071.8    -412.82    -221.92    -75.819    -80.223    -27.476    1008.5  3.2009E+06
3.2009E+06
   x( M)     9.8400     9.8400     0.0000     0.0000     8.8800     8.8800     10.320     10.560     20.400     0.0000     0.0000
   10 -3.6058E-05 -1.9984E-05    -1097.5    -709.86    -202.38    -112.52    -73.215    -41.262    3235.2  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     9.1200     10.560     10.800     20.640     0.0000     0.0000
   11 -5.5797E-05 -1.5094E-05    -1668.8    -494.31    -270.25    -73.955    -114.73    -32.736    1260.2  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     9.1200     9.1200     12.960     12.960     21.120     0.0000     0.0000
   12 -5.3063E-05 -1.6155E-05    -1525.2    -511.53    -262.73    -80.270    -107.32    -34.627    1478.0  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     8.8800     12.960     12.960     20.880     0.0000     0.0000
   13 -4.9325E-05 -1.7024E-05    -1379.8    -528.55    -253.72    -87.813    -88.194    -30.836    1695.7  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     8.8800     10.560     12.960     20.880     0.0000     0.0000
   14 -4.3287E-05 -1.6996E-05    -1232.6    -545.18    -234.47    -92.289    -82.986    -32.881    1913.5  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     8.8800     10.560     10.560     20.880     0.0000     0.0000
   15 -3.6762E-05 -1.6545E-05    -1084.7    -561.73    -211.42    -95.351    -76.410    -34.779    2131.2  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     8.8800     10.560     10.560     20.640     0.0000     0.0000

   Min. -6.1604E-05 -2.0101E-05    -1681.6    -709.86    -300.67    -112.52    -115.82    -45.294    69.705  3.2009E+06
3.2009E+06
  Pile N.      3          8          2          10         3          10         1          6          1          1          1
```

* MAXIMUM VALUES AND LOCATIONS *

```
  PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR       SHEAR    SOIL REACT  SOIL REACT    TOTAL    FLEX. RIG.
FLEX. RIG.
           y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR      STRESS      z-DIR      y-DIR
             M          M        KN- M      KN- M       KN          KN        KN/ M       KN/ M      KN/ M**2   KN- M**2   KN- M**2
 ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
    1  6.3191E-03  1.1618E-03     695.33     134.40     600.80     119.15     349.30     74.045  1.0041E+04  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
    2  6.4135E-03  2.0633E-03     699.53     240.41     607.45     216.48     263.09     102.07  1.2993E+04  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
    3  5.8683E-03  1.2091E-03     655.92     143.71     553.65     124.82     637.28     156.21    9503.7  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.4400     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
    4  5.9627E-03  2.1106E-03     652.07     248.52     559.73     222.13     266.54     116.69  1.2460E+04  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
    5  5.4176E-03  1.2563E-03     600.29     149.31     504.15     129.99     317.90     90.958    8908.4  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
    6  5.5120E-03  2.1578E-03     603.41     256.65     511.47     227.66     256.40     127.85  1.1938E+04  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
```



```
    7  4.9668E-03  1.3035E-03     550.24     156.75     455.33     135.38     291.26     98.226    8343.4  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
    8  5.0612E-03  2.2050E-03     553.51     264.74     462.81     233.12     230.32     132.32  1.1434E+04  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
    9  4.5160E-03  1.3507E-03     500.22     164.86     406.53     140.86     324.19     130.71    7779.0  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
   10  4.6105E-03  2.2522E-03     502.64     272.90     414.05     238.59     196.76     132.25  1.0940E+04  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
   11  6.3663E-03  1.6126E-03     697.56     187.76     604.19     167.97     301.06     90.610  1.1520E+04  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
   12  5.9155E-03  1.6598E-03     651.34     195.96     556.45     173.57     343.98     117.89  1.0961E+04  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
   13  5.4648E-03  1.7070E-03     603.58     204.24     508.05     179.06     369.28     145.45  1.0406E+04  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
   14  5.0140E-03  1.7542E-03     553.14     211.92     459.26     184.47     322.49     147.63    9858.3  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
   15  4.5633E-03  1.8015E-03     501.48     219.50     410.30     189.88     252.83     136.61    9331.6  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000

   Max.  6.4135E-03  2.2522E-03     699.53     272.90     607.45     238.59     637.28     156.21  1.2993E+04  3.2009E+06
3.2009E+06
  Pile N.      2          10         2          10         2          10         3          3          2          1          1
```

LOAD CASE :   4
CASE NAME : R sismico MIN
LOAD TYPE : Dead, DL

* TABLE L *   COMPUTATION ON PILE CAP

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

```
    VERT. LOAD,  KN    HOR. LOAD Y,  KN    HOR. LOAD Z,  KN
        25830.5            7174.56            -1133.53

    MOMENT X , KN- M    MOMENT Y, KN- M    MOMENT Z, KN- M
       -4834.41           -10011.6           -23623.9
```

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

```
     VERTICAL , M      HORIZONTAL Y, M     HORIZONTAL Z, M
      1.25618E-03         5.12394E-03        -8.17904E-04

    ANGLE ROT. X,RAD    ANGLE ROT. Y,RAD    ANGLE ROT. Z,RAD
```



```
      -8.29619E-05        -4.26872E-05        -2.53328E-04
```

THE GLOBAL STRUCTURAL COORDINATE SYSTEM
----

* PILE TOP DISPLACEMENTS *

```
 PILE GROUP   DISP. X, M   DISP. Y, M   DISP. Z, M    ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
 **********  ***********  ***********  ***********  ***********  ***********  ***********
    1       4.4881E-04  4.5610E-03  -4.5864E-04  -8.2962E-05  -4.2687E-05  -2.5333E-04
    2       2.2949E-03  4.4988E-03  -1.0527E-03  -8.2962E-05  -4.2687E-05  -2.5333E-04
    3       3.9098E-04  4.8580E-03  -4.8975E-04  -8.2962E-05  -4.2687E-05  -2.5333E-04
    4       2.2370E-03  4.7958E-03  -1.0838E-03  -8.2962E-05  -4.2687E-05  -2.5333E-04
    5       3.3315E-04  5.1551E-03  -5.2087E-04  -8.2962E-05  -4.2687E-05  -2.5333E-04
    6       2.1792E-03  5.0928E-03  -1.1149E-03  -8.2962E-05  -4.2687E-05  -2.5333E-04
    7       2.7532E-04  5.4521E-03  -5.5198E-04  -8.2962E-05  -4.2687E-05  -2.5333E-04
    8       2.1214E-03  5.3899E-03  -1.1461E-03  -8.2962E-05  -4.2687E-05  -2.5333E-04
    9       2.1749E-04  5.7491E-03  -5.8309E-04  -8.2962E-05  -4.2687E-05  -2.5333E-04
    10       2.0635E-03  5.6869E-03  -1.1772E-03  -8.2962E-05  -4.2687E-05  -2.5333E-04
    11       1.3718E-03  4.5299E-03  -7.5568E-04  -8.2962E-05  -4.2687E-05  -2.5333E-04
    12       1.3140E-03  4.8269E-03  -7.8679E-04  -8.2962E-05  -4.2687E-05  -2.5333E-04
    13       1.2562E-03  5.1239E-03  -8.1790E-04  -8.2962E-05  -4.2687E-05  -2.5333E-04
    14       1.1983E-03  5.4210E-03  -8.4902E-04  -8.2962E-05  -4.2687E-05  -2.5333E-04
    15       1.1405E-03  5.7180E-03  -8.8013E-04  -8.2962E-05  -4.2687E-05  -2.5333E-04

  MINIMUM     2.1749E-04  4.4988E-03  -1.1772E-03  -8.2962E-05  -4.2687E-05  -2.5333E-04
  Pile N.       9          2           10           1            1            1
  MAXIMUM     2.2949E-03  5.7491E-03  -4.5864E-04  -8.2962E-05  -4.2687E-05  -2.5333E-04
  Pile N.       2          9           1            1            1            1
```

* PILE TOP REACTIONS *

```
 PILE GROUP   FOR. X, KN   FOR. Y, KN   FOR. Z, KN  MOM X, KN- M  MOM Y, KN- M  MOM Z, KN- M
 **********  ***********  ***********  ***********  ***********  ***********  ***********
    1         655.52      418.26      -36.316      -11.778      84.859      1117.3
    2         3097.5      409.86      -101.44      -11.778      282.95      1096.2
    3         571.05      450.50      -39.703      -11.778      95.080      1214.5
    4         3021.6      442.03      -104.75      -11.778      292.90      1193.4
    5         486.59      482.50      -43.068      -11.778      105.22      1310.9
    6         2945.7      474.19      -108.06      -11.778      302.89      1290.7
    7         402.12      514.46      -46.426      -11.778      115.35      1407.3
    8         2869.7      505.94      -111.29      -11.778      312.57      1386.5
    9         317.66      547.08      -49.837      -11.778      125.76      1507.2
    10         2793.8      537.80      -114.56      -11.778      322.45      1483.0
    11         1885.7      414.12      -68.941      -11.778      183.98      1106.9
    12         1809.8      446.57      -72.327      -11.778      194.22      1205.2
    13         1733.9      478.79      -75.677      -11.778      204.34      1302.6
    14         1657.9      510.22      -78.909      -11.778      213.99      1396.9
    15         1582.0      542.20      -82.232      -11.778      224.07      1493.9

  MINIMUM        317.66      409.86      -114.56      -11.778      84.859      1096.2
  Pile N.       9           2           10           1            1           2
  MAXIMUM        3097.5      547.08      -36.316      -11.778      322.45      1507.2
  Pile N.       2           9           1            1            10          9
```

THE PILE COORDINATE SYSTEM (LOCAL AXES)
----

* PILE TOP DISPLACEMENTS *

PILE GROUP	DISP. x, M	DISP. y, M	DISP. z, M	ROT. x,RAD	ROT. y,RAD	ROT. z,RAD
**********	***********	***********	***********	***********	***********	***********
1	4.4881E-04	4.5610E-03	-4.5864E-04	-8.2962E-05	-4.2687E-05	-2.5333E-04
2	2.2949E-03	4.4988E-03	-1.0527E-03	-8.2962E-05	-4.2687E-05	-2.5333E-04
3	3.9098E-04	4.8580E-03	-4.8975E-04	-8.2962E-05	-4.2687E-05	-2.5333E-04
4	2.2370E-03	4.7958E-03	-1.0838E-03	-8.2962E-05	-4.2687E-05	-2.5333E-04
5	3.3315E-04	5.1551E-03	-5.2087E-04	-8.2962E-05	-4.2687E-05	-2.5333E-04
6	2.1792E-03	5.0928E-03	-1.1149E-03	-8.2962E-05	-4.2687E-05	-2.5333E-04
7	2.7532E-04	5.4521E-03	-5.5198E-04	-8.2962E-05	-4.2687E-05	-2.5333E-04
8	2.1214E-03	5.3899E-03	-1.1461E-03	-8.2962E-05	-4.2687E-05	-2.5333E-04
9	2.1749E-04	5.7491E-03	-5.8309E-04	-8.2962E-05	-4.2687E-05	-2.5333E-04
10	2.0635E-03	5.6869E-03	-1.1772E-03	-8.2962E-05	-4.2687E-05	-2.5333E-04
11	1.3718E-03	4.5299E-03	-7.5568E-04	-8.2962E-05	-4.2687E-05	-2.5333E-04
12	1.3140E-03	4.8269E-03	-7.8679E-04	-8.2962E-05	-4.2687E-05	-2.5333E-04
13	1.2562E-03	5.1239E-03	-8.1790E-04	-8.2962E-05	-4.2687E-05	-2.5333E-04
14	1.1983E-03	5.4210E-03	-8.4902E-04	-8.2962E-05	-4.2687E-05	-2.5333E-04
15	1.1405E-03	5.7180E-03	-8.8013E-04	-8.2962E-05	-4.2687E-05	-2.5333E-04

MINIMUM	2.1749E-04	4.4988E-03	-1.1772E-03	-8.2962E-05	-4.2687E-05	-2.5333E-04
Pile N.	9	2	10	1	1	1
MAXIMUM	2.2949E-03	5.7491E-03	-4.5864E-04	-8.2962E-05	-4.2687E-05	-2.5333E-04
Pile N.	2	9	1	1	1	1

* PILE TOP REACTIONS *

PILE GROUP	AXIAL, KN	LAT. y, KN	LAT. z, KN	MOM x, KN- M	MOM y, KN- M	MOM z, KN- M
**********	***********	***********	***********	***********	***********	***********
1	655.52	418.26	-36.316	-11.778	84.859	1117.3
2	3097.5	409.86	-101.44	-11.778	282.95	1096.2
3	571.05	450.50	-39.703	-11.778	95.080	1214.5
4	3021.6	442.03	-104.75	-11.778	292.90	1193.4
5	486.59	482.50	-43.068	-11.778	105.22	1310.9
6	2945.7	474.19	-108.06	-11.778	302.89	1290.7
7	402.12	514.46	-46.426	-11.778	115.35	1407.3
8	2869.7	505.94	-111.29	-11.778	312.57	1386.5
9	317.66	547.08	-49.837	-11.778	125.76	1507.2
10	2793.8	537.80	-114.56	-11.778	322.45	1483.0
11	1885.7	414.12	-68.941	-11.778	183.98	1106.9
12	1809.8	446.57	-72.327	-11.778	194.22	1205.2
13	1733.9	478.79	-75.677	-11.778	204.34	1302.6
14	1657.9	510.22	-78.909	-11.778	213.99	1396.9
15	1582.0	542.20	-82.232	-11.778	224.07	1493.9

MINIMUM	317.66	409.86	-114.56	-11.778	84.859	1096.2
Pile N.	9	2	10	1	1	2
MAXIMUM	3097.5	547.08	-36.316	-11.778	322.45	1507.2
Pile N.	2	9	1	1	10	9

PILE GROUP	STRESS, KN/ M**2
**********	****************
1	7184.4
2	9412.1
3	7685.7
4	9915.3
5	8182.2
6	1.0420E+04
7	8678.9
8	1.0915E+04

9	9196.4
10	1.1416E+04
11	8281.7
12	8796.0
13	9305.2
14	9796.4
15	1.0303E+04

MINIMUM	7184.4
Pile N.	1
MAXIMUM	1.1416E+04
Pile N.	10

* EFFECTS FOR LATERALLY LOADED PILE *

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR M	DISPL. z-DIR M	MOMENT z-DIR KN- M	MOMENT y-DIR KN- M	SHEAR y-DIR KN	SHEAR z-DIR KN	SOIL REACT y-DIR KN/ M	SOIL REACT z-DIR KN/ M	TOTAL STRESS KN/ M**2	FLEX. RIG. z-DIR KN- M**2	FLEX. RIG. y-DIR KN- M**2
******	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********
1	-3.5612E-05	-4.5864E-04	-1117.3	-47.196	-208.17	-36.318	-76.977	-12.701	579.60	3.2009E+06	3.2009E+06
x(M)	10.080	0.0000	0.0000	7.2000	8.8800	0.0000	10.560	7.2000	20.400	0.0000	0.0000
2	-3.5248E-05	-1.0527E-03	-1096.2	-121.68	-205.84	-101.47	-75.903	-39.659	2738.8	3.2009E+06	3.2009E+06
x(M)	10.080	0.0000	0.0000	7.4400	8.8800	0.0000	10.560	8.6400	20.400	0.0000	0.0000
3	-3.9348E-05	-4.8975E-04	-1214.5	-50.796	-217.96	-39.705	-79.486	-14.796	504.92	3.2009E+06	3.2009E+06
x(M)	10.080	0.0000	0.0000	7.2000	8.8800	0.0000	10.800	8.4000	20.640	0.0000	0.0000
4	-3.8866E-05	-1.0838E-03	-1193.4	-124.83	-214.61	-104.78	-78.112	-43.182	2671.7	3.2009E+06	3.2009E+06
x(M)	10.080	0.0000	0.0000	7.4400	8.8800	0.0000	10.800	8.4000	20.640	0.0000	0.0000
5	-4.2854E-05	-5.2087E-04	-1310.9	-54.252	-229.13	-43.070	-82.717	-15.184	430.24	3.2009E+06	3.2009E+06
x(M)	10.080	0.0000	0.0000	7.2000	8.8800	0.0000	10.800	8.4000	20.880	0.0000	0.0000
6	-4.2843E-05	-1.1149E-03	-1290.7	-128.04	-225.24	-108.09	-81.070	-48.452	2604.5	3.2009E+06	3.2009E+06
x(M)	10.080	0.0000	0.0000	7.4400	8.8800	0.0000	10.800	8.4000	20.640	0.0000	0.0000
7	-4.7229E-05	-5.5198E-04	-1407.3	-57.668	-245.71	-46.428	-87.263	-19.224	355.55	3.2009E+06	3.2009E+06
x(M)	10.080	0.0000	0.0000	7.2000	8.8800	0.0000	10.800	8.6400	20.880	0.0000	0.0000
8	-4.6021E-05	-1.1461E-03	-1386.5	-130.67	-236.25	-111.32	-84.236	-42.893	2537.4	3.2009E+06	3.2009E+06
x(M)	10.080	0.0000	0.0000	7.4400	8.8800	0.0000	10.800	8.4000	20.880	0.0000	0.0000
9	-5.7723E-05	-5.8309E-04	-1507.2	-61.451	-289.01	-49.839	-98.801	-44.351	280.87	3.2009E+06	3.2009E+06
x(M)	10.080	0.0000	0.0000	7.2000	8.8800	0.0000	10.560	8.6400	20.880	0.0000	0.0000
10	-5.0797E-05	-1.1772E-03	-1483.0	-133.62	-254.59	-114.59	-101.20	-60.108	2470.3	3.2009E+06	3.2009E+06
x(M)	10.080	0.0000	0.0000	7.4400	8.8800	0.0000	12.960	8.6400	20.880	0.0000	0.0000
11	-3.5369E-05	-7.5568E-04	-1106.9	-84.496	-206.19	-68.954	-76.209	-26.398	1667.3	3.2009E+06	3.2009E+06
x(M)	10.080	0.0000	0.0000	7.2000	8.8800	0.0000	10.560	8.4000	20.400	0.0000	0.0000
12	-3.9905E-05	-7.8679E-04	-1205.2	-88.116	-217.32	-72.340	-78.953	-34.743	1600.2	3.2009E+06	3.2009E+06
x(M)	10.080	0.0000	0.0000	7.2000	8.8800	0.0000	10.800	8.4000	20.640	0.0000	0.0000
13	-4.4135E-05	-8.1790E-04	-1302.6	-91.499	-229.22	-75.690	-82.224	-38.846	1533.1	3.2009E+06	

											3.2009E+06
x(M)	10.080	0.0000	0.0000	7.2000	8.8800	0.0000	10.800	8.4000	20.640	0.0000	0.0000
14	-4.6230E-05	-8.4902E-04	-1396.9	-94.117	-238.43	-78.923	-85.091	-29.023	1465.9	3.2009E+06	3.2009E+06
x(M)	10.080	0.0000	0.0000	7.2000	8.8800	0.0000	10.800	8.4000	20.880	0.0000	0.0000
15	-5.1900E-05	-8.8013E-04	-1493.9	-97.342	-260.96	-82.245	-98.912	-47.864	1398.8	3.2009E+06	3.2009E+06
x(M)	10.080	0.0000	0.0000	7.2000	8.8800	0.0000	12.960	8.6400	20.880	0.0000	0.0000
Min.	-5.7723E-05	-1.1772E-03	-1507.2	-133.62	-289.01	-114.59	-101.20	-60.108	280.87	3.2009E+06	3.2009E+06
Pile N.	9	10	9	10	9	10	10	10	9	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR M	DISPL. z-DIR M	MOMENT z-DIR KN- M	MOMENT y-DIR KN- M	SHEAR y-DIR KN	SHEAR z-DIR KN	SOIL REACT y-DIR KN/ M	SOIL REACT z-DIR KN/ M	TOTAL STRESS KN/ M**2	FLEX. RIG. z-DIR KN- M**2	FLEX. RIG. y-DIR KN- M**2
******	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********
1	4.5610E-03	3.2328E-06	510.84	84.859	418.29	18.708	157.81	6.8524	7184.4	3.2009E+06	3.2009E+06
x(M)	0.0000	9.8400	7.2000	0.0000	0.0000	8.8800	8.4000	10.560	0.0000	0.0000	0.0000
2	4.4988E-03	8.6084E-06	502.59	282.95	409.99	50.351	149.74	18.630	9412.1	3.2009E+06	3.2009E+06
x(M)	0.0000	10.080	7.2000	0.0000	0.0000	8.8800	8.6400	10.560	0.0000	0.0000	0.0000
3	4.8580E-03	3.6078E-06	544.57	95.080	450.53	19.863	184.51	7.1795	7685.7	3.2009E+06	3.2009E+06
x(M)	0.0000	10.080	7.2000	0.0000	0.0000	8.8800	8.4000	10.560	0.0000	0.0000	0.0000
4	4.7958E-03	9.0900E-06	536.54	292.90	442.17	50.298	177.07	18.386	9915.3	3.2009E+06	3.2009E+06
x(M)	0.0000	10.080	7.2000	0.0000	0.0000	8.8800	8.4000	10.800	0.0000	0.0000	0.0000
5	5.1551E-03	3.9689E-06	576.77	105.22	482.53	21.092	184.86	7.5263	8182.2	3.2009E+06	3.2009E+06
x(M)	0.0000	10.080	7.2000	0.0000	0.0000	8.8800	8.4000	10.800	0.0000	0.0000	0.0000
6	5.0928E-03	9.6475E-06	570.45	302.89	474.34	50.832	207.39	18.358	1.0420E+04	3.2009E+06	3.2009E+06
x(M)	0.0000	10.080	7.2000	0.0000	0.0000	8.8800	8.4000	10.800	0.0000	0.0000	0.0000
7	5.4521E-03	4.3914E-06	608.73	115.35	514.48	22.736	245.64	7.9953	8678.9	3.2009E+06	3.2009E+06
x(M)	0.0000	10.080	7.2000	0.0000	0.0000	8.8800	8.6400	10.800	0.0000	0.0000	0.0000
8	5.3899E-03	1.0022E-05	601.65	312.57	506.09	51.544	191.14	18.432	1.0915E+04	3.2009E+06	3.2009E+06
x(M)	0.0000	10.080	7.2000	0.0000	0.0000	8.8800	8.4000	10.800	0.0000	0.0000	0.0000
9	5.7491E-03	5.3246E-06	646.31	125.76	547.10	26.560	549.72	9.0548	9196.4	3.2009E+06	3.2009E+06
x(M)	0.0000	9.8400	7.4400	0.0000	0.0000	8.8800	8.6400	10.560	0.0000	0.0000	0.0000
10	5.6869E-03	1.0743E-05	633.66	322.45	537.96	53.912	273.93	21.815	1.1416E+04	3.2009E+06	3.2009E+06
x(M)	0.0000	10.080	7.2000	0.0000	0.0000	8.8800	8.6400	12.960	0.0000	0.0000	0.0000
11	4.5299E-03	5.8912E-06	507.13	183.98	414.20	34.343	158.77	12.691	8281.7	3.2009E+06	3.2009E+06
x(M)	0.0000	10.080	7.2000	0.0000	0.0000	8.8800	8.4000	10.560	0.0000	0.0000	0.0000
12	4.8269E-03	6.4750E-06	542.65	194.22	446.66	35.250	215.43	12.800	8796.0	3.2009E+06	3.2009E+06
x(M)	0.0000	10.080	7.2000	0.0000	0.0000	8.8800	8.4000	10.800	0.0000	0.0000	0.0000
13	5.1239E-03	6.9964E-06	576.58	204.34	478.87	36.315	247.39	13.017	9305.2	3.2009E+06	3.2009E+06
x(M)	0.0000	10.080	7.2000	0.0000	0.0000	8.8800	8.4000	10.800	0.0000	0.0000	0.0000

14	5.4210E-03	7.1765E-06	605.41	213.99	510.31	36.988	189.09	13.185	9796.4	3.2009E+06	3.2009E+06
x(M)	0.0000	10.080	7.2000	0.0000	0.0000	8.8800	8.4000	10.800	0.0000	0.0000	0.0000
15	5.7180E-03	7.8975E-06	637.95	224.07	542.29	39.687	320.60	14.910	1.0303E+04	3.2009E+06	3.2009E+06
x(M)	0.0000	10.080	7.2000	0.0000	0.0000	8.8800	8.6400	12.960	0.0000	0.0000	0.0000
Max.	5.7491E-03	1.0743E-05	646.31	322.45	547.10	53.912	549.72	21.815	1.1416E+04	3.2009E+06	3.2009E+06
Pile N.	9	10	9	10	9	10	9	10	10	1	1

LOAD CASE : 5
CASE NAME : SLE statico MAX
LOAD TYPE : Dead, DL

* TABLE L * COMPUTATION ON PILE CAP

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VERT. LOAD, KN	HOR. LOAD Y, KN	HOR. LOAD Z, KN
32499.7	7965.65	931.431

MOMENT X , KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
1735.38	1713.83	-43655.9

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL , M	HORIZONTAL Y, M	HORIZONTAL Z, M
1.64160E-03	6.02660E-03	5.19507E-04

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
2.98629E-05	-1.59041E-05	-3.87141E-04

THE GLOBAL STRUCTURAL COORDINATE SYSTEM
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* PILE TOP DISPLACEMENTS *

PILE GROUP	DISP. X, M	DISP. Y, M	DISP. Z, M	ROT. X,RAD	ROT. Y,RAD	ROT. Z,RAD
**********	***********	***********	***********	***********	***********	***********
1	7.3011E-05	6.2293E-03	3.9019E-04	2.9863E-05	-1.5904E-05	-3.8714E-04
2	2.8572E-03	6.2517E-03	6.0403E-04	2.9863E-05	-1.5904E-05	-3.8714E-04
3	1.6126E-04	6.1223E-03	4.0139E-04	2.9863E-05	-1.5904E-05	-3.8714E-04
4	2.9454E-03	6.1447E-03	6.1523E-04	2.9863E-05	-1.5904E-05	-3.8714E-04
5	2.4951E-04	6.0154E-03	4.1258E-04	2.9863E-05	-1.5904E-05	-3.8714E-04
6	3.0337E-03	6.0378E-03	6.2643E-04	2.9863E-05	-1.5904E-05	-3.8714E-04
7	3.3776E-04	5.9085E-03	4.2378E-04	2.9863E-05	-1.5904E-05	-3.8714E-04
8	3.1219E-03	5.9309E-03	6.3763E-04	2.9863E-05	-1.5904E-05	-3.8714E-04
9	4.2601E-04	5.8016E-03	4.3498E-04	2.9863E-05	-1.5904E-05	-3.8714E-04
10	3.2102E-03	5.8240E-03	6.4883E-04	2.9863E-05	-1.5904E-05	-3.8714E-04
11	1.4651E-03	6.2404E-03	4.9711E-04	2.9863E-05	-1.5904E-05	-3.8714E-04

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 12     1.5533E-03  6.1335E-03  5.0831E-04  2.9863E-05 -1.5904E-05 -3.8714E-04
 13     1.6416E-03  6.0266E-03  5.1951E-04  2.9863E-05 -1.5904E-05 -3.8714E-04
 14     1.7299E-03  5.9197E-03  5.3071E-04  2.9863E-05 -1.5904E-05 -3.8714E-04
 15     1.8181E-03  5.8128E-03  5.4191E-04  2.9863E-05 -1.5904E-05 -3.8714E-04

MINIMUM    7.3011E-05  5.8016E-03  3.9019E-04  2.9863E-05 -1.5904E-05 -3.8714E-04
Pile N.       1          9          1          1          1          1
MAXIMUM    3.2102E-03  6.2517E-03  6.4883E-04  2.9863E-05 -1.5904E-05 -3.8714E-04
Pile N.      10          2         10          1          1          1

* PILE TOP REACTIONS *

PILE GROUP   FOR. X, KN   FOR. Y, KN   FOR. Z, KN MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
********** *********** *********** *********** *********** *********** ***********
  1       106.64     554.77     48.071     4.2397     -154.76     1450.3
  2       3754.1     553.77     71.151     4.2397     -225.16     1455.6
  3       235.53     543.07     49.301     4.2397     -158.47     1415.0
  4       3824.9     542.27     72.395     4.2397     -228.94     1420.8
  5       364.42     531.40     50.535     4.2397     -162.21     1379.8
  6       3895.7     530.77     73.641     4.2397     -232.72     1386.0
  7       493.31     519.73     51.771     4.2397     -165.96     1344.8
  8       3966.5     519.24     74.886     4.2397     -236.52     1351.2
  9       622.20     508.07     53.011     4.2397     -169.72     1309.9
 10        4037.3     507.71     76.133     4.2397     -240.34     1316.4
 11        2008.1     554.16     59.631     4.2397     -189.96     1452.7
 12        2124.0     542.57     60.867     4.2397     -193.71     1417.7
 13        2239.9     530.98     62.106     4.2397     -197.47     1382.8
 14        2355.7     519.37     63.345     4.2397     -201.25     1347.9
 15        2471.6     507.78     64.587     4.2397     -205.04     1313.1

MINIMUM      106.64     507.71     48.071     4.2397     -240.34     1309.9
Pile N.       1         10          1          1         10          9
MAXIMUM      4037.3     554.77     76.133     4.2397     -154.76     1455.6
Pile N.      10          1         10          1          1          2


THE PILE COORDINATE SYSTEM (LOCAL AXES)
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* PILE TOP DISPLACEMENTS *

PILE GROUP   DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
********** *********** *********** *********** *********** *********** ***********
  1     7.3011E-05  6.2293E-03  3.9019E-04  2.9863E-05 -1.5904E-05 -3.8714E-04
  2     2.8572E-03  6.2517E-03  6.0403E-04  2.9863E-05 -1.5904E-05 -3.8714E-04
  3     1.6126E-04  6.1223E-03  4.0139E-04  2.9863E-05 -1.5904E-05 -3.8714E-04
  4     2.9454E-03  6.1447E-03  6.1523E-04  2.9863E-05 -1.5904E-05 -3.8714E-04
  5     2.4951E-04  6.0154E-03  4.1258E-04  2.9863E-05 -1.5904E-05 -3.8714E-04
  6     3.0337E-03  6.0378E-03  6.2643E-04  2.9863E-05 -1.5904E-05 -3.8714E-04
  7     3.3776E-04  5.9085E-03  4.2378E-04  2.9863E-05 -1.5904E-05 -3.8714E-04
  8     3.1219E-03  5.9309E-03  6.3763E-04  2.9863E-05 -1.5904E-05 -3.8714E-04
  9     4.2601E-04  5.8016E-03  4.3498E-04  2.9863E-05 -1.5904E-05 -3.8714E-04
 10      3.2102E-03  5.8240E-03  6.4883E-04  2.9863E-05 -1.5904E-05 -3.8714E-04
 11      1.4651E-03  6.2404E-03  4.9711E-04  2.9863E-05 -1.5904E-05 -3.8714E-04
 12      1.5533E-03  6.1335E-03  5.0831E-04  2.9863E-05 -1.5904E-05 -3.8714E-04
 13      1.6416E-03  6.0266E-03  5.1951E-04  2.9863E-05 -1.5904E-05 -3.8714E-04
 14      1.7299E-03  5.9197E-03  5.3071E-04  2.9863E-05 -1.5904E-05 -3.8714E-04
 15      1.8181E-03  5.8128E-03  5.4191E-04  2.9863E-05 -1.5904E-05 -3.8714E-04

MINIMUM    7.3011E-05  5.8016E-03  3.9019E-04  2.9863E-05 -1.5904E-05 -3.8714E-04
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Pile N.       1          9          1          1          1          1
MAXIMUM    3.2102E-03  6.2517E-03  6.4883E-04  2.9863E-05 -1.5904E-05 -3.8714E-04
Pile N.      10          2         10          1          1          1

* PILE TOP REACTIONS *

PILE GROUP   AXIAL, KN    LAT. y, KN   LAT. z, KN MOM x, KN- M MOM y, KN- M MOM z, KN- M
********** *********** *********** *********** *********** *********** ***********
  1       106.64     554.77     48.071     4.2397     -154.76     1450.3
  2       3754.1     553.77     71.151     4.2397     -225.16     1455.6
  3       235.53     543.07     49.301     4.2397     -158.47     1415.0
  4       3824.9     542.27     72.395     4.2397     -228.94     1420.8
  5       364.42     531.40     50.535     4.2397     -162.21     1379.8
  6       3895.7     530.77     73.641     4.2397     -232.72     1386.0
  7       493.31     519.73     51.771     4.2397     -165.96     1344.8
  8       3966.5     519.24     74.886     4.2397     -236.52     1351.2
  9       622.20     508.07     53.011     4.2397     -169.72     1309.9
 10        4037.3     507.71     76.133     4.2397     -240.34     1316.4
 11        2008.1     554.16     59.631     4.2397     -189.96     1452.7
 12        2124.0     542.57     60.867     4.2397     -193.71     1417.7
 13        2239.9     530.98     62.106     4.2397     -197.47     1382.8
 14        2355.7     519.37     63.345     4.2397     -201.25     1347.9
 15        2471.6     507.78     64.587     4.2397     -205.04     1313.1

MINIMUM      106.64     507.71     48.071     4.2397     -240.34     1309.9
Pile N.       1         10          1          1         10          9
MAXIMUM      4037.3     554.77     76.133     4.2397     -154.76     1455.6
Pile N.      10          1         10          1          1          2

PILE GROUP   STRESS, KN/ M**2
********** ****************
  1        8692.1
  2      1.2002E+04
  3        8601.3
  4      1.1865E+04
  5        8511.9
  6      1.1729E+04
  7        8423.5
  8      1.1593E+04
  9        8335.8
 10       1.1458E+04
 11       1.0412E+04
 12       1.0313E+04
 13       1.0214E+04
 14       1.0116E+04
 15       1.0019E+04

MINIMUM       8335.8
Pile N.       9
MAXIMUM    1.2002E+04
Pile N.       2

* EFFECTS FOR LATERALLY LOADED PILE *

* MINIMUM VALUES AND LOCATIONS *

PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR    SOIL REACT  SOIL REACT    TOTAL    FLEX. RIG.
FLEX. RIG.
        y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS      z-DIR      y-DIR
          M          M        KN- M      KN- M        KN         KN       KN/ M      KN/ M    KN/ M**2   KN- M**2   KN- M**2
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 ****** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
   1 -5.5095E-05 -4.5272E-06    -1450.3    -154.76    -277.44    -22.974    -105.89    -10.183     94.287  3.2009E+06
3.2009E+06
  x( M)    10.080     10.080     0.0000     0.0000     8.8800     8.8800     12.960     12.960     20.880     0.0000     0.0000
   2 -5.2187E-05 -6.2725E-06    -1455.6    -225.16    -264.99    -32.376    -123.66    -17.622     3319.3  3.2009E+06
3.2009E+06
  x( M)    10.080     10.080     0.0000     0.0000     8.8800     9.1200     12.960     12.960     20.880     0.0000     0.0000
   3 -5.2668E-05 -4.5095E-06    -1415.0    -158.47    -269.42    -23.249    -93.399    -8.7956     208.25  3.2009E+06
3.2009E+06
  x( M)    10.080     10.080     0.0000     0.0000     8.8800     8.8800     10.560     12.960     20.880     0.0000     0.0000
   4 -5.0595E-05 -6.3126E-06    -1420.8    -228.94    -260.26    -33.007    -101.36    -15.154     3381.9  3.2009E+06
3.2009E+06
  x( M)    10.080     10.080     0.0000     0.0000     8.8800     9.1200     12.960     12.960     20.880     0.0000     0.0000
   5 -5.0595E-05 -4.5217E-06    -1379.8    -162.21    -262.75    -23.663    -91.719    -8.4481     322.22  3.2009E+06
3.2009E+06
  x( M)    10.080     10.080     0.0000     0.0000     8.8800     8.8800     10.560     10.800     20.880     0.0000     0.0000
   6 -4.9081E-05 -6.3601E-06    -1386.0    -232.72    -255.77    -33.676    -89.823    -12.619     3444.5  3.2009E+06
3.2009E+06
  x( M)    10.080     10.080     0.0000     0.0000     8.8800     9.1200     10.800     12.960     20.880     0.0000     0.0000
   7 -4.8751E-05 -4.5530E-06    -1344.8    -165.96    -256.93    -24.176    -90.249    -8.6943     436.18  3.2009E+06
3.2009E+06
  x( M)    10.080     10.080     0.0000     0.0000     8.8800     9.1200     10.560     10.800     20.880     0.0000     0.0000
   8 -4.7628E-05 -6.4130E-06    -1351.2    -236.52    -251.48    -34.377    -88.727    -12.375     3507.1  3.2009E+06
3.2009E+06
  x( M)    10.080     10.080     0.0000     0.0000     8.8800     9.1200     10.560     10.800     20.880     0.0000     0.0000
   9 -4.7065E-05 -4.5972E-06    -1309.9    -169.72    -251.70    -24.779    -88.915    -8.9600     550.15  3.2009E+06
3.2009E+06
  x( M)    10.080     10.080     0.0000     0.0000     8.8800     9.1200     10.560     10.800     20.880     0.0000     0.0000
  10 -4.6225E-05 -6.4705E-06    -1316.4    -240.34    -247.34    -35.108    -87.674    -12.701     3569.7  3.2009E+06
3.2009E+06
  x( M)    10.080     10.080     0.0000     0.0000     8.8800     9.1200     10.560     10.800     20.880     0.0000     0.0000
  11 -5.3164E-05 -5.3734E-06    -1452.7    -189.96    -269.24    -27.499    -119.14    -14.243     1775.6  3.2009E+06
3.2009E+06
  x( M)    10.080     10.080     0.0000     0.0000     8.8800     9.1200     12.960     12.960     20.400     0.0000     0.0000
  12 -5.1321E-05 -5.3960E-06    -1417.7    -193.71    -263.55    -28.037    -93.958    -11.836     1878.0  3.2009E+06
3.2009E+06
  x( M)    10.080     10.080     0.0000     0.0000     8.8800     9.1200     12.960     12.960     20.880     0.0000     0.0000
  13 -4.9623E-05 -5.4316E-06    -1382.8    -197.47    -258.37    -28.629    -90.521    -10.249     1980.5  3.2009E+06
3.2009E+06
  x( M)    10.080     10.080     0.0000     0.0000     8.8800     9.1200     10.560     10.800     20.880     0.0000     0.0000
  14 -4.8033E-05 -5.4770E-06    -1347.9    -201.25    -253.57    -29.265    -89.322    -10.534     2082.9  3.2009E+06
3.2009E+06
  x( M)    10.080     10.080     0.0000     0.0000     8.8800     9.1200     10.560     10.800     20.880     0.0000     0.0000
  15 -4.6528E-05 -5.5298E-06    -1313.1    -205.04    -249.04    -29.940    -88.174    -10.832     2185.4  3.2009E+06
3.2009E+06
  x( M)    10.080     10.080     0.0000     0.0000     8.8800     9.1200     10.560     10.800     20.880     0.0000     0.0000

  Min. -5.5095E-05 -6.4705E-06    -1455.6    -240.34    -277.44    -35.108    -123.66    -17.622     94.287  3.2009E+06
3.2009E+06
 Pile N.     1         10          2         10          1         10          2          2          1          1          1

  * MAXIMUM VALUES AND LOCATIONS *

PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR    SOIL REACT  SOIL REACT    TOTAL    FLEX. RIG.
FLEX. RIG.
        y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS      z-DIR      y-DIR
          M          M        KN- M      KN- M        KN         KN       KN/ M      KN/ M    KN/ M**2   KN- M**2   KN- M**2
 ****** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
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```
   1  6.2292E-03  3.9261E-04     668.21     52.201     554.77     48.071     396.84     45.074     8692.1  3.2009E+06
3.2009E+06
  x( M)    0.0000     0.2400     7.2000     7.6800     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
   2  6.2516E-03  6.0582E-04     668.10     77.786     553.98     71.183     295.44     48.442  1.2002E+04  3.2009E+06
3.2009E+06
  x( M)    0.0000     0.2400     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
   3  6.1223E-03  4.0378E-04     655.73     53.556     543.09     49.303     357.02     42.577     8601.3  3.2009E+06
3.2009E+06
  x( M)    0.0000     0.2400     7.2000     7.6800     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
   4  6.1447E-03  6.1699E-04     656.26     79.296     542.47     72.428     281.27     48.094  1.1865E+04  3.2009E+06
3.2009E+06
  x( M)    0.0000     0.2400     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
   5  6.0154E-03  4.1494E-04     643.51     54.956     531.42     50.537     327.97     41.083     8511.9  3.2009E+06
3.2009E+06
  x( M)    0.0000     0.2400     7.2000     7.6800     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
   6  6.0378E-03  6.2815E-04     644.47     80.827     530.97     73.675     269.12     48.015  1.1729E+04  3.2009E+06
3.2009E+06
  x( M)    0.0000     0.2400     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
   7  5.9085E-03  4.2611E-04     631.45     56.391     519.75     51.774     305.71     40.243     8423.5  3.2009E+06
3.2009E+06
  x( M)    0.0000     0.2400     7.2000     7.6800     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
   8  5.9309E-03  6.3932E-04     632.71     82.379     519.44     74.921     258.56     48.166  1.1593E+04  3.2009E+06
3.2009E+06
  x( M)    0.0000     0.2400     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
   9  5.8016E-03  4.3727E-04     619.50     57.853     508.10     53.015     288.06     39.870     8335.8  3.2009E+06
3.2009E+06
  x( M)    0.0000     0.2400     7.2000     7.6800     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
  10  5.8240E-03  6.5048E-04     620.97     83.951     507.91     76.170     249.29     48.523  1.1458E+04  3.2009E+06
3.2009E+06
  x( M)    0.0000     0.2400     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
  11  6.2404E-03  4.9922E-04     667.81     64.929     554.27     59.645     330.46     45.872  1.0412E+04  3.2009E+06
3.2009E+06
  x( M)    0.0000     0.2400     7.2000     7.6800     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
  12  6.1335E-03  5.1038E-04     655.77     66.366     542.68     60.883     308.86     44.836  1.0313E+04  3.2009E+06
3.2009E+06
  x( M)    0.0000     0.2400     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
  13  6.0266E-03  5.2155E-04     643.84     67.853     531.09     62.122     291.38     44.258  1.0214E+04  3.2009E+06
3.2009E+06
  x( M)    0.0000     0.2400     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
  14  5.9197E-03  5.3271E-04     631.98     69.364     519.49     63.363     276.90     44.033  1.0116E+04  3.2009E+06
3.2009E+06
  x( M)    0.0000     0.2400     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
  15  5.8128E-03  5.4388E-04     620.17     70.897     507.90     64.606     264.71     44.099  1.0019E+04  3.2009E+06
3.2009E+06
  x( M)    0.0000     0.2400     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000

  Max.  6.2516E-03  6.5048E-04     668.21     83.951     554.77     76.170     396.84     48.523  1.2002E+04  3.2009E+06
3.2009E+06
 Pile N.     2         10          1         10          1         10          1         10          2          1          1


LOAD CASE :     6
CASE NAME : SLE statico MIN
LOAD TYPE : Dead, DL


* TABLE L *   COMPUTATION ON PILE CAP
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 * EQUIVALENT CONCENTRATED LOAD AT ORIGIN *


     VERT. LOAD, KN    HOR. LOAD Y, KN    HOR. LOAD Z, KN
         25809.7          7527.41           931.431

    MOMENT X , KN- M    MOMENT Y, KN- M    MOMENT Z, KN- M
         1601.78          3436.60          -21546.4


 * DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *


      VERTICAL , M      HORIZONTAL Y, M     HORIZONTAL Z, M
       1.25305E-03        5.30377E-03        5.50901E-04

    ANGLE ROT. X,RAD    ANGLE ROT. Y,RAD    ANGLE ROT. Z,RAD
       2.72109E-05       -4.98268E-06       -2.40980E-04


  THE GLOBAL STRUCTURAL COORDINATE SYSTEM
  ---------------------------------------

  * PILE TOP DISPLACEMENTS *

 PILE GROUP   DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
 ********** *********** *********** *********** *********** *********** ***********
     1      2.4330E-04  5.4884E-03  4.3306E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
     2      1.9726E-03  5.5088E-03  6.2792E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
     3      3.1584E-04  5.3910E-03  4.4327E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
     4      2.0452E-03  5.4114E-03  6.3812E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
     5      3.8838E-04  5.2936E-03  4.5347E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
     6      2.1177E-03  5.3140E-03  6.4833E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
     7      4.6091E-04  5.1961E-03  4.6368E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
     8      2.1903E-03  5.2166E-03  6.5853E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
     9      5.3345E-04  5.0987E-03  4.7388E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
    10      2.2628E-03  5.1191E-03  6.6874E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
    11      1.1080E-03  5.4986E-03  5.3049E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
    12      1.1805E-03  5.4012E-03  5.4069E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
    13      1.2530E-03  5.3038E-03  5.5090E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
    14      1.3256E-03  5.2064E-03  5.6111E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
    15      1.3981E-03  5.1089E-03  5.7131E-04  2.7211E-05 -4.9827E-06 -2.4098E-04

  MINIMUM    2.4330E-04  5.0987E-03  4.3306E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
  Pile N.        1           9           1           1           1           1
  MAXIMUM    2.2628E-03  5.5088E-03  6.6874E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
  Pile N.       10           2          10           1           1           1

  * PILE TOP REACTIONS *

 PILE GROUP   FOR. X, KN   FOR. Y, KN   FOR. Z, KN MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
 ********** *********** *********** *********** *********** *********** ***********
     1        355.36      523.13      49.268      3.8632     -152.16      1442.6
     2        2674.5      523.55      70.472      3.8632     -216.84      1448.6
     3        461.30      512.29      50.375      3.8632     -155.46      1409.5
     4        2769.7      512.70      71.562      3.8632     -220.06      1415.2
     5        567.24      501.46      51.480      3.8632     -158.75      1376.3
     6        2865.0      502.01      72.675      3.8632     -223.41      1382.6
     7        673.19      490.77      52.602      3.8632     -162.13      1343.9
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     8        2960.2      491.40      73.801      3.8632     -226.82      1350.4
     9        779.13      480.16      53.734      3.8632     -165.56      1311.9
    10        3055.4      480.82      74.935      3.8632     -230.27      1318.5
    11        1539.3      523.39      59.894      3.8632     -184.57      1446.0
    12        1634.5      512.45      60.979      3.8632     -187.75      1412.1
    13        1729.7      501.71      62.090      3.8632     -191.08      1379.3
    14        1825.0      491.08      63.216      3.8632     -194.48      1347.1
    15        1920.2      480.48      64.349      3.8632     -197.91      1315.1

  MINIMUM       355.36      480.16      49.268      3.8632     -230.27      1311.9
  Pile N.        1           9           1           1          10           9
  MAXIMUM       3055.4      523.55      74.935      3.8632     -152.16      1448.6
  Pile N.       10           2          10           1           1           2


  THE PILE COORDINATE SYSTEM (LOCAL AXES)
  ---------------------------------------

  * PILE TOP DISPLACEMENTS *

 PILE GROUP   DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
 ********** *********** *********** *********** *********** *********** ***********
     1      2.4330E-04  5.4884E-03  4.3306E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
     2      1.9726E-03  5.5088E-03  6.2792E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
     3      3.1584E-04  5.3910E-03  4.4327E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
     4      2.0452E-03  5.4114E-03  6.3812E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
     5      3.8838E-04  5.2936E-03  4.5347E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
     6      2.1177E-03  5.3140E-03  6.4833E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
     7      4.6091E-04  5.1961E-03  4.6368E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
     8      2.1903E-03  5.2166E-03  6.5853E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
     9      5.3345E-04  5.0987E-03  4.7388E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
    10      2.2628E-03  5.1191E-03  6.6874E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
    11      1.1080E-03  5.4986E-03  5.3049E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
    12      1.1805E-03  5.4012E-03  5.4069E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
    13      1.2530E-03  5.3038E-03  5.5090E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
    14      1.3256E-03  5.2064E-03  5.6111E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
    15      1.3981E-03  5.1089E-03  5.7131E-04  2.7211E-05 -4.9827E-06 -2.4098E-04

  MINIMUM    2.4330E-04  5.0987E-03  4.3306E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
  Pile N.        1           9           1           1           1           1
  MAXIMUM    2.2628E-03  5.5088E-03  6.6874E-04  2.7211E-05 -4.9827E-06 -2.4098E-04
  Pile N.       10           2          10           1           1           1

  * PILE TOP REACTIONS *

 PILE GROUP   AXIAL, KN   LAT. y, KN   LAT. z, KN MOM x, KN- M MOM y, KN- M MOM z, KN- M
 ********** *********** *********** *********** *********** *********** ***********
     1        355.36      523.13      49.268      3.8632     -152.16      1442.6
     2        2674.5      523.55      70.472      3.8632     -216.84      1448.6
     3        461.30      512.29      50.375      3.8632     -155.46      1409.5
     4        2769.7      512.70      71.562      3.8632     -220.06      1415.2
     5        567.24      501.46      51.480      3.8632     -158.75      1376.3
     6        2865.0      502.01      72.675      3.8632     -223.41      1382.6
     7        673.19      490.77      52.602      3.8632     -162.13      1343.9
     8        2960.2      491.40      73.801      3.8632     -226.82      1350.4
     9        779.13      480.16      53.734      3.8632     -165.56      1311.9
    10        3055.4      480.82      74.935      3.8632     -230.27      1318.5
    11        1539.3      523.39      59.894      3.8632     -184.57      1446.0
    12        1634.5      512.45      60.979      3.8632     -187.75      1412.1
    13        1729.7      501.71      62.090      3.8632     -191.08      1379.3
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    14        1825.0      491.08      63.216      3.8632     -194.48      1347.1
    15        1920.2      480.48      64.349      3.8632     -197.91      1315.1

  MINIMUM       355.36      480.16      49.268      3.8632     -230.27      1311.9
  Pile N.        1           9           1           1          10           9
  MAXIMUM       3055.4      523.55      74.935      3.8632     -152.16      1448.6
  Pile N.       10           2          10           1           1           2

  PILE GROUP   STRESS, KN/ M**2
  ********** ****************
     1          8865.1
     2        1.0999E+04
     3          8766.5
     4        1.0891E+04
     5          8667.9
     6        1.0789E+04
     7          8574.4
     8        1.0689E+04
     9          8483.2
    10        1.0591E+04
    11          9953.7
    12          9842.4
    13          9737.8
    14          9636.7
    15          9537.3

  MINIMUM       8483.2
  Pile N.        9
  MAXIMUM     1.0999E+04
  Pile N.        2

  * EFFECTS FOR LATERALLY LOADED PILE *

  * MINIMUM VALUES AND LOCATIONS *

   PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR   SOIL REACT  SOIL REACT     TOTAL    FLEX. RIG.
FLEX. RIG.
          y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS      z-DIR      y-DIR
            M          M        KN- M      KN- M        KN         KN       KN/ M      KN/ M     KN/ M**2   KN- M**2   KN- M**2
  ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
     1  -5.6370E-05 -5.2420E-06    -1442.6    -152.16    -288.03    -26.932    -98.882    -9.2717     314.20  3.2009E+06
3.2009E+06
   x( M)     9.8400     9.8400     0.0000     0.0000     8.8800     8.8800     10.320     10.560     20.880     0.0000     0.0000
     2  -5.5819E-05 -7.4000E-06    -1448.6    -216.84    -284.44    -37.941    -97.728    -13.080     2364.8  3.2009E+06
3.2009E+06
   x( M)     9.8400     9.8400     0.0000     0.0000     8.8800     8.8800     10.560     10.560     20.880     0.0000     0.0000
     3  -5.2016E-05 -5.0278E-06    -1409.5    -155.46    -271.44    -26.307    -94.348    -9.1881     407.88  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     8.8800     10.560     10.560     20.880     0.0000     0.0000
     4  -5.1214E-05 -7.0011E-06    -1415.2    -220.06    -266.15    -36.498    -92.735    -12.785     2449.0  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     8.8800     10.560     10.560     20.880     0.0000     0.0000
     5  -4.8044E-05 -4.7974E-06    -1376.3    -158.75    -254.34    -25.498    -89.653    -9.0507     501.55  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     8.8800     10.560     10.560     20.880     0.0000     0.0000
     6  -4.8322E-05 -6.8091E-06    -1382.6    -223.41    -254.42    -35.993    -89.538    -12.751     2533.2  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     8.8800     10.560     10.560     20.640     0.0000     0.0000
     7  -4.5499E-05 -4.7139E-06    -1343.9    -162.13    -243.84    -25.385    -86.764    -9.1290     595.23  3.2009E+06
```



```
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     8.8800     10.560     10.800     20.880     0.0000     0.0000
     8  -4.6172E-05 -6.7228E-06    -1350.4    -226.82    -246.10    -35.993    -87.274    -12.878     2617.4  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     8.8800     10.560     10.800     20.640     0.0000     0.0000
     9  -4.3568E-05 -4.6937E-06    -1311.9    -165.56    -236.21    -25.585    -84.661    -9.2895     688.90  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     8.8800     10.560     10.800     20.640     0.0000     0.0000
    10  -4.4415E-05 -6.6932E-06    -1318.5    -230.27    -239.63    -36.282    -85.516    -13.080     2701.6  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     8.8800     10.560     10.800     20.640     0.0000     0.0000
    11  -5.6866E-05 -6.4325E-06    -1446.0    -184.57    -289.11    -32.871    -99.142    -11.300     1361.0  3.2009E+06
3.2009E+06
   x( M)     9.8400     9.8400     0.0000     0.0000     8.8800     8.8800     10.320     10.560     20.880     0.0000     0.0000
    12  -5.1266E-05 -5.9784E-06    -1412.1    -187.75    -267.09    -31.242    -93.072    -10.945     1445.2  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     8.8800     10.560     10.560     20.880     0.0000     0.0000
    13  -4.8021E-05 -5.7789E-06    -1379.3    -191.08    -253.56    -30.638    -89.367    -10.873     1529.4  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     8.8800     10.560     10.560     20.880     0.0000     0.0000
    14  -4.5732E-05 -5.6967E-06    -1347.1    -194.48    -244.43    -30.592    -86.868    -10.983     1613.6  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     8.8800     10.560     10.800     20.640     0.0000     0.0000
    15  -4.3912E-05 -5.6724E-06    -1315.1    -197.91    -237.50    -30.837    -84.973    -11.164     1697.8  3.2009E+06
3.2009E+06
   x( M)     10.080     10.080     0.0000     0.0000     8.8800     8.8800     10.560     10.800     20.640     0.0000     0.0000

   Min. -5.6866E-05 -7.4000E-06    -1448.6    -230.27    -289.11    -37.941    -99.142    -13.080     314.20  3.2009E+06
3.2009E+06
  Pile N.     11          2          2         10         11          2         11          2          1          1          1

  * MAXIMUM VALUES AND LOCATIONS *

   PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR   SOIL REACT  SOIL REACT     TOTAL    FLEX. RIG.
FLEX. RIG.
          y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS      z-DIR      y-DIR
            M          M        KN- M      KN- M        KN         KN       KN/ M      KN/ M     KN/ M**2   KN- M**2   KN- M**2
  ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
     1   5.4884E-03  4.3306E-04     621.39     55.460     523.15     49.270     598.88     65.572     8865.1  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.4400     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
     2   5.5088E-03  6.2792E-04     622.98     79.676     523.69     70.494     561.91     87.433  1.0999E+04  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.4400     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
     3   5.3910E-03  4.4327E-04     608.29     56.611     512.32     50.377     483.57     55.532     8766.5  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.4400     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
     4   5.4114E-03  6.3812E-04     609.46     80.704     512.85     71.584     433.26     70.214  1.0891E+04  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.4400     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
     5   5.2936E-03  4.5347E-04     595.15     57.743     501.48     51.483     362.97     43.731     8667.9  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.4400     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
     6   5.3140E-03  6.4833E-04     597.26     81.933     502.16     72.699     357.62     60.385  1.0789E+04  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.4400     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
     7   5.1961E-03  4.6368E-04     583.53     59.025     490.81     52.606     295.58     37.375     8574.4  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
```

```
    8  5.2166E-03  6.5853E-04     585.97     83.271     491.55     73.826     309.89     54.540  1.0689E+04  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
    9  5.0987E-03  4.7388E-04     572.46     60.379     480.20     53.738     251.69     33.412     8483.2  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
   10  5.1191E-03  6.6874E-04     574.94     84.673     480.97     74.961     277.82     50.982  1.0591E+04  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
   11  5.4986E-03  5.3049E-04     622.80     67.659     523.48     59.905     603.20     79.981     9953.7  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.4400     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
   12  5.4012E-03  5.4070E-04     608.58     68.631     512.54     60.991     444.12     61.513     9842.4  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.4400     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
   13  5.3038E-03  5.5090E-04     596.09     69.824     501.80     62.103     353.05     51.098     9737.8  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.4400     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
   14  5.2063E-03  5.6111E-04     584.70     71.139     491.17     63.229     297.76     45.052     9636.7  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000
   15  5.1089E-03  5.7131E-04     573.67     72.519     480.58     64.363     260.83     41.268     9537.3  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.2000     7.4400     0.0000     0.0000     8.6400     8.6400     0.0000     0.0000     0.0000

   Max.  5.5088E-03  6.6874E-04     622.98     84.673     523.69     74.961     603.20     87.433  1.0999E+04  3.2009E+06
3.2009E+06
 Pile N.      2        10         2        10         2        10        11         2         2         1         1
```

***** SUMMARY FOR LOAD CASES AND COMBINATIONS *****

***** LOAD CASES RESULTS *****

LOAD CASE : 1

* TABLE L * COMPUTATION ON PILE CAP

```
 * EQUIVALENT CONCENTRATED LOAD AT ORIGIN *
    LOAD X, KN     LOAD Y, KN     LOAD Z, KN    MOM X, KN- M   MOM Y, KN- M   MOM Z, KN- M
       46722.6        11948.5        1397.15        2603.06        2860.59       -62792.4

 * DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *
     DISP X, M      DISP Y, M      DISP Z, M      ROT X,RAD      ROT Y,RAD      ROT Z,RAD
  2.95744E-03      0.0103156   8.32789E-04    6.24429E-05   -2.82103E-05   -7.84332E-04

  * PILE TOP DISPLACEMENTS, GLOBAL *
           DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
          ***********  ***********  ***********  ***********  ***********  ***********
  MINIMUM   -2.4767E-04  9.8451E-03  5.6238E-04  6.2443E-05  -2.8210E-05  -7.8433E-04
  Pile N.         1          9          1          1          1          1
  MAXIMUM    6.1626E-03    0.010786  1.1032E-03  6.2443E-05  -2.8210E-05  -7.8433E-04
  Pile N.        10          2         10          1          1          1

  * PILE TOP REACTIONS, GLOBAL *
          FOR. X, KN   FOR. Y, KN   FOR. Z, KN  MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
          ***********  ***********  ***********  ***********  ***********  ***********
```



```
  MINIMUM       -356.68      764.12      65.118      8.8651     -394.21      1918.2
  Pile N.         1         10          1          1         10          9
  MAXIMUM        5373.6      830.25      121.98      8.8651     -219.16      2156.6
  Pile N.        10          1         10          1          1          2

  * PILE TOP DISPLACEMENTS, LOCAL *
           DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
          ***********  ***********  ***********  ***********  ***********  ***********
  MINIMUM   -2.4767E-04  9.8451E-03  5.6238E-04  6.2443E-05  -2.8210E-05  -7.8433E-04
  Pile N.         1          9          1          1          1          1
  MAXIMUM    6.1626E-03    0.010786  1.1032E-03  6.2443E-05  -2.8210E-05  -7.8433E-04
  Pile N.        10          2         10          1          1          1

  * PILE TOP REACTIONS, LOCAL *
           AXIAL, KN    LAT. y, KN   LAT. z, KN  MOM x, KN- M MOM y, KN- M MOM z, KN- M
          ***********  ***********  ***********  ***********  ***********  ***********
  MINIMUM       -356.68      764.12      65.118      8.8651     -394.21      1918.2
  Pile N.         1         10          1          1         10          9
  MAXIMUM        5373.6      830.25      121.98      8.8651     -219.16      2156.6
  Pile N.        10          1         10          1          1          2

  * EFFECTS FOR LATERALLY LOADED PILE *

 PILE     DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR  SOIL REACT SOIL REACT      TOTAL
          y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS
              M          M      KN- M      KN- M         KN         KN      KN/ M      KN/ M   KN/ M**2
 ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
**********
   Min. -8.5490E-05 -1.1042E-05    -2156.6    -394.21    -359.45    -49.450    -247.41    -35.454     69.421
 Pile N.      2          6          2         10          2         10         11          2          3
   Max.    0.010786  1.1064E-03     1041.4     130.23     830.23     122.06     250.34     58.283  1.7541E+04
 Pile N.      2         10          2         10          1         10          3          6          2
```

LOAD CASE : 2

* TABLE L * COMPUTATION ON PILE CAP

```
 * EQUIVALENT CONCENTRATED LOAD AT ORIGIN *
    LOAD X, KN     LOAD Y, KN     LOAD Z, KN    MOM X, KN- M   MOM Y, KN- M   MOM Z, KN- M
       37482.6        11291.1        1397.15        2402.68        5212.02       -31921.8

 * DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *
     DISP X, M      DISP Y, M      DISP Z, M      ROT X,RAD      ROT Y,RAD      ROT Z,RAD
  1.92813E-03    8.23188E-03   8.49477E-04    4.92214E-05   -6.30647E-06   -3.96991E-04

  * PILE TOP DISPLACEMENTS, GLOBAL *
           DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
          ***********  ***********  ***********  ***********  ***********  ***********
  MINIMUM    2.5177E-04  7.8610E-03  6.3632E-04  4.9221E-05  -6.3065E-06  -3.9699E-04
  Pile N.         1          9          1          1          1          1
  MAXIMUM    3.6045E-03  8.6028E-03  1.0626E-03  4.9221E-05  -6.3065E-06  -3.9699E-04
  Pile N.        10          2         10          1          1          1

  * PILE TOP REACTIONS, GLOBAL *
          FOR. X, KN   FOR. Y, KN   FOR. Z, KN  MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
          ***********  ***********  ***********  ***********  ***********  ***********
  MINIMUM        367.72      720.13      69.482      6.9880     -358.93      1958.5
  Pile N.         1         10          1          1         10          9
  MAXIMUM        4353.6      779.83      116.50      6.9880     -215.20      2154.0
  Pile N.        10          1         10          1          1          2
```



```
  * PILE TOP DISPLACEMENTS, LOCAL *
           DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
          ***********  ***********  ***********  ***********  ***********  ***********
  MINIMUM    2.5177E-04  7.8610E-03  6.3632E-04  4.9221E-05  -6.3065E-06  -3.9699E-04
  Pile N.         1          9          1          1          1          1
  MAXIMUM    3.6045E-03  8.6028E-03  1.0626E-03  4.9221E-05  -6.3065E-06  -3.9699E-04
  Pile N.        10          2         10          1          1          1

  * PILE TOP REACTIONS, LOCAL *
           AXIAL, KN    LAT. y, KN   LAT. z, KN  MOM x, KN- M MOM y, KN- M MOM z, KN- M
          ***********  ***********  ***********  ***********  ***********  ***********
  MINIMUM        367.72      720.13      69.482      6.9880     -358.93      1958.5
  Pile N.         1         10          1          1         10          9
  MAXIMUM        4353.6      779.83      116.50      6.9880     -215.20      2154.0
  Pile N.        10          1         10          1          1          2

  * EFFECTS FOR LATERALLY LOADED PILE *

 PILE     DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR  SOIL REACT SOIL REACT      TOTAL
          y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS
              M          M      KN- M      KN- M         KN         KN      KN/ M      KN/ M   KN/ M**2
 ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
**********
   Min. -9.4370E-05 -1.2245E-05    -2154.0    -358.93    -385.82    -52.721    -177.83    -25.193     325.13
 Pile N.      5          8          2         10          5         10          3          4          1
   Max.  8.6028E-03  1.0626E-03     903.22     128.43     779.86     116.56     857.60     125.79  1.6335E+04
 Pile N.      2         10         12         10          1         10          5         15          2
```

LOAD CASE : 3

* TABLE L * COMPUTATION ON PILE CAP

```
 * EQUIVALENT CONCENTRATED LOAD AT ORIGIN *
    LOAD X, KN     LOAD Y, KN     LOAD Z, KN    MOM X, KN- M   MOM Y, KN- M   MOM Z, KN- M
       28598.9        7612.80        2682.47        7299.22        14297.1       -28071.2

 * DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *
     DISP X, M      DISP Y, M      DISP Z, M      ROT X,RAD      ROT Y,RAD      ROT Z,RAD
  1.39629E-03    5.46477E-03   1.70702E-03    1.25894E-04    2.38355E-05   -2.72618E-04

  * PILE TOP DISPLACEMENTS, GLOBAL *
           DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
          ***********  ***********  ***********  ***********  ***********  ***********
  MINIMUM    5.3976E-05  4.5160E-03  1.1618E-03  1.2589E-04   2.3835E-05  -2.7262E-04
  Pile N.         1          9          1          1          1          1
  MAXIMUM    2.7386E-03  6.4135E-03  2.2522E-03  1.2589E-04   2.3835E-05  -2.7262E-04
  Pile N.        10          2         10          1          1          1

  * PILE TOP REACTIONS, GLOBAL *
          FOR. X, KN   FOR. Y, KN   FOR. Z, KN  MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
          ***********  ***********  ***********  ***********  ***********  ***********
  MINIMUM        78.835      406.49      119.15      17.873     -709.86      1071.8
  Pile N.         1          9          1          1         10          9
  MAXIMUM        3658.9      607.28      238.49      17.873     -346.16      1681.6
  Pile N.        10          2         10          1          1          2

  * PILE TOP DISPLACEMENTS, LOCAL *
           DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
          ***********  ***********  ***********  ***********  ***********  ***********
```



```
  MINIMUM    5.3976E-05  4.5160E-03  1.1618E-03  1.2589E-04   2.3835E-05  -2.7262E-04
  Pile N.         1          9          1          1          1          1
  MAXIMUM    2.7386E-03  6.4135E-03  2.2522E-03  1.2589E-04   2.3835E-05  -2.7262E-04
  Pile N.        10          2         10          1          1          1

  * PILE TOP REACTIONS, LOCAL *
           AXIAL, KN    LAT. y, KN   LAT. z, KN  MOM x, KN- M MOM y, KN- M MOM z, KN- M
          ***********  ***********  ***********  ***********  ***********  ***********
  MINIMUM        78.835      406.49      119.15      17.873     -709.86      1071.8
  Pile N.         1          9          1          1         10          9
  MAXIMUM        3658.9      607.28      238.49      17.873     -346.16      1681.6
  Pile N.        10          2         10          1          1          2

  * EFFECTS FOR LATERALLY LOADED PILE *

 PILE     DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR  SOIL REACT SOIL REACT      TOTAL
          y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS
              M          M      KN- M      KN- M         KN         KN      KN/ M      KN/ M   KN/ M**2
 ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
**********
   Min. -6.1604E-05 -2.0101E-05    -1681.6    -709.86    -300.67    -112.52    -115.82    -45.294     69.705
 Pile N.      3          8          2         10          3         10          1          6          1
   Max.  6.4135E-03  2.2522E-03     699.53     272.90     607.45     238.59     637.28     156.21  1.2993E+04
 Pile N.      2         10          2         10          2         10          3          3          2
```

LOAD CASE : 4

* TABLE L * COMPUTATION ON PILE CAP

```
 * EQUIVALENT CONCENTRATED LOAD AT ORIGIN *
    LOAD X, KN     LOAD Y, KN     LOAD Z, KN    MOM X, KN- M   MOM Y, KN- M   MOM Z, KN- M
       25830.5        7174.56       -1133.53       -4834.41       -10011.6       -23623.9

 * DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *
     DISP X, M      DISP Y, M      DISP Z, M      ROT X,RAD      ROT Y,RAD      ROT Z,RAD
  1.25618E-03    5.12394E-03  -8.17904E-04   -8.29619E-05   -4.26872E-05   -2.53328E-04

  * PILE TOP DISPLACEMENTS, GLOBAL *
           DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
          ***********  ***********  ***********  ***********  ***********  ***********
  MINIMUM    2.1749E-04  4.4988E-03 -1.1772E-03 -8.2962E-05  -4.2687E-05  -2.5333E-04
  Pile N.         9          2         10          1          1          1
  MAXIMUM    2.2949E-03  5.7491E-03 -4.5864E-04 -8.2962E-05  -4.2687E-05  -2.5333E-04
  Pile N.         2          9          1          1          1          1

  * PILE TOP REACTIONS, GLOBAL *
          FOR. X, KN   FOR. Y, KN   FOR. Z, KN  MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
          ***********  ***********  ***********  ***********  ***********  ***********
  MINIMUM        317.66      409.86     -114.56     -11.778      84.859      1096.2
  Pile N.         9          2         10          1          1          2
  MAXIMUM        3097.5      547.08     -36.316     -11.778      322.45      1507.2
  Pile N.         2          9          1          1         10          9

  * PILE TOP DISPLACEMENTS, LOCAL *
           DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
          ***********  ***********  ***********  ***********  ***********  ***********
  MINIMUM    2.1749E-04  4.4988E-03 -1.1772E-03 -8.2962E-05  -4.2687E-05  -2.5333E-04
  Pile N.         9          2         10          1          1          1
  MAXIMUM    2.2949E-03  5.7491E-03 -4.5864E-04 -8.2962E-05  -4.2687E-05  -2.5333E-04
  Pile N.         2          9          1          1          1          1
```

* PILE TOP REACTIONS, LOCAL *

	AXIAL, KN	LAT. y, KN	LAT. z, KN	MOM x, KN- M	MOM y, KN- M	MOM z, KN- M
MINIMUM	317.66	409.86	-114.56	-11.778	84.859	1096.2
Pile N.	9	2	10	1	1	2
MAXIMUM	3097.5	547.08	-36.316	-11.778	322.45	1507.2
Pile N.	2	9	1	1	10	9

* EFFECTS FOR LATERALLY LOADED PILE *

PILE	DISPL. y-DIR M	DISPL. z-DIR M	MOMENT z-DIR KN- M	MOMENT y-DIR KN- M	SHEAR y-DIR KN	SHEAR z-DIR KN	SOIL REACT y-DIR KN/ M	SOIL REACT z-DIR KN/ M	TOTAL STRESS KN/ M**2
Min.	-5.7723E-05	-1.1772E-03	-1507.2	-133.62	-289.01	-114.59	-101.20	-60.108	280.87
Pile N.	9	10	9	10	9	10	10	10	9
Max.	5.7491E-03	1.0743E-05	646.31	322.45	547.10	53.912	549.72	21.815	1.1416E+04
Pile N.	9	10	9	10	9	10	9	10	10

LOAD CASE : 5

* TABLE L * COMPUTATION ON PILE CAP

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

LOAD X, KN	LOAD Y, KN	LOAD Z, KN	MOM X, KN- M	MOM Y, KN- M	MOM Z, KN- M
32499.7	7965.65	931.431	1735.38	1713.83	-43655.9

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

DISP X, M	DISP Y, M	DISP Z, M	ROT X,RAD	ROT Y,RAD	ROT Z,RAD
1.64160E-03	6.02660E-03	5.19507E-04	2.98629E-05	-1.59041E-05	-3.87141E-04

* PILE TOP DISPLACEMENTS, GLOBAL *

	DISP. X, M	DISP. Y, M	DISP. Z, M	ROT. X,RAD	ROT. Y,RAD	ROT. Z,RAD
MINIMUM	7.3011E-05	5.8016E-03	3.9019E-04	2.9863E-05	-1.5904E-05	-3.8714E-04
Pile N.	1	9	1	1	1	1
MAXIMUM	3.2102E-03	6.2517E-03	6.4883E-04	2.9863E-05	-1.5904E-05	-3.8714E-04
Pile N.	10	2	10	1	1	1

* PILE TOP REACTIONS, GLOBAL *

	FOR. X, KN	FOR. Y, KN	FOR. Z, KN	MOM X, KN- M	MOM Y, KN- M	MOM Z, KN- M
MINIMUM	106.64	507.71	48.071	4.2397	-240.34	1309.9
Pile N.	1	10	1	1	10	9
MAXIMUM	4037.3	554.77	76.133	4.2397	-154.76	1455.6
Pile N.	10	1	10	1	1	2

* PILE TOP DISPLACEMENTS, LOCAL *

	DISP. x, M	DISP. y, M	DISP. z, M	ROT. x,RAD	ROT. y,RAD	ROT. z,RAD
MINIMUM	7.3011E-05	5.8016E-03	3.9019E-04	2.9863E-05	-1.5904E-05	-3.8714E-04
Pile N.	1	9	1	1	1	1
MAXIMUM	3.2102E-03	6.2517E-03	6.4883E-04	2.9863E-05	-1.5904E-05	-3.8714E-04
Pile N.	10	2	10	1	1	1

* PILE TOP REACTIONS, LOCAL *

	AXIAL, KN	LAT. y, KN	LAT. z, KN	MOM x, KN- M	MOM y, KN- M	MOM z, KN- M

MINIMUM	106.64	507.71	48.071	4.2397	-240.34	1309.9
Pile N.	1	10	1	1	10	9
MAXIMUM	4037.3	554.77	76.133	4.2397	-154.76	1455.6
Pile N.	10	1	10	1	1	2

* EFFECTS FOR LATERALLY LOADED PILE *

PILE	DISPL. y-DIR M	DISPL. z-DIR M	MOMENT z-DIR KN- M	MOMENT y-DIR KN- M	SHEAR y-DIR KN	SHEAR z-DIR KN	SOIL REACT y-DIR KN/ M	SOIL REACT z-DIR KN/ M	TOTAL STRESS KN/ M**2
Min.	-5.5095E-05	-6.4705E-06	-1455.6	-240.34	-277.44	-35.108	-123.66	-17.622	94.287
Pile N.	1	10	2	10	1	10	2	2	1
Max.	6.2516E-03	6.5048E-04	668.21	83.951	554.77	76.170	396.84	48.523	1.2002E+04
Pile N.	2	10	1	10	1	10	1	10	2

LOAD CASE : 6

* TABLE L * COMPUTATION ON PILE CAP

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

LOAD X, KN	LOAD Y, KN	LOAD Z, KN	MOM X, KN- M	MOM Y, KN- M	MOM Z, KN- M
25809.7	7527.41	931.431	1601.78	3436.60	-21546.4

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

DISP X, M	DISP Y, M	DISP Z, M	ROT X,RAD	ROT Y,RAD	ROT Z,RAD
1.25305E-03	5.30377E-03	5.50901E-04	2.72109E-05	-4.98268E-06	-2.40980E-04

* PILE TOP DISPLACEMENTS, GLOBAL *

	DISP. X, M	DISP. Y, M	DISP. Z, M	ROT. X,RAD	ROT. Y,RAD	ROT. Z,RAD
MINIMUM	2.4330E-04	5.0987E-03	4.3306E-04	2.7211E-05	-4.9827E-06	-2.4098E-04
Pile N.	1	9	1	1	1	1
MAXIMUM	2.2628E-03	5.5088E-03	6.6874E-04	2.7211E-05	-4.9827E-06	-2.4098E-04
Pile N.	10	2	10	1	1	1

* PILE TOP REACTIONS, GLOBAL *

	FOR. X, KN	FOR. Y, KN	FOR. Z, KN	MOM X, KN- M	MOM Y, KN- M	MOM Z, KN- M
MINIMUM	355.36	480.16	49.268	3.8632	-230.27	1311.9
Pile N.	1	9	1	1	10	9
MAXIMUM	3055.4	523.55	74.935	3.8632	-152.16	1448.6
Pile N.	10	2	10	1	1	2

* PILE TOP DISPLACEMENTS, LOCAL *

	DISP. x, M	DISP. y, M	DISP. z, M	ROT. x,RAD	ROT. y,RAD	ROT. z,RAD
MINIMUM	2.4330E-04	5.0987E-03	4.3306E-04	2.7211E-05	-4.9827E-06	-2.4098E-04
Pile N.	1	9	1	1	1	1
MAXIMUM	2.2628E-03	5.5088E-03	6.6874E-04	2.7211E-05	-4.9827E-06	-2.4098E-04
Pile N.	10	2	10	1	1	1

* PILE TOP REACTIONS, LOCAL *

	AXIAL, KN	LAT. y, KN	LAT. z, KN	MOM x, KN- M	MOM y, KN- M	MOM z, KN- M
MINIMUM	355.36	480.16	49.268	3.8632	-230.27	1311.9
Pile N.	1	9	1	1	10	9
MAXIMUM	3055.4	523.55	74.935	3.8632	-152.16	1448.6
Pile N.	10	2	10	1	1	2

* EFFECTS FOR LATERALLY LOADED PILE *

PILE	DISPL. y-DIR M	DISPL. z-DIR M	MOMENT z-DIR KN- M	MOMENT y-DIR KN- M	SHEAR y-DIR KN	SHEAR z-DIR KN	SOIL REACT y-DIR KN/ M	SOIL REACT z-DIR KN/ M	TOTAL STRESS KN/ M**2
Min.	-5.6866E-05	-7.4000E-06	-1448.6	-230.27	-289.11	-37.941	-99.142	-13.080	314.20
Pile N.	11	2	2	10	11	2	11	2	1
Max.	5.5088E-03	6.6874E-04	622.98	84.673	523.69	74.961	603.20	87.433	1.0999E+04
Pile N.	2	10	2	10	2	10	11	2	2

16.2 Pila tipo 1: allegati *GROUP v2016*

===

GROUP for Windows, Version 2016.10.11

Serial Number : 197566553

Analysis of A Group of Piles
Subjected to Axial and Lateral Loading

===

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Name of output echo file : pila 2 - 11 D1200 L=27m_R00.gp10e
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Name of plot output file : pila 2 - 11 D1200 L=27m_R00.gp10p
Name of runtime file : pila 2 - 11 D1200 L=27m_R00.gp10r

Time and Date of Analysis

Date: November 02, 2020 Time: 10:43:17

***** INPUT INFORMATION *****

New Group

ANALYSIS TYPE = 3D ANALYSIS

ADJUST DEPTH FOR BATTER PILES

GENERATE LOAD-DISP (AND T-R) CURVES BASED ON SOIL PROFILE

EXTEND INTERPOLATION FOR L-DP (AND T-R) CURVES

UNITS SYSTEM = METR

* TABLE B * PILE CAP OPTIONS

LENGTH,YY (M) = 8.600
WIDTH, ZZ (M) = 13.20
THICKNESS,XX (M) = 2.000

* PILE CAP DIMENSIONS ARE NOT CONSIDERED
FOR THE PILE GROUP ANALYSIS

* TABLE C * LOAD AND CONTROL PARAMETERS

** LOAD CASES **

NUMBER OF LOAD CASES : 6

LOAD CASE : 1
CASE NAME : R statico MAX
LOAD TYPE : Dead, DL
SCALE FACTOR : 1.0000

* CONCENTRATED LOADS *

NL	VERT.LOAD	HR.LOAD Y	HR.LOAD Z	MOMENT X	MOMENT Y	MOMENT Z	COORD X	COORD Y	COORD Z
	KN	KN	KN	KN- M	KN- M	KN- M	M	M	M
1	1.49E+04	1.16E+03	7.80E+02	0.00	0.00	0.00	-9.40	0.00	2.50
2	1.44E+04	1.17E+03	0.00	0.00	0.00	0.00	-9.40	0.00	-2.50
3	1.03E+04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VER.LOAD X, KN	HOR.LOAD Y, KN	HOR.LOAD Z, KN
39544.7	2328.56	780.000

MOMENT X, KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
11.2875	8589.75	-21888.4

* THE LOADING IS STATIC *

* CONTROL PARAMETERS *
TOLERANCE ON CONVERGENCE OF PILE CAP MOVEMENT = 1.00000E-04
TOLERANCE ON DETERMINATION OF PILE DEFLECTIONS = 1.00000E-04 M
MAX NO OF ITERATIONS ALLOWED FOR FOUNDATION ANALYSIS = 100
MAXIMUM NO OF ITERATIONS ALLOWED FOR PILE ANALYSIS = 100
FACTOR TO APPLY THE LOAD IN INCREMENTS = 1.0000
MINIMUM FACTOR FOR LOAD INCREMENTS = 1.0000
PRINT RESULTS ONLY AT PILE CAP

LOAD CASE : 2
CASE NAME : R statico MIN
LOAD TYPE : Dead, DL
SCALE FACTOR : 1.0000

* CONCENTRATED LOADS *

NL	VERT.LOAD	HR.LOAD Y	HR.LOAD Z	MOMENT X	MOMENT Y	MOMENT Z	COORD X	COORD Y	COORD Z
	KN	KN	KN	KN- M	KN- M	KN- M	M	M	M
1	6.34E+03	-9.75E+02	7.80E+02	0.00	0.00	0.00	-9.40	0.00	2.50
2	5.96E+03	-9.49E+02	0.00	0.00	0.00	0.00	-9.40	0.00	-2.50
3	1.03E+04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VER.LOAD X, KN	HOR.LOAD Y, KN	HOR.LOAD Z, KN
22561.7	-1923.55	780.000

MOMENT X, KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
63.7125	8289.75	18081.4

* THE LOADING IS STATIC *

* CONTROL PARAMETERS *
TOLERANCE ON CONVERGENCE OF PILE CAP MOVEMENT = 1.00000E-04
TOLERANCE ON DETERMINATION OF PILE DEFLECTIONS = 1.00000E-04 M
MAX NO OF ITERATIONS ALLOWED FOR FOUNDATION ANALYSIS = 100
MAXIMUM NO OF ITERATIONS ALLOWED FOR PILE ANALYSIS = 100
FACTOR TO APPLY THE LOAD IN INCREMENTS = 1.0000
MINIMUM FACTOR FOR LOAD INCREMENTS = 1.0000
PRINT RESULTS ONLY AT PILE CAP

LOAD CASE : 3
CASE NAME : R sismico MAX
LOAD TYPE : Dead, DL
SCALE FACTOR : 1.0000

* CONCENTRATED LOADS *

NL	VERT.LOAD	HR.LOAD Y	HR.LOAD Z	MOMENT X	MOMENT Y	MOMENT Z	COORD X	COORD Y	COORD Z
	KN	KN	KN	KN- M	KN- M	KN- M	M	M	M
1	5.88E+03	3.05E+03	3.21E+03	0.00	0.00	0.00	-9.40	0.00	2.50
2	5.73E+03	3.04E+03	0.00	0.00	0.00	0.00	-9.40	0.00	-2.50
3	7.60E+03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VER.LOAD X, KN	HOR.LOAD Y, KN	HOR.LOAD Z, KN
19211.0	6098.37	3210.00

MOMENT X, KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
-27.4750	30529.0	-57324.7

* THE LOADING IS STATIC *

* CONTROL PARAMETERS *
TOLERANCE ON CONVERGENCE OF PILE CAP MOVEMENT = 1.00000E-04
TOLERANCE ON DETERMINATION OF PILE DEFLECTIONS = 1.00000E-04 M

MAX NO OF ITERATIONS ALLOWED FOR FOUNDATION ANALYSIS = 100
MAXIMUM NO OF ITERATIONS ALLOWED FOR PILE ANALYSIS = 100
FACTOR TO APPLY THE LOAD IN INCREMENTS = 1.0000
MINIMUM FACTOR FOR LOAD INCREMENTS = 1.0000
PRINT RESULTS ONLY AT PILE CAP

LOAD CASE : 4
CASE NAME : R sismico MIN
LOAD TYPE : Dead, DL
SCALE FACTOR : 1.0000

* CONCENTRATED LOADS *

NL	VERT.LOAD	HR.LOAD Y	HR.LOAD Z	MOMENT X	MOMENT Y	MOMENT Z	COORD X	COORD Y	COORD Z
	KN	KN	KN	KN- M	KN- M	KN- M	M	M	M
1	4.94E+03	-3.05E+03	-3.21E+03	0.00	0.00	0.00	-9.40	0.00	2.50
2	4.81E+03	-3.04E+03	0.00	0.00	0.00	0.00	-9.40	0.00	-2.50
3	7.60E+03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VER.LOAD X, KN	HOR.LOAD Y, KN	HOR.LOAD Z, KN
17349.0	-6098.37	-3210.00

MOMENT X, KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
27.4750	-29864.0	57324.7

* THE LOADING IS STATIC *

* CONTROL PARAMETERS *
TOLERANCE ON CONVERGENCE OF PILE CAP MOVEMENT = 1.00000E-04
TOLERANCE ON DETERMINATION OF PILE DEFLECTIONS = 1.00000E-04 M
MAX NO OF ITERATIONS ALLOWED FOR FOUNDATION ANALYSIS = 100
MAXIMUM NO OF ITERATIONS ALLOWED FOR PILE ANALYSIS = 100
FACTOR TO APPLY THE LOAD IN INCREMENTS = 1.0000
MINIMUM FACTOR FOR LOAD INCREMENTS = 1.0000
PRINT RESULTS ONLY AT PILE CAP

LOAD CASE : 5
CASE NAME : SLE statico MAX
LOAD TYPE : Dead, DL
SCALE FACTOR : 1.0000

* CONCENTRATED LOADS *

NL	VERT.LOAD	HR.LOAD Y	HR.LOAD Z	MOMENT X	MOMENT Y	MOMENT Z	COORD X	COORD Y	COORD Z
	KN	KN	KN	KN- M	KN- M	KN- M	M	M	M
1	1.07E+04	8.20E+02	5.20E+02	0.00	0.00	0.00	-9.40	0.00	2.50
2	1.04E+04	8.23E+02	0.00	0.00	0.00	0.00	-9.40	0.00	-2.50
3	7.60E+03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VER.LOAD X, KN HOR.LOAD Y, KN HOR.LOAD Z, KN

28695.0 1642.37 520.000

MOMENT X, KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
7.52500	5733.00	-15438.3

* THE LOADING IS STATIC *

* CONTROL PARAMETERS *
TOLERANCE ON CONVERGENCE OF PILE CAP MOVEMENT = 1.00000E-04
TOLERANCE ON DETERMINATION OF PILE DEFLECTIONS = 1.00000E-04 M
MAX NO OF ITERATIONS ALLOWED FOR FOUNDATION ANALYSIS = 100
MAXIMUM NO OF ITERATIONS ALLOWED FOR PILE ANALYSIS = 100
FACTOR TO APPLY THE LOAD IN INCREMENTS = 1.0000
MINIMUM FACTOR FOR LOAD INCREMENTS = 1.0000
PRINT RESULTS ONLY AT PILE CAP

LOAD CASE : 6
CASE NAME : SLE statico MIN
LOAD TYPE : Dead, DL
SCALE FACTOR : 1.0000

* CONCENTRATED LOADS *

NL	VERT.LOAD KN	HR.LOAD Y KN	HR.LOAD Z KN	MOMENT X KN- M	MOMENT Y KN- M	MOMENT Z KN- M	COORD X M	COORD Y M	COORD Z M
1	4.54E+03	-6.95E+02	5.20E+02	0.00	0.00	0.00	-9.40	0.00	2.50
2	4.27E+03	-6.78E+02	0.00	0.00	0.00	0.00	-9.40	0.00	-2.50
3	7.60E+03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VER.LOAD X, KN	HOR.LOAD Y, KN	HOR.LOAD Z, KN
16410.0	-1372.37	520.000

MOMENT X, KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
42.4750	5545.50	12900.3

* THE LOADING IS STATIC *

* CONTROL PARAMETERS *
TOLERANCE ON CONVERGENCE OF PILE CAP MOVEMENT = 1.00000E-04
TOLERANCE ON DETERMINATION OF PILE DEFLECTIONS = 1.00000E-04 M
MAX NO OF ITERATIONS ALLOWED FOR FOUNDATION ANALYSIS = 100
MAXIMUM NO OF ITERATIONS ALLOWED FOR PILE ANALYSIS = 100
FACTOR TO APPLY THE LOAD IN INCREMENTS = 1.0000
MINIMUM FACTOR FOR LOAD INCREMENTS = 1.0000
PRINT RESULTS ONLY AT PILE CAP

* TABLE D * ARRANGEMENT OF PILE GROUPS

GROUP	CONN.Z-Z	CONN.Y-Y	PILE PROP	P-Y CURVE	L-S CURVE	T-R CURVE	R-F-L SET
1	FIX	FIX	1	0	1 G	1 G	0
2	FIX	FIX	1	0	1 G	1 G	0
3	FIX	FIX	1	0	1 G	1 G	0
4	FIX	FIX	1	0	1 G	1 G	0
5	FIX	FIX	1	0	1 G	1 G	0
6	FIX	FIX	1	0	1 G	1 G	0
7	FIX	FIX	1	0	1 G	1 G	0
8	FIX	FIX	1	0	1 G	1 G	0
9	FIX	FIX	1	0	1 G	1 G	0
10	FIX	FIX	1	0	1 G	1 G	0
11	FIX	FIX	1	0	1 G	1 G	0

GROUP	CorX, M	CorY, M	CorZ, M	ALPHA,DEG	BETA,DEG	THETA,DEG	GROUND, M	SPz, KN- M	SPy, KN- M
1	0.000	3.100	-5.400	0.000	90.00	0.000	0.000	0.000	0.000
2	0.000	-3.100	-5.400	0.000	90.00	0.000	0.000	0.000	0.000
3	0.000	3.100	-1.800	0.000	90.00	0.000	0.000	0.000	0.000
4	0.000	-3.100	-1.800	0.000	90.00	0.000	0.000	0.000	0.000
5	0.000	3.100	1.800	0.000	90.00	0.000	0.000	0.000	0.000
6	0.000	-3.100	1.800	0.000	90.00	0.000	0.000	0.000	0.000
7	0.000	3.100	5.400	0.000	90.00	0.000	0.000	0.000	0.000
8	0.000	-3.100	5.400	0.000	90.00	0.000	0.000	0.000	0.000
9	0.000	0.000	-3.600	0.000	90.00	0.000	0.000	0.000	0.000
10	0.000	0.000	0.000	0.000	90.00	0.000	0.000	0.000	0.000
11	0.000	0.000	3.600	0.000	90.00	0.000	0.000	0.000	0.000

* TABLE E * PILE GEOMETRY AND PROPERTIES
PILE TYPE = 1 - DRIVEN PILE
= 2 - DRILLED SHAFT

PROP	SECTS	INC	PILE TYPE	LENGTH, M
1	1	100	2	27.000

* PILE SECTIONS *

PROP	SECT	FROM, M	TO, M	CROSS SECT
1	1	0.00000	27.0000	1

* PILE CROSS SECTIONS *

CROSS SECTION : 1
SECTION NAME : palo_D1200
TYPE : ELASTIC
CROSS SECTION TYPE : GENERAL SECTION
EQUIVALENT DIAMETER : 1200.00 MM
YOUNG MODULUS : 3.14472E+07 KN/ M**2

* PILE CROSS SECTIONS PROPERTIES *

ELASTIC SECTIONS

SECT	DIAM,MM	AREA,MM**2	Iz,MM**4	Iy,MM**4	GJ, KN- M**2	Mn, KN- M	Vn, KN
1	1200.0	1.1310E+06	1.0179E+11	1.0179E+11	1.3337E+06	0.0000	0.0000

* TABLE F * SOIL DATA

SOILS INFORMATION

GROUND SURFACE = 0.00000 M

2 LAYER(S) OF SOIL

LAYER 1
THE SOIL IS A SAND

		TOP OF LAYER	BOTTOM OF LAYER
X COORDINATE	(M)	0.00000	7.00000
EFFECTIVE UNIT WEIGHT	(KN/ M**3)	10.5000	10.5000
FRICTION ANGLE	(DEGREES)	30.0000	30.0000
P-Y SUBGRADE MODULUS	(KN/ M**3)	9377.12 (K)	9377.12 (K)
ULTIMATE UNIT SIDE FRICTION	(KN/ M**2)	12.6000 (S)	62.6987 (S)
ULTIMATE UNIT TIP RESISTANCE	(KN/ M**2)	0.00000	0.00000

LAYER 2
THE SOIL IS A SOFT CLAY

		TOP OF LAYER	BOTTOM OF LAYER
X COORDINATE	(M)	7.00000	40.0000
EFFECTIVE UNIT WEIGHT	(KN/ M**3)	11.0000	11.0000
UNDRAINED COHESION, C	(KN/ M**2)	200.000	200.000
STRAIN AT 50% STRESS		4.00000E-03 (E)	4.00000E-03 (E)
ULTIMATE UNIT SIDE FRICTION	(KN/ M**2)	110.000 (S)	110.000 (S)
ULTIMATE UNIT TIP RESISTANCE	(KN/ M**2)	1800.00 (T)	1800.00 (T)

Notes : Program estimated values for listed parameters
if zero input values were entered:
(E) STRAIN AT 50% STRESS
(K) P-Y SUBGRADE MODULUS for Static Loading
(S) ULTIMATE UNIT SIDE FRICTION for Drilled Shafts
(T) ULTIMATE UNIT TIP RESISTANCE for Drilled Shafts

* TABLE H * AXIAL LOAD VS DISPLACEMENT

AXIAL LOAD-DISPLACEMENT CURVES GENERATED INTERNALLY

NUM OF CURVES 1

CURVE 1 NUM OF POINTS 19

DISPLACEMENT, M	AXIAL LOAD, KN
-0.0543980	-8168.61
-0.0290631	-8306.55
-0.0165096	-8606.33
-5.79051E-03	-7504.21
-3.61429E-03	-5514.83
-8.07477E-04	-1374.62
-4.03738E-04	-687.311
-8.07477E-05	-137.462
-8.07477E-06	-13.7462
0.00000	0.00000
8.48738E-06	14.5542
8.48738E-05	145.542
4.24369E-04	727.710
8.48738E-04	1455.42
3.77243E-03	5769.77
6.08375E-03	7929.13
0.0173939	9762.92

0.0303011	9936.06
0.0558721	10108.9

* TABLE I * TORS. MOM. VS ANGLE ROT.

TORQUE-ROTATION CURVES GENERATED INTERNALLY

NUM OF CURVES 1

CURVE 1 NUM OF POINTS 19

ROT. ANGLE,Rad.	TORS.MOMEN, KN- M
-0.14206	-4881.00
-0.10077	-4963.41
-0.0810871	-5060.84
-0.0615739	-4961.74
-0.0521971	-4555.00
-0.0267588	-2962.50
-0.0176966	-2178.43
-4.63084E-03	-667.892
-4.66004E-04	-68.2216
0.00000	0.00000
4.66004E-04	68.2216
4.63084E-03	667.892
0.0176966	2178.43
0.0267588	2962.50
0.0521971	4555.00
0.0615739	4961.74
0.0810871	5060.84
0.10077	4963.41
0.14206	4881.00

* TABLE J * MOMENT CURVATURE SETS

USER DEFINED MOMENT CURVATURE

NUM OF SETS : 1

CURVE SET 1 NUM OF CURVES 1

CURVE 1 AXIAL LOAD 0.000E+00 KN

POINT	MOMENT KN- M	CURVATURE RADIAN/ M
1	0.00000	0.00000

```
=======================================================================

        GROUP for Windows, Version 2016.10.11

        Serial Number : 197566553

        Analysis of A Group of Piles
       Subjected to Axial and Lateral Loading
```



```
=======================================================================

---------------------------------------------------------------------------
         Time and Date of Analysis
---------------------------------------------------------------------------

    Date:  November 02, 2020     Time:  10:43:17


      *****    COMPUTATION RESULTS    *****


New Group



      *****    LOAD CASES RESULTS    *****


LOAD CASE :     1
CASE NAME : R statico MAX
LOAD TYPE : Dead, DL


* TABLE L *   COMPUTATION ON PILE CAP


* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *


   VERT. LOAD,  KN    HOR. LOAD Y,  KN    HOR. LOAD Z,  KN
     39544.7          2328.56           780.000

   MOMENT X , KN- M    MOMENT Y, KN- M    MOMENT Z, KN- M
     11.2875          8589.75          -21888.4


* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *


   VERTICAL , M      HORIZONTAL Y, M     HORIZONTAL Z, M
```



```
   2.29864E-03      2.56753E-03      7.54869E-04

   ANGLE ROT. X,RAD    ANGLE ROT. Y,RAD    ANGLE ROT. Z,RAD
   3.71496E-07      4.64883E-05      -2.41826E-04


THE GLOBAL STRUCTURAL COORDINATE SYSTEM
---------------------------------------

 * PILE TOP DISPLACEMENTS *

PILE GROUP   DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
********** *********** *********** *********** *********** *********** ***********
   1     2.7973E-03  2.5695E-03  7.5602E-04  3.7150E-07  4.6488E-05 -2.4183E-04
   2     1.2979E-03  2.5695E-03  7.5372E-04  3.7150E-07  4.6488E-05 -2.4183E-04
   3     2.9646E-03  2.5682E-03  7.5602E-04  3.7150E-07  4.6488E-05 -2.4183E-04
   4     1.4653E-03  2.5682E-03  7.5372E-04  3.7150E-07  4.6488E-05 -2.4183E-04
   5     3.1320E-03  2.5669E-03  7.5602E-04  3.7150E-07  4.6488E-05 -2.4183E-04
   6     1.6327E-03  2.5669E-03  7.5372E-04  3.7150E-07  4.6488E-05 -2.4183E-04
   7     3.2993E-03  2.5655E-03  7.5602E-04  3.7150E-07  4.6488E-05 -2.4183E-04
   8     1.8000E-03  2.5655E-03  7.5372E-04  3.7150E-07  4.6488E-05 -2.4183E-04
   9     2.1313E-03  2.5689E-03  7.5487E-04  3.7150E-07  4.6488E-05 -2.4183E-04
  10     2.2986E-03  2.5675E-03  7.5487E-04  3.7150E-07  4.6488E-05 -2.4183E-04
  11     2.4660E-03  2.5662E-03  7.5487E-04  3.7150E-07  4.6488E-05 -2.4183E-04

 MINIMUM    1.2979E-03  2.5655E-03  7.5372E-04  3.7150E-07  4.6488E-05 -2.4183E-04
 Pile N.      2          7          2          1          1          1
 MAXIMUM    3.2993E-03  2.5695E-03  7.5602E-04  3.7150E-07  4.6488E-05 -2.4183E-04
 Pile N.      7          1          1          1          1          1

 * PILE TOP REACTIONS *

PILE GROUP   FOR. X, KN   FOR. Y, KN   FOR. Z, KN MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
********** *********** *********** *********** *********** *********** ***********
   1      4330.8      211.66      70.965    0.054386     -189.40      504.96
   2      2118.3      212.42      70.925    0.054386     -188.59      504.77
   3      4577.7      211.42      70.941    0.054386     -189.41      504.52
   4      2365.2      212.19      70.901    0.054386     -188.59      504.33
   5      4824.7      211.19      70.917    0.054386     -189.41      504.08
   6      2612.2      211.95      70.877    0.054386     -188.60      503.89
   7      5071.6      210.95      70.893    0.054386     -189.41      503.64
   8      2859.2      211.71      70.853    0.054386     -188.60      503.45
   9      3348.0      211.92      70.933    0.054386     -189.00      504.65
  10      3595.0      211.69      70.909    0.054386     -189.00      504.21
  11      3841.9      211.45      70.885    0.054386     -189.00      503.77

 MINIMUM       2118.3      210.95      70.853    0.054386     -189.41      503.45
 Pile N.         2          7          8          1          3          8
 MAXIMUM       5071.6      212.42      70.965    0.054386     -188.59      504.96
 Pile N.         7          2          1          1          2          1


THE PILE COORDINATE SYSTEM (LOCAL AXES)
---------------------------------------

 * PILE TOP DISPLACEMENTS *

PILE GROUP   DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
********** *********** *********** *********** *********** *********** ***********
   1     2.7973E-03  2.5695E-03  7.5602E-04  3.7150E-07  4.6488E-05 -2.4183E-04
```



```
   2     1.2979E-03  2.5695E-03  7.5372E-04  3.7150E-07  4.6488E-05 -2.4183E-04
   3     2.9646E-03  2.5682E-03  7.5602E-04  3.7150E-07  4.6488E-05 -2.4183E-04
   4     1.4653E-03  2.5682E-03  7.5372E-04  3.7150E-07  4.6488E-05 -2.4183E-04
   5     3.1320E-03  2.5669E-03  7.5602E-04  3.7150E-07  4.6488E-05 -2.4183E-04
   6     1.6327E-03  2.5669E-03  7.5372E-04  3.7150E-07  4.6488E-05 -2.4183E-04
   7     3.2993E-03  2.5655E-03  7.5602E-04  3.7150E-07  4.6488E-05 -2.4183E-04
   8     1.8000E-03  2.5655E-03  7.5372E-04  3.7150E-07  4.6488E-05 -2.4183E-04
   9     2.1313E-03  2.5689E-03  7.5487E-04  3.7150E-07  4.6488E-05 -2.4183E-04
  10     2.2986E-03  2.5675E-03  7.5487E-04  3.7150E-07  4.6488E-05 -2.4183E-04
  11     2.4660E-03  2.5662E-03  7.5487E-04  3.7150E-07  4.6488E-05 -2.4183E-04

 MINIMUM    1.2979E-03  2.5655E-03  7.5372E-04  3.7150E-07  4.6488E-05 -2.4183E-04
 Pile N.      2          7          2          1          1          1
 MAXIMUM    3.2993E-03  2.5695E-03  7.5602E-04  3.7150E-07  4.6488E-05 -2.4183E-04
 Pile N.      7          1          1          1          1          1

 * PILE TOP REACTIONS *

PILE GROUP   AXIAL, KN   LAT. y, KN   LAT. z, KN MOM x, KN- M MOM y, KN- M MOM z, KN- M
********** *********** *********** *********** *********** *********** ***********
   1      4330.8      211.66      70.965    0.054386     -189.40      504.96
   2      2118.3      212.42      70.925    0.054386     -188.59      504.77
   3      4577.7      211.42      70.941    0.054386     -189.41      504.52
   4      2365.2      212.19      70.901    0.054386     -188.59      504.33
   5      4824.7      211.19      70.917    0.054386     -189.41      504.08
   6      2612.2      211.95      70.877    0.054386     -188.60      503.89
   7      5071.6      210.95      70.893    0.054386     -189.41      503.64
   8      2859.2      211.71      70.853    0.054386     -188.60      503.45
   9      3348.0      211.92      70.933    0.054386     -189.00      504.65
  10      3595.0      211.69      70.909    0.054386     -189.00      504.21
  11      3841.9      211.45      70.885    0.054386     -189.00      503.77

 MINIMUM       2118.3      210.95      70.853    0.054386     -189.41      503.45
 Pile N.         2          7          8          1          3          8
 MAXIMUM       5071.6      212.42      70.965    0.054386     -188.59      504.96
 Pile N.         7          2          1          1          2          1

PILE GROUP   STRESS, KN/ M**2
********** ****************
   1        7008.3
   2        5049.3
   3        7224.2
   4        5265.2
   5        7440.2
   6        5481.2
   7        7656.1
   8        5697.1
   9        6136.7
  10        6352.7
  11        6568.6

 MINIMUM       5049.3
 Pile N.         2
 MAXIMUM       7656.1
 Pile N.         7

 * EFFECTS FOR LATERALLY LOADED PILE *

 * MINIMUM VALUES AND LOCATIONS *
```



```
   PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR   SOIL REACT SOIL REACT    TOTAL   FLEX. RIG.
FLEX. RIG.
          y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS      z-DIR      y-DIR
            M          M        KN- M      KN- M        KN         KN       KN/ M      KN/ M    KN/ M**2   KN- M**2   KN- M**2
  ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
    1 -1.5720E-05 -5.0650E-06    -504.96    -189.40    -162.60    -52.778    -74.867    -24.304     3829.2 3.2009E+06
3.2009E+06
   x( M)    9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.600     0.0000     0.0000
    2 -1.5712E-05 -5.0442E-06    -504.77    -188.59    -162.66    -52.602    -74.886    -24.221     1873.0 3.2009E+06
3.2009E+06
   x( M)    9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.600     0.0000     0.0000
    3 -1.5709E-05 -5.0648E-06    -504.52    -189.41    -162.51    -52.783    -74.832    -24.310     4047.6 3.2009E+06
3.2009E+06
   x( M)    9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.600     0.0000     0.0000
    4 -1.5701E-05 -5.0440E-06    -504.33    -188.59    -162.56    -52.607    -74.851    -24.227     2091.3 3.2009E+06
3.2009E+06
   x( M)    9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.600     0.0000     0.0000
    5 -1.5698E-05 -5.0646E-06    -504.08    -189.41    -162.41    -52.789    -74.798    -24.315     4266.0 3.2009E+06
3.2009E+06
   x( M)    9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.600     0.0000     0.0000
    6 -1.5689E-05 -5.0437E-06    -503.89    -188.60    -162.47    -52.612    -74.817    -24.232     2309.7 3.2009E+06
3.2009E+06
   x( M)    9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.600     0.0000     0.0000
    7 -1.5686E-05 -5.0644E-06    -503.64    -189.41    -162.31    -52.794    -74.764    -24.321     4484.3 3.2009E+06
3.2009E+06
   x( M)    9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.600     0.0000     0.0000
    8 -1.5678E-05 -5.0435E-06    -503.45    -188.60    -162.37    -52.617    -74.782    -24.238     2528.1 3.2009E+06
3.2009E+06
   x( M)    9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.600     0.0000     0.0000
    9 -1.5711E-05 -5.0545E-06    -504.65    -189.00    -162.58    -52.692    -74.859    -24.265     2960.3 3.2009E+06
3.2009E+06
   x( M)    9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.600     0.0000     0.0000
   10 -1.5699E-05 -5.0542E-06    -504.21    -189.00    -162.49    -52.698    -74.824    -24.271     3178.6 3.2009E+06
3.2009E+06
   x( M)    9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.600     0.0000     0.0000
   11 -1.5688E-05 -5.0540E-06    -503.77    -189.00    -162.39    -52.703    -74.790    -24.277     3397.0 3.2009E+06
3.2009E+06
   x( M)    9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.600     0.0000     0.0000

   Min. -1.5720E-05 -5.0650E-06    -504.96    -189.41    -162.66    -52.794    -74.886    -24.321     1873.0 3.2009E+06
3.2009E+06
  Pile N.     1          1          1          3          2          7          2          7          2          1          1

   * MAXIMUM VALUES AND LOCATIONS *

   PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR   SOIL REACT SOIL REACT    TOTAL   FLEX. RIG.
FLEX. RIG.
          y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS      z-DIR      y-DIR
            M          M        KN- M      KN- M        KN         KN       KN/ M      KN/ M    KN/ M**2   KN- M**2   KN- M**2
  ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
    1  2.5695E-03  7.5602E-04     324.49     103.58     211.75     71.000     161.51     55.995     7008.3 3.2009E+06
3.2009E+06
   x( M)    0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.8300     7.8300     0.0000     0.0000     0.0000
    2  2.5695E-03  7.5372E-04     324.43     103.18     212.47     70.942     161.30     55.659     5049.3 3.2009E+06
3.2009E+06
   x( M)    0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.8300     7.8300     0.0000     0.0000     0.0000
    3  2.5682E-03  7.5602E-04     324.31     103.59     211.52     70.978     161.45     56.023     7224.2 3.2009E+06
3.2009E+06
```

x(M) 0.0000 0.0000 7.0200 7.0200 0.0000 0.0000 7.8300 7.8300 0.0000 0.0000 0.0000
4 2.5682E-03 7.5372E-04 324.25 103.19 212.24 70.920 161.24 55.687 5265.2 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.0200 0.0000 0.0000 7.8300 7.8300 0.0000 0.0000 0.0000
5 2.5669E-03 7.5602E-04 324.13 103.60 211.29 70.955 161.39 56.051 7440.2 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.0200 0.0000 0.0000 7.8300 7.8300 0.0000 0.0000 0.0000
6 2.5669E-03 7.5372E-04 324.06 103.20 212.00 70.898 161.18 55.715 5481.2 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.0200 0.0000 0.0000 7.8300 7.8300 0.0000 0.0000 0.0000
7 2.5655E-03 7.5602E-04 323.94 103.61 211.06 70.933 161.33 56.079 7656.1 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.0200 0.0000 0.0000 7.8300 7.8300 0.0000 0.0000 0.0000
8 2.5655E-03 7.5372E-04 323.88 103.21 211.77 70.876 161.12 55.743 5697.1 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.0200 0.0000 0.0000 7.8300 7.8300 0.0000 0.0000 0.0000
9 2.5689E-03 7.5487E-04 324.37 103.38 211.99 70.960 161.37 55.841 6136.7 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.0200 0.0000 0.0000 7.8300 7.8300 0.0000 0.0000 0.0000
10 2.5675E-03 7.5487E-04 324.19 103.40 211.76 70.938 161.31 55.869 6352.7 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.0200 0.0000 0.0000 7.8300 7.8300 0.0000 0.0000 0.0000
11 2.5662E-03 7.5487E-04 324.00 103.41 211.53 70.916 161.25 55.897 6568.6 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.0200 0.0000 0.0000 7.8300 7.8300 0.0000 0.0000 0.0000

Max. 2.5695E-03 7.5602E-04 324.49 103.61 212.47 71.000 161.51 56.079 7656.1 3.2009E+06
3.2009E+06
Pile N. 1 1 1 7 2 1 1 7 7 1 1

LOAD CASE : 2
CASE NAME : R statico MIN
LOAD TYPE : Dead, DL

* TABLE L * COMPUTATION ON PILE CAP

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VERT. LOAD, KN HOR. LOAD Y, KN HOR. LOAD Z, KN
22561.7 -1923.55 780.000

MOMENT X , KN- M MOMENT Y, KN- M MOMENT Z, KN- M
63.7125 8289.75 18081.4

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL , M HORIZONTAL Y, M HORIZONTAL Z, M
1.26410E-03 -2.09578E-03 7.39328E-04

ANGLE ROT. X,RAD ANGLE ROT. Y,RAD ANGLE ROT. Z,RAD
2.27821E-06 4.26239E-05 1.94717E-04

THE GLOBAL STRUCTURAL COORDINATE SYSTEM
----

* PILE TOP DISPLACEMENTS *

PILE GROUP DISP. X, M DISP. Y, M DISP. Z, M ROT. X,RAD ROT. Y,RAD ROT. Z,RAD
********** *********** *********** *********** *********** *********** ***********
1 4.3030E-04 -2.0836E-03 7.4639E-04 2.2782E-06 4.2624E-05 1.9472E-04
2 1.6375E-03 -2.0836E-03 7.3226E-04 2.2782E-06 4.2624E-05 1.9472E-04
3 5.8375E-04 -2.0918E-03 7.4639E-04 2.2782E-06 4.2624E-05 1.9472E-04
4 1.7910E-03 -2.0918E-03 7.3226E-04 2.2782E-06 4.2624E-05 1.9472E-04
5 7.3720E-04 -2.1000E-03 7.4639E-04 2.2782E-06 4.2624E-05 1.9472E-04
6 1.9444E-03 -2.1000E-03 7.3226E-04 2.2782E-06 4.2624E-05 1.9472E-04
7 8.9064E-04 -2.1082E-03 7.4639E-04 2.2782E-06 4.2624E-05 1.9472E-04
8 2.0979E-03 -2.1082E-03 7.3226E-04 2.2782E-06 4.2624E-05 1.9472E-04
9 1.1106E-03 -2.0877E-03 7.3933E-04 2.2782E-06 4.2624E-05 1.9472E-04
10 1.2641E-03 -2.0959E-03 7.3933E-04 2.2782E-06 4.2624E-05 1.9472E-04
11 1.4175E-03 -2.1041E-03 7.3933E-04 2.2782E-06 4.2624E-05 1.9472E-04

MINIMUM 4.3030E-04 -2.1082E-03 7.3226E-04 2.2782E-06 4.2624E-05 1.9472E-04
Pile N. 1 7 2 1 1 1
MAXIMUM 2.0979E-03 -2.0836E-03 7.4639E-04 2.2782E-06 4.2624E-05 1.9472E-04
Pile N. 8 1 1 1 1 1

* PILE TOP REACTIONS *

PILE GROUP FOR. X, KN FOR. Y, KN FOR. Z, KN MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
********** *********** *********** *********** *********** *********** ***********
1 737.89 -173.83 71.872 0.3335 -193.31 -413.64
2 2619.4 -173.32 70.045 0.3335 -188.32 -413.81
3 1001.0 -174.69 71.838 0.3335 -193.28 -416.51
4 2845.9 -174.19 70.014 0.3335 -188.30 -416.67
5 1264.1 -175.55 71.803 0.3335 -193.26 -419.37
6 3072.3 -175.06 69.984 0.3335 -188.28 -419.53
7 1517.3 -176.41 71.770 0.3335 -193.24 -422.23
8 3298.7 -175.92 69.954 0.3335 -188.25 -422.39
9 1841.9 -173.99 70.937 0.3335 -190.80 -415.16
10 2068.3 -174.86 70.907 0.3335 -190.78 -418.02
11 2294.8 -175.73 70.876 0.3335 -190.76 -420.88

MINIMUM 737.89 -176.41 69.954 0.3335 -193.31 -422.39
Pile N. 1 7 8 1 1 8
MAXIMUM 3298.7 -173.32 71.872 0.3335 -188.25 -413.64
Pile N. 8 2 1 1 8 1

THE PILE COORDINATE SYSTEM (LOCAL AXES)
----

* PILE TOP DISPLACEMENTS *

PILE GROUP DISP. x, M DISP. y, M DISP. z, M ROT. x,RAD ROT. y,RAD ROT. z,RAD
********** *********** *********** *********** *********** *********** ***********
1 4.3030E-04 -2.0836E-03 7.4639E-04 2.2782E-06 4.2624E-05 1.9472E-04
2 1.6375E-03 -2.0836E-03 7.3226E-04 2.2782E-06 4.2624E-05 1.9472E-04
3 5.8375E-04 -2.0918E-03 7.4639E-04 2.2782E-06 4.2624E-05 1.9472E-04
4 1.7910E-03 -2.0918E-03 7.3226E-04 2.2782E-06 4.2624E-05 1.9472E-04
5 7.3720E-04 -2.1000E-03 7.4639E-04 2.2782E-06 4.2624E-05 1.9472E-04
6 1.9444E-03 -2.1000E-03 7.3226E-04 2.2782E-06 4.2624E-05 1.9472E-04

7 8.9064E-04 -2.1082E-03 7.4639E-04 2.2782E-06 4.2624E-05 1.9472E-04
8 2.0979E-03 -2.1082E-03 7.3226E-04 2.2782E-06 4.2624E-05 1.9472E-04
9 1.1106E-03 -2.0877E-03 7.3933E-04 2.2782E-06 4.2624E-05 1.9472E-04
10 1.2641E-03 -2.0959E-03 7.3933E-04 2.2782E-06 4.2624E-05 1.9472E-04
11 1.4175E-03 -2.1041E-03 7.3933E-04 2.2782E-06 4.2624E-05 1.9472E-04

MINIMUM 4.3030E-04 -2.1082E-03 7.3226E-04 2.2782E-06 4.2624E-05 1.9472E-04
Pile N. 1 7 2 1 1 1
MAXIMUM 2.0979E-03 -2.0836E-03 7.4639E-04 2.2782E-06 4.2624E-05 1.9472E-04
Pile N. 8 1 1 1 1 1

* PILE TOP REACTIONS *

PILE GROUP AXIAL, KN LAT. y, KN LAT. z, KN MOM x, KN- M MOM y, KN- M MOM z, KN- M
********** *********** *********** *********** *********** *********** ***********
1 737.89 -173.83 71.872 0.3335 -193.31 -413.64
2 2619.4 -173.32 70.045 0.3335 -188.32 -413.81
3 1001.0 -174.69 71.838 0.3335 -193.28 -416.51
4 2845.9 -174.19 70.014 0.3335 -188.30 -416.67
5 1264.1 -175.55 71.803 0.3335 -193.26 -419.37
6 3072.3 -175.06 69.984 0.3335 -188.28 -419.53
7 1517.3 -176.41 71.770 0.3335 -193.24 -422.23
8 3298.7 -175.92 69.954 0.3335 -188.25 -422.39
9 1841.9 -173.99 70.937 0.3335 -190.80 -415.16
10 2068.3 -174.86 70.907 0.3335 -190.78 -418.02
11 2294.8 -175.73 70.876 0.3335 -190.76 -420.88

MINIMUM 737.89 -176.41 69.954 0.3335 -193.31 -422.39
Pile N. 1 7 8 1 1 8
MAXIMUM 3298.7 -173.32 71.872 0.3335 -188.25 -413.64
Pile N. 8 2 1 1 8 1

PILE GROUP STRESS, KN/ M**2
********** ****************
1 3343.8
2 4996.1
3 3591.7
4 5211.6
5 3839.6
6 5427.1
7 4078.7
8 5642.6
9 4321.9
10 4537.4
11 4752.9

MINIMUM 3343.8
Pile N. 1
MAXIMUM 5642.6
Pile N. 8

* EFFECTS FOR LATERALLY LOADED PILE *

* MINIMUM VALUES AND LOCATIONS *

PILE DISPL. DISPL. MOMENT MOMENT SHEAR SHEAR SOIL REACT SOIL REACT TOTAL FLEX. RIG.
FLEX. RIG.
y-DIR z-DIR z-DIR y-DIR y-DIR z-DIR y-DIR z-DIR STRESS z-DIR y-DIR
M M KN- M KN- M KN KN KN/ M KN/ M KN/ M**2 KN- M**2 KN- M**2
****** ********** ********** ********** ********** ********** ********** ********** ********** **********

********** ********** **********
1 -2.0836E-03 -4.8874E-06 -267.60 -193.31 -173.84 -54.814 -136.35 -26.058 652.44 3.2009E+06
3.2009E+06
x(M) 0.0000 9.1800 7.0200 0.0000 0.0000 8.3700 7.0200 9.4500 22.140 0.0000 0.0000
2 -2.0836E-03 -4.7792E-06 -267.73 -188.32 -173.36 -53.624 -136.47 -25.506 2316.1 3.2009E+06
3.2009E+06
x(M) 0.0000 9.1800 7.0200 0.0000 0.0000 8.3700 7.0200 9.4500 21.600 0.0000 0.0000
3 -2.0918E-03 -4.8920E-06 -268.81 -193.28 -174.71 -54.768 -136.78 -26.017 885.09 3.2009E+06
3.2009E+06
x(M) 0.0000 9.1800 7.0200 0.0000 0.0000 8.3700 7.0200 9.4500 22.140 0.0000 0.0000
4 -2.0918E-03 -4.7837E-06 -268.93 -188.30 -174.24 -53.579 -136.89 -25.467 2516.3 3.2009E+06
3.2009E+06
x(M) 0.0000 9.1800 7.0200 0.0000 0.0000 8.3700 7.0200 9.4500 21.600 0.0000 0.0000
5 -2.1000E-03 -4.8966E-06 -270.01 -193.26 -175.57 -54.723 -137.20 -25.977 1117.8 3.2009E+06
3.2009E+06
x(M) 0.0000 9.1800 7.0200 0.0000 0.0000 8.3700 7.0200 9.4500 21.870 0.0000 0.0000
6 -2.1000E-03 -4.7882E-06 -270.14 -188.28 -175.11 -53.534 -137.31 -25.427 2716.5 3.2009E+06
3.2009E+06
x(M) 0.0000 9.1800 7.0200 0.0000 0.0000 8.3700 7.0200 9.4500 21.600 0.0000 0.0000
7 -2.1082E-03 -4.9011E-06 -271.22 -193.24 -176.44 -54.677 -137.61 -25.937 1341.5 3.2009E+06
3.2009E+06
x(M) 0.0000 9.1800 7.0200 0.0000 0.0000 8.3700 7.0200 9.4500 21.870 0.0000 0.0000
8 -2.1082E-03 -4.7926E-06 -271.34 -188.25 -175.98 -53.490 -137.73 -25.388 2916.7 3.2009E+06
3.2009E+06
x(M) 0.0000 9.1800 7.0200 0.0000 0.0000 8.3700 7.0200 9.4500 21.600 0.0000 0.0000
9 -2.0877E-03 -4.8355E-06 -268.27 -190.80 -174.03 -54.196 -136.62 -25.762 1628.6 3.2009E+06
3.2009E+06
x(M) 0.0000 9.1800 7.0200 0.0000 0.0000 8.3700 7.0200 9.4500 21.870 0.0000 0.0000
10 -2.0959E-03 -4.8401E-06 -269.47 -190.78 -174.90 -54.151 -137.04 -25.722 1828.8 3.2009E+06
3.2009E+06
x(M) 0.0000 9.1800 7.0200 0.0000 0.0000 8.3700 7.0200 9.4500 21.870 0.0000 0.0000
11 -2.1041E-03 -4.8446E-06 -270.68 -190.76 -175.78 -54.106 -137.46 -25.682 2029.0 3.2009E+06
3.2009E+06
x(M) 0.0000 9.1800 7.0200 0.0000 0.0000 8.3700 7.0200 9.4500 21.870 0.0000 0.0000

Min. -2.1082E-03 -4.9011E-06 -271.34 -193.31 -176.44 -54.814 -137.73 -26.058 652.44 3.2009E+06
3.2009E+06
Pile N. 7 7 8 1 7 1 8 1 1 1 1

* MAXIMUM VALUES AND LOCATIONS *

PILE DISPL. DISPL. MOMENT MOMENT SHEAR SHEAR SOIL REACT SOIL REACT TOTAL FLEX. RIG.
FLEX. RIG.
y-DIR z-DIR z-DIR y-DIR y-DIR z-DIR y-DIR z-DIR STRESS z-DIR y-DIR
M M KN- M KN- M KN KN KN/ M KN/ M KN/ M**2 KN- M**2 KN- M**2
****** ********** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
1 1.2299E-05 7.4639E-04 413.64 104.98 137.09 71.878 65.094 57.491 3343.8 3.2009E+06
3.2009E+06
x(M) 9.1800 0.0000 0.0000 7.0200 8.3700 0.0000 9.4500 7.8300 0.0000 0.0000 0.0000
2 1.2294E-05 7.3227E-04 413.81 102.79 137.11 70.066 65.145 56.307 4996.1 3.2009E+06
3.2009E+06
x(M) 9.1800 0.0000 0.0000 7.0200 8.3700 0.0000 9.4500 7.8300 0.0000 0.0000 0.0000
3 1.2373E-05 7.4639E-04 416.51 104.94 137.67 71.846 65.327 57.413 3591.7 3.2009E+06
3.2009E+06
x(M) 9.1800 0.0000 0.0000 7.0200 8.3700 0.0000 9.4500 7.8300 0.0000 0.0000 0.0000
4 1.2368E-05 7.3227E-04 416.67 102.74 137.70 70.037 65.379 56.227 5211.6 3.2009E+06
3.2009E+06
x(M) 9.1800 0.0000 0.0000 7.0200 8.3700 0.0000 9.4500 7.8300 0.0000 0.0000 0.0000
5 1.2447E-05 7.4639E-04 419.37 104.90 138.26 71.813 65.560 57.334 3839.6 3.2009E+06

```
3.2009E+06
   x( M)    9.1800    0.0000    0.0000    7.0200    8.3700    0.0000    9.4500    7.8300    0.0000    0.0000    0.0000
     6  1.2443E-05  7.3227E-04    419.53    102.70    138.29    70.009    65.612    56.148    5427.1  3.2009E+06
3.2009E+06
   x( M)    9.1800    0.0000    0.0000    7.0200    8.3700    0.0000    9.4500    7.8300    0.0000    0.0000    0.0000
     7  1.2522E-05  7.4639E-04    422.23    104.86    138.84    71.782    65.793    57.256    4078.7  3.2009E+06
3.2009E+06
   x( M)    9.1800    0.0000    0.0000    7.0200    8.3700    0.0000    9.4500    7.8300    0.0000    0.0000    0.0000
     8  1.2517E-05  7.3227E-04    422.39    102.66    138.87    69.980    65.845    56.069    5642.6  3.2009E+06
3.2009E+06
   x( M)    9.1800    0.0000    0.0000    7.0200    8.3700    0.0000    9.4500    7.8300    0.0000    0.0000    0.0000
     9  1.2334E-05  7.3933E-04    415.16    103.86    137.39    70.952    65.236    56.863    4321.9  3.2009E+06
3.2009E+06
   x( M)    9.1800    0.0000    0.0000    7.0200    8.3700    0.0000    9.4500    7.8300    0.0000    0.0000    0.0000
    10  1.2408E-05  7.3933E-04    418.02    103.82    137.98    70.923    65.470    56.783    4537.4  3.2009E+06
3.2009E+06
   x( M)    9.1800    0.0000    0.0000    7.0200    8.3700    0.0000    9.4500    7.8300    0.0000    0.0000    0.0000
    11  1.2482E-05  7.3933E-04    420.88    103.78    138.56    70.895    65.703    56.704    4752.9  3.2009E+06
3.2009E+06
   x( M)    9.1800    0.0000    0.0000    7.0200    8.3700    0.0000    9.4500    7.8300    0.0000    0.0000    0.0000

    Max.  1.2522E-05  7.4639E-04    422.39    104.98    138.87    71.878    65.845    57.491    5642.6  3.2009E+06
3.2009E+06
  Pile N.     7         1         8         1         8         1         8         1         8         1         1


   LOAD CASE :    3
   CASE NAME : R sismico MAX
   LOAD TYPE : Dead, DL


   * TABLE L *   COMPUTATION ON PILE CAP


   * EQUIVALENT CONCENTRATED LOAD AT ORIGIN *


      VERT. LOAD,  KN    HOR. LOAD Y,  KN   HOR. LOAD Z,  KN
          19211.0          6098.37           3210.00

     MOMENT X , KN- M    MOMENT Y, KN- M    MOMENT Z, KN- M
         -27.4750          30529.0          -57324.7


   * DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *


      VERTICAL , M      HORIZONTAL Y, M     HORIZONTAL Z, M
       1.13091E-03       6.82589E-03       3.13219E-03

     ANGLE ROT. X,RAD    ANGLE ROT. Y,RAD    ANGLE ROT. Z,RAD
      -1.22588E-06       1.65398E-04      -6.02391E-04


    THE GLOBAL STRUCTURAL COORDINATE SYSTEM
    ---------------------------------------

    * PILE TOP DISPLACEMENTS *
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  PILE GROUP   DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
  **********  ***********  ***********  ***********  ***********  ***********  ***********
     1      2.1052E-03  6.8193E-03  3.1284E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
     2     -1.6297E-03  6.8193E-03  3.1360E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
     3      2.7006E-03  6.8237E-03  3.1284E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
     4     -1.0342E-03  6.8237E-03  3.1360E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
     5      3.2960E-03  6.8281E-03  3.1284E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
     6     -4.3879E-04  6.8281E-03  3.1360E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
     7      3.8915E-03  6.8325E-03  3.1284E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
     8      1.5664E-04  6.8325E-03  3.1360E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
     9      5.3547E-04  6.8215E-03  3.1322E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
    10      1.1309E-03  6.8259E-03  3.1322E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
    11      1.7263E-03  6.8303E-03  3.1322E-03 -1.2259E-06  1.6540E-04 -6.0239E-04

   MINIMUM   -1.6297E-03  6.8193E-03  3.1284E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
   Pile N.       2          1          1          1          1          1
   MAXIMUM    3.8915E-03  6.8325E-03  3.1360E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
   Pile N.       7          7          2          1          1          1

   * PILE TOP REACTIONS *

  PILE GROUP   FOR. X, KN   FOR. Y, KN   FOR. Z, KN MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
  **********  ***********  ***********  ***********  ***********  ***********  ***********
     1        3309.5     552.35     290.79    -0.1795    -788.70     1330.8
     2       -2587.4     557.46     294.01    -0.1795    -791.14     1329.2
     3        4188.1     552.05     290.42    -0.1795    -788.69     1332.5
     4       -1709.1     557.16     293.64    -0.1795    -791.13     1330.8
     5        5066.8     551.75     290.05    -0.1795    -788.68     1334.2
     6       -746.98     556.79     293.24    -0.1795    -791.12     1332.6
     7        5881.0     551.51     289.71    -0.1795    -788.67     1335.9
     8        268.62     556.38     292.82    -0.1795    -791.11     1334.3
     9        918.23     554.65     292.16    -0.1795    -789.91     1330.9
    10        1871.8     554.29     291.77    -0.1795    -789.90     1332.6
    11        2750.5     553.99     291.40    -0.1795    -789.90     1334.3

   MINIMUM      -2587.4     551.51     289.71    -0.1795    -791.14     1329.2
   Pile N.       2          7          7          1          2          2
   MAXIMUM       5881.0     557.46     294.01    -0.1795    -788.67     1335.9
   Pile N.       7          2          2          1          7          7


   THE PILE COORDINATE SYSTEM (LOCAL AXES)
   ---------------------------------------

   * PILE TOP DISPLACEMENTS *

  PILE GROUP   DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
  **********  ***********  ***********  ***********  ***********  ***********  ***********
     1      2.1052E-03  6.8193E-03  3.1284E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
     2     -1.6297E-03  6.8193E-03  3.1360E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
     3      2.7006E-03  6.8237E-03  3.1284E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
     4     -1.0342E-03  6.8237E-03  3.1360E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
     5      3.2960E-03  6.8281E-03  3.1284E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
     6     -4.3879E-04  6.8281E-03  3.1360E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
     7      3.8915E-03  6.8325E-03  3.1284E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
     8      1.5664E-04  6.8325E-03  3.1360E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
     9      5.3547E-04  6.8215E-03  3.1322E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
    10      1.1309E-03  6.8259E-03  3.1322E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
    11      1.7263E-03  6.8303E-03  3.1322E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
```



```
   MINIMUM   -1.6297E-03  6.8193E-03  3.1284E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
   Pile N.       2          1          1          1          1          1
   MAXIMUM    3.8915E-03  6.8325E-03  3.1360E-03 -1.2259E-06  1.6540E-04 -6.0239E-04
   Pile N.       7          7          2          1          1          1

   * PILE TOP REACTIONS *

  PILE GROUP   AXIAL, KN    LAT. y, KN   LAT. z, KN MOM x, KN- M MOM y, KN- M MOM z, KN- M
  **********  ***********  ***********  ***********  ***********  ***********  ***********
     1        3309.5     552.35     290.79    -0.1795    -788.70     1330.8
     2       -2587.4     557.46     294.01    -0.1795    -791.14     1329.2
     3        4188.1     552.05     290.42    -0.1795    -788.69     1332.5
     4       -1709.1     557.16     293.64    -0.1795    -791.13     1330.8
     5        5066.8     551.75     290.05    -0.1795    -788.68     1334.2
     6       -746.98     556.79     293.24    -0.1795    -791.12     1332.6
     7        5881.0     551.51     289.71    -0.1795    -788.67     1335.9
     8        268.62     556.38     292.82    -0.1795    -791.11     1334.3
     9        918.23     554.65     292.16    -0.1795    -789.91     1330.9
    10        1871.8     554.29     291.77    -0.1795    -789.90     1332.6
    11        2750.5     553.99     291.40    -0.1795    -789.90     1334.3

   MINIMUM      -2587.4     551.51     289.71    -0.1795    -791.14     1329.2
   Pile N.       2          7          7          1          2          2
   MAXIMUM       5881.0     557.46     294.01    -0.1795    -788.67     1335.9
   Pile N.       7          2          2          1          7          7

  PILE GROUP   STRESS, KN/ M**2
  **********  ****************
     1      1.2045E+04
     2      1.1406E+04
     3      1.2830E+04
     4      1.0637E+04
     5      1.3616E+04
     6        9795.3
     7      1.4344E+04
     8        9381.1
     9        9934.6
    10      1.0786E+04
    11      1.1572E+04

   MINIMUM       9381.1
   Pile N.       8
   MAXIMUM    1.4344E+04
   Pile N.       7

   * EFFECTS FOR LATERALLY LOADED PILE *

   * MINIMUM VALUES AND LOCATIONS *

  PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR   SOIL REACT  SOIL REACT    TOTAL    FLEX. RIG.
FLEX. RIG.
         y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS      z-DIR      y-DIR
           M          M        KN- M      KN- M        KN         KN       KN/ M      KN/ M    KN/ M**2   KN- M**2   KN- M**2
 ****** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
     1 -4.4586E-05 -2.2244E-05    -1330.8    -788.70    -295.10    -150.60    -122.73    -64.831     2926.2  3.2009E+06
3.2009E+06
   x( M)    9.7200    9.7200    0.0000    0.0000    8.9100    8.9100    11.880    11.880    19.440    0.0000    0.0000
     2 -4.4277E-05 -2.2133E-05    -1329.2    -791.14    -294.34    -150.52    -119.32    -63.128     2287.8  3.2009E+06
```



```
3.2009E+06
   x( M)    9.7200    9.7200    0.0000    0.0000    8.9100    8.9100    11.880    11.880    19.440    0.0000    0.0000
     3 -4.4670E-05 -2.2270E-05    -1332.5    -788.69    -295.40    -150.64    -123.30    -65.088     3703.1  3.2009E+06
3.2009E+06
   x( M)    9.7200    9.7200    0.0000    0.0000    8.9100    8.9100    11.880    11.880    19.440    0.0000    0.0000
     4 -4.4357E-05 -2.2157E-05    -1330.8    -791.13    -294.63    -150.56    -119.86    -63.371     1511.2  3.2009E+06
3.2009E+06
   x( M)    9.7200    9.7200    0.0000    0.0000    8.9100    8.9100    11.880    11.880    19.440    0.0000    0.0000
     5 -4.4754E-05 -2.2296E-05    -1334.2    -788.68    -295.70    -150.68    -123.88    -65.349     4480.0  3.2009E+06
3.2009E+06
   x( M)    9.7200    9.7200    0.0000    0.0000    8.9100    8.9100    11.880    11.880    19.440    0.0000    0.0000
     6 -4.4441E-05 -2.2184E-05    -1332.6    -791.12    -294.92    -150.60    -120.46    -63.643     660.48  3.2009E+06
3.2009E+06
   x( M)    9.7200    9.7200    0.0000    0.0000    8.9100    8.9100    11.880    11.880    19.440    0.0000    0.0000
     7 -4.4835E-05 -2.2321E-05    -1335.9    -788.67    -295.98    -150.72    -124.43    -65.591     5199.9  3.2009E+06
3.2009E+06
   x( M)    9.7200    9.7200    0.0000    0.0000    8.9100    8.9100    11.880    11.880    19.440    0.0000    0.0000
     8 -4.4530E-05 -2.2212E-05    -1334.3    -791.11    -295.23    -150.65    -121.09    -63.934     237.51  3.2009E+06
3.2009E+06
   x( M)    9.7200    9.7200    0.0000    0.0000    8.9100    8.9100    11.880    11.880    19.440    0.0000    0.0000
     9 -4.4476E-05 -2.2203E-05    -1330.9    -789.91    -294.87    -150.59    -121.35    -64.133     811.89  3.2009E+06
3.2009E+06
   x( M)    9.7200    9.7200    0.0000    0.0000    8.9100    8.9100    11.880    11.880    19.440    0.0000    0.0000
    10 -4.4562E-05 -2.2230E-05    -1332.6    -789.90    -295.18    -150.63    -121.96    -64.408     1655.0  3.2009E+06
3.2009E+06
   x( M)    9.7200    9.7200    0.0000    0.0000    8.9100    8.9100    11.880    11.880    19.440    0.0000    0.0000
    11 -4.4644E-05 -2.2256E-05    -1334.3    -789.90    -295.47    -150.67    -122.52    -64.662     2431.9  3.2009E+06
3.2009E+06
   x( M)    9.7200    9.7200    0.0000    0.0000    8.9100    8.9100    11.880    11.880    19.440    0.0000    0.0000

    Min. -4.4835E-05 -2.2321E-05    -1335.9    -791.14    -295.98    -150.72    -124.43    -65.591     237.51  3.2009E+06
3.2009E+06
  Pile N.     7         7         7         2         7         7         7         7         8         1         1

   * MAXIMUM VALUES AND LOCATIONS *

  PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR   SOIL REACT  SOIL REACT    TOTAL    FLEX. RIG.
FLEX. RIG.
         y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS      z-DIR      y-DIR
           M          M        KN- M      KN- M        KN         KN       KN/ M      KN/ M    KN/ M**2   KN- M**2   KN- M**2
 ****** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
     1  6.8193E-03  3.1284E-03     741.00     366.92     552.53     290.90     229.58     134.15  1.2045E+04  3.2009E+06
3.2009E+06
   x( M)    0.0000    0.0000    7.0200    7.2900    0.0000    0.0000    8.3700    8.3700    0.0000    0.0000    0.0000
     2  6.8193E-03  3.1360E-03     739.59     367.31     557.31     293.92     230.33     134.38  1.1406E+04  3.2009E+06
3.2009E+06
   x( M)    0.0000    0.0000    7.0200    7.2900    0.0000    0.0000    8.3700    8.3700    0.0000    0.0000    0.0000
     3  6.8237E-03  3.1284E-03     741.72     366.97     552.28     290.56     229.59     134.11  1.2830E+04  3.2009E+06
3.2009E+06
   x( M)    0.0000    0.0000    7.0200    7.2900    0.0000    0.0000    8.3700    8.3700    0.0000    0.0000    0.0000
     4  6.8237E-03  3.1360E-03     740.30     367.37     557.07     293.58     230.27     134.28  1.0637E+04  3.2009E+06
3.2009E+06
   x( M)    0.0000    0.0000    7.0200    7.2900    0.0000    0.0000    8.3700    8.3700    0.0000    0.0000    0.0000
     5  6.8281E-03  3.1284E-03     742.44     367.03     552.03     290.22     229.60     134.06  1.3616E+04  3.2009E+06
3.2009E+06
   x( M)    0.0000    0.0000    7.0200    7.2900    0.0000    0.0000    8.3700    8.3700    0.0000    0.0000    0.0000
     6  6.8281E-03  3.1360E-03     741.03     367.43     556.75     293.21     230.20     134.20     9795.3  3.2009E+06
3.2009E+06
   x( M)    0.0000    0.0000    7.0200    7.2900    0.0000    0.0000    8.3700    8.3700    0.0000    0.0000    0.0000
```

7 6.8325E-03 3.1284E-03 743.15 367.07 551.84 289.91 229.63 134.02 1.4344E+04 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.2900 0.0000 0.0000 8.3700 8.3700 0.0000 0.0000 0.0000
8 6.8325E-03 3.1360E-03 741.78 367.49 556.39 292.82 230.14 134.12 9381.1 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.2900 0.0000 0.0000 8.3700 8.3700 0.0000 0.0000 0.0000
9 6.8215E-03 3.1322E-03 740.68 367.15 554.70 292.19 229.86 134.19 9934.6 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.2900 0.0000 0.0000 8.3700 8.3700 0.0000 0.0000 0.0000
10 6.8259E-03 3.1322E-03 741.41 367.21 554.39 291.83 229.83 134.13 1.0786E+04 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.2900 0.0000 0.0000 8.3700 8.3700 0.0000 0.0000 0.0000
11 6.8303E-03 3.1322E-03 742.13 367.26 554.14 291.49 229.82 134.07 1.1572E+04 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.2900 0.0000 0.0000 8.3700 8.3700 0.0000 0.0000 0.0000

Max. 6.8325E-03 3.1360E-03 743.15 367.49 557.31 293.92 230.33 134.38 1.4344E+04 3.2009E+06
3.2009E+06
Pile N. 7 2 7 8 2 2 2 2 7 1 1

LOAD CASE : 4
CASE NAME : R sismico MIN
LOAD TYPE : Dead, DL

* TABLE L * COMPUTATION ON PILE CAP

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VERT. LOAD, KN	HOR. LOAD Y, KN	HOR. LOAD Z, KN
17349.0	-6098.37	-3210.00

MOMENT X , KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
27.4750	-29864.0	57324.7

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL , M	HORIZONTAL Y, M	HORIZONTAL Z, M
1.01708E-03	-6.81469E-03	-3.11990E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
8.66520E-07	-1.61603E-04	5.99253E-04

THE GLOBAL STRUCTURAL COORDINATE SYSTEM
----

* PILE TOP DISPLACEMENTS *

PILE GROUP	DISP. X, M	DISP. Y, M	DISP. Z, M	ROT. X,RAD	ROT. Y,RAD	ROT. Z,RAD
**********	***********	***********	***********	***********	***********	***********
1	3.2051E-05	-6.8100E-03	-3.1172E-03	8.6652E-07	-1.6160E-04	5.9925E-04
2	3.7474E-03	-6.8100E-03	-3.1226E-03	8.6652E-07	-1.6160E-04	5.9925E-04

3	-5.4972E-04	-6.8131E-03	-3.1172E-03	8.6652E-07	-1.6160E-04	5.9925E-04
4	3.1656E-03	-6.8131E-03	-3.1226E-03	8.6652E-07	-1.6160E-04	5.9925E-04
5	-1.1315E-03	-6.8163E-03	-3.1172E-03	8.6652E-07	-1.6160E-04	5.9925E-04
6	2.5839E-03	-6.8163E-03	-3.1226E-03	8.6652E-07	-1.6160E-04	5.9925E-04
7	-1.7133E-03	-6.8194E-03	-3.1172E-03	8.6652E-07	-1.6160E-04	5.9925E-04
8	2.0021E-03	-6.8194E-03	-3.1226E-03	8.6652E-07	-1.6160E-04	5.9925E-04
9	1.5988E-03	-6.8116E-03	-3.1199E-03	8.6652E-07	-1.6160E-04	5.9925E-04
10	1.0171E-03	-6.8147E-03	-3.1199E-03	8.6652E-07	-1.6160E-04	5.9925E-04
11	4.3531E-04	-6.8178E-03	-3.1199E-03	8.6652E-07	-1.6160E-04	5.9925E-04
MINIMUM	-1.7133E-03	-6.8194E-03	-3.1226E-03	8.6652E-07	-1.6160E-04	5.9925E-04
Pile N.	7	7	2	1	1	1
MAXIMUM	3.7474E-03	-6.8100E-03	-3.1172E-03	8.6652E-07	-1.6160E-04	5.9925E-04
Pile N.	2	1	1	1	1	1

* PILE TOP REACTIONS *

PILE GROUP	FOR. X, KN	FOR. Y, KN	FOR. Z, KN	MOM X, KN- M	MOM Y, KN- M	MOM Z, KN- M
**********	***********	***********	***********	***********	***********	***********
1	54.961	-555.23	-292.15	0.1269	790.98	-1331.9
2	5732.9	-550.28	-290.45	0.1269	792.86	-1333.4
3	-935.83	-556.42	-292.54	0.1269	790.95	-1332.6
4	4874.4	-551.36	-290.79	0.1269	792.83	-1334.2
5	-1852.6	-557.55	-292.90	0.1269	790.92	-1333.4
6	4015.9	-552.43	-291.13	0.1269	792.80	-1334.9
7	-2710.7	-558.63	-293.24	0.1269	790.90	-1334.2
8	3157.4	-553.51	-291.46	0.1269	792.77	-1335.7
9	2562.3	-553.21	-291.43	0.1269	791.91	-1333.0
10	1703.8	-554.29	-291.77	0.1269	791.88	-1333.8
11	746.47	-555.45	-292.15	0.1269	791.85	-1334.6
MINIMUM	-2710.7	-558.63	-293.24	0.1269	790.90	-1335.7
Pile N.	7	7	7	1	7	8
MAXIMUM	5732.9	-550.28	-290.45	0.1269	792.86	-1331.9
Pile N.	2	2	2	1	2	1

THE PILE COORDINATE SYSTEM (LOCAL AXES)
----

* PILE TOP DISPLACEMENTS *

PILE GROUP	DISP. x, M	DISP. y, M	DISP. z, M	ROT. x,RAD	ROT. y,RAD	ROT. z,RAD
**********	***********	***********	***********	***********	***********	***********
1	3.2051E-05	-6.8100E-03	-3.1172E-03	8.6652E-07	-1.6160E-04	5.9925E-04
2	3.7474E-03	-6.8100E-03	-3.1226E-03	8.6652E-07	-1.6160E-04	5.9925E-04
3	-5.4972E-04	-6.8131E-03	-3.1172E-03	8.6652E-07	-1.6160E-04	5.9925E-04
4	3.1656E-03	-6.8131E-03	-3.1226E-03	8.6652E-07	-1.6160E-04	5.9925E-04
5	-1.1315E-03	-6.8163E-03	-3.1172E-03	8.6652E-07	-1.6160E-04	5.9925E-04
6	2.5839E-03	-6.8163E-03	-3.1226E-03	8.6652E-07	-1.6160E-04	5.9925E-04
7	-1.7133E-03	-6.8194E-03	-3.1172E-03	8.6652E-07	-1.6160E-04	5.9925E-04
8	2.0021E-03	-6.8194E-03	-3.1226E-03	8.6652E-07	-1.6160E-04	5.9925E-04
9	1.5988E-03	-6.8116E-03	-3.1199E-03	8.6652E-07	-1.6160E-04	5.9925E-04
10	1.0171E-03	-6.8147E-03	-3.1199E-03	8.6652E-07	-1.6160E-04	5.9925E-04
11	4.3531E-04	-6.8178E-03	-3.1199E-03	8.6652E-07	-1.6160E-04	5.9925E-04
MINIMUM	-1.7133E-03	-6.8194E-03	-3.1226E-03	8.6652E-07	-1.6160E-04	5.9925E-04
Pile N.	7	7	2	1	1	1
MAXIMUM	3.7474E-03	-6.8100E-03	-3.1172E-03	8.6652E-07	-1.6160E-04	5.9925E-04
Pile N.	2	1	1	1	1	1

* PILE TOP REACTIONS *

PILE GROUP	AXIAL, KN	LAT. y, KN	LAT. z, KN	MOM x, KN- M	MOM y, KN- M	MOM z, KN- M
**********	***********	***********	***********	***********	***********	***********
1	54.961	-555.23	-292.15	0.1269	790.98	-1331.9
2	5732.9	-550.28	-290.45	0.1269	792.86	-1333.4
3	-935.83	-556.42	-292.54	0.1269	790.95	-1332.6
4	4874.4	-551.36	-290.79	0.1269	792.83	-1334.2
5	-1852.6	-557.55	-292.90	0.1269	790.92	-1333.4
6	4015.9	-552.43	-291.13	0.1269	792.80	-1334.9
7	-2710.7	-558.63	-293.24	0.1269	790.90	-1334.2
8	3157.4	-553.51	-291.46	0.1269	792.77	-1335.7
9	2562.3	-553.21	-291.43	0.1269	791.91	-1333.0
10	1703.8	-554.29	-291.77	0.1269	791.88	-1333.8
11	746.47	-555.45	-292.15	0.1269	791.85	-1334.6
MINIMUM	-2710.7	-558.63	-293.24	0.1269	790.90	-1335.7
Pile N.	7	7	7	1	7	8
MAXIMUM	5732.9	-550.28	-290.45	0.1269	792.86	-1331.9
Pile N.	2	2	2	1	2	1

PILE GROUP	STRESS, KN/ M**2
**********	****************
1	9179.5
2	1.4213E+04
3	9962.1
4	1.3458E+04
5	1.0777E+04
6	1.2703E+04
7	1.1539E+04
8	1.1948E+04
9	1.1405E+04
10	1.0650E+04
11	9807.4
MINIMUM	9179.5
Pile N.	1
MAXIMUM	1.4213E+04
Pile N.	2

* EFFECTS FOR LATERALLY LOADED PILE *

* MINIMUM VALUES AND LOCATIONS *

PILE DISPL. DISPL. MOMENT MOMENT SHEAR SHEAR SOIL REACT SOIL REACT TOTAL FLEX. RIG.
FLEX. RIG.
y-DIR z-DIR z-DIR y-DIR y-DIR z-DIR y-DIR z-DIR STRESS z-DIR y-DIR
M M KN- M KN- M KN KN KN/ M KN/ M KN/ M**2 KN- M**2 KN- M**2
****** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
1 -6.8100E-03 -3.1172E-03 -739.78 -366.14 -555.23 -292.15 -229.97 -134.20 48.596 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.2900 0.0000 0.0000 8.3700 8.3700 19.440 0.0000 0.0000
2 -6.8100E-03 -3.1226E-03 -741.06 -367.39 -550.61 -290.64 -229.11 -134.63 5069.0 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.2900 0.0000 0.0000 8.3700 8.3700 19.440 0.0000 0.0000
3 -6.8131E-03 -3.1172E-03 -739.91 -366.03 -556.37 -292.51 -230.22 -134.13 827.45 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.2900 0.0000 0.0000 8.3700 8.3700 19.440 0.0000 0.0000

4 -6.8131E-03 -3.1226E-03 -741.22 -367.28 -551.63 -290.95 -229.27 -134.52 4309.9 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.2900 0.0000 0.0000 8.3700 8.3700 19.440 0.0000 0.0000
5 -6.8162E-03 -3.1172E-03 -740.07 -365.92 -557.45 -292.84 -230.47 -134.08 1638.0 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.2900 0.0000 0.0000 8.3700 8.3700 19.440 0.0000 0.0000
6 -6.8162E-03 -3.1226E-03 -741.38 -367.17 -552.66 -291.26 -229.43 -134.41 3550.8 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.2900 0.0000 0.0000 8.3700 8.3700 19.440 0.0000 0.0000
7 -6.8194E-03 -3.1172E-03 -740.23 -365.81 -558.48 -293.15 -230.72 -134.03 2396.8 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.2900 0.0000 0.0000 8.3700 8.3700 19.440 0.0000 0.0000
8 -6.8194E-03 -3.1226E-03 -741.54 -367.06 -553.69 -291.57 -229.61 -134.32 2791.7 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.2900 0.0000 0.0000 8.3700 8.3700 19.440 0.0000 0.0000
9 -6.8116E-03 -3.1199E-03 -740.52 -366.72 -553.35 -291.52 -229.57 -134.34 2265.6 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.2900 0.0000 0.0000 8.3700 8.3700 19.440 0.0000 0.0000
10 -6.8147E-03 -3.1199E-03 -740.68 -366.61 -554.38 -291.82 -229.77 -134.25 1506.5 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.2900 0.0000 0.0000 8.3700 8.3700 19.440 0.0000 0.0000
11 -6.8178E-03 -3.1199E-03 -740.82 -366.50 -555.49 -292.17 -229.99 -134.17 660.02 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 7.0200 7.2900 0.0000 0.0000 8.3700 8.3700 19.440 0.0000 0.0000

Min. -6.8194E-03 -3.1226E-03 -741.54 -367.39 -558.48 -293.15 -230.72 -134.63 48.596 3.2009E+06
3.2009E+06
Pile N. 7 2 8 2 7 7 7 2 1 1 1

* MAXIMUM VALUES AND LOCATIONS *

PILE DISPL. DISPL. MOMENT MOMENT SHEAR SHEAR SOIL REACT SOIL REACT TOTAL FLEX. RIG.
FLEX. RIG.
y-DIR z-DIR z-DIR y-DIR y-DIR z-DIR y-DIR z-DIR STRESS z-DIR y-DIR
M M KN- M KN- M KN KN KN/ M KN/ M KN/ M**2 KN- M**2 KN- M**2
****** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
1 4.4376E-05 2.2114E-05 1331.9 790.98 294.59 150.22 120.58 63.655 9179.5 3.2009E+06
3.2009E+06
x(M) 9.7200 9.7200 0.0000 0.0000 8.9100 8.9100 11.880 11.880 0.0000 0.0000 0.0000
2 4.4679E-05 2.2323E-05 1333.4 792.86 295.25 150.96 123.78 65.566 1.4213E+04 3.2009E+06
3.2009E+06
x(M) 9.7200 9.7200 0.0000 0.0000 8.9100 8.9100 11.880 11.880 0.0000 0.0000 0.0000
3 4.4350E-05 2.2085E-05 1332.6 790.95 294.61 150.12 120.06 63.328 9962.1 3.2009E+06
3.2009E+06
x(M) 9.7200 9.7200 0.0000 0.0000 8.9100 8.9100 11.880 11.880 0.0000 0.0000 0.0000
4 4.4657E-05 2.2297E-05 1334.2 792.83 295.27 150.86 123.32 65.269 1.3458E+04 3.2009E+06
3.2009E+06
x(M) 9.7200 9.7200 0.0000 0.0000 8.9100 8.9100 11.880 11.880 0.0000 0.0000 0.0000
5 4.4329E-05 2.2059E-05 1333.4 790.92 294.63 150.03 119.59 63.026 1.0777E+04 3.2009E+06
3.2009E+06
x(M) 9.7200 9.7200 0.0000 0.0000 8.9100 8.9100 11.880 11.880 0.0000 0.0000 0.0000
6 4.4635E-05 2.2270E-05 1334.9 792.80 295.30 150.77 122.87 64.974 1.2703E+04 3.2009E+06
3.2009E+06
x(M) 9.7200 9.7200 0.0000 0.0000 8.9100 8.9100 11.880 11.880 0.0000 0.0000 0.0000
7 4.4311E-05 2.2035E-05 1334.2 790.90 294.66 149.94 119.15 62.742 1.1539E+04 3.2009E+06
3.2009E+06
x(M) 9.7200 9.7200 0.0000 0.0000 8.9100 8.9100 11.880 11.880 0.0000 0.0000 0.0000
8 4.4614E-05 2.2244E-05 1335.7 792.77 295.32 150.68 122.42 64.680 1.1948E+04 3.2009E+06
3.2009E+06

```
  x( M)     9.7200     9.7200     0.0000     0.0000     8.9100     8.9100     11.880     11.880     0.0000     0.0000     0.0000
     9  4.4520E-05  2.2207E-05      1333.0      791.91      294.94      150.55      121.99      64.484  1.1405E+04  3.2009E+06
3.2009E+06
  x( M)     9.7200     9.7200     0.0000     0.0000     8.9100     8.9100     11.880     11.880     0.0000     0.0000     0.0000
    10  4.4499E-05  2.2181E-05      1333.8      791.88      294.97      150.46      121.54      64.194  1.0650E+04  3.2009E+06
3.2009E+06
  x( M)     9.7200     9.7200     0.0000     0.0000     8.9100     8.9100     11.880     11.880     0.0000     0.0000     0.0000
    11  4.4474E-05  2.2153E-05      1334.6      791.85      294.98      150.36      121.04      63.874      9807.4  3.2009E+06
3.2009E+06
  x( M)     9.7200     9.7200     0.0000     0.0000     8.9100     8.9100     11.880     11.880     0.0000     0.0000     0.0000

   Max.  4.4679E-05  2.2323E-05      1335.7      792.86      295.32      150.96      123.78      65.566  1.4213E+04  3.2009E+06
3.2009E+06
 Pile N.      2          2          8          2          8          2          2          2          2          1          1



  LOAD CASE :     5
  CASE NAME : SLE statico MAX
  LOAD TYPE : Dead, DL



  * TABLE L *   COMPUTATION ON PILE CAP


  * EQUIVALENT CONCENTRATED LOAD AT ORIGIN *


      VERT. LOAD,  KN    HOR. LOAD Y,  KN   HOR. LOAD Z,  KN
        28695.0           1642.37           520.000

     MOMENT X , KN- M    MOMENT Y, KN- M    MOMENT Z, KN- M
         7.52500          5733.00          -15438.3


  * DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *


       VERTICAL , M      HORIZONTAL Y, M     HORIZONTAL Z, M
        1.63023E-03        1.79787E-03        4.99310E-04

     ANGLE ROT. X,RAD    ANGLE ROT. Y,RAD    ANGLE ROT. Z,RAD
        2.51407E-07        3.10100E-05       -1.70490E-04


  THE GLOBAL STRUCTURAL COORDINATE SYSTEM
  ---------------------------------------

  * PILE TOP DISPLACEMENTS *

 PILE GROUP   DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
 **********  ***********  ***********  ***********  ***********  ***********  ***********
     1       1.9913E-03  1.7992E-03  5.0009E-04  2.5141E-07  3.1010E-05  -1.7049E-04
     2       9.3426E-04  1.7992E-03  4.9853E-04  2.5141E-07  3.1010E-05  -1.7049E-04
     3       2.1029E-03  1.7983E-03  5.0009E-04  2.5141E-07  3.1010E-05  -1.7049E-04
     4       1.0459E-03  1.7983E-03  4.9853E-04  2.5141E-07  3.1010E-05  -1.7049E-04
     5       2.2146E-03  1.7974E-03  5.0009E-04  2.5141E-07  3.1010E-05  -1.7049E-04
     6       1.1575E-03  1.7974E-03  4.9853E-04  2.5141E-07  3.1010E-05  -1.7049E-04
     7       2.3262E-03  1.7965E-03  5.0009E-04  2.5141E-07  3.1010E-05  -1.7049E-04
```



```
     8       1.2692E-03  1.7965E-03  4.9853E-04  2.5141E-07  3.1010E-05  -1.7049E-04
     9       1.5186E-03  1.7988E-03  4.9931E-04  2.5141E-07  3.1010E-05  -1.7049E-04
    10       1.6302E-03  1.7979E-03  4.9931E-04  2.5141E-07  3.1010E-05  -1.7049E-04
    11       1.7419E-03  1.7970E-03  4.9931E-04  2.5141E-07  3.1010E-05  -1.7049E-04

 MINIMUM     9.3426E-04  1.7965E-03  4.9853E-04  2.5141E-07  3.1010E-05  -1.7049E-04
 Pile N.        2          7          2          1          1          1
 MAXIMUM     2.3262E-03  1.7992E-03  5.0009E-04  2.5141E-07  3.1010E-05  -1.7049E-04
 Pile N.        7          1          1          1          1          1

  * PILE TOP REACTIONS *

 PILE GROUP   FOR. X, KN   FOR. Y, KN   FOR. Z, KN  MOM X, KN- M  MOM Y, KN- M  MOM Z, KN- M
 **********  ***********  ***********  ***********  ***********  ***********  ***********
     1          3141.4       149.33      47.326     0.036805     -126.06      355.36
     2          1581.6       149.71      47.251     0.036805     -125.50      355.27
     3          3306.2       149.19      47.316     0.036805     -126.06      355.06
     4          1746.4       149.57      47.240     0.036805     -125.50      354.97
     5          3470.9       149.05      47.305     0.036805     -126.06      354.76
     6          1911.1       149.42      47.230     0.036805     -125.51      354.66
     7          3635.7       148.90      47.295     0.036805     -126.06      354.45
     8          2075.8       149.28      47.219     0.036805     -125.51      354.36
     9          2443.9       149.45      47.283     0.036805     -125.78      355.17
    10          2608.6       149.31      47.273     0.036805     -125.78      354.86
    11          2773.4       149.16      47.262     0.036805     -125.78      354.56

 MINIMUM        1581.6       148.90      47.219     0.036805     -126.06      354.36
 Pile N.        2          7          8          1          1          8
 MAXIMUM        3635.7       149.71      47.326     0.036805     -125.50      355.36
 Pile N.        7          2          1          1          2          1


  THE PILE COORDINATE SYSTEM (LOCAL AXES)
  ---------------------------------------

  * PILE TOP DISPLACEMENTS *

 PILE GROUP   DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
 **********  ***********  ***********  ***********  ***********  ***********  ***********
     1       1.9913E-03  1.7992E-03  5.0009E-04  2.5141E-07  3.1010E-05  -1.7049E-04
     2       9.3426E-04  1.7992E-03  4.9853E-04  2.5141E-07  3.1010E-05  -1.7049E-04
     3       2.1029E-03  1.7983E-03  5.0009E-04  2.5141E-07  3.1010E-05  -1.7049E-04
     4       1.0459E-03  1.7983E-03  4.9853E-04  2.5141E-07  3.1010E-05  -1.7049E-04
     5       2.2146E-03  1.7974E-03  5.0009E-04  2.5141E-07  3.1010E-05  -1.7049E-04
     6       1.1575E-03  1.7974E-03  4.9853E-04  2.5141E-07  3.1010E-05  -1.7049E-04
     7       2.3262E-03  1.7965E-03  5.0009E-04  2.5141E-07  3.1010E-05  -1.7049E-04
     8       1.2692E-03  1.7965E-03  4.9853E-04  2.5141E-07  3.1010E-05  -1.7049E-04
     9       1.5186E-03  1.7988E-03  4.9931E-04  2.5141E-07  3.1010E-05  -1.7049E-04
    10       1.6302E-03  1.7979E-03  4.9931E-04  2.5141E-07  3.1010E-05  -1.7049E-04
    11       1.7419E-03  1.7970E-03  4.9931E-04  2.5141E-07  3.1010E-05  -1.7049E-04

 MINIMUM     9.3426E-04  1.7965E-03  4.9853E-04  2.5141E-07  3.1010E-05  -1.7049E-04
 Pile N.        2          7          2          1          1          1
 MAXIMUM     2.3262E-03  1.7992E-03  5.0009E-04  2.5141E-07  3.1010E-05  -1.7049E-04
 Pile N.        7          1          1          1          1          1

  * PILE TOP REACTIONS *

 PILE GROUP   AXIAL, KN   LAT. y, KN   LAT. z, KN  MOM x, KN- M  MOM y, KN- M  MOM z, KN- M
 **********  ***********  ***********  ***********  ***********  ***********  ***********
```



```
     1          3141.4       149.33      47.326     0.036805     -126.06      355.36
     2          1581.6       149.71      47.251     0.036805     -125.50      355.27
     3          3306.2       149.19      47.316     0.036805     -126.06      355.06
     4          1746.4       149.57      47.240     0.036805     -125.50      354.97
     5          3470.9       149.05      47.305     0.036805     -126.06      354.76
     6          1911.1       149.42      47.230     0.036805     -125.51      354.66
     7          3635.7       148.90      47.295     0.036805     -126.06      354.45
     8          2075.8       149.28      47.219     0.036805     -125.51      354.36
     9          2443.9       149.45      47.283     0.036805     -125.78      355.17
    10          2608.6       149.31      47.273     0.036805     -125.78      354.86
    11          2773.4       149.16      47.262     0.036805     -125.78      354.56

 MINIMUM        1581.6       148.90      47.219     0.036805     -126.06      354.36
 Pile N.        2          7          8          1          1          8
 MAXIMUM        3635.7       149.71      47.326     0.036805     -125.50      355.36
 Pile N.        7          2          1          1          2          1

 PILE GROUP   STRESS, KN/ M**2
 **********  ****************
     1          5000.3
     2          3619.5
     3          5144.2
     4          3763.4
     5          5288.2
     6          3907.4
     7          5432.2
     8          4051.4
     9          4381.9
    10          4525.8
    11          4669.8

 MINIMUM        3619.5
 Pile N.        2
 MAXIMUM        5432.2
 Pile N.        7

  * EFFECTS FOR LATERALLY LOADED PILE *

  * MINIMUM VALUES AND LOCATIONS *

  PILE    DISPL.     DISPL.     MOMENT     MOMENT     SHEAR      SHEAR   SOIL REACT  SOIL REACT    TOTAL   FLEX. RIG.
FLEX. RIG.
            y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS      z-DIR      y-DIR
              M          M       KN- M      KN- M        KN         KN       KN/ M      KN/ M    KN/ M**2   KN- M**2   KN- M**2
 ******  **********  **********  **********  **********  **********  **********  **********  **********  **********
**********  **********  **********
     1 -1.0152E-05 -3.1084E-06     -355.36     -126.06     -121.79     -37.455     -59.402     -18.300      2777.6  3.2009E+06
3.2009E+06
  x( M)     9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.330     0.0000     0.0000
     2 -1.0150E-05 -3.0961E-06     -355.27     -125.50     -121.83     -37.327     -59.421     -18.237      1398.5  3.2009E+06
3.2009E+06
  x( M)     9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.330     0.0000     0.0000
     3 -1.0145E-05 -3.1080E-06     -355.06     -126.06     -121.72     -37.459     -59.373     -18.303      2923.3  3.2009E+06
3.2009E+06
  x( M)     9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.330     0.0000     0.0000
     4 -1.0142E-05 -3.0957E-06     -354.97     -125.50     -121.76     -37.330     -59.392     -18.240      1544.1  3.2009E+06
3.2009E+06
  x( M)     9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.330     0.0000     0.0000
     5 -1.0137E-05 -3.1077E-06     -354.76     -126.06     -121.65     -37.462     -59.343     -18.306      3069.0  3.2009E+06
3.2009E+06
```



```
  x( M)     9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.330     0.0000     0.0000
     6 -1.0134E-05 -3.0954E-06     -354.66     -125.51     -121.69     -37.333     -59.362     -18.243      1689.8  3.2009E+06
3.2009E+06
  x( M)     9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.330     0.0000     0.0000
     7 -1.0129E-05 -3.1073E-06     -354.45     -126.06     -121.58     -37.465     -59.314     -18.309      3214.6  3.2009E+06
3.2009E+06
  x( M)     9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.330     0.0000     0.0000
     8 -1.0126E-05 -3.0950E-06     -354.36     -125.51     -121.62     -37.337     -59.333     -18.246      1835.4  3.2009E+06
3.2009E+06
  x( M)     9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.330     0.0000     0.0000
     9 -1.0147E-05 -3.1021E-06     -355.17     -125.78     -121.78     -37.393     -59.397     -18.270      2160.9  3.2009E+06
3.2009E+06
  x( M)     9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.330     0.0000     0.0000
    10 -1.0139E-05 -3.1017E-06     -354.86     -125.78     -121.71     -37.396     -59.367     -18.273      2306.5  3.2009E+06
3.2009E+06
  x( M)     9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.330     0.0000     0.0000
    11 -1.0131E-05 -3.1013E-06     -354.56     -125.78     -121.63     -37.399     -59.338     -18.276      2452.2  3.2009E+06
3.2009E+06
  x( M)     9.1800     9.1800     0.0000     0.0000     8.3700     8.3700     9.4500     9.4500     21.330     0.0000     0.0000

   Min. -1.0152E-05 -3.1084E-06     -355.36     -126.06     -121.83     -37.465     -59.421     -18.309      1398.5  3.2009E+06
3.2009E+06
 Pile N.      1          1          1          1          2          7          2          7          2          1          1

  * MAXIMUM VALUES AND LOCATIONS *

  PILE    DISPL.     DISPL.     MOMENT     MOMENT     SHEAR      SHEAR   SOIL REACT  SOIL REACT    TOTAL   FLEX. RIG.
FLEX. RIG.
            y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS      z-DIR      y-DIR
              M          M       KN- M      KN- M        KN         KN       KN/ M      KN/ M    KN/ M**2   KN- M**2   KN- M**2
 ******  **********  **********  **********  **********  **********  **********  **********  **********  **********
**********  **********  **********
     1  1.7992E-03  5.0009E-04      234.04      70.712      149.38      47.343      127.63      40.186      5000.3  3.2009E+06
3.2009E+06
  x( M)     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
     2  1.7992E-03  4.9853E-04      234.02      70.446      149.73      47.259      127.73      40.055      3619.5  3.2009E+06
3.2009E+06
  x( M)     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
     3  1.7983E-03  5.0009E-04      233.91      70.718      149.24      47.333      127.57      40.196      5144.2  3.2009E+06
3.2009E+06
  x( M)     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
     4  1.7983E-03  4.9853E-04      233.89      70.452      149.59      47.249      127.67      40.066      3763.4  3.2009E+06
3.2009E+06
  x( M)     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
     5  1.7974E-03  5.0009E-04      233.78      70.724      149.10      47.324      127.51      40.207      5288.2  3.2009E+06
3.2009E+06
  x( M)     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
     6  1.7974E-03  4.9853E-04      233.76      70.458      149.45      47.240      127.61      40.076      3907.4  3.2009E+06
3.2009E+06
  x( M)     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
     7  1.7965E-03  5.0009E-04      233.65      70.729      148.96      47.314      127.46      40.217      5432.2  3.2009E+06
3.2009E+06
  x( M)     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
     8  1.7965E-03  4.9853E-04      233.63      70.464      149.31      47.230      127.56      40.086      4051.4  3.2009E+06
3.2009E+06
  x( M)     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
     9  1.7988E-03  4.9931E-04      233.97      70.582      149.49      47.296      127.65      40.126      4381.9  3.2009E+06
3.2009E+06
  x( M)     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
    10  1.7979E-03  4.9931E-04      233.84      70.588      149.35      47.287      127.59      40.136      4525.8  3.2009E+06
```

```
3.2009E+06
  x( M)    0.0000    0.0000    7.0200    7.0200    0.0000    0.0000    7.0200    7.0200    0.0000    0.0000    0.0000
    11  1.7970E-03  4.9931E-04    233.71    70.594    149.20    47.277    127.54    40.146    4669.8  3.2009E+06
3.2009E+06
  x( M)    0.0000    0.0000    7.0200    7.0200    0.0000    0.0000    7.0200    7.0200    0.0000    0.0000    0.0000

  Max.  1.7992E-03  5.0009E-04    234.04    70.729    149.73    47.343    127.73    40.217    5432.2  3.2009E+06
3.2009E+06
 Pile N.     1      1      1      7      2      1      2      7      7      1      1



  LOAD CASE :    6
  CASE NAME : SLE statico MIN
  LOAD TYPE : Dead, DL



  * TABLE L *   COMPUTATION ON PILE CAP


  * EQUIVALENT CONCENTRATED LOAD AT ORIGIN *


     VERT. LOAD,  KN    HOR. LOAD Y,  KN    HOR. LOAD Z,  KN
        16410.0         -1372.37           520.000

    MOMENT X , KN- M    MOMENT Y, KN- M    MOMENT Z, KN- M
       42.4750          5545.50          12900.3


  * DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *


      VERTICAL , M      HORIZONTAL Y, M     HORIZONTAL Z, M
     8.95790E-04      -1.46855E-03       4.88440E-04

    ANGLE ROT. X,RAD    ANGLE ROT. Y,RAD    ANGLE ROT. Z,RAD
     1.50217E-06       2.81567E-05        1.33333E-04


  THE GLOBAL STRUCTURAL COORDINATE SYSTEM
  ---------------------------------------

  * PILE TOP DISPLACEMENTS *

  PILE GROUP   DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
  ********** *********** *********** *********** *********** *********** ***********
    1       3.3041E-04 -1.4604E-03  4.9310E-04  1.5022E-06  2.8157E-05  1.3333E-04
    2       1.1571E-03 -1.4604E-03  4.8378E-04  1.5022E-06  2.8157E-05  1.3333E-04
    3       4.3178E-04 -1.4659E-03  4.9310E-04  1.5022E-06  2.8157E-05  1.3333E-04
    4       1.2584E-03 -1.4659E-03  4.8378E-04  1.5022E-06  2.8157E-05  1.3333E-04
    5       5.3314E-04 -1.4713E-03  4.9310E-04  1.5022E-06  2.8157E-05  1.3333E-04
    6       1.3598E-03 -1.4713E-03  4.8378E-04  1.5022E-06  2.8157E-05  1.3333E-04
    7       6.3451E-04 -1.4767E-03  4.9310E-04  1.5022E-06  2.8157E-05  1.3333E-04
    8       1.4612E-03 -1.4767E-03  4.8378E-04  1.5022E-06  2.8157E-05  1.3333E-04
    9       7.9443E-04 -1.4631E-03  4.8844E-04  1.5022E-06  2.8157E-05  1.3333E-04
   10        8.9579E-04 -1.4686E-03  4.8844E-04  1.5022E-06  2.8157E-05  1.3333E-04
   11        9.9715E-04 -1.4740E-03  4.8844E-04  1.5022E-06  2.8157E-05  1.3333E-04
```



```
  MINIMUM    3.3041E-04 -1.4767E-03  4.8378E-04  1.5022E-06  2.8157E-05  1.3333E-04
  Pile N.      1        7        2        1        1        1
  MAXIMUM    1.4612E-03 -1.4604E-03  4.9310E-04  1.5022E-06  2.8157E-05  1.3333E-04
  Pile N.      8        1        1        1        1        1

  * PILE TOP REACTIONS *

  PILE GROUP   FOR. X, KN   FOR. Y, KN   FOR. Z, KN MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
  ********** *********** *********** *********** *********** *********** ***********
    1         566.59    -124.01     47.887     0.2199    -128.90    -298.23
    2         1910.4    -123.75     46.707     0.2199    -125.58    -298.31
    3         740.41    -124.59     47.871     0.2199    -128.88    -300.12
    4         2060.0    -124.34     46.692     0.2199    -125.57    -300.21
    5         914.23    -125.18     47.854     0.2199    -128.87    -302.02
    6         2209.6    -124.93     46.678     0.2199    -125.55    -302.10
    7         1088.1    -125.77     47.837     0.2199    -128.85    -303.92
    8         2359.2    -125.52     46.663     0.2199    -125.54    -304.00
    9         1362.3    -124.17     47.286     0.2199    -127.23    -299.22
   10          1524.9    -124.75     47.270     0.2199    -127.22    -301.12
   11          1674.4    -125.35     47.255     0.2199    -127.20    -303.01

  MINIMUM       566.59    -125.77     46.663     0.2199    -128.90    -304.00
  Pile N.      1        7        8        1        1        8
  MAXIMUM       2359.2    -123.75     47.887     0.2199    -125.54    -298.23
  Pile N.      8        2        1        1        8        1


  THE PILE COORDINATE SYSTEM (LOCAL AXES)
  ---------------------------------------

  * PILE TOP DISPLACEMENTS *

  PILE GROUP   DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
  ********** *********** *********** *********** *********** *********** ***********
    1       3.3041E-04 -1.4604E-03  4.9310E-04  1.5022E-06  2.8157E-05  1.3333E-04
    2       1.1571E-03 -1.4604E-03  4.8378E-04  1.5022E-06  2.8157E-05  1.3333E-04
    3       4.3178E-04 -1.4659E-03  4.9310E-04  1.5022E-06  2.8157E-05  1.3333E-04
    4       1.2584E-03 -1.4659E-03  4.8378E-04  1.5022E-06  2.8157E-05  1.3333E-04
    5       5.3314E-04 -1.4713E-03  4.9310E-04  1.5022E-06  2.8157E-05  1.3333E-04
    6       1.3598E-03 -1.4713E-03  4.8378E-04  1.5022E-06  2.8157E-05  1.3333E-04
    7       6.3451E-04 -1.4767E-03  4.9310E-04  1.5022E-06  2.8157E-05  1.3333E-04
    8       1.4612E-03 -1.4767E-03  4.8378E-04  1.5022E-06  2.8157E-05  1.3333E-04
    9       7.9443E-04 -1.4631E-03  4.8844E-04  1.5022E-06  2.8157E-05  1.3333E-04
   10        8.9579E-04 -1.4686E-03  4.8844E-04  1.5022E-06  2.8157E-05  1.3333E-04
   11        9.9715E-04 -1.4740E-03  4.8844E-04  1.5022E-06  2.8157E-05  1.3333E-04

  MINIMUM    3.3041E-04 -1.4767E-03  4.8378E-04  1.5022E-06  2.8157E-05  1.3333E-04
  Pile N.      1        7        2        1        1        1
  MAXIMUM    1.4612E-03 -1.4604E-03  4.9310E-04  1.5022E-06  2.8157E-05  1.3333E-04
  Pile N.      8        1        1        1        1        1

  * PILE TOP REACTIONS *

  PILE GROUP   AXIAL, KN    LAT. y, KN   LAT. z, KN MOM x, KN- M MOM y, KN- M MOM z, KN- M
  ********** *********** *********** *********** *********** *********** ***********
    1         566.59    -124.01     47.887     0.2199    -128.90    -298.23
    2         1910.4    -123.75     46.707     0.2199    -125.58    -298.31
    3         740.41    -124.59     47.871     0.2199    -128.88    -300.12
    4         2060.0    -124.34     46.692     0.2199    -125.57    -300.21
    5         914.23    -125.18     47.854     0.2199    -128.87    -302.02
```



```
    6         2209.6    -124.93     46.678     0.2199    -125.55    -302.10
    7         1088.1    -125.77     47.837     0.2199    -128.85    -303.92
    8         2359.2    -125.52     46.663     0.2199    -125.54    -304.00
    9         1362.3    -124.17     47.286     0.2199    -127.23    -299.22
   10          1524.9    -124.75     47.270     0.2199    -127.22    -301.12
   11          1674.4    -125.35     47.255     0.2199    -127.20    -303.01

  MINIMUM       566.59    -125.77     46.663     0.2199    -128.90    -304.00
  Pile N.      1        7        8        1        1        8
  MAXIMUM       2359.2    -123.75     47.887     0.2199    -125.54    -298.23
  Pile N.      8        2        1        1        8        1

  PILE GROUP   STRESS, KN/ M**2
  ********** ****************
    1         2416.1
    2         3597.1
    3         2580.0
    4         3739.6
    5         2743.9
    6         3882.1
    7         2907.9
    8         4024.7
    9         3121.1
   10          3275.1
   11          3417.7

  MINIMUM       2416.1
  Pile N.      1
  MAXIMUM       4024.7
  Pile N.      8

  * EFFECTS FOR LATERALLY LOADED PILE *

  * MINIMUM VALUES AND LOCATIONS *

   PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR   SOIL REACT  SOIL REACT     TOTAL    FLEX. RIG.
FLEX. RIG.
          y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS      z-DIR      y-DIR
            M          M        KN- M      KN- M        KN         KN       KN/ M      KN/ M    KN/ M**2   KN- M**2   KN- M**2
 ****** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
    1 -1.4604E-03 -2.9699E-06   -194.53   -128.90   -124.01   -38.725   -114.08   -19.499    500.98  3.2009E+06
3.2009E+06
  x( M)    0.0000    9.1800    7.0200    0.0000    0.0000    8.3700    7.0200    9.1800    21.600    0.0000    0.0000
    2 -1.4604E-03 -2.9030E-06   -194.60   -125.58   -123.78   -37.879   -114.17   -19.090    1689.2  3.2009E+06
3.2009E+06
  x( M)    0.0000    9.1800    7.0200    0.0000    0.0000    8.3700    7.0200    9.1800    21.060    0.0000    0.0000
    3 -1.4658E-03 -2.9733E-06   -195.35   -128.88   -124.60   -38.698   -114.41   -19.468    654.67  3.2009E+06
3.2009E+06
  x( M)    0.0000    9.1800    7.0200    0.0000    0.0000    8.3700    7.0200    9.1800    21.060    0.0000    0.0000
    4 -1.4658E-03 -2.9063E-06   -195.42   -125.57   -124.37   -37.852   -114.50   -19.059    1821.4  3.2009E+06
3.2009E+06
  x( M)    0.0000    9.1800    7.0200    0.0000    0.0000    8.3700    7.0200    9.1800    21.060    0.0000    0.0000
    5 -1.4713E-03 -2.9766E-06   -196.17   -128.87   -125.19   -38.671   -114.74   -19.436    808.36  3.2009E+06
3.2009E+06
  x( M)    0.0000    9.1800    7.0200    0.0000    0.0000    8.3700    7.0200    9.1800    21.060    0.0000    0.0000
    6 -1.4713E-03 -2.9096E-06   -196.24   -125.55   -124.96   -37.825   -114.83   -19.028    1953.7  3.2009E+06
3.2009E+06
  x( M)    0.0000    9.1800    7.0200    0.0000    0.0000    8.3700    7.0200    9.1800    21.060    0.0000    0.0000
    7 -1.4767E-03 -2.9799E-06   -196.98   -128.85   -125.78   -38.644   -115.06   -19.405    962.05  3.2009E+06
```



```
3.2009E+06
  x( M)    0.0000    9.1800    7.0200    0.0000    0.0000    8.3700    7.0200    9.1800    21.060    0.0000    0.0000
    8 -1.4767E-03 -2.9128E-06   -197.05   -125.54   -125.55   -37.799   -115.16   -18.997    2085.9  3.2009E+06
3.2009E+06
  x( M)    0.0000    9.1800    7.0200    0.0000    0.0000    8.3700    7.0200    9.1800    21.060    0.0000    0.0000
    9 -1.4631E-03 -2.9381E-06   -194.97   -127.23   -124.18   -38.288   -114.29   -19.279    1204.5  3.2009E+06
3.2009E+06
  x( M)    0.0000    9.1800    7.0200    0.0000    0.0000    8.3700    7.0200    9.1800    21.060    0.0000    0.0000
   10 -1.4686E-03 -2.9414E-06   -195.79   -127.22   -124.77   -38.261   -114.62   -19.248    1348.3  3.2009E+06
3.2009E+06
  x( M)    0.0000    9.1800    7.0200    0.0000    0.0000    8.3700    7.0200    9.1800    21.060    0.0000    0.0000
   11 -1.4740E-03 -2.9447E-06   -196.61   -127.20   -125.37   -38.235   -114.95   -19.216    1480.5  3.2009E+06
3.2009E+06
  x( M)    0.0000    9.1800    7.0200    0.0000    0.0000    8.3700    7.0200    9.1800    21.060    0.0000    0.0000

   Min. -1.4767E-03 -2.9799E-06   -197.05   -128.90   -125.78   -38.725   -115.16   -19.499    500.98  3.2009E+06
3.2009E+06
 Pile N.     7      7      8      1      7      1      8      1      1      1      1

  * MAXIMUM VALUES AND LOCATIONS *

   PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR   SOIL REACT  SOIL REACT     TOTAL    FLEX. RIG.
FLEX. RIG.
          y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS      z-DIR      y-DIR
            M          M        KN- M      KN- M        KN         KN       KN/ M      KN/ M    KN/ M**2   KN- M**2   KN- M**2
 ****** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
    1  7.9423E-06  4.9310E-04    298.23    71.633    103.22    47.891    52.145    43.733    2416.1  3.2009E+06
3.2009E+06
  x( M)    9.1800    0.0000    0.0000    7.0200    8.3700    0.0000    9.1800    7.0200    0.0000    0.0000    0.0000
    2  7.9371E-06  4.8378E-04    298.31    70.123    103.23    46.718    52.193    42.786    3597.1  3.2009E+06
3.2009E+06
  x( M)    9.1800    0.0000    0.0000    7.0200    8.3700    0.0000    9.1800    7.0200    0.0000    0.0000    0.0000
    3  7.9893E-06  4.9310E-04    300.12    71.605    103.64    47.875    52.310    43.641    2580.0  3.2009E+06
3.2009E+06
  x( M)    9.1800    0.0000    0.0000    7.0200    8.3700    0.0000    9.1800    7.0200    0.0000    0.0000    0.0000
    4  7.9841E-06  4.8378E-04    300.21    70.095    103.66    46.703    52.357    42.696    3739.6  3.2009E+06
3.2009E+06
  x( M)    9.1800    0.0000    0.0000    7.0200    8.3700    0.0000    9.1800    7.0200    0.0000    0.0000    0.0000
    5  8.0364E-06  4.9310E-04    302.02    71.577    104.07    47.859    52.475    43.550    2743.9  3.2009E+06
3.2009E+06
  x( M)    9.1800    0.0000    0.0000    7.0200    8.3700    0.0000    9.1800    7.0200    0.0000    0.0000    0.0000
    6  8.0312E-06  4.8378E-04    302.10    70.068    104.08    46.689    52.522    42.606    3882.1  3.2009E+06
3.2009E+06
  x( M)    9.1800    0.0000    0.0000    7.0200    8.3700    0.0000    9.1800    7.0200    0.0000    0.0000    0.0000
    7  8.0834E-06  4.9310E-04    303.92    71.549    104.49    47.843    52.639    43.459    2907.9  3.2009E+06
3.2009E+06
  x( M)    9.1800    0.0000    0.0000    7.0200    8.3700    0.0000    9.1800    7.0200    0.0000    0.0000    0.0000
    8  8.0783E-06  4.8378E-04    304.00    70.040    104.50    46.675    52.685    42.517    4024.7  3.2009E+06
3.2009E+06
  x( M)    9.1800    0.0000    0.0000    7.0200    8.3700    0.0000    9.1800    7.0200    0.0000    0.0000    0.0000
    9  7.9632E-06  4.8844E-04    299.22    70.865    103.44    47.293    52.251    43.214    3121.1  3.2009E+06
3.2009E+06
  x( M)    9.1800    0.0000    0.0000    7.0200    8.3700    0.0000    9.1800    7.0200    0.0000    0.0000    0.0000
   10  8.0102E-06  4.8844E-04    301.12    70.837    103.86    47.278    52.416    43.123    3275.1  3.2009E+06
3.2009E+06
  x( M)    9.1800    0.0000    0.0000    7.0200    8.3700    0.0000    9.1800    7.0200    0.0000    0.0000    0.0000
   11  8.0573E-06  4.8844E-04    303.01    70.809    104.28    47.264    52.580    43.033    3417.7  3.2009E+06
3.2009E+06
  x( M)    9.1800    0.0000    0.0000    7.0200    8.3700    0.0000    9.1800    7.0200    0.0000    0.0000    0.0000
```

```
Max.  8.0834E-06  4.9310E-04    304.00     71.633     104.50     47.891     52.685     43.733     4024.7  3.2009E+06
3.2009E+06
Pile N.       7          1          8          1          8          1          8          1          8          1          1
```

***** SUMMARY FOR LOAD CASES AND COMBINATIONS *****

***** LOAD CASES RESULTS *****

LOAD CASE : 1

* TABLE L * COMPUTATION ON PILE CAP

```
* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *
    LOAD X, KN     LOAD Y, KN     LOAD Z, KN    MOM X, KN- M   MOM Y, KN- M   MOM Z, KN- M
      39544.7        2328.56        780.000        11.2875        8589.75       -21888.4

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *
    DISP X, M      DISP Y, M      DISP Z, M      ROT X,RAD      ROT Y,RAD      ROT Z,RAD
  2.29864E-03    2.56753E-03    7.54869E-04    3.71496E-07    4.64883E-05   -2.41826E-04

 * PILE TOP DISPLACEMENTS, GLOBAL *
           DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
          *********** *********** *********** *********** *********** ***********
 MINIMUM    1.2979E-03   2.5655E-03   7.5372E-04   3.7150E-07   4.6488E-05  -2.4183E-04
 Pile N.         2            7            2            1            1            1
 MAXIMUM    3.2993E-03   2.5695E-03   7.5602E-04   3.7150E-07   4.6488E-05  -2.4183E-04
 Pile N.         7            1            1            1            1            1

 * PILE TOP REACTIONS, GLOBAL *
           FOR. X, KN   FOR. Y, KN   FOR. Z, KN  MOM X, KN- M  MOM Y, KN- M  MOM Z, KN- M
          *********** *********** *********** *********** *********** ***********
 MINIMUM       2118.3       210.95       70.853     0.054386      -189.41       503.45
 Pile N.         2            7            8            1            3            8
 MAXIMUM       5071.6       212.42       70.965     0.054386      -188.59       504.96
 Pile N.         7            2            1            1            2            1

 * PILE TOP DISPLACEMENTS, LOCAL *
           DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
          *********** *********** *********** *********** *********** ***********
 MINIMUM    1.2979E-03   2.5655E-03   7.5372E-04   3.7150E-07   4.6488E-05  -2.4183E-04
 Pile N.         2            7            2            1            1            1
 MAXIMUM    3.2993E-03   2.5695E-03   7.5602E-04   3.7150E-07   4.6488E-05  -2.4183E-04
 Pile N.         7            1            1            1            1            1

 * PILE TOP REACTIONS, LOCAL *
           AXIAL, KN    LAT. y, KN   LAT. z, KN  MOM x, KN- M  MOM y, KN- M  MOM z, KN- M
          *********** *********** *********** *********** *********** ***********
 MINIMUM       2118.3       210.95       70.853     0.054386      -189.41       503.45
 Pile N.         2            7            8            1            3            8
 MAXIMUM       5071.6       212.42       70.965     0.054386      -188.59       504.96
 Pile N.         7            2            1            1            2            1

 * EFFECTS FOR LATERALLY LOADED PILE *

PILE     DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR  SOIL REACT SOIL REACT      TOTAL
```



```
          y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS
            M          M       KN- M      KN- M        KN         KN      KN/ M      KN/ M    KN/ M**2
 ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
**********
 Min. -1.5720E-05 -5.0650E-06    -504.96    -189.41    -162.66    -52.794    -74.886    -24.321     1873.0
Pile N.       1          1          1          3          2          7          2          7          2
 Max.  2.5695E-03  7.5602E-04    324.49     103.61     212.47     71.000     161.51     56.079     7656.1
Pile N.       1          1          1          7          2          1          1          7          7
```

LOAD CASE : 2

* TABLE L * COMPUTATION ON PILE CAP

```
* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *
    LOAD X, KN     LOAD Y, KN     LOAD Z, KN    MOM X, KN- M   MOM Y, KN- M   MOM Z, KN- M
      22561.7       -1923.55        780.000        63.7125        8289.75        18081.4

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *
    DISP X, M      DISP Y, M      DISP Z, M      ROT X,RAD      ROT Y,RAD      ROT Z,RAD
  1.26410E-03   -2.09588E-03    7.39328E-04    2.27821E-06    4.26239E-05    1.94717E-04

 * PILE TOP DISPLACEMENTS, GLOBAL *
           DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
          *********** *********** *********** *********** *********** ***********
 MINIMUM    4.3030E-04  -2.1082E-03   7.3226E-04   2.2782E-06   4.2624E-05   1.9472E-04
 Pile N.         1            7            2            1            1            1
 MAXIMUM    2.0979E-03  -2.0836E-03   7.4639E-04   2.2782E-06   4.2624E-05   1.9472E-04
 Pile N.         8            1            1            1            1            1

 * PILE TOP REACTIONS, GLOBAL *
           FOR. X, KN   FOR. Y, KN   FOR. Z, KN  MOM X, KN- M  MOM Y, KN- M  MOM Z, KN- M
          *********** *********** *********** *********** *********** ***********
 MINIMUM       737.89      -176.41       69.954       0.3335      -193.31      -422.39
 Pile N.         1            7            8            1            1            8
 MAXIMUM       3298.7      -173.32       71.872       0.3335      -188.25      -413.64
 Pile N.         8            2            1            1            8            1

 * PILE TOP DISPLACEMENTS, LOCAL *
           DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
          *********** *********** *********** *********** *********** ***********
 MINIMUM    4.3030E-04  -2.1082E-03   7.3226E-04   2.2782E-06   4.2624E-05   1.9472E-04
 Pile N.         1            7            2            1            1            1
 MAXIMUM    2.0979E-03  -2.0836E-03   7.4639E-04   2.2782E-06   4.2624E-05   1.9472E-04
 Pile N.         8            1            1            1            1            1

 * PILE TOP REACTIONS, LOCAL *
           AXIAL, KN    LAT. y, KN   LAT. z, KN  MOM x, KN- M  MOM y, KN- M  MOM z, KN- M
          *********** *********** *********** *********** *********** ***********
 MINIMUM       737.89      -176.41       69.954       0.3335      -193.31      -422.39
 Pile N.         1            7            8            1            1            8
 MAXIMUM       3298.7      -173.32       71.872       0.3335      -188.25      -413.64
 Pile N.         8            2            1            1            8            1

 * EFFECTS FOR LATERALLY LOADED PILE *

PILE     DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR  SOIL REACT SOIL REACT      TOTAL
          y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS
            M          M       KN- M      KN- M        KN         KN      KN/ M      KN/ M    KN/ M**2
 ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
**********
```



```
 Min. -2.1082E-03 -4.9011E-06    -271.34    -193.31    -176.44    -54.814    -137.73    -26.058     652.44
Pile N.       7          7          8          1          7          1          8          1          1
 Max.  1.2522E-05  7.4639E-04    422.39     104.98     138.87     71.878     65.845     57.491     5642.6
Pile N.       7          1          8          1          8          1          8          1          8
```

LOAD CASE : 3

* TABLE L * COMPUTATION ON PILE CAP

```
* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *
    LOAD X, KN     LOAD Y, KN     LOAD Z, KN    MOM X, KN- M   MOM Y, KN- M   MOM Z, KN- M
      19211.0        6098.37        3210.00       -27.4750        30529.0       -57324.7

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *
    DISP X, M      DISP Y, M      DISP Z, M      ROT X,RAD      ROT Y,RAD      ROT Z,RAD
  1.13091E-03    6.82589E-03    3.13219E-03   -1.22588E-06    1.65398E-04   -6.02391E-04

 * PILE TOP DISPLACEMENTS, GLOBAL *
           DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
          *********** *********** *********** *********** *********** ***********
 MINIMUM   -1.6297E-03   6.8193E-03   3.1284E-03  -1.2259E-06   1.6540E-04  -6.0239E-04
 Pile N.         2            1            1            1            1            1
 MAXIMUM    3.8915E-03   6.8325E-03   3.1360E-03  -1.2259E-06   1.6540E-04  -6.0239E-04
 Pile N.         7            7            2            1            1            1

 * PILE TOP REACTIONS, GLOBAL *
           FOR. X, KN   FOR. Y, KN   FOR. Z, KN  MOM X, KN- M  MOM Y, KN- M  MOM Z, KN- M
          *********** *********** *********** *********** *********** ***********
 MINIMUM      -2587.4       551.51       289.71      -0.1795      -791.14       1329.2
 Pile N.         2            7            7            1            2            2
 MAXIMUM       5881.0       557.46       294.01      -0.1795      -788.67       1335.9
 Pile N.         7            2            2            1            7            7

 * PILE TOP DISPLACEMENTS, LOCAL *
           DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
          *********** *********** *********** *********** *********** ***********
 MINIMUM   -1.6297E-03   6.8193E-03   3.1284E-03  -1.2259E-06   1.6540E-04  -6.0239E-04
 Pile N.         2            1            1            1            1            1
 MAXIMUM    3.8915E-03   6.8325E-03   3.1360E-03  -1.2259E-06   1.6540E-04  -6.0239E-04
 Pile N.         7            7            2            1            1            1

 * PILE TOP REACTIONS, LOCAL *
           AXIAL, KN    LAT. y, KN   LAT. z, KN  MOM x, KN- M  MOM y, KN- M  MOM z, KN- M
          *********** *********** *********** *********** *********** ***********
 MINIMUM      -2587.4       551.51       289.71      -0.1795      -791.14       1329.2
 Pile N.         2            7            7            1            2            2
 MAXIMUM       5881.0       557.46       294.01      -0.1795      -788.67       1335.9
 Pile N.         7            2            2            1            7            7

 * EFFECTS FOR LATERALLY LOADED PILE *

PILE     DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR  SOIL REACT SOIL REACT      TOTAL
          y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS
            M          M       KN- M      KN- M        KN         KN      KN/ M      KN/ M    KN/ M**2
 ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
**********
 Min. -4.4835E-05 -2.2321E-05    -1335.9    -791.14    -295.98    -150.72    -124.43    -65.591     237.51
Pile N.       7          7          7          2          7          7          7          7          8
 Max.  6.8325E-03  3.1360E-03    743.15     367.49     557.31     293.92     230.33     134.38  1.4344E+04
Pile N.       7          2          7          8          2          2          2          2          7
```


LOAD CASE : 4

* TABLE L * COMPUTATION ON PILE CAP

```
* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *
    LOAD X, KN     LOAD Y, KN     LOAD Z, KN    MOM X, KN- M   MOM Y, KN- M   MOM Z, KN- M
      17349.0       -6098.37       -3210.00        27.4750       -29864.0        57324.7

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *
    DISP X, M      DISP Y, M      DISP Z, M      ROT X,RAD      ROT Y,RAD      ROT Z,RAD
  1.01708E-03   -6.81469E-03   -3.11990E-03    8.66520E-07   -1.61603E-04    5.99253E-04

 * PILE TOP DISPLACEMENTS, GLOBAL *
           DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
          *********** *********** *********** *********** *********** ***********
 MINIMUM   -1.7133E-03  -6.8194E-03  -3.1226E-03   8.6652E-07  -1.6160E-04   5.9925E-04
 Pile N.         7            7            2            1            1            1
 MAXIMUM    3.7474E-03  -6.8100E-03  -3.1172E-03   8.6652E-07  -1.6160E-04   5.9925E-04
 Pile N.         2            1            1            1            1            1

 * PILE TOP REACTIONS, GLOBAL *
           FOR. X, KN   FOR. Y, KN   FOR. Z, KN  MOM X, KN- M  MOM Y, KN- M  MOM Z, KN- M
          *********** *********** *********** *********** *********** ***********
 MINIMUM      -2710.7      -558.63      -293.24       0.1269       790.90      -1335.7
 Pile N.         7            7            7            1            7            8
 MAXIMUM       5732.9      -550.28      -290.45       0.1269       792.86      -1331.9
 Pile N.         2            2            2            1            2            1

 * PILE TOP DISPLACEMENTS, LOCAL *
           DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
          *********** *********** *********** *********** *********** ***********
 MINIMUM   -1.7133E-03  -6.8194E-03  -3.1226E-03   8.6652E-07  -1.6160E-04   5.9925E-04
 Pile N.         7            7            2            1            1            1
 MAXIMUM    3.7474E-03  -6.8100E-03  -3.1172E-03   8.6652E-07  -1.6160E-04   5.9925E-04
 Pile N.         2            1            1            1            1            1

 * PILE TOP REACTIONS, LOCAL *
           AXIAL, KN    LAT. y, KN   LAT. z, KN  MOM x, KN- M  MOM y, KN- M  MOM z, KN- M
          *********** *********** *********** *********** *********** ***********
 MINIMUM      -2710.7      -558.63      -293.24       0.1269       790.90      -1335.7
 Pile N.         7            7            7            1            7            8
 MAXIMUM       5732.9      -550.28      -290.45       0.1269       792.86      -1331.9
 Pile N.         2            2            2            1            2            1

 * EFFECTS FOR LATERALLY LOADED PILE *

PILE     DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR  SOIL REACT SOIL REACT      TOTAL
          y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS
            M          M       KN- M      KN- M        KN         KN      KN/ M      KN/ M    KN/ M**2
 ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
**********
 Min. -6.8194E-03 -3.1226E-03    -741.54    -367.39    -558.48    -293.15    -230.72    -134.63     48.596
Pile N.       7          2          8          2          7          7          7          2          1
 Max.  4.4679E-05  2.2323E-05    1335.7     792.86     295.32     150.96     123.78     65.566  1.4213E+04
Pile N.       2          2          8          2          8          2          2          2          2
```

LOAD CASE : 5

* TABLE L * COMPUTATION ON PILE CAP

```
 * EQUIVALENT CONCENTRATED LOAD AT ORIGIN *
     LOAD X, KN     LOAD Y, KN     LOAD Z, KN   MOM X, KN- M   MOM Y, KN- M   MOM Z, KN- M
       28695.0       1642.37       520.000       7.52500       5733.00      -15438.3

 * DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *
      DISP X, M     DISP Y, M     DISP Z, M     ROT X,RAD     ROT Y,RAD     ROT Z,RAD
    1.63023E-03   1.79787E-03   4.99310E-04   2.51407E-07   3.10100E-05  -1.70490E-04

  * PILE TOP DISPLACEMENTS, GLOBAL *
         DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
        *********** *********** *********** *********** *********** ***********
  MINIMUM    9.3426E-04  1.7965E-03  4.9853E-04  2.5141E-07  3.1010E-05 -1.7049E-04
  Pile N.        2           7           2           1           1           1
  MAXIMUM    2.3262E-03  1.7992E-03  5.0009E-04  2.5141E-07  3.1010E-05 -1.7049E-04
  Pile N.        7           1           1           1           1           1

  * PILE TOP REACTIONS, GLOBAL *
         FOR. X, KN   FOR. Y, KN   FOR. Z, KN MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
        *********** *********** *********** *********** *********** ***********
  MINIMUM       1581.6      148.90      47.219    0.036805     -126.06      354.36
  Pile N.        2           7           8           1           1           8
  MAXIMUM       3635.7      149.71      47.326    0.036805     -125.50      355.36
  Pile N.        7           2           1           1           2           1

  * PILE TOP DISPLACEMENTS, LOCAL *
         DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
        *********** *********** *********** *********** *********** ***********
  MINIMUM    9.3426E-04  1.7965E-03  4.9853E-04  2.5141E-07  3.1010E-05 -1.7049E-04
  Pile N.        2           7           2           1           1           1
  MAXIMUM    2.3262E-03  1.7992E-03  5.0009E-04  2.5141E-07  3.1010E-05 -1.7049E-04
  Pile N.        7           1           1           1           1           1

  * PILE TOP REACTIONS, LOCAL *
         AXIAL, KN   LAT. y, KN   LAT. z, KN MOM x, KN- M MOM y, KN- M MOM z, KN- M
        *********** *********** *********** *********** *********** ***********
  MINIMUM       1581.6      148.90      47.219    0.036805     -126.06      354.36
  Pile N.        2           7           8           1           1           8
  MAXIMUM       3635.7      149.71      47.326    0.036805     -125.50      355.36
  Pile N.        7           2           1           1           2           1

  * EFFECTS FOR LATERALLY LOADED PILE *

 PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR   SOIL REACT  SOIL REACT    TOTAL
         y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS
           M          M        KN- M      KN- M        KN         KN       KN/ M      KN/ M     KN/ M**2
 ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
**********
  Min. -1.0152E-05 -3.1084E-06    -355.36    -126.06    -121.83    -37.465    -59.421    -18.309     1398.5
 Pile N.     1          1          1          1          2          7          2          7          2
  Max.  1.7992E-03  5.0009E-04     234.04     70.729     149.73     47.343     127.73     40.217     5432.2
 Pile N.     1          1          1          7          2          1          2          7          7

 LOAD CASE :     6

 * TABLE L *   COMPUTATION ON PILE CAP

 * EQUIVALENT CONCENTRATED LOAD AT ORIGIN *
     LOAD X, KN     LOAD Y, KN     LOAD Z, KN   MOM X, KN- M   MOM Y, KN- M   MOM Z, KN- M
       16410.0      -1372.37       520.000       42.4750       5545.50       12900.3
```



```
 * DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *
      DISP X, M     DISP Y, M     DISP Z, M     ROT X,RAD     ROT Y,RAD     ROT Z,RAD
    8.95790E-04  -1.46855E-03   4.88440E-04   1.50217E-06   2.81567E-05   1.33333E-04

  * PILE TOP DISPLACEMENTS, GLOBAL *
         DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
        *********** *********** *********** *********** *********** ***********
  MINIMUM    3.3041E-04 -1.4767E-03  4.8378E-04  1.5022E-06  2.8157E-05  1.3333E-04
  Pile N.        1           7           2           1           1           1
  MAXIMUM    1.4612E-03 -1.4604E-03  4.9310E-04  1.5022E-06  2.8157E-05  1.3333E-04
  Pile N.        8           1           1           1           1           1

  * PILE TOP REACTIONS, GLOBAL *
         FOR. X, KN   FOR. Y, KN   FOR. Z, KN MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
        *********** *********** *********** *********** *********** ***********
  MINIMUM       566.59     -125.77      46.663      0.2199     -128.90     -304.00
  Pile N.        1           7           8           1           1           8
  MAXIMUM       2359.2     -123.75      47.887      0.2199     -125.54     -298.23
  Pile N.        8           2           1           1           8           1

  * PILE TOP DISPLACEMENTS, LOCAL *
         DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
        *********** *********** *********** *********** *********** ***********
  MINIMUM    3.3041E-04 -1.4767E-03  4.8378E-04  1.5022E-06  2.8157E-05  1.3333E-04
  Pile N.        1           7           2           1           1           1
  MAXIMUM    1.4612E-03 -1.4604E-03  4.9310E-04  1.5022E-06  2.8157E-05  1.3333E-04
  Pile N.        8           1           1           1           1           1

  * PILE TOP REACTIONS, LOCAL *
         AXIAL, KN   LAT. y, KN   LAT. z, KN MOM x, KN- M MOM y, KN- M MOM z, KN- M
        *********** *********** *********** *********** *********** ***********
  MINIMUM       566.59     -125.77      46.663      0.2199     -128.90     -304.00
  Pile N.        1           7           8           1           1           8
  MAXIMUM       2359.2     -123.75      47.887      0.2199     -125.54     -298.23
  Pile N.        8           2           1           1           8           1

  * EFFECTS FOR LATERALLY LOADED PILE *

 PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR   SOIL REACT  SOIL REACT    TOTAL
         y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS
           M          M        KN- M      KN- M        KN         KN       KN/ M      KN/ M     KN/ M**2
 ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
**********
  Min. -1.4767E-03 -2.9799E-06    -197.05    -128.90    -125.78    -38.725    -115.16    -19.499     500.98
 Pile N.     7          7          8          1          7          1          8          1          1
  Max.  8.0834E-06  4.9310E-04     304.00     71.633     104.50     47.891     52.685     43.733     4024.7
 Pile N.     7          1          8          1          8          1          8          1          8
```

16.3 Pila tipo 2: allegati *GROUP v2016*

==

GROUP for Windows, Version 2016.10.11

Serial Number : 197566553

Analysis of A Group of Piles
Subjected to Axial and Lateral Loading

==

This program is licensed to :

Errevia S.R.L.
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Path to file locations : W:\INCARICHI\801-899\877 - ANAS AQ Toscana\01.E78\DOC PRODOTTA\DI LAVORO\STRUTTURE\CALCOLI\05_viadotto Tressa Est (VI01)\01_pile\04_pila 4\
Name of input data file : VI01 - pila 4 - 4x2 D1200 L=27m_R00.gp10r
Name of output echo file : VI01 - pila 4 - 4x2 D1200 L=27m_R00.gp10e
Name of output results file : VI01 - pila 4 - 4x2 D1200 L=27m_R00.gp10o
Name of output summary file : VI01 - pila 4 - 4x2 D1200 L=27m_R00.gp10t
Name of plot output file : VI01 - pila 4 - 4x2 D1200 L=27m_R00.gp10p
Name of runtime file : VI01 - pila 4 - 4x2 D1200 L=27m_R00.gp10r

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Time and Date of Analysis

Date: November 04, 2020 Time: 10:22:23

***** INPUT INFORMATION *****

New Group

ANALYSIS TYPE = 3D ANALYSIS

ADJUST DEPTH FOR BATTER PILES

GENERATE LOAD-DISP (AND T-R) CURVES BASED ON SOIL PROFILE

EXTEND INTERPOLATION FOR L-DP (AND T-R) CURVES

UNITS SYSTEM = METR

* TABLE B * PILE CAP OPTIONS

LENGTH,YY (M) = 7.240
WIDTH, ZZ (M) = 14.48
THICKNESS,XX (M) = 1.500

* PILE CAP DIMENSIONS ARE NOT CONSIDERED
FOR THE PILE GROUP ANALYSIS

* TABLE C * LOAD AND CONTROL PARAMETERS

** LOAD CASES **

NUMBER OF LOAD CASES : 6

LOAD CASE : 1
CASE NAME : R statico MAX
LOAD TYPE : Dead, DL
SCALE FACTOR : 1.0000

* CONCENTRATED LOADS *

NL	VERT.LOAD	HR.LOAD Y	HR.LOAD Z	MOMENT X	MOMENT Y	MOMENT Z	COORD X	COORD Y	COORD Z
	KN	KN	KN	KN- M	KN- M	KN- M	M	M	M
1	1.06E+04	3.08E+02	5.10E+02	0.00	0.00	0.00	-9.33	-0.22	2.49
2	1.02E+04	3.04E+02	0.00	0.00	0.00	0.00	-9.33	0.22	-2.49
3	6.85E+03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VER.LOAD X, KN HOR.LOAD Y, KN HOR.LOAD Z, KN
27634.8 612.180 510.000

MOMENT X, KN- M MOMENT Y, KN- M MOMENT Z, KN- M
-126.090 5799.21 -5617.83

* THE LOADING IS STATIC *

* CONTROL PARAMETERS *
TOLERANCE ON CONVERGENCE OF PILE CAP MOVEMENT = 1.00000E-04
TOLERANCE ON DETERMINATION OF PILE DEFLECTIONS = 1.00000E-04 M
MAX NO OF ITERATIONS ALLOWED FOR FOUNDATION ANALYSIS = 100
MAXIMUM NO OF ITERATIONS ALLOWED FOR PILE ANALYSIS = 100
FACTOR TO APPLY THE LOAD IN INCREMENTS = 1.0000
MINIMUM FACTOR FOR LOAD INCREMENTS = 1.0000
PRINT RESULTS ONLY AT PILE CAP

LOAD CASE : 2
CASE NAME : R statico MIN
LOAD TYPE : Dead, DL
SCALE FACTOR : 1.0000

* CONCENTRATED LOADS *

NL	VERT.LOAD	HR.LOAD Y	HR.LOAD Z	MOMENT X	MOMENT Y	MOMENT Z	COORD X	COORD Y	COORD Z
	KN	KN	KN	KN- M	KN- M	KN- M	M	M	M
1	3.54E+03	-3.08E+02	5.10E+02	0.00	0.00	0.00	-9.33	-0.22	2.49
2	3.56E+03	-3.04E+02	0.00	0.00	0.00	0.00	-9.33	0.22	-2.49
3	6.85E+03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VER.LOAD X, KN HOR.LOAD Y, KN HOR.LOAD Z, KN
13959.3 -612.180 510.000

MOMENT X, KN- M MOMENT Y, KN- M MOMENT Z, KN- M
-102.784 4712.36 5707.50

* THE LOADING IS STATIC *

* CONTROL PARAMETERS *
TOLERANCE ON CONVERGENCE OF PILE CAP MOVEMENT = 1.00000E-04
TOLERANCE ON DETERMINATION OF PILE DEFLECTIONS = 1.00000E-04 M
MAX NO OF ITERATIONS ALLOWED FOR FOUNDATION ANALYSIS = 100
MAXIMUM NO OF ITERATIONS ALLOWED FOR PILE ANALYSIS = 100
FACTOR TO APPLY THE LOAD IN INCREMENTS = 1.0000
MINIMUM FACTOR FOR LOAD INCREMENTS = 1.0000
PRINT RESULTS ONLY AT PILE CAP

LOAD CASE : 3
CASE NAME : R sismico MAX
LOAD TYPE : Dead, DL
SCALE FACTOR : 1.0000

* CONCENTRATED LOADS *

NL	VERT.LOAD	HR.LOAD Y	HR.LOAD Z	MOMENT X	MOMENT Y	MOMENT Z	COORD X	COORD Y	COORD Z
	KN	KN	KN	KN- M	KN- M	KN- M	M	M	M
1	3.77E+03	2.36E+03	2.27E+03	0.00	0.00	0.00	-9.33	-0.22	2.49
2	3.78E+03	2.49E+03	0.00	0.00	0.00	0.00	-9.33	0.22	-2.49
3	5.08E+03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VER.LOAD X, KN HOR.LOAD Y, KN HOR.LOAD Z, KN
12625.0 4853.12 2270.00

MOMENT X, KN- M MOMENT Y, KN- M MOMENT Z, KN- M
-180.989 21174.1 -45280.1

* THE LOADING IS STATIC *

* CONTROL PARAMETERS *
TOLERANCE ON CONVERGENCE OF PILE CAP MOVEMENT = 1.00000E-04
TOLERANCE ON DETERMINATION OF PILE DEFLECTIONS = 1.00000E-04 M

MAX NO OF ITERATIONS ALLOWED FOR FOUNDATION ANALYSIS = 100
MAXIMUM NO OF ITERATIONS ALLOWED FOR PILE ANALYSIS = 100
FACTOR TO APPLY THE LOAD IN INCREMENTS = 1.0000
MINIMUM FACTOR FOR LOAD INCREMENTS = 1.0000
PRINT RESULTS ONLY AT PILE CAP

LOAD CASE : 4
CASE NAME : R sismico MIN
LOAD TYPE : Dead, DL
SCALE FACTOR : 1.0000

* CONCENTRATED LOADS *

NL	VERT.LOAD	HR.LOAD Y	HR.LOAD Z	MOMENT X	MOMENT Y	MOMENT Z	COORD X	COORD Y	COORD Z
	KN	KN	KN	KN- M	KN- M	KN- M	M	M	M
1	2.89E+03	-2.36E+03	-2.27E+03	0.00	0.00	0.00	-9.33	-0.22	2.49
2	2.88E+03	-2.49E+03	0.00	0.00	0.00	0.00	-9.33	0.22	-2.49
3	5.08E+03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VER.LOAD X, KN HOR.LOAD Y, KN HOR.LOAD Z, KN
10853.0 -4853.12 -2270.00

MOMENT X, KN- M MOMENT Y, KN- M MOMENT Z, KN- M
180.989 -21154.2 45281.9

* THE LOADING IS STATIC *

* CONTROL PARAMETERS *
TOLERANCE ON CONVERGENCE OF PILE CAP MOVEMENT = 1.00000E-04
TOLERANCE ON DETERMINATION OF PILE DEFLECTIONS = 1.00000E-04 M
MAX NO OF ITERATIONS ALLOWED FOR FOUNDATION ANALYSIS = 100
MAXIMUM NO OF ITERATIONS ALLOWED FOR PILE ANALYSIS = 100
FACTOR TO APPLY THE LOAD IN INCREMENTS = 1.0000
MINIMUM FACTOR FOR LOAD INCREMENTS = 1.0000
PRINT RESULTS ONLY AT PILE CAP

LOAD CASE : 5
CASE NAME : SLE statico MAX
LOAD TYPE : Dead, DL
SCALE FACTOR : 1.0000

* CONCENTRATED LOADS *

NL	VERT.LOAD	HR.LOAD Y	HR.LOAD Z	MOMENT X	MOMENT Y	MOMENT Z	COORD X	COORD Y	COORD Z
	KN	KN	KN	KN- M	KN- M	KN- M	M	M	M
1	7.64E+03	2.06E+02	3.40E+02	0.00	0.00	0.00	-9.33	-0.22	2.49
2	7.36E+03	2.02E+02	0.00	0.00	0.00	0.00	-9.33	0.22	-2.49
3	5.08E+03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VER.LOAD X, KN HOR.LOAD Y, KN HOR.LOAD Z, KN

20084.0 408.120 340.000

MOMENT X, KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
-84.0600	3866.88	-3745.16

* THE LOADING IS STATIC *

* CONTROL PARAMETERS *

TOLERANCE ON CONVERGENCE OF PILE CAP MOVEMENT = 1.00000E-04
TOLERANCE ON DETERMINATION OF PILE DEFLECTIONS = 1.00000E-04 M
MAX NO OF ITERATIONS ALLOWED FOR FOUNDATION ANALYSIS = 100
MAXIMUM NO OF ITERATIONS ALLOWED FOR PILE ANALYSIS = 100
FACTOR TO APPLY THE LOAD IN INCREMENTS = 1.0000
MINIMUM FACTOR FOR LOAD INCREMENTS = 1.0000
PRINT RESULTS ONLY AT PILE CAP

LOAD CASE : 6
CASE NAME : SLE statico MIN
LOAD TYPE : Dead, DL
SCALE FACTOR : 1.0000

* CONCENTRATED LOADS *

NL	VERT.LOAD KN	HR.LOAD Y KN	HR.LOAD Z KN	MOMENT X KN- M	MOMENT Y KN- M	MOMENT Z KN- M	COORD X M	COORD Y M	COORD Z M
1	2.54E+03	-2.06E+02	3.40E+02	0.00	0.00	0.00	-9.33	-0.22	2.49
2	2.55E+03	-2.02E+02	0.00	0.00	0.00	0.00	-9.33	0.22	-2.49
3	5.08E+03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VER.LOAD X, KN	HOR.LOAD Y, KN	HOR.LOAD Z, KN
10164.0	-408.120	340.000

MOMENT X, KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
-68.5230	3144.81	3805.29

* THE LOADING IS STATIC *

* CONTROL PARAMETERS *

TOLERANCE ON CONVERGENCE OF PILE CAP MOVEMENT = 1.00000E-04
TOLERANCE ON DETERMINATION OF PILE DEFLECTIONS = 1.00000E-04 M
MAX NO OF ITERATIONS ALLOWED FOR FOUNDATION ANALYSIS = 100
MAXIMUM NO OF ITERATIONS ALLOWED FOR PILE ANALYSIS = 100
FACTOR TO APPLY THE LOAD IN INCREMENTS = 1.0000
MINIMUM FACTOR FOR LOAD INCREMENTS = 1.0000
PRINT RESULTS ONLY AT PILE CAP

** LOAD CASES ENVELOPES **

PRINT RESULTS ONLY AT PILE CAP

* TABLE D * ARRANGEMENT OF PILE GROUPS

GROUP	CONN.Z-Z	CONN.Y-Y	PILE PROP	P-Y CURVE	L-S CURVE	T-R CURVE	R-F-L SET
1	FIX	FIX	1	0	1 G	1 G	0
2	FIX	FIX	1	0	1 G	1 G	0
3	FIX	FIX	1	0	1 G	1 G	0
4	FIX	FIX	1	0	1 G	1 G	0
5	FIX	FIX	1	0	1 G	1 G	0
6	FIX	FIX	1	0	1 G	1 G	0
7	FIX	FIX	1	0	1 G	1 G	0
8	FIX	FIX	1	0	1 G	1 G	0

GROUP	CorX, M	CorY, M	CorZ, M	ALPHA,DEG	BETA,DEG	THETA,DEG	GROUND, M	SPz, KN- M	SPy, KN- M
1	0.000	2.530	-5.796	0.000	90.00	0.000	0.000	0.000	0.000
2	0.000	-1.453	-6.155	0.000	90.00	0.000	0.000	0.000	0.000
3	0.000	2.171	-1.812	0.000	90.00	0.000	0.000	0.000	0.000
4	0.000	-1.812	-2.171	0.000	90.00	0.000	0.000	0.000	0.000
5	0.000	1.812	2.171	0.000	90.00	0.000	0.000	0.000	0.000
6	0.000	-2.171	1.812	0.000	90.00	0.000	0.000	0.000	0.000
7	0.000	1.453	6.155	0.000	90.00	0.000	0.000	0.000	0.000
8	0.000	-2.530	5.796	0.000	90.00	0.000	0.000	0.000	0.000

* TABLE E * PILE GEOMETRY AND PROPERTIES

PILE TYPE = 1 - DRIVEN PILE
= 2 - DRILLED SHAFT

PROP	SECTS	INC	PILE TYPE	LENGTH, M
1	1	100	2	27.000

* PILE SECTIONS *

PROP	SECT	FROM, M	TO, M	CROSS SECT
1	1	0.00000	27.0000	1

* PILE CROSS SECTIONS *

CROSS SECTION : 1
SECTION NAME : palo_D1200
TYPE : ELASTIC
CROSS SECTION TYPE : GENERAL SECTION
EQUIVALENT DIAMETER : 1200.00 MM
YOUNG MODULUS : 3.14472E+07 KN/ M**2

* PILE CROSS SECTIONS PROPERTIES *

ELASTIC SECTIONS

SECT	DIAM,MM	AREA,MM**2	Iz,MM**4	Iy,MM**4	GJ, KN- M**2	Mn, KN- M	Vn, KN
1	1200.0	1.1310E+06	1.0179E+11	1.0179E+11	1.3337E+06	0.0000	0.0000

* TABLE F * SOIL DATA

SOILS INFORMATION

GROUND SURFACE = 0.00000 M

2 LAYER(S) OF SOIL

LAYER 1
THE SOIL IS A SAND

		TOP OF LAYER	BOTTOM OF LAYER
X COORDINATE	(M)	0.00000	7.00000
EFFECTIVE UNIT WEIGHT	(KN/ M**3)	10.5000	10.5000
FRICTION ANGLE	(DEGREES)	30.0000	30.0000
P-Y SUBGRADE MODULUS	(KN/ M**3)	9377.12 (K)	9377.12 (K)
ULTIMATE UNIT SIDE FRICTION	(KN/ M**2)	12.6000 (S)	62.6987 (S)
ULTIMATE UNIT TIP RESISTANCE	(KN/ M**2)	0.00000	0.00000

LAYER 2
THE SOIL IS A SOFT CLAY

		TOP OF LAYER	BOTTOM OF LAYER
X COORDINATE	(M)	7.00000	40.0000
EFFECTIVE UNIT WEIGHT	(KN/ M**3)	11.0000	11.0000
UNDRAINED COHESION, C	(KN/ M**2)	200.000	200.000
STRAIN AT 50% STRESS		4.00000E-03 (E)	4.00000E-03 (E)
ULTIMATE UNIT SIDE FRICTION	(KN/ M**2)	110.000 (S)	110.000 (S)
ULTIMATE UNIT TIP RESISTANCE	(KN/ M**2)	1800.00 (T)	1800.00 (T)

Notes : Program estimated values for listed parameters
if zero input values were entered:
(E) STRAIN AT 50% STRESS
(K) P-Y SUBGRADE MODULUS for Static Loading
(S) ULTIMATE UNIT SIDE FRICTION for Drilled Shafts
(T) ULTIMATE UNIT TIP RESISTANCE for Drilled Shafts

* TABLE H * AXIAL LOAD VS DISPLACEMENT

AXIAL LOAD-DISPLACEMENT CURVES GENERATED INTERNALLY

NUM OF CURVES 1

CURVE 1 NUM OF POINTS 19

DISPLACEMENT, M	AXIAL LOAD, KN
-0.0543980	-8168.61
-0.0290631	-8306.55
-0.0165096	-8606.33
-5.79051E-03	-7504.21
-3.61429E-03	-5514.83
-8.07477E-04	-1374.62
-4.03738E-04	-687.311
-8.07477E-05	-137.462
-8.07477E-06	-13.7462
0.00000	0.00000
8.48738E-06	14.5542
8.48738E-05	145.542
4.24369E-04	727.710
8.48738E-04	1455.42
3.77243E-03	5769.77
6.08375E-03	7929.13
0.0173939	9762.92
0.0303011	9936.06

0.0558721 10108.9

* TABLE I * TORS. MOM. VS ANGLE ROT.

TORQUE-ROTATION CURVES GENERATED INTERNALLY

NUM OF CURVES 1

CURVE 1 NUM OF POINTS 19

ROT. ANGLE,Rad.	TORS.MOMEN, KN- M
-0.14206	-4881.00
-0.10077	-4963.41
-0.0810871	-5060.84
-0.0615739	-4961.74
-0.0521971	-4555.00
-0.0267588	-2962.50
-0.0176966	-2178.43
-4.63084E-03	-667.892
-4.66004E-04	-68.2216
0.00000	0.00000
4.66004E-04	68.2216
4.63084E-03	667.892
0.0176966	2178.43
0.0267588	2962.50
0.0521971	4555.00
0.0615739	4961.74
0.0810871	5060.84
0.10077	4963.41
0.14206	4881.00

* TABLE J * MOMENT CURVATURE SETS

USER DEFINED MOMENT CURVATURE

NUM OF SETS : 1

CURVE SET 1 NUM OF CURVES 1

CURVE 1 AXIAL LOAD 0.000E+00 KN

POINT	MOMENT KN- M	CURVATURE RADIAN/ M
1	0.00000	0.00000

```
=========================================================================

        GROUP for Windows, Version 2016.10.11

        Serial Number : 197566553

        Analysis of A Group of Piles
        Subjected to Axial and Lateral Loading

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=========================================================================


------------------------------------------------------------------------
         Time and Date of Analysis
------------------------------------------------------------------------

    Date:  November 04, 2020    Time:  10:22:23



    *****    COMPUTATION RESULTS    *****


 New Group



    *****    LOAD CASES RESULTS    *****


 LOAD CASE :    1
 CASE NAME : R statico MAX
 LOAD TYPE : Dead, DL



 * TABLE L *   COMPUTATION ON PILE CAP


 * EQUIVALENT CONCENTRATED LOAD AT ORIGIN *


   VERT. LOAD,  KN    HOR. LOAD Y,  KN    HOR. LOAD Z,  KN
      27634.8           612.180             510.000

   MOMENT X , KN- M    MOMENT Y, KN- M    MOMENT Z, KN- M
      -126.090            5799.21            -5617.83


 * DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *


   VERTICAL , M      HORIZONTAL Y, M     HORIZONTAL Z, M
```



```
    2.20335E-03       1.11575E-03       6.67138E-04

   ANGLE ROT. X,RAD   ANGLE ROT. Y,RAD   ANGLE ROT. Z,RAD
    -5.39152E-06       4.15487E-05       -1.53245E-04


 THE GLOBAL STRUCTURAL COORDINATE SYSTEM
 --------------------------------------

 * PILE TOP DISPLACEMENTS *

 PILE GROUP   DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
 ********** *********** *********** *********** *********** *********** ***********
    1     2.3503E-03  1.0845E-03  6.5350E-04 -5.3915E-06  4.1549E-05 -1.5324E-04
    2     1.7249E-03  1.0826E-03  6.7497E-04 -5.3915E-06  4.1549E-05 -1.5324E-04
    3     2.4608E-03  1.1060E-03  6.5543E-04 -5.3915E-06  4.1549E-05 -1.5324E-04
    4     1.8354E-03  1.1040E-03  6.7691E-04 -5.3915E-06  4.1549E-05 -1.5324E-04
    5     2.5713E-03  1.1275E-03  6.5737E-04 -5.3915E-06  4.1549E-05 -1.5324E-04
    6     1.9459E-03  1.1255E-03  6.7884E-04 -5.3915E-06  4.1549E-05 -1.5324E-04
    7     2.6818E-03  1.1489E-03  6.5930E-04 -5.3915E-06  4.1549E-05 -1.5324E-04
    8     2.0564E-03  1.1470E-03  6.8078E-04 -5.3915E-06  4.1549E-05 -1.5324E-04

 MINIMUM    1.7249E-03  1.0826E-03  6.5350E-04 -5.3915E-06  4.1549E-05 -1.5324E-04
 Pile N.        2          2          1          1          1          1
 MAXIMUM    2.6818E-03  1.1489E-03  6.8078E-04 -5.3915E-06  4.1549E-05 -1.5324E-04
 Pile N.        7          7          8          1          1          1

 * PILE TOP REACTIONS *

 PILE GROUP   FOR. X, KN   FOR. Y, KN   FOR. Z, KN MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
 ********** *********** *********** *********** *********** *********** ***********
    1         3671.2      72.880      62.182     -0.7893     -165.27      132.78
    2         2748.3      72.754      64.776     -0.7893     -172.91      131.92
    3         3834.3      75.350      62.363     -0.7893     -165.87      140.40
    4         2911.4      75.228      64.956     -0.7893     -173.51      139.54
    5         3997.3      77.818      62.544     -0.7893     -166.47      148.01
    6         3074.4      77.699      65.137     -0.7893     -174.11      147.15
    7         4160.4      80.283      62.725     -0.7893     -167.06      155.62
    8         3237.5      80.167      65.317     -0.7893     -174.71      154.76

 MINIMUM       2748.3      72.754      62.182     -0.7893     -174.71      131.92
 Pile N.        2          2          1          1          8          2
 MAXIMUM       4160.4      80.283      65.317     -0.7893     -165.27      155.62
 Pile N.        7          7          8          1          1          7


 THE PILE COORDINATE SYSTEM (LOCAL AXES)
 --------------------------------------

 * PILE TOP DISPLACEMENTS *

 PILE GROUP   DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
 ********** *********** *********** *********** *********** *********** ***********
    1     2.3503E-03  1.0845E-03  6.5350E-04 -5.3915E-06  4.1549E-05 -1.5324E-04
    2     1.7249E-03  1.0826E-03  6.7497E-04 -5.3915E-06  4.1549E-05 -1.5324E-04
    3     2.4608E-03  1.1060E-03  6.5543E-04 -5.3915E-06  4.1549E-05 -1.5324E-04
    4     1.8354E-03  1.1040E-03  6.7691E-04 -5.3915E-06  4.1549E-05 -1.5324E-04
    5     2.5713E-03  1.1275E-03  6.5737E-04 -5.3915E-06  4.1549E-05 -1.5324E-04
    6     1.9459E-03  1.1255E-03  6.7884E-04 -5.3915E-06  4.1549E-05 -1.5324E-04
    7     2.6818E-03  1.1489E-03  6.5930E-04 -5.3915E-06  4.1549E-05 -1.5324E-04
```



```
    8     2.0564E-03  1.1470E-03  6.8078E-04 -5.3915E-06  4.1549E-05 -1.5324E-04

 MINIMUM    1.7249E-03  1.0826E-03  6.5350E-04 -5.3915E-06  4.1549E-05 -1.5324E-04
 Pile N.        2          2          1          1          1          1
 MAXIMUM    2.6818E-03  1.1489E-03  6.8078E-04 -5.3915E-06  4.1549E-05 -1.5324E-04
 Pile N.        7          7          8          1          1          1

 * PILE TOP REACTIONS *

 PILE GROUP   AXIAL, KN   LAT. y, KN   LAT. z, KN MOM x, KN- M MOM y, KN- M MOM z, KN- M
 ********** *********** *********** *********** *********** *********** ***********
    1         3671.2      72.880      62.182     -0.7893     -165.27      132.78
    2         2748.3      72.754      64.776     -0.7893     -172.91      131.92
    3         3834.3      75.350      62.363     -0.7893     -165.87      140.40
    4         2911.4      75.228      64.956     -0.7893     -173.51      139.54
    5         3997.3      77.818      62.544     -0.7893     -166.47      148.01
    6         3074.4      77.699      65.137     -0.7893     -174.11      147.15
    7         4160.4      80.283      62.725     -0.7893     -167.06      155.62
    8         3237.5      80.167      65.317     -0.7893     -174.71      154.76

 MINIMUM       2748.3      72.754      62.182     -0.7893     -174.71      131.92
 Pile N.        2          2          1          1          8          2
 MAXIMUM       4160.4      80.283      65.317     -0.7893     -165.27      155.62
 Pile N.        7          7          8          1          1          7

 PILE GROUP   STRESS, KN/ M**2
 ********** ****************
    1          4495.7
    2          3712.0
    3          4671.2
    4          3886.7
    5          4847.5
    6          4062.1
    7          5024.4
    8          4238.3

 MINIMUM       3712.0
 Pile N.        2
 MAXIMUM       5024.4
 Pile N.        7

 * EFFECTS FOR LATERALLY LOADED PILE *

 * MINIMUM VALUES AND LOCATIONS *

   PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR   SOIL REACT  SOIL REACT    TOTAL    FLEX. RIG.
FLEX. RIG.
           y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS      z-DIR      y-DIR
             M          M        KN- M      KN- M        KN         KN       KN/ M      KN/ M    KN/ M**2   KN- M**2   KN- M**2
  ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
    1  -4.7549E-06 -3.6371E-06    -132.78    -165.27    -70.193    -53.403    -36.319    -28.319     3246.1  3.2009E+06
3.2009E+06
   x( M)     8.9100     8.9100     0.0000     0.0000     8.1000     8.1000     8.9100     9.1800     20.790     0.0000     0.0000
    2  -4.7466E-06 -3.7780E-06    -131.92    -172.91    -69.683    -55.147    -35.982    -29.267     2430.0  3.2009E+06
3.2009E+06
   x( M)     8.9100     8.9100     0.0000     0.0000     8.1000     8.1000     8.9100     9.1800     20.790     0.0000     0.0000
    3  -4.9144E-06 -3.6620E-06    -140.40    -165.87    -71.884    -53.290    -37.105    -28.219     3390.2  3.2009E+06
3.2009E+06
   x( M)     8.9100     8.9100     0.0000     0.0000     8.1000     8.1000     9.1800     9.1800     20.790     0.0000     0.0000
```



```
    4  -4.9057E-06 -3.8033E-06    -139.54    -173.51    -71.376    -55.033    -36.833    -29.165     2574.2  3.2009E+06
3.2009E+06
   x( M)     8.9100     8.9100     0.0000     0.0000     8.1000     8.1000     9.1800     9.1800     20.790     0.0000     0.0000
    5  -5.0742E-06 -3.6866E-06    -148.01    -166.47    -73.553    -53.177    -37.946    -28.119     3534.4  3.2009E+06
3.2009E+06
   x( M)     8.9100     8.9100     0.0000     0.0000     8.1000     8.1000     9.1800     9.1800     20.790     0.0000     0.0000
    6  -5.0652E-06 -3.8282E-06    -147.15    -174.11    -73.047    -54.918    -37.676    -29.062     2718.4  3.2009E+06
3.2009E+06
   x( M)     8.9100     8.9100     0.0000     0.0000     8.1000     8.1000     9.1800     9.1800     20.790     0.0000     0.0000
    7  -5.2343E-06 -3.7109E-06    -155.62    -167.06    -75.201    -53.063    -38.773    -28.019     3678.6  3.2009E+06
3.2009E+06
   x( M)     8.9100     8.9100     0.0000     0.0000     8.1000     8.1000     9.1800     9.1800     20.790     0.0000     0.0000
    8  -5.2251E-06 -3.8527E-06    -154.76    -174.71    -74.697    -54.803    -38.506    -28.960     2862.6  3.2009E+06
3.2009E+06
   x( M)     8.9100     8.9100     0.0000     0.0000     8.1000     8.1000     9.1800     9.1800     20.790     0.0000     0.0000

   Min. -5.2343E-06 -3.8527E-06    -155.62    -174.71    -75.201    -55.147    -38.773    -29.267     2430.0  3.2009E+06
3.2009E+06
  Pile N.      7          8          7          8          7          2          7          2          2          1          1

   * MAXIMUM VALUES AND LOCATIONS *

   PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR   SOIL REACT  SOIL REACT    TOTAL    FLEX. RIG.
FLEX. RIG.
           y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS      z-DIR      y-DIR
             M          M        KN- M      KN- M        KN         KN       KN/ M      KN/ M    KN/ M**2   KN- M**2   KN- M**2
  ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
    1   1.0845E-03  6.5349E-04    128.75     96.405     72.900     62.207     78.981     65.756     4495.7  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
    2   1.0826E-03  6.7497E-04    128.25     99.917     72.769     64.796     78.261     67.978     3712.0  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
    3   1.1060E-03  6.5543E-04    132.19     96.548     75.373     62.390     80.816     65.353     4671.2  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
    4   1.1040E-03  6.7691E-04    131.69    100.06     75.245     64.978     80.108     67.569     3886.7  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
    5   1.1275E-03  6.5737E-04    135.62     96.691     77.843     62.572     82.618     64.959     4847.5  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
    6   1.1255E-03  6.7884E-04    135.13    100.20     77.718     65.159     81.921     67.168     4062.1  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
    7   1.1489E-03  6.5930E-04    139.04     96.836     80.310     62.754     84.387     64.573     5024.4  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
    8   1.1470E-03  6.8078E-04    138.55    100.34     80.188     65.341     83.701     66.775     4238.3  3.2009E+06
3.2009E+06
   x( M)     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000

   Max.  1.1489E-03  6.8078E-04    139.04    100.34     80.310     65.341     84.387     67.978     5024.4  3.2009E+06
3.2009E+06
  Pile N.      7          8          7          8          7          8          7          2          7          1          1



   LOAD CASE :    2
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CASE NAME : R statico MIN
LOAD TYPE : Dead, DL

* TABLE L *   COMPUTATION ON PILE CAP

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VERT. LOAD, KN	HOR. LOAD Y, KN	HOR. LOAD Z, KN
13959.3	-612.180	510.000

MOMENT X , KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
-102.784	4712.36	5707.50

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL , M	HORIZONTAL Y, M	HORIZONTAL Z, M
1.05183E-03	-1.05262E-03	5.86097E-04

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-4.34614E-06	1.52957E-05	1.33155E-04

THE GLOBAL STRUCTURAL COORDINATE SYSTEM
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* PILE TOP DISPLACEMENTS *

PILE GROUP	DISP. X, M	DISP. Y, M	DISP. Z, M	ROT. X,RAD	ROT. Y,RAD	ROT. Z,RAD
1	6.2623E-04	-1.0778E-03	5.7510E-04	-4.3461E-06	1.5296E-05	1.3316E-04
2	1.1512E-03	-1.0794E-03	5.9241E-04	-4.3461E-06	1.5296E-05	1.3316E-04
3	7.3497E-04	-1.0605E-03	5.7666E-04	-4.3461E-06	1.5296E-05	1.3316E-04
4	1.2599E-03	-1.0620E-03	5.9397E-04	-4.3461E-06	1.5296E-05	1.3316E-04
5	8.4371E-04	-1.0432E-03	5.7822E-04	-4.3461E-06	1.5296E-05	1.3316E-04
6	1.3687E-03	-1.0447E-03	5.9554E-04	-4.3461E-06	1.5296E-05	1.3316E-04
7	9.5245E-04	-1.0259E-03	5.7978E-04	-4.3461E-06	1.5296E-05	1.3316E-04
8	1.4774E-03	-1.0274E-03	5.9709E-04	-4.3461E-06	1.5296E-05	1.3316E-04
MINIMUM	6.2623E-04	-1.0794E-03	5.7510E-04	-4.3461E-06	1.5296E-05	1.3316E-04
Pile N.	1	2	1	1	1	1
MAXIMUM	1.4774E-03	-1.0259E-03	5.9709E-04	-4.3461E-06	1.5296E-05	1.3316E-04
Pile N.	8	7	8	1	1	1

* PILE TOP REACTIONS *

PILE GROUP	FOR. X, KN	FOR. Y, KN	FOR. Z, KN	MOM X, KN- M	MOM Y, KN- M	MOM Z, KN- M
1	1073.9	-79.568	62.484	-0.6363	-180.90	-163.55
2	1901.8	-79.605	64.439	-0.6363	-187.03	-164.08
3	1260.3	-77.523	62.675	-0.6363	-181.52	-157.43
4	2062.2	-77.565	64.632	-0.6363	-187.65	-157.96
5	1446.8	-75.477	62.867	-0.6363	-182.14	-151.30
6	2222.7	-75.525	64.825	-0.6363	-188.28	-151.83
7	1608.5	-73.434	63.060	-0.6363	-182.76	-145.16

8	2383.2	-73.483	65.018	-0.6363	-188.90	-145.69
MINIMUM	1073.9	-79.605	62.484	-0.6363	-188.90	-164.08
Pile N.	1	2	1	1	8	2
MAXIMUM	2383.2	-73.434	65.018	-0.6363	-180.90	-145.16
Pile N.	8	7	8	1	1	7

THE PILE COORDINATE SYSTEM (LOCAL AXES)
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* PILE TOP DISPLACEMENTS *

PILE GROUP	DISP. x, M	DISP. y, M	DISP. z, M	ROT. x,RAD	ROT. y,RAD	ROT. z,RAD
1	6.2623E-04	-1.0778E-03	5.7510E-04	-4.3461E-06	1.5296E-05	1.3316E-04
2	1.1512E-03	-1.0794E-03	5.9241E-04	-4.3461E-06	1.5296E-05	1.3316E-04
3	7.3497E-04	-1.0605E-03	5.7666E-04	-4.3461E-06	1.5296E-05	1.3316E-04
4	1.2599E-03	-1.0620E-03	5.9397E-04	-4.3461E-06	1.5296E-05	1.3316E-04
5	8.4371E-04	-1.0432E-03	5.7822E-04	-4.3461E-06	1.5296E-05	1.3316E-04
6	1.3687E-03	-1.0447E-03	5.9554E-04	-4.3461E-06	1.5296E-05	1.3316E-04
7	9.5245E-04	-1.0259E-03	5.7978E-04	-4.3461E-06	1.5296E-05	1.3316E-04
8	1.4774E-03	-1.0274E-03	5.9709E-04	-4.3461E-06	1.5296E-05	1.3316E-04
MINIMUM	6.2623E-04	-1.0794E-03	5.7510E-04	-4.3461E-06	1.5296E-05	1.3316E-04
Pile N.	1	2	1	1	1	1
MAXIMUM	1.4774E-03	-1.0259E-03	5.9709E-04	-4.3461E-06	1.5296E-05	1.3316E-04
Pile N.	8	7	8	1	1	1

* PILE TOP REACTIONS *

PILE GROUP	AXIAL, KN	LAT. y, KN	LAT. z, KN	MOM x, KN- M	MOM y, KN- M	MOM z, KN- M
1	1073.9	-79.568	62.484	-0.6363	-180.90	-163.55
2	1901.8	-79.605	64.439	-0.6363	-187.03	-164.08
3	1260.3	-77.523	62.675	-0.6363	-181.52	-157.43
4	2062.2	-77.565	64.632	-0.6363	-187.65	-157.96
5	1446.8	-75.477	62.867	-0.6363	-182.14	-151.30
6	2222.7	-75.525	64.825	-0.6363	-188.28	-151.83
7	1608.5	-73.434	63.060	-0.6363	-182.76	-145.16
8	2383.2	-73.483	65.018	-0.6363	-188.90	-145.69
MINIMUM	1073.9	-79.605	62.484	-0.6363	-188.90	-164.08
Pile N.	1	2	1	1	8	2
MAXIMUM	2383.2	-73.434	65.018	-0.6363	-180.90	-145.16
Pile N.	8	7	8	1	1	7

PILE GROUP	STRESS, KN/ M**2
1	2387.0
2	3148.1
3	2530.7
4	3269.3
5	2675.0
6	3391.0
7	2798.0
8	3513.4
MINIMUM	2387.0
Pile N.	1

MAXIMUM	3513.4
Pile N.	8

* EFFECTS FOR LATERALLY LOADED PILE *

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR M	DISPL. z-DIR M	MOMENT z-DIR KN- M	MOMENT y-DIR KN- M	SHEAR y-DIR KN	SHEAR z-DIR KN	SOIL REACT y-DIR KN/ M	SOIL REACT z-DIR KN/ M	TOTAL STRESS KN/ M**2	FLEX. RIG. z-DIR KN- M**2	FLEX. RIG. y-DIR KN- M**2
1	-1.0778E-03	-3.4892E-06	-134.35	-180.90	-79.576	-51.246	-83.739	-27.275	949.50	3.2009E+06	3.2009E+06
x(M)	0.0000	8.9100	7.0200	0.0000	0.0000	8.3700	7.0200	9.1800	20.790	0.0000	0.0000
2	-1.0794E-03	-3.6074E-06	-134.45	-187.03	-79.618	-52.788	-83.365	-28.027	1681.5	3.2009E+06	3.2009E+06
x(M)	0.0000	8.9100	7.0200	0.0000	0.0000	8.3700	7.0200	9.1800	20.790	0.0000	0.0000
3	-1.0605E-03	-3.4903E-06	-131.56	-181.52	-77.531	-51.500	-82.203	-27.489	1114.4	3.2009E+06	3.2009E+06
x(M)	0.0000	8.9100	7.0200	0.0000	0.0000	8.3700	7.0200	9.1800	20.790	0.0000	0.0000
4	-1.0621E-03	-3.6084E-06	-131.66	-187.65	-77.579	-53.042	-81.826	-28.241	1823.4	3.2009E+06	3.2009E+06
x(M)	0.0000	8.9100	7.0200	0.0000	0.0000	8.3700	7.0200	9.1800	20.790	0.0000	0.0000
5	-1.0432E-03	-3.4912E-06	-128.77	-182.14	-75.486	-51.753	-80.643	-27.705	1279.3	3.2009E+06	3.2009E+06
x(M)	0.0000	8.9100	7.0200	0.0000	0.0000	8.3700	7.0200	9.1800	20.790	0.0000	0.0000
6	-1.0447E-03	-3.6091E-06	-128.87	-188.28	-75.539	-53.296	-80.263	-28.457	1965.3	3.2009E+06	3.2009E+06
x(M)	0.0000	8.9100	7.0200	0.0000	0.0000	8.3700	7.0200	9.1800	20.790	0.0000	0.0000
7	-1.0259E-03	-3.4917E-06	-125.97	-182.76	-73.444	-52.008	-79.059	-27.921	1422.2	3.2009E+06	3.2009E+06
x(M)	0.0000	8.9100	7.0200	0.0000	0.0000	8.3700	7.0200	9.1800	20.790	0.0000	0.0000
8	-1.0274E-03	-3.6095E-06	-126.07	-188.90	-73.498	-53.550	-78.676	-28.673	2107.2	3.2009E+06	3.2009E+06
x(M)	0.0000	8.9100	7.0200	0.0000	0.0000	8.3700	7.0200	9.1800	20.790	0.0000	0.0000
Min.	-1.0794E-03	-3.6095E-06	-134.45	-188.90	-79.618	-53.550	-83.739	-28.673	949.50	3.2009E+06	3.2009E+06
Pile N.	2	8	2	8	2	8	1	8	1	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR M	DISPL. z-DIR M	MOMENT z-DIR KN- M	MOMENT y-DIR KN- M	SHEAR y-DIR KN	SHEAR z-DIR KN	SOIL REACT y-DIR KN/ M	SOIL REACT z-DIR KN/ M	TOTAL STRESS KN/ M**2	FLEX. RIG. z-DIR KN- M**2	FLEX. RIG. y-DIR KN- M**2
1	4.9692E-06	5.7510E-04	163.55	92.130	72.539	62.492	37.961	64.204	2387.0	3.2009E+06	3.2009E+06
x(M)	8.9100	0.0000	0.0000	7.0200	8.1000	0.0000	9.1800	7.0200	0.0000	0.0000	0.0000
2	4.9895E-06	5.9241E-04	164.08	94.952	72.435	64.454	37.873	65.884	3148.1	3.2009E+06	3.2009E+06
x(M)	8.9100	0.0000	0.0000	7.0200	8.1000	0.0000	9.1800	7.0200	0.0000	0.0000	0.0000
3	4.8427E-06	5.7666E-04	157.43	92.525	71.181	62.685	37.255	64.829	2530.7	3.2009E+06	3.2009E+06
x(M)	8.9100	0.0000	0.0000	7.0200	8.1000	0.0000	9.1800	7.0200	0.0000	0.0000	0.0000
4	4.8630E-06	5.9397E-04	157.96	95.347	71.074	64.648	37.166	66.508	3269.3	3.2009E+06	

											3.2009E+06
x(M)	8.9100	0.0000	0.0000	7.0200	8.1000	0.0000	9.1800	7.0200	0.0000	0.0000	0.0000
5	4.7165E-06	5.7822E-04	151.30	92.922	69.808	62.878	36.540	65.460	2675.0	3.2009E+06	3.2009E+06
x(M)	8.9100	0.0000	0.0000	7.0200	8.1000	0.0000	9.1800	7.0200	0.0000	0.0000	0.0000
6	4.7369E-06	5.9553E-04	151.83	95.743	69.699	64.843	36.451	67.138	3391.0	3.2009E+06	3.2009E+06
x(M)	8.9100	0.0000	0.0000	7.0200	8.1000	0.0000	9.1800	7.0200	0.0000	0.0000	0.0000
7	4.5906E-06	5.7978E-04	145.16	93.318	68.420	63.073	35.815	66.097	2798.0	3.2009E+06	3.2009E+06
x(M)	8.9100	0.0000	0.0000	7.0200	8.1000	0.0000	9.1800	7.0200	0.0000	0.0000	0.0000
8	4.6111E-06	5.9710E-04	145.69	96.139	68.310	65.037	35.727	67.773	3513.4	3.2009E+06	3.2009E+06
x(M)	8.9100	0.0000	0.0000	7.0200	8.1000	0.0000	9.1800	7.0200	0.0000	0.0000	0.0000
Max.	4.9895E-06	5.9710E-04	164.08	96.139	72.539	65.037	37.961	67.773	3513.4	3.2009E+06	3.2009E+06
Pile N.	2	8	2	8	1	8	1	8	8	1	1

LOAD CASE : 3
CASE NAME : R sismico MAX
LOAD TYPE : Dead, DL

* TABLE L *   COMPUTATION ON PILE CAP

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VERT. LOAD, KN	HOR. LOAD Y, KN	HOR. LOAD Z, KN
12625.0	4853.12	2270.00

MOMENT X , KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
-180.989	21174.1	-45280.1

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL , M	HORIZONTAL Y, M	HORIZONTAL Z, M
1.06736E-03	9.02175E-03	3.19907E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-9.52115E-06	1.98135E-04	-1.13618E-03

THE GLOBAL STRUCTURAL COORDINATE SYSTEM
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* PILE TOP DISPLACEMENTS *

PILE GROUP	DISP. X, M	DISP. Y, M	DISP. Z, M	ROT. X,RAD	ROT. Y,RAD	ROT. Z,RAD
1	2.7940E-03	8.9666E-03	3.1750E-03	-9.5211E-06	1.9813E-04	-1.1362E-03
2	-1.8035E-03	8.9631E-03	3.2129E-03	-9.5211E-06	1.9813E-04	-1.1362E-03
3	3.1754E-03	9.0045E-03	3.1784E-03	-9.5211E-06	1.9813E-04	-1.1362E-03

4	-1.4221E-03	9.0011E-03	3.2163E-03	-9.5211E-06	1.9813E-04	-1.1362E-03
5	3.5568E-03	9.0424E-03	3.1818E-03	-9.5211E-06	1.9813E-04	-1.1362E-03
6	-1.0407E-03	9.0390E-03	3.2197E-03	-9.5211E-06	1.9813E-04	-1.1362E-03
7	3.9383E-03	9.0804E-03	3.1852E-03	-9.5211E-06	1.9813E-04	-1.1362E-03
8	-6.5925E-04	9.0769E-03	3.2232E-03	-9.5211E-06	1.9813E-04	-1.1362E-03
MINIMUM	-1.8035E-03	8.9631E-03	3.1750E-03	-9.5211E-06	1.9813E-04	-1.1362E-03
Pile N.	2	2	1	1	1	1
MAXIMUM	3.9383E-03	9.0804E-03	3.2232E-03	-9.5211E-06	1.9813E-04	-1.1362E-03
Pile N.	7	7	8	1	1	1

* PILE TOP REACTIONS *

PILE GROUP	FOR. X, KN	FOR. Y, KN	FOR. Z, KN	MOM X, KN- M	MOM Y, KN- M	MOM Z, KN- M
1	4325.9	598.42	280.36	-1.3939	-747.25	1186.7
2	-2843.9	605.83	287.33	-1.3939	-759.28	1179.8
3	4888.8	601.43	280.30	-1.3939	-748.09	1199.0
4	-2281.2	608.85	287.26	-1.3939	-760.09	1192.1
5	5451.6	604.41	280.23	-1.3939	-748.89	1211.3
6	-1718.6	611.87	287.19	-1.3939	-760.89	1204.3
7	5924.7	607.48	280.20	-1.3939	-749.70	1223.5
8	-1122.3	614.84	287.11	-1.3939	-761.70	1216.6
MINIMUM	-2843.9	598.42	280.20	-1.3939	-761.70	1179.8
Pile N.	2	1	7	1	8	2
MAXIMUM	5924.7	614.84	287.33	-1.3939	-747.25	1223.5
Pile N.	7	8	2	1	1	7

THE PILE COORDINATE SYSTEM (LOCAL AXES)
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* PILE TOP DISPLACEMENTS *

PILE GROUP	DISP. x, M	DISP. y, M	DISP. z, M	ROT. x,RAD	ROT. y,RAD	ROT. z,RAD
1	2.7940E-03	8.9666E-03	3.1750E-03	-9.5211E-06	1.9813E-04	-1.1362E-03
2	-1.8035E-03	8.9631E-03	3.2129E-03	-9.5211E-06	1.9813E-04	-1.1362E-03
3	3.1754E-03	9.0045E-03	3.1784E-03	-9.5211E-06	1.9813E-04	-1.1362E-03
4	-1.4221E-03	9.0011E-03	3.2163E-03	-9.5211E-06	1.9813E-04	-1.1362E-03
5	3.5568E-03	9.0424E-03	3.1818E-03	-9.5211E-06	1.9813E-04	-1.1362E-03
6	-1.0407E-03	9.0390E-03	3.2197E-03	-9.5211E-06	1.9813E-04	-1.1362E-03
7	3.9383E-03	9.0804E-03	3.1852E-03	-9.5211E-06	1.9813E-04	-1.1362E-03
8	-6.5925E-04	9.0769E-03	3.2232E-03	-9.5211E-06	1.9813E-04	-1.1362E-03
MINIMUM	-1.8035E-03	8.9631E-03	3.1750E-03	-9.5211E-06	1.9813E-04	-1.1362E-03
Pile N.	2	2	1	1	1	1
MAXIMUM	3.9383E-03	9.0804E-03	3.2232E-03	-9.5211E-06	1.9813E-04	-1.1362E-03
Pile N.	7	7	8	1	1	1

* PILE TOP REACTIONS *

PILE GROUP	AXIAL, KN	LAT. y, KN	LAT. z, KN	MOM x, KN- M	MOM y, KN- M	MOM z, KN- M
1	4325.9	598.42	280.36	-1.3939	-747.25	1186.7
2	-2843.9	605.83	287.33	-1.3939	-759.28	1179.8
3	4888.8	601.43	280.30	-1.3939	-748.09	1199.0
4	-2281.2	608.85	287.26	-1.3939	-760.09	1192.1
5	5451.6	604.41	280.23	-1.3939	-748.89	1211.3

6	-1718.6	611.87	287.19	-1.3939	-760.89	1204.3
7	5924.7	607.48	280.20	-1.3939	-749.70	1223.5
8	-1122.3	614.84	287.11	-1.3939	-761.70	1216.6
MINIMUM	-2843.9	598.42	280.20	-1.3939	-761.70	1179.8
Pile N.	2	1	7	1	8	2
MAXIMUM	5924.7	614.84	287.33	-1.3939	-747.25	1223.5
Pile N.	7	8	2	1	1	7

PILE GROUP	STRESS, KN/ M**2
1	1.2091E+04
2	1.0785E+04
3	1.2653E+04
4	1.0351E+04
5	1.3215E+04
6	9916.8
7	1.3697E+04
8	9453.5
MINIMUM	9453.5
Pile N.	8
MAXIMUM	1.3697E+04
Pile N.	7

* EFFECTS FOR LATERALLY LOADED PILE *

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR M	DISPL. z-DIR M	MOMENT z-DIR KN- M	MOMENT y-DIR KN- M	SHEAR y-DIR KN	SHEAR z-DIR KN	SOIL REACT y-DIR KN/ M	SOIL REACT z-DIR KN/ M	TOTAL STRESS KN/ M**2	FLEX. RIG. z-DIR KN- M**2	FLEX. RIG. y-DIR KN- M**2
1	-5.5810E-05	-2.3159E-05	-1186.7	-747.25	-343.18	-147.24	-159.66	-74.854	3824.9	3.2009E+06	3.2009E+06
x(M)	9.7200	9.7200	0.0000	0.0000	8.6400	8.9100	11.880	11.880	19.440	0.0000	0.0000
2	-5.4955E-05	-2.3029E-05	-1179.8	-759.28	-339.23	-148.09	-154.85	-73.496	2514.5	3.2009E+06	3.2009E+06
x(M)	9.7200	9.7200	0.0000	0.0000	8.6400	8.9100	11.880	11.880	19.440	0.0000	0.0000
3	-5.6169E-05	-2.3193E-05	-1199.0	-748.09	-344.62	-147.21	-160.94	-75.038	4322.6	3.2009E+06	3.2009E+06
x(M)	9.7200	9.7200	0.0000	0.0000	8.6400	8.9100	11.880	11.880	19.440	0.0000	0.0000
4	-5.5306E-05	-2.3062E-05	-1192.1	-760.09	-340.64	-148.06	-156.04	-73.646	2017.1	3.2009E+06	3.2009E+06
x(M)	9.7200	9.7200	0.0000	0.0000	8.6400	8.9100	11.880	11.880	19.440	0.0000	0.0000
5	-5.6527E-05	-2.3226E-05	-1211.3	-748.89	-346.05	-147.17	-162.25	-75.226	4820.3	3.2009E+06	3.2009E+06
x(M)	9.7200	9.7200	0.0000	0.0000	8.6400	8.9100	11.880	11.880	19.440	0.0000	0.0000
6	-5.5657E-05	-2.3096E-05	-1204.3	-760.89	-342.04	-148.03	-157.23	-73.797	1519.6	3.2009E+06	3.2009E+06
x(M)	9.7200	9.7200	0.0000	0.0000	8.6400	8.9100	11.880	11.880	19.440	0.0000	0.0000
7	-5.6874E-05	-2.3253E-05	-1223.5	-749.70	-347.43	-147.12	-163.51	-75.396	5238.6	3.2009E+06	3.2009E+06
x(M)	9.7200	9.7200	0.0000	0.0000	8.6400	8.9100	11.880	11.880	19.440	0.0000	0.0000
8	-5.6012E-05	-2.3147E-05	-1216.6	-761.70	-343.46	-148.01	-158.45	-73.962	992.31	3.2009E+06	3.2009E+06
x(M)	9.7200	9.9900	0.0000	0.0000	8.6400	8.9100	11.880	11.880	19.440	0.0000	0.0000
Min.	-5.6874E-05	-2.3253E-05	-1223.5	-761.70	-347.43	-148.09	-163.51	-75.396	992.31	3.2009E+06	3.2009E+06
Pile N.	7	7	7	8	7	2	7	7	8	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR M	DISPL. z-DIR M	MOMENT z-DIR KN- M	MOMENT y-DIR KN- M	SHEAR y-DIR KN	SHEAR z-DIR KN	SOIL REACT y-DIR KN/ M	SOIL REACT z-DIR KN/ M	TOTAL STRESS KN/ M**2	FLEX. RIG. z-DIR KN- M**2	FLEX. RIG. y-DIR KN- M**2
1	8.9666E-03	3.1750E-03	894.06	362.75	598.63	280.50	235.43	143.48	1.2091E+04	3.2009E+06	3.2009E+06
x(M)	0.0000	0.0000	6.4800	7.0200	0.0000	0.0000	8.3700	8.3700	0.0000	0.0000	0.0000
2	8.9631E-03	3.2129E-03	889.96	366.35	605.68	287.24	231.74	141.08	1.0785E+04	3.2009E+06	3.2009E+06
x(M)	0.0000	0.0000	6.4800	7.2900	0.0000	0.0000	8.3700	8.3700	0.0000	0.0000	0.0000
3	9.0045E-03	3.1784E-03	898.36	363.01	601.67	280.46	236.37	142.89	1.2653E+04	3.2009E+06	3.2009E+06
x(M)	0.0000	0.0000	6.4800	7.0200	0.0000	0.0000	8.3700	8.3700	0.0000	0.0000	0.0000
4	9.0011E-03	3.2163E-03	894.23	366.60	608.74	287.19	232.67	140.52	1.0351E+04	3.2009E+06	3.2009E+06
x(M)	0.0000	0.0000	6.4800	7.2900	0.0000	0.0000	8.3700	8.3700	0.0000	0.0000	0.0000
5	9.0424E-03	3.1818E-03	902.65	363.27	604.69	280.41	237.31	142.29	1.3215E+04	3.2009E+06	3.2009E+06
x(M)	0.0000	0.0000	6.4800	7.0200	0.0000	0.0000	8.3700	8.3700	0.0000	0.0000	0.0000
6	9.0390E-03	3.2197E-03	898.49	366.84	611.78	287.14	233.59	139.96	9916.8	3.2009E+06	3.2009E+06
x(M)	0.0000	0.0000	6.4800	7.2900	0.0000	0.0000	8.3700	8.3700	0.0000	0.0000	0.0000
7	9.0804E-03	3.1852E-03	906.89	363.51	607.79	280.39	238.19	141.65	1.3697E+04	3.2009E+06	3.2009E+06
x(M)	0.0000	0.0000	6.4800	7.0200	0.0000	0.0000	8.3700	8.3700	0.0000	0.0000	0.0000
8	9.0769E-03	3.2232E-03	902.77	367.10	614.78	287.08	234.49	139.42	9453.5	3.2009E+06	3.2009E+06
x(M)	0.0000	0.0000	6.4800	7.2900	0.0000	0.0000	8.3700	8.3700	0.0000	0.0000	0.0000
Max.	9.0804E-03	3.2232E-03	906.89	367.10	614.78	287.24	238.19	143.48	1.3697E+04	3.2009E+06	3.2009E+06
Pile N.	7	8	7	8	8	2	7	1	7	1	1

LOAD CASE : 4
CASE NAME : R sismico MIN
LOAD TYPE : Dead, DL

* TABLE L * COMPUTATION ON PILE CAP

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VERT. LOAD, KN	HOR. LOAD Y, KN	HOR. LOAD Z, KN
10853.0	-4853.12	-2270.00

MOMENT X , KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
180.989	-21154.2	45281.9

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL , M	HORIZONTAL Y, M	HORIZONTAL Z, M
9.12478E-04	-9.00329E-03	-3.19194E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
8.68691E-06	-1.96207E-04	1.13138E-03

THE GLOBAL STRUCTURAL COORDINATE SYSTEM
----

* PILE TOP DISPLACEMENTS *

PILE GROUP	DISP. X, M	DISP. Y, M	DISP. Z, M	ROT. X,RAD	ROT. Y,RAD	ROT. Z,RAD
1	-8.1317E-04	-8.9529E-03	-3.1700E-03	8.6869E-06	-1.9621E-04	1.1314E-03
2	3.7645E-03	-8.9498E-03	-3.2046E-03	8.6869E-06	-1.9621E-04	1.1314E-03
3	-1.1886E-03	-8.9875E-03	-3.1731E-03	8.6869E-06	-1.9621E-04	1.1314E-03
4	3.3891E-03	-8.9844E-03	-3.2077E-03	8.6869E-06	-1.9621E-04	1.1314E-03
5	-1.5641E-03	-9.0221E-03	-3.1762E-03	8.6869E-06	-1.9621E-04	1.1314E-03
6	3.0136E-03	-9.0190E-03	-3.2108E-03	8.6869E-06	-1.9621E-04	1.1314E-03
7	-1.9396E-03	-9.0568E-03	-3.1793E-03	8.6869E-06	-1.9621E-04	1.1314E-03
8	2.6381E-03	-9.0536E-03	-3.2139E-03	8.6869E-06	-1.9621E-04	1.1314E-03
MINIMUM	-1.9396E-03	-9.0568E-03	-3.2139E-03	8.6869E-06	-1.9621E-04	1.1314E-03
Pile N.	7	7	8	1	1	1
MAXIMUM	3.7645E-03	-8.9498E-03	-3.1700E-03	8.6869E-06	-1.9621E-04	1.1314E-03
Pile N.	2	2	1	1	1	1

* PILE TOP REACTIONS *

PILE GROUP	FOR. X, KN	FOR. Y, KN	FOR. Z, KN	MOM X, KN- M	MOM Y, KN- M	MOM Z, KN- M
1	-1383.0	-604.94	-282.76	1.2717	748.23	-1185.5
2	5758.1	-596.55	-283.63	1.2717	760.26	-1189.6
3	-1936.9	-608.89	-283.13	1.2717	748.90	-1195.9
4	5204.1	-600.47	-284.00	1.2717	760.93	-1200.0
5	-2490.7	-612.83	-283.50	1.2717	749.56	-1206.3
6	4650.0	-604.38	-284.37	1.2717	761.58	-1210.4
7	-3044.5	-616.77	-283.87	1.2717	750.22	-1216.7
8	4095.9	-608.30	-284.73	1.2717	762.23	-1220.8
MINIMUM	-3044.5	-616.77	-284.73	1.2717	748.23	-1220.8
Pile N.	7	7	8	1	1	8
MAXIMUM	5758.1	-596.55	-282.76	1.2717	762.23	-1185.5
Pile N.	2	2	1	1	8	1

THE PILE COORDINATE SYSTEM (LOCAL AXES)
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* PILE TOP DISPLACEMENTS *

PILE GROUP	DISP. x, M	DISP. y, M	DISP. z, M	ROT. x,RAD	ROT. y,RAD	ROT. z,RAD
1	-8.1317E-04	-8.9529E-03	-3.1700E-03	8.6869E-06	-1.9621E-04	1.1314E-03

```
   2      3.7645E-03 -8.9498E-03 -3.2046E-03  8.6869E-06 -1.9621E-04  1.1314E-03
   3     -1.1886E-03 -8.9875E-03 -3.1731E-03  8.6869E-06 -1.9621E-04  1.1314E-03
   4      3.3891E-03 -8.9844E-03 -3.2077E-03  8.6869E-06 -1.9621E-04  1.1314E-03
   5     -1.5641E-03 -9.0221E-03 -3.1762E-03  8.6869E-06 -1.9621E-04  1.1314E-03
   6      3.0136E-03 -9.0190E-03 -3.2108E-03  8.6869E-06 -1.9621E-04  1.1314E-03
   7     -1.9396E-03 -9.0568E-03 -3.1793E-03  8.6869E-06 -1.9621E-04  1.1314E-03
   8      2.6381E-03 -9.0536E-03 -3.2139E-03  8.6869E-06 -1.9621E-04  1.1314E-03

 MINIMUM  -1.9396E-03 -9.0568E-03 -3.2139E-03  8.6869E-06 -1.9621E-04  1.1314E-03
 Pile N.      7          7          8          1          1          1
 MAXIMUM   3.7645E-03 -8.9498E-03 -3.1700E-03  8.6869E-06 -1.9621E-04  1.1314E-03
 Pile N.      2          2          1          1          1          1

 * PILE TOP REACTIONS *

PILE GROUP   AXIAL, KN   LAT. y, KN   LAT. z, KN MOM x, KN- M MOM y, KN- M MOM z, KN- M
********** *********** *********** *********** *********** *********** ***********
   1      -1383.0    -604.94    -282.76     1.2717     748.23    -1185.5
   2       5758.1    -596.55    -283.63     1.2717     760.26    -1189.6
   3      -1936.9    -608.89    -283.13     1.2717     748.90    -1195.9
   4       5204.1    -600.47    -284.00     1.2717     760.93    -1200.0
   5      -2490.7    -612.83    -283.50     1.2717     749.56    -1206.3
   6       4650.0    -604.38    -284.37     1.2717     761.58    -1210.4
   7      -3044.5    -616.77    -283.87     1.2717     750.22    -1216.7
   8       4095.9    -608.30    -284.73     1.2717     762.23    -1220.8

 MINIMUM     -3044.5    -616.77    -284.73     1.2717     748.23    -1220.8
 Pile N.      7          7          8          1          1          8
 MAXIMUM      5758.1    -596.55    -282.76     1.2717     762.23    -1185.5
 Pile N.      2          2          1          1          8          1

PILE GROUP   STRESS, KN/ M**2
********** ****************
   1        9486.4
   2      1.3413E+04
   3      1.0030E+04
   4      1.2977E+04
   5      1.0574E+04
   6      1.2541E+04
   7      1.1118E+04
   8      1.2105E+04

 MINIMUM      9486.4
 Pile N.      1
 MAXIMUM   1.3413E+04
 Pile N.      2

 * EFFECTS FOR LATERALLY LOADED PILE *

 * MINIMUM VALUES AND LOCATIONS *

  PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR   SOIL REACT  SOIL REACT    TOTAL    FLEX. RIG.
FLEX. RIG.
          y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS      z-DIR      y-DIR
            M          M        KN- M      KN- M        KN         KN       KN/ M      KN/ M     KN/ M**2   KN- M**2   KN- M**2
 ****** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
    1 -8.9529E-03 -3.1700E-03    -890.33    -361.56    -604.87    -282.72    -233.42    -140.10     1222.9  3.2009E+06
3.2009E+06
  x( M)     0.0000     0.0000     6.4800     7.0200     0.0000     0.0000     8.3700     8.3700     19.440     0.0000     0.0000
```



```
    2 -8.9498E-03 -3.2046E-03    -893.26    -367.12    -596.84    -283.81    -234.14    -145.37     5091.3  3.2009E+06
3.2009E+06
  x( M)     0.0000     0.0000     6.4800     7.0200     0.0000     0.0000     8.3700     8.3700     19.440     0.0000     0.0000
    3 -8.9875E-03 -3.1731E-03    -893.72    -361.63    -608.79    -283.07    -233.98    -139.06     1712.6  3.2009E+06
3.2009E+06
  x( M)     0.0000     0.0000     6.4800     7.2900     0.0000     0.0000     8.3700     8.3700     19.440     0.0000     0.0000
    4 -8.9844E-03 -3.2077E-03    -896.66    -367.17    -600.74    -284.17    -234.66    -144.21     4601.4  3.2009E+06
3.2009E+06
  x( M)     0.0000     0.0000     6.4800     7.0200     0.0000     0.0000     8.3700     8.3700     19.440     0.0000     0.0000
    5 -9.0222E-03 -3.1762E-03    -897.08    -361.71    -612.70    -283.42    -234.53    -138.04     2202.3  3.2009E+06
3.2009E+06
  x( M)     0.0000     0.0000     6.4800     7.2900     0.0000     0.0000     8.3700     8.3700     19.440     0.0000     0.0000
    6 -9.0190E-03 -3.2108E-03    -900.04    -367.22    -604.62    -284.52    -235.19    -143.07     4111.5  3.2009E+06
3.2009E+06
  x( M)     0.0000     0.0000     6.4800     7.0200     0.0000     0.0000     8.3700     8.3700     19.440     0.0000     0.0000
    7 -9.0568E-03 -3.1793E-03    -900.45    -361.79    -616.61    -283.78    -235.07    -137.04     2692.0  3.2009E+06
3.2009E+06
  x( M)     0.0000     0.0000     6.4800     7.2900     0.0000     0.0000     8.3700     8.3700     19.440     0.0000     0.0000
    8 -9.0536E-03 -3.2139E-03    -903.42    -367.27    -608.51    -284.86    -235.69    -141.95     3621.6  3.2009E+06
3.2009E+06
  x( M)     0.0000     0.0000     6.4800     7.0200     0.0000     0.0000     8.3700     8.3700     19.440     0.0000     0.0000

  Min. -9.0568E-03 -3.2139E-03    -903.42    -367.27    -616.61    -284.86    -235.69    -145.37     1222.9  3.2009E+06
3.2009E+06
 Pile N.      7          8          8          8          7          8          8          2          1          1          1

 * MAXIMUM VALUES AND LOCATIONS *

  PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR   SOIL REACT  SOIL REACT    TOTAL    FLEX. RIG.
FLEX. RIG.
          y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR     STRESS      z-DIR      y-DIR
            M          M        KN- M      KN- M        KN         KN       KN/ M      KN/ M     KN/ M**2   KN- M**2   KN- M**2
 ****** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
    1  5.5099E-05  2.2796E-05     1185.5     748.23     340.19     146.33     156.41     73.174     9486.4  3.2009E+06
3.2009E+06
  x( M)     9.7200     9.7200     0.0000     0.0000     8.6400     8.9100     11.880     11.880     0.0000     0.0000     0.0000
    2  5.5836E-05  2.3477E-05     1189.6     760.26     342.96     149.13     159.09     75.683 1.3413E+04  3.2009E+06
3.2009E+06
  x( M)     9.7200     9.7200     0.0000     0.0000     8.6400     8.9100     11.880     11.880     0.0000     0.0000     0.0000
    3  5.5306E-05  2.2767E-05     1195.9     748.90     340.99     146.15     156.80     72.955 1.0030E+04  3.2009E+06
3.2009E+06
  x( M)     9.7200     9.7200     0.0000     0.0000     8.6400     8.9100     11.880     11.880     0.0000     0.0000     0.0000
    4  5.6041E-05  2.3442E-05     1200.0     760.93     343.77     148.93     159.86     75.631 1.2977E+04  3.2009E+06
3.2009E+06
  x( M)     9.7200     9.7200     0.0000     0.0000     8.6400     8.9100     11.880     11.880     0.0000     0.0000     0.0000
    5  5.5513E-05  2.2739E-05     1206.3     749.56     341.77     145.98     157.14     72.711 1.0574E+04  3.2009E+06
3.2009E+06
  x( M)     9.7200     9.7200     0.0000     0.0000     8.6400     8.9100     11.880     11.880     0.0000     0.0000     0.0000
    6  5.6244E-05  2.3408E-05     1210.4     761.58     344.57     148.74     160.57     75.551 1.2541E+04  3.2009E+06
3.2009E+06
  x( M)     9.7200     9.7200     0.0000     0.0000     8.6400     8.9100     11.880     11.880     0.0000     0.0000     0.0000
    7  5.5718E-05  2.2744E-05     1216.7     750.22     342.54     145.81     157.41     72.442 1.1118E+04  3.2009E+06
3.2009E+06
  x( M)     9.7200     9.9900     0.0000     0.0000     8.6400     8.9100     11.880     11.880     0.0000     0.0000     0.0000
    8  5.6447E-05  2.3374E-05     1220.8     762.23     345.36     148.55     161.22     75.440 1.2105E+04  3.2009E+06
3.2009E+06
  x( M)     9.7200     9.7200     0.0000     0.0000     8.6400     8.9100     11.880     11.880     0.0000     0.0000     0.0000

  Max.  5.6447E-05  2.3477E-05     1220.8     762.23     345.36     149.13     161.22     75.683 1.3413E+04  3.2009E+06
```



```
3.2009E+06
 Pile N.      8          2          8          8          8          2          8          2          2          1          1


 LOAD CASE :     5
 CASE NAME : SLE statico MAX
 LOAD TYPE : Dead, DL


 * TABLE L *   COMPUTATION ON PILE CAP


 * EQUIVALENT CONCENTRATED LOAD AT ORIGIN *


    VERT. LOAD,  KN    HOR. LOAD Y,  KN   HOR. LOAD Z,  KN
       20084.0          408.120           340.000

   MOMENT X , KN- M    MOMENT Y, KN- M    MOMENT Z, KN- M
      -84.0600          3866.88          -3745.16


 * DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *


    VERTICAL , M      HORIZONTAL Y, M     HORIZONTAL Z, M
     1.56373E-03       7.38475E-04        4.40648E-04

   ANGLE ROT. X,RAD    ANGLE ROT. Y,RAD    ANGLE ROT. Z,RAD
    -3.55343E-06       2.76907E-05       -1.02101E-04


 THE GLOBAL STRUCTURAL COORDINATE SYSTEM
 ---------------------------------------

 * PILE TOP DISPLACEMENTS *

PILE GROUP   DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
********** *********** *********** *********** *********** *********** ***********
   1      1.6616E-03  7.1788E-04  4.3166E-04 -3.5534E-06  2.7691E-05 -1.0210E-04
   2      1.2449E-03  7.1660E-04  4.4581E-04 -3.5534E-06  2.7691E-05 -1.0210E-04
   3      1.7353E-03  7.3204E-04  4.3293E-04 -3.5534E-06  2.7691E-05 -1.0210E-04
   4      1.3185E-03  7.3076E-04  4.4709E-04 -3.5534E-06  2.7691E-05 -1.0210E-04
   5      1.8089E-03  7.4619E-04  4.3421E-04 -3.5534E-06  2.7691E-05 -1.0210E-04
   6      1.3922E-03  7.4491E-04  4.4836E-04 -3.5534E-06  2.7691E-05 -1.0210E-04
   7      1.8826E-03  7.6035E-04  4.3548E-04 -3.5534E-06  2.7691E-05 -1.0210E-04
   8      1.4659E-03  7.5907E-04  4.4964E-04 -3.5534E-06  2.7691E-05 -1.0210E-04

 MINIMUM    1.2449E-03  7.1660E-04  4.3166E-04 -3.5534E-06  2.7691E-05 -1.0210E-04
 Pile N.      2          2          1          1          1          1
 MAXIMUM    1.8826E-03  7.6035E-04  4.4964E-04 -3.5534E-06  2.7691E-05 -1.0210E-04
 Pile N.      7          7          8          1          1          1

 * PILE TOP REACTIONS *

PILE GROUP   FOR. X, KN   FOR. Y, KN   FOR. Z, KN MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
********** *********** *********** *********** *********** *********** ***********
   1       2654.9     48.595     41.460    -0.5202    -109.97     88.172
```



```
   2       2040.0     48.482     43.170    -0.5202    -115.06     87.616
   3       2763.6     50.246     41.583    -0.5202    -110.37     93.239
   4       2148.7     50.135     43.293    -0.5202    -115.46     92.684
   5       2872.3     51.896     41.707    -0.5202    -110.77     98.302
   6       2257.4     51.786     43.416    -0.5202    -115.86     97.749
   7       2981.0     53.544     41.831    -0.5202    -111.17     103.36
   8       2366.1     53.436     43.540    -0.5202    -116.26     102.81

 MINIMUM      2040.0     48.482     41.460    -0.5202    -116.26     87.616
 Pile N.      2          2          1          1          8          2
 MAXIMUM      2981.0     53.544     43.540    -0.5202    -109.97     103.36
 Pile N.      7          7          8          1          1          7


 THE PILE COORDINATE SYSTEM (LOCAL AXES)
 ---------------------------------------

 * PILE TOP DISPLACEMENTS *

PILE GROUP   DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
********** *********** *********** *********** *********** *********** ***********
   1      1.6616E-03  7.1788E-04  4.3166E-04 -3.5534E-06  2.7691E-05 -1.0210E-04
   2      1.2449E-03  7.1660E-04  4.4581E-04 -3.5534E-06  2.7691E-05 -1.0210E-04
   3      1.7353E-03  7.3204E-04  4.3293E-04 -3.5534E-06  2.7691E-05 -1.0210E-04
   4      1.3185E-03  7.3076E-04  4.4709E-04 -3.5534E-06  2.7691E-05 -1.0210E-04
   5      1.8089E-03  7.4619E-04  4.3421E-04 -3.5534E-06  2.7691E-05 -1.0210E-04
   6      1.3922E-03  7.4491E-04  4.4836E-04 -3.5534E-06  2.7691E-05 -1.0210E-04
   7      1.8826E-03  7.6035E-04  4.3548E-04 -3.5534E-06  2.7691E-05 -1.0210E-04
   8      1.4659E-03  7.5907E-04  4.4964E-04 -3.5534E-06  2.7691E-05 -1.0210E-04

 MINIMUM    1.2449E-03  7.1660E-04  4.3166E-04 -3.5534E-06  2.7691E-05 -1.0210E-04
 Pile N.      2          2          1          1          1          1
 MAXIMUM    1.8826E-03  7.6035E-04  4.4964E-04 -3.5534E-06  2.7691E-05 -1.0210E-04
 Pile N.      7          7          8          1          1          1

 * PILE TOP REACTIONS *

PILE GROUP   AXIAL, KN    LAT. y, KN   LAT. z, KN MOM x, KN- M MOM y, KN- M MOM z, KN- M
********** *********** *********** *********** *********** *********** ***********
   1       2654.9     48.595     41.460    -0.5202    -109.97     88.172
   2       2040.0     48.482     43.170    -0.5202    -115.06     87.616
   3       2763.6     50.246     41.583    -0.5202    -110.37     93.239
   4       2148.7     50.135     43.293    -0.5202    -115.46     92.684
   5       2872.3     51.896     41.707    -0.5202    -110.77     98.302
   6       2257.4     51.786     43.416    -0.5202    -115.86     97.749
   7       2981.0     53.544     41.831    -0.5202    -111.17     103.36
   8       2366.1     53.436     43.540    -0.5202    -116.26     102.81

 MINIMUM      2040.0     48.482     41.460    -0.5202    -116.26     87.616
 Pile N.      2          2          1          1          8          2
 MAXIMUM      2981.0     53.544     43.540    -0.5202    -109.97     103.36
 Pile N.      7          7          8          1          1          7

PILE GROUP   STRESS, KN/ M**2
********** ****************
   1        3178.3
   2        2656.3
   3        3295.2
   4        2772.6
   5        3412.7
```

```
   6         2889.5
   7         3530.6
   8         3006.9

 MINIMUM       2656.3
 Pile N.       2
 MAXIMUM       3530.6
 Pile N.       7

 * EFFECTS FOR LATERALLY LOADED PILE *

 * MINIMUM VALUES AND LOCATIONS *

  PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR   SOIL REACT  SOIL REACT     TOTAL    FLEX. RIG.
FLEX. RIG.
          y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR      STRESS     z-DIR      y-DIR
            M          M        KN- M      KN- M        KN         KN       KN/ M      KN/ M     KN/ M**2   KN- M**2   KN- M**2
 ****** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
    1 -2.8059E-06 -2.1752E-06    -88.172    -109.97    -50.807    -38.977    -28.278    -21.922     2347.5 3.2009E+06
3.2009E+06
  x( M)    8.9100     8.9100     0.0000     0.0000     8.1000     8.1000     8.9100     8.9100     20.250     0.0000     0.0000
    2 -2.8042E-06 -2.2633E-06    -87.616    -115.06    -50.472    -40.293    -28.047    -22.637     1803.8 3.2009E+06
3.2009E+06
  x( M)    8.9100     8.9100     0.0000     0.0000     8.1000     8.1000     8.9100     8.9100     20.250     0.0000     0.0000
    3 -2.9050E-06 -2.1931E-06    -93.239    -110.37    -52.073    -38.916    -28.908    -21.824     2443.6 3.2009E+06
3.2009E+06
  x( M)    8.9100     8.9100     0.0000     0.0000     8.1000     8.1000     8.9100     8.9100     20.250     0.0000     0.0000
    4 -2.9032E-06 -2.2814E-06    -92.684    -115.46    -51.739    -40.230    -28.678    -22.536     1899.9 3.2009E+06
3.2009E+06
  x( M)    8.9100     8.9100     0.0000     0.0000     8.1000     8.1000     8.9100     8.9100     20.250     0.0000     0.0000
    5 -3.0047E-06 -2.2108E-06    -98.302    -110.77    -53.324    -38.854    -29.527    -21.725     2539.7 3.2009E+06
3.2009E+06
  x( M)    8.9100     8.9100     0.0000     0.0000     8.1000     8.1000     8.9100     8.9100     20.250     0.0000     0.0000
    6 -3.0026E-06 -2.2993E-06    -97.749    -115.86    -52.991    -40.167    -29.299    -22.436     1996.0 3.2009E+06
3.2009E+06
  x( M)    8.9100     8.9100     0.0000     0.0000     8.1000     8.1000     8.9100     8.9100     20.250     0.0000     0.0000
    7 -3.1047E-06 -2.2283E-06    -103.36    -111.17    -54.560    -38.791    -30.134    -21.628     2635.8 3.2009E+06
3.2009E+06
  x( M)    8.9100     8.9100     0.0000     0.0000     8.1000     8.1000     8.9100     8.9100     20.250     0.0000     0.0000
    8 -3.1025E-06 -2.3170E-06    -102.81    -116.26    -54.229    -40.102    -29.909    -22.337     2092.1 3.2009E+06
3.2009E+06
  x( M)    8.9100     8.9100     0.0000     0.0000     8.1000     8.1000     8.9100     8.9100     20.250     0.0000     0.0000

   Min. -3.1047E-06 -2.3170E-06    -103.36    -116.26    -54.560    -40.293    -30.134    -22.637     1803.8 3.2009E+06
3.2009E+06
 Pile N.     7          8          7          8          7          2          7          2          2          1          1

 * MAXIMUM VALUES AND LOCATIONS *

  PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR   SOIL REACT  SOIL REACT     TOTAL    FLEX. RIG.
FLEX. RIG.
          y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR      STRESS     z-DIR      y-DIR
            M          M        KN- M      KN- M        KN         KN       KN/ M      KN/ M     KN/ M**2   KN- M**2   KN- M**2
 ****** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
    1  7.1788E-04  4.3166E-04     87.834     65.981     48.605     41.472     63.161     52.339     3178.3 3.2009E+06
3.2009E+06
  x( M)    0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
    2  7.1660E-04  4.4581E-04     87.496     68.395     48.489     43.180     62.583     54.104     2656.3 3.2009E+06
```



```
3.2009E+06
  x( M)    0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
    3  7.3203E-04  4.3293E-04     90.195     66.081     50.257     41.596     64.632     52.031     3295.2 3.2009E+06
3.2009E+06
  x( M)    0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
    4  7.3076E-04  4.4709E-04     89.859     68.493     50.143     43.304     64.063     53.792     2772.6 3.2009E+06
3.2009E+06
  x( M)    0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
    5  7.4619E-04  4.3421E-04     92.547     66.180     51.908     41.720     66.077     51.730     3412.7 3.2009E+06
3.2009E+06
  x( M)    0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
    6  7.4492E-04  4.4836E-04     92.212     68.592     51.795     43.427     65.517     53.487     2889.5 3.2009E+06
3.2009E+06
  x( M)    0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
    7  7.6035E-04  4.3548E-04     94.891     66.281     53.557     41.845     67.497     51.436     3530.6 3.2009E+06
3.2009E+06
  x( M)    0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000
    8  7.5907E-04  4.4964E-04     94.558     68.690     53.446     43.551     66.946     53.187     3006.9 3.2009E+06
3.2009E+06
  x( M)    0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     7.0200     7.0200     0.0000     0.0000     0.0000

   Max.  7.6035E-04  4.4964E-04     94.891     68.690     53.557     43.551     67.497     54.104     3530.6 3.2009E+06
3.2009E+06
 Pile N.     7          8          7          8          7          8          7          2          7          1          1



 LOAD CASE :    6
 CASE NAME : SLE statico MIN
 LOAD TYPE : Dead, DL



 * TABLE L *   COMPUTATION ON PILE CAP


 * EQUIVALENT CONCENTRATED LOAD AT ORIGIN *


    VERT. LOAD,  KN    HOR. LOAD Y,  KN    HOR. LOAD Z,  KN
       10164.0          -408.120             340.000

    MOMENT X , KN- M    MOMENT Y, KN- M    MOMENT Z, KN- M
       -68.5230            3144.81            3805.29


 * DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *


     VERTICAL , M       HORIZONTAL Y, M     HORIZONTAL Z, M
      7.45741E-04        -6.75028E-04        3.86992E-04

    ANGLE ROT. X,RAD    ANGLE ROT. Y,RAD    ANGLE ROT. Z,RAD
     -2.87270E-06        1.02123E-05         8.15314E-05


  THE GLOBAL STRUCTURAL COORDINATE SYSTEM
  ----------------------------------------

  * PILE TOP DISPLACEMENTS *
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```
 PILE GROUP   DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
 ********** *********** *********** *********** *********** *********** ***********
    1       4.8024E-04  -6.9168E-04  3.7972E-04  -2.8727E-06  1.0212E-05  8.1531E-05
    2       8.0138E-04  -6.9271E-04  3.9117E-04  -2.8727E-06  1.0212E-05  8.1531E-05
    3       5.5019E-04  -6.8023E-04  3.8075E-04  -2.8727E-06  1.0212E-05  8.1531E-05
    4       8.7133E-04  -6.8127E-04  3.9220E-04  -2.8727E-06  1.0212E-05  8.1531E-05
    5       6.2015E-04  -6.6879E-04  3.8178E-04  -2.8727E-06  1.0212E-05  8.1531E-05
    6       9.4129E-04  -6.6982E-04  3.9323E-04  -2.8727E-06  1.0212E-05  8.1531E-05
    7       6.9010E-04  -6.5735E-04  3.8282E-04  -2.8727E-06  1.0212E-05  8.1531E-05
    8       1.0112E-03  -6.5838E-04  3.9426E-04  -2.8727E-06  1.0212E-05  8.1531E-05

 MINIMUM    4.8024E-04  -6.9271E-04  3.7972E-04  -2.8727E-06  1.0212E-05  8.1531E-05
 Pile N.       1           2           1           1           1           1
 MAXIMUM    1.0112E-03  -6.5735E-04  3.9426E-04  -2.8727E-06  1.0212E-05  8.1531E-05
 Pile N.       8           7           8           1           1           1

 * PILE TOP REACTIONS *

 PILE GROUP   FOR. X, KN   FOR. Y, KN   FOR. Z, KN MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
 ********** *********** *********** *********** *********** *********** ***********
    1         823.51      -53.026      41.642     -0.4205     -120.47     -113.09
    2         1374.2      -53.079      42.963     -0.4205     -124.57     -113.43
    3         943.47      -51.667      41.773     -0.4205     -120.89     -109.00
    4         1488.8      -51.721      43.094     -0.4205     -124.99     -109.34
    5         1063.4      -50.308      41.905     -0.4205     -121.31     -104.91
    6         1592.0      -50.364      43.227     -0.4205     -125.40     -105.25
    7         1183.4      -48.948      42.037     -0.4205     -121.72     -100.81
    8         1695.2      -49.006      43.359     -0.4205     -125.82     -101.15

 MINIMUM       823.51      -53.079      41.642     -0.4205     -125.82     -113.43
 Pile N.       1           2           1           1           8           2
 MAXIMUM       1695.2      -48.948      43.359     -0.4205     -120.47     -100.81
 Pile N.       8           7           8           1           1           7


 THE PILE COORDINATE SYSTEM (LOCAL AXES)
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 * PILE TOP DISPLACEMENTS *

 PILE GROUP   DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
 ********** *********** *********** *********** *********** *********** ***********
    1       4.8024E-04  -6.9168E-04  3.7972E-04  -2.8727E-06  1.0212E-05  8.1531E-05
    2       8.0138E-04  -6.9271E-04  3.9117E-04  -2.8727E-06  1.0212E-05  8.1531E-05
    3       5.5019E-04  -6.8023E-04  3.8075E-04  -2.8727E-06  1.0212E-05  8.1531E-05
    4       8.7133E-04  -6.8127E-04  3.9220E-04  -2.8727E-06  1.0212E-05  8.1531E-05
    5       6.2015E-04  -6.6879E-04  3.8178E-04  -2.8727E-06  1.0212E-05  8.1531E-05
    6       9.4129E-04  -6.6982E-04  3.9323E-04  -2.8727E-06  1.0212E-05  8.1531E-05
    7       6.9010E-04  -6.5735E-04  3.8282E-04  -2.8727E-06  1.0212E-05  8.1531E-05
    8       1.0112E-03  -6.5838E-04  3.9426E-04  -2.8727E-06  1.0212E-05  8.1531E-05

 MINIMUM    4.8024E-04  -6.9271E-04  3.7972E-04  -2.8727E-06  1.0212E-05  8.1531E-05
 Pile N.       1           2           1           1           1           1
 MAXIMUM    1.0112E-03  -6.5735E-04  3.9426E-04  -2.8727E-06  1.0212E-05  8.1531E-05
 Pile N.       8           7           8           1           1           1

 * PILE TOP REACTIONS *

 PILE GROUP   AXIAL, KN    LAT. y, KN   LAT. z, KN MOM x, KN- M MOM y, KN- M MOM z, KN- M
```



```
 ********** *********** *********** *********** *********** *********** ***********
    1         823.51      -53.026      41.642     -0.4205     -120.47     -113.09
    2         1374.2      -53.079      42.963     -0.4205     -124.57     -113.43
    3         943.47      -51.667      41.773     -0.4205     -120.89     -109.00
    4         1488.8      -51.721      43.094     -0.4205     -124.99     -109.34
    5         1063.4      -50.308      41.905     -0.4205     -121.31     -104.91
    6         1592.0      -50.364      43.227     -0.4205     -125.40     -105.25
    7         1183.4      -48.948      42.037     -0.4205     -121.72     -100.81
    8         1695.2      -49.006      43.359     -0.4205     -125.82     -101.15

 MINIMUM       823.51      -53.079      41.642     -0.4205     -125.82     -113.43
 Pile N.       1           2           1           1           8           2
 MAXIMUM       1695.2      -48.948      43.359     -0.4205     -120.47     -100.81
 Pile N.       8           7           8           1           1           7

 PILE GROUP   STRESS, KN/ M**2
 ********** ****************
    1         1702.2
    2         2208.2
    3         1793.7
    4         2295.2
    5         1885.6
    6         2372.7
    7         1978.0
    8         2450.5

 MINIMUM       1702.2
 Pile N.       1
 MAXIMUM       2450.5
 Pile N.       8

 * EFFECTS FOR LATERALLY LOADED PILE *

 * MINIMUM VALUES AND LOCATIONS *

  PILE    DISPL.     DISPL.     MOMENT     MOMENT      SHEAR      SHEAR   SOIL REACT  SOIL REACT     TOTAL    FLEX. RIG.
FLEX. RIG.
          y-DIR      z-DIR      z-DIR      y-DIR      y-DIR      z-DIR      y-DIR      z-DIR      STRESS     z-DIR      y-DIR
            M          M        KN- M      KN- M        KN         KN       KN/ M      KN/ M     KN/ M**2   KN- M**2   KN- M**2
 ****** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
    1 -6.9168E-04 -2.0938E-06    -90.727    -120.47    -53.030    -37.045    -66.804    -21.056     728.14 3.2009E+06
3.2009E+06
  x( M)    0.0000     8.9100     7.0200     0.0000     0.0000     8.1000     7.0200     8.9100     20.790     0.0000     0.0000
    2 -6.9271E-04 -2.1671E-06    -90.798    -124.57    -53.085    -38.099    -66.525    -21.624     1215.1 3.2009E+06
3.2009E+06
  x( M)    0.0000     8.9100     7.0200     0.0000     0.0000     8.1000     7.0200     8.9100     20.520     0.0000     0.0000
    3 -6.8023E-04 -2.0922E-06    -88.813    -120.89    -51.672    -37.289    -65.571    -21.236     834.21 3.2009E+06
3.2009E+06
  x( M)    0.0000     8.9100     7.0200     0.0000     0.0000     8.1000     7.0200     8.9100     20.790     0.0000     0.0000
    4 -6.8127E-04 -2.1655E-06    -88.883    -124.99    -51.728    -38.344    -65.289    -21.804     1316.4 3.2009E+06
3.2009E+06
  x( M)    0.0000     8.9100     7.0200     0.0000     0.0000     8.1000     7.0200     8.9100     20.250     0.0000     0.0000
    5 -6.6879E-04 -2.0905E-06    -86.893    -121.31    -50.313    -37.534    -64.318    -21.416     940.28 3.2009E+06
3.2009E+06
  x( M)    0.0000     8.9100     7.0200     0.0000     0.0000     8.1000     7.0200     8.9100     20.250     0.0000     0.0000
    6 -6.6982E-04 -2.1637E-06    -86.963    -125.40    -50.371    -38.587    -64.034    -21.985     1407.6 3.2009E+06
3.2009E+06
  x( M)    0.0000     8.9100     7.0200     0.0000     0.0000     8.1000     7.0200     8.9100     20.250     0.0000     0.0000
    7 -6.5735E-04 -2.0887E-06    -84.967    -121.72    -48.953    -37.779    -63.047    -21.598     1046.3 3.2009E+06
```

3.2009E+06
x(M) 0.0000 8.9100 7.0200 0.0000 0.0000 8.1000 7.0200 8.9100 20.250 0.0000 0.0000
8 -6.5838E-04 -2.1618E-06 -85.037 -125.82 -49.014 -38.831 -62.761 -22.166 1498.9 3.2009E+06
3.2009E+06
x(M) 0.0000 8.9100 7.0200 0.0000 0.0000 8.1000 7.0200 8.9100 20.250 0.0000 0.0000

Min. -6.9271E-04 -2.1671E-06 -90.798 -125.82 -53.085 -38.831 -66.804 -22.166 728.14 3.2009E+06
3.2009E+06
Pile N. 2 2 2 8 2 8 1 8 1 1 1

* MAXIMUM VALUES AND LOCATIONS *

PILE DISPL. DISPL. MOMENT MOMENT SHEAR SHEAR SOIL REACT SOIL REACT TOTAL FLEX. RIG.
FLEX. RIG.
y-DIR z-DIR z-DIR y-DIR y-DIR z-DIR y-DIR z-DIR STRESS z-DIR y-DIR
M M KN- M KN- M KN KN KN/ M KN/ M KN/ M**2 KN- M**2 KN- M**2
****** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
1 2.9107E-06 3.7972E-04 113.09 63.172 52.267 41.646 29.270 51.110 1702.2 3.2009E+06
3.2009E+06
x(M) 8.9100 0.0000 0.0000 7.0200 8.1000 0.0000 8.9100 7.0200 0.0000 0.0000 0.0000
2 2.9251E-06 3.9117E-04 113.43 65.111 52.201 42.970 29.188 52.456 2208.2 3.2009E+06
3.2009E+06
x(M) 8.9100 0.0000 0.0000 7.0200 8.1000 0.0000 8.9100 7.0200 0.0000 0.0000 0.0000
3 2.8321E-06 3.8075E-04 109.00 63.443 51.246 41.778 28.745 51.599 1793.7 3.2009E+06
3.2009E+06
x(M) 8.9100 0.0000 0.0000 7.0200 8.1000 0.0000 8.9100 7.0200 0.0000 0.0000 0.0000
4 2.8465E-06 3.9220E-04 109.34 65.381 51.180 43.102 28.661 52.945 2295.2 3.2009E+06
3.2009E+06
x(M) 8.9100 0.0000 0.0000 7.0200 8.1000 0.0000 8.9100 7.0200 0.0000 0.0000 0.0000
5 2.7538E-06 3.8179E-04 104.91 63.713 50.216 41.911 28.211 52.094 1885.6 3.2009E+06
3.2009E+06
x(M) 8.9100 0.0000 0.0000 7.0200 8.1000 0.0000 8.9100 7.0200 0.0000 0.0000 0.0000
6 2.7683E-06 3.9323E-04 105.25 65.652 50.149 43.235 28.128 53.438 2372.7 3.2009E+06
3.2009E+06
x(M) 8.9100 0.0000 0.0000 7.0200 8.1000 0.0000 8.9100 7.0200 0.0000 0.0000 0.0000
7 2.6760E-06 3.8282E-04 100.81 63.984 49.176 42.043 27.671 52.592 1978.0 3.2009E+06
3.2009E+06
x(M) 8.9100 0.0000 0.0000 7.0200 8.1000 0.0000 8.9100 7.0200 0.0000 0.0000 0.0000
8 2.6904E-06 3.9426E-04 101.15 65.922 49.109 43.368 27.587 53.935 2450.5 3.2009E+06
3.2009E+06
x(M) 8.9100 0.0000 0.0000 7.0200 8.1000 0.0000 8.9100 7.0200 0.0000 0.0000 0.0000

Max. 2.9251E-06 3.9426E-04 113.43 65.922 52.267 43.368 29.270 53.935 2450.5 3.2009E+06
3.2009E+06
Pile N. 2 8 2 8 1 8 1 8 8 1 1

LOAD CASE ENV : 1
CASE NAME : MINIMUM ENVELOPE

* TABLE L * COMPUTATION ON PILE CAP

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VERT. LOAD, KN HOR. LOAD Y, KN HOR. LOAD Z, KN
1.0164E+04 -4853.1 -2270.0

MOMENT X , KN- M MOMENT Y, KN- M MOMENT Z, KN- M
-180.99 -2.1154E+04 -4.5280E+04

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL , M HORIZONTAL Y, M HORIZONTAL Z, M
7.4574E-04 -9.0033E-03 -3.1919E-03

ANGLE ROT. X,RAD ANGLE ROT. Y,RAD ANGLE ROT. Z,RAD
-9.5212E-06 -1.9621E-04 -1.1362E-03

* TABLE M * COMPUTATION ON INDIVIDUAL PILE

THE GLOBAL STRUCTURAL COORDINATE SYSTEM
----

* PILE TOP DISPLACEMENTS *

PILE GROUP DISP. X, M DISP. Y, M DISP. Z, M ROT. X,RAD ROT. Y,RAD ROT. Z,RAD
********** *********** *********** *********** *********** *********** ***********
1 -8.1317E-04 -8.9529E-03 -3.1700E-03 -9.5211E-06 -1.9621E-04 -1.1362E-03
2 -1.8035E-03 -8.9498E-03 -3.2046E-03 -9.5211E-06 -1.9621E-04 -1.1362E-03
3 -1.1886E-03 -8.9875E-03 -3.1731E-03 -9.5211E-06 -1.9621E-04 -1.1362E-03
4 -1.4221E-03 -8.9844E-03 -3.2077E-03 -9.5211E-06 -1.9621E-04 -1.1362E-03
5 -1.5641E-03 -9.0221E-03 -3.1762E-03 -9.5211E-06 -1.9621E-04 -1.1362E-03
6 -1.0407E-03 -9.0190E-03 -3.2108E-03 -9.5211E-06 -1.9621E-04 -1.1362E-03
7 -1.9396E-03 -9.0568E-03 -3.1793E-03 -9.5211E-06 -1.9621E-04 -1.1362E-03
8 -6.5925E-04 -9.0536E-03 -3.2139E-03 -9.5211E-06 -1.9621E-04 -1.1362E-03

MINIMUM -1.9396E-03 -9.0568E-03 -3.2139E-03 -9.5211E-06 -1.9621E-04 -1.1362E-03
Pile N. 7 7 8 1 1 1
MAXIMUM -6.5925E-04 -8.9498E-03 -3.1700E-03 -9.5211E-06 -1.9621E-04 -1.1362E-03
Pile N. 8 2 1 1 1 1

* PILE TOP REACTIONS *

PILE GROUP FOR. X, KN FOR. Y, KN FOR. Z, KN MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
********** *********** *********** *********** *********** *********** ***********
1 -1383.0 -604.94 -282.76 -1.3939 -747.25 -1185.5
2 -2843.9 -596.55 -283.63 -1.3939 -759.28 -1189.6
3 -1936.9 -608.89 -283.13 -1.3939 -748.09 -1195.9
4 -2281.2 -600.47 -284.00 -1.3939 -760.09 -1200.0
5 -2490.7 -612.83 -283.50 -1.3939 -748.89 -1206.3
6 -1718.6 -604.38 -284.37 -1.3939 -760.89 -1210.4
7 -3044.5 -616.77 -283.87 -1.3939 -749.70 -1216.7
8 -1122.3 -608.30 -284.73 -1.3939 -761.70 -1220.8

MINIMUM -3044.5 -616.77 -284.73 -1.3939 -761.70 -1220.8
Pile N. 7 7 8 1 8 8
MAXIMUM -1122.3 -596.55 -282.76 -1.3939 -747.25 -1185.5
Pile N. 8 2 1 1 1 1

THE PILE COORDINATE SYSTEM (LOCAL AXES)
----

* PILE TOP DISPLACEMENTS *

PILE GROUP DISP. x, M DISP. y, M DISP. z, M ROT. x,RAD ROT. y,RAD ROT. z,RAD
********** *********** *********** *********** *********** *********** ***********
1 -8.1317E-04 -8.9529E-03 -3.1700E-03 -9.5211E-06 -1.9621E-04 -1.1362E-03
2 -1.8035E-03 -8.9498E-03 -3.2046E-03 -9.5211E-06 -1.9621E-04 -1.1362E-03
3 -1.1886E-03 -8.9875E-03 -3.1731E-03 -9.5211E-06 -1.9621E-04 -1.1362E-03
4 -1.4221E-03 -8.9844E-03 -3.2077E-03 -9.5211E-06 -1.9621E-04 -1.1362E-03
5 -1.5641E-03 -9.0221E-03 -3.1762E-03 -9.5211E-06 -1.9621E-04 -1.1362E-03
6 -1.0407E-03 -9.0190E-03 -3.2108E-03 -9.5211E-06 -1.9621E-04 -1.1362E-03
7 -1.9396E-03 -9.0568E-03 -3.1793E-03 -9.5211E-06 -1.9621E-04 -1.1362E-03
8 -6.5925E-04 -9.0536E-03 -3.2139E-03 -9.5211E-06 -1.9621E-04 -1.1362E-03

MINIMUM -1.9396E-03 -9.0568E-03 -3.2139E-03 -9.5211E-06 -1.9621E-04 -1.1362E-03
Pile N. 7 7 8 1 1 1
MAXIMUM -6.5925E-04 -8.9498E-03 -3.1700E-03 -9.5211E-06 -1.9621E-04 -1.1362E-03
Pile N. 8 2 1 1 1 1

* PILE TOP REACTIONS *

PILE GROUP AXIAL, KN LAT. y, KN LAT. z, KN MOM x, KN- M MOM y, KN- M MOM z, KN- M
********** *********** *********** *********** *********** *********** ***********
1 -1383.0 -604.94 -282.76 -1.3939 -747.25 -1185.5
2 -2843.9 -596.55 -283.63 -1.3939 -759.28 -1189.6
3 -1936.9 -608.89 -283.13 -1.3939 -748.09 -1195.9
4 -2281.2 -600.47 -284.00 -1.3939 -760.09 -1200.0
5 -2490.7 -612.83 -283.50 -1.3939 -748.89 -1206.3
6 -1718.6 -604.38 -284.37 -1.3939 -760.89 -1210.4
7 -3044.5 -616.77 -283.87 -1.3939 -749.70 -1216.7
8 -1122.3 -608.30 -284.73 -1.3939 -761.70 -1220.8

MINIMUM -3044.5 -616.77 -284.73 -1.3939 -761.70 -1220.8
Pile N. 7 7 8 1 8 8
MAXIMUM -1122.3 -596.55 -282.76 -1.3939 -747.25 -1185.5
Pile N. 8 2 1 1 1 1

PILE GROUP STRESS, KN/ M**2
********** ****************
1 1702.2
2 2208.2
3 1793.7
4 2295.2
5 1885.6
6 2372.7
7 1978.0
8 2450.5

MINIMUM 1702.2
Pile N. 1
MAXIMUM 2450.5
Pile N. 8

* EFFECTS FOR LATERALLY LOADED PILE *

* MINIMUM VALUES AND LOCATIONS *

PILE DISPL. DISPL. MOMENT MOMENT SHEAR SHEAR SOIL REACT SOIL REACT TOTAL FLEX. RIG.
FLEX. RIG.
y-DIR z-DIR z-DIR y-DIR y-DIR z-DIR y-DIR z-DIR STRESS z-DIR y-DIR
M M KN- M KN- M KN KN KN/ M KN/ M KN/ M**2 KN- M**2 KN- M**2
****** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
1 -8.9529E-03 -3.1700E-03 -1186.7 -747.25 -604.87 -282.72 -233.42 -140.10 728.14 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 8.3700 8.3700 20.790 0.0000 0.0000
2 -8.9498E-03 -3.2046E-03 -1179.8 -759.28 -596.84 -283.81 -234.14 -145.37 1215.1 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 8.3700 8.3700 20.520 0.0000 0.0000
3 -8.9875E-03 -3.1731E-03 -1199.0 -748.09 -608.79 -283.07 -233.98 -139.06 834.21 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 8.3700 8.3700 20.790 0.0000 0.0000
4 -8.9844E-03 -3.2077E-03 -1192.1 -760.09 -600.74 -284.17 -234.66 -144.21 1316.4 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 8.3700 8.3700 20.250 0.0000 0.0000
5 -9.0222E-03 -3.1762E-03 -1211.3 -748.89 -612.70 -283.42 -234.53 -138.04 940.28 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 8.3700 8.3700 20.250 0.0000 0.0000
6 -9.0190E-03 -3.2108E-03 -1204.3 -760.89 -604.62 -284.52 -235.19 -143.07 1407.6 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 8.3700 8.3700 20.250 0.0000 0.0000
7 -9.0568E-03 -3.1793E-03 -1223.5 -749.70 -616.61 -283.78 -235.07 -137.04 1046.3 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 8.3700 8.3700 20.250 0.0000 0.0000
8 -9.0536E-03 -3.2139E-03 -1216.6 -761.70 -608.51 -284.86 -235.69 -141.95 992.31 3.2009E+06
3.2009E+06
x(M) 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 8.3700 8.3700 19.440 0.0000 0.0000

Min. -9.0568E-03 -3.2139E-03 -1223.5 -761.70 -616.61 -284.86 -235.69 -145.37 728.14 3.2009E+06
3.2009E+06
Pile N. 7 8 7 8 7 8 8 2 1 1 1

* MAXIMUM VALUES AND LOCATIONS *

PILE DISPL. DISPL. MOMENT MOMENT SHEAR SHEAR SOIL REACT SOIL REACT TOTAL FLEX. RIG.
FLEX. RIG.
y-DIR z-DIR z-DIR y-DIR y-DIR z-DIR y-DIR z-DIR STRESS z-DIR y-DIR
M M KN- M KN- M KN KN KN/ M KN/ M KN/ M**2 KN- M**2 KN- M**2
****** ********** ********** ********** ********** ********** ********** ********** **********
********** ********** **********
1 0.0000 0.0000 0.0000 0.0000 0.0000 0.076288 0.0000 0.0000 1702.2 3.2009E+06 3.2009E+06

x(M) 27.000 26.730 27.000 27.000 27.000 11.880 0.0000 0.0000 0.0000 0.0000 0.0000
2 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 2208.2 3.2009E+06 3.2009E+06
x(M) 27.000 25.380 27.000 27.000 27.000 27.000 0.0000 0.0000 0.0000 0.0000 0.0000
3 0.0000 0.0000 0.0000 0.0000 0.0000 0.3993 0.0000 0.0000 1793.7 3.2009E+06 3.2009E+06
x(M) 27.000 25.380 27.000 25.650 27.000 11.880 0.0000 0.0000 0.0000 0.0000 0.0000
4 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 2295.2 3.2009E+06 3.2009E+06
x(M) 27.000 25.380 27.000 25.650 27.000 25.380 0.0000 0.0000 0.0000 0.0000 0.0000
5 0.0000 0.0000 0.0000 0.0000 0.0000 0.4437 0.0000 0.0000 1885.6 3.2009E+06 3.2009E+06
x(M) 27.000 26.460 27.000 25.650 27.000 11.880 0.0000 0.0000 0.0000 0.0000 0.0000
6 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 2372.7 3.2009E+06 3.2009E+06
x(M) 27.000 25.380 27.000 27.000 27.000 27.000 0.0000 0.0000 0.0000 0.0000 0.0000
7 0.0000 0.0000 0.0000 0.0000 0.0000 0.2615 0.0000 0.0000 1978.0 3.2009E+06 3.2009E+06
x(M) 27.000 25.380 27.000 25.650 27.000 11.880 0.0000 0.0000 0.0000 0.0000 0.0000
8 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 2450.5 3.2009E+06 3.2009E+06
x(M) 27.000 25.380 27.000 25.650 27.000 25.380 0.0000 0.0000 0.0000 0.0000 0.0000

Max.	0.0000	0.0000	0.0000	0.0000	0.0000	0.4437	0.0000	0.0000	2450.5	3.2009E+06	3.2009E+06
Pile N.	7	5	4	6	8	5	1	1	8	1	1

LOAD CASE ENV : 2
CASE NAME : MAXIMUM ENVELOPE

* TABLE L * COMPUTATION ON PILE CAP

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VERT. LOAD, KN	HOR. LOAD Y, KN	HOR. LOAD Z, KN
2.7635E+04	4853.1	2270.0

MOMENT X , KN- M	MOMENT Y, KN- M	MOMENT Z, KN- M
180.99	2.1174E+04	4.5282E+04

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL , M	HORIZONTAL Y, M	HORIZONTAL Z, M
2.2033E-03	9.0218E-03	3.1991E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
8.6869E-06	1.9813E-04	1.1314E-03

* TABLE M * COMPUTATION ON INDIVIDUAL PILE

THE GLOBAL STRUCTURAL COORDINATE SYSTEM
----

* PILE TOP DISPLACEMENTS *

PILE GROUP	DISP. X, M	DISP. Y, M	DISP. Z, M	ROT. X,RAD	ROT. Y,RAD	ROT. Z,RAD
**********	***********	***********	***********	***********	***********	***********
1	2.7940E-03	8.9666E-03	3.1750E-03	8.6869E-06	1.9813E-04	1.1314E-03
2	3.7645E-03	8.9631E-03	3.2129E-03	8.6869E-06	1.9813E-04	1.1314E-03
3	3.1754E-03	9.0045E-03	3.1784E-03	8.6869E-06	1.9813E-04	1.1314E-03
4	3.3891E-03	9.0011E-03	3.2163E-03	8.6869E-06	1.9813E-04	1.1314E-03
5	3.5568E-03	9.0424E-03	3.1818E-03	8.6869E-06	1.9813E-04	1.1314E-03
6	3.0136E-03	9.0390E-03	3.2197E-03	8.6869E-06	1.9813E-04	1.1314E-03
7	3.9383E-03	9.0804E-03	3.1852E-03	8.6869E-06	1.9813E-04	1.1314E-03
8	2.6381E-03	9.0769E-03	3.2232E-03	8.6869E-06	1.9813E-04	1.1314E-03
MINIMUM	2.6381E-03	8.9631E-03	3.1750E-03	8.6869E-06	1.9813E-04	1.1314E-03
Pile N.	8	2	1	1	1	1
MAXIMUM	3.9383E-03	9.0804E-03	3.2232E-03	8.6869E-06	1.9813E-04	1.1314E-03
Pile N.	7	7	8	1	1	1

* PILE TOP REACTIONS *

PILE GROUP	FOR. X, KN	FOR. Y, KN	FOR. Z, KN	MOM X, KN- M	MOM Y, KN- M	MOM Z, KN- M
**********	***********	***********	***********	***********	***********	***********
1	4325.9	598.42	280.36	1.2717	748.23	1186.7
2	5758.1	605.83	287.33	1.2717	760.26	1179.8
3	4888.8	601.43	280.30	1.2717	748.90	1199.0
4	5204.1	608.85	287.26	1.2717	760.93	1192.1
5	5451.6	604.41	280.23	1.2717	749.56	1211.3
6	4650.0	611.87	287.19	1.2717	761.58	1204.3
7	5924.7	607.48	280.20	1.2717	750.22	1223.5
8	4095.9	614.84	287.11	1.2717	762.23	1216.6
MINIMUM	4095.9	598.42	280.20	1.2717	748.23	1179.8
Pile N.	8	1	7	1	1	2
MAXIMUM	5924.7	614.84	287.33	1.2717	762.23	1223.5
Pile N.	7	8	2	1	8	7

THE PILE COORDINATE SYSTEM (LOCAL AXES)
----

* PILE TOP DISPLACEMENTS *

PILE GROUP	DISP. x, M	DISP. y, M	DISP. z, M	ROT. x,RAD	ROT. y,RAD	ROT. z,RAD
**********	***********	***********	***********	***********	***********	***********
1	2.7940E-03	8.9666E-03	3.1750E-03	8.6869E-06	1.9813E-04	1.1314E-03
2	3.7645E-03	8.9631E-03	3.2129E-03	8.6869E-06	1.9813E-04	1.1314E-03
3	3.1754E-03	9.0045E-03	3.1784E-03	8.6869E-06	1.9813E-04	1.1314E-03
4	3.3891E-03	9.0011E-03	3.2163E-03	8.6869E-06	1.9813E-04	1.1314E-03
5	3.5568E-03	9.0424E-03	3.1818E-03	8.6869E-06	1.9813E-04	1.1314E-03
6	3.0136E-03	9.0390E-03	3.2197E-03	8.6869E-06	1.9813E-04	1.1314E-03
7	3.9383E-03	9.0804E-03	3.1852E-03	8.6869E-06	1.9813E-04	1.1314E-03
8	2.6381E-03	9.0769E-03	3.2232E-03	8.6869E-06	1.9813E-04	1.1314E-03
MINIMUM	2.6381E-03	8.9631E-03	3.1750E-03	8.6869E-06	1.9813E-04	1.1314E-03
Pile N.	8	2	1	1	1	1
MAXIMUM	3.9383E-03	9.0804E-03	3.2232E-03	8.6869E-06	1.9813E-04	1.1314E-03
Pile N.	7	7	8	1	1	1

* PILE TOP REACTIONS *

PILE GROUP	AXIAL, KN	LAT. y, KN	LAT. z, KN	MOM x, KN- M	MOM y, KN- M	MOM z, KN- M
**********	***********	***********	***********	***********	***********	***********
1	4325.9	598.42	280.36	1.2717	748.23	1186.7
2	5758.1	605.83	287.33	1.2717	760.26	1179.8
3	4888.8	601.43	280.30	1.2717	748.90	1199.0
4	5204.1	608.85	287.26	1.2717	760.93	1192.1
5	5451.6	604.41	280.23	1.2717	749.56	1211.3
6	4650.0	611.87	287.19	1.2717	761.58	1204.3
7	5924.7	607.48	280.20	1.2717	750.22	1223.5
8	4095.9	614.84	287.11	1.2717	762.23	1216.6
MINIMUM	4095.9	598.42	280.20	1.2717	748.23	1179.8
Pile N.	8	1	7	1	1	2
MAXIMUM	5924.7	614.84	287.33	1.2717	762.23	1223.5
Pile N.	7	8	2	1	8	7

PILE GROUP	STRESS, KN/ M**2
**********	****************
1	1.2091E+04
2	1.3413E+04
3	1.2653E+04
4	1.2977E+04
5	1.3215E+04
6	1.2541E+04
7	1.3697E+04
8	1.2105E+04
MINIMUM	1.2091E+04
Pile N.	1
MAXIMUM	1.3697E+04
Pile N.	7

* EFFECTS FOR LATERALLY LOADED PILE *

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR M	DISPL. z-DIR M	MOMENT z-DIR KN- M	MOMENT y-DIR KN- M	SHEAR y-DIR KN	SHEAR z-DIR KN	SOIL REACT y-DIR KN/ M	SOIL REACT z-DIR KN/ M	TOTAL STRESS KN/ M**2	FLEX. RIG. z-DIR KN- M**2	FLEX. RIG. y-DIR KN- M**2
******	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3824.9	3.2009E+06	3.2009E+06
x(M)	27.000	25.920	27.000	27.000	27.000	27.000	0.0000	0.0000	19.440	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	5091.3	3.2009E+06	3.2009E+06
x(M)	27.000	25.920	27.000	27.000	27.000	25.920	0.0000	0.0000	19.440	0.0000	0.0000
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	4322.6	3.2009E+06	3.2009E+06
x(M)	27.000	25.920	27.000	26.190	27.000	27.000	0.0000	0.0000	19.440	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	4601.4	3.2009E+06	3.2009E+06
x(M)	27.000	25.920	27.000	27.000	27.000	25.920	0.0000	0.0000	19.440	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	4820.3	3.2009E+06	3.2009E+06
x(M)	27.000	25.920	27.000	26.190	27.000	25.920	0.0000	0.0000	19.440	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	4111.5	3.2009E+06	3.2009E+06
x(M)	27.000	25.920	27.000	27.000	27.000	25.920	0.0000	0.0000	19.440	0.0000	0.0000
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	5238.6	3.2009E+06	3.2009E+06
x(M)	27.000	25.920	27.000	27.000	27.000	25.920	0.0000	0.0000	19.440	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3621.6	3.2009E+06	3.2009E+06
x(M)	27.000	25.920	27.000	25.110	27.000	25.920	0.0000	0.0000	19.440	0.0000	0.0000
Min.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3621.6	3.2009E+06	3.2009E+06
Pile N.	3	2	3	4	2	3	1	1	8	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR M	DISPL. z-DIR M	MOMENT z-DIR KN- M	MOMENT y-DIR KN- M	SHEAR y-DIR KN	SHEAR z-DIR KN	SOIL REACT y-DIR KN/ M	SOIL REACT z-DIR KN/ M	TOTAL STRESS KN/ M**2	FLEX. RIG. z-DIR KN- M**2	FLEX. RIG. y-DIR KN- M**2
******	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********
1	8.9666E-03	3.1750E-03	1185.5	748.23	598.63	280.50	235.43	143.48	1.2091E+04	3.2009E+06	3.2009E+06
x(M)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	8.3700	8.3700	0.0000	0.0000	0.0000
2	8.9631E-03	3.2129E-03	1189.6	760.26	605.68	287.24	231.74	141.08	1.3413E+04	3.2009E+06	3.2009E+06
x(M)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	8.3700	8.3700	0.0000	0.0000	0.0000
3	9.0045E-03	3.1784E-03	1195.9	748.90	601.67	280.46	236.37	142.89	1.2653E+04	3.2009E+06	

											3.2009E+06
x(M)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	8.3700	8.3700	0.0000	0.0000	0.0000
4	9.0011E-03	3.2163E-03	1200.0	760.93	608.74	287.19	232.67	140.52	1.2977E+04	3.2009E+06	3.2009E+06
x(M)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	8.3700	8.3700	0.0000	0.0000	0.0000
5	9.0424E-03	3.1818E-03	1206.3	749.56	604.69	280.41	237.31	142.29	1.3215E+04	3.2009E+06	3.2009E+06
x(M)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	8.3700	8.3700	0.0000	0.0000	0.0000
6	9.0390E-03	3.2197E-03	1210.4	761.58	611.78	287.14	233.59	139.96	1.2541E+04	3.2009E+06	3.2009E+06
x(M)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	8.3700	8.3700	0.0000	0.0000	0.0000
7	9.0804E-03	3.1852E-03	1216.7	750.22	607.79	280.39	238.19	141.65	1.3697E+04	3.2009E+06	3.2009E+06
x(M)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	8.3700	8.3700	0.0000	0.0000	0.0000
8	9.0769E-03	3.2232E-03	1220.8	762.23	614.78	287.08	234.49	139.42	1.2105E+04	3.2009E+06	3.2009E+06
x(M)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	8.3700	8.3700	0.0000	0.0000	0.0000
Max.	9.0804E-03	3.2232E-03	1220.8	762.23	614.78	287.24	238.19	143.48	1.3697E+04	3.2009E+06	3.2009E+06
Pile N.	7	8	8	8	8	2	7	1	7	1	1

***** SUMMARY FOR LOAD CASES AND COMBINATIONS *****

***** LOAD CASES RESULTS *****

LOAD CASE : 1

* TABLE L * COMPUTATION ON PILE CAP

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

LOAD X, KN	LOAD Y, KN	LOAD Z, KN	MOM X, KN- M	MOM Y, KN- M	MOM Z, KN- M
27634.8	612.180	510.000	-126.090	5799.21	-5617.83

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

DISP X, M	DISP Y, M	DISP Z, M	ROT X,RAD	ROT Y,RAD	ROT Z,RAD
2.20335E-03	1.11575E-03	6.67138E-04	-5.39152E-06	4.15487E-05	-1.53245E-04

* PILE TOP DISPLACEMENTS, GLOBAL *

	DISP. X, M	DISP. Y, M	DISP. Z, M	ROT. X,RAD	ROT. Y,RAD	ROT. Z,RAD
	***********	***********	***********	***********	***********	***********
MINIMUM	1.7249E-03	1.0826E-03	6.5350E-04	-5.3915E-06	4.1549E-05	-1.5324E-04
Pile N.	2	2	1	1	1	1
MAXIMUM	2.6818E-03	1.1489E-03	6.8078E-04	-5.3915E-06	4.1549E-05	-1.5324E-04
Pile N.	7	7	8	1	1	1

* PILE TOP REACTIONS, GLOBAL *

	FOR. X, KN	FOR. Y, KN	FOR. Z, KN	MOM X, KN- M	MOM Y, KN- M	MOM Z, KN- M
	***********	***********	***********	***********	***********	***********
MINIMUM	2748.3	72.754	62.182	-0.7893	-174.71	131.92
Pile N.	2	2	1	1	8	2
MAXIMUM	4160.4	80.283	65.317	-0.7893	-165.27	155.62
Pile N.	7	7	8	1	1	7

* PILE TOP DISPLACEMENTS, LOCAL *

DISP. x, M DISP. y, M DISP. z, M ROT. x,RAD ROT. y,RAD ROT. z,RAD

*********** *********** *********** *********** *********** ***********
MINIMUM 1.7249E-03 1.0826E-03 6.5350E-04 -5.3915E-06 4.1549E-05 -1.5324E-04
Pile N. 2 2 1 1 1 1
MAXIMUM 2.6818E-03 1.1489E-03 6.8078E-04 -5.3915E-06 4.1549E-05 -1.5324E-04
Pile N. 7 7 8 1 1 1

* PILE TOP REACTIONS, LOCAL *
AXIAL, KN LAT. y, KN LAT. z, KN MOM x, KN- M MOM y, KN- M MOM z, KN- M
*********** *********** *********** *********** *********** ***********
MINIMUM 2748.3 72.754 62.182 -0.7893 -174.71 131.92
Pile N. 2 2 1 1 8 2
MAXIMUM 4160.4 80.283 65.317 -0.7893 -165.27 155.62
Pile N. 7 7 8 1 1 7

* EFFECTS FOR LATERALLY LOADED PILE *

PILE DISPL. DISPL. MOMENT MOMENT SHEAR SHEAR SOIL REACT SOIL REACT TOTAL
y-DIR z-DIR z-DIR y-DIR y-DIR z-DIR y-DIR z-DIR STRESS
M M KN- M KN- M KN KN KN/ M KN/ M KN/ M**2
****** ********** ********** ********** ********** ********** ********** ********** **********
****
Min. -5.2343E-06 -3.8527E-06 -155.62 -174.71 -75.201 -55.147 -38.773 -29.267 2430.0
Pile N. 7 8 7 8 7 2 7 2 2
Max. 1.1489E-03 6.8078E-04 139.04 100.34 80.310 65.341 84.387 67.978 5024.4
Pile N. 7 8 7 8 7 8 7 2 7

LOAD CASE : 2

* TABLE L * COMPUTATION ON PILE CAP

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *
LOAD X, KN LOAD Y, KN LOAD Z, KN MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
13959.3 -612.180 510.000 -102.784 4712.36 5707.50

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *
DISP X, M DISP Y, M DISP Z, M ROT X,RAD ROT Y,RAD ROT Z,RAD
1.05183E-03 -1.05262E-03 5.86097E-04 -4.34614E-06 1.52957E-05 1.33155E-04

* PILE TOP DISPLACEMENTS, GLOBAL *
DISP. X, M DISP. Y, M DISP. Z, M ROT. X,RAD ROT. Y,RAD ROT. Z,RAD
*********** *********** *********** *********** *********** ***********
MINIMUM 6.2623E-04 -1.0794E-03 5.7510E-04 -4.3461E-06 1.5296E-05 1.3316E-04
Pile N. 1 2 1 1 1 1
MAXIMUM 1.4774E-03 -1.0259E-03 5.9709E-04 -4.3461E-06 1.5296E-05 1.3316E-04
Pile N. 8 7 8 1 1 1

* PILE TOP REACTIONS, GLOBAL *
FOR. X, KN FOR. Y, KN FOR. Z, KN MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
*********** *********** *********** *********** *********** ***********
MINIMUM 1073.9 -79.605 62.484 -0.6363 -188.90 -164.08
Pile N. 1 2 1 1 8 2
MAXIMUM 2383.2 -73.434 65.018 -0.6363 -180.90 -145.16
Pile N. 8 7 8 1 1 7

* PILE TOP DISPLACEMENTS, LOCAL *
DISP. x, M DISP. y, M DISP. z, M ROT. x,RAD ROT. y,RAD ROT. z,RAD
*********** *********** *********** *********** *********** ***********
MINIMUM 6.2623E-04 -1.0794E-03 5.7510E-04 -4.3461E-06 1.5296E-05 1.3316E-04
Pile N. 1 2 1 1 1 1
MAXIMUM 1.4774E-03 -1.0259E-03 5.9709E-04 -4.3461E-06 1.5296E-05 1.3316E-04

Pile N. 8 7 8 1 1 1

* PILE TOP REACTIONS, LOCAL *
AXIAL, KN LAT. y, KN LAT. z, KN MOM x, KN- M MOM y, KN- M MOM z, KN- M
*********** *********** *********** *********** *********** ***********
MINIMUM 1073.9 -79.605 62.484 -0.6363 -188.90 -164.08
Pile N. 1 2 1 1 8 2
MAXIMUM 2383.2 -73.434 65.018 -0.6363 -180.90 -145.16
Pile N. 8 7 8 1 1 7

* EFFECTS FOR LATERALLY LOADED PILE *

PILE DISPL. DISPL. MOMENT MOMENT SHEAR SHEAR SOIL REACT SOIL REACT TOTAL
y-DIR z-DIR z-DIR y-DIR y-DIR z-DIR y-DIR z-DIR STRESS
M M KN- M KN- M KN KN KN/ M KN/ M KN/ M**2
****** ********** ********** ********** ********** ********** ********** ********** **********
****
Min. -1.0794E-03 -3.6095E-06 -134.45 -188.90 -79.618 -53.550 -83.739 -28.673 949.50
Pile N. 2 8 2 8 2 8 1 8 1
Max. 4.9895E-06 5.9710E-04 164.08 96.139 72.539 65.037 37.961 67.773 3513.4
Pile N. 2 8 2 8 1 8 1 8 8

LOAD CASE : 3

* TABLE L * COMPUTATION ON PILE CAP

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *
LOAD X, KN LOAD Y, KN LOAD Z, KN MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
12625.0 4853.12 2270.00 -180.989 21174.1 -45280.1

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *
DISP X, M DISP Y, M DISP Z, M ROT X,RAD ROT Y,RAD ROT Z,RAD
1.06736E-03 9.02175E-03 3.19907E-03 -9.52115E-06 1.98135E-04 -1.13618E-03

* PILE TOP DISPLACEMENTS, GLOBAL *
DISP. X, M DISP. Y, M DISP. Z, M ROT. X,RAD ROT. Y,RAD ROT. Z,RAD
*********** *********** *********** *********** *********** ***********
MINIMUM -1.8035E-03 8.9631E-03 3.1750E-03 -9.5211E-06 1.9813E-04 -1.1362E-03
Pile N. 2 2 1 1 1 1
MAXIMUM 3.9383E-03 9.0804E-03 3.2232E-03 -9.5211E-06 1.9813E-04 -1.1362E-03
Pile N. 7 7 8 1 1 1

* PILE TOP REACTIONS, GLOBAL *
FOR. X, KN FOR. Y, KN FOR. Z, KN MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
*********** *********** *********** *********** *********** ***********
MINIMUM -2843.9 598.42 280.20 -1.3939 -761.70 1179.8
Pile N. 2 1 7 1 8 2
MAXIMUM 5924.7 614.84 287.33 -1.3939 -747.25 1223.5
Pile N. 7 8 2 1 1 7

* PILE TOP DISPLACEMENTS, LOCAL *
DISP. x, M DISP. y, M DISP. z, M ROT. x,RAD ROT. y,RAD ROT. z,RAD
*********** *********** *********** *********** *********** ***********
MINIMUM -1.8035E-03 8.9631E-03 3.1750E-03 -9.5211E-06 1.9813E-04 -1.1362E-03
Pile N. 2 2 1 1 1 1
MAXIMUM 3.9383E-03 9.0804E-03 3.2232E-03 -9.5211E-06 1.9813E-04 -1.1362E-03
Pile N. 7 7 8 1 1 1

* PILE TOP REACTIONS, LOCAL *
AXIAL, KN LAT. y, KN LAT. z, KN MOM x, KN- M MOM y, KN- M MOM z, KN- M

*********** *********** *********** *********** *********** ***********
MINIMUM -2843.9 598.42 280.20 -1.3939 -761.70 1179.8
Pile N. 2 1 7 1 8 2
MAXIMUM 5924.7 614.84 287.33 -1.3939 -747.25 1223.5
Pile N. 7 8 2 1 1 7

* EFFECTS FOR LATERALLY LOADED PILE *

PILE DISPL. DISPL. MOMENT MOMENT SHEAR SHEAR SOIL REACT SOIL REACT TOTAL
y-DIR z-DIR z-DIR y-DIR y-DIR z-DIR y-DIR z-DIR STRESS
M M KN- M KN- M KN KN KN/ M KN/ M KN/ M**2
****** ********** ********** ********** ********** ********** ********** ********** **********
****
Min. -5.6874E-05 -2.3253E-05 -1223.5 -761.70 -347.43 -148.09 -163.51 -75.396 992.31
Pile N. 7 7 7 8 7 2 7 7 8
Max. 9.0804E-03 3.2232E-03 906.89 367.10 614.78 287.24 238.19 143.48 1.3697E+04
Pile N. 7 8 7 8 8 2 7 1 7

LOAD CASE : 4

* TABLE L * COMPUTATION ON PILE CAP

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *
LOAD X, KN LOAD Y, KN LOAD Z, KN MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
10853.0 -4853.12 -2270.00 180.989 -21154.2 45281.9

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *
DISP X, M DISP Y, M DISP Z, M ROT X,RAD ROT Y,RAD ROT Z,RAD
9.12478E-04 -9.00329E-03 -3.19194E-03 8.68691E-06 -1.96207E-04 1.13138E-03

* PILE TOP DISPLACEMENTS, GLOBAL *
DISP. X, M DISP. Y, M DISP. Z, M ROT. X,RAD ROT. Y,RAD ROT. Z,RAD
*********** *********** *********** *********** *********** ***********
MINIMUM -1.9396E-03 -9.0568E-03 -3.2139E-03 8.6869E-06 -1.9621E-04 1.1314E-03
Pile N. 7 7 8 1 1 1
MAXIMUM 3.7645E-03 -8.9498E-03 -3.1700E-03 8.6869E-06 -1.9621E-04 1.1314E-03
Pile N. 2 2 1 1 1 1

* PILE TOP REACTIONS, GLOBAL *
FOR. X, KN FOR. Y, KN FOR. Z, KN MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
*********** *********** *********** *********** *********** ***********
MINIMUM -3044.5 -616.77 -284.73 1.2717 748.23 -1220.8
Pile N. 7 7 8 1 1 8
MAXIMUM 5758.1 -596.55 -282.76 1.2717 762.23 -1185.5
Pile N. 2 2 1 1 8 1

* PILE TOP DISPLACEMENTS, LOCAL *
DISP. x, M DISP. y, M DISP. z, M ROT. x,RAD ROT. y,RAD ROT. z,RAD
*********** *********** *********** *********** *********** ***********
MINIMUM -1.9396E-03 -9.0568E-03 -3.2139E-03 8.6869E-06 -1.9621E-04 1.1314E-03
Pile N. 7 7 8 1 1 1
MAXIMUM 3.7645E-03 -8.9498E-03 -3.1700E-03 8.6869E-06 -1.9621E-04 1.1314E-03
Pile N. 2 2 1 1 1 1

* PILE TOP REACTIONS, LOCAL *
AXIAL, KN LAT. y, KN LAT. z, KN MOM x, KN- M MOM y, KN- M MOM z, KN- M
*********** *********** *********** *********** *********** ***********
MINIMUM -3044.5 -616.77 -284.73 1.2717 748.23 -1220.8
Pile N. 7 7 8 1 1 8
MAXIMUM 5758.1 -596.55 -282.76 1.2717 762.23 -1185.5

Pile N. 2 2 1 1 8 1

* EFFECTS FOR LATERALLY LOADED PILE *

PILE DISPL. DISPL. MOMENT MOMENT SHEAR SHEAR SOIL REACT SOIL REACT TOTAL
y-DIR z-DIR z-DIR y-DIR y-DIR z-DIR y-DIR z-DIR STRESS
M M KN- M KN- M KN KN KN/ M KN/ M KN/ M**2
****** ********** ********** ********** ********** ********** ********** ********** **********
****
Min. -9.0568E-03 -3.2139E-03 -903.42 -367.27 -616.61 -284.86 -235.69 -145.37 1222.9
Pile N. 7 8 8 8 7 8 8 2 1
Max. 5.6447E-05 2.3477E-05 1220.8 762.23 345.36 149.13 161.22 75.683 1.3413E+04
Pile N. 8 2 8 8 8 2 8 2 2

LOAD CASE : 5

* TABLE L * COMPUTATION ON PILE CAP

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *
LOAD X, KN LOAD Y, KN LOAD Z, KN MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
20084.0 408.120 340.000 -84.0600 3866.88 -3745.16

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *
DISP X, M DISP Y, M DISP Z, M ROT X,RAD ROT Y,RAD ROT Z,RAD
1.56373E-03 7.38475E-04 4.40648E-04 -3.55343E-06 2.76907E-05 -1.02101E-04

* PILE TOP DISPLACEMENTS, GLOBAL *
DISP. X, M DISP. Y, M DISP. Z, M ROT. X,RAD ROT. Y,RAD ROT. Z,RAD
*********** *********** *********** *********** *********** ***********
MINIMUM 1.2449E-03 7.1660E-04 4.3166E-04 -3.5534E-06 2.7691E-05 -1.0210E-04
Pile N. 2 2 1 1 1 1
MAXIMUM 1.8826E-03 7.6035E-04 4.4964E-04 -3.5534E-06 2.7691E-05 -1.0210E-04
Pile N. 7 7 8 1 1 1

* PILE TOP REACTIONS, GLOBAL *
FOR. X, KN FOR. Y, KN FOR. Z, KN MOM X, KN- M MOM Y, KN- M MOM Z, KN- M
*********** *********** *********** *********** *********** ***********
MINIMUM 2040.0 48.482 41.460 -0.5202 -116.26 87.616
Pile N. 2 2 1 1 8 2
MAXIMUM 2981.0 53.544 43.540 -0.5202 -109.97 103.36
Pile N. 7 7 8 1 1 7

* PILE TOP DISPLACEMENTS, LOCAL *
DISP. x, M DISP. y, M DISP. z, M ROT. x,RAD ROT. y,RAD ROT. z,RAD
*********** *********** *********** *********** *********** ***********
MINIMUM 1.2449E-03 7.1660E-04 4.3166E-04 -3.5534E-06 2.7691E-05 -1.0210E-04
Pile N. 2 2 1 1 1 1
MAXIMUM 1.8826E-03 7.6035E-04 4.4964E-04 -3.5534E-06 2.7691E-05 -1.0210E-04
Pile N. 7 7 8 1 1 1

* PILE TOP REACTIONS, LOCAL *
AXIAL, KN LAT. y, KN LAT. z, KN MOM x, KN- M MOM y, KN- M MOM z, KN- M
*********** *********** *********** *********** *********** ***********
MINIMUM 2040.0 48.482 41.460 -0.5202 -116.26 87.616
Pile N. 2 2 1 1 8 2
MAXIMUM 2981.0 53.544 43.540 -0.5202 -109.97 103.36
Pile N. 7 7 8 1 1 7

* EFFECTS FOR LATERALLY LOADED PILE *

```
 PILE    DISPL.      DISPL.      MOMENT      MOMENT       SHEAR       SHEAR    SOIL REACT  SOIL REACT     TOTAL
         y-DIR       z-DIR       y-DIR       y-DIR        z-DIR       y-DIR       z-DIR       STRESS
           M           M         KN- M       KN- M         KN          KN         KN/ M       KN/ M      KN/ M**2
 ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
**********
  Min. -3.1047E-06 -2.3170E-06   -103.36    -116.26    -54.560    -40.293    -30.134    -22.637     1803.8
Pile N.     7          8          7          8          7          2          7          2          2
  Max.  7.6035E-04  4.4964E-04    94.891     68.690     53.557     43.551     67.497     54.104     3530.6
Pile N.     7          8          7          8          7          8          7          2          7

 LOAD CASE :    6

 * TABLE L *   COMPUTATION ON PILE CAP

 * EQUIVALENT CONCENTRATED LOAD AT ORIGIN *
    LOAD X, KN     LOAD Y, KN     LOAD Z, KN    MOM X, KN- M   MOM Y, KN- M   MOM Z, KN- M
      10164.0       -408.120       340.000      -68.5230       3144.81        3805.29

 * DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *
    DISP X, M      DISP Y, M      DISP Z, M      ROT X,RAD      ROT Y,RAD      ROT Z,RAD
   7.45741E-04   -6.75028E-04   3.86992E-04   -2.87270E-06   1.02123E-05    8.15314E-05

  * PILE TOP DISPLACEMENTS, GLOBAL *
           DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
          *********** *********** *********** *********** *********** ***********
  MINIMUM     4.8024E-04  -6.9271E-04   3.7972E-04  -2.8727E-06   1.0212E-05   8.1531E-05
  Pile N.          1            2            1            1            1            1
  MAXIMUM     1.0112E-03  -6.5735E-04   3.9426E-04  -2.8727E-06   1.0212E-05   8.1531E-05
  Pile N.          8            7            8            1            1            1

  * PILE TOP REACTIONS, GLOBAL *
           FOR. X, KN   FOR. Y, KN   FOR. Z, KN  MOM X, KN- M  MOM Y, KN- M  MOM Z, KN- M
          *********** *********** *********** *********** *********** ***********
  MINIMUM       823.51      -53.079       41.642      -0.4205      -125.82      -113.43
  Pile N.          1            2            1            1            8            2
  MAXIMUM       1695.2      -48.948       43.359      -0.4205      -120.47      -100.81
  Pile N.          8            7            8            1            1            7

  * PILE TOP DISPLACEMENTS, LOCAL *
           DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
          *********** *********** *********** *********** *********** ***********
  MINIMUM     4.8024E-04  -6.9271E-04   3.7972E-04  -2.8727E-06   1.0212E-05   8.1531E-05
  Pile N.          1            2            1            1            1            1
  MAXIMUM     1.0112E-03  -6.5735E-04   3.9426E-04  -2.8727E-06   1.0212E-05   8.1531E-05
  Pile N.          8            7            8            1            1            1

  * PILE TOP REACTIONS, LOCAL *
           AXIAL, KN    LAT. y, KN   LAT. z, KN  MOM x, KN- M  MOM y, KN- M  MOM z, KN- M
          *********** *********** *********** *********** *********** ***********
  MINIMUM       823.51      -53.079       41.642      -0.4205      -125.82      -113.43
  Pile N.          1            2            1            1            8            2
  MAXIMUM       1695.2      -48.948       43.359      -0.4205      -120.47      -100.81
  Pile N.          8            7            8            1            1            7

  * EFFECTS FOR LATERALLY LOADED PILE *

 PILE    DISPL.      DISPL.      MOMENT      MOMENT       SHEAR       SHEAR    SOIL REACT  SOIL REACT     TOTAL
         y-DIR       z-DIR       y-DIR       y-DIR        z-DIR       y-DIR       z-DIR       STRESS
           M           M         KN- M       KN- M         KN          KN         KN/ M       KN/ M      KN/ M**2
 ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
```



```
**********
  Min. -6.9271E-04 -2.1671E-06    -90.798    -125.82    -53.085    -38.831    -66.804    -22.166     728.14
Pile N.     2          2          2          8          2          8          1          8          1
  Max.  2.9251E-06  3.9426E-04    113.43     65.922     52.267     43.368     29.270     53.935     2450.5
Pile N.     2          8          2          8          1          8          1          8          8

 * TABLE M *   COMPUTATION ON INDIVIDUAL PILE

  * PILE TOP DISPLACEMENTS, GLOBAL *
           DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
          *********** *********** *********** *********** *********** ***********
  MINIMUM    -1.9396E-03  -9.0568E-03  -3.2139E-03  -9.5211E-06  -1.9621E-04  -1.1362E-03
  Pile N.          7            7            8            1            1            1
  MAXIMUM    -6.5925E-04  -8.9498E-03  -3.1700E-03  -9.5211E-06  -1.9621E-04  -1.1362E-03
  Pile N.          8            2            1            1            1            1

  * PILE TOP REACTIONS, GLOBAL *
           FOR. X, KN   FOR. Y, KN   FOR. Z, KN  MOM X, KN- M  MOM Y, KN- M  MOM Z, KN- M
          *********** *********** *********** *********** *********** ***********
  MINIMUM      -3044.5      -616.77      -284.73      -1.3939      -761.70      -1220.8
  Pile N.          7            7            8            1            8            8
  MAXIMUM      -1122.3      -596.55      -282.76      -1.3939      -747.25      -1185.5
  Pile N.          8            2            1            1            1            1

  * PILE TOP DISPLACEMENTS, LOCAL *
           DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
          *********** *********** *********** *********** *********** ***********
  MINIMUM    -1.9396E-03  -9.0568E-03  -3.2139E-03  -9.5211E-06  -1.9621E-04  -1.1362E-03
  Pile N.          7            7            8            1            1            1
  MAXIMUM    -6.5925E-04  -8.9498E-03  -3.1700E-03  -9.5211E-06  -1.9621E-04  -1.1362E-03
  Pile N.          8            2            1            1            1            1

  * PILE TOP REACTIONS, LOCAL *
           AXIAL, KN    LAT. y, KN   LAT. z, KN  MOM x, KN- M  MOM y, KN- M  MOM z, KN- M
          *********** *********** *********** *********** *********** ***********
  MINIMUM      -3044.5      -616.77      -284.73      -1.3939      -761.70      -1220.8
  Pile N.          7            7            8            1            8            8
  MAXIMUM      -1122.3      -596.55      -282.76      -1.3939      -747.25      -1185.5
  Pile N.          8            2            1            1            1            1

  * EFFECTS FOR LATERALLY LOADED PILE *

 PILE    DISPL.      DISPL.      MOMENT      MOMENT       SHEAR       SHEAR    SOIL REACT  SOIL REACT     TOTAL
         y-DIR       z-DIR       z-DIR       y-DIR        y-DIR       z-DIR       y-DIR       z-DIR       STRESS
           M           M         KN- M       KN- M         KN          KN         KN/ M       KN/ M      KN/ M**2
 ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
**********
  Min. -9.0568E-03 -3.2139E-03    -1223.5    -761.70    -616.61    -284.86    -235.69    -145.37     728.14
Pile N.     7          8          7          8          7          8          8          2          1
  Max.     0.0000     0.0000     0.0000     0.0000     0.0000     0.4437     0.0000     0.0000     2450.5
Pile N.     7          5          4          6          8          5          1          1          8

 * TABLE M *   COMPUTATION ON INDIVIDUAL PILE

  * PILE TOP DISPLACEMENTS, GLOBAL *
           DISP. X, M   DISP. Y, M   DISP. Z, M   ROT. X,RAD   ROT. Y,RAD   ROT. Z,RAD
          *********** *********** *********** *********** *********** ***********
  MINIMUM     2.6381E-03   8.9631E-03   3.1750E-03   8.6869E-06   1.9813E-04   1.1314E-03
  Pile N.          8            2            1            1            1            1
  MAXIMUM     3.9383E-03   9.0804E-03   3.2232E-03   8.6869E-06   1.9813E-04   1.1314E-03
```



```
  Pile N.          7            7            8            1            1            1

  * PILE TOP REACTIONS, GLOBAL *
           FOR. X, KN   FOR. Y, KN   FOR. Z, KN  MOM X, KN- M  MOM Y, KN- M  MOM Z, KN- M
          *********** *********** *********** *********** *********** ***********
  MINIMUM       4095.9       598.42       280.20       1.2717       748.23       1179.8
  Pile N.          8            1            7            1            1            2
  MAXIMUM       5924.7       614.84       287.33       1.2717       762.23       1223.5
  Pile N.          7            8            2            1            8            7

  * PILE TOP DISPLACEMENTS, LOCAL *
           DISP. x, M   DISP. y, M   DISP. z, M   ROT. x,RAD   ROT. y,RAD   ROT. z,RAD
          *********** *********** *********** *********** *********** ***********
  MINIMUM     2.6381E-03   8.9631E-03   3.1750E-03   8.6869E-06   1.9813E-04   1.1314E-03
  Pile N.          8            2            1            1            1            1
  MAXIMUM     3.9383E-03   9.0804E-03   3.2232E-03   8.6869E-06   1.9813E-04   1.1314E-03
  Pile N.          7            7            8            1            1            1

  * PILE TOP REACTIONS, LOCAL *
           AXIAL, KN    LAT. y, KN   LAT. z, KN  MOM x, KN- M  MOM y, KN- M  MOM z, KN- M
          *********** *********** *********** *********** *********** ***********
  MINIMUM       4095.9       598.42       280.20       1.2717       748.23       1179.8
  Pile N.          8            1            7            1            1            2
  MAXIMUM       5924.7       614.84       287.33       1.2717       762.23       1223.5
  Pile N.          7            8            2            1            8            7

  * EFFECTS FOR LATERALLY LOADED PILE *

 PILE    DISPL.      DISPL.      MOMENT      MOMENT       SHEAR       SHEAR    SOIL REACT  SOIL REACT     TOTAL
         y-DIR       z-DIR       z-DIR       y-DIR        y-DIR       z-DIR       y-DIR       z-DIR       STRESS
           M           M         KN- M       KN- M         KN          KN         KN/ M       KN/ M      KN/ M**2
 ****** ********** ********** ********** ********** ********** ********** ********** ********** **********
**********
  Min.     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     3621.6
Pile N.     3          2          3          4          2          3          1          1          8
  Max.  9.0804E-03  3.2232E-03    1220.8     762.23     614.78     287.24     238.19     143.48  1.3697E+04
Pile N.     7          8          8          8          8          2          7          1          7
```

16.4 Paratie provvisionali: allegati *PARATIE 18.0®*

Sommario

1. Descrizione della Stratigrafia e degli Strati di Terreno

Tipo : HORIZONTAL
Quota : 200 m
OCR : 1

Tipo : HORIZONTAL
Quota : 185.1 m
OCR : 1

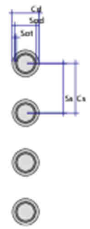
Strato di Terreno	Terreno	γ dry	γ sat	ø'	øcv	øp	c'	Su	Modulo Elastico	Eu	Evc	Eur	Ah	Av	exp	Pa	Rur/Rvc	Rvc	Ku	Kvc	Kur
		kN/m³	kN/m³	°	°	°	kPa	kPa			kPa	kPa				kPa		kPa	kN/m³	kN/m³	kN/m³
1	unità b	19.5	20.5	30			15		Constant		10000	30000									
2	unità FAA	20	21	28			30		Constant		20000	60000									

2. Descrizione Pareti

X : 0 m
Quota in alto : 198 m
Quota di fondo : 180.5 m
Muro di sinistra

Armatura Lunghezza segmenti : 1 m

Sezione : micropalo
Area equivalente : 0.0272470727097916 m
Inerzia equivalente : 0.0001 m^4/m
Materiale calcestruzzo : C25/30
Tipo sezione : Tangent
Spaziatura : 0.4 m
Diametro : 0.22 m
Efficacia : 1
Materiale acciaio : S355
Sezione : CHS168.3*12.5
Tipo sezione : O
Spaziatura : 0.4 m
Spessore : 0.0125 m
Diametro : 0.1683 m



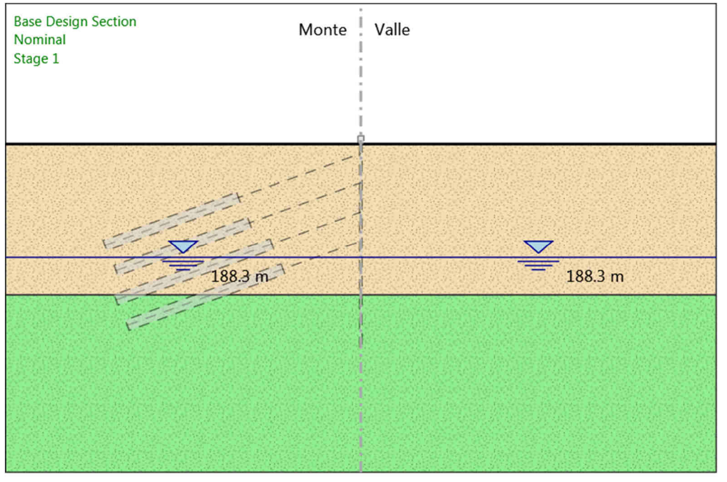
X : 0 m
Quota in alto : 198.7 m
Quota di fondo : 198 m
Muro di sinistra

Armatura Lunghezza segmenti : 1 m
Rinforzo longitudinale 1
Lunghezza : 0.7 m
Materiale : B450C
Quota iniziale : 198.7 m
Barre di sinistra 1
Numero di barre : 5
Diametro : 0.02 m
Distanza dal bordo : 0.067 m
Barre di destra 1
Numero di barre : 5
Diametro : 0.02 m
Distanza dal bordo : 0.067 m
Staffe 1
Numero di staffe : 2
Copertura : 0.045 m
Diametro : 0.012 m
Lunghezza : 0.7 m
Quota iniziale : 198.7 m
Passo : 0.2 m

Sezione : cordolo
Area equivalente : 0.5 m
Inerzia equivalente : 0.0104 m^4/m
Materiale calcestruzzo : C32/40
Tipo sezione : Solid
Spessore : 0.5 m
Efficacia : 1

3. Fasi di Calcolo

3.1. Stage 1

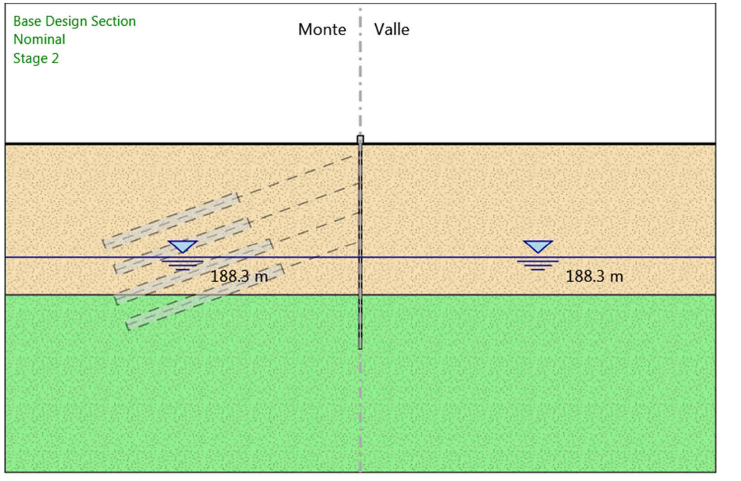


Stage 1
Scavo
Muro di sinistra
Lato monte : 198 m
Lato valle : 198 m

Linea di scavo di sinistra (Orizzontale)
198 m
Linea di scavo di destra (Orizzontale)
198 m

Falda acquifera
Falda di sinistra : 188.3 m
Falda di destra : 188.3 m

3.2. Stage 2



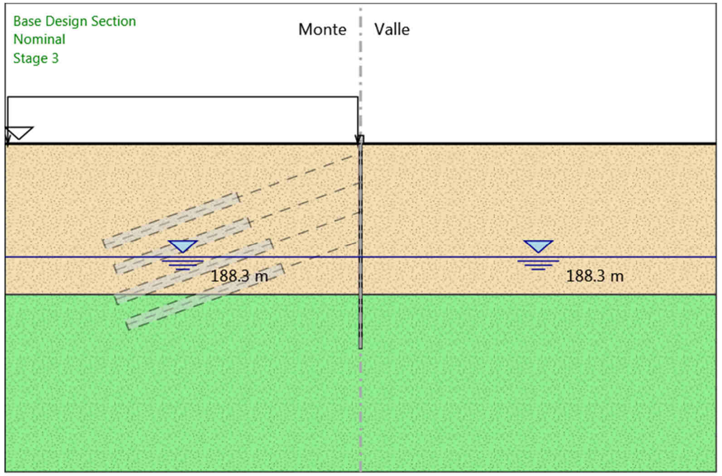
Stage 2
Scavo
Muro di sinistra
Lato monte : 198 m
Lato valle : 198 m

Linea di scavo di sinistra (Orizzontale)
198 m
Linea di scavo di destra (Orizzontale)
198 m

Falda acquifera
Falda di sinistra : 188.3 m
Falda di destra : 188.3 m

Elementi strutturali
Paratia : micropali
X : 0 m
Quota in alto : 198 m
Quota di fondo : 180.5 m
Sezione : micropalo
Paratia : cordolo_sx
X : 0 m
Quota in alto : 198.7 m
Quota di fondo : 198 m
Sezione : cordolo

3.3. Stage 3



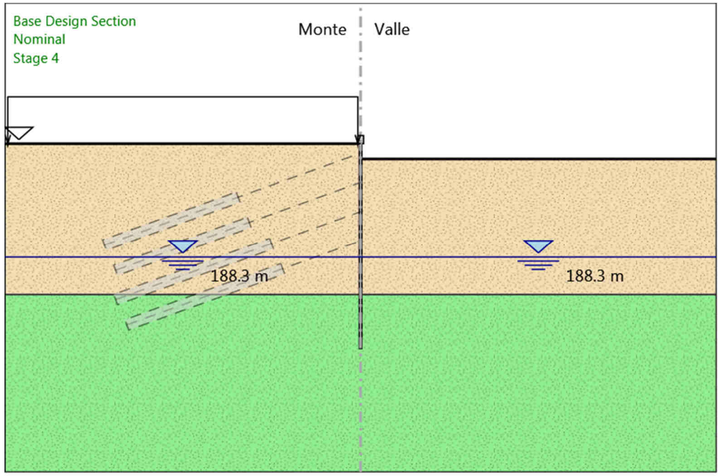
Stage 3
Scavo
Muro di sinistra
Lato monte : 198 m
Lato valle : 198 m

Linea di scavo di sinistra (Orizzontale)
198 m
Linea di scavo di destra (Orizzontale)
198 m

Falda acquifera
Falda di sinistra : 188.3 m
Falda di destra : 188.3 m

Elementi strutturali
Paratia : micropali
X : 0 m
Quota in alto : 198 m
Quota di fondo : 180.5 m
Sezione : micropalo
Paratia : cordolo_sx
X : 0 m
Quota in alto : 198.7 m
Quota di fondo : 198 m
Sezione : cordolo

3.4. Stage 4



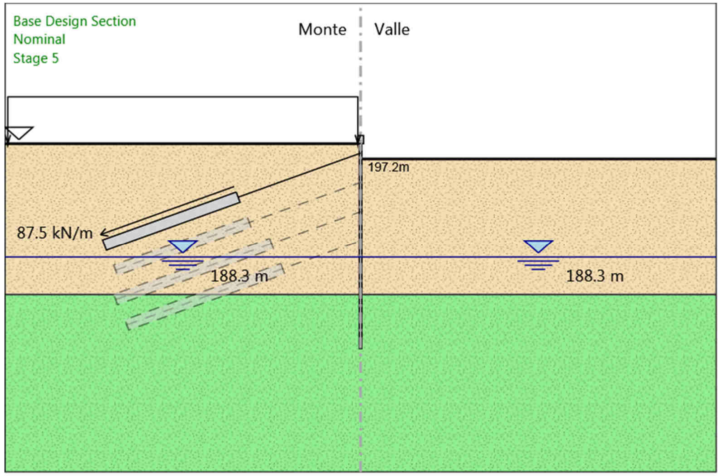
Stage 4
Scavo
Muro di sinistra
Lato monte : 198 m
Lato valle : 196.7 m

Linea di scavo di sinistra (Orizzontale)
198 m
Linea di scavo di destra (Orizzontale)
196.7 m

Falda acquifera
Falda di sinistra : 188.3 m
Falda di destra : 188.3 m

Elementi strutturali
Paratia : micropali
X : 0 m
Quota in alto : 198 m
Quota di fondo : 180.5 m
Sezione : micropalo
Paratia : cordolo_sx
X : 0 m
Quota in alto : 198.7 m
Quota di fondo : 198 m
Sezione : cordolo

3.5. Stage 5



Stage 5
Scavo
Muro di sinistra
Lato monte : 198 m
Lato valle : 196.7 m

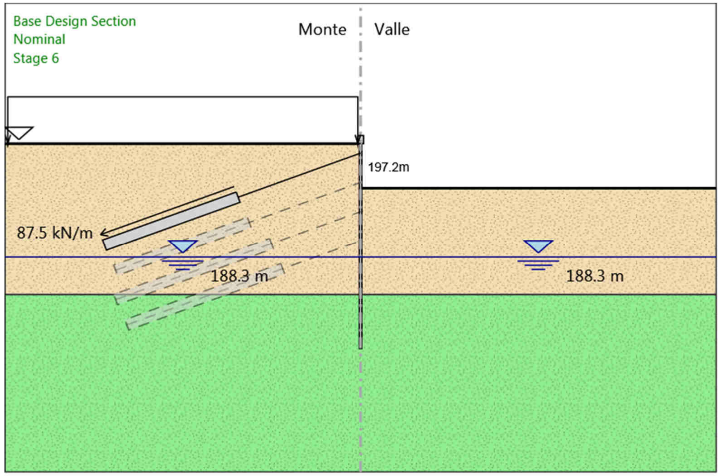
Linea di scavo di sinistra (Orizzontale)
198 m
Linea di scavo di destra (Orizzontale)
196.7 m

Falda acquifera
Falda di sinistra : 188.3 m
Falda di destra : 188.3 m

Elementi strutturali
Paratia : micropali
X : 0 m
Quota in alto : 198 m
Quota di fondo : 180.5 m
Sezione : micropalo
Paratia : cordolo_sx
X : 0 m
Quota in alto : 198.7 m
Quota di fondo : 198 m
Sezione : cordolo
Tirante : I-ordine
X : 0 m
Z : 197.2 m
Lunghezza bulbo : 12 m
Diametro bulbo : 0.2 m
Lunghezza libera : 11 m
Spaziatura orizzontale : 2 m
Precarico : 175 kN

Angolo : 20 °
Sezione : 3 trefoli
Tipo di barre : Barre trefoli
Numero di barre : 3
Diametro : 0.01331 m
Area : 0.000417 m^2

3.6. Stage 6



Stage 6
Scavo
Muro di sinistra
Lato monte : 198 m
Lato valle : 194.2 m

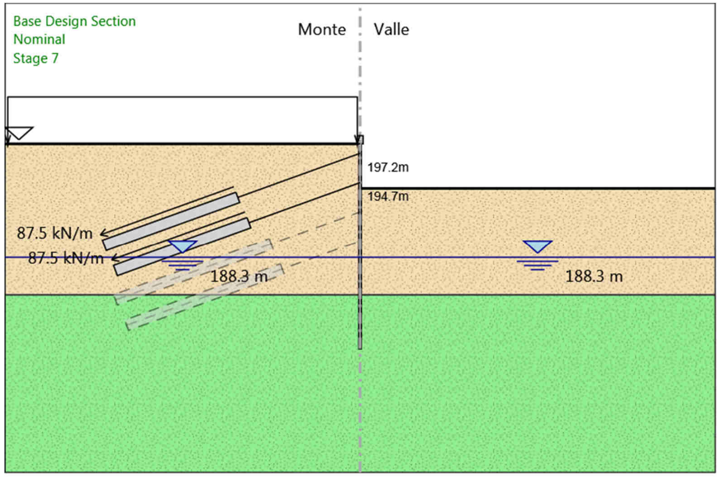
Linea di scavo di sinistra (Orizzontale)
198 m
Linea di scavo di destra (Orizzontale)
194.2 m

Falda acquifera
Falda di sinistra : 188.3 m
Falda di destra : 188.3 m

Elementi strutturali
Paratia : micropali
X : 0 m
Quota in alto : 198 m
Quota di fondo : 180.5 m
Sezione : micropalo
Paratia : cordolo_sx
X : 0 m
Quota in alto : 198.7 m
Quota di fondo : 198 m
Sezione : cordolo
Tirante : I-ordine
X : 0 m
Z : 197.2 m
Lunghezza bulbo : 12 m
Diametro bulbo : 0.2 m
Lunghezza libera : 11 m
Spaziatura orizzontale : 2 m
Precarico : 175 kN

Angolo : 20 °
Sezione : 3 trefoli
Tipo di barre : Barre trefoli
Numero di barre : 3
Diametro : 0.01331 m
Area : 0.000417 m^2

3.7. Stage 7



Stage 7
Scavo
Muro di sinistra
Lato monte : 198 m
Lato valle : 194.2 m

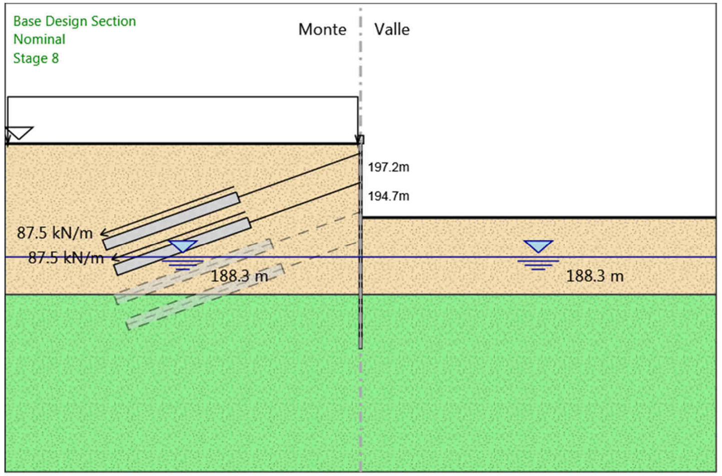
Linea di scavo di sinistra (Orizzontale)
198 m
Linea di scavo di destra (Orizzontale)
194.2 m

Falda acquifera
Falda di sinistra : 188.3 m
Falda di destra : 188.3 m

Elementi strutturali
Paratia : micropali
X : 0 m
Quota in alto : 198 m
Quota di fondo : 180.5 m
Sezione : micropalo
Paratia : cordolo_sx
X : 0 m
Quota in alto : 198.7 m
Quota di fondo : 198 m
Sezione : cordolo
Tirante : I-ordine
X : 0 m
Z : 197.2 m
Lunghezza bulbo : 12 m
Diametro bulbo : 0.2 m
Lunghezza libera : 11 m
Spaziatura orizzontale : 2 m
Precarico : 175 kN

Angolo : 20 °
Sezione : 3 trefoli
Tipo di barre : Barre trefoli
Numero di barre : 3
Diametro : 0.01331 m
Area : 0.000417 m^2
Tirante : II-ordine
X : 0 m
Z : 194.7 m
Lunghezza bulbo : 12 m
Diametro bulbo : 0.2 m
Lunghezza libera : 10 m
Spaziatura orizzontale : 2 m
Precarico : 175 kN
Angolo : 20 °
Sezione : 3 trefoli
Tipo di barre : Barre trefoli
Numero di barre : 3
Diametro : 0.01331 m
Area : 0.000417 m^2

3.8. Stage 8



Stage 8
Scavo
    Muro di sinistra
        Lato monte : 198 m
        Lato valle : 191.7 m

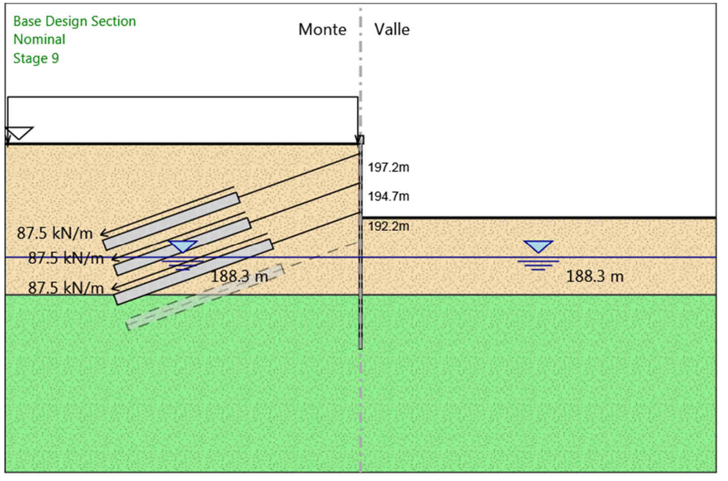
        Linea di scavo di sinistra (Orizzontale)
            198 m
        Linea di scavo di destra (Orizzontale)
            191.7 m

Falda acquifera
    Falda di sinistra : 188.3 m
    Falda di destra : 188.3 m

Elementi strutturali
    Paratia : micropali
        X : 0 m
        Quota in alto : 198 m
        Quota di fondo : 180.5 m
        Sezione : micropalo
    Paratia : cordolo_sx
        X : 0 m
        Quota in alto : 198.7 m
        Quota di fondo : 198 m
        Sezione : cordolo
    Tirante : I-ordine
        X : 0 m
        Z : 197.2 m
        Lunghezza bulbo : 12 m
        Diametro bulbo : 0.2 m
        Lunghezza libera : 11 m
        Spaziatura orizzontale : 2 m
        Precarico : 175 kN

        Angolo : 20 °
        Sezione : 3 trefoli
            Tipo di barre : Barre trefoli
            Numero di barre : 3
            Diametro : 0.01331 m
            Area : 0.000417 m^2
    Tirante : II-ordine
        X : 0 m
        Z : 194.7 m
        Lunghezza bulbo : 12 m
        Diametro bulbo : 0.2 m
        Lunghezza libera : 10 m
        Spaziatura orizzontale : 2 m
        Precarico : 175 kN
        Angolo : 20 °
        Sezione : 3 trefoli
            Tipo di barre : Barre trefoli
            Numero di barre : 3
            Diametro : 0.01331 m
            Area : 0.000417 m^2

3.9. Stage 9



Stage 9
Scavo
Muro di sinistra
Lato monte : 198 m
Lato valle : 191.7 m

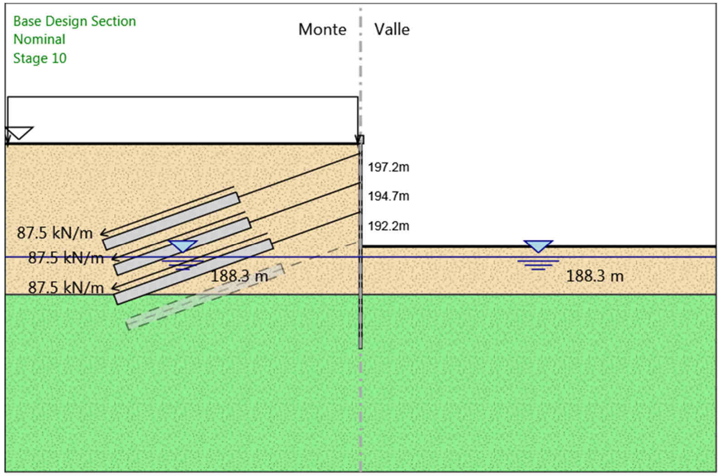
Linea di scavo di sinistra (Orizzontale)
198 m
Linea di scavo di destra (Orizzontale)
191.7 m

Falda acquifera
Falda di sinistra : 188.3 m
Falda di destra : 188.3 m

Elementi strutturali
Paratia : micropali
X : 0 m
Quota in alto : 198 m
Quota di fondo : 180.5 m
Sezione : micropalo
Paratia : cordolo_sx
X : 0 m
Quota in alto : 198.7 m
Quota di fondo : 198 m
Sezione : cordolo
Tirante : I-ordine
X : 0 m
Z : 197.2 m
Lunghezza bulbo : 12 m
Diametro bulbo : 0.2 m
Lunghezza libera : 11 m
Spaziatura orizzontale : 2 m
Precarico : 175 kN

Angolo : 20 °
Sezione : 3 trefoli
Tipo di barre : Barre trefoli
Numero di barre : 3
Diametro : 0.01331 m
Area : 0.000417 m^2
Tirante : II-ordine
X : 0 m
Z : 194.7 m
Lunghezza bulbo : 12 m
Diametro bulbo : 0.2 m
Lunghezza libera : 10 m
Spaziatura orizzontale : 2 m
Precarico : 175 kN
Angolo : 20 °
Sezione : 3 trefoli
Tipo di barre : Barre trefoli
Numero di barre : 3
Diametro : 0.01331 m
Area : 0.000417 m^2
Tirante : III-ordine
X : 0 m
Z : 192.2 m
Lunghezza bulbo : 14 m
Diametro bulbo : 0.2 m
Lunghezza libera : 8 m
Spaziatura orizzontale : 2 m
Precarico : 175 kN
Angolo : 20 °
Sezione : 4 trefoli
Tipo di barre : Barre trefoli
Numero di barre : 4
Diametro : 0.01331 m
Area : 0.000556 m^2

3.10. Stage 10



Stage 10
Scavo
- Muro di sinistra
  - Lato monte : 198 m
  - Lato valle : 189.2 m

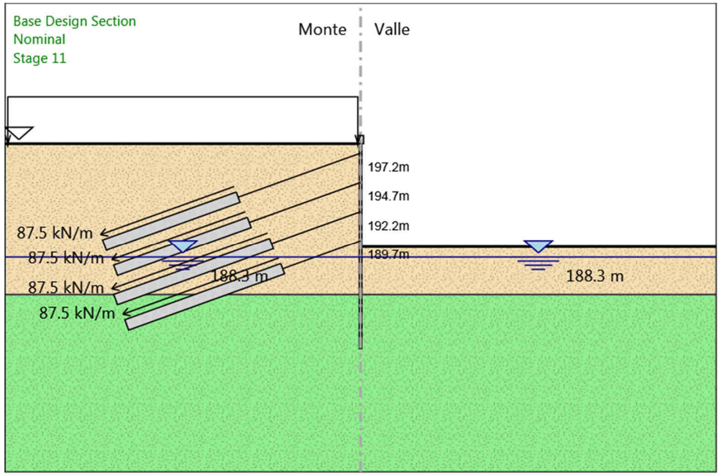
  - Linea di scavo di sinistra (Orizzontale)
    - 198 m
  - Linea di scavo di destra (Orizzontale)
    - 189.2 m

Falda acquifera
- Falda di sinistra : 188.3 m
- Falda di destra : 188.3 m

Elementi strutturali
- Paratia : micropali
  - X : 0 m
  - Quota in alto : 198 m
  - Quota di fondo : 180.5 m
  - Sezione : micropalo
- Paratia : cordolo_sx
  - X : 0 m
  - Quota in alto : 198.7 m
  - Quota di fondo : 198 m
  - Sezione : cordolo
- Tirante : I-ordine
  - X : 0 m
  - Z : 197.2 m
  - Lunghezza bulbo : 12 m
  - Diametro bulbo : 0.2 m
  - Lunghezza libera : 11 m
  - Spaziatura orizzontale : 2 m
  - Precarico : 175 kN

  - Angolo : 20 °
  - Sezione : 3 trefoli
    - Tipo di barre : Barre trefoli
    - Numero di barre : 3
    - Diametro : 0.01331 m
    - Area : 0.000417 m^2
- Tirante : II-ordine
  - X : 0 m
  - Z : 194.7 m
  - Lunghezza bulbo : 12 m
  - Diametro bulbo : 0.2 m
  - Lunghezza libera : 10 m
  - Spaziatura orizzontale : 2 m
  - Precarico : 175 kN
  - Angolo : 20 °
  - Sezione : 3 trefoli
    - Tipo di barre : Barre trefoli
    - Numero di barre : 3
    - Diametro : 0.01331 m
    - Area : 0.000417 m^2
- Tirante : III-ordine
  - X : 0 m
  - Z : 192.2 m
  - Lunghezza bulbo : 14 m
  - Diametro bulbo : 0.2 m
  - Lunghezza libera : 8 m
  - Spaziatura orizzontale : 2 m
  - Precarico : 175 kN
  - Angolo : 20 °
  - Sezione : 4 trefoli
    - Tipo di barre : Barre trefoli
    - Numero di barre : 4
    - Diametro : 0.01331 m
    - Area : 0.000556 m^2

3.11. Stage 11



Stage 11
Scavo
Muro di sinistra
Lato monte : 198 m
Lato valle : 189.2 m

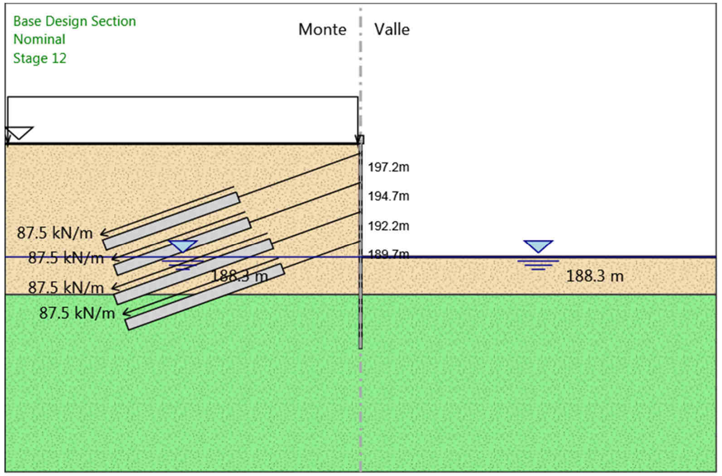
Linea di scavo di sinistra (Orizzontale)
198 m
Linea di scavo di destra (Orizzontale)
189.2 m

Falda acquifera
Falda di sinistra : 188.3 m
Falda di destra : 188.3 m

Elementi strutturali
Paratia : micropali
X : 0 m
Quota in alto : 198 m
Quota di fondo : 180.5 m
Sezione : micropalo
Paratia : cordolo_sx
X : 0 m
Quota in alto : 198.7 m
Quota di fondo : 198 m
Sezione : cordolo
Tirante : I-ordine
X : 0 m
Z : 197.2 m
Lunghezza bulbo : 12 m
Diametro bulbo : 0.2 m
Lunghezza libera : 11 m
Spaziatura orizzontale : 2 m
Precarico : 175 kN

Angolo : 20 °
Sezione : 3 trefoli
Tipo di barre : Barre trefoli
Numero di barre : 3
Diametro : 0.01331 m
Area : 0.000417 m^2
Tirante : II-ordine
X : 0 m
Z : 194.7 m
Lunghezza bulbo : 12 m
Diametro bulbo : 0.2 m
Lunghezza libera : 10 m
Spaziatura orizzontale : 2 m
Precarico : 175 kN
Angolo : 20 °
Sezione : 3 trefoli
Tipo di barre : Barre trefoli
Numero di barre : 3
Diametro : 0.01331 m
Area : 0.000417 m^2
Tirante : III-ordine
X : 0 m
Z : 192.2 m
Lunghezza bulbo : 14 m
Diametro bulbo : 0.2 m
Lunghezza libera : 8 m
Spaziatura orizzontale : 2 m
Precarico : 175 kN
Angolo : 20 °
Sezione : 4 trefoli
Tipo di barre : Barre trefoli
Numero di barre : 4
Diametro : 0.01331 m
Area : 0.000556 m^2
Tirante : IV-ordine
X : 0 m
Z : 189.7 m
Lunghezza bulbo : 14 m
Diametro bulbo : 0.2 m
Lunghezza libera : 7 m
Spaziatura orizzontale : 2 m
Precarico : 175 kN
Angolo : 20 °
Sezione : 4 trefoli
Tipo di barre : Barre trefoli
Numero di barre : 4
Diametro : 0.01331 m
Area : 0.000556 m^2

3.12. Stage 12



Stage 12
Scavo
Muro di sinistra
Lato monte : 198 m
Lato valle : 188.3 m

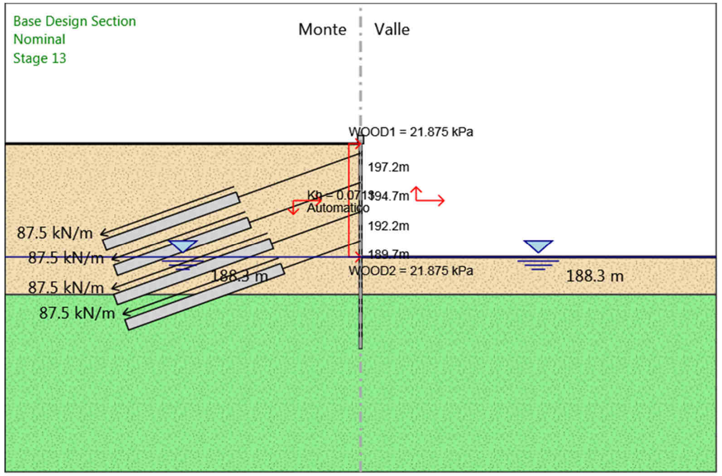
Linea di scavo di sinistra (Orizzontale)
198 m
Linea di scavo di destra (Orizzontale)
188.3 m

Falda acquifera
Falda di sinistra : 188.3 m
Falda di destra : 188.3 m

Elementi strutturali
Paratia : micropali
X : 0 m
Quota in alto : 198 m
Quota di fondo : 180.5 m
Sezione : micropalo
Paratia : cordolo_sx
X : 0 m
Quota in alto : 198.7 m
Quota di fondo : 198 m
Sezione : cordolo
Tirante : I-ordine
X : 0 m
Z : 197.2 m
Lunghezza bulbo : 12 m
Diametro bulbo : 0.2 m
Lunghezza libera : 11 m
Spaziatura orizzontale : 2 m
Precarico : 175 kN

Angolo : 20 °
Sezione : 3 trefoli
Tipo di barre : Barre trefoli
Numero di barre : 3
Diametro : 0.01331 m
Area : 0.000417 m^2
Tirante : II-ordine
X : 0 m
Z : 194.7 m
Lunghezza bulbo : 12 m
Diametro bulbo : 0.2 m
Lunghezza libera : 10 m
Spaziatura orizzontale : 2 m
Precarico : 175 kN
Angolo : 20 °
Sezione : 3 trefoli
Tipo di barre : Barre trefoli
Numero di barre : 3
Diametro : 0.01331 m
Area : 0.000417 m^2
Tirante : III-ordine
X : 0 m
Z : 192.2 m
Lunghezza bulbo : 14 m
Diametro bulbo : 0.2 m
Lunghezza libera : 8 m
Spaziatura orizzontale : 2 m
Precarico : 175 kN
Angolo : 20 °
Sezione : 4 trefoli
Tipo di barre : Barre trefoli
Numero di barre : 4
Diametro : 0.01331 m
Area : 0.000556 m^2
Tirante : IV-ordine
X : 0 m
Z : 189.7 m
Lunghezza bulbo : 14 m
Diametro bulbo : 0.2 m
Lunghezza libera : 7 m
Spaziatura orizzontale : 2 m
Precarico : 175 kN
Angolo : 20 °
Sezione : 4 trefoli
Tipo di barre : Barre trefoli
Numero di barre : 4
Diametro : 0.01331 m
Area : 0.000556 m^2

3.13. Stage 13



Stage 13
Scavo
Muro di sinistra
Lato monte : 198 m
Lato valle : 188.3 m

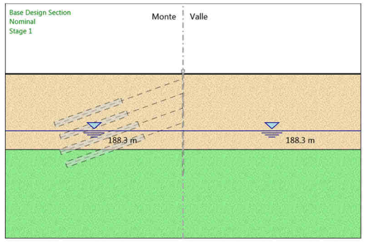
Linea di scavo di sinistra (Orizzontale)
198 m
Linea di scavo di destra (Orizzontale)
188.3 m

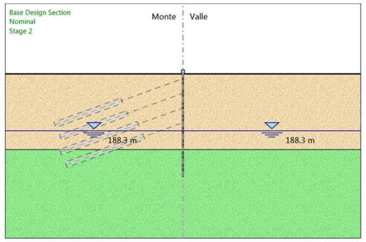
Falda acquifera
Falda di sinistra : 188.3 m
Falda di destra : 188.3 m

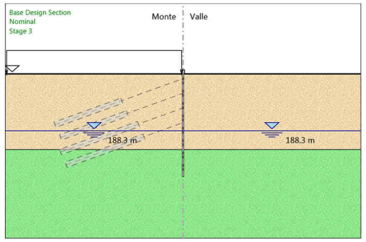
Elementi strutturali
Paratia : micropali
X : 0 m
Quota in alto : 198 m
Quota di fondo : 180.5 m
Sezione : micropalo
Paratia : cordolo_sx
X : 0 m
Quota in alto : 198.7 m
Quota di fondo : 198 m
Sezione : cordolo
Tirante : I-ordine
X : 0 m
Z : 197.2 m
Lunghezza bulbo : 12 m
Diametro bulbo : 0.2 m
Lunghezza libera : 11 m
Spaziatura orizzontale : 2 m
Precarico : 175 kN

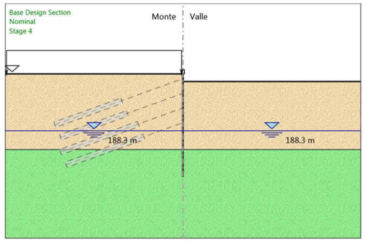
Angolo : 20 °
Sezione : 3 trefoli
Tipo di barre : Barre trefoli
Numero di barre : 3
Diametro : 0.01331 m
Area : 0.000417 m^2
Tirante : II-ordine
X : 0 m
Z : 194.7 m
Lunghezza bulbo : 12 m
Diametro bulbo : 0.2 m
Lunghezza libera : 10 m
Spaziatura orizzontale : 2 m
Precarico : 175 kN
Angolo : 20 °
Sezione : 3 trefoli
Tipo di barre : Barre trefoli
Numero di barre : 3
Diametro : 0.01331 m
Area : 0.000417 m^2
Tirante : III-ordine
X : 0 m
Z : 192.2 m
Lunghezza bulbo : 14 m
Diametro bulbo : 0.2 m
Lunghezza libera : 8 m
Spaziatura orizzontale : 2 m
Precarico : 175 kN
Angolo : 20 °
Sezione : 4 trefoli
Tipo di barre : Barre trefoli
Numero di barre : 4
Diametro : 0.01331 m
Area : 0.000556 m^2
Tirante : IV-ordine
X : 0 m
Z : 189.7 m
Lunghezza bulbo : 14 m
Diametro bulbo : 0.2 m
Lunghezza libera : 7 m
Spaziatura orizzontale : 2 m
Precarico : 175 kN
Angolo : 20 °
Sezione : 4 trefoli
Tipo di barre : Barre trefoli
Numero di barre : 4
Diametro : 0.01331 m
Area : 0.000556 m^2

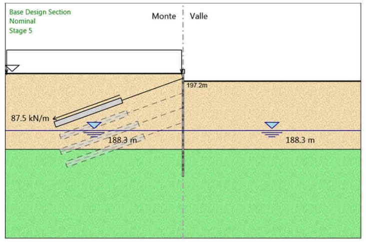
3.14. Tabella Configurazione Stage (Nominal)

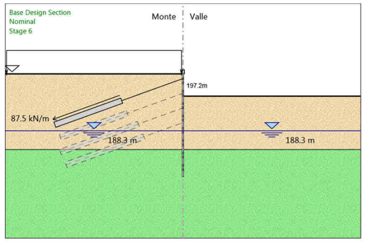


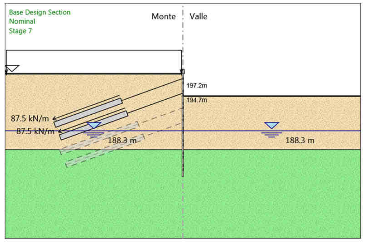


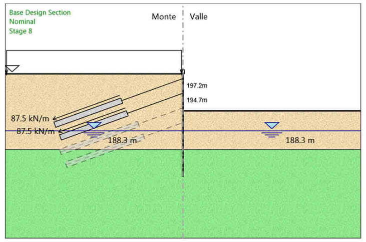


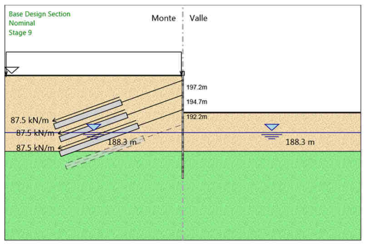


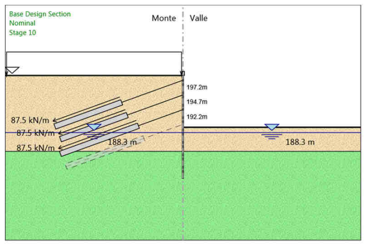


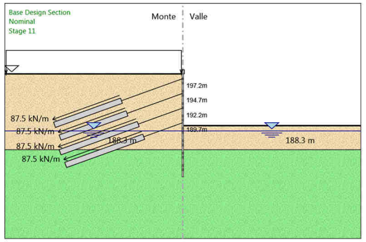


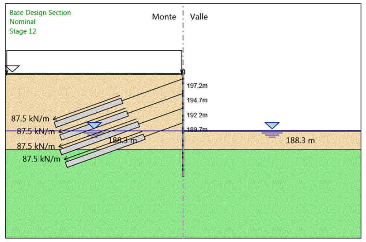


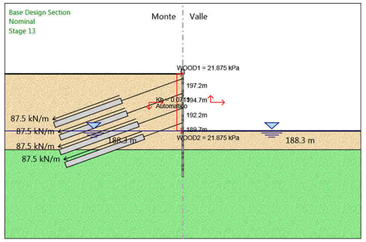












4. Descrizione Coefficienti Design Assumption

Coefficienti A

Nome	Carichi Permanenti Sfavorevoli (F_dead_load_unfavour)	Carichi Permanenti Favorevoli (F_dead_load_favour)	Carichi Variabili Sfavorevoli (F_live_load_unfavour)	Carichi Variabili Favorevoli (F_live_load_favour)	Carico Sismico (F_seism_load)	Pressioni Acqua Lato Monte (F_WaterDR)	Pressioni Acqua Lato Valle (F_WaterRes)	Carichi Permanenti Destabilizzanti (F_UPL_GDStab)	Carichi Permanenti Stabilizzanti (F_UPL_GStab)	Carichi Variabili Destabilizzanti (F_UPL_QDStab)	Carichi Permanenti Destabilizzanti (F_HYD_GDStab)	Carichi Permanenti Stabilizzanti (F_HYD_GStab)	Carichi Variabili Destabilizzanti (F_HYD_QDStab)
Simbolo	γG	γG	γQ	γQ	γQE	γG	γG	γGdst	γGstb	γQdst	γGdst	γGstb	γQdst
Nominal	1	1	1	1	1	1	1	1	1	1	1	1	1
NTC2018: SLE (Rara/Frequente/Quasi Permanente)	1	1	1	1	0	1	1	1	1	1	1	1	1
NTC2018: A1+M1+R1 (R3 per tiranti)	1.3	1	1.5	1	0	1.3	1	1	1	1	1.3	0.9	1
NTC2018: A2+M2+R1	1	1	1.3	1	0	1	1	1	1	1	1.3	0.9	1
NTC2018: SISMICA STR	1	1	1	1	1	1	1	1	1	1	1	1	1
NTC2018: SISMICA GEO	1	1	1	1	1	1	1	1	1	1	1.3	0.9	1

Coefficienti M

Nome	Parziale su tan(ø') (F_Fr)	Parziale su c' (F_eff_cohe)	Parziale su Su (F_Su)	Parziale su qu (F_qu)	Parziale su peso specifico (F_gamma)
Simbolo	γϕ	γc	γcu	γqu	γγ
Nominal	1	1	1	1	1
NTC2018: SLE (Rara/Frequente/Quasi Permanente)	1	1	1	1	1
NTC2018: A1+M1+R1 (R3 per tiranti)	1	1	1	1	1
NTC2018: A2+M2+R1	1.25	1.25	1.4	1	1
NTC2018: SISMICA STR	1	1	1	1	1
NTC2018: SISMICA GEO	1	1	1	1	1

Coefficienti R

Nome	Parziale resistenza terreno (es. Kp) (F_Soil_Res_walls)	Parziale resistenza Tiranti permanenti (F_Anch_P)	Parziale resistenza Tiranti temporanei (F_Anch_T)	Parziale elementi strutturali (F_wall)
Simbolo	γRe	γap	γat	
Nominal	1	1	1	1
NTC2018: SLE (Rara/Frequente/Quasi Permanente)	1	1	1	1
NTC2018: A1+M1+R1 (R3 per tiranti)	1	1.2	1.1	1
NTC2018: A2+M2+R1	1	1.2	1.1	1
NTC2018: SISMICA STR	1	1.2	1.1	1
NTC2018: SISMICA GEO	1	1.2	1.1	1

4.1. Risultati NTC2018: SLE (Rara/Frequente/Quasi Permanente)

4.1.1. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT

Stage: Stage 1

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 1	198.7	0
Stage 1	198.5	0
Stage 1	198.3	0
Stage 1	198.1	0
Stage 1	198	0
Stage 1	197.8	0
Stage 1	197.6	0
Stage 1	197.4	0
Stage 1	197.2	0
Stage 1	197	0
Stage 1	196.8	0
Stage 1	196.6	0
Stage 1	196.4	0
Stage 1	196.2	0
Stage 1	196	0
Stage 1	195.8	0
Stage 1	195.6	0
Stage 1	195.4	0
Stage 1	195.2	0
Stage 1	195	0
Stage 1	194.8	0
Stage 1	194.7	0
Stage 1	194.5	0
Stage 1	194.3	0
Stage 1	194.1	0
Stage 1	193.9	0
Stage 1	193.7	0
Stage 1	193.5	0
Stage 1	193.3	0
Stage 1	193.1	0
Stage 1	192.9	0
Stage 1	192.7	0
Stage 1	192.5	0
Stage 1	192.3	0
Stage 1	192.2	0
Stage 1	192	0
Stage 1	191.8	0
Stage 1	191.6	0
Stage 1	191.4	0
Stage 1	191.2	0
Stage 1	191	0
Stage 1	190.8	0
Stage 1	190.6	0
Stage 1	190.4	0
Stage 1	190.2	0
Stage 1	190	0
Stage 1	189.8	0
Stage 1	189.7	0
Stage 1	189.5	0
Stage 1	189.3	0
Stage 1	189.1	0
Stage 1	188.9	0
Stage 1	188.7	0
Stage 1	188.5	0
Stage 1	188.3	0
Stage 1	188.1	0
Stage 1	187.9	0
Stage 1	187.7	0
Stage 1	187.5	0
Stage 1	187.3	0
Stage 1	187.1	0
Stage 1	186.9	0
Stage 1	186.7	0
Stage 1	186.5	0

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 1	186.3	0
Stage 1	186.1	0
Stage 1	185.9	0
Stage 1	185.7	0
Stage 1	185.5	0
Stage 1	185.3	0
Stage 1	185.1	0
Stage 1	184.9	0
Stage 1	184.7	0
Stage 1	184.5	0
Stage 1	184.3	0
Stage 1	184.1	0
Stage 1	183.9	0
Stage 1	183.7	0
Stage 1	183.5	0
Stage 1	183.3	0
Stage 1	183.1	0
Stage 1	182.9	0
Stage 1	182.7	0
Stage 1	182.5	0
Stage 1	182.3	0
Stage 1	182.1	0
Stage 1	181.9	0
Stage 1	181.7	0
Stage 1	181.5	0
Stage 1	181.3	0
Stage 1	181.1	0
Stage 1	180.9	0
Stage 1	180.7	0
Stage 1	180.5	0

4.1.2. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 1

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	198	0	0
Stage 1	197.8	0	0
Stage 1	197.6	0	0
Stage 1	197.4	0	0
Stage 1	197.2	0	0
Stage 1	197	0	0
Stage 1	196.8	0	0
Stage 1	196.6	0	0
Stage 1	196.4	0	0
Stage 1	196.2	0	0
Stage 1	196	0	0
Stage 1	195.8	0	0
Stage 1	195.6	0	0
Stage 1	195.4	0	0
Stage 1	195.2	0	0
Stage 1	195	0	0
Stage 1	194.8	0	0
Stage 1	194.7	0	0
Stage 1	194.5	0	0
Stage 1	194.3	0	0
Stage 1	194.1	0	0
Stage 1	193.9	0	0
Stage 1	193.7	0	0
Stage 1	193.5	0	0
Stage 1	193.3	0	0
Stage 1	193.1	0	0
Stage 1	192.9	0	0
Stage 1	192.7	0	0
Stage 1	192.5	0	0
Stage 1	192.3	0	0
Stage 1	192.2	0	0
Stage 1	192	0	0
Stage 1	191.8	0	0
Stage 1	191.6	0	0
Stage 1	191.4	0	0
Stage 1	191.2	0	0
Stage 1	191	0	0
Stage 1	190.8	0	0
Stage 1	190.6	0	0
Stage 1	190.4	0	0
Stage 1	190.2	0	0
Stage 1	190	0	0
Stage 1	189.8	0	0
Stage 1	189.7	0	0
Stage 1	189.5	0	0
Stage 1	189.3	0	0
Stage 1	189.1	0	0
Stage 1	188.9	0	0
Stage 1	188.7	0	0
Stage 1	188.5	0	0
Stage 1	188.3	0	0
Stage 1	188.1	0	0
Stage 1	187.9	0	0
Stage 1	187.7	0	0
Stage 1	187.5	0	0
Stage 1	187.3	0	0
Stage 1	187.1	0	0
Stage 1	186.9	0	0
Stage 1	186.7	0	0
Stage 1	186.5	0	0
Stage 1	186.3	0	0
Stage 1	186.1	0	0
Stage 1	185.9	0	0
Stage 1	185.7	0	0
Stage 1	185.5	0	0
Stage 1	185.3	0	0
Stage 1	185.1	0	0

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	184.9	0	0
Stage 1	184.7	0	0
Stage 1	184.5	0	0
Stage 1	184.3	0	0
Stage 1	184.1	0	0
Stage 1	183.9	0	0
Stage 1	183.7	0	0
Stage 1	183.5	0	0
Stage 1	183.3	0	0
Stage 1	183.1	0	0
Stage 1	182.9	0	0
Stage 1	182.7	0	0
Stage 1	182.5	0	0
Stage 1	182.3	0	0
Stage 1	182.1	0	0
Stage 1	181.9	0	0
Stage 1	181.7	0	0
Stage 1	181.5	0	0
Stage 1	181.3	0	0
Stage 1	181.1	0	0
Stage 1	180.9	0	0
Stage 1	180.7	0	0
Stage 1	180.5	0	0

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	198.7	0	0
Stage 1	198.5	0	0
Stage 1	198.3	0	0
Stage 1	198.1	0	0
Stage 1	198	0	0

4.1.3. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 2

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 2	198.7	0
Stage 2	198.5	0
Stage 2	198.3	0
Stage 2	198.1	0
Stage 2	198	0
Stage 2	197.8	0
Stage 2	197.6	0
Stage 2	197.4	0
Stage 2	197.2	0
Stage 2	197	0
Stage 2	196.8	0
Stage 2	196.6	0
Stage 2	196.4	0
Stage 2	196.2	0
Stage 2	196	0
Stage 2	195.8	0
Stage 2	195.6	0
Stage 2	195.4	0
Stage 2	195.2	0
Stage 2	195	0
Stage 2	194.8	0
Stage 2	194.7	0
Stage 2	194.5	0
Stage 2	194.3	0
Stage 2	194.1	0
Stage 2	193.9	0
Stage 2	193.7	0
Stage 2	193.5	0
Stage 2	193.3	0
Stage 2	193.1	0
Stage 2	192.9	0
Stage 2	192.7	0
Stage 2	192.5	0
Stage 2	192.3	0
Stage 2	192.2	0
Stage 2	192	0
Stage 2	191.8	0
Stage 2	191.6	0
Stage 2	191.4	0
Stage 2	191.2	0
Stage 2	191	0
Stage 2	190.8	0
Stage 2	190.6	0
Stage 2	190.4	0
Stage 2	190.2	0
Stage 2	190	0
Stage 2	189.8	0
Stage 2	189.7	0
Stage 2	189.5	0
Stage 2	189.3	0
Stage 2	189.1	0
Stage 2	188.9	0
Stage 2	188.7	0
Stage 2	188.5	0
Stage 2	188.3	0
Stage 2	188.1	0
Stage 2	187.9	0
Stage 2	187.7	0
Stage 2	187.5	0
Stage 2	187.3	0
Stage 2	187.1	0
Stage 2	186.9	0
Stage 2	186.7	0
Stage 2	186.5	0
Stage 2	186.3	0
Stage 2	186.1	0
Stage 2	185.9	0

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	**Z (m)**	**Spostamento orizzontale (mm)**
Stage 2	185.7	0
Stage 2	185.5	0
Stage 2	185.3	0
Stage 2	185.1	0
Stage 2	184.9	0
Stage 2	184.7	0
Stage 2	184.5	0
Stage 2	184.3	0
Stage 2	184.1	0
Stage 2	183.9	0
Stage 2	183.7	0
Stage 2	183.5	0
Stage 2	183.3	0
Stage 2	183.1	0
Stage 2	182.9	0
Stage 2	182.7	0
Stage 2	182.5	0
Stage 2	182.3	0
Stage 2	182.1	0
Stage 2	181.9	0
Stage 2	181.7	0
Stage 2	181.5	0
Stage 2	181.3	0
Stage 2	181.1	0
Stage 2	180.9	0
Stage 2	180.7	0
Stage 2	180.5	0

4.1.4. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 2

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 2	198	0	0
Stage 2	197.8	0	0
Stage 2	197.6	0	0
Stage 2	197.4	0	0
Stage 2	197.2	0	0
Stage 2	197	0	0
Stage 2	196.8	0	0
Stage 2	196.6	0	0
Stage 2	196.4	0	0
Stage 2	196.2	0	0
Stage 2	196	0	0
Stage 2	195.8	0	0
Stage 2	195.6	0	0
Stage 2	195.4	0	0
Stage 2	195.2	0	0
Stage 2	195	0	0
Stage 2	194.8	0	0
Stage 2	194.7	0	0
Stage 2	194.5	0	0
Stage 2	194.3	0	0
Stage 2	194.1	0	0
Stage 2	193.9	0	0
Stage 2	193.7	0	0
Stage 2	193.5	0	0
Stage 2	193.3	0	0
Stage 2	193.1	0	0
Stage 2	192.9	0	0
Stage 2	192.7	0	0
Stage 2	192.5	0	0
Stage 2	192.3	0	0
Stage 2	192.2	0	0
Stage 2	192	0	0
Stage 2	191.8	0	0
Stage 2	191.6	0	0
Stage 2	191.4	0	0
Stage 2	191.2	0	0
Stage 2	191	0	0
Stage 2	190.8	0	0
Stage 2	190.6	0	0
Stage 2	190.4	0	0
Stage 2	190.2	0	0
Stage 2	190	0	0
Stage 2	189.8	0	0
Stage 2	189.7	0	0
Stage 2	189.5	0	0
Stage 2	189.3	0	0
Stage 2	189.1	0	0
Stage 2	188.9	0	0
Stage 2	188.7	0	0
Stage 2	188.5	0	0
Stage 2	188.3	0	0
Stage 2	188.1	0	0
Stage 2	187.9	0	0
Stage 2	187.7	0	0
Stage 2	187.5	0	0
Stage 2	187.3	0	0
Stage 2	187.1	0	0
Stage 2	186.9	0	0
Stage 2	186.7	0	0
Stage 2	186.5	0	0
Stage 2	186.3	0	0
Stage 2	186.1	0	0
Stage 2	185.9	0	0
Stage 2	185.7	0	0
Stage 2	185.5	0	0
Stage 2	185.3	0	0
Stage 2	185.1	0	0

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	184.9	0	0
Stage 2	184.7	0	0
Stage 2	184.5	0	0
Stage 2	184.3	0	0
Stage 2	184.1	0	0
Stage 2	183.9	0	0
Stage 2	183.7	0	0
Stage 2	183.5	0	0
Stage 2	183.3	0	0
Stage 2	183.1	0	0
Stage 2	182.9	0	0
Stage 2	182.7	0	0
Stage 2	182.5	0	0
Stage 2	182.3	0	0
Stage 2	182.1	0	0
Stage 2	181.9	0	0
Stage 2	181.7	0	0
Stage 2	181.5	0	0
Stage 2	181.3	0	0
Stage 2	181.1	0	0
Stage 2	180.9	0	0
Stage 2	180.7	0	0
Stage 2	180.5	0	0

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	198.7	0	0
Stage 2	198.5	0	0
Stage 2	198.3	0	0
Stage 2	198.1	0	0
Stage 2	198	0	0

4.1.5. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 3

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 3	198.7	0.38
Stage 3	198.5	0.38
Stage 3	198.3	0.38
Stage 3	198.1	0.38
Stage 3	198	0.38
Stage 3	197.8	0.38
Stage 3	197.6	0.38
Stage 3	197.4	0.38
Stage 3	197.2	0.38
Stage 3	197	0.38
Stage 3	196.8	0.38
Stage 3	196.6	0.38
Stage 3	196.4	0.38
Stage 3	196.2	0.38
Stage 3	196	0.38
Stage 3	195.8	0.38
Stage 3	195.6	0.38
Stage 3	195.4	0.38
Stage 3	195.2	0.38
Stage 3	195	0.38
Stage 3	194.8	0.38
Stage 3	194.7	0.38
Stage 3	194.5	0.38
Stage 3	194.3	0.38
Stage 3	194.1	0.38
Stage 3	193.9	0.38
Stage 3	193.7	0.38
Stage 3	193.5	0.38
Stage 3	193.3	0.38
Stage 3	193.1	0.38
Stage 3	192.9	0.38
Stage 3	192.7	0.38
Stage 3	192.5	0.38
Stage 3	192.3	0.38
Stage 3	192.2	0.38
Stage 3	192	0.38
Stage 3	191.8	0.38
Stage 3	191.6	0.38
Stage 3	191.4	0.38
Stage 3	191.2	0.38
Stage 3	191	0.38
Stage 3	190.8	0.38
Stage 3	190.6	0.38
Stage 3	190.4	0.38
Stage 3	190.2	0.38
Stage 3	190	0.38
Stage 3	189.8	0.38
Stage 3	189.7	0.38
Stage 3	189.5	0.39
Stage 3	189.3	0.39
Stage 3	189.1	0.39
Stage 3	188.9	0.39
Stage 3	188.7	0.39
Stage 3	188.5	0.39
Stage 3	188.3	0.39
Stage 3	188.1	0.39
Stage 3	187.9	0.39
Stage 3	187.7	0.39
Stage 3	187.5	0.39
Stage 3	187.3	0.38
Stage 3	187.1	0.38
Stage 3	186.9	0.38
Stage 3	186.7	0.37
Stage 3	186.5	0.37
Stage 3	186.3	0.36
Stage 3	186.1	0.35
Stage 3	185.9	0.34

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 3	185.7	0.33
Stage 3	185.5	0.31
Stage 3	185.3	0.3
Stage 3	185.1	0.28
Stage 3	184.9	0.27
Stage 3	184.7	0.25
Stage 3	184.5	0.24
Stage 3	184.3	0.23
Stage 3	184.1	0.22
Stage 3	183.9	0.21
Stage 3	183.7	0.2
Stage 3	183.5	0.2
Stage 3	183.3	0.19
Stage 3	183.1	0.19
Stage 3	182.9	0.19
Stage 3	182.7	0.19
Stage 3	182.5	0.19
Stage 3	182.3	0.19
Stage 3	182.1	0.19
Stage 3	181.9	0.19
Stage 3	181.7	0.19
Stage 3	181.5	0.19
Stage 3	181.3	0.19
Stage 3	181.1	0.19
Stage 3	180.9	0.2
Stage 3	180.7	0.2
Stage 3	180.5	0.2

4.1.6. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 3

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	198	0	0
Stage 3	197.8	0	0
Stage 3	197.6	0	0
Stage 3	197.4	0	0
Stage 3	197.4	0	0
Stage 3	197.2	0	0
Stage 3	197	0	0
Stage 3	196.8	0	0
Stage 3	196.6	0	0
Stage 3	196.4	0	0
Stage 3	196.2	0	0
Stage 3	196	0	0
Stage 3	195.8	0	0
Stage 3	195.6	0	0
Stage 3	195.4	0	0
Stage 3	195.2	0	0
Stage 3	195	0	0
Stage 3	194.8	0	0
Stage 3	194.7	0	0
Stage 3	194.5	0	0
Stage 3	194.3	0	0
Stage 3	194.1	0	0
Stage 3	193.9	0	0
Stage 3	193.7	0	0
Stage 3	193.5	0	0
Stage 3	193.3	0	0
Stage 3	193.1	0	0
Stage 3	192.9	0	0
Stage 3	192.7	0	0
Stage 3	192.5	0	-0.01
Stage 3	192.3	0	-0.01
Stage 3	192.2	-0.01	-0.01
Stage 3	192	-0.01	-0.01
Stage 3	191.8	-0.01	-0.01
Stage 3	191.6	-0.01	-0.01
Stage 3	191.4	-0.02	-0.01
Stage 3	191.2	-0.02	-0.01
Stage 3	191	-0.02	-0.02
Stage 3	190.8	-0.02	-0.01
Stage 3	190.6	-0.03	-0.01
Stage 3	190.4	-0.03	-0.01
Stage 3	190.2	-0.03	-0.01
Stage 3	190	-0.03	0
Stage 3	189.8	-0.03	0.01
Stage 3	189.7	-0.03	0.02
Stage 3	189.5	-0.02	0.03
Stage 3	189.3	-0.01	0.04
Stage 3	189.1	0	0.06
Stage 3	188.9	0.02	0.09
Stage 3	188.7	0.04	0.11
Stage 3	188.5	0.07	0.14
Stage 3	188.3	0.1	0.17
Stage 3	188.1	0.15	0.21
Stage 3	187.9	0.19	0.24
Stage 3	187.7	0.25	0.28
Stage 3	187.5	0.31	0.31
Stage 3	187.3	0.38	0.33
Stage 3	187.1	0.45	0.35
Stage 3	186.9	0.52	0.35
Stage 3	186.7	0.58	0.33
Stage 3	186.5	0.64	0.28
Stage 3	186.3	0.68	0.2
Stage 3	186.1	0.69	0.08
Stage 3	185.9	0.67	-0.09
Stage 3	185.7	0.61	-0.32
Stage 3	185.5	0.49	-0.62
Stage 3	185.3	0.29	-0.98

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	185.1	0.01	-1.43
Stage 3	184.9	-0.39	-1.95
Stage 3	184.7	-0.63	-1.24
Stage 3	184.5	-0.77	-0.67
Stage 3	184.3	-0.82	-0.25
Stage 3	184.1	-0.81	0.06
Stage 3	183.9	-0.75	0.27
Stage 3	183.7	-0.67	0.4
Stage 3	183.5	-0.58	0.47
Stage 3	183.3	-0.48	0.49
Stage 3	183.1	-0.39	0.47
Stage 3	182.9	-0.3	0.43
Stage 3	182.7	-0.22	0.38
Stage 3	182.5	-0.16	0.32
Stage 3	182.3	-0.11	0.26
Stage 3	182.1	-0.07	0.2
Stage 3	181.9	-0.04	0.15
Stage 3	181.7	-0.02	0.1
Stage 3	181.5	-0.01	0.06
Stage 3	181.3	0	0.03
Stage 3	181.1	0	0.01
Stage 3	180.9	0	0
Stage 3	180.7	0	-0.01
Stage 3	180.5	0	-0.01

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	198.7	0	0
Stage 3	198.5	0	0
Stage 3	198.5	0	0
Stage 3	198.3	0	0
Stage 3	198.3	0	0
Stage 3	198.1	0	0
Stage 3	198.1	0	0
Stage 3	198	0	0

4.1.7. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 4

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 4	198.7	1.01
Stage 4	198.5	0.98
Stage 4	198.3	0.95
Stage 4	198.1	0.92
Stage 4	198	0.91
Stage 4	197.8	0.88
Stage 4	197.6	0.86
Stage 4	197.4	0.83
Stage 4	197.2	0.8
Stage 4	197	0.78
Stage 4	196.8	0.75
Stage 4	196.6	0.72
Stage 4	196.4	0.7
Stage 4	196.2	0.68
Stage 4	196	0.66
Stage 4	195.8	0.64
Stage 4	195.6	0.62
Stage 4	195.4	0.61
Stage 4	195.2	0.6
Stage 4	195	0.59
Stage 4	194.8	0.58
Stage 4	194.7	0.58
Stage 4	194.5	0.57
Stage 4	194.3	0.57
Stage 4	194.1	0.57
Stage 4	193.9	0.57
Stage 4	193.7	0.57
Stage 4	193.5	0.57
Stage 4	193.3	0.57
Stage 4	193.1	0.57
Stage 4	192.9	0.57
Stage 4	192.7	0.57
Stage 4	192.5	0.57
Stage 4	192.3	0.57
Stage 4	192.2	0.57
Stage 4	192	0.57
Stage 4	191.8	0.57
Stage 4	191.6	0.57
Stage 4	191.4	0.57
Stage 4	191.2	0.57
Stage 4	191	0.57
Stage 4	190.8	0.57
Stage 4	190.6	0.57
Stage 4	190.4	0.57
Stage 4	190.2	0.57
Stage 4	190	0.57
Stage 4	189.8	0.57
Stage 4	189.7	0.57
Stage 4	189.5	0.57
Stage 4	189.3	0.57
Stage 4	189.1	0.57
Stage 4	188.9	0.57
Stage 4	188.7	0.57
Stage 4	188.5	0.58
Stage 4	188.3	0.58
Stage 4	188.1	0.58
Stage 4	187.9	0.58
Stage 4	187.7	0.57
Stage 4	187.5	0.57
Stage 4	187.3	0.57
Stage 4	187.1	0.57
Stage 4	186.9	0.56
Stage 4	186.7	0.55
Stage 4	186.5	0.54
Stage 4	186.3	0.53
Stage 4	186.1	0.52
Stage 4	185.9	0.5

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 4	185.7	0.48
Stage 4	185.5	0.46
Stage 4	185.3	0.44
Stage 4	185.1	0.42
Stage 4	184.9	0.39
Stage 4	184.7	0.37
Stage 4	184.5	0.35
Stage 4	184.3	0.33
Stage 4	184.1	0.32
Stage 4	183.9	0.31
Stage 4	183.7	0.3
Stage 4	183.5	0.29
Stage 4	183.3	0.28
Stage 4	183.1	0.28
Stage 4	182.9	0.28
Stage 4	182.7	0.28
Stage 4	182.5	0.28
Stage 4	182.3	0.28
Stage 4	182.1	0.28
Stage 4	181.9	0.28
Stage 4	181.7	0.28
Stage 4	181.5	0.28
Stage 4	181.3	0.28
Stage 4	181.1	0.29
Stage 4	180.9	0.29
Stage 4	180.7	0.29
Stage 4	180.5	0.29

4.1.8. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 4

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 4	198	0	0
Stage 4	197.8	0	0
Stage 4	197.8	0	0
Stage 4	197.6	0	0
Stage 4	197.6	0	0
Stage 4	197.4	0	0
Stage 4	197.4	0	0
Stage 4	197.2	0	0
Stage 4	197.2	0	0
Stage 4	197	-0.02	-0.12
Stage 4	196.8	-0.17	-0.74
Stage 4	196.6	-0.54	-1.86
Stage 4	196.4	-0.83	-1.42
Stage 4	196.2	-1.01	-0.92
Stage 4	196	-1.11	-0.48
Stage 4	195.8	-1.13	-0.12
Stage 4	195.6	-1.1	0.15
Stage 4	195.4	-1.03	0.35
Stage 4	195.2	-0.94	0.48
Stage 4	195	-0.83	0.55
Stage 4	194.8	-0.71	0.58
Stage 4	194.7	-0.65	0.58
Stage 4	194.5	-0.54	0.56
Stage 4	194.3	-0.44	0.52
Stage 4	194.1	-0.34	0.47
Stage 4	193.9	-0.26	0.41
Stage 4	193.7	-0.19	0.35
Stage 4	193.5	-0.13	0.29
Stage 4	193.3	-0.08	0.23
Stage 4	193.1	-0.05	0.18
Stage 4	192.9	-0.02	0.14
Stage 4	192.7	0	0.1
Stage 4	192.5	0.01	0.06
Stage 4	192.3	0.02	0.03
Stage 4	192.2	0.02	0.02
Stage 4	192	0.02	0
Stage 4	191.8	0.02	-0.01
Stage 4	191.6	0.01	-0.03
Stage 4	191.4	0.01	-0.03
Stage 4	191.2	0	-0.04
Stage 4	191	-0.01	-0.04
Stage 4	190.8	-0.02	-0.04
Stage 4	190.6	-0.03	-0.04
Stage 4	190.4	-0.03	-0.04
Stage 4	190.2	-0.04	-0.03
Stage 4	190	-0.04	-0.02
Stage 4	189.8	-0.05	-0.01
Stage 4	189.7	-0.04	0.01
Stage 4	189.5	-0.04	0.02
Stage 4	189.3	-0.03	0.05
Stage 4	189.1	-0.01	0.08
Stage 4	188.9	0.01	0.11
Stage 4	188.7	0.04	0.16
Stage 4	188.5	0.08	0.2
Stage 4	188.3	0.13	0.26
Stage 4	188.1	0.19	0.31
Stage 4	187.9	0.27	0.37
Stage 4	187.7	0.35	0.43
Stage 4	187.5	0.45	0.48
Stage 4	187.3	0.56	0.53
Stage 4	187.1	0.67	0.56
Stage 4	186.9	0.78	0.56
Stage 4	186.7	0.89	0.54
Stage 4	186.5	0.98	0.47
Stage 4	186.3	1.05	0.35
Stage 4	186.1	1.09	0.16
Stage 4	185.9	1.07	-0.11

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 4	185.7	0.97	-0.47
Stage 4	185.5	0.78	-0.95
Stage 4	185.3	0.47	-1.55
Stage 4	185.1	0.01	-2.29
Stage 4	184.9	-0.62	-3.16
Stage 4	184.7	-1.01	-1.97
Stage 4	184.5	-1.22	-1.04
Stage 4	184.3	-1.29	-0.34
Stage 4	184.1	-1.26	0.16
Stage 4	183.9	-1.16	0.48
Stage 4	183.7	-1.02	0.68
Stage 4	183.5	-0.87	0.77
Stage 4	183.3	-0.71	0.78
Stage 4	183.1	-0.57	0.75
Stage 4	182.9	-0.43	0.67
Stage 4	182.7	-0.31	0.58
Stage 4	182.5	-0.22	0.48
Stage 4	182.3	-0.14	0.38
Stage 4	182.1	-0.08	0.29
Stage 4	181.9	-0.04	0.21
Stage 4	181.7	-0.01	0.14
Stage 4	181.5	0	0.08
Stage 4	181.3	0.01	0.03
Stage 4	181.1	0.01	0
Stage 4	180.9	0.01	-0.01
Stage 4	180.7	0	-0.02
Stage 4	180.5	0	-0.01

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 4	198.7	0	0
Stage 4	198.5	0	0
Stage 4	198.5	0	0
Stage 4	198.3	0	0
Stage 4	198.3	0	0
Stage 4	198.1	0	0
Stage 4	198.1	0	0
Stage 4	198	0	0

4.1.9. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 5

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 5	198.7	-5.21
Stage 5	198.5	-4.88
Stage 5	198.3	-4.56
Stage 5	198.1	-4.23
Stage 5	198	-4.07
Stage 5	197.8	-3.74
Stage 5	197.6	-3.42
Stage 5	197.4	-3.08
Stage 5	197.2	-2.72
Stage 5	197	-2.33
Stage 5	196.8	-1.93
Stage 5	196.6	-1.53
Stage 5	196.4	-1.15
Stage 5	196.2	-0.79
Stage 5	196	-0.48
Stage 5	195.8	-0.2
Stage 5	195.6	0.04
Stage 5	195.4	0.23
Stage 5	195.2	0.39
Stage 5	195	0.51
Stage 5	194.8	0.6
Stage 5	194.7	0.63
Stage 5	194.5	0.68
Stage 5	194.3	0.71
Stage 5	194.1	0.73
Stage 5	193.9	0.73
Stage 5	193.7	0.73
Stage 5	193.5	0.71
Stage 5	193.3	0.7
Stage 5	193.1	0.68
Stage 5	192.9	0.67
Stage 5	192.7	0.65
Stage 5	192.5	0.63
Stage 5	192.3	0.62
Stage 5	192.2	0.61
Stage 5	192	0.6
Stage 5	191.8	0.59
Stage 5	191.6	0.58
Stage 5	191.4	0.58
Stage 5	191.2	0.57
Stage 5	191	0.57
Stage 5	190.8	0.56
Stage 5	190.6	0.56
Stage 5	190.4	0.56
Stage 5	190.2	0.56
Stage 5	190	0.56
Stage 5	189.8	0.56
Stage 5	189.7	0.56
Stage 5	189.5	0.57
Stage 5	189.3	0.57
Stage 5	189.1	0.57
Stage 5	188.9	0.57
Stage 5	188.7	0.57
Stage 5	188.5	0.57
Stage 5	188.3	0.57
Stage 5	188.1	0.58
Stage 5	187.9	0.58
Stage 5	187.7	0.57
Stage 5	187.5	0.57
Stage 5	187.3	0.57
Stage 5	187.1	0.57
Stage 5	186.9	0.56
Stage 5	186.7	0.55
Stage 5	186.5	0.54
Stage 5	186.3	0.53
Stage 5	186.1	0.52
Stage 5	185.9	0.5

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 5	185.7	0.48
Stage 5	185.5	0.46
Stage 5	185.3	0.44
Stage 5	185.1	0.42
Stage 5	184.9	0.39
Stage 5	184.7	0.37
Stage 5	184.5	0.35
Stage 5	184.3	0.33
Stage 5	184.1	0.32
Stage 5	183.9	0.31
Stage 5	183.7	0.3
Stage 5	183.5	0.29
Stage 5	183.3	0.28
Stage 5	183.1	0.28
Stage 5	182.9	0.28
Stage 5	182.7	0.28
Stage 5	182.5	0.28
Stage 5	182.3	0.28
Stage 5	182.1	0.28
Stage 5	181.9	0.28
Stage 5	181.7	0.28
Stage 5	181.5	0.28
Stage 5	181.3	0.28
Stage 5	181.1	0.29
Stage 5	180.9	0.29
Stage 5	180.7	0.29
Stage 5	180.5	0.29

4.1.10. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 5

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 5	198	0	-6.33
Stage 5	197.8	-1.27	-6.33
Stage 5	197.6	-4.17	-14.53
Stage 5	197.4	-8.67	-22.49
Stage 5	197.2	-14.71	-30.18
Stage 5	197	-5.78	44.61
Stage 5	196.8	1.68	37.34
Stage 5	196.6	7.73	30.25
Stage 5	196.4	12.4	23.34
Stage 5	196.2	15.72	16.58
Stage 5	196	17.7	9.94
Stage 5	195.8	18.42	3.59
Stage 5	195.6	18.11	-1.53
Stage 5	195.4	17.01	-5.5
Stage 5	195.2	15.4	-8.06
Stage 5	195	13.5	-9.49
Stage 5	194.8	11.49	-10.05
Stage 5	194.7	10.5	-9.98
Stage 5	194.5	8.55	-9.72
Stage 5	194.3	6.75	-9.01
Stage 5	194.1	5.14	-8.06
Stage 5	193.9	3.74	-6.99
Stage 5	193.7	2.56	-5.9
Stage 5	193.5	1.6	-4.83
Stage 5	193.3	0.83	-3.83
Stage 5	193.1	0.24	-2.94
Stage 5	192.9	-0.19	-2.16
Stage 5	192.7	-0.49	-1.5
Stage 5	192.5	-0.68	-0.95
Stage 5	192.3	-0.78	-0.52
Stage 5	192.2	-0.81	-0.27
Stage 5	192	-0.82	-0.06
Stage 5	191.8	-0.79	0.15
Stage 5	191.6	-0.74	0.29
Stage 5	191.4	-0.66	0.37
Stage 5	191.2	-0.58	0.41
Stage 5	191	-0.5	0.42
Stage 5	190.8	-0.42	0.4
Stage 5	190.6	-0.34	0.37
Stage 5	190.4	-0.28	0.34
Stage 5	190.2	-0.22	0.29
Stage 5	190	-0.17	0.25
Stage 5	189.8	-0.12	0.22
Stage 5	189.7	-0.1	0.2
Stage 5	189.5	-0.07	0.18
Stage 5	189.3	-0.03	0.17
Stage 5	189.1	0	0.16
Stage 5	188.9	0.03	0.17
Stage 5	188.7	0.07	0.19
Stage 5	188.5	0.12	0.22
Stage 5	188.3	0.17	0.26
Stage 5	188.1	0.23	0.31
Stage 5	187.9	0.3	0.36
Stage 5	187.7	0.38	0.41
Stage 5	187.5	0.48	0.46
Stage 5	187.3	0.58	0.51
Stage 5	187.1	0.69	0.54
Stage 5	186.9	0.79	0.55
Stage 5	186.7	0.9	0.52
Stage 5	186.5	0.99	0.46
Stage 5	186.3	1.06	0.34
Stage 5	186.1	1.09	0.15
Stage 5	185.9	1.07	-0.11
Stage 5	185.7	0.97	-0.48
Stage 5	185.5	0.78	-0.95
Stage 5	185.3	0.47	-1.55
Stage 5	185.1	0.01	-2.29

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 5	184.9	-0.62	-3.16
Stage 5	184.7	-1.01	-1.97
Stage 5	184.5	-1.22	-1.04
Stage 5	184.3	-1.29	-0.34
Stage 5	184.1	-1.26	0.16
Stage 5	183.9	-1.16	0.49
Stage 5	183.7	-1.03	0.68
Stage 5	183.5	-0.87	0.77
Stage 5	183.3	-0.71	0.79
Stage 5	183.1	-0.57	0.75
Stage 5	182.9	-0.43	0.67
Stage 5	182.7	-0.31	0.58
Stage 5	182.5	-0.22	0.48
Stage 5	182.3	-0.14	0.38
Stage 5	182.1	-0.08	0.29
Stage 5	181.9	-0.04	0.21
Stage 5	181.7	-0.01	0.14
Stage 5	181.5	0	0.08
Stage 5	181.3	0.01	0.03
Stage 5	181.1	0.01	0
Stage 5	180.9	0.01	-0.01
Stage 5	180.7	0	-0.02
Stage 5	180.5	0	-0.01

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 5	198.7	0	0
Stage 5	198.5	0	0
Stage 5	198.5	0	0
Stage 5	198.3	0	0
Stage 5	198.3	0	0
Stage 5	198.1	0	0
Stage 5	198.1	0	0
Stage 5	198	0	0

4.1.11. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 6

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 6	198.7	-6.13
Stage 6	198.5	-5.67
Stage 6	198.3	-5.21
Stage 6	198.1	-4.75
Stage 6	198	-4.52
Stage 6	197.8	-4.06
Stage 6	197.6	-3.59
Stage 6	197.4	-3.12
Stage 6	197.2	-2.62
Stage 6	197	-2.09
Stage 6	196.8	-1.55
Stage 6	196.6	-1.02
Stage 6	196.4	-0.5
Stage 6	196.2	0
Stage 6	196	0.45
Stage 6	195.8	0.86
Stage 6	195.6	1.22
Stage 6	195.4	1.52
Stage 6	195.2	1.77
Stage 6	195	1.97
Stage 6	194.8	2.12
Stage 6	194.7	2.17
Stage 6	194.5	2.25
Stage 6	194.3	2.29
Stage 6	194.1	2.29
Stage 6	193.9	2.27
Stage 6	193.7	2.22
Stage 6	193.5	2.16
Stage 6	193.3	2.1
Stage 6	193.1	2.03
Stage 6	192.9	1.95
Stage 6	192.7	1.88
Stage 6	192.5	1.82
Stage 6	192.3	1.75
Stage 6	192.2	1.72
Stage 6	192	1.67
Stage 6	191.8	1.62
Stage 6	191.6	1.58
Stage 6	191.4	1.54
Stage 6	191.2	1.51
Stage 6	191	1.49
Stage 6	190.8	1.47
Stage 6	190.6	1.45
Stage 6	190.4	1.44
Stage 6	190.2	1.43
Stage 6	190	1.42
Stage 6	189.8	1.42
Stage 6	189.7	1.42
Stage 6	189.5	1.41
Stage 6	189.3	1.41
Stage 6	189.1	1.41
Stage 6	188.9	1.41
Stage 6	188.7	1.41
Stage 6	188.5	1.41
Stage 6	188.3	1.41
Stage 6	188.1	1.41
Stage 6	187.9	1.41
Stage 6	187.7	1.41
Stage 6	187.5	1.4
Stage 6	187.3	1.39
Stage 6	187.1	1.38
Stage 6	186.9	1.36
Stage 6	186.7	1.34
Stage 6	186.5	1.32
Stage 6	186.3	1.29
Stage 6	186.1	1.25
Stage 6	185.9	1.21

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 6	185.7	1.17
Stage 6	185.5	1.12
Stage 6	185.3	1.06
Stage 6	185.1	1.01
Stage 6	184.9	0.95
Stage 6	184.7	0.9
Stage 6	184.5	0.85
Stage 6	184.3	0.81
Stage 6	184.1	0.78
Stage 6	183.9	0.75
Stage 6	183.7	0.72
Stage 6	183.5	0.7
Stage 6	183.3	0.69
Stage 6	183.1	0.68
Stage 6	182.9	0.67
Stage 6	182.7	0.67
Stage 6	182.5	0.67
Stage 6	182.3	0.67
Stage 6	182.1	0.67
Stage 6	181.9	0.67
Stage 6	181.7	0.67
Stage 6	181.5	0.67
Stage 6	181.3	0.68
Stage 6	181.1	0.68
Stage 6	180.9	0.68
Stage 6	180.7	0.68
Stage 6	180.5	0.69

4.1.12. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 6

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 6	198	0	-6.56
Stage 6	197.8	-1.31	-6.56
Stage 6	197.6	-4.31	-14.98
Stage 6	197.4	-8.92	-23.05
Stage 6	197.2	-15.07	-30.77
Stage 6	197	-6.17	44.53
Stage 6	196.8	1.38	37.73
Stage 6	196.6	7.66	31.41
Stage 6	196.4	12.77	25.54
Stage 6	196.2	16.79	20.12
Stage 6	196	19.81	15.1
Stage 6	195.8	21.9	10.42
Stage 6	195.6	23.1	6.01
Stage 6	195.4	23.48	1.91
Stage 6	195.2	23.17	-1.52
Stage 6	195	22.28	-4.48
Stage 6	194.8	20.85	-7.16
Stage 6	194.7	19.94	-9.08
Stage 6	194.5	17.74	-11.01
Stage 6	194.3	15	-13.69
Stage 6	194.1	11.67	-16.63
Stage 6	193.9	8.63	-15.2
Stage 6	193.7	5.97	-13.29
Stage 6	193.5	3.72	-11.25
Stage 6	193.3	1.88	-9.24
Stage 6	193.1	0.41	-7.34
Stage 6	192.9	-0.72	-5.63
Stage 6	192.7	-1.55	-4.13
Stage 6	192.5	-2.12	-2.85
Stage 6	192.3	-2.47	-1.78
Stage 6	192.2	-2.59	-1.14
Stage 6	192	-2.7	-0.56
Stage 6	191.8	-2.69	0.03
Stage 6	191.6	-2.6	0.47
Stage 6	191.4	-2.44	0.78
Stage 6	191.2	-2.24	0.98
Stage 6	191	-2.02	1.1
Stage 6	190.8	-1.8	1.14
Stage 6	190.6	-1.57	1.14
Stage 6	190.4	-1.35	1.1
Stage 6	190.2	-1.14	1.04
Stage 6	190	-0.94	0.97
Stage 6	189.8	-0.76	0.9
Stage 6	189.7	-0.68	0.85
Stage 6	189.5	-0.52	0.81
Stage 6	189.3	-0.37	0.76
Stage 6	189.1	-0.22	0.73
Stage 6	188.9	-0.07	0.72
Stage 6	188.7	0.07	0.73
Stage 6	188.5	0.23	0.76
Stage 6	188.3	0.39	0.81
Stage 6	188.1	0.56	0.88
Stage 6	187.9	0.75	0.94
Stage 6	187.7	0.95	1.01
Stage 6	187.5	1.17	1.07
Stage 6	187.3	1.39	1.11
Stage 6	187.1	1.61	1.11
Stage 6	186.9	1.83	1.07
Stage 6	186.7	2.02	0.97
Stage 6	186.5	2.18	0.79
Stage 6	186.3	2.28	0.51
Stage 6	186.1	2.3	0.1
Stage 6	185.9	2.21	-0.46
Stage 6	185.7	1.97	-1.19
Stage 6	185.5	1.55	-2.12
Stage 6	185.3	0.9	-3.26
Stage 6	185.1	-0.03	-4.64

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 6	184.9	-1.29	-6.27
Stage 6	184.7	-2.09	-4.04
Stage 6	184.5	-2.54	-2.26
Stage 6	184.3	-2.73	-0.9
Stage 6	184.1	-2.71	0.09
Stage 6	183.9	-2.55	0.78
Stage 6	183.7	-2.31	1.22
Stage 6	183.5	-2.02	1.46
Stage 6	183.3	-1.71	1.54
Stage 6	183.1	-1.4	1.52
Stage 6	182.9	-1.12	1.42
Stage 6	182.7	-0.86	1.27
Stage 6	182.5	-0.65	1.1
Stage 6	182.3	-0.46	0.92
Stage 6	182.1	-0.32	0.73
Stage 6	181.9	-0.2	0.57
Stage 6	181.7	-0.12	0.42
Stage 6	181.5	-0.06	0.29
Stage 6	181.3	-0.03	0.18
Stage 6	181.1	-0.01	0.1
Stage 6	180.9	0	0.04
Stage 6	180.7	0	0
Stage 6	180.5	0	-0.01

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 6	198.7	0	0
Stage 6	198.5	0	0
Stage 6	198.5	0	0
Stage 6	198.3	0	0
Stage 6	198.3	0	0
Stage 6	198.1	0	0
Stage 6	198.1	0	0
Stage 6	198	0	0

4.1.13. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 7

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 7	198.7	-5.07
Stage 7	198.5	-4.82
Stage 7	198.3	-4.57
Stage 7	198.1	-4.32
Stage 7	198	-4.19
Stage 7	197.8	-3.94
Stage 7	197.6	-3.68
Stage 7	197.4	-3.42
Stage 7	197.2	-3.13
Stage 7	197	-2.82
Stage 7	196.8	-2.49
Stage 7	196.6	-2.16
Stage 7	196.4	-1.85
Stage 7	196.2	-1.56
Stage 7	196	-1.31
Stage 7	195.8	-1.08
Stage 7	195.6	-0.89
Stage 7	195.4	-0.72
Stage 7	195.2	-0.58
Stage 7	195	-0.45
Stage 7	194.8	-0.31
Stage 7	194.7	-0.24
Stage 7	194.5	-0.07
Stage 7	194.3	0.11
Stage 7	194.1	0.3
Stage 7	193.9	0.49
Stage 7	193.7	0.66
Stage 7	193.5	0.82
Stage 7	193.3	0.97
Stage 7	193.1	1.09
Stage 7	192.9	1.2
Stage 7	192.7	1.3
Stage 7	192.5	1.37
Stage 7	192.3	1.43
Stage 7	192.2	1.46
Stage 7	192	1.5
Stage 7	191.8	1.53
Stage 7	191.6	1.55
Stage 7	191.4	1.56
Stage 7	191.2	1.56
Stage 7	191	1.56
Stage 7	190.8	1.56
Stage 7	190.6	1.55
Stage 7	190.4	1.54
Stage 7	190.2	1.53
Stage 7	190	1.52
Stage 7	189.8	1.51
Stage 7	189.7	1.5
Stage 7	189.5	1.49
Stage 7	189.3	1.48
Stage 7	189.1	1.47
Stage 7	188.9	1.46
Stage 7	188.7	1.46
Stage 7	188.5	1.45
Stage 7	188.3	1.44
Stage 7	188.1	1.43
Stage 7	187.9	1.42
Stage 7	187.7	1.42
Stage 7	187.5	1.41
Stage 7	187.3	1.39
Stage 7	187.1	1.38
Stage 7	186.9	1.36
Stage 7	186.7	1.34
Stage 7	186.5	1.31
Stage 7	186.3	1.28
Stage 7	186.1	1.25
Stage 7	185.9	1.21

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 7	185.7	1.16
Stage 7	185.5	1.11
Stage 7	185.3	1.06
Stage 7	185.1	1
Stage 7	184.9	0.95
Stage 7	184.7	0.9
Stage 7	184.5	0.85
Stage 7	184.3	0.81
Stage 7	184.1	0.77
Stage 7	183.9	0.75
Stage 7	183.7	0.72
Stage 7	183.5	0.7
Stage 7	183.3	0.69
Stage 7	183.1	0.68
Stage 7	182.9	0.67
Stage 7	182.7	0.67
Stage 7	182.5	0.67
Stage 7	182.3	0.67
Stage 7	182.1	0.67
Stage 7	181.9	0.67
Stage 7	181.7	0.67
Stage 7	181.5	0.67
Stage 7	181.3	0.68
Stage 7	181.1	0.68
Stage 7	180.9	0.68
Stage 7	180.7	0.68
Stage 7	180.5	0.69

4.1.14. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 7

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 7	198	0	-6.05
Stage 7	197.8	-1.21	-6.05
Stage 7	197.6	-4.06	-14.22
Stage 7	197.4	-8.53	-22.36
Stage 7	197.2	-14.58	-30.28
Stage 7	197	-6.02	42.83
Stage 7	196.8	1.03	35.23
Stage 7	196.6	6.58	27.75
Stage 7	196.4	10.66	20.41
Stage 7	196.2	13.3	13.17
Stage 7	196	14.5	6
Stage 7	195.8	14.27	-1.14
Stage 7	195.6	12.6	-8.32
Stage 7	195.4	9.49	-15.58
Stage 7	195.2	4.89	-22.97
Stage 7	195	-1.21	-30.54
Stage 7	194.8	-8.85	-38.18
Stage 7	194.7	-13.23	-43.84
Stage 7	194.5	-6.68	32.74
Stage 7	194.3	-1.63	25.29
Stage 7	194.1	1.95	17.9
Stage 7	193.9	4.46	12.52
Stage 7	193.7	6.13	8.34
Stage 7	193.5	7.14	5.05
Stage 7	193.3	7.63	2.48
Stage 7	193.1	7.73	0.5
Stage 7	192.9	7.53	-0.98
Stage 7	192.7	7.13	-2.04
Stage 7	192.5	6.57	-2.77
Stage 7	192.3	5.93	-3.22
Stage 7	192.2	5.59	-3.39
Stage 7	192	4.89	-3.5
Stage 7	191.8	4.19	-3.49
Stage 7	191.6	3.52	-3.37
Stage 7	191.4	2.88	-3.17
Stage 7	191.2	2.3	-2.92
Stage 7	191	1.77	-2.63
Stage 7	190.8	1.31	-2.32
Stage 7	190.6	0.91	-2.01
Stage 7	190.4	0.57	-1.7
Stage 7	190.2	0.29	-1.4
Stage 7	190	0.06	-1.12
Stage 7	189.8	-0.11	-0.85
Stage 7	189.7	-0.17	-0.66
Stage 7	189.5	-0.27	-0.48
Stage 7	189.3	-0.32	-0.25
Stage 7	189.1	-0.33	-0.04
Stage 7	188.9	-0.3	0.16
Stage 7	188.7	-0.23	0.35
Stage 7	188.5	-0.12	0.52
Stage 7	188.3	0.02	0.69
Stage 7	188.1	0.19	0.85
Stage 7	187.9	0.38	0.99
Stage 7	187.7	0.6	1.11
Stage 7	187.5	0.84	1.2
Stage 7	187.3	1.1	1.26
Stage 7	187.1	1.35	1.28
Stage 7	186.9	1.6	1.25
Stage 7	186.7	1.83	1.14
Stage 7	186.5	2.02	0.95
Stage 7	186.3	2.15	0.66
Stage 7	186.1	2.2	0.24
Stage 7	185.9	2.13	-0.34
Stage 7	185.7	1.91	-1.08
Stage 7	185.5	1.51	-2.02
Stage 7	185.3	0.87	-3.18
Stage 7	185.1	-0.04	-4.57

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 7	184.9	-1.28	-6.21
Stage 7	184.7	-2.08	-3.99
Stage 7	184.5	-2.53	-2.23
Stage 7	184.3	-2.71	-0.89
Stage 7	184.1	-2.69	0.1
Stage 7	183.9	-2.53	0.78
Stage 7	183.7	-2.29	1.21
Stage 7	183.5	-2	1.45
Stage 7	183.3	-1.69	1.53
Stage 7	183.1	-1.39	1.51
Stage 7	182.9	-1.11	1.41
Stage 7	182.7	-0.86	1.26
Stage 7	182.5	-0.64	1.09
Stage 7	182.3	-0.46	0.91
Stage 7	182.1	-0.31	0.73
Stage 7	181.9	-0.2	0.56
Stage 7	181.7	-0.12	0.41
Stage 7	181.5	-0.06	0.28
Stage 7	181.3	-0.03	0.18
Stage 7	181.1	-0.01	0.09
Stage 7	180.9	0	0.04
Stage 7	180.7	0	0
Stage 7	180.5	0	-0.01

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 7	198.7	0	0
Stage 7	198.5	0	0
Stage 7	198.5	0	0
Stage 7	198.3	0	0
Stage 7	198.3	0	0
Stage 7	198.1	0	0
Stage 7	198.1	0	0
Stage 7	198	0	0

4.1.15. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 8

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 8	198.7	-6.49
Stage 8	198.5	-6.13
Stage 8	198.3	-5.76
Stage 8	198.1	-5.39
Stage 8	198	-5.21
Stage 8	197.8	-4.84
Stage 8	197.6	-4.47
Stage 8	197.4	-4.09
Stage 8	197.2	-3.69
Stage 8	197	-3.25
Stage 8	196.8	-2.8
Stage 8	196.6	-2.34
Stage 8	196.4	-1.89
Stage 8	196.2	-1.46
Stage 8	196	-1.04
Stage 8	195.8	-0.64
Stage 8	195.6	-0.26
Stage 8	195.4	0.11
Stage 8	195.2	0.48
Stage 8	195	0.86
Stage 8	194.8	1.26
Stage 8	194.7	1.47
Stage 8	194.5	1.93
Stage 8	194.3	2.41
Stage 8	194.1	2.91
Stage 8	193.9	3.4
Stage 8	193.7	3.87
Stage 8	193.5	4.31
Stage 8	193.3	4.71
Stage 8	193.1	5.06
Stage 8	192.9	5.35
Stage 8	192.7	5.58
Stage 8	192.5	5.75
Stage 8	192.3	5.85
Stage 8	192.2	5.88
Stage 8	192	5.88
Stage 8	191.8	5.83
Stage 8	191.6	5.74
Stage 8	191.4	5.6
Stage 8	191.2	5.43
Stage 8	191	5.25
Stage 8	190.8	5.05
Stage 8	190.6	4.85
Stage 8	190.4	4.65
Stage 8	190.2	4.46
Stage 8	190	4.27
Stage 8	189.8	4.1
Stage 8	189.7	4.02
Stage 8	189.5	3.87
Stage 8	189.3	3.73
Stage 8	189.1	3.6
Stage 8	188.9	3.49
Stage 8	188.7	3.4
Stage 8	188.5	3.31
Stage 8	188.3	3.24
Stage 8	188.1	3.17
Stage 8	187.9	3.11
Stage 8	187.7	3.06
Stage 8	187.5	3.01
Stage 8	187.3	2.96
Stage 8	187.1	2.91
Stage 8	186.9	2.86
Stage 8	186.7	2.81
Stage 8	186.5	2.74
Stage 8	186.3	2.68
Stage 8	186.1	2.6
Stage 8	185.9	2.52

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 8	185.7	2.43
Stage 8	185.5	2.33
Stage 8	185.3	2.23
Stage 8	185.1	2.13
Stage 8	184.9	2.02
Stage 8	184.7	1.92
Stage 8	184.5	1.83
Stage 8	184.3	1.75
Stage 8	184.1	1.67
Stage 8	183.9	1.61
Stage 8	183.7	1.56
Stage 8	183.5	1.52
Stage 8	183.3	1.49
Stage 8	183.1	1.46
Stage 8	182.9	1.44
Stage 8	182.7	1.43
Stage 8	182.5	1.42
Stage 8	182.3	1.41
Stage 8	182.1	1.41
Stage 8	181.9	1.41
Stage 8	181.7	1.41
Stage 8	181.5	1.41
Stage 8	181.3	1.41
Stage 8	181.1	1.41
Stage 8	180.9	1.41
Stage 8	180.7	1.41
Stage 8	180.5	1.42

4.1.16. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 8

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 8	198	0	-6.71
Stage 8	197.8	-1.34	-6.71
Stage 8	197.6	-4.43	-15.42
Stage 8	197.4	-9.2	-23.88
Stage 8	197.2	-15.62	-32.08
Stage 8	197	-7.83	38.95
Stage 8	196.8	-1.59	31.16
Stage 8	196.6	3.12	23.56
Stage 8	196.4	6.35	16.14
Stage 8	196.2	8.13	8.89
Stage 8	196	8.5	1.85
Stage 8	195.8	7.5	-4.96
Stage 8	195.6	5.19	-11.59
Stage 8	195.4	1.57	-18.07
Stage 8	195.2	-3.31	-24.42
Stage 8	195	-9.45	-30.68
Stage 8	194.8	-16.79	-36.7
Stage 8	194.7	-20.88	-40.91
Stage 8	194.5	-12.17	43.55
Stage 8	194.3	-4.45	38.57
Stage 8	194.1	2.35	34.02
Stage 8	193.9	8.32	29.88
Stage 8	193.7	13.55	26.11
Stage 8	193.5	18.08	22.67
Stage 8	193.3	21.87	18.96
Stage 8	193.1	24.87	14.98
Stage 8	192.9	27.02	10.75
Stage 8	192.7	28.27	6.26
Stage 8	192.5	28.57	1.51
Stage 8	192.3	27.87	-3.51
Stage 8	192.2	27.13	-7.46
Stage 8	192	24.82	-11.51
Stage 8	191.8	21.39	-17.17
Stage 8	191.6	16.77	-23.1
Stage 8	191.4	12.37	-22.01
Stage 8	191.2	8.34	-20.12
Stage 8	191	4.79	-17.77
Stage 8	190.8	1.76	-15.12
Stage 8	190.6	-0.69	-12.3
Stage 8	190.4	-2.63	-9.7
Stage 8	190.2	-4.1	-7.34
Stage 8	190	-5.15	-5.25
Stage 8	189.8	-5.84	-3.43
Stage 8	189.7	-6.06	-2.25
Stage 8	189.5	-6.29	-1.16
Stage 8	189.3	-6.28	0.07
Stage 8	189.1	-6.06	1.09
Stage 8	188.9	-5.68	1.92
Stage 8	188.7	-5.16	2.59
Stage 8	188.5	-4.54	3.13
Stage 8	188.3	-3.83	3.54
Stage 8	188.1	-3.06	3.86
Stage 8	187.9	-2.24	4.05
Stage 8	187.7	-1.42	4.15
Stage 8	187.5	-0.59	4.14
Stage 8	187.3	0.22	4.05
Stage 8	187.1	0.99	3.85
Stage 8	186.9	1.7	3.55
Stage 8	186.7	2.33	3.13
Stage 8	186.5	2.84	2.57
Stage 8	186.3	3.21	1.84
Stage 8	186.1	3.4	0.93
Stage 8	185.9	3.36	-0.19
Stage 8	185.7	3.05	-1.56
Stage 8	185.5	2.41	-3.21
Stage 8	185.3	1.38	-5.15
Stage 8	185.1	-0.11	-7.42

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 8	184.9	-2.11	-10.02
Stage 8	184.7	-3.45	-6.68
Stage 8	184.5	-4.24	-3.98
Stage 8	184.3	-4.62	-1.87
Stage 8	184.1	-4.67	-0.28
Stage 8	183.9	-4.5	0.87
Stage 8	183.7	-4.17	1.65
Stage 8	183.5	-3.74	2.13
Stage 8	183.3	-3.27	2.37
Stage 8	183.1	-2.78	2.43
Stage 8	182.9	-2.31	2.36
Stage 8	182.7	-1.87	2.2
Stage 8	182.5	-1.48	1.98
Stage 8	182.3	-1.13	1.73
Stage 8	182.1	-0.84	1.47
Stage 8	181.9	-0.6	1.21
Stage 8	181.7	-0.4	0.96
Stage 8	181.5	-0.25	0.74
Stage 8	181.3	-0.15	0.54
Stage 8	181.1	-0.07	0.37
Stage 8	180.9	-0.03	0.23
Stage 8	180.7	-0.01	0.11
Stage 8	180.5	0	0.03

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 8	198.7	0	0
Stage 8	198.5	0	0
Stage 8	198.5	0	0
Stage 8	198.3	0	0
Stage 8	198.3	0	0
Stage 8	198.1	0	0
Stage 8	198.1	0	0
Stage 8	198	0	0

4.1.17. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 9

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 9	198.7	-5.91
Stage 9	198.5	-5.59
Stage 9	198.3	-5.26
Stage 9	198.1	-4.94
Stage 9	198	-4.78
Stage 9	197.8	-4.45
Stage 9	197.6	-4.13
Stage 9	197.4	-3.79
Stage 9	197.2	-3.43
Stage 9	197	-3.04
Stage 9	196.8	-2.64
Stage 9	196.6	-2.24
Stage 9	196.4	-1.85
Stage 9	196.2	-1.48
Stage 9	196	-1.14
Stage 9	195.8	-0.83
Stage 9	195.6	-0.55
Stage 9	195.4	-0.3
Stage 9	195.2	-0.06
Stage 9	195	0.17
Stage 9	194.8	0.4
Stage 9	194.7	0.53
Stage 9	194.5	0.79
Stage 9	194.3	1.07
Stage 9	194.1	1.35
Stage 9	193.9	1.61
Stage 9	193.7	1.85
Stage 9	193.5	2.06
Stage 9	193.3	2.24
Stage 9	193.1	2.38
Stage 9	192.9	2.49
Stage 9	192.7	2.57
Stage 9	192.5	2.63
Stage 9	192.3	2.69
Stage 9	192.2	2.73
Stage 9	192	2.81
Stage 9	191.8	2.9
Stage 9	191.6	2.99
Stage 9	191.4	3.07
Stage 9	191.2	3.15
Stage 9	191	3.22
Stage 9	190.8	3.27
Stage 9	190.6	3.31
Stage 9	190.4	3.35
Stage 9	190.2	3.37
Stage 9	190	3.38
Stage 9	189.8	3.39
Stage 9	189.7	3.39
Stage 9	189.5	3.39
Stage 9	189.3	3.38
Stage 9	189.1	3.37
Stage 9	188.9	3.35
Stage 9	188.7	3.33
Stage 9	188.5	3.31
Stage 9	188.3	3.28
Stage 9	188.1	3.25
Stage 9	187.9	3.22
Stage 9	187.7	3.18
Stage 9	187.5	3.14
Stage 9	187.3	3.1
Stage 9	187.1	3.05
Stage 9	186.9	2.99
Stage 9	186.7	2.93
Stage 9	186.5	2.86
Stage 9	186.3	2.78
Stage 9	186.1	2.7
Stage 9	185.9	2.6

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 9	185.7	2.5
Stage 9	185.5	2.39
Stage 9	185.3	2.28
Stage 9	185.1	2.17
Stage 9	184.9	2.05
Stage 9	184.7	1.95
Stage 9	184.5	1.85
Stage 9	184.3	1.76
Stage 9	184.1	1.68
Stage 9	183.9	1.62
Stage 9	183.7	1.56
Stage 9	183.5	1.52
Stage 9	183.3	1.48
Stage 9	183.1	1.46
Stage 9	182.9	1.44
Stage 9	182.7	1.42
Stage 9	182.5	1.41
Stage 9	182.3	1.41
Stage 9	182.1	1.4
Stage 9	181.9	1.4
Stage 9	181.7	1.4
Stage 9	181.5	1.4
Stage 9	181.3	1.41
Stage 9	181.1	1.41
Stage 9	180.9	1.41
Stage 9	180.7	1.41
Stage 9	180.5	1.41

4.1.18. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 9

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 9	198	0	-6.31
Stage 9	197.8	-1.26	-6.31
Stage 9	197.6	-4.17	-14.53
Stage 9	197.4	-8.68	-22.57
Stage 9	197.2	-14.76	-30.39
Stage 9	197	-6.4	41.81
Stage 9	196.8	0.46	34.29
Stage 9	196.6	5.84	26.88
Stage 9	196.4	9.76	19.6
Stage 9	196.2	12.23	12.4
Stage 9	196	13.3	5.33
Stage 9	195.8	12.98	-1.61
Stage 9	195.6	11.28	-8.48
Stage 9	195.4	8.22	-15.32
Stage 9	195.2	3.78	-22.18
Stage 9	195	-2.04	-29.1
Stage 9	194.8	-9.23	-35.98
Stage 9	194.7	-13.33	-40.98
Stage 9	194.5	-5.5	39.13
Stage 9	194.3	1.05	32.75
Stage 9	194.1	6.35	26.54
Stage 9	193.9	10.45	20.48
Stage 9	193.7	13.35	14.5
Stage 9	193.5	15.06	8.56
Stage 9	193.3	15.47	2.06
Stage 9	193.1	14.48	-4.96
Stage 9	192.9	11.98	-12.51
Stage 9	192.7	7.87	-20.55
Stage 9	192.5	2.06	-29.03
Stage 9	192.3	-5.52	-37.9
Stage 9	192.2	-10	-44.78
Stage 9	192	-3.9	30.47
Stage 9	191.8	0.3	21
Stage 9	191.6	2.59	11.44
Stage 9	191.4	3.96	6.87
Stage 9	191.2	4.67	3.56
Stage 9	191	4.91	1.2
Stage 9	190.8	4.84	-0.34
Stage 9	190.6	4.61	-1.18
Stage 9	190.4	4.26	-1.74
Stage 9	190.2	3.84	-2.08
Stage 9	190	3.4	-2.22
Stage 9	189.8	2.95	-2.23
Stage 9	189.7	2.74	-2.14
Stage 9	189.5	2.34	-2.02
Stage 9	189.3	1.98	-1.78
Stage 9	189.1	1.69	-1.47
Stage 9	188.9	1.46	-1.13
Stage 9	188.7	1.31	-0.75
Stage 9	188.5	1.24	-0.36
Stage 9	188.3	1.24	0.04
Stage 9	188.1	1.33	0.43
Stage 9	187.9	1.49	0.79
Stage 9	187.7	1.71	1.09
Stage 9	187.5	1.98	1.34
Stage 9	187.3	2.28	1.51
Stage 9	187.1	2.6	1.59
Stage 9	186.9	2.91	1.57
Stage 9	186.7	3.19	1.41
Stage 9	186.5	3.41	1.11
Stage 9	186.3	3.54	0.62
Stage 9	186.1	3.52	-0.07
Stage 9	185.9	3.32	-1.01
Stage 9	185.7	2.88	-2.21
Stage 9	185.5	2.14	-3.71
Stage 9	185.3	1.03	-5.53
Stage 9	185.1	-0.5	-7.69

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 9	184.9	-2.54	-10.21
Stage 9	184.7	-3.89	-6.74
Stage 9	184.5	-4.68	-3.94
Stage 9	184.3	-5.03	-1.76
Stage 9	184.1	-5.06	-0.12
Stage 9	183.9	-4.84	1.06
Stage 9	183.7	-4.47	1.86
Stage 9	183.5	-4.01	2.34
Stage 9	183.3	-3.49	2.57
Stage 9	183.1	-2.97	2.62
Stage 9	182.9	-2.46	2.53
Stage 9	182.7	-1.99	2.35
Stage 9	182.5	-1.57	2.11
Stage 9	182.3	-1.2	1.84
Stage 9	182.1	-0.88	1.56
Stage 9	181.9	-0.63	1.28
Stage 9	181.7	-0.42	1.02
Stage 9	181.5	-0.27	0.78
Stage 9	181.3	-0.15	0.57
Stage 9	181.1	-0.08	0.39
Stage 9	180.9	-0.03	0.24
Stage 9	180.7	-0.01	0.12
Stage 9	180.5	0	0.03

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 9	198.7	0	0
Stage 9	198.5	0	0
Stage 9	198.5	0	0
Stage 9	198.3	0	0
Stage 9	198.3	0	0
Stage 9	198.1	0	0
Stage 9	198.1	0	0
Stage 9	198	0	0

4.1.19. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 10

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 10	198.7	-6.08
Stage 10	198.5	-5.79
Stage 10	198.3	-5.5
Stage 10	198.1	-5.21
Stage 10	198	-5.07
Stage 10	197.8	-4.78
Stage 10	197.6	-4.48
Stage 10	197.4	-4.18
Stage 10	197.2	-3.86
Stage 10	197	-3.5
Stage 10	196.8	-3.13
Stage 10	196.6	-2.75
Stage 10	196.4	-2.39
Stage 10	196.2	-2.03
Stage 10	196	-1.7
Stage 10	195.8	-1.38
Stage 10	195.6	-1.08
Stage 10	195.4	-0.79
Stage 10	195.2	-0.5
Stage 10	195	-0.2
Stage 10	194.8	0.13
Stage 10	194.7	0.32
Stage 10	194.5	0.72
Stage 10	194.3	1.17
Stage 10	194.1	1.65
Stage 10	193.9	2.16
Stage 10	193.7	2.68
Stage 10	193.5	3.22
Stage 10	193.3	3.77
Stage 10	193.1	4.33
Stage 10	192.9	4.91
Stage 10	192.7	5.52
Stage 10	192.5	6.17
Stage 10	192.3	6.85
Stage 10	192.2	7.22
Stage 10	192	8
Stage 10	191.8	8.81
Stage 10	191.6	9.64
Stage 10	191.4	10.44
Stage 10	191.2	11.2
Stage 10	191	11.9
Stage 10	190.8	12.52
Stage 10	190.6	13.04
Stage 10	190.4	13.45
Stage 10	190.2	13.75
Stage 10	190	13.93
Stage 10	189.8	13.99
Stage 10	189.7	13.97
Stage 10	189.5	13.85
Stage 10	189.3	13.63
Stage 10	189.1	13.32
Stage 10	188.9	12.93
Stage 10	188.7	12.49
Stage 10	188.5	12
Stage 10	188.3	11.48
Stage 10	188.1	10.94
Stage 10	187.9	10.39
Stage 10	187.7	9.85
Stage 10	187.5	9.31
Stage 10	187.3	8.78
Stage 10	187.1	8.28
Stage 10	186.9	7.79
Stage 10	186.7	7.32
Stage 10	186.5	6.87
Stage 10	186.3	6.45
Stage 10	186.1	6.04
Stage 10	185.9	5.66

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 10	185.7	5.29
Stage 10	185.5	4.94
Stage 10	185.3	4.61
Stage 10	185.1	4.29
Stage 10	184.9	4.01
Stage 10	184.7	3.75
Stage 10	184.5	3.52
Stage 10	184.3	3.32
Stage 10	184.1	3.15
Stage 10	183.9	3
Stage 10	183.7	2.89
Stage 10	183.5	2.8
Stage 10	183.3	2.73
Stage 10	183.1	2.67
Stage 10	182.9	2.63
Stage 10	182.7	2.61
Stage 10	182.5	2.59
Stage 10	182.3	2.58
Stage 10	182.1	2.58
Stage 10	181.9	2.58
Stage 10	181.7	2.58
Stage 10	181.5	2.59
Stage 10	181.3	2.59
Stage 10	181.1	2.6
Stage 10	180.9	2.61
Stage 10	180.7	2.62
Stage 10	180.5	2.63

4.1.20. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 10

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 10	198	0	-6.5
Stage 10	197.8	-1.3	-6.5
Stage 10	197.6	-4.3	-15.01
Stage 10	197.4	-8.98	-23.36
Stage 10	197.2	-15.28	-31.54
Stage 10	197	-7.5	38.9
Stage 10	196.8	-1.29	31.06
Stage 10	196.6	3.39	23.38
Stage 10	196.4	6.56	15.85
Stage 10	196.2	8.25	8.46
Stage 10	196	8.48	1.16
Stage 10	195.8	7.26	-6.08
Stage 10	195.6	4.6	-13.31
Stage 10	195.4	0.48	-20.59
Stage 10	195.2	-5.09	-27.89
Stage 10	195	-12.13	-35.2
Stage 10	194.8	-20.61	-42.4
Stage 10	194.7	-25.37	-47.58
Stage 10	194.5	-19.05	31.62
Stage 10	194.3	-14.01	25.17
Stage 10	194.1	-10.2	19.05
Stage 10	193.9	-7.55	13.25
Stage 10	193.7	-6	7.76
Stage 10	193.5	-5.49	2.54
Stage 10	193.3	-6.08	-2.93
Stage 10	193.1	-7.8	-8.61
Stage 10	192.9	-10.69	-14.43
Stage 10	192.7	-14.75	-20.31
Stage 10	192.5	-19.98	-26.18
Stage 10	192.3	-26.37	-31.92
Stage 10	192.2	-29.97	-36.04
Stage 10	192	-16.03	69.72
Stage 10	191.8	-3.22	64.06
Stage 10	191.6	8.41	58.14
Stage 10	191.4	18.8	51.96
Stage 10	191.2	27.91	45.52
Stage 10	191	35.67	38.82
Stage 10	190.8	42.04	31.86
Stage 10	190.6	46.97	24.64
Stage 10	190.4	50.4	17.16
Stage 10	190.2	52.29	9.42
Stage 10	190	52.57	1.42
Stage 10	189.8	51.2	-6.84
Stage 10	189.7	49.88	-13.23
Stage 10	189.5	45.93	-19.72
Stage 10	189.3	40.21	-28.63
Stage 10	189.1	32.65	-37.79
Stage 10	188.9	25.49	-35.82
Stage 10	188.7	18.9	-32.96
Stage 10	188.5	12.97	-29.64
Stage 10	188.3	7.76	-26.06
Stage 10	188.1	3.29	-22.33
Stage 10	187.9	-0.45	-18.69
Stage 10	187.7	-3.48	-15.17
Stage 10	187.5	-5.84	-11.79
Stage 10	187.3	-7.55	-8.55
Stage 10	187.1	-8.64	-5.44
Stage 10	186.9	-9.15	-2.57
Stage 10	186.7	-9.23	-0.39
Stage 10	186.5	-9.01	1.12
Stage 10	186.3	-8.62	1.95
Stage 10	186.1	-8.19	2.13
Stage 10	185.9	-7.86	1.65
Stage 10	185.7	-7.76	0.52
Stage 10	185.5	-8	-1.24
Stage 10	185.3	-8.73	-3.64
Stage 10	185.1	-10.07	-6.66

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 10	184.9	-12.12	-10.28
Stage 10	184.7	-13.18	-5.29
Stage 10	184.5	-13.45	-1.38
Stage 10	184.3	-13.14	1.57
Stage 10	184.1	-12.4	3.7
Stage 10	183.9	-11.38	5.12
Stage 10	183.7	-10.18	5.97
Stage 10	183.5	-8.91	6.35
Stage 10	183.3	-7.64	6.39
Stage 10	183.1	-6.41	6.15
Stage 10	182.9	-5.26	5.74
Stage 10	182.7	-4.22	5.2
Stage 10	182.5	-3.3	4.59
Stage 10	182.3	-2.51	3.95
Stage 10	182.1	-1.85	3.31
Stage 10	181.9	-1.31	2.71
Stage 10	181.7	-0.88	2.14
Stage 10	181.5	-0.55	1.63
Stage 10	181.3	-0.32	1.18
Stage 10	181.1	-0.16	0.8
Stage 10	180.9	-0.06	0.49
Stage 10	180.7	-0.01	0.24
Stage 10	180.5	0	0.06

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 10	198.7	0	0
Stage 10	198.5	0	0
Stage 10	198.5	0	0
Stage 10	198.3	0	0
Stage 10	198.3	0	0
Stage 10	198.1	0	0
Stage 10	198.1	0	0
Stage 10	198	0	0

4.1.21. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 11

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 11	198.7	-6.12
Stage 11	198.5	-5.81
Stage 11	198.3	-5.5
Stage 11	198.1	-5.2
Stage 11	198	-5.04
Stage 11	197.8	-4.74
Stage 11	197.6	-4.43
Stage 11	197.4	-4.11
Stage 11	197.2	-3.76
Stage 11	197	-3.39
Stage 11	196.8	-3
Stage 11	196.6	-2.61
Stage 11	196.4	-2.23
Stage 11	196.2	-1.86
Stage 11	196	-1.51
Stage 11	195.8	-1.19
Stage 11	195.6	-0.88
Stage 11	195.4	-0.59
Stage 11	195.2	-0.3
Stage 11	195	-0.01
Stage 11	194.8	0.31
Stage 11	194.7	0.48
Stage 11	194.5	0.86
Stage 11	194.3	1.27
Stage 11	194.1	1.71
Stage 11	193.9	2.16
Stage 11	193.7	2.61
Stage 11	193.5	3.06
Stage 11	193.3	3.5
Stage 11	193.1	3.95
Stage 11	192.9	4.39
Stage 11	192.7	4.83
Stage 11	192.5	5.29
Stage 11	192.3	5.78
Stage 11	192.2	6.03
Stage 11	192	6.57
Stage 11	191.8	7.13
Stage 11	191.6	7.68
Stage 11	191.4	8.2
Stage 11	191.2	8.67
Stage 11	191	9.09
Stage 11	190.8	9.43
Stage 11	190.6	9.7
Stage 11	190.4	9.89
Stage 11	190.2	10.01
Stage 11	190	10.06
Stage 11	189.8	10.06
Stage 11	189.7	10.05
Stage 11	189.5	10
Stage 11	189.3	9.92
Stage 11	189.1	9.81
Stage 11	188.9	9.67
Stage 11	188.7	9.49
Stage 11	188.5	9.28
Stage 11	188.3	9.05
Stage 11	188.1	8.79
Stage 11	187.9	8.52
Stage 11	187.7	8.24
Stage 11	187.5	7.95
Stage 11	187.3	7.65
Stage 11	187.1	7.35
Stage 11	186.9	7.05
Stage 11	186.7	6.74
Stage 11	186.5	6.44
Stage 11	186.3	6.14
Stage 11	186.1	5.83
Stage 11	185.9	5.53

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 11	185.7	5.23
Stage 11	185.5	4.94
Stage 11	185.3	4.65
Stage 11	185.1	4.37
Stage 11	184.9	4.1
Stage 11	184.7	3.85
Stage 11	184.5	3.63
Stage 11	184.3	3.43
Stage 11	184.1	3.26
Stage 11	183.9	3.11
Stage 11	183.7	2.99
Stage 11	183.5	2.89
Stage 11	183.3	2.81
Stage 11	183.1	2.74
Stage 11	182.9	2.69
Stage 11	182.7	2.66
Stage 11	182.5	2.63
Stage 11	182.3	2.61
Stage 11	182.1	2.6
Stage 11	181.9	2.59
Stage 11	181.7	2.59
Stage 11	181.5	2.59
Stage 11	181.3	2.59
Stage 11	181.1	2.59
Stage 11	180.9	2.59
Stage 11	180.7	2.59
Stage 11	180.5	2.6

4.1.22. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 11

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 11	198	0	-6.49
Stage 11	197.8	-1.3	-6.49
Stage 11	197.6	-4.29	-14.96
Stage 11	197.4	-8.94	-23.26
Stage 11	197.2	-15.22	-31.37
Stage 11	197	-7.33	39.45
Stage 11	196.8	-0.98	31.71
Stage 11	196.6	3.85	24.14
Stage 11	196.4	7.19	16.74
Stage 11	196.2	9.09	9.49
Stage 11	196	9.56	2.34
Stage 11	195.8	8.61	-4.74
Stage 11	195.6	6.25	-11.8
Stage 11	195.4	2.47	-18.9
Stage 11	195.2	-2.74	-26.03
Stage 11	195	-9.37	-33.16
Stage 11	194.8	-17.41	-40.19
Stage 11	194.7	-21.93	-45.26
Stage 11	194.5	-15	34.66
Stage 11	194.3	-9.33	28.34
Stage 11	194.1	-4.87	22.31
Stage 11	193.9	-1.56	16.56
Stage 11	193.7	0.66	11.07
Stage 11	193.5	1.82	5.79
Stage 11	193.3	1.85	0.18
Stage 11	193.1	0.71	-5.73
Stage 11	192.9	-1.67	-11.89
Stage 11	192.7	-5.32	-18.24
Stage 11	192.5	-10.26	-24.72
Stage 11	192.3	-16.51	-31.23
Stage 11	192.2	-20.11	-36.07
Stage 11	192	-7.79	61.6
Stage 11	191.8	3.14	54.67
Stage 11	191.6	12.59	47.25
Stage 11	191.4	20.46	39.33
Stage 11	191.2	26.64	30.9
Stage 11	191	31.03	21.96
Stage 11	190.8	33.53	12.51
Stage 11	190.6	34.04	2.55
Stage 11	190.4	32.46	-7.89
Stage 11	190.2	28.71	-18.78
Stage 11	190	22.69	-30.09
Stage 11	189.8	14.33	-41.78
Stage 11	189.7	9.26	-50.78
Stage 11	189.5	13.73	22.35
Stage 11	189.3	15.73	10.03
Stage 11	189.1	15.25	-2.43
Stage 11	188.9	14.12	-5.63
Stage 11	188.7	12.6	-7.59
Stage 11	188.5	10.86	-8.7
Stage 11	188.3	9.03	-9.14
Stage 11	188.1	7.24	-8.98
Stage 11	187.9	5.54	-8.51
Stage 11	187.7	3.99	-7.75
Stage 11	187.5	2.64	-6.73
Stage 11	187.3	1.54	-5.49
Stage 11	187.1	0.73	-4.06
Stage 11	186.9	0.22	-2.55
Stage 11	186.7	-0.07	-1.46
Stage 11	186.5	-0.23	-0.81
Stage 11	186.3	-0.36	-0.61
Stage 11	186.1	-0.54	-0.9
Stage 11	185.9	-0.87	-1.69
Stage 11	185.7	-1.48	-3
Stage 11	185.5	-2.45	-4.85
Stage 11	185.3	-3.9	-7.25
Stage 11	185.1	-5.94	-10.21

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 11	184.9	-8.68	-13.73
Stage 11	184.7	-10.38	-8.46
Stage 11	184.5	-11.22	-4.24
Stage 11	184.3	-11.42	-0.96
Stage 11	184.1	-11.11	1.5
Stage 11	183.9	-10.46	3.25
Stage 11	183.7	-9.58	4.42
Stage 11	183.5	-8.56	5.1
Stage 11	183.3	-7.48	5.4
Stage 11	183.1	-6.4	5.41
Stage 11	182.9	-5.36	5.2
Stage 11	182.7	-4.39	4.84
Stage 11	182.5	-3.51	4.39
Stage 11	182.3	-2.74	3.87
Stage 11	182.1	-2.07	3.34
Stage 11	181.9	-1.51	2.81
Stage 11	181.7	-1.05	2.29
Stage 11	181.5	-0.69	1.81
Stage 11	181.3	-0.41	1.38
Stage 11	181.1	-0.22	0.98
Stage 11	180.9	-0.09	0.64
Stage 11	180.7	-0.02	0.34
Stage 11	180.5	0	0.1

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 11	198.7	0	0
Stage 11	198.5	0	0
Stage 11	198.5	0	0
Stage 11	198.3	0	0
Stage 11	198.3	0	0
Stage 11	198.1	0	0
Stage 11	198.1	0	0
Stage 11	198	0	0

4.1.23. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 12

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 12	198.7	-6.04
Stage 12	198.5	-5.75
Stage 12	198.3	-5.45
Stage 12	198.1	-5.15
Stage 12	198	-5.01
Stage 12	197.8	-4.71
Stage 12	197.6	-4.41
Stage 12	197.4	-4.1
Stage 12	197.2	-3.77
Stage 12	197	-3.41
Stage 12	196.8	-3.03
Stage 12	196.6	-2.65
Stage 12	196.4	-2.27
Stage 12	196.2	-1.92
Stage 12	196	-1.58
Stage 12	195.8	-1.27
Stage 12	195.6	-0.97
Stage 12	195.4	-0.69
Stage 12	195.2	-0.41
Stage 12	195	-0.13
Stage 12	194.8	0.18
Stage 12	194.7	0.35
Stage 12	194.5	0.72
Stage 12	194.3	1.12
Stage 12	194.1	1.56
Stage 12	193.9	2
Stage 12	193.7	2.46
Stage 12	193.5	2.91
Stage 12	193.3	3.37
Stage 12	193.1	3.84
Stage 12	192.9	4.3
Stage 12	192.7	4.79
Stage 12	192.5	5.29
Stage 12	192.3	5.83
Stage 12	192.2	6.12
Stage 12	192	6.73
Stage 12	191.8	7.37
Stage 12	191.6	8.02
Stage 12	191.4	8.66
Stage 12	191.2	9.27
Stage 12	191	9.83
Stage 12	190.8	10.33
Stage 12	190.6	10.78
Stage 12	190.4	11.16
Stage 12	190.2	11.48
Stage 12	190	11.75
Stage 12	189.8	11.98
Stage 12	189.7	12.08
Stage 12	189.5	12.27
Stage 12	189.3	12.42
Stage 12	189.1	12.53
Stage 12	188.9	12.57
Stage 12	188.7	12.54
Stage 12	188.5	12.44
Stage 12	188.3	12.27
Stage 12	188.1	12.04
Stage 12	187.9	11.76
Stage 12	187.7	11.43
Stage 12	187.5	11.06
Stage 12	187.3	10.67
Stage 12	187.1	10.24
Stage 12	186.9	9.8
Stage 12	186.7	9.35
Stage 12	186.5	8.89
Stage 12	186.3	8.42
Stage 12	186.1	7.95
Stage 12	185.9	7.49

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 12	185.7	7.03
Stage 12	185.5	6.58
Stage 12	185.3	6.14
Stage 12	185.1	5.72
Stage 12	184.9	5.32
Stage 12	184.7	4.95
Stage 12	184.5	4.62
Stage 12	184.3	4.33
Stage 12	184.1	4.07
Stage 12	183.9	3.85
Stage 12	183.7	3.67
Stage 12	183.5	3.52
Stage 12	183.3	3.4
Stage 12	183.1	3.3
Stage 12	182.9	3.23
Stage 12	182.7	3.17
Stage 12	182.5	3.13
Stage 12	182.3	3.1
Stage 12	182.1	3.08
Stage 12	181.9	3.07
Stage 12	181.7	3.06
Stage 12	181.5	3.06
Stage 12	181.3	3.06
Stage 12	181.1	3.06
Stage 12	180.9	3.06
Stage 12	180.7	3.06
Stage 12	180.5	3.07

4.1.24. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 12

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 12	198	0	-6.46
Stage 12	197.8	-1.29	-6.46
Stage 12	197.6	-4.28	-14.92
Stage 12	197.4	-8.92	-23.2
Stage 12	197.2	-15.18	-31.31
Stage 12	197	-7.28	39.5
Stage 12	196.8	-0.93	31.75
Stage 12	196.6	3.9	24.16
Stage 12	196.4	7.25	16.73
Stage 12	196.2	9.13	9.43
Stage 12	196	9.58	2.23
Stage 12	195.8	8.6	-4.9
Stage 12	195.6	6.19	-12.04
Stage 12	195.4	2.35	-19.22
Stage 12	195.2	-2.94	-26.43
Stage 12	195	-9.67	-33.66
Stage 12	194.8	-17.83	-40.8
Stage 12	194.7	-22.42	-45.94
Stage 12	194.5	-15.74	33.38
Stage 12	194.3	-10.36	26.94
Stage 12	194.1	-6.2	20.78
Stage 12	193.9	-3.22	14.9
Stage 12	193.7	-1.36	9.28
Stage 12	193.5	-0.59	3.87
Stage 12	193.3	-0.96	-1.87
Stage 12	193.1	-2.54	-7.89
Stage 12	192.9	-5.37	-14.14
Stage 12	192.7	-9.48	-20.57
Stage 12	192.5	-14.9	-27.09
Stage 12	192.3	-21.62	-33.6
Stage 12	192.2	-25.46	-38.4
Stage 12	192	-13.49	59.84
Stage 12	191.8	-2.88	53.05
Stage 12	191.6	6.28	45.84
Stage 12	191.4	13.93	38.22
Stage 12	191.2	19.97	30.19
Stage 12	191	24.32	21.76
Stage 12	190.8	26.91	12.94
Stage 12	190.6	27.66	3.76
Stage 12	190.4	26.5	-5.76
Stage 12	190.2	23.39	-15.57
Stage 12	190	18.27	-25.62
Stage 12	189.8	11.1	-35.86
Stage 12	189.7	6.73	-43.62
Stage 12	189.5	15.75	45.08
Stage 12	189.3	22.69	34.7
Stage 12	189.1	27.57	24.39
Stage 12	188.9	30.4	14.18
Stage 12	188.7	31.22	4.08
Stage 12	188.5	30.04	-5.91
Stage 12	188.3	26.81	-16.12
Stage 12	188.1	23.29	-17.61
Stage 12	187.9	19.82	-17.38
Stage 12	187.7	16.49	-16.62
Stage 12	187.5	13.38	-15.55
Stage 12	187.3	10.52	-14.29
Stage 12	187.1	7.94	-12.92
Stage 12	186.9	5.64	-11.5
Stage 12	186.7	3.63	-10.07
Stage 12	186.5	1.89	-8.68
Stage 12	186.3	0.42	-7.33
Stage 12	186.1	-0.9	-6.62
Stage 12	185.9	-2.21	-6.58
Stage 12	185.7	-3.66	-7.24
Stage 12	185.5	-5.39	-8.62
Stage 12	185.3	-7.53	-10.73
Stage 12	185.1	-10.25	-13.57

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 12	184.9	-13.67	-17.13
Stage 12	184.7	-15.73	-10.29
Stage 12	184.5	-16.69	-4.8
Stage 12	184.3	-16.8	-0.53
Stage 12	184.1	-16.26	2.67
Stage 12	183.9	-15.27	4.95
Stage 12	183.7	-13.98	6.47
Stage 12	183.5	-12.51	7.36
Stage 12	183.3	-10.96	7.75
Stage 12	183.1	-9.41	7.75
Stage 12	182.9	-7.91	7.46
Stage 12	182.7	-6.52	6.97
Stage 12	182.5	-5.25	6.35
Stage 12	182.3	-4.12	5.64
Stage 12	182.1	-3.14	4.9
Stage 12	181.9	-2.31	4.15
Stage 12	181.7	-1.63	3.43
Stage 12	181.5	-1.08	2.74
Stage 12	181.3	-0.65	2.11
Stage 12	181.1	-0.35	1.53
Stage 12	180.9	-0.15	1.02
Stage 12	180.7	-0.03	0.56
Stage 12	180.5	0	0.17

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 12	198.7	0	0
Stage 12	198.5	0	0
Stage 12	198.5	0	0
Stage 12	198.3	0	0
Stage 12	198.3	0	0
Stage 12	198.1	0	0
Stage 12	198.1	0	0
Stage 12	198	0	0

4.1.25. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 13

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 13	198.7	-7.3
Stage 13	198.5	-6.98
Stage 13	198.3	-6.66
Stage 13	198.1	-6.34
Stage 13	198	-6.18
Stage 13	197.8	-5.86
Stage 13	197.6	-5.54
Stage 13	197.4	-5.21
Stage 13	197.2	-4.86
Stage 13	197	-4.48
Stage 13	196.8	-4.08
Stage 13	196.6	-3.69
Stage 13	196.4	-3.3
Stage 13	196.2	-2.93
Stage 13	196	-2.58
Stage 13	195.8	-2.25
Stage 13	195.6	-1.94
Stage 13	195.4	-1.64
Stage 13	195.2	-1.35
Stage 13	195	-1.06
Stage 13	194.8	-0.74
Stage 13	194.7	-0.56
Stage 13	194.5	-0.18
Stage 13	194.3	0.24
Stage 13	194.1	0.68
Stage 13	193.9	1.13
Stage 13	193.7	1.6
Stage 13	193.5	2.07
Stage 13	193.3	2.54
Stage 13	193.1	3.01
Stage 13	192.9	3.49
Stage 13	192.7	3.98
Stage 13	192.5	4.5
Stage 13	192.3	5.05
Stage 13	192.2	5.34
Stage 13	192	5.96
Stage 13	191.8	6.6
Stage 13	191.6	7.26
Stage 13	191.4	7.9
Stage 13	191.2	8.51
Stage 13	191	9.07
Stage 13	190.8	9.58
Stage 13	190.6	10.03
Stage 13	190.4	10.42
Stage 13	190.2	10.75
Stage 13	190	11.02
Stage 13	189.8	11.25
Stage 13	189.7	11.36
Stage 13	189.5	11.55
Stage 13	189.3	11.7
Stage 13	189.1	11.8
Stage 13	188.9	11.84
Stage 13	188.7	11.81
Stage 13	188.5	11.71
Stage 13	188.3	11.55
Stage 13	188.1	11.32
Stage 13	187.9	11.04
Stage 13	187.7	10.72
Stage 13	187.5	10.36
Stage 13	187.3	9.97
Stage 13	187.1	9.56
Stage 13	186.9	9.13
Stage 13	186.7	8.69
Stage 13	186.5	8.24
Stage 13	186.3	7.79
Stage 13	186.1	7.34
Stage 13	185.9	6.9

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento orizzontale (mm)
Stage 13	185.7	6.46
Stage 13	185.5	6.03
Stage 13	185.3	5.61
Stage 13	185.1	5.21
Stage 13	184.9	4.83
Stage 13	184.7	4.49
Stage 13	184.5	4.18
Stage 13	184.3	3.9
Stage 13	184.1	3.66
Stage 13	183.9	3.46
Stage 13	183.7	3.29
Stage 13	183.5	3.15
Stage 13	183.3	3.04
Stage 13	183.1	2.95
Stage 13	182.9	2.88
Stage 13	182.7	2.83
Stage 13	182.5	2.79
Stage 13	182.3	2.76
Stage 13	182.1	2.74
Stage 13	181.9	2.73
Stage 13	181.7	2.73
Stage 13	181.5	2.72
Stage 13	181.3	2.72
Stage 13	181.1	2.73
Stage 13	180.9	2.73
Stage 13	180.7	2.73
Stage 13	180.5	2.73

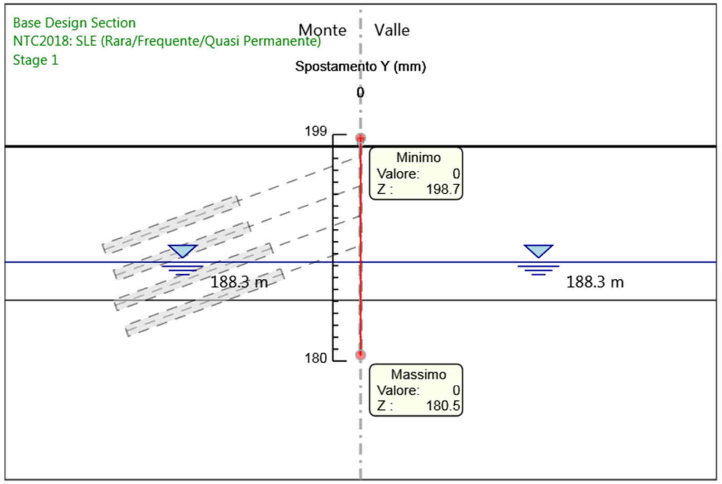
4.1.26. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 13

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 13	198	0	-5.72
Stage 13	197.8	-1.14	-5.72
Stage 13	197.6	-3.89	-13.73
Stage 13	197.4	-8.23	-21.68
Stage 13	197.2	-14.12	-29.49
Stage 13	197	-6.54	37.94
Stage 13	196.8	-0.45	30.44
Stage 13	196.6	4.17	23.1
Stage 13	196.4	7.36	15.92
Stage 13	196.2	9.13	8.87
Stage 13	196	9.51	1.92
Stage 13	195.8	8.52	-4.97
Stage 13	195.6	6.15	-11.85
Stage 13	195.4	2.39	-18.77
Stage 13	195.2	-2.75	-25.72
Stage 13	195	-9.29	-32.68
Stage 13	194.8	-17.19	-39.53
Stage 13	194.7	-21.64	-44.47
Stage 13	194.5	-15.29	31.74
Stage 13	194.3	-10.17	25.59
Stage 13	194.1	-6.23	19.73
Stage 13	193.9	-3.39	14.16
Stage 13	193.7	-1.62	8.85
Stage 13	193.5	-0.87	3.76
Stage 13	193.3	-1.2	-1.65
Stage 13	193.1	-2.67	-7.34
Stage 13	192.9	-5.32	-13.26
Stage 13	192.7	-9.19	-19.33
Stage 13	192.5	-14.29	-25.49
Stage 13	192.3	-20.62	-31.64
Stage 13	192.2	-24.23	-36.17
Stage 13	192	-12.71	57.59
Stage 13	191.8	-2.48	51.17
Stage 13	191.6	6.39	44.35
Stage 13	191.4	13.81	37.11
Stage 13	191.2	19.7	29.46
Stage 13	191	23.98	21.41
Stage 13	190.8	26.58	12.98
Stage 13	190.6	27.42	4.19
Stage 13	190.4	26.43	-4.93
Stage 13	190.2	23.56	-14.34
Stage 13	190	18.76	-23.99
Stage 13	189.8	12	-33.83
Stage 13	189.7	7.87	-41.29
Stage 13	189.5	16.4	42.65
Stage 13	189.3	22.94	32.68
Stage 13	189.1	27.49	22.78
Stage 13	188.9	30.09	12.97
Stage 13	188.7	30.74	3.28
Stage 13	188.5	29.48	-6.3
Stage 13	188.3	26.26	-16.1
Stage 13	188.1	22.74	-17.63
Stage 13	187.9	19.25	-17.43
Stage 13	187.7	15.91	-16.7
Stage 13	187.5	12.78	-15.65
Stage 13	187.3	9.9	-14.39
Stage 13	187.1	7.3	-13.01
Stage 13	186.9	4.99	-11.57
Stage 13	186.7	2.97	-10.1
Stage 13	186.5	1.24	-8.65
Stage 13	186.3	-0.21	-7.23
Stage 13	186.1	-1.49	-6.42
Stage 13	185.9	-2.74	-6.26
Stage 13	185.7	-4.1	-6.77
Stage 13	185.5	-5.69	-7.96
Stage 13	185.3	-7.66	-9.86
Stage 13	185.1	-10.15	-12.45

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 13	184.9	-13.3	-15.73
Stage 13	184.7	-15.15	-9.28
Stage 13	184.5	-15.98	-4.13
Stage 13	184.3	-16.01	-0.14
Stage 13	184.1	-15.44	2.84
Stage 13	183.9	-14.45	4.95
Stage 13	183.7	-13.18	6.33
Stage 13	183.5	-11.76	7.12
Stage 13	183.3	-10.27	7.44
Stage 13	183.1	-8.79	7.4
Stage 13	182.9	-7.37	7.09
Stage 13	182.7	-6.05	6.6
Stage 13	182.5	-4.86	5.98
Stage 13	182.3	-3.8	5.29
Stage 13	182.1	-2.89	4.57
Stage 13	181.9	-2.11	3.86
Stage 13	181.7	-1.48	3.17
Stage 13	181.5	-0.98	2.52
Stage 13	181.3	-0.59	1.93
Stage 13	181.1	-0.31	1.39
Stage 13	180.9	-0.13	0.91
Stage 13	180.7	-0.03	0.5
Stage 13	180.5	0	0.15

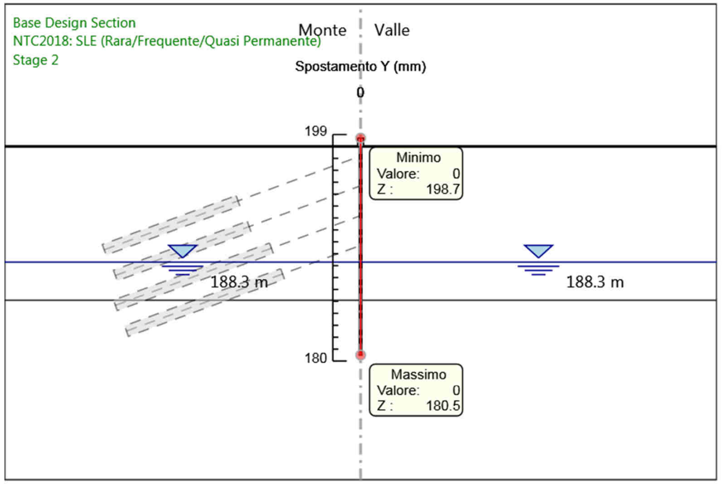
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 13	198.7	0	0
Stage 13	198.5	0	0
Stage 13	198.5	0	0
Stage 13	198.3	0	0
Stage 13	198.3	0	0
Stage 13	198.1	0	0
Stage 13	198.1	0	0
Stage 13	198	0	0

4.1.27. Grafico Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 1



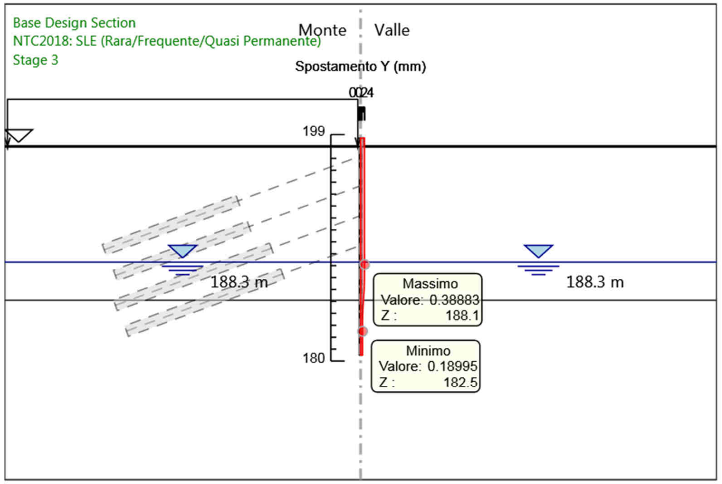
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 1
Spostamento orizzontale

4.1.28. Grafico Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 2



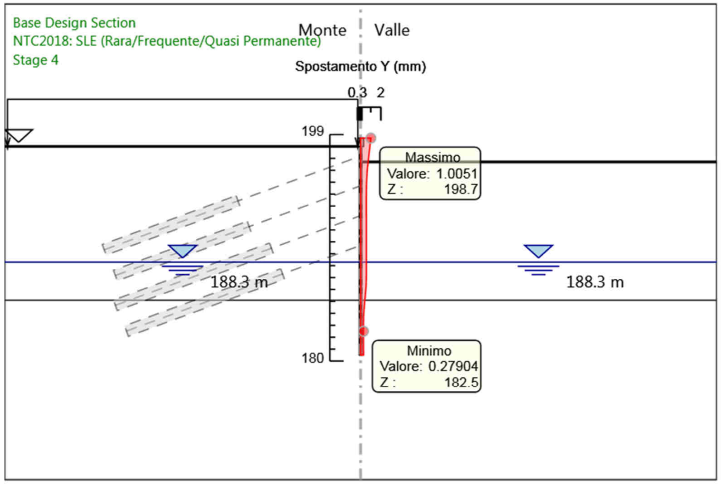
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 2
Spostamento orizzontale

4.1.29. Grafico Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 3



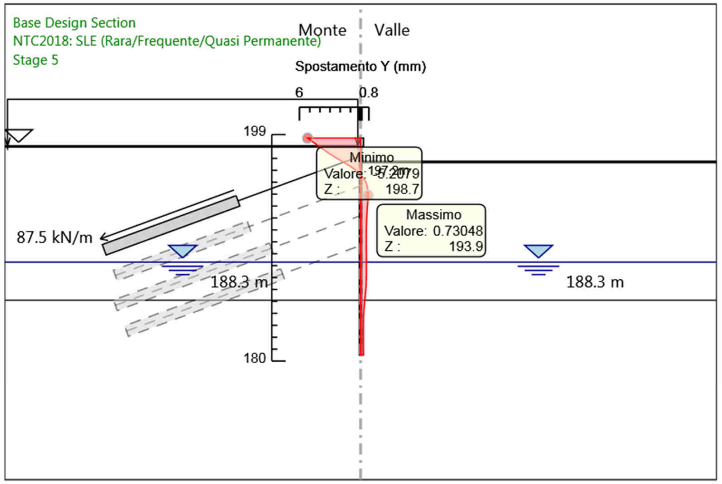
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 3
Spostamento orizzontale

4.1.30. Grafico Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 4



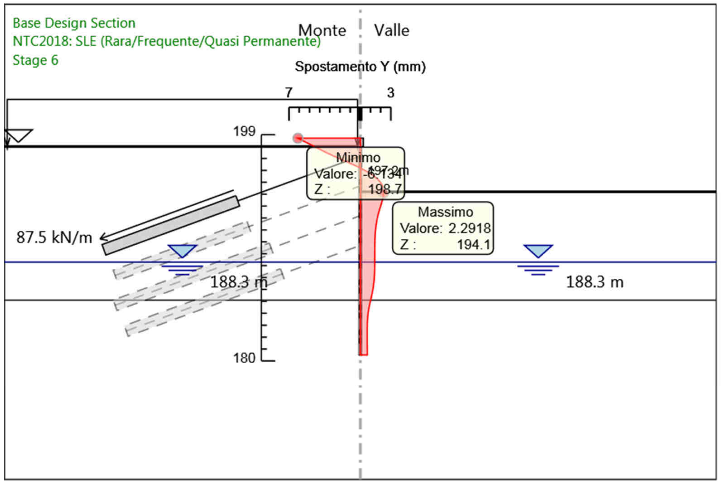
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 4
Spostamento orizzontale

4.1.31. Grafico Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 5



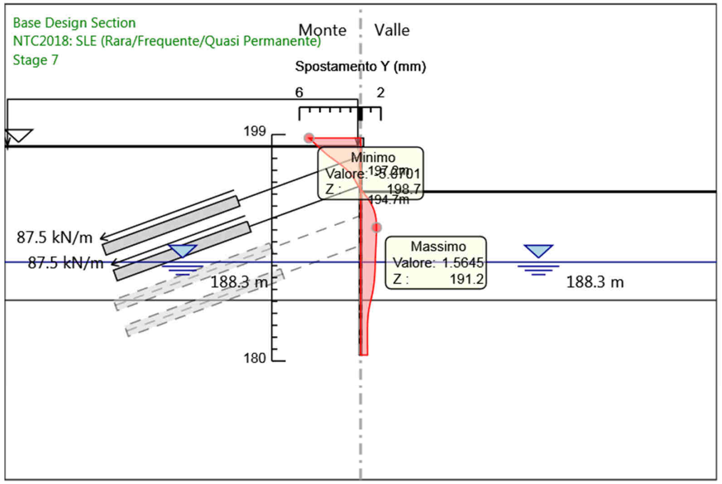
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 5
Spostamento orizzontale

4.1.32. Grafico Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 6



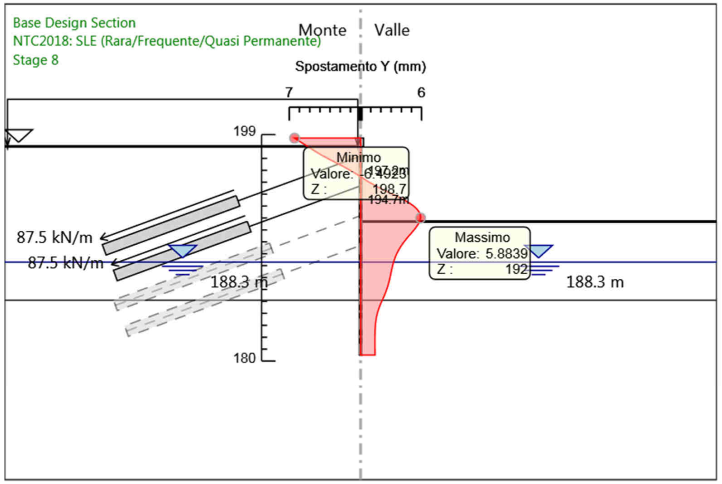
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 6
Spostamento orizzontale

4.1.33. Grafico Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 7



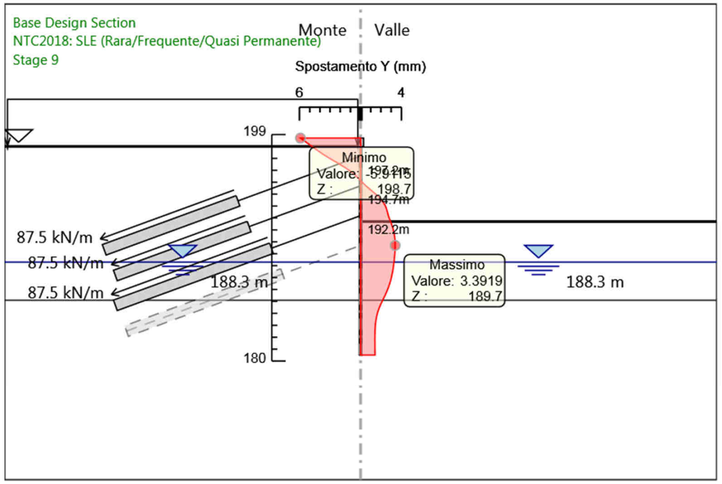
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 7
Spostamento orizzontale

4.1.34. Grafico Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 8



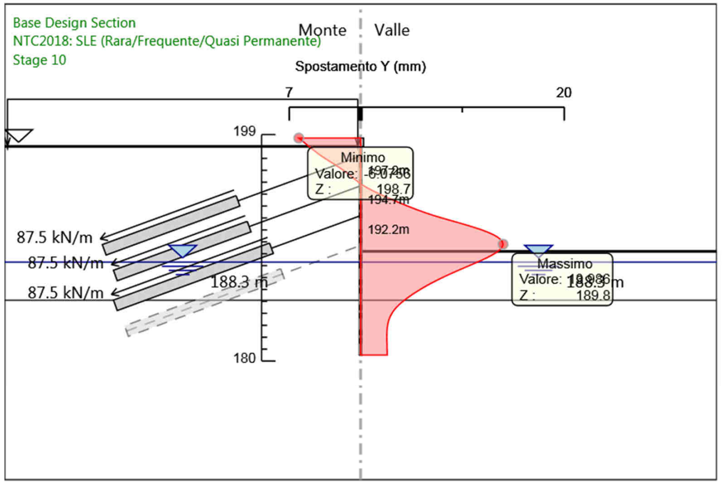
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 8
Spostamento orizzontale

4.1.35. Grafico Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 9



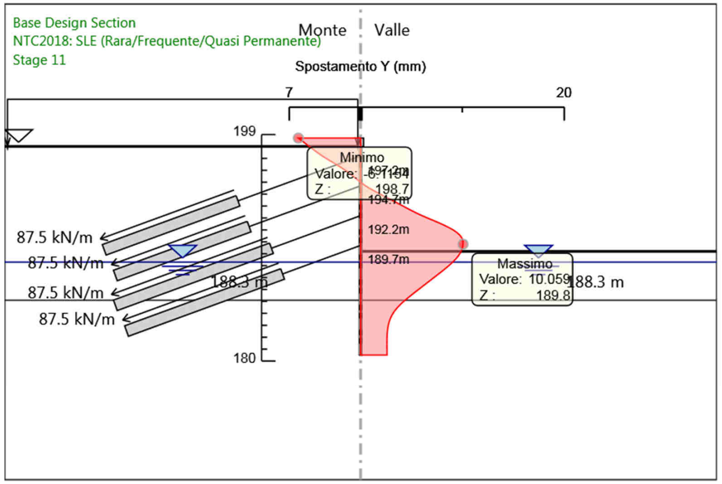
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 9
Spostamento orizzontale

4.1.36. Grafico Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 10



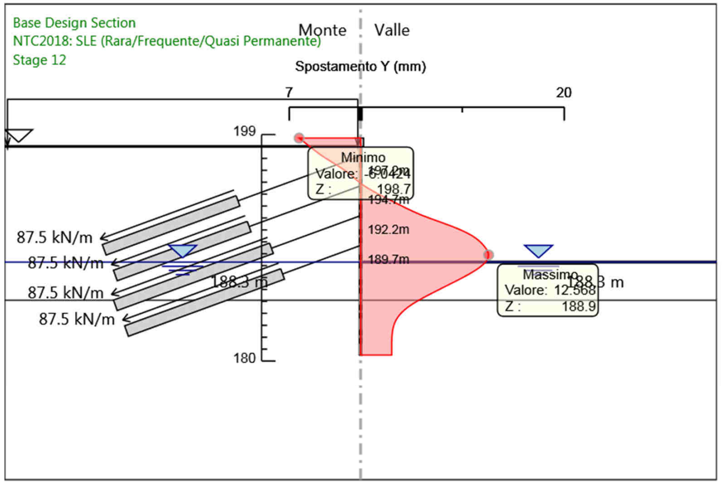
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 10
Spostamento orizzontale

4.1.37. Grafico Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 11



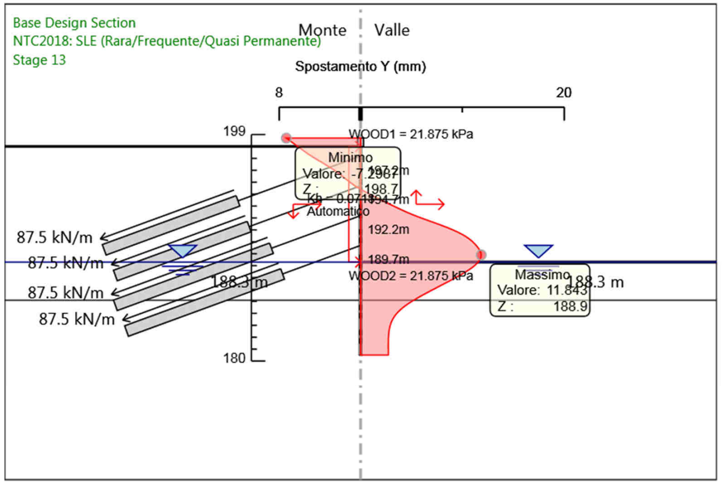
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 11
Spostamento orizzontale

4.1.38. Grafico Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 12



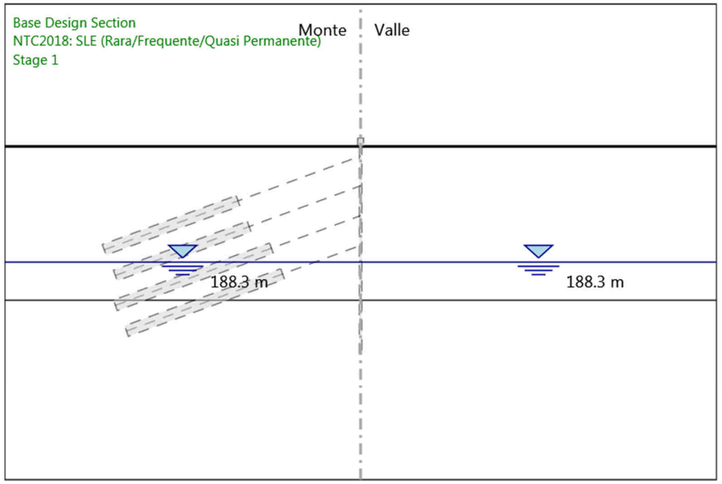
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 12
Spostamento orizzontale

4.1.39. Grafico Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 13



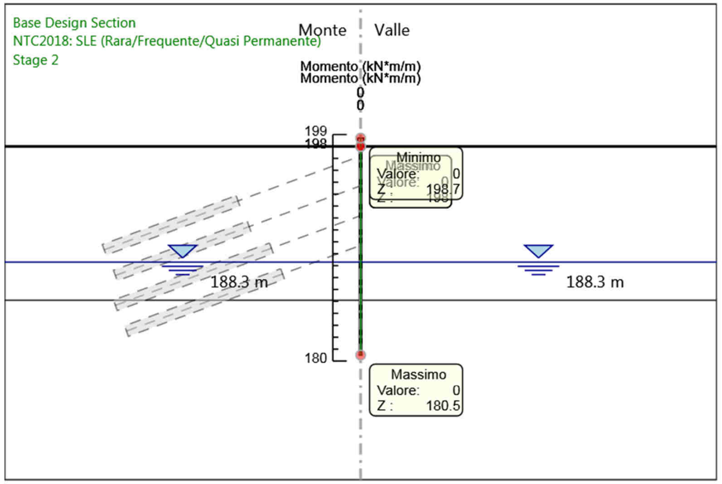
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 13
Spostamento orizzontale

4.1.40. Grafico Risultati Momento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 1



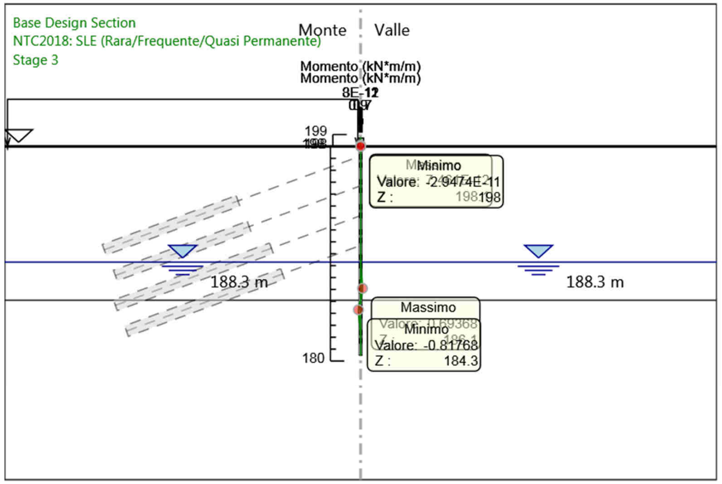
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 1
Momento

4.1.41. Grafico Risultati Momento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 2



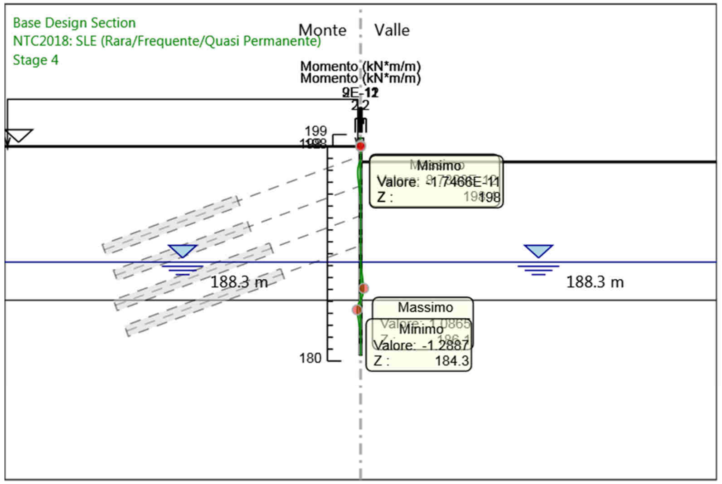
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 2
Momento

4.1.42. Grafico Risultati Momento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 3



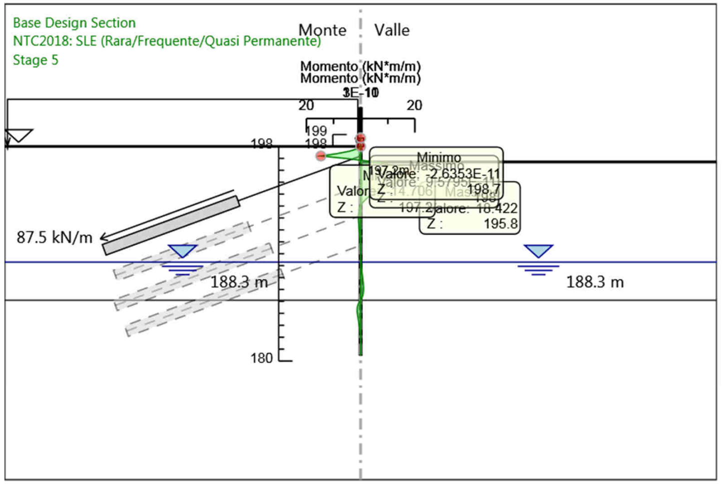
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 3
Momento

4.1.43. Grafico Risultati Momento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 4



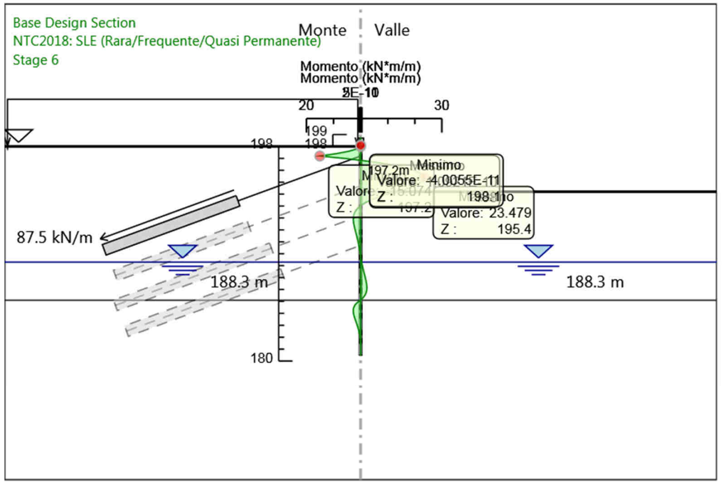
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 4
Momento

4.1.44. Grafico Risultati Momento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 5



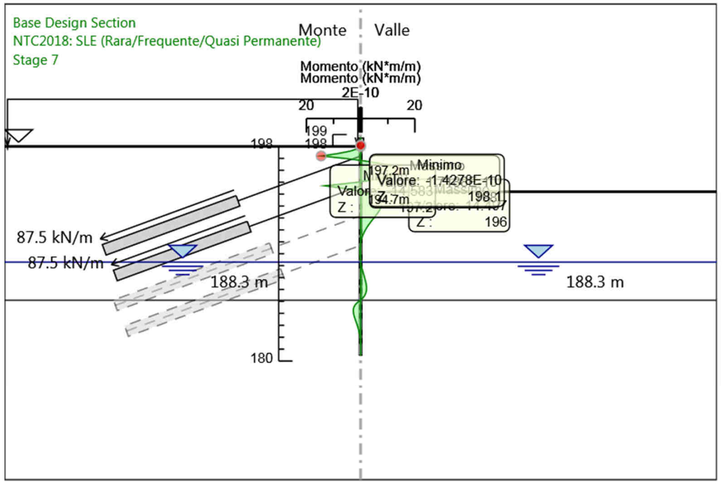
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 5
Momento

4.1.45. Grafico Risultati Momento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 6



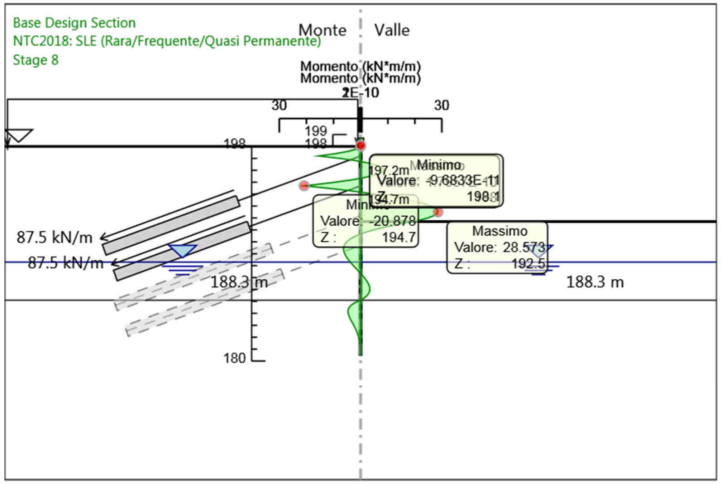
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 6
Momento

4.1.46. Grafico Risultati Momento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 7



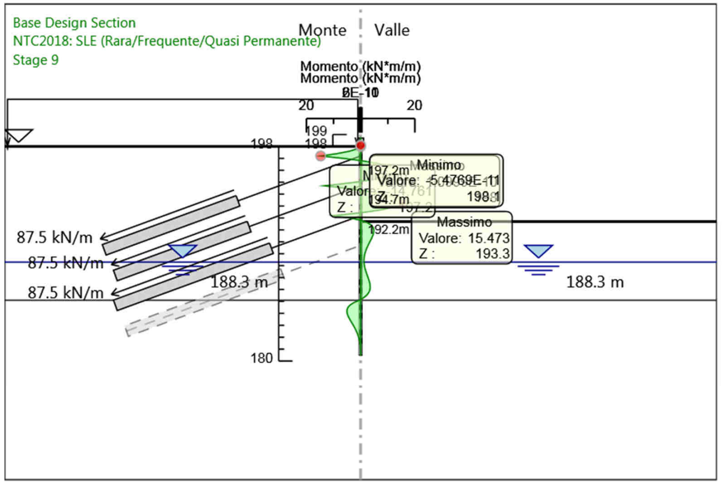
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 7
Momento

4.1.47. Grafico Risultati Momento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 8



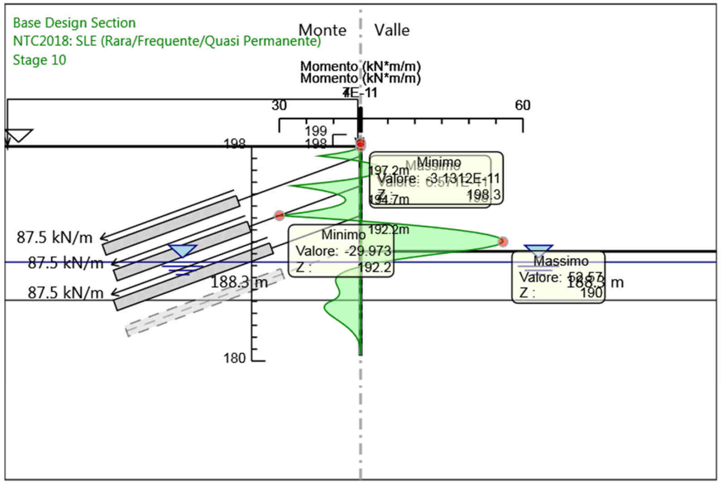
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 8
Momento

4.1.48. Grafico Risultati Momento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 9



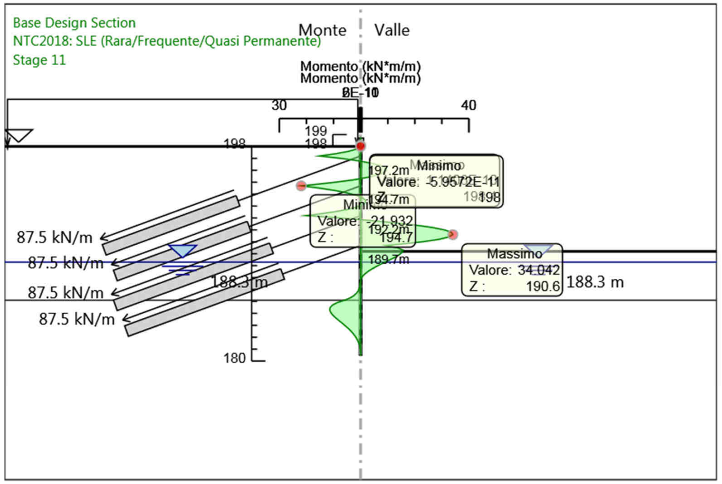
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 9
Momento

4.1.49. Grafico Risultati Momento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 10



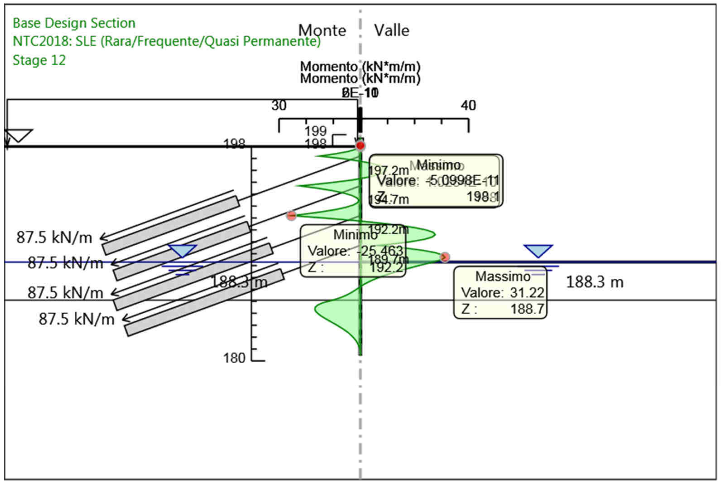
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 10
Momento

4.1.50. Grafico Risultati Momento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 11



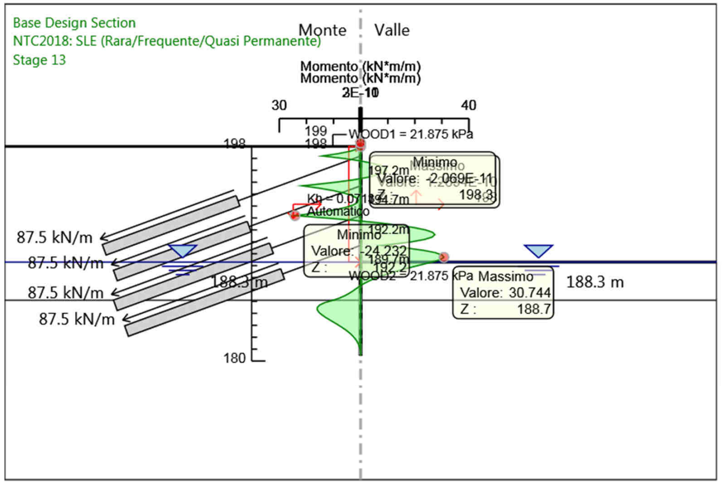
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 11
Momento

4.1.51. Grafico Risultati Momento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 12



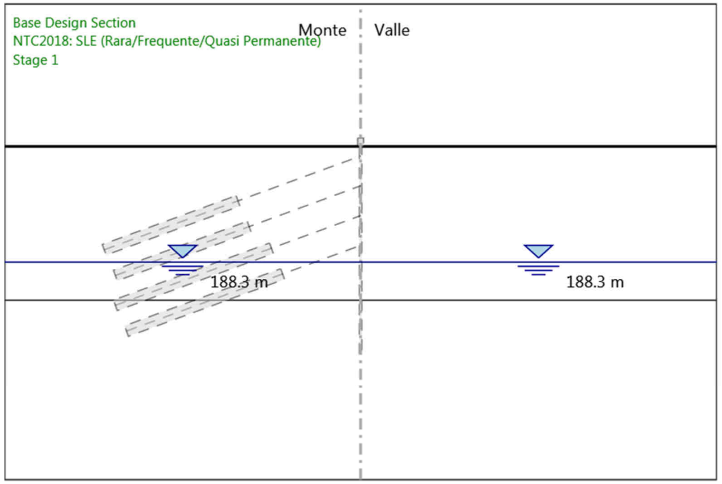
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 12
Momento

4.1.52. Grafico Risultati Momento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 13



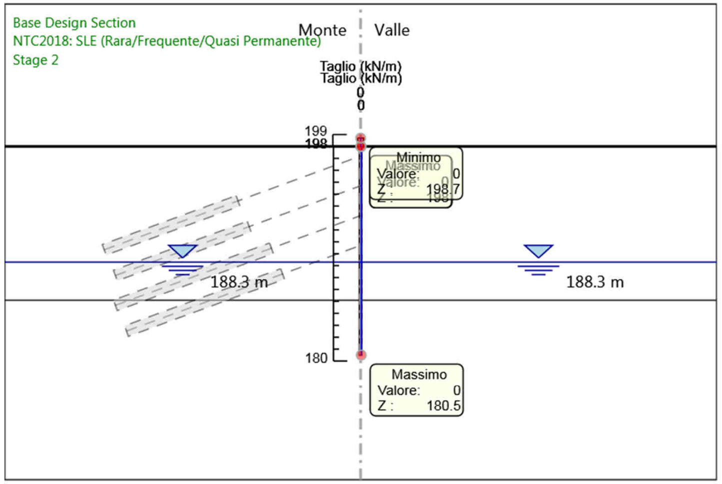
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 13
Momento

4.1.53. Grafico Risultati Taglio NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 1



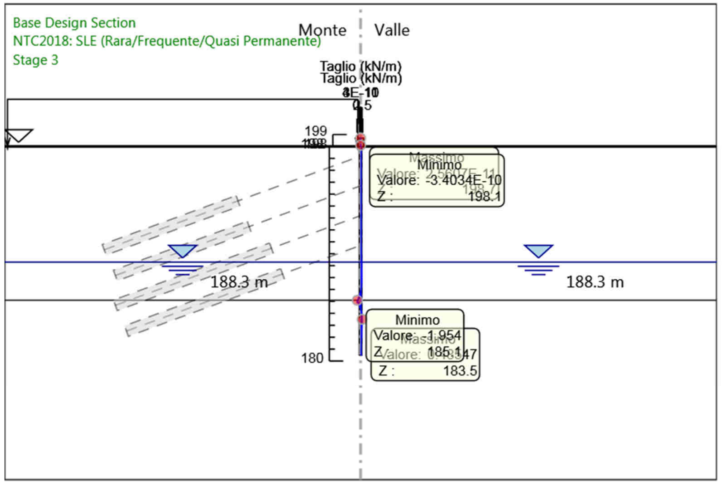
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 1
Taglio

4.1.54. Grafico Risultati Taglio NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 2



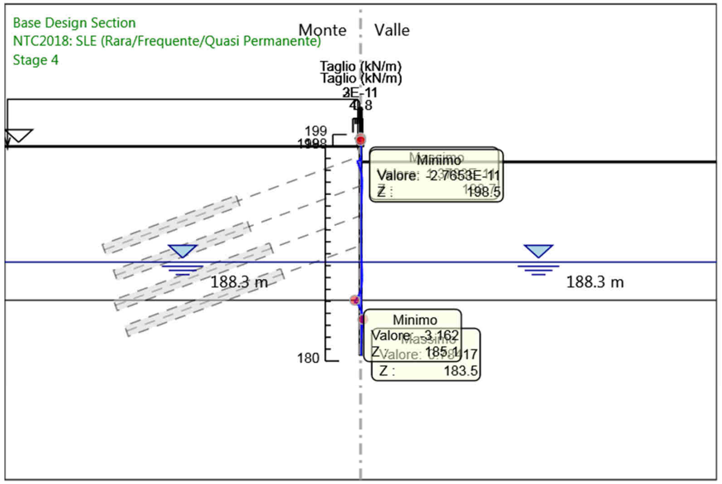
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 2
Taglio

4.1.55. Grafico Risultati Taglio NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 3



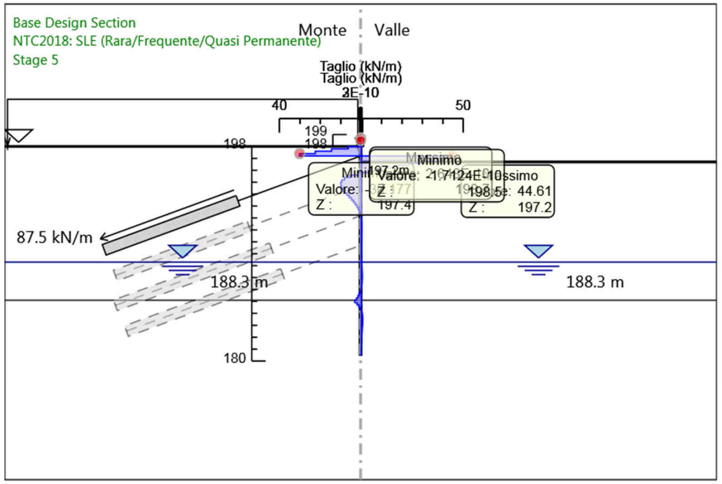
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 3
Taglio

4.1.56. Grafico Risultati Taglio NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 4



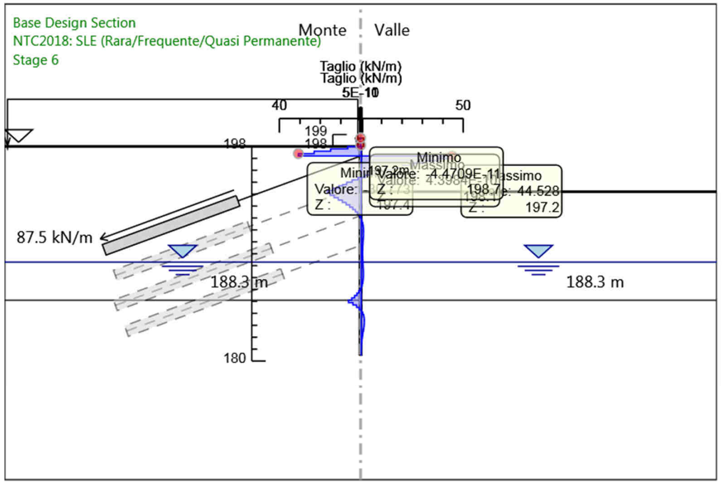
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 4
Taglio

4.1.57. Grafico Risultati Taglio NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 5



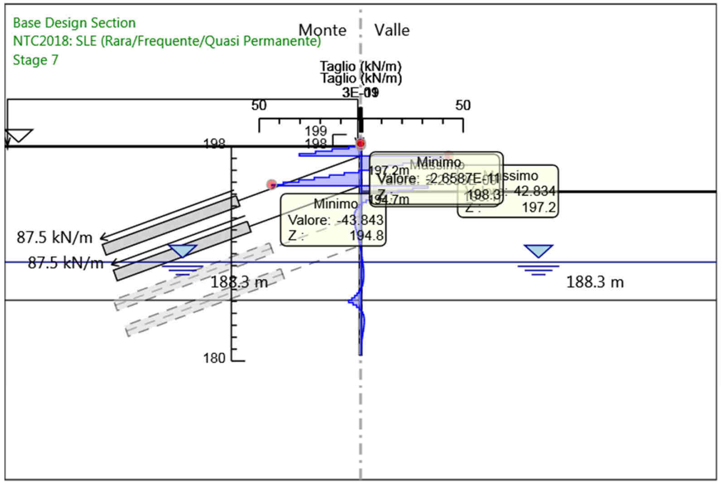
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 5
Taglio

4.1.58. Grafico Risultati Taglio NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 6



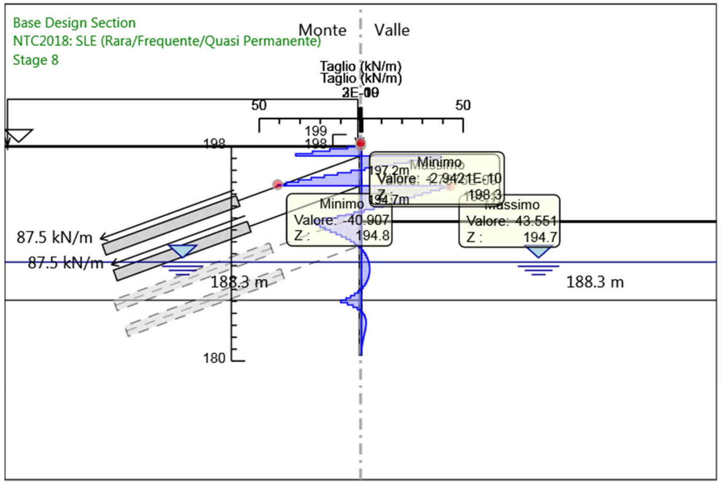
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 6
Taglio

4.1.59. Grafico Risultati Taglio NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 7



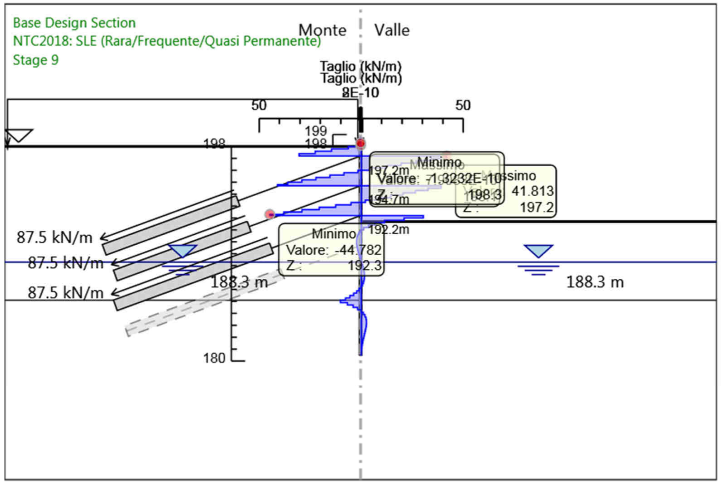
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 7
Taglio

4.1.60. Grafico Risultati Taglio NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 8



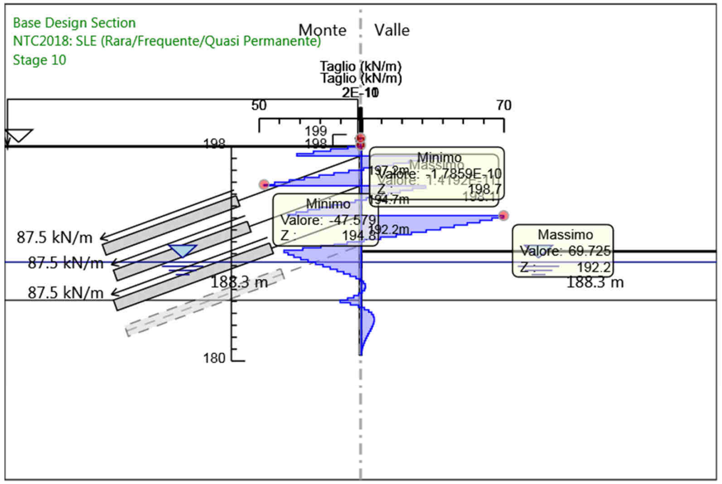
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 8
Taglio

4.1.61. Grafico Risultati Taglio NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 9



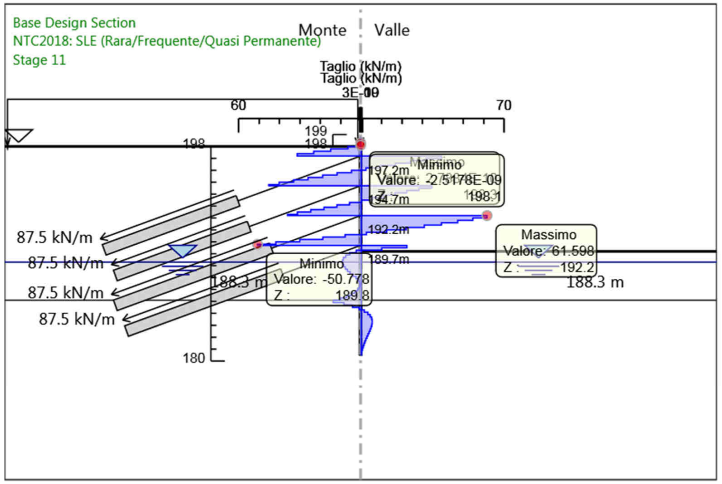
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 9
Taglio

4.1.62. Grafico Risultati Taglio NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 10



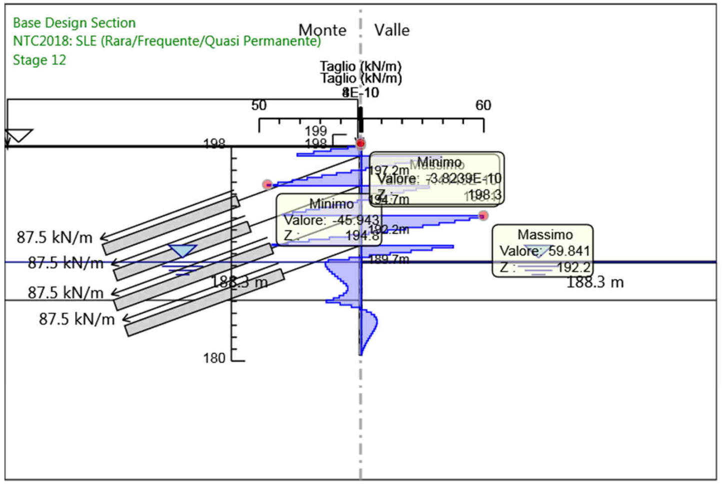
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 10
Taglio

4.1.63. Grafico Risultati Taglio NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 11



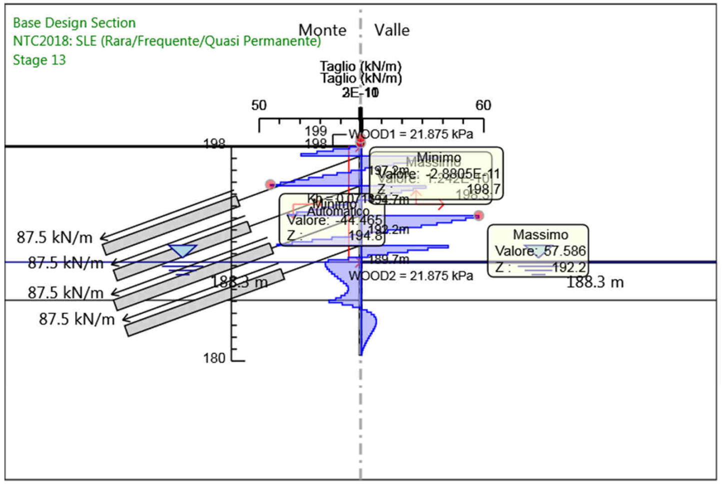
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 11
Taglio

4.1.64. Grafico Risultati Taglio NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 12



Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 12
Taglio

4.1.65. Grafico Risultati Taglio NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Stage: Stage 13



Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
Stage: Stage 13
Taglio

4.1.66. Risultati Elementi strutturali - NTC2018: SLE (Rara/Frequente/Quasi Permanente)

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Sollecitazione I-ordine
Stage	**Forza (kN/m)**
Stage 5	87.5
Stage 6	87.8394
Stage 7	86.02197
Stage 8	84.04349
Stage 9	84.96123
Stage 10	83.43627
Stage 11	83.76372
Stage 12	83.74849
Stage 13	79.86749

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Sollecitazione II-ordine
Stage	**Forza (kN/m)**
Stage 7	87.5
Stage 8	94.1936
Stage 9	90.49837
Stage 10	89.67563
Stage 11	90.32568
Stage 12	89.78961
Stage 13	86.23386

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Sollecitazione III-ordine
Stage	**Forza (kN/m)**
Stage 9	87.5
Stage 10	116.8647
Stage 11	109.0848
Stage 12	109.6457
Stage 13	104.5633

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente)	Sollecitazione IV-ordine
Stage	**Forza (kN/m)**
Stage 11	87.5
Stage 12	102.6862
Stage 13	97.28547

4.2. Risultati NTC2018: A1+M1+R1 (R3 per tiranti)

4.2.1. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 1

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	198	0	0
Stage 1	197.8	0	0
Stage 1	197.6	0	0
Stage 1	197.4	0	0
Stage 1	197.2	0	0
Stage 1	197	0	0
Stage 1	196.8	0	0
Stage 1	196.6	0	0
Stage 1	196.4	0	0
Stage 1	196.2	0	0
Stage 1	196	0	0
Stage 1	195.8	0	0
Stage 1	195.6	0	0
Stage 1	195.4	0	0
Stage 1	195.2	0	0
Stage 1	195	0	0
Stage 1	194.8	0	0
Stage 1	194.7	0	0
Stage 1	194.5	0	0
Stage 1	194.3	0	0
Stage 1	194.1	0	0
Stage 1	193.9	0	0
Stage 1	193.7	0	0
Stage 1	193.5	0	0
Stage 1	193.3	0	0
Stage 1	193.1	0	0
Stage 1	192.9	0	0
Stage 1	192.7	0	0
Stage 1	192.5	0	0
Stage 1	192.3	0	0
Stage 1	192.2	0	0
Stage 1	192	0	0
Stage 1	191.8	0	0
Stage 1	191.6	0	0
Stage 1	191.4	0	0
Stage 1	191.2	0	0
Stage 1	191	0	0
Stage 1	190.8	0	0
Stage 1	190.6	0	0
Stage 1	190.4	0	0
Stage 1	190.2	0	0
Stage 1	190	0	0
Stage 1	189.8	0	0
Stage 1	189.7	0	0
Stage 1	189.5	0	0
Stage 1	189.3	0	0
Stage 1	189.1	0	0
Stage 1	188.9	0	0
Stage 1	188.7	0	0
Stage 1	188.5	0	0
Stage 1	188.3	0	0
Stage 1	188.1	0	0
Stage 1	187.9	0	0
Stage 1	187.7	0	0
Stage 1	187.5	0	0
Stage 1	187.3	0	0
Stage 1	187.1	0	0
Stage 1	186.9	0	0
Stage 1	186.7	0	0
Stage 1	186.5	0	0
Stage 1	186.3	0	0
Stage 1	186.1	0	0
Stage 1	185.9	0	0
Stage 1	185.7	0	0

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	185.5	0	0
Stage 1	185.3	0	0
Stage 1	185.1	0	0
Stage 1	184.9	0	0
Stage 1	184.7	0	0
Stage 1	184.5	0	0
Stage 1	184.3	0	0
Stage 1	184.1	0	0
Stage 1	183.9	0	0
Stage 1	183.7	0	0
Stage 1	183.5	0	0
Stage 1	183.3	0	0
Stage 1	183.1	0	0
Stage 1	182.9	0	0
Stage 1	182.7	0	0
Stage 1	182.5	0	0
Stage 1	182.3	0	0
Stage 1	182.1	0	0
Stage 1	181.9	0	0
Stage 1	181.7	0	0
Stage 1	181.5	0	0
Stage 1	181.3	0	0
Stage 1	181.1	0	0
Stage 1	180.9	0	0
Stage 1	180.7	0	0
Stage 1	180.5	0	0

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	198.7	0	0
Stage 1	198.5	0	0
Stage 1	198.3	0	0
Stage 1	198.1	0	0
Stage 1	198	0	0

4.2.2. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 2

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	198	0	0
Stage 2	197.8	0	0
Stage 2	197.6	0	0
Stage 2	197.4	0	0
Stage 2	197.2	0	0
Stage 2	197	0	0
Stage 2	196.8	0	0
Stage 2	196.6	0	0
Stage 2	196.4	0	0
Stage 2	196.2	0	0
Stage 2	196	0	0
Stage 2	195.8	0	0
Stage 2	195.6	0	0
Stage 2	195.4	0	0
Stage 2	195.2	0	0
Stage 2	195	0	0
Stage 2	194.8	0	0
Stage 2	194.7	0	0
Stage 2	194.5	0	0
Stage 2	194.3	0	0
Stage 2	194.1	0	0
Stage 2	193.9	0	0
Stage 2	193.7	0	0
Stage 2	193.5	0	0
Stage 2	193.3	0	0
Stage 2	193.1	0	0
Stage 2	192.9	0	0
Stage 2	192.7	0	0
Stage 2	192.5	0	0
Stage 2	192.3	0	0
Stage 2	192.2	0	0
Stage 2	192	0	0
Stage 2	191.8	0	0
Stage 2	191.6	0	0
Stage 2	191.4	0	0
Stage 2	191.2	0	0
Stage 2	191	0	0
Stage 2	190.8	0	0
Stage 2	190.6	0	0
Stage 2	190.4	0	0
Stage 2	190.2	0	0
Stage 2	190	0	0
Stage 2	189.8	0	0
Stage 2	189.7	0	0
Stage 2	189.5	0	0
Stage 2	189.3	0	0
Stage 2	189.1	0	0
Stage 2	188.9	0	0
Stage 2	188.7	0	0
Stage 2	188.5	0	0
Stage 2	188.3	0	0
Stage 2	188.1	0	0
Stage 2	187.9	0	0
Stage 2	187.7	0	0
Stage 2	187.5	0	0
Stage 2	187.3	0	0
Stage 2	187.1	0	0
Stage 2	186.9	0	0
Stage 2	186.7	0	0
Stage 2	186.5	0	0
Stage 2	186.3	0	0
Stage 2	186.1	0	0
Stage 2	185.9	0	0
Stage 2	185.7	0	0
Stage 2	185.5	0	0
Stage 2	185.3	0	0
Stage 2	185.1	0	0

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	184.9	0	0
Stage 2	184.7	0	0
Stage 2	184.5	0	0
Stage 2	184.3	0	0
Stage 2	184.1	0	0
Stage 2	183.9	0	0
Stage 2	183.7	0	0
Stage 2	183.5	0	0
Stage 2	183.3	0	0
Stage 2	183.1	0	0
Stage 2	182.9	0	0
Stage 2	182.7	0	0
Stage 2	182.5	0	0
Stage 2	182.3	0	0
Stage 2	182.1	0	0
Stage 2	181.9	0	0
Stage 2	181.7	0	0
Stage 2	181.5	0	0
Stage 2	181.3	0	0
Stage 2	181.1	0	0
Stage 2	180.9	0	0
Stage 2	180.7	0	0
Stage 2	180.5	0	0

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	198.7	0	0
Stage 2	198.5	0	0
Stage 2	198.3	0	0
Stage 2	198.1	0	0
Stage 2	198	0	0

4.2.3. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 3

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 3	198	0	0
Stage 3	197.8	0	0
Stage 3	197.6	0	0
Stage 3	197.4	0	0
Stage 3	197.4	0	0
Stage 3	197.2	0	0
Stage 3	197	0	0
Stage 3	196.8	0	0
Stage 3	196.6	0	0
Stage 3	196.4	0	0
Stage 3	196.2	0	0
Stage 3	196	0	0
Stage 3	195.8	0	0
Stage 3	195.6	0	0
Stage 3	195.4	0	0
Stage 3	195.2	0	0
Stage 3	195	0	0
Stage 3	194.8	0	0
Stage 3	194.7	0	0
Stage 3	194.5	0	0
Stage 3	194.3	0	0
Stage 3	194.1	0	0
Stage 3	193.9	0	0
Stage 3	193.7	0	0
Stage 3	193.5	0	0
Stage 3	193.3	0	0
Stage 3	193.1	0	0
Stage 3	192.9	0	0
Stage 3	192.7	0	-0.01
Stage 3	192.5	0	-0.01
Stage 3	192.3	-0.01	-0.01
Stage 3	192.2	-0.01	-0.01
Stage 3	192	-0.01	-0.01
Stage 3	191.8	-0.01	-0.01
Stage 3	191.6	-0.02	-0.02
Stage 3	191.4	-0.02	-0.02
Stage 3	191.2	-0.02	-0.02
Stage 3	191	-0.03	-0.02
Stage 3	190.8	-0.03	-0.02
Stage 3	190.6	-0.03	-0.02
Stage 3	190.4	-0.04	-0.01
Stage 3	190.2	-0.04	-0.01
Stage 3	190	-0.04	0
Stage 3	189.8	-0.04	0.01
Stage 3	189.7	-0.03	0.02
Stage 3	189.5	-0.03	0.04
Stage 3	189.3	-0.02	0.06
Stage 3	189.1	0	0.08
Stage 3	188.9	0.02	0.11
Stage 3	188.7	0.05	0.15
Stage 3	188.5	0.09	0.18
Stage 3	188.3	0.13	0.23
Stage 3	188.1	0.19	0.27
Stage 3	187.9	0.25	0.32
Stage 3	187.7	0.33	0.36
Stage 3	187.5	0.41	0.4
Stage 3	187.3	0.49	0.43
Stage 3	187.1	0.58	0.45
Stage 3	186.9	0.67	0.45
Stage 3	186.7	0.76	0.42
Stage 3	186.5	0.83	0.36
Stage 3	186.3	0.88	0.26
Stage 3	186.1	0.9	0.1
Stage 3	185.9	0.88	-0.12
Stage 3	185.7	0.79	-0.42
Stage 3	185.5	0.63	-0.8
Stage 3	185.3	0.38	-1.28

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 3	185.1	0.01	-1.86
Stage 3	184.9	-0.5	-2.54
Stage 3	184.7	-0.82	-1.61
Stage 3	184.5	-1	-0.88
Stage 3	184.3	-1.06	-0.32
Stage 3	184.1	-1.05	0.08
Stage 3	183.9	-0.98	0.35
Stage 3	183.7	-0.87	0.52
Stage 3	183.5	-0.75	0.61
Stage 3	183.3	-0.62	0.63
Stage 3	183.1	-0.5	0.61
Stage 3	182.9	-0.39	0.56
Stage 3	182.7	-0.29	0.49
Stage 3	182.5	-0.21	0.41
Stage 3	182.3	-0.14	0.34
Stage 3	182.1	-0.09	0.26
Stage 3	181.9	-0.05	0.19
Stage 3	181.7	-0.02	0.13
Stage 3	181.5	-0.01	0.08
Stage 3	181.3	0	0.04
Stage 3	181.1	0	0.01
Stage 3	180.9	0	0
Stage 3	180.7	0	-0.01
Stage 3	180.5	0	-0.01

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 3	198.7	0	0
Stage 3	198.5	0	0
Stage 3	198.5	0	0
Stage 3	198.3	0	0
Stage 3	198.3	0	0
Stage 3	198.1	0	0
Stage 3	198.1	0	0
Stage 3	198	0	0

4.2.4. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 4

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 4	198	0	0
Stage 4	197.8	0	0
Stage 4	197.8	0	0
Stage 4	197.6	0	0
Stage 4	197.6	0	0
Stage 4	197.4	0	0
Stage 4	197.4	0	0
Stage 4	197.2	0	0
Stage 4	197.2	0	0
Stage 4	197	-0.03	-0.15
Stage 4	196.8	-0.22	-0.96
Stage 4	196.6	-0.71	-2.42
Stage 4	196.4	-1.07	-1.84
Stage 4	196.2	-1.31	-1.2
Stage 4	196	-1.44	-0.63
Stage 4	195.8	-1.47	-0.16
Stage 4	195.6	-1.43	0.2
Stage 4	195.4	-1.34	0.45
Stage 4	195.2	-1.22	0.62
Stage 4	195	-1.07	0.72
Stage 4	194.8	-0.92	0.75
Stage 4	194.7	-0.85	0.75
Stage 4	194.5	-0.7	0.73
Stage 4	194.3	-0.57	0.68
Stage 4	194.1	-0.44	0.61
Stage 4	193.9	-0.34	0.54
Stage 4	193.7	-0.24	0.46
Stage 4	193.5	-0.17	0.38
Stage 4	193.3	-0.11	0.3
Stage 4	193.1	-0.06	0.24
Stage 4	192.9	-0.03	0.18
Stage 4	192.7	0	0.12
Stage 4	192.5	0.02	0.08
Stage 4	192.3	0.02	0.04
Stage 4	192.2	0.03	0.02
Stage 4	192	0.03	0
Stage 4	191.8	0.02	-0.02
Stage 4	191.6	0.02	-0.03
Stage 4	191.4	0.01	-0.04
Stage 4	191.2	0	-0.05
Stage 4	191	-0.01	-0.06
Stage 4	190.8	-0.03	-0.06
Stage 4	190.6	-0.04	-0.05
Stage 4	190.4	-0.05	-0.05
Stage 4	190.2	-0.05	-0.04
Stage 4	190	-0.06	-0.02
Stage 4	189.8	-0.06	-0.01
Stage 4	189.7	-0.06	0.01
Stage 4	189.5	-0.05	0.03
Stage 4	189.3	-0.04	0.06
Stage 4	189.1	-0.02	0.1
Stage 4	188.9	0.01	0.15
Stage 4	188.7	0.05	0.2
Stage 4	188.5	0.1	0.26
Stage 4	188.3	0.17	0.33
Stage 4	188.1	0.25	0.41
Stage 4	187.9	0.35	0.48
Stage 4	187.7	0.46	0.56
Stage 4	187.5	0.59	0.63
Stage 4	187.3	0.72	0.69
Stage 4	187.1	0.87	0.72
Stage 4	186.9	1.01	0.73
Stage 4	186.7	1.16	0.7
Stage 4	186.5	1.28	0.62
Stage 4	186.3	1.37	0.46
Stage 4	186.1	1.41	0.21
Stage 4	185.9	1.38	-0.14

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 4	185.7	1.26	-0.61
Stage 4	185.5	1.02	-1.23
Stage 4	185.3	0.61	-2.02
Stage 4	185.1	0.02	-2.97
Stage 4	184.9	-0.8	-4.11
Stage 4	184.7	-1.32	-2.56
Stage 4	184.5	-1.59	-1.35
Stage 4	184.3	-1.68	-0.44
Stage 4	184.1	-1.63	0.2
Stage 4	183.9	-1.51	0.63
Stage 4	183.7	-1.33	0.88
Stage 4	183.5	-1.13	1
Stage 4	183.3	-0.93	1.02
Stage 4	183.1	-0.73	0.97
Stage 4	182.9	-0.56	0.88
Stage 4	182.7	-0.41	0.76
Stage 4	182.5	-0.28	0.63
Stage 4	182.3	-0.18	0.5
Stage 4	182.1	-0.11	0.38
Stage 4	181.9	-0.05	0.27
Stage 4	181.7	-0.02	0.18
Stage 4	181.5	0	0.1
Stage 4	181.3	0.01	0.04
Stage 4	181.1	0.01	0
Stage 4	180.9	0.01	-0.02
Stage 4	180.7	0	-0.02
Stage 4	180.5	0	-0.01

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 4	198.7	0	0
Stage 4	198.5	0	0
Stage 4	198.5	0	0
Stage 4	198.3	0	0
Stage 4	198.3	0	0
Stage 4	198.1	0	0
Stage 4	198.1	0	0
Stage 4	198	0	0

4.2.5. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 5

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 5	198	0	-8.23
Stage 5	197.8	-1.65	-8.23
Stage 5	197.6	-5.43	-18.89
Stage 5	197.4	-11.27	-29.23
Stage 5	197.2	-19.12	-39.23
Stage 5	197	-7.52	57.99
Stage 5	196.8	2.19	48.54
Stage 5	196.6	10.05	39.32
Stage 5	196.4	16.12	30.34
Stage 5	196.2	20.43	21.56
Stage 5	196	23.02	12.92
Stage 5	195.8	23.95	4.66
Stage 5	195.6	23.55	-1.99
Stage 5	195.4	22.12	-7.15
Stage 5	195.2	20.02	-10.48
Stage 5	195	17.56	-12.34
Stage 5	194.8	14.94	-13.06
Stage 5	194.7	13.65	-12.97
Stage 5	194.5	11.12	-12.64
Stage 5	194.3	8.78	-11.71
Stage 5	194.1	6.68	-10.48
Stage 5	193.9	4.86	-9.09
Stage 5	193.7	3.33	-7.66
Stage 5	193.5	2.07	-6.27
Stage 5	193.3	1.08	-4.98
Stage 5	193.1	0.31	-3.82
Stage 5	192.9	-0.25	-2.8
Stage 5	192.7	-0.64	-1.95
Stage 5	192.5	-0.88	-1.24
Stage 5	192.3	-1.02	-0.68
Stage 5	192.2	-1.06	-0.36
Stage 5	192	-1.07	-0.08
Stage 5	191.8	-1.03	0.19
Stage 5	191.6	-0.96	0.37
Stage 5	191.4	-0.86	0.48
Stage 5	191.2	-0.76	0.53
Stage 5	191	-0.65	0.54
Stage 5	190.8	-0.54	0.52
Stage 5	190.6	-0.45	0.49
Stage 5	190.4	-0.36	0.44
Stage 5	190.2	-0.28	0.38
Stage 5	190	-0.22	0.33
Stage 5	189.8	-0.16	0.28
Stage 5	189.7	-0.13	0.26
Stage 5	189.5	-0.09	0.23
Stage 5	189.3	-0.04	0.22
Stage 5	189.1	0	0.21
Stage 5	188.9	0.04	0.22
Stage 5	188.7	0.09	0.25
Stage 5	188.5	0.15	0.29
Stage 5	188.3	0.22	0.34
Stage 5	188.1	0.3	0.4
Stage 5	187.9	0.39	0.47
Stage 5	187.7	0.5	0.54
Stage 5	187.5	0.62	0.6
Stage 5	187.3	0.75	0.66
Stage 5	187.1	0.89	0.7
Stage 5	186.9	1.03	0.71
Stage 5	186.7	1.17	0.68
Stage 5	186.5	1.29	0.6
Stage 5	186.3	1.38	0.44
Stage 5	186.1	1.42	0.2
Stage 5	185.9	1.39	-0.15
Stage 5	185.7	1.26	-0.62
Stage 5	185.5	1.01	-1.24
Stage 5	185.3	0.61	-2.02
Stage 5	185.1	0.02	-2.98

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 5	184.9	-0.81	-4.11
Stage 5	184.7	-1.32	-2.56
Stage 5	184.5	-1.59	-1.35
Stage 5	184.3	-1.68	-0.44
Stage 5	184.1	-1.64	0.2
Stage 5	183.9	-1.51	0.63
Stage 5	183.7	-1.33	0.88
Stage 5	183.5	-1.13	1
Stage 5	183.3	-0.93	1.02
Stage 5	183.1	-0.74	0.97
Stage 5	182.9	-0.56	0.88
Stage 5	182.7	-0.41	0.76
Stage 5	182.5	-0.28	0.63
Stage 5	182.3	-0.18	0.5
Stage 5	182.1	-0.11	0.38
Stage 5	181.9	-0.05	0.27
Stage 5	181.7	-0.02	0.18
Stage 5	181.5	0	0.1
Stage 5	181.3	0.01	0.04
Stage 5	181.1	0.01	0
Stage 5	180.9	0.01	-0.02
Stage 5	180.7	0	-0.02
Stage 5	180.5	0	-0.01

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 5	198.7	0	0
Stage 5	198.5	0	0
Stage 5	198.5	0	0
Stage 5	198.3	0	0
Stage 5	198.3	0	0
Stage 5	198.1	0	0
Stage 5	198.1	0	0
Stage 5	198	0	0

4.2.6. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 6

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 6	198	0	-8.53
Stage 6	197.8	-1.71	-8.53
Stage 6	197.6	-5.6	-19.47
Stage 6	197.4	-11.6	-29.97
Stage 6	197.2	-19.6	-40
Stage 6	197	-8.02	57.89
Stage 6	196.8	1.79	49.05
Stage 6	196.6	9.96	40.83
Stage 6	196.4	16.6	33.21
Stage 6	196.2	21.83	26.16
Stage 6	196	25.76	19.63
Stage 6	195.8	28.46	13.54
Stage 6	195.6	30.03	7.81
Stage 6	195.4	30.52	2.48
Stage 6	195.2	30.13	-1.98
Stage 6	195	28.96	-5.83
Stage 6	194.8	27.1	-9.31
Stage 6	194.7	25.92	-11.81
Stage 6	194.5	23.06	-14.31
Stage 6	194.3	19.5	-17.8
Stage 6	194.1	15.17	-21.61
Stage 6	193.9	11.22	-19.76
Stage 6	193.7	7.76	-17.28
Stage 6	193.5	4.84	-14.63
Stage 6	193.3	2.44	-12.01
Stage 6	193.1	0.53	-9.55
Stage 6	192.9	-0.94	-7.32
Stage 6	192.7	-2.01	-5.37
Stage 6	192.5	-2.75	-3.7
Stage 6	192.3	-3.21	-2.32
Stage 6	192.2	-3.36	-1.48
Stage 6	192	-3.51	-0.73
Stage 6	191.8	-3.5	0.04
Stage 6	191.6	-3.38	0.61
Stage 6	191.4	-3.17	1.02
Stage 6	191.2	-2.92	1.28
Stage 6	191	-2.63	1.43
Stage 6	190.8	-2.34	1.49
Stage 6	190.6	-2.04	1.48
Stage 6	190.4	-1.75	1.43
Stage 6	190.2	-1.48	1.36
Stage 6	190	-1.23	1.27
Stage 6	189.8	-0.99	1.17
Stage 6	189.7	-0.88	1.11
Stage 6	189.5	-0.67	1.05
Stage 6	189.3	-0.47	0.99
Stage 6	189.1	-0.28	0.95
Stage 6	188.9	-0.1	0.94
Stage 6	188.7	0.09	0.95
Stage 6	188.5	0.29	0.99
Stage 6	188.3	0.5	1.06
Stage 6	188.1	0.73	1.14
Stage 6	187.9	0.98	1.23
Stage 6	187.7	1.24	1.31
Stage 6	187.5	1.52	1.39
Stage 6	187.3	1.81	1.44
Stage 6	187.1	2.09	1.45
Stage 6	186.9	2.37	1.4
Stage 6	186.7	2.63	1.27
Stage 6	186.5	2.83	1.03
Stage 6	186.3	2.97	0.66
Stage 6	186.1	2.99	0.13
Stage 6	185.9	2.87	-0.59
Stage 6	185.7	2.56	-1.55
Stage 6	185.5	2.01	-2.75
Stage 6	185.3	1.17	-4.24
Stage 6	185.1	-0.04	-6.04

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 6	184.9	-1.67	-8.15
Stage 6	184.7	-2.72	-5.25
Stage 6	184.5	-3.31	-2.94
Stage 6	184.3	-3.54	-1.17
Stage 6	184.1	-3.52	0.12
Stage 6	183.9	-3.32	1.01
Stage 6	183.7	-3	1.58
Stage 6	183.5	-2.62	1.89
Stage 6	183.3	-2.22	2.01
Stage 6	183.1	-1.82	1.98
Stage 6	182.9	-1.46	1.85
Stage 6	182.7	-1.12	1.65
Stage 6	182.5	-0.84	1.43
Stage 6	182.3	-0.6	1.19
Stage 6	182.1	-0.41	0.96
Stage 6	181.9	-0.26	0.74
Stage 6	181.7	-0.15	0.54
Stage 6	181.5	-0.08	0.37
Stage 6	181.3	-0.03	0.23
Stage 6	181.1	-0.01	0.12
Stage 6	180.9	0	0.05
Stage 6	180.7	0	0
Stage 6	180.5	0	-0.01

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 6	198.7	0	0
Stage 6	198.5	0	0
Stage 6	198.5	0	0
Stage 6	198.3	0	0
Stage 6	198.3	0	0
Stage 6	198.1	0	0
Stage 6	198.1	0	0
Stage 6	198	0	0

4.2.7. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 7

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 7	198	0	-7.87
Stage 7	197.8	-1.57	-7.87
Stage 7	197.6	-5.27	-18.49
Stage 7	197.4	-11.08	-29.06
Stage 7	197.2	-18.96	-39.36
Stage 7	197	-7.82	55.68
Stage 7	196.8	1.34	45.8
Stage 7	196.6	8.55	36.08
Stage 7	196.4	13.86	26.53
Stage 7	196.2	17.28	17.12
Stage 7	196	18.85	7.8
Stage 7	195.8	18.55	-1.49
Stage 7	195.6	16.39	-10.81
Stage 7	195.4	12.34	-20.25
Stage 7	195.2	6.36	-29.86
Stage 7	195	-1.58	-39.7
Stage 7	194.8	-11.5	-49.63
Stage 7	194.7	-17.2	-57
Stage 7	194.5	-8.69	42.56
Stage 7	194.3	-2.11	32.88
Stage 7	194.1	2.54	23.27
Stage 7	193.9	5.79	16.28
Stage 7	193.7	7.96	10.85
Stage 7	193.5	9.28	6.56
Stage 7	193.3	9.92	3.22
Stage 7	193.1	10.05	0.65
Stage 7	192.9	9.8	-1.27
Stage 7	192.7	9.26	-2.65
Stage 7	192.5	8.54	-3.6
Stage 7	192.3	7.71	-4.18
Stage 7	192.2	7.27	-4.41
Stage 7	192	6.36	-4.55
Stage 7	191.8	5.45	-4.54
Stage 7	191.6	4.57	-4.39
Stage 7	191.4	3.75	-4.13
Stage 7	191.2	2.99	-3.79
Stage 7	191	2.3	-3.42
Stage 7	190.8	1.7	-3.02
Stage 7	190.6	1.18	-2.61
Stage 7	190.4	0.74	-2.21
Stage 7	190.2	0.37	-1.82
Stage 7	190	0.08	-1.45
Stage 7	189.8	-0.14	-1.1
Stage 7	189.7	-0.23	-0.86
Stage 7	189.5	-0.35	-0.62
Stage 7	189.3	-0.42	-0.33
Stage 7	189.1	-0.43	-0.05
Stage 7	188.9	-0.38	0.21
Stage 7	188.7	-0.29	0.45
Stage 7	188.5	-0.16	0.68
Stage 7	188.3	0.02	0.9
Stage 7	188.1	0.24	1.1
Stage 7	187.9	0.5	1.28
Stage 7	187.7	0.78	1.44
Stage 7	187.5	1.1	1.56
Stage 7	187.3	1.42	1.64
Stage 7	187.1	1.76	1.66
Stage 7	186.9	2.08	1.62
Stage 7	186.7	2.38	1.48
Stage 7	186.5	2.63	1.24
Stage 7	186.3	2.8	0.86
Stage 7	186.1	2.86	0.31
Stage 7	185.9	2.77	-0.44
Stage 7	185.7	2.49	-1.41
Stage 7	185.5	1.96	-2.63
Stage 7	185.3	1.14	-4.14
Stage 7	185.1	-0.05	-5.95

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 7	184.9	-1.67	-8.07
Stage 7	184.7	-2.71	-5.19
Stage 7	184.5	-3.29	-2.9
Stage 7	184.3	-3.52	-1.15
Stage 7	184.1	-3.49	0.13
Stage 7	183.9	-3.29	1.01
Stage 7	183.7	-2.97	1.58
Stage 7	183.5	-2.6	1.88
Stage 7	183.3	-2.2	1.99
Stage 7	183.1	-1.81	1.96
Stage 7	182.9	-1.44	1.83
Stage 7	182.7	-1.11	1.64
Stage 7	182.5	-0.83	1.42
Stage 7	182.3	-0.59	1.18
Stage 7	182.1	-0.4	0.95
Stage 7	181.9	-0.26	0.73
Stage 7	181.7	-0.15	0.53
Stage 7	181.5	-0.08	0.37
Stage 7	181.3	-0.03	0.23
Stage 7	181.1	-0.01	0.12
Stage 7	180.9	0	0.05
Stage 7	180.7	0	0
Stage 7	180.5	0	-0.01

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 7	198.7	0	0
Stage 7	198.5	0	0
Stage 7	198.5	0	0
Stage 7	198.3	0	0
Stage 7	198.3	0	0
Stage 7	198.1	0	0
Stage 7	198.1	0	0
Stage 7	198	0	0

4.2.8. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 8

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 8	198	0	-8.72
Stage 8	197.8	-1.74	-8.72
Stage 8	197.6	-5.75	-20.04
Stage 8	197.4	-11.96	-31.04
Stage 8	197.2	-20.3	-41.7
Stage 8	197	-10.17	50.63
Stage 8	196.8	-2.07	40.51
Stage 8	196.6	4.05	30.63
Stage 8	196.4	8.25	20.99
Stage 8	196.2	10.56	11.55
Stage 8	196	11.04	2.41
Stage 8	195.8	9.75	-6.45
Stage 8	195.6	6.74	-15.07
Stage 8	195.4	2.04	-23.49
Stage 8	195.2	-4.31	-31.75
Stage 8	195	-12.28	-39.88
Stage 8	194.8	-21.82	-47.71
Stage 8	194.7	-27.14	-53.18
Stage 8	194.5	-15.82	56.62
Stage 8	194.3	-5.79	50.14
Stage 8	194.1	3.05	44.22
Stage 8	193.9	10.82	38.84
Stage 8	193.7	17.61	33.95
Stage 8	193.5	23.51	29.47
Stage 8	193.3	28.43	24.65
Stage 8	193.1	32.33	19.48
Stage 8	192.9	35.13	13.98
Stage 8	192.7	36.75	8.14
Stage 8	192.5	37.14	1.96
Stage 8	192.3	36.23	-4.56
Stage 8	192.2	35.26	-9.7
Stage 8	192	32.27	-14.97
Stage 8	191.8	27.8	-22.33
Stage 8	191.6	21.8	-30.03
Stage 8	191.4	16.08	-28.61
Stage 8	191.2	10.85	-26.15
Stage 8	191	6.23	-23.1
Stage 8	190.8	2.29	-19.66
Stage 8	190.6	-0.9	-15.99
Stage 8	190.4	-3.42	-12.6
Stage 8	190.2	-5.33	-9.54
Stage 8	190	-6.7	-6.83
Stage 8	189.8	-7.59	-4.45
Stage 8	189.7	-7.88	-2.92
Stage 8	189.5	-8.18	-1.5
Stage 8	189.3	-8.17	0.09
Stage 8	189.1	-7.88	1.41
Stage 8	188.9	-7.38	2.5
Stage 8	188.7	-6.71	3.37
Stage 8	188.5	-5.9	4.07
Stage 8	188.3	-4.97	4.61
Stage 8	188.1	-3.97	5.01
Stage 8	187.9	-2.92	5.27
Stage 8	187.7	-1.84	5.39
Stage 8	187.5	-0.76	5.39
Stage 8	187.3	0.29	5.26
Stage 8	187.1	1.29	5.01
Stage 8	186.9	2.21	4.62
Stage 8	186.7	3.03	4.07
Stage 8	186.5	3.69	3.34
Stage 8	186.3	4.17	2.4
Stage 8	186.1	4.42	1.22
Stage 8	185.9	4.37	-0.25
Stage 8	185.7	3.96	-2.03
Stage 8	185.5	3.13	-4.17
Stage 8	185.3	1.79	-6.7
Stage 8	185.1	-0.14	-9.64

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 8	184.9	-2.74	-13.02
Stage 8	184.7	-4.48	-8.68
Stage 8	184.5	-5.52	-5.18
Stage 8	184.3	-6	-2.43
Stage 8	184.1	-6.07	-0.36
Stage 8	183.9	-5.85	1.13
Stage 8	183.7	-5.42	2.14
Stage 8	183.5	-4.87	2.77
Stage 8	183.3	-4.25	3.08
Stage 8	183.1	-3.62	3.16
Stage 8	182.9	-3	3.07
Stage 8	182.7	-2.43	2.86
Stage 8	182.5	-1.92	2.57
Stage 8	182.3	-1.47	2.25
Stage 8	182.1	-1.09	1.91
Stage 8	181.9	-0.77	1.57
Stage 8	181.7	-0.52	1.25
Stage 8	181.5	-0.33	0.96
Stage 8	181.3	-0.19	0.7
Stage 8	181.1	-0.09	0.48
Stage 8	180.9	-0.04	0.29
Stage 8	180.7	-0.01	0.15
Stage 8	180.5	0	0.04

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 8	198.7	0	0
Stage 8	198.5	0	0
Stage 8	198.5	0	0
Stage 8	198.3	0	0
Stage 8	198.3	0	0
Stage 8	198.1	0	0
Stage 8	198.1	0	0
Stage 8	198	0	0

4.2.9. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 9

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 9	198	0	-8.2
Stage 9	197.8	-1.64	-8.2
Stage 9	197.6	-5.42	-18.89
Stage 9	197.4	-11.29	-29.34
Stage 9	197.2	-19.19	-39.51
Stage 9	197	-8.32	54.36
Stage 9	196.8	0.6	44.57
Stage 9	196.6	7.59	34.95
Stage 9	196.4	12.68	25.48
Stage 9	196.2	15.91	16.12
Stage 9	196	17.29	6.93
Stage 9	195.8	16.87	-2.09
Stage 9	195.6	14.67	-11.02
Stage 9	195.4	10.69	-19.91
Stage 9	195.2	4.92	-28.83
Stage 9	195	-2.65	-37.84
Stage 9	194.8	-12	-46.77
Stage 9	194.7	-17.33	-53.27
Stage 9	194.5	-7.16	50.87
Stage 9	194.3	1.36	42.57
Stage 9	194.1	8.26	34.5
Stage 9	193.9	13.58	26.62
Stage 9	193.7	17.35	18.86
Stage 9	193.5	19.58	11.12
Stage 9	193.3	20.12	2.68
Stage 9	193.1	18.82	-6.45
Stage 9	192.9	15.57	-16.27
Stage 9	192.7	10.23	-26.71
Stage 9	192.5	2.68	-37.74
Stage 9	192.3	-7.17	-49.27
Stage 9	192.2	-12.99	-58.22
Stage 9	192	-5.07	39.61
Stage 9	191.8	0.39	27.3
Stage 9	191.6	3.36	14.88
Stage 9	191.4	5.15	8.93
Stage 9	191.2	6.07	4.63
Stage 9	191	6.38	1.56
Stage 9	190.8	6.3	-0.44
Stage 9	190.6	5.99	-1.54
Stage 9	190.4	5.54	-2.27
Stage 9	190.2	5	-2.7
Stage 9	190	4.42	-2.89
Stage 9	189.8	3.84	-2.89
Stage 9	189.7	3.56	-2.78
Stage 9	189.5	3.04	-2.62
Stage 9	189.3	2.57	-2.31
Stage 9	189.1	2.19	-1.92
Stage 9	188.9	1.9	-1.47
Stage 9	188.7	1.7	-0.98
Stage 9	188.5	1.61	-0.47
Stage 9	188.3	1.62	0.05
Stage 9	188.1	1.73	0.56
Stage 9	187.9	1.94	1.02
Stage 9	187.7	2.22	1.42
Stage 9	187.5	2.57	1.74
Stage 9	187.3	2.96	1.96
Stage 9	187.1	3.37	2.07
Stage 9	186.9	3.78	2.04
Stage 9	186.7	4.15	1.84
Stage 9	186.5	4.44	1.44
Stage 9	186.3	4.6	0.81
Stage 9	186.1	4.58	-0.09
Stage 9	185.9	4.32	-1.31
Stage 9	185.7	3.75	-2.87
Stage 9	185.5	2.78	-4.82
Stage 9	185.3	1.35	-7.18
Stage 9	185.1	-0.65	-10

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 9	184.9	-3.31	-13.27
Stage 9	184.7	-5.06	-8.76
Stage 9	184.5	-6.09	-5.13
Stage 9	184.3	-6.54	-2.29
Stage 9	184.1	-6.57	-0.15
Stage 9	183.9	-6.3	1.38
Stage 9	183.7	-5.81	2.41
Stage 9	183.5	-5.21	3.04
Stage 9	183.3	-4.54	3.34
Stage 9	183.1	-3.86	3.41
Stage 9	182.9	-3.2	3.29
Stage 9	182.7	-2.59	3.06
Stage 9	182.5	-2.04	2.75
Stage 9	182.3	-1.56	2.4
Stage 9	182.1	-1.15	2.03
Stage 9	181.9	-0.82	1.67
Stage 9	181.7	-0.55	1.33
Stage 9	181.5	-0.35	1.02
Stage 9	181.3	-0.2	0.74
Stage 9	181.1	-0.1	0.5
Stage 9	180.9	-0.04	0.31
Stage 9	180.7	-0.01	0.15
Stage 9	180.5	0	0.04

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 9	198.7	0	0
Stage 9	198.5	0	0
Stage 9	198.5	0	0
Stage 9	198.3	0	0
Stage 9	198.3	0	0
Stage 9	198.1	0	0
Stage 9	198.1	0	0
Stage 9	198	0	0

4.2.10. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 10

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 10	198	0	-8.45
Stage 10	197.8	-1.69	-8.45
Stage 10	197.6	-5.59	-19.52
Stage 10	197.4	-11.67	-30.37
Stage 10	197.2	-19.87	-41
Stage 10	197	-9.75	50.57
Stage 10	196.8	-1.68	40.38
Stage 10	196.6	4.4	30.4
Stage 10	196.4	8.52	20.61
Stage 10	196.2	10.72	11
Stage 10	196	11.02	1.51
Stage 10	195.8	9.44	-7.9
Stage 10	195.6	5.98	-17.31
Stage 10	195.4	0.63	-26.77
Stage 10	195.2	-6.62	-36.26
Stage 10	195	-15.77	-45.76
Stage 10	194.8	-26.8	-55.12
Stage 10	194.7	-32.98	-61.85
Stage 10	194.5	-24.76	41.11
Stage 10	194.3	-18.22	32.72
Stage 10	194.1	-13.27	24.77
Stage 10	193.9	-9.82	17.23
Stage 10	193.7	-7.8	10.09
Stage 10	193.5	-7.14	3.31
Stage 10	193.3	-7.9	-3.81
Stage 10	193.1	-10.14	-11.19
Stage 10	192.9	-13.89	-18.75
Stage 10	192.7	-19.17	-26.41
Stage 10	192.5	-25.98	-34.03
Stage 10	192.3	-34.28	-41.5
Stage 10	192.2	-38.96	-46.85
Stage 10	192	-20.84	90.64
Stage 10	191.8	-4.18	83.28
Stage 10	191.6	10.94	75.58
Stage 10	191.4	24.45	67.55
Stage 10	191.2	36.28	59.17
Stage 10	191	46.37	50.46
Stage 10	190.8	54.66	41.41
Stage 10	190.6	61.06	32.03
Stage 10	190.4	65.52	22.3
Stage 10	190.2	67.97	12.24
Stage 10	190	68.34	1.84
Stage 10	189.8	66.56	-8.89
Stage 10	189.7	64.84	-17.2
Stage 10	189.5	59.72	-25.63
Stage 10	189.3	52.27	-37.21
Stage 10	189.1	42.45	-49.13
Stage 10	188.9	33.13	-46.56
Stage 10	188.7	24.57	-42.84
Stage 10	188.5	16.86	-38.53
Stage 10	188.3	10.08	-33.88
Stage 10	188.1	4.28	-29.03
Stage 10	187.9	-0.58	-24.3
Stage 10	187.7	-4.53	-19.73
Stage 10	187.5	-7.59	-15.33
Stage 10	187.3	-9.82	-11.11
Stage 10	187.1	-11.23	-7.08
Stage 10	186.9	-11.9	-3.34
Stage 10	186.7	-12	-0.5
Stage 10	186.5	-11.71	1.45
Stage 10	186.3	-11.2	2.54
Stage 10	186.1	-10.65	2.77
Stage 10	185.9	-10.22	2.14
Stage 10	185.7	-10.08	0.68
Stage 10	185.5	-10.41	-1.61
Stage 10	185.3	-11.35	-4.73
Stage 10	185.1	-13.08	-8.66

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 10	184.9	-15.76	-13.36
Stage 10	184.7	-17.13	-6.88
Stage 10	184.5	-17.49	-1.79
Stage 10	184.3	-17.08	2.05
Stage 10	184.1	-16.12	4.81
Stage 10	183.9	-14.79	6.65
Stage 10	183.7	-13.24	7.75
Stage 10	183.5	-11.59	8.26
Stage 10	183.3	-9.93	8.3
Stage 10	183.1	-8.33	8
Stage 10	182.9	-6.84	7.46
Stage 10	182.7	-5.48	6.76
Stage 10	182.5	-4.29	5.96
Stage 10	182.3	-3.27	5.13
Stage 10	182.1	-2.4	4.31
Stage 10	181.9	-1.7	3.52
Stage 10	181.7	-1.14	2.78
Stage 10	181.5	-0.72	2.12
Stage 10	181.3	-0.41	1.54
Stage 10	181.1	-0.2	1.04
Stage 10	180.9	-0.08	0.63
Stage 10	180.7	-0.01	0.31
Stage 10	180.5	0	0.07

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 10	198.7	0	0
Stage 10	198.5	0	0
Stage 10	198.5	0	0
Stage 10	198.3	0	0
Stage 10	198.3	0	0
Stage 10	198.1	0	0
Stage 10	198.1	0	0
Stage 10	198	0	0

4.2.11. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 11

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 11	198	0	-8.43
Stage 11	197.8	-1.69	-8.43
Stage 11	197.6	-5.58	-19.45
Stage 11	197.4	-11.63	-30.24
Stage 11	197.2	-19.78	-40.78
Stage 11	197	-9.52	51.29
Stage 11	196.8	-1.28	41.23
Stage 11	196.6	5	31.39
Stage 11	196.4	9.35	21.77
Stage 11	196.2	11.82	12.33
Stage 11	196	12.43	3.04
Stage 11	195.8	11.19	-6.16
Stage 11	195.6	8.13	-15.34
Stage 11	195.4	3.21	-24.58
Stage 11	195.2	-3.56	-33.83
Stage 11	195	-12.18	-43.11
Stage 11	194.8	-22.63	-52.25
Stage 11	194.7	-28.51	-58.83
Stage 11	194.5	-19.5	45.06
Stage 11	194.3	-12.13	36.84
Stage 11	194.1	-6.33	29.01
Stage 11	193.9	-2.02	21.53
Stage 11	193.7	0.86	14.4
Stage 11	193.5	2.36	7.53
Stage 11	193.3	2.41	0.24
Stage 11	193.1	0.92	-7.44
Stage 11	192.9	-2.17	-15.45
Stage 11	192.7	-6.91	-23.71
Stage 11	192.5	-13.34	-32.13
Stage 11	192.3	-21.46	-40.6
Stage 11	192.2	-26.15	-46.89
Stage 11	192	-10.13	80.08
Stage 11	191.8	4.08	71.07
Stage 11	191.6	16.37	61.43
Stage 11	191.4	26.59	51.13
Stage 11	191.2	34.63	40.17
Stage 11	191	40.34	28.55
Stage 11	190.8	43.59	16.26
Stage 11	190.6	44.25	3.32
Stage 11	190.4	42.2	-10.25
Stage 11	190.2	37.32	-24.41
Stage 11	190	29.5	-39.12
Stage 11	189.8	18.63	-54.31
Stage 11	189.7	12.03	-66.01
Stage 11	189.5	17.84	29.06
Stage 11	189.3	20.45	13.04
Stage 11	189.1	19.82	-3.15
Stage 11	188.9	18.36	-7.32
Stage 11	188.7	16.38	-9.87
Stage 11	188.5	14.12	-11.32
Stage 11	188.3	11.75	-11.88
Stage 11	188.1	9.41	-11.68
Stage 11	187.9	7.2	-11.07
Stage 11	187.7	5.18	-10.07
Stage 11	187.5	3.43	-8.75
Stage 11	187.3	2	-7.14
Stage 11	187.1	0.95	-5.28
Stage 11	186.9	0.28	-3.31
Stage 11	186.7	-0.09	-1.89
Stage 11	186.5	-0.3	-1.05
Stage 11	186.3	-0.46	-0.8
Stage 11	186.1	-0.7	-1.17
Stage 11	185.9	-1.14	-2.2
Stage 11	185.7	-1.92	-3.9
Stage 11	185.5	-3.18	-6.31
Stage 11	185.3	-5.06	-9.43
Stage 11	185.1	-7.72	-13.28

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 11	184.9	-11.29	-17.84
Stage 11	184.7	-13.49	-11
Stage 11	184.5	-14.59	-5.51
Stage 11	184.3	-14.84	-1.24
Stage 11	184.1	-14.45	1.95
Stage 11	183.9	-13.6	4.23
Stage 11	183.7	-12.45	5.74
Stage 11	183.5	-11.13	6.63
Stage 11	183.3	-9.73	7.02
Stage 11	183.1	-8.32	7.03
Stage 11	182.9	-6.97	6.76
Stage 11	182.7	-5.71	6.29
Stage 11	182.5	-4.57	5.7
Stage 11	182.3	-3.56	5.04
Stage 11	182.1	-2.69	4.34
Stage 11	181.9	-1.96	3.65
Stage 11	181.7	-1.37	2.98
Stage 11	181.5	-0.9	2.36
Stage 11	181.3	-0.54	1.79
Stage 11	181.1	-0.28	1.28
Stage 11	180.9	-0.12	0.83
Stage 11	180.7	-0.03	0.45
Stage 11	180.5	0	0.13
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 11	198.7	0	0
Stage 11	198.5	0	0
Stage 11	198.5	0	0
Stage 11	198.3	0	0
Stage 11	198.3	0	0
Stage 11	198.1	0	0
Stage 11	198.1	0	0
Stage 11	198	0	0

4.2.12. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 12

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 12	198	0	-8.4
Stage 12	197.8	-1.68	-8.4
Stage 12	197.6	-5.56	-19.39
Stage 12	197.4	-11.59	-30.16
Stage 12	197.2	-19.73	-40.7
Stage 12	197	-9.46	51.35
Stage 12	196.8	-1.21	41.27
Stage 12	196.6	5.08	31.41
Stage 12	196.4	9.42	21.74
Stage 12	196.2	11.88	12.26
Stage 12	196	12.46	2.9
Stage 12	195.8	11.18	-6.38
Stage 12	195.6	8.05	-15.65
Stage 12	195.4	3.05	-24.98
Stage 12	195.2	-3.82	-34.35
Stage 12	195	-12.57	-43.76
Stage 12	194.8	-23.17	-53.03
Stage 12	194.7	-29.15	-59.73
Stage 12	194.5	-20.47	43.4
Stage 12	194.3	-13.46	35.02
Stage 12	194.1	-8.06	27.02
Stage 12	193.9	-4.19	19.37
Stage 12	193.7	-1.77	12.06
Stage 12	193.5	-0.77	5.03
Stage 12	193.3	-1.25	-2.43
Stage 12	193.1	-3.3	-10.26
Stage 12	192.9	-6.98	-18.39
Stage 12	192.7	-12.33	-26.74
Stage 12	192.5	-19.37	-35.21
Stage 12	192.3	-28.11	-43.68
Stage 12	192.2	-33.1	-49.93
Stage 12	192	-17.54	77.79
Stage 12	191.8	-3.75	68.96
Stage 12	191.6	8.17	59.6
Stage 12	191.4	18.11	49.69
Stage 12	191.2	25.96	39.25
Stage 12	191	31.61	28.28
Stage 12	190.8	34.98	16.82
Stage 12	190.6	35.95	4.88
Stage 12	190.4	34.46	-7.49
Stage 12	190.2	30.41	-20.24
Stage 12	190	23.75	-33.31
Stage 12	189.8	14.42	-46.62
Stage 12	189.7	8.75	-56.71
Stage 12	189.5	20.47	58.61
Stage 12	189.3	29.5	45.11
Stage 12	189.1	35.84	31.71
Stage 12	188.9	39.52	18.43
Stage 12	188.7	40.59	5.31
Stage 12	188.5	39.05	-7.68
Stage 12	188.3	34.86	-20.95
Stage 12	188.1	30.28	-22.89
Stage 12	187.9	25.76	-22.59
Stage 12	187.7	21.44	-21.61
Stage 12	187.5	17.4	-20.22
Stage 12	187.3	13.68	-18.58
Stage 12	187.1	10.32	-16.8
Stage 12	186.9	7.33	-14.95
Stage 12	186.7	4.71	-13.09
Stage 12	186.5	2.46	-11.28
Stage 12	186.3	0.55	-9.53
Stage 12	186.1	-1.17	-8.6
Stage 12	185.9	-2.88	-8.56
Stage 12	185.7	-4.76	-9.42
Stage 12	185.5	-7	-11.21
Stage 12	185.3	-9.79	-13.95
Stage 12	185.1	-13.32	-17.64

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 12	184.9	-17.78	-22.26
Stage 12	184.7	-20.45	-13.38
Stage 12	184.5	-21.7	-6.24
Stage 12	184.3	-21.84	-0.69
Stage 12	184.1	-21.14	3.47
Stage 12	183.9	-19.85	6.44
Stage 12	183.7	-18.17	8.41
Stage 12	183.5	-16.26	9.57
Stage 12	183.3	-14.24	10.07
Stage 12	183.1	-12.23	10.08
Stage 12	182.9	-10.29	9.7
Stage 12	182.7	-8.48	9.07
Stage 12	182.5	-6.82	8.25
Stage 12	182.3	-5.36	7.33
Stage 12	182.1	-4.08	6.37
Stage 12	181.9	-3	5.4
Stage 12	181.7	-2.11	4.46
Stage 12	181.5	-1.4	3.57
Stage 12	181.3	-0.85	2.74
Stage 12	181.1	-0.45	1.99
Stage 12	180.9	-0.19	1.32
Stage 12	180.7	-0.04	0.73
Stage 12	180.5	0	0.22

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 12	198.7	0	0
Stage 12	198.5	0	0
Stage 12	198.5	0	0
Stage 12	198.3	0	0
Stage 12	198.3	0	0
Stage 12	198.1	0	0
Stage 12	198.1	0	0
Stage 12	198	0	0

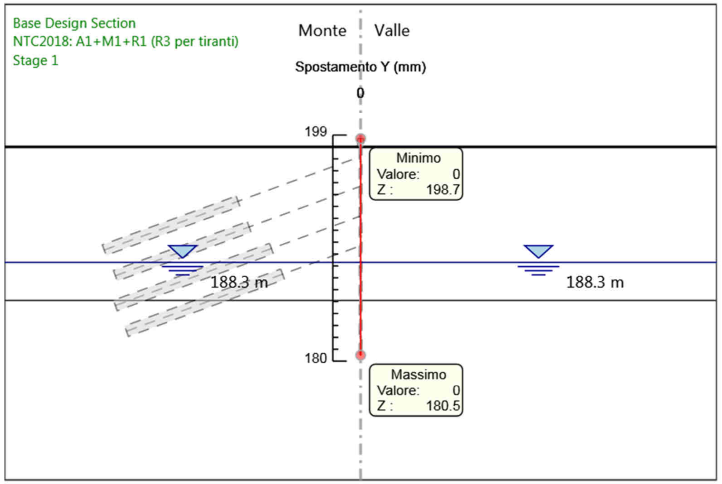
4.2.13. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 13

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 13	198	0	-7.43
Stage 13	197.8	-1.49	-7.43
Stage 13	197.6	-5.06	-17.86
Stage 13	197.4	-10.69	-28.19
Stage 13	197.2	-18.36	-38.34
Stage 13	197	-8.5	49.32
Stage 13	196.8	-0.58	39.58
Stage 13	196.6	5.42	30.03
Stage 13	196.4	9.56	20.69
Stage 13	196.2	11.87	11.53
Stage 13	196	12.37	2.49
Stage 13	195.8	11.07	-6.47
Stage 13	195.6	7.99	-15.41
Stage 13	195.4	3.11	-24.4
Stage 13	195.2	-3.58	-33.43
Stage 13	195	-12.07	-42.48
Stage 13	194.8	-22.35	-51.39
Stage 13	194.7	-28.13	-57.8
Stage 13	194.5	-19.88	41.26
Stage 13	194.3	-13.23	33.27
Stage 13	194.1	-8.1	25.65
Stage 13	193.9	-4.41	18.41
Stage 13	193.7	-2.11	11.51
Stage 13	193.5	-1.14	4.89
Stage 13	193.3	-1.56	-2.15
Stage 13	193.1	-3.47	-9.54
Stage 13	192.9	-6.92	-17.23
Stage 13	192.7	-11.95	-25.13
Stage 13	192.5	-18.57	-33.14
Stage 13	192.3	-26.8	-41.13
Stage 13	192.2	-31.5	-47.01
Stage 13	192	-16.53	74.86
Stage 13	191.8	-3.22	66.52
Stage 13	191.6	8.31	57.65
Stage 13	191.4	17.95	48.24
Stage 13	191.2	25.61	38.3
Stage 13	191	31.18	27.83
Stage 13	190.8	34.55	16.87
Stage 13	190.6	35.64	5.44
Stage 13	190.4	34.36	-6.41
Stage 13	190.2	30.63	-18.65
Stage 13	190	24.39	-31.19
Stage 13	189.8	15.6	-43.97
Stage 13	189.7	10.23	-53.67
Stage 13	189.5	21.32	55.45
Stage 13	189.3	29.82	42.49
Stage 13	189.1	35.74	29.61
Stage 13	188.9	39.11	16.87
Stage 13	188.7	39.97	4.27
Stage 13	188.5	38.33	-8.19
Stage 13	188.3	34.14	-20.94
Stage 13	188.1	29.56	-22.92
Stage 13	187.9	25.03	-22.66
Stage 13	187.7	20.69	-21.71
Stage 13	187.5	16.62	-20.34
Stage 13	187.3	12.88	-18.71
Stage 13	187.1	9.49	-16.92
Stage 13	186.9	6.48	-15.04
Stage 13	186.7	3.86	-13.13
Stage 13	186.5	1.61	-11.24
Stage 13	186.3	-0.27	-9.4
Stage 13	186.1	-1.94	-8.35
Stage 13	185.9	-3.57	-8.14
Stage 13	185.7	-5.33	-8.8
Stage 13	185.5	-7.4	-10.35
Stage 13	185.3	-9.96	-12.81
Stage 13	185.1	-13.2	-16.18

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 13	184.9	-17.29	-20.45
Stage 13	184.7	-19.7	-12.07
Stage 13	184.5	-20.77	-5.37
Stage 13	184.3	-20.81	-0.18
Stage 13	184.1	-20.07	3.69
Stage 13	183.9	-18.78	6.43
Stage 13	183.7	-17.14	8.23
Stage 13	183.5	-15.29	9.26
Stage 13	183.3	-13.35	9.67
Stage 13	183.1	-11.43	9.62
Stage 13	182.9	-9.59	9.22
Stage 13	182.7	-7.87	8.57
Stage 13	182.5	-6.32	7.77
Stage 13	182.3	-4.94	6.88
Stage 13	182.1	-3.75	5.94
Stage 13	181.9	-2.75	5.02
Stage 13	181.7	-1.92	4.12
Stage 13	181.5	-1.27	3.28
Stage 13	181.3	-0.77	2.51
Stage 13	181.1	-0.41	1.81
Stage 13	180.9	-0.17	1.19
Stage 13	180.7	-0.04	0.65
Stage 13	180.5	0	0.19

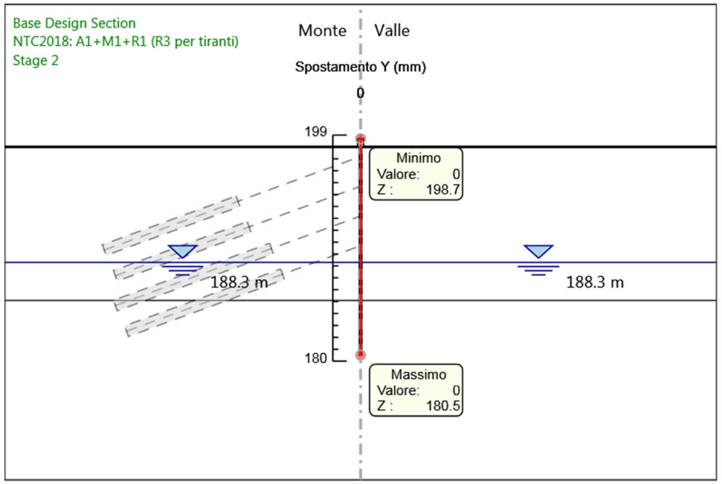
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 13	198.7	0	0
Stage 13	198.5	0	0
Stage 13	198.5	0	0
Stage 13	198.3	0	0
Stage 13	198.3	0	0
Stage 13	198.1	0	0
Stage 13	198.1	0	0
Stage 13	198	0	0

4.2.14. Grafico Spostamento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 1



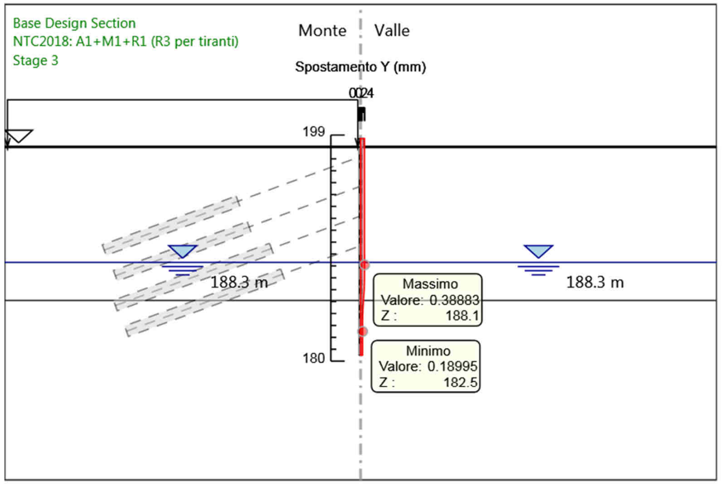
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 1
Spostamento orizzontale

4.2.15. Grafico Spostamento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 2



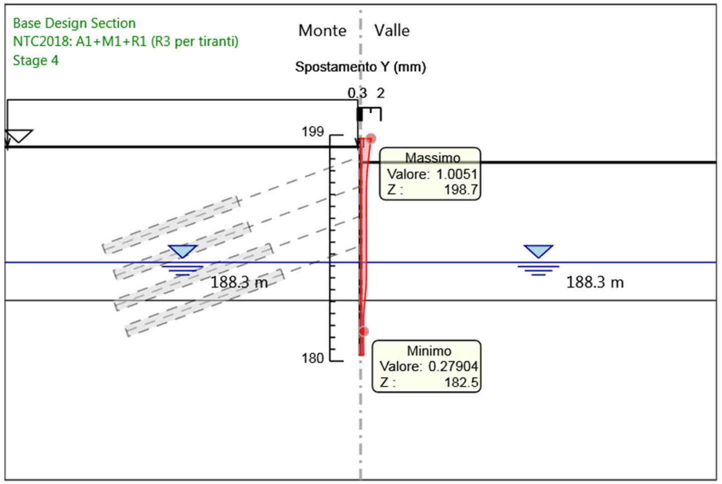
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 2
Spostamento orizzontale

4.2.16. Grafico Spostamento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 3



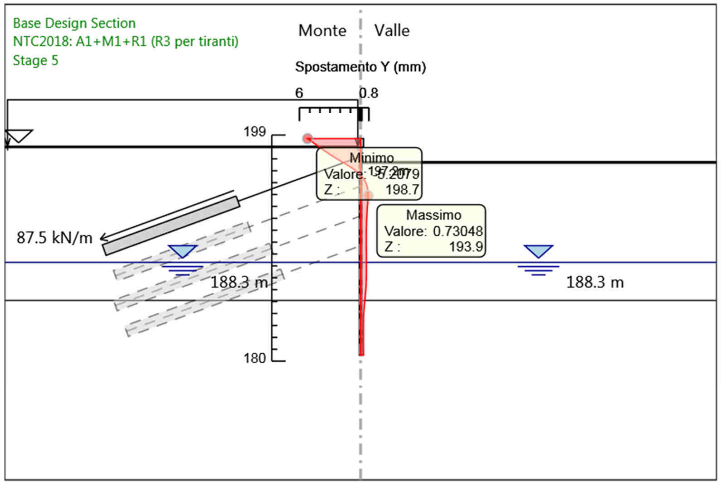
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 3
Spostamento orizzontale

4.2.17. Grafico Spostamento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 4



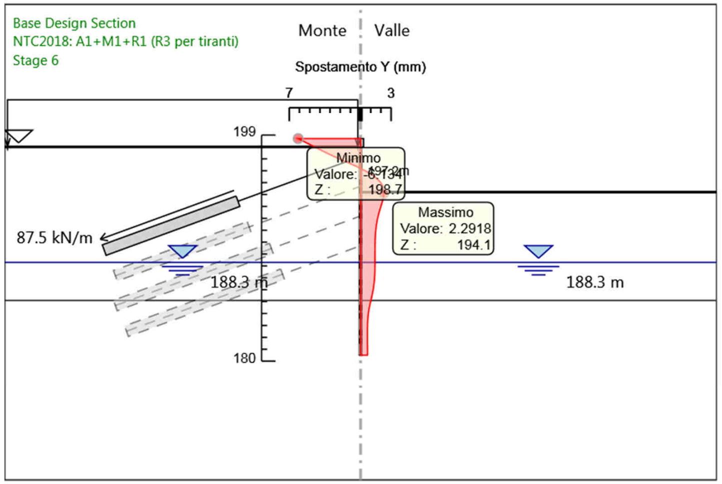
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 4
Spostamento orizzontale

4.2.18. Grafico Spostamento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 5



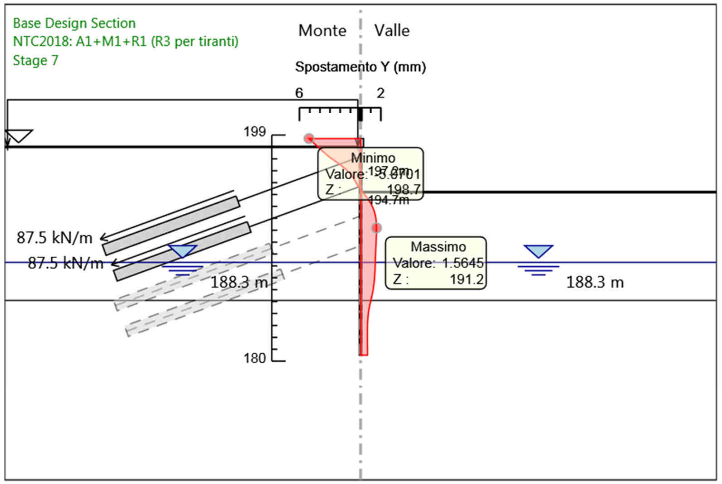
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 5
Spostamento orizzontale

4.2.19. Grafico Spostamento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 6



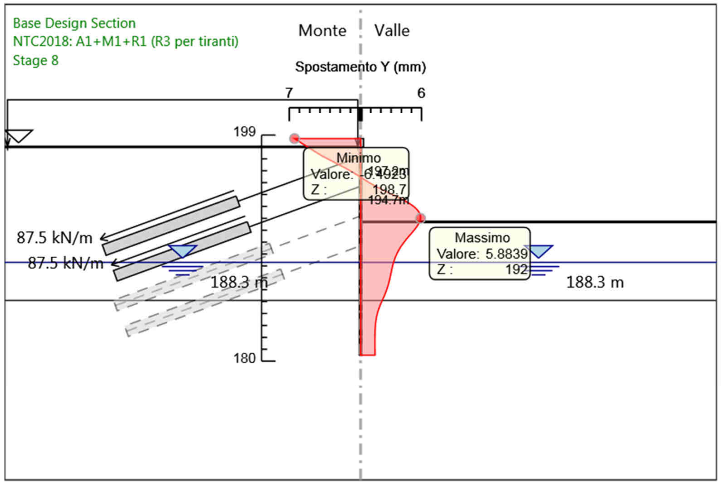
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 6
Spostamento orizzontale

4.2.20. Grafico Spostamento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 7



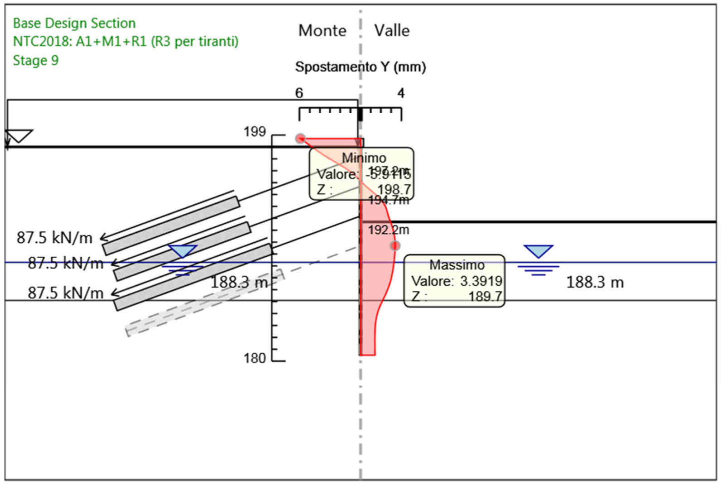
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 7
Spostamento orizzontale

4.2.21. Grafico Spostamento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 8



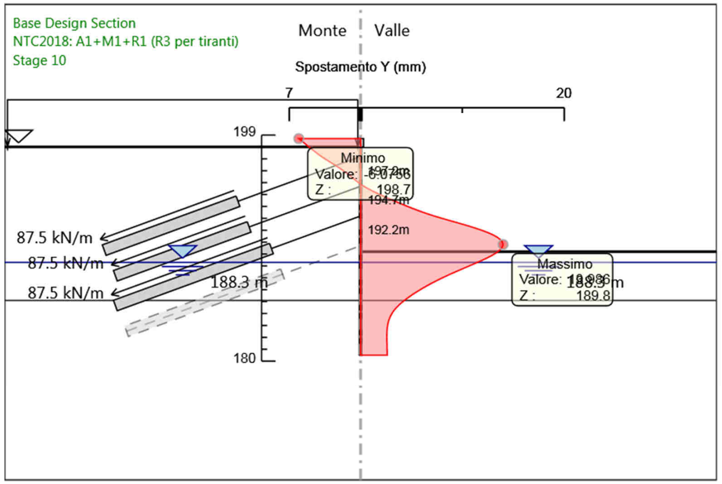
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 8
Spostamento orizzontale

4.2.22. Grafico Spostamento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 9



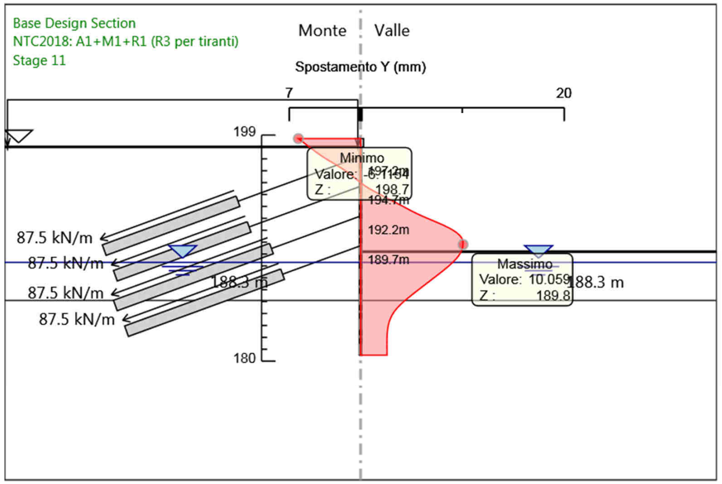
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 9
Spostamento orizzontale

4.2.23. Grafico Spostamento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 10



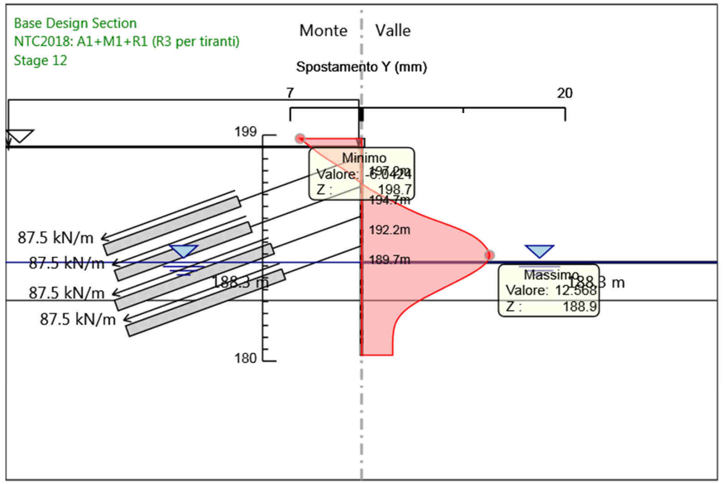
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 10
Spostamento orizzontale

4.2.24. Grafico Spostamento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 11



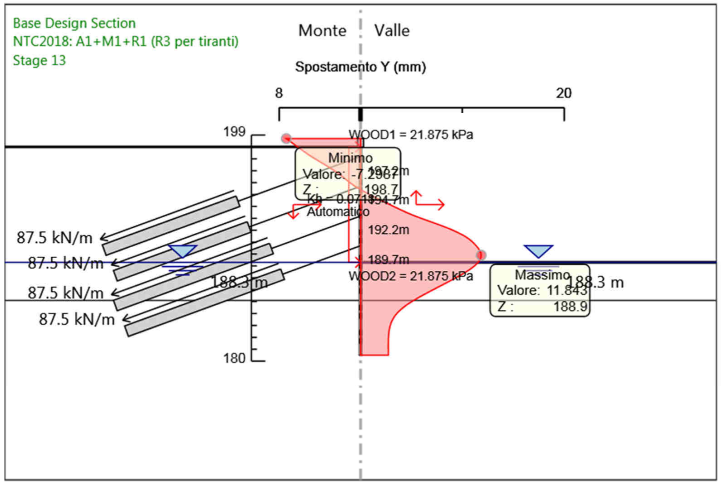
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 11
Spostamento orizzontale

4.2.25. Grafico Spostamento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 12



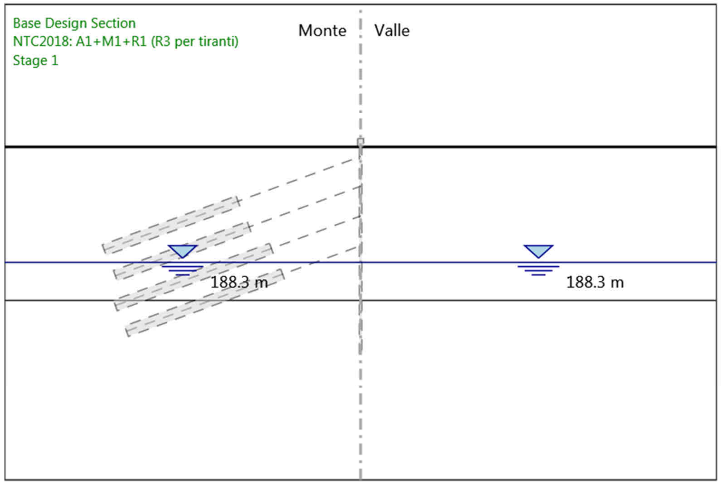
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 12
Spostamento orizzontale

4.2.26. Grafico Spostamento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 13



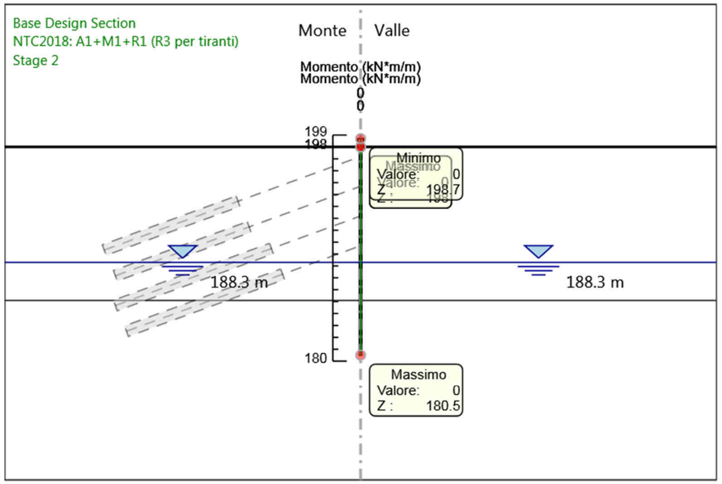
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 13
Spostamento orizzontale

4.2.27. Grafico Risultati Momento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 1



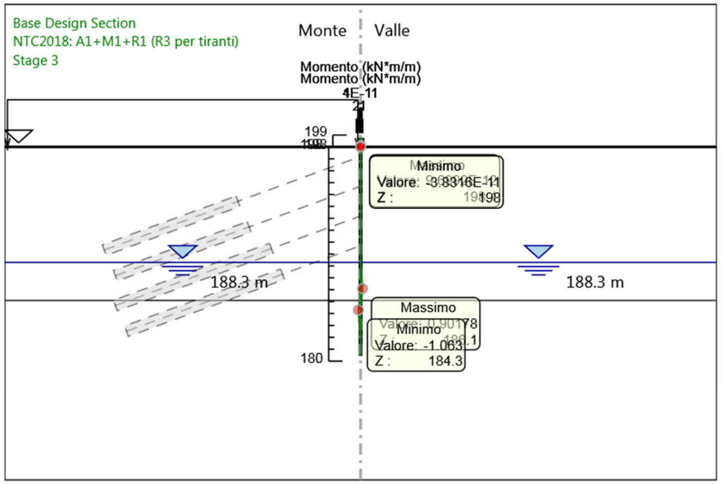
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 1
Momento

4.2.28. Grafico Risultati Momento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 2



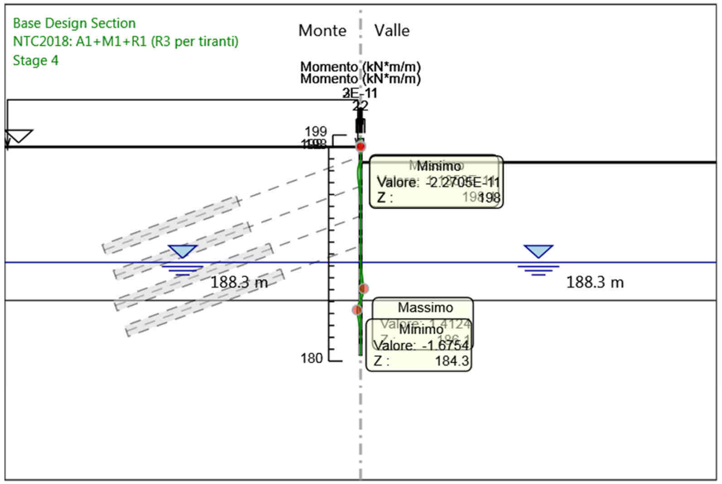
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 2
Momento

4.2.29. Grafico Risultati Momento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 3



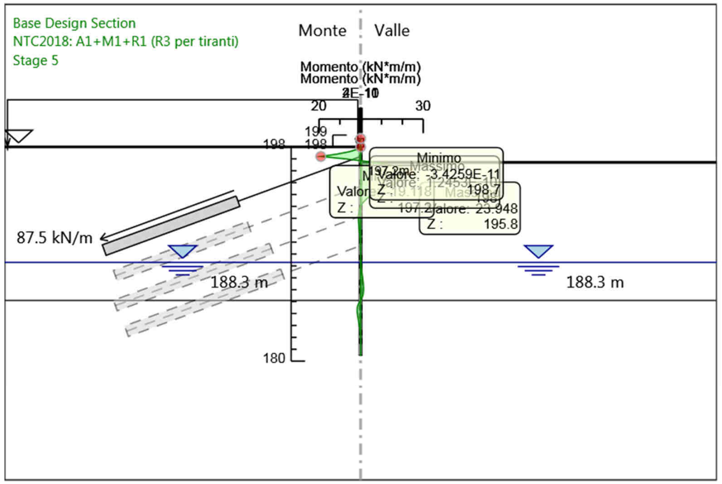
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 3
Momento

4.2.30. Grafico Risultati Momento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 4



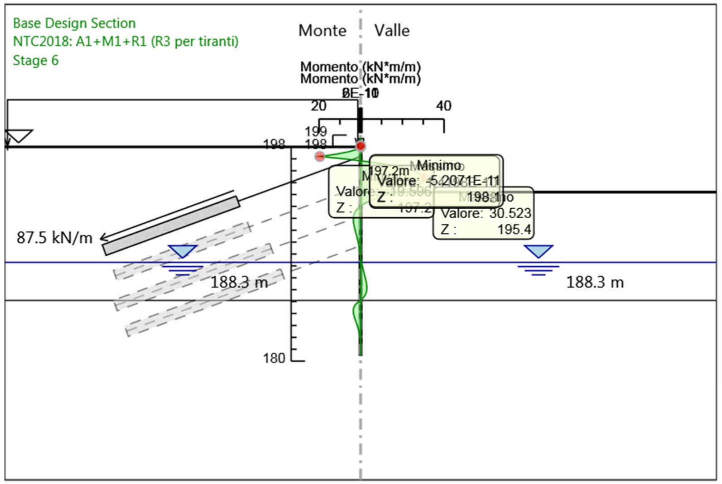
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 4
Momento

4.2.31. Grafico Risultati Momento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 5



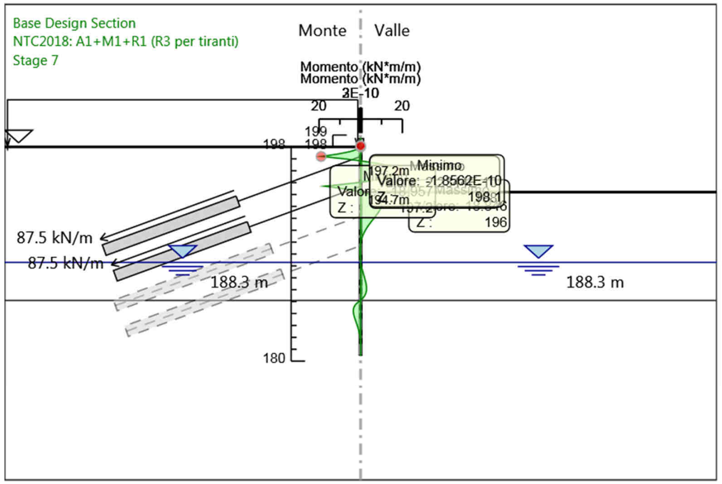
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 5
Momento

4.2.32. Grafico Risultati Momento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 6



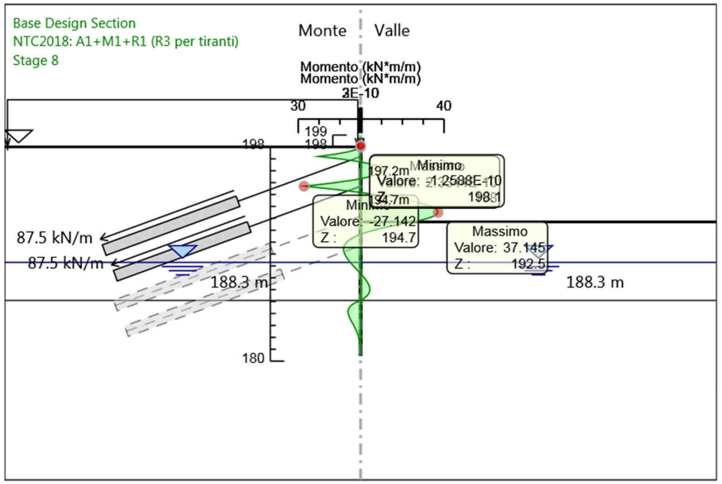
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 6
Momento

4.2.33. Grafico Risultati Momento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 7



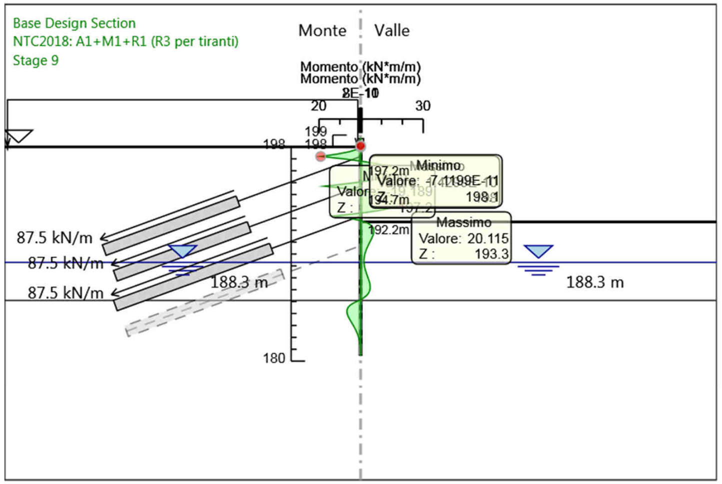
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 7
Momento

4.2.34. Grafico Risultati Momento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 8



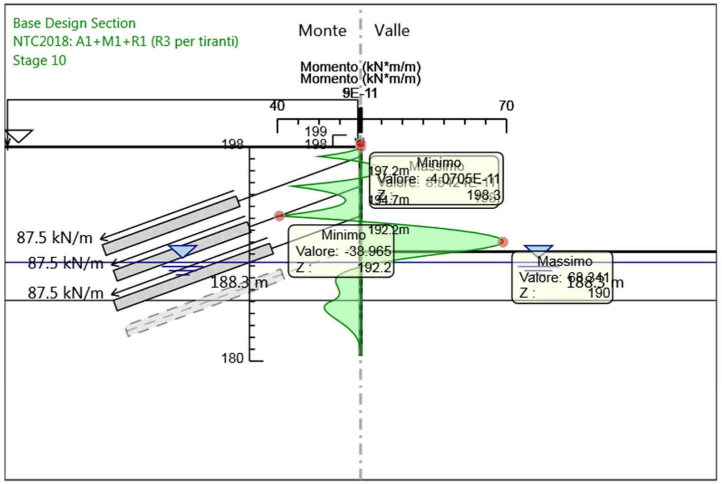
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 8
Momento

4.2.35. Grafico Risultati Momento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 9



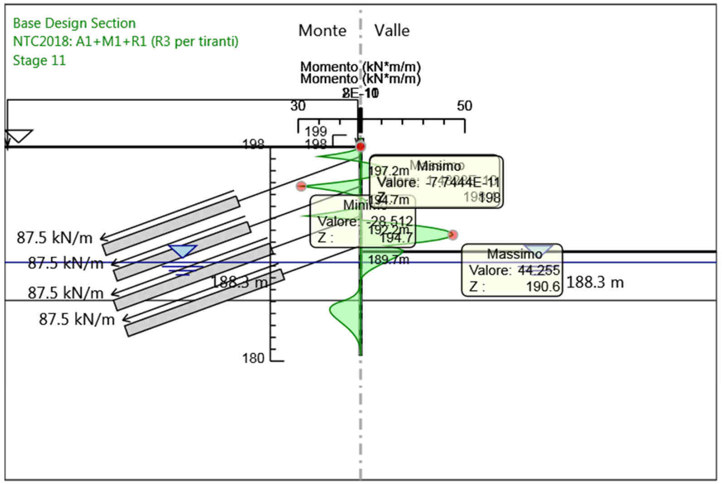
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 9
Momento

4.2.36. Grafico Risultati Momento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 10



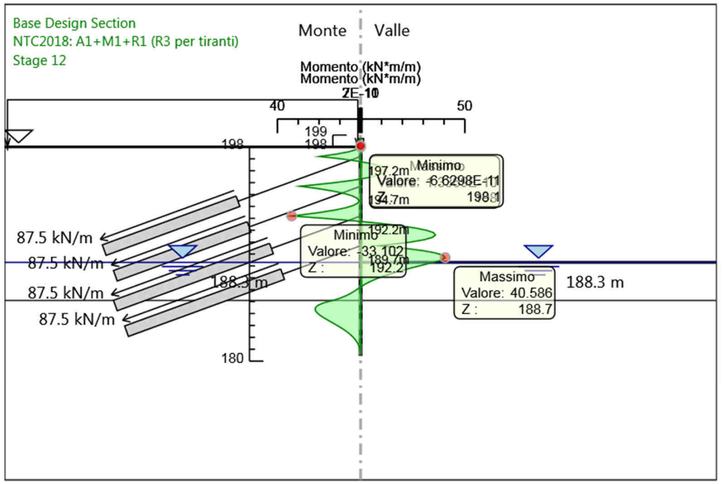
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 10
Momento

4.2.37. Grafico Risultati Momento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 11



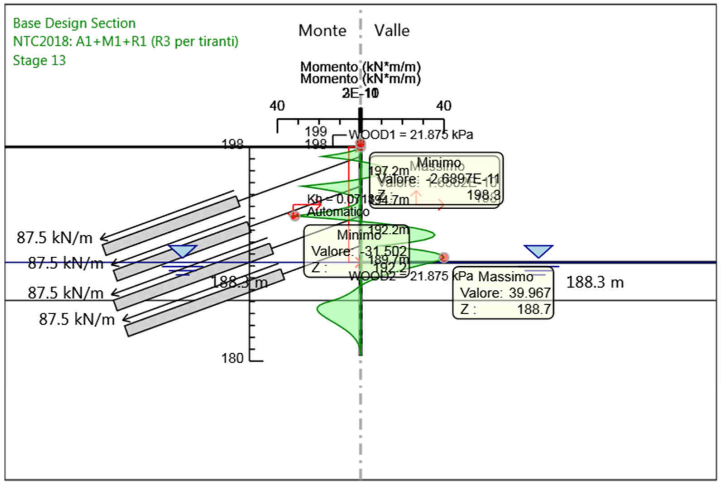
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 11
Momento

4.2.38. Grafico Risultati Momento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 12



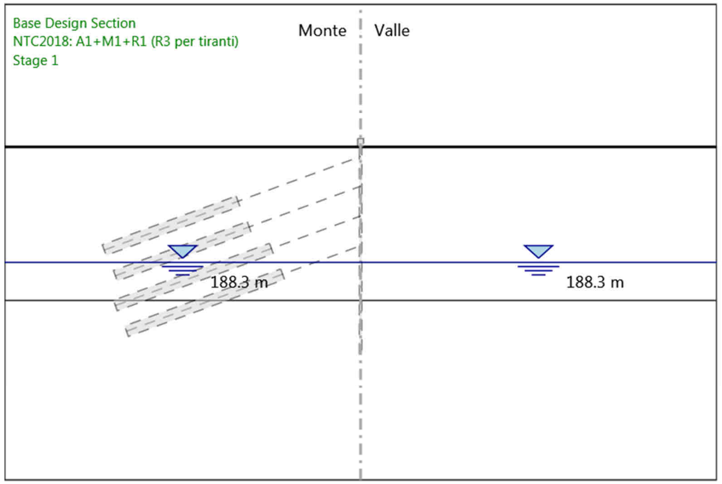
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 12
Momento

4.2.39. Grafico Risultati Momento NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 13



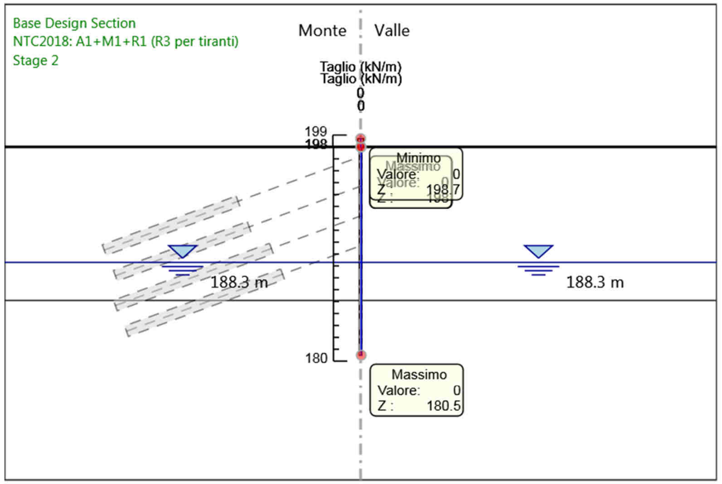
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 13
Momento

4.2.40. Grafico Risultati Taglio NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 1



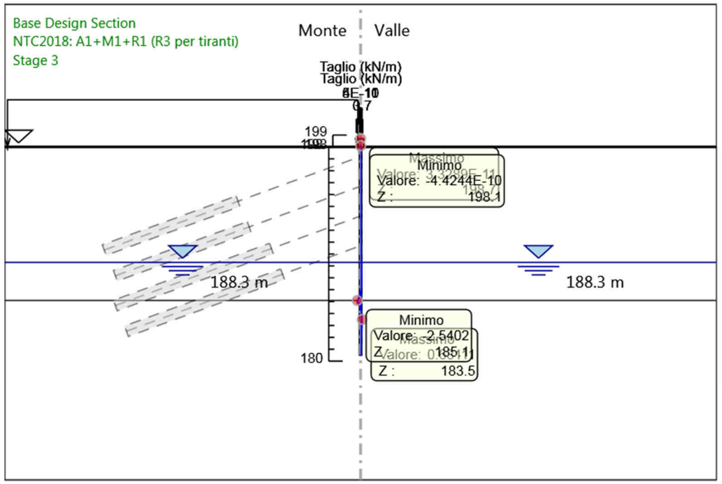
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 1
Taglio

4.2.41. Grafico Risultati Taglio NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 2



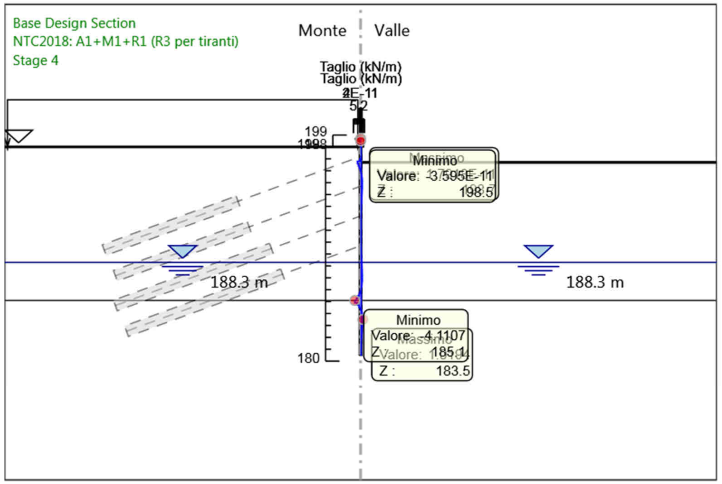
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 2
Taglio

4.2.42. Grafico Risultati Taglio NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 3



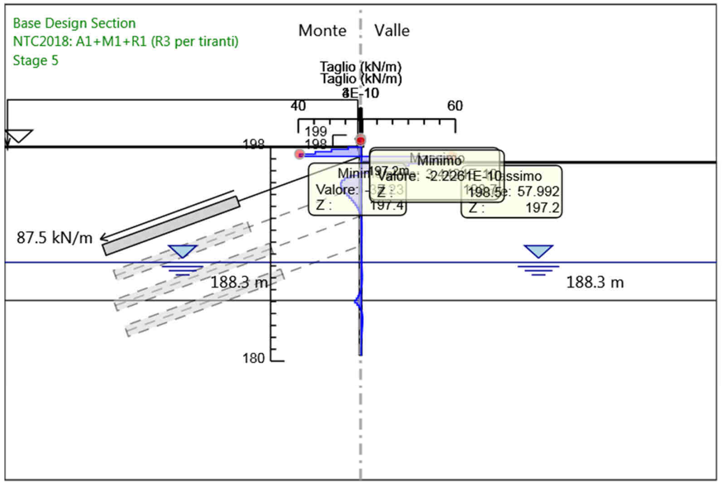
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 3
Taglio

4.2.43. Grafico Risultati Taglio NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 4



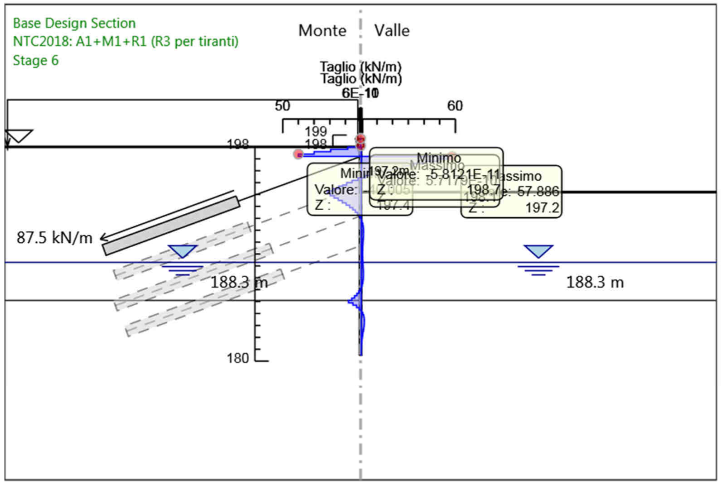
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 4
Taglio

4.2.44. Grafico Risultati Taglio NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 5



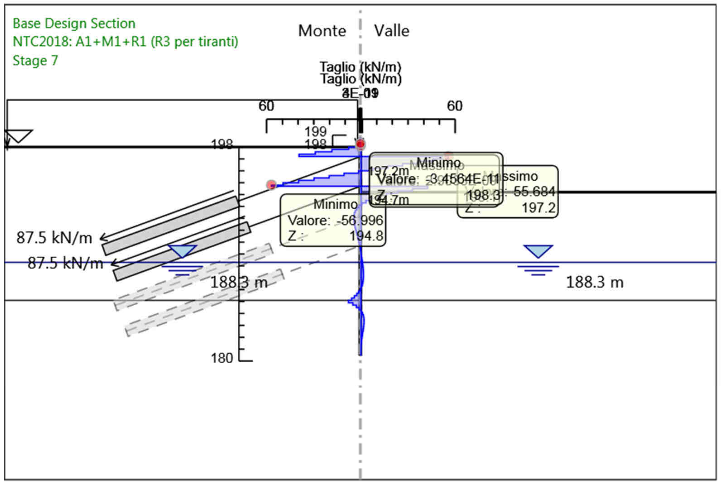
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 5
Taglio

4.2.45. Grafico Risultati Taglio NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 6



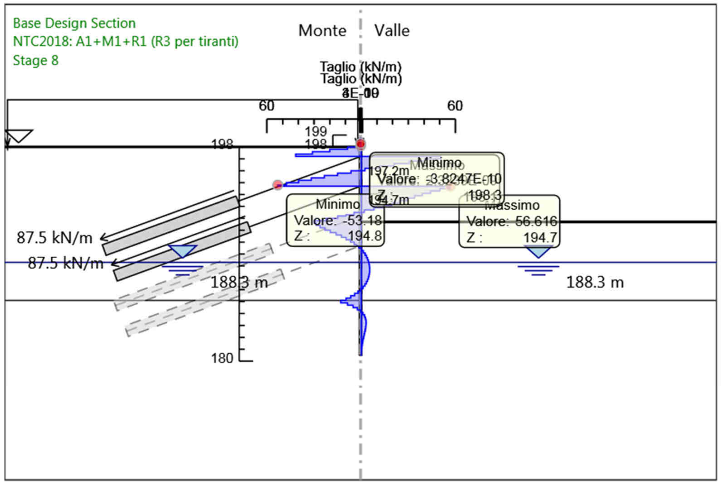
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 6
Taglio

4.2.46. Grafico Risultati Taglio NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 7



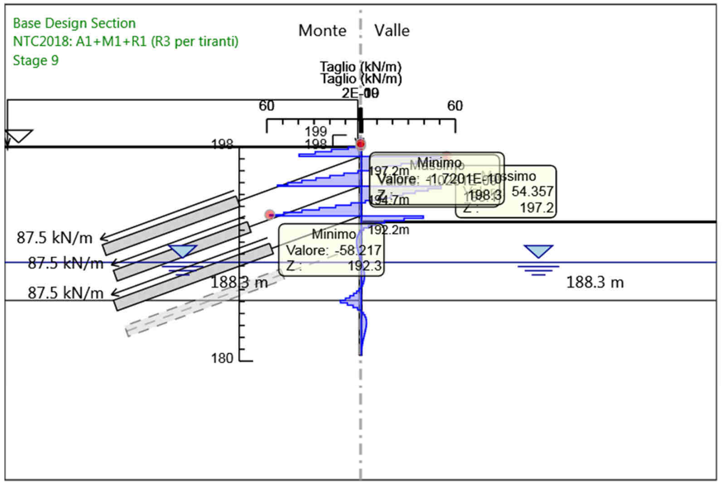
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 7
Taglio

4.2.47. Grafico Risultati Taglio NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 8



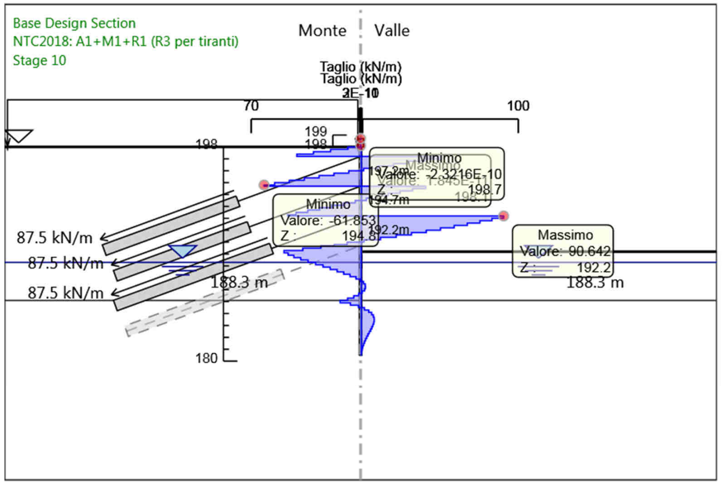
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 8
Taglio

4.2.48. Grafico Risultati Taglio NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 9



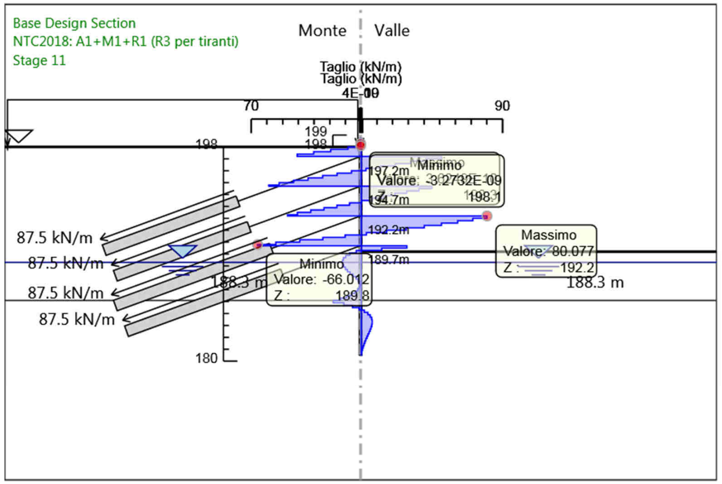
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 9
Taglio

4.2.49. Grafico Risultati Taglio NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 10



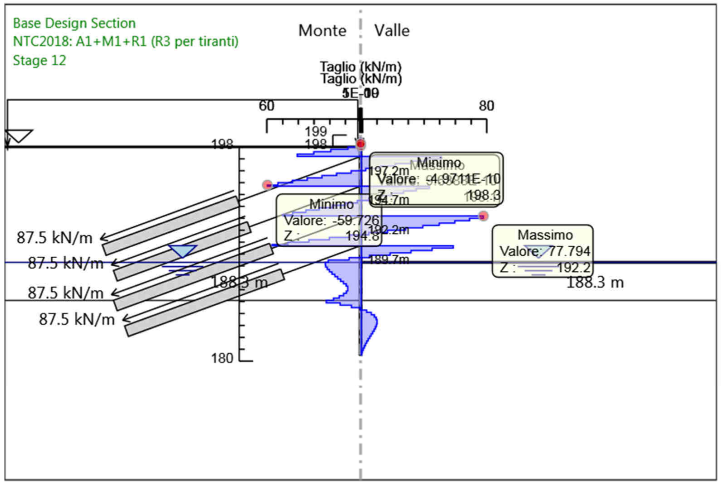
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 10
Taglio

4.2.50. Grafico Risultati Taglio NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 11



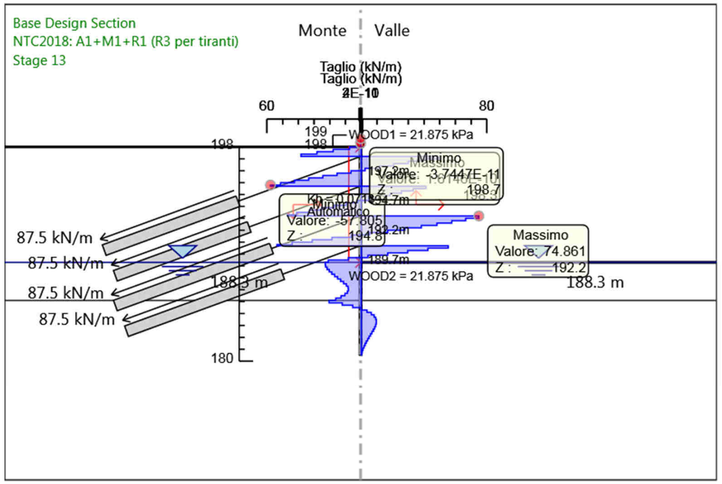
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 11
Taglio

4.2.51. Grafico Risultati Taglio NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 12



Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 12
Taglio

4.2.52. Grafico Risultati Taglio NTC2018: A1+M1+R1 (R3 per tiranti) - Stage: Stage 13



Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)
Stage: Stage 13
Taglio

4.2.53. Risultati Elementi strutturali - NTC2018: A1+M1+R1 (R3 per tiranti)

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Sollecitazione I-ordine
Stage	Forza (kN/m)
Stage 5	113.75
Stage 6	114.19122
Stage 7	111.828561
Stage 8	109.256537
Stage 9	110.449599
Stage 10	108.467151
Stage 11	108.892836
Stage 12	108.873037
Stage 13	103.827737

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Sollecitazione II-ordine
Stage	**Forza (kN/m)**
Stage 7	113.75
Stage 8	122.45168
Stage 9	117.647881
Stage 10	116.578319
Stage 11	117.423384
Stage 12	116.726493
Stage 13	112.104018

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Sollecitazione III-ordine
Stage	**Forza (kN/m)**
Stage 9	113.75
Stage 10	151.92411
Stage 11	141.81024
Stage 12	142.53941
Stage 13	135.93229

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)	Sollecitazione IV-ordine
Stage	Forza (kN/m)
Stage 11	113.75
Stage 12	133.49206
Stage 13	126.471111

4.3. Risultati NTC2018: A2+M2+R1

4.3.1. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 1

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	198	0	0
Stage 1	197.8	0	0
Stage 1	197.6	0	0
Stage 1	197.4	0	0
Stage 1	197.2	0	0
Stage 1	197	0	0
Stage 1	196.8	0	0
Stage 1	196.6	0	0
Stage 1	196.4	0	0
Stage 1	196.2	0	0
Stage 1	196	0	0
Stage 1	195.8	0	0
Stage 1	195.6	0	0
Stage 1	195.4	0	0
Stage 1	195.2	0	0
Stage 1	195	0	0
Stage 1	194.8	0	0
Stage 1	194.7	0	0
Stage 1	194.5	0	0
Stage 1	194.3	0	0
Stage 1	194.1	0	0
Stage 1	193.9	0	0
Stage 1	193.7	0	0
Stage 1	193.5	0	0
Stage 1	193.3	0	0
Stage 1	193.1	0	0
Stage 1	192.9	0	0
Stage 1	192.7	0	0
Stage 1	192.5	0	0
Stage 1	192.3	0	0
Stage 1	192.2	0	0
Stage 1	192	0	0
Stage 1	191.8	0	0
Stage 1	191.6	0	0
Stage 1	191.4	0	0
Stage 1	191.2	0	0
Stage 1	191	0	0
Stage 1	190.8	0	0
Stage 1	190.6	0	0
Stage 1	190.4	0	0
Stage 1	190.2	0	0
Stage 1	190	0	0
Stage 1	189.8	0	0
Stage 1	189.7	0	0
Stage 1	189.5	0	0
Stage 1	189.3	0	0
Stage 1	189.1	0	0
Stage 1	188.9	0	0
Stage 1	188.7	0	0
Stage 1	188.5	0	0
Stage 1	188.3	0	0
Stage 1	188.1	0	0
Stage 1	187.9	0	0
Stage 1	187.7	0	0
Stage 1	187.5	0	0
Stage 1	187.3	0	0
Stage 1	187.1	0	0
Stage 1	186.9	0	0
Stage 1	186.7	0	0
Stage 1	186.5	0	0
Stage 1	186.3	0	0
Stage 1	186.1	0	0
Stage 1	185.9	0	0
Stage 1	185.7	0	0
Stage 1	185.5	0	0
Stage 1	185.3	0	0

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	185.1	0	0
Stage 1	184.9	0	0
Stage 1	184.7	0	0
Stage 1	184.5	0	0
Stage 1	184.3	0	0
Stage 1	184.1	0	0
Stage 1	183.9	0	0
Stage 1	183.7	0	0
Stage 1	183.5	0	0
Stage 1	183.3	0	0
Stage 1	183.1	0	0
Stage 1	182.9	0	0
Stage 1	182.7	0	0
Stage 1	182.5	0	0
Stage 1	182.3	0	0
Stage 1	182.1	0	0
Stage 1	181.9	0	0
Stage 1	181.7	0	0
Stage 1	181.5	0	0
Stage 1	181.3	0	0
Stage 1	181.1	0	0
Stage 1	180.9	0	0
Stage 1	180.7	0	0
Stage 1	180.5	0	0

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	198.7	0	0
Stage 1	198.5	0	0
Stage 1	198.3	0	0
Stage 1	198.1	0	0
Stage 1	198	0	0

4.3.2. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 2

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	198	0	0
Stage 2	197.8	0	0
Stage 2	197.6	0	0
Stage 2	197.4	0	0
Stage 2	197.2	0	0
Stage 2	197	0	0
Stage 2	196.8	0	0
Stage 2	196.6	0	0
Stage 2	196.4	0	0
Stage 2	196.2	0	0
Stage 2	196	0	0
Stage 2	195.8	0	0
Stage 2	195.6	0	0
Stage 2	195.4	0	0
Stage 2	195.2	0	0
Stage 2	195	0	0
Stage 2	194.8	0	0
Stage 2	194.7	0	0
Stage 2	194.5	0	0
Stage 2	194.3	0	0
Stage 2	194.1	0	0
Stage 2	193.9	0	0
Stage 2	193.7	0	0
Stage 2	193.5	0	0
Stage 2	193.3	0	0
Stage 2	193.1	0	0
Stage 2	192.9	0	0
Stage 2	192.7	0	0
Stage 2	192.5	0	0
Stage 2	192.3	0	0
Stage 2	192.2	0	0
Stage 2	192	0	0
Stage 2	191.8	0	0
Stage 2	191.6	0	0
Stage 2	191.4	0	0
Stage 2	191.2	0	0
Stage 2	191	0	0
Stage 2	190.8	0	0
Stage 2	190.6	0	0
Stage 2	190.4	0	0
Stage 2	190.2	0	0
Stage 2	190	0	0
Stage 2	189.8	0	0
Stage 2	189.7	0	0
Stage 2	189.5	0	0
Stage 2	189.3	0	0
Stage 2	189.1	0	0
Stage 2	188.9	0	0
Stage 2	188.7	0	0
Stage 2	188.5	0	0
Stage 2	188.3	0	0
Stage 2	188.1	0	0
Stage 2	187.9	0	0
Stage 2	187.7	0	0
Stage 2	187.5	0	0
Stage 2	187.3	0	0
Stage 2	187.1	0	0
Stage 2	186.9	0	0
Stage 2	186.7	0	0
Stage 2	186.5	0	0
Stage 2	186.3	0	0
Stage 2	186.1	0	0
Stage 2	185.9	0	0
Stage 2	185.7	0	0
Stage 2	185.5	0	0
Stage 2	185.3	0	0
Stage 2	185.1	0	0
Stage 2	184.9	0	0
Stage 2	184.7	0	0

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	184.5	0	0
Stage 2	184.3	0	0
Stage 2	184.1	0	0
Stage 2	183.9	0	0
Stage 2	183.7	0	0
Stage 2	183.5	0	0
Stage 2	183.3	0	0
Stage 2	183.1	0	0
Stage 2	182.9	0	0
Stage 2	182.7	0	0
Stage 2	182.5	0	0
Stage 2	182.3	0	0
Stage 2	182.1	0	0
Stage 2	181.9	0	0
Stage 2	181.7	0	0
Stage 2	181.5	0	0
Stage 2	181.3	0	0
Stage 2	181.1	0	0
Stage 2	180.9	0	0
Stage 2	180.7	0	0
Stage 2	180.5	0	0
Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	198.7	0	0
Stage 2	198.5	0	0
Stage 2	198.3	0	0
Stage 2	198.1	0	0
Stage 2	198	0	0

4.3.3. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 3

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	198	0	0
Stage 3	197.8	0	0
Stage 3	197.6	0	0
Stage 3	197.4	0	0
Stage 3	197.2	0	0
Stage 3	197	0	0
Stage 3	196.8	0	0
Stage 3	196.6	0	0
Stage 3	196.4	0	0
Stage 3	196.2	0	0
Stage 3	196	0	0
Stage 3	195.8	0	0
Stage 3	195.6	0	0
Stage 3	195.4	0	0
Stage 3	195.2	0	0
Stage 3	195	0	0
Stage 3	194.8	0	0
Stage 3	194.7	0	0
Stage 3	194.5	0	0
Stage 3	194.3	0	0
Stage 3	194.1	0	0
Stage 3	193.9	0	0
Stage 3	193.7	0	0
Stage 3	193.5	0	0
Stage 3	193.3	0	0
Stage 3	193.1	0	0
Stage 3	192.9	0	0
Stage 3	192.7	0	-0.01
Stage 3	192.5	0	-0.01
Stage 3	192.3	-0.01	-0.01
Stage 3	192.2	-0.01	-0.01
Stage 3	192	-0.01	-0.01
Stage 3	191.8	-0.01	-0.01
Stage 3	191.6	-0.01	-0.01
Stage 3	191.4	-0.02	-0.01
Stage 3	191.2	-0.02	-0.02
Stage 3	191	-0.02	-0.02
Stage 3	190.8	-0.03	-0.01
Stage 3	190.6	-0.03	-0.01
Stage 3	190.4	-0.03	-0.01
Stage 3	190.2	-0.03	0
Stage 3	190	-0.03	0
Stage 3	189.8	-0.03	0.01
Stage 3	189.7	-0.03	0.02
Stage 3	189.5	-0.02	0.03
Stage 3	189.3	-0.01	0.05
Stage 3	189.1	0.01	0.07
Stage 3	188.9	0.02	0.1
Stage 3	188.7	0.05	0.12
Stage 3	188.5	0.08	0.15
Stage 3	188.3	0.12	0.19
Stage 3	188.1	0.16	0.22
Stage 3	187.9	0.21	0.26
Stage 3	187.7	0.27	0.29
Stage 3	187.5	0.34	0.32
Stage 3	187.3	0.41	0.34
Stage 3	187.1	0.48	0.36
Stage 3	186.9	0.55	0.35
Stage 3	186.7	0.61	0.33
Stage 3	186.5	0.67	0.28
Stage 3	186.3	0.71	0.19
Stage 3	186.1	0.72	0.06
Stage 3	185.9	0.7	-0.11
Stage 3	185.7	0.63	-0.35
Stage 3	185.5	0.5	-0.65
Stage 3	185.3	0.29	-1.02
Stage 3	185.1	0	-1.47
Stage 3	184.9	-0.4	-2
Stage 3	184.7	-0.66	-1.28

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	184.5	-0.8	-0.7
Stage 3	184.3	-0.85	-0.27
Stage 3	184.1	-0.84	0.05
Stage 3	183.9	-0.79	0.27
Stage 3	183.7	-0.71	0.4
Stage 3	183.5	-0.61	0.48
Stage 3	183.3	-0.51	0.5
Stage 3	183.1	-0.41	0.48
Stage 3	182.9	-0.32	0.45
Stage 3	182.7	-0.24	0.4
Stage 3	182.5	-0.18	0.34
Stage 3	182.3	-0.12	0.28
Stage 3	182.1	-0.08	0.22
Stage 3	181.9	-0.05	0.16
Stage 3	181.7	-0.02	0.11
Stage 3	181.5	-0.01	0.07
Stage 3	181.3	0	0.04
Stage 3	181.1	0	0.02
Stage 3	180.9	0	0
Stage 3	180.7	0	-0.01
Stage 3	180.5	0	0

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	198.7	0	0
Stage 3	198.5	0	0
Stage 3	198.5	0	0
Stage 3	198.3	0	0
Stage 3	198.3	0	0
Stage 3	198.1	0	0
Stage 3	198.1	0	0
Stage 3	198	0	0

4.3.4. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 4

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 4	198	0	0
Stage 4	197.8	0	0
Stage 4	197.8	0	0
Stage 4	197.6	0	0
Stage 4	197.6	0	0
Stage 4	197.4	0	0
Stage 4	197.4	0	0
Stage 4	197.2	0	0
Stage 4	197.2	0	0
Stage 4	197	-0.04	-0.22
Stage 4	196.8	-0.23	-0.95
Stage 4	196.6	-0.67	-2.19
Stage 4	196.4	-1	-1.63
Stage 4	196.2	-1.2	-1.03
Stage 4	196	-1.31	-0.52
Stage 4	195.8	-1.33	-0.1
Stage 4	195.6	-1.29	0.21
Stage 4	195.4	-1.2	0.43
Stage 4	195.2	-1.08	0.58
Stage 4	195	-0.95	0.66
Stage 4	194.8	-0.81	0.68
Stage 4	194.7	-0.75	0.68
Stage 4	194.5	-0.62	0.66
Stage 4	194.3	-0.49	0.61
Stage 4	194.1	-0.38	0.55
Stage 4	193.9	-0.29	0.48
Stage 4	193.7	-0.21	0.4
Stage 4	193.5	-0.14	0.33
Stage 4	193.3	-0.09	0.27
Stage 4	193.1	-0.05	0.21
Stage 4	192.9	-0.02	0.15
Stage 4	192.7	0	0.11
Stage 4	192.5	0.02	0.07
Stage 4	192.3	0.03	0.04
Stage 4	192.2	0.03	0.02
Stage 4	192	0.03	0
Stage 4	191.8	0.02	-0.02
Stage 4	191.6	0.02	-0.03
Stage 4	191.4	0.01	-0.04
Stage 4	191.2	0	-0.04
Stage 4	191	-0.01	-0.05
Stage 4	190.8	-0.02	-0.05
Stage 4	190.6	-0.03	-0.04
Stage 4	190.4	-0.03	-0.04
Stage 4	190.2	-0.04	-0.03
Stage 4	190	-0.04	-0.02
Stage 4	189.8	-0.05	0
Stage 4	189.7	-0.04	0.01
Stage 4	189.5	-0.04	0.03
Stage 4	189.3	-0.03	0.06
Stage 4	189.1	-0.01	0.09
Stage 4	188.9	0.02	0.13
Stage 4	188.7	0.05	0.17
Stage 4	188.5	0.09	0.22
Stage 4	188.3	0.15	0.27
Stage 4	188.1	0.21	0.33
Stage 4	187.9	0.29	0.39
Stage 4	187.7	0.38	0.45
Stage 4	187.5	0.48	0.5
Stage 4	187.3	0.59	0.54
Stage 4	187.1	0.7	0.57
Stage 4	186.9	0.82	0.57
Stage 4	186.7	0.92	0.54
Stage 4	186.5	1.02	0.47
Stage 4	186.3	1.09	0.34
Stage 4	186.1	1.12	0.15
Stage 4	185.9	1.09	-0.13
Stage 4	185.7	0.99	-0.5
Stage 4	185.5	0.79	-0.99

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 4	185.3	0.48	-1.6
Stage 4	185.1	0.01	-2.34
Stage 4	184.9	-0.64	-3.22
Stage 4	184.7	-1.04	-2.02
Stage 4	184.5	-1.25	-1.07
Stage 4	184.3	-1.33	-0.36
Stage 4	184.1	-1.3	0.14
Stage 4	183.9	-1.2	0.48
Stage 4	183.7	-1.07	0.68
Stage 4	183.5	-0.91	0.78
Stage 4	183.3	-0.75	0.8
Stage 4	183.1	-0.6	0.76
Stage 4	182.9	-0.46	0.69
Stage 4	182.7	-0.34	0.6
Stage 4	182.5	-0.24	0.5
Stage 4	182.3	-0.16	0.4
Stage 4	182.1	-0.1	0.31
Stage 4	181.9	-0.05	0.22
Stage 4	181.7	-0.02	0.15
Stage 4	181.5	0	0.09
Stage 4	181.3	0.01	0.04
Stage 4	181.1	0.01	0.01
Stage 4	180.9	0.01	-0.01
Stage 4	180.7	0	-0.02
Stage 4	180.5	0	-0.01

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 4	198.7	0	0
Stage 4	198.5	0	0
Stage 4	198.5	0	0
Stage 4	198.3	0	0
Stage 4	198.3	0	0
Stage 4	198.1	0	0
Stage 4	198.1	0	0
Stage 4	198	0	0

4.3.5. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 5

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 5	198	0	-6.23
Stage 5	197.8	-1.25	-6.23
Stage 5	197.6	-4.11	-14.3
Stage 5	197.4	-8.53	-22.12
Stage 5	197.2	-14.47	-29.68
Stage 5	197	-5.43	45.18
Stage 5	196.8	2.17	37.98
Stage 5	196.6	8.35	30.94
Stage 5	196.4	13.17	24.07
Stage 5	196.2	16.63	17.33
Stage 5	196	18.77	10.68
Stage 5	195.8	19.59	4.09
Stage 5	195.6	19.31	-1.38
Stage 5	195.4	18.18	-5.65
Stage 5	195.2	16.5	-8.42
Stage 5	195	14.5	-9.99
Stage 5	194.8	12.37	-10.63
Stage 5	194.7	11.31	-10.59
Stage 5	194.5	9.24	-10.34
Stage 5	194.3	7.32	-9.61
Stage 5	194.1	5.6	-8.62
Stage 5	193.9	4.1	-7.51
Stage 5	193.7	2.83	-6.35
Stage 5	193.5	1.78	-5.21
Stage 5	193.3	0.95	-4.15
Stage 5	193.1	0.31	-3.2
Stage 5	192.9	-0.16	-2.36
Stage 5	192.7	-0.49	-1.65
Stage 5	192.5	-0.71	-1.07
Stage 5	192.3	-0.83	-0.6
Stage 5	192.2	-0.86	-0.33
Stage 5	192	-0.88	-0.1
Stage 5	191.8	-0.85	0.13
Stage 5	191.6	-0.79	0.29
Stage 5	191.4	-0.72	0.38
Stage 5	191.2	-0.63	0.43
Stage 5	191	-0.54	0.44
Stage 5	190.8	-0.46	0.43
Stage 5	190.6	-0.38	0.4
Stage 5	190.4	-0.3	0.36
Stage 5	190.2	-0.24	0.32
Stage 5	190	-0.18	0.28
Stage 5	189.8	-0.13	0.24
Stage 5	189.7	-0.11	0.22
Stage 5	189.5	-0.07	0.2
Stage 5	189.3	-0.03	0.19
Stage 5	189.1	0	0.18
Stage 5	188.9	0.04	0.19
Stage 5	188.7	0.08	0.21
Stage 5	188.5	0.13	0.24
Stage 5	188.3	0.19	0.28
Stage 5	188.1	0.25	0.32
Stage 5	187.9	0.33	0.38
Stage 5	187.7	0.41	0.43
Stage 5	187.5	0.51	0.48
Stage 5	187.3	0.61	0.52
Stage 5	187.1	0.72	0.55
Stage 5	186.9	0.83	0.55
Stage 5	186.7	0.94	0.53
Stage 5	186.5	1.03	0.46
Stage 5	186.3	1.09	0.33
Stage 5	186.1	1.12	0.14
Stage 5	185.9	1.1	-0.14
Stage 5	185.7	0.99	-0.51
Stage 5	185.5	0.79	-0.99
Stage 5	185.3	0.47	-1.6
Stage 5	185.1	0.01	-2.34
Stage 5	184.9	-0.64	-3.22
Stage 5	184.7	-1.04	-2.02

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 5	184.5	-1.26	-1.07
Stage 5	184.3	-1.33	-0.36
Stage 5	184.1	-1.3	0.14
Stage 5	183.9	-1.2	0.48
Stage 5	183.7	-1.07	0.68
Stage 5	183.5	-0.91	0.78
Stage 5	183.3	-0.75	0.8
Stage 5	183.1	-0.6	0.77
Stage 5	182.9	-0.46	0.69
Stage 5	182.7	-0.34	0.6
Stage 5	182.5	-0.24	0.5
Stage 5	182.3	-0.16	0.4
Stage 5	182.1	-0.09	0.31
Stage 5	181.9	-0.05	0.22
Stage 5	181.7	-0.02	0.15
Stage 5	181.5	0	0.09
Stage 5	181.3	0.01	0.04
Stage 5	181.1	0.01	0.01
Stage 5	180.9	0.01	-0.01
Stage 5	180.7	0	-0.02
Stage 5	180.5	0	-0.01

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 5	198.7	0	0
Stage 5	198.5	0	0
Stage 5	198.5	0	0
Stage 5	198.3	0	0
Stage 5	198.3	0	0
Stage 5	198.1	0	0
Stage 5	198.1	0	0
Stage 5	198	0	0

4.3.6. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 6

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 6	198	0	-6.5
Stage 6	197.8	-1.3	-6.5
Stage 6	197.6	-4.26	-14.82
Stage 6	197.4	-8.82	-22.78
Stage 6	197.2	-14.89	-30.38
Stage 6	197	-5.87	45.13
Stage 6	196.8	1.83	38.49
Stage 6	196.6	8.3	32.34
Stage 6	196.4	13.63	26.68
Stage 6	196.2	17.93	21.49
Stage 6	196	21.28	16.73
Stage 6	195.8	23.74	12.34
Stage 6	195.6	25.4	8.26
Stage 6	195.4	26.29	4.44
Stage 6	195.2	26.55	1.32
Stage 6	195	26.21	-1.71
Stage 6	194.8	25.19	-5.06
Stage 6	194.7	24.41	-7.82
Stage 6	194.5	22.27	-10.69
Stage 6	194.3	19.31	-14.84
Stage 6	194.1	15.45	-19.31
Stage 6	193.9	11.79	-18.27
Stage 6	193.7	8.46	-16.66
Stage 6	193.5	5.5	-14.79
Stage 6	193.3	2.94	-12.79
Stage 6	193.1	0.8	-10.74
Stage 6	192.9	-0.94	-8.68
Stage 6	192.7	-2.27	-6.65
Stage 6	192.5	-3.2	-4.65
Stage 6	192.3	-3.79	-2.96
Stage 6	192.2	-3.98	-1.92
Stage 6	192	-4.18	-1
Stage 6	191.8	-4.19	-0.05
Stage 6	191.6	-4.06	0.67
Stage 6	191.4	-3.82	1.18
Stage 6	191.2	-3.52	1.52
Stage 6	191	-3.18	1.72
Stage 6	190.8	-2.81	1.81
Stage 6	190.6	-2.45	1.82
Stage 6	190.4	-2.1	1.77
Stage 6	190.2	-1.76	1.67
Stage 6	190	-1.45	1.56
Stage 6	189.8	-1.16	1.43
Stage 6	189.7	-1.03	1.34
Stage 6	189.5	-0.78	1.25
Stage 6	189.3	-0.55	1.15
Stage 6	189.1	-0.34	1.06
Stage 6	188.9	-0.14	1
Stage 6	188.7	0.05	0.96
Stage 6	188.5	0.24	0.95
Stage 6	188.3	0.44	0.96
Stage 6	188.1	0.63	0.99
Stage 6	187.9	0.84	1.03
Stage 6	187.7	1.05	1.07
Stage 6	187.5	1.27	1.11
Stage 6	187.3	1.5	1.13
Stage 6	187.1	1.72	1.12
Stage 6	186.9	1.94	1.07
Stage 6	186.7	2.13	0.96
Stage 6	186.5	2.28	0.76
Stage 6	186.3	2.38	0.47
Stage 6	186.1	2.39	0.05
Stage 6	185.9	2.28	-0.52
Stage 6	185.7	2.03	-1.26
Stage 6	185.5	1.59	-2.2
Stage 6	185.3	0.92	-3.35
Stage 6	185.1	-0.03	-4.74
Stage 6	184.9	-1.31	-6.38
Stage 6	184.7	-2.13	-4.12

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 6	184.5	-2.59	-2.32
Stage 6	184.3	-2.78	-0.95
Stage 6	184.1	-2.77	0.07
Stage 6	183.9	-2.61	0.77
Stage 6	183.7	-2.37	1.22
Stage 6	183.5	-2.08	1.47
Stage 6	183.3	-1.76	1.57
Stage 6	183.1	-1.45	1.55
Stage 6	182.9	-1.16	1.45
Stage 6	182.7	-0.9	1.3
Stage 6	182.5	-0.68	1.13
Stage 6	182.3	-0.49	0.94
Stage 6	182.1	-0.33	0.76
Stage 6	181.9	-0.22	0.59
Stage 6	181.7	-0.13	0.44
Stage 6	181.5	-0.07	0.3
Stage 6	181.3	-0.03	0.19
Stage 6	181.1	-0.01	0.11
Stage 6	180.9	0	0.04
Stage 6	180.7	0	0.01
Stage 6	180.5	0	-0.01

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 6	198.7	0	0
Stage 6	198.5	0	0
Stage 6	198.5	0	0
Stage 6	198.3	0	0
Stage 6	198.3	0	0
Stage 6	198.1	0	0
Stage 6	198.1	0	0
Stage 6	198	0	0

4.3.7. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 7

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 7	198	0	-6.01
Stage 7	197.8	-1.2	-6.01
Stage 7	197.6	-4.02	-14.08
Stage 7	197.4	-8.44	-22.09
Stage 7	197.2	-14.41	-29.88
Stage 7	197	-5.73	43.42
Stage 7	196.8	1.46	35.95
Stage 7	196.6	7.18	28.61
Stage 7	196.4	11.47	21.41
Stage 7	196.2	14.33	14.33
Stage 7	196	15.8	7.32
Stage 7	195.8	15.86	0.34
Stage 7	195.6	14.53	-6.65
Stage 7	195.4	11.79	-13.72
Stage 7	195.2	7.61	-20.91
Stage 7	195	1.93	-28.39
Stage 7	194.8	-5.33	-36.29
Stage 7	194.7	-9.58	-42.49
Stage 7	194.5	-2.89	33.4
Stage 7	194.3	2.07	24.8
Stage 7	194.1	5.3	16.16
Stage 7	193.9	7.35	10.26
Stage 7	193.7	8.48	5.65
Stage 7	193.5	8.89	2.06
Stage 7	193.3	8.76	-0.64
Stage 7	193.1	8.25	-2.56
Stage 7	192.9	7.5	-3.78
Stage 7	192.7	6.62	-4.39
Stage 7	192.5	5.72	-4.46
Stage 7	192.3	4.86	-4.34
Stage 7	192.2	4.44	-4.17
Stage 7	192	3.65	-3.96
Stage 7	191.8	2.92	-3.62
Stage 7	191.6	2.27	-3.25
Stage 7	191.4	1.7	-2.86
Stage 7	191.2	1.21	-2.48
Stage 7	191	0.78	-2.11
Stage 7	190.8	0.43	-1.76
Stage 7	190.6	0.15	-1.43
Stage 7	190.4	-0.08	-1.13
Stage 7	190.2	-0.25	-0.86
Stage 7	190	-0.37	-0.61
Stage 7	189.8	-0.45	-0.39
Stage 7	189.7	-0.48	-0.24
Stage 7	189.5	-0.5	-0.1
Stage 7	189.3	-0.48	0.08
Stage 7	189.1	-0.43	0.24
Stage 7	188.9	-0.35	0.4
Stage 7	188.7	-0.24	0.54
Stage 7	188.5	-0.11	0.68
Stage 7	188.3	0.06	0.82
Stage 7	188.1	0.25	0.95
Stage 7	187.9	0.46	1.06
Stage 7	187.7	0.69	1.16
Stage 7	187.5	0.94	1.24
Stage 7	187.3	1.19	1.28
Stage 7	187.1	1.45	1.29
Stage 7	186.9	1.7	1.24
Stage 7	186.7	1.93	1.13
Stage 7	186.5	2.11	0.93
Stage 7	186.3	2.24	0.62
Stage 7	186.1	2.27	0.19
Stage 7	185.9	2.2	-0.39
Stage 7	185.7	1.97	-1.15
Stage 7	185.5	1.55	-2.1
Stage 7	185.3	0.89	-3.27
Stage 7	185.1	-0.04	-4.67
Stage 7	184.9	-1.3	-6.31
Stage 7	184.7	-2.12	-4.08

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 7	184.5	-2.58	-2.29
Stage 7	184.3	-2.76	-0.93
Stage 7	184.1	-2.75	0.08
Stage 7	183.9	-2.59	0.77
Stage 7	183.7	-2.35	1.22
Stage 7	183.5	-2.06	1.46
Stage 7	183.3	-1.75	1.56
Stage 7	183.1	-1.44	1.54
Stage 7	182.9	-1.15	1.44
Stage 7	182.7	-0.89	1.29
Stage 7	182.5	-0.67	1.12
Stage 7	182.3	-0.48	0.94
Stage 7	182.1	-0.33	0.75
Stage 7	181.9	-0.21	0.58
Stage 7	181.7	-0.13	0.43
Stage 7	181.5	-0.07	0.3
Stage 7	181.3	-0.03	0.19
Stage 7	181.1	-0.01	0.1
Stage 7	180.9	0	0.04
Stage 7	180.7	0	0.01
Stage 7	180.5	0	-0.01

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 7	198.7	0	0
Stage 7	198.5	0	0
Stage 7	198.5	0	0
Stage 7	198.3	0	0
Stage 7	198.3	0	0
Stage 7	198.1	0	0
Stage 7	198.1	0	0
Stage 7	198	0	0

4.3.8. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 8

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 8	198	0	-6.94
Stage 8	197.8	-1.39	-6.94
Stage 8	197.6	-4.56	-15.88
Stage 8	197.4	-9.46	-24.5
Stage 8	197.2	-16.02	-32.8
Stage 8	197	-8.75	36.38
Stage 8	196.8	-3.03	28.6
Stage 8	196.6	1.18	21.06
Stage 8	196.4	3.94	13.78
Stage 8	196.2	5.29	6.76
Stage 8	196	5.32	0.14
Stage 8	195.8	4.11	-6.07
Stage 8	195.6	1.73	-11.89
Stage 8	195.4	-1.74	-17.34
Stage 8	195.2	-6.23	-22.45
Stage 8	195	-11.7	-27.35
Stage 8	194.8	-18.13	-32.13
Stage 8	194.7	-21.68	-35.56
Stage 8	194.5	-10.38	56.51
Stage 8	194.3	0.09	52.36
Stage 8	194.1	9.67	47.89
Stage 8	193.9	18.29	43.1
Stage 8	193.7	25.89	38
Stage 8	193.5	32.4	32.57
Stage 8	193.3	37.77	26.83
Stage 8	193.1	41.92	20.76
Stage 8	192.9	44.8	14.38
Stage 8	192.7	46.33	7.68
Stage 8	192.5	46.46	0.66
Stage 8	192.3	45.13	-6.68
Stage 8	192.2	43.89	-12.42
Stage 8	192	40.23	-18.29
Stage 8	191.8	34.94	-26.42
Stage 8	191.6	27.97	-34.88
Stage 8	191.4	21.2	-33.85
Stage 8	191.2	15.06	-30.71
Stage 8	191	9.58	-27.39
Stage 8	190.8	4.77	-24.05
Stage 8	190.6	0.61	-20.79
Stage 8	190.4	-2.92	-17.66
Stage 8	190.2	-5.86	-14.7
Stage 8	190	-8.25	-11.93
Stage 8	189.8	-10.12	-9.34
Stage 8	189.7	-10.87	-7.55
Stage 8	189.5	-12.04	-5.82
Stage 8	189.3	-12.77	-3.69
Stage 8	189.1	-13.12	-1.71
Stage 8	188.9	-13.09	0.13
Stage 8	188.7	-12.72	1.85
Stage 8	188.5	-12.03	3.48
Stage 8	188.3	-11.06	4.83
Stage 8	188.1	-9.89	5.83
Stage 8	187.9	-8.59	6.52
Stage 8	187.7	-7.2	6.93
Stage 8	187.5	-5.78	7.1
Stage 8	187.3	-4.37	7.06
Stage 8	187.1	-3	6.83
Stage 8	186.9	-1.72	6.42
Stage 8	186.7	-0.55	5.84
Stage 8	186.5	0.46	5.08
Stage 8	186.3	1.29	4.14
Stage 8	186.1	1.89	2.99
Stage 8	185.9	2.21	1.63
Stage 8	185.7	2.22	0.03
Stage 8	185.5	1.85	-1.83
Stage 8	185.3	1.06	-3.98
Stage 8	185.1	-0.23	-6.43
Stage 8	184.9	-2.07	-9.2
Stage 8	184.7	-3.28	-6.09

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 8	184.5	-4	-3.58
Stage 8	184.3	-4.33	-1.62
Stage 8	184.1	-4.36	-0.15
Stage 8	183.9	-4.18	0.9
Stage 8	183.7	-3.86	1.61
Stage 8	183.5	-3.45	2.03
Stage 8	183.3	-3	2.24
Stage 8	183.1	-2.54	2.28
Stage 8	182.9	-2.1	2.2
Stage 8	182.7	-1.69	2.04
Stage 8	182.5	-1.33	1.83
Stage 8	182.3	-1.01	1.59
Stage 8	182.1	-0.74	1.34
Stage 8	181.9	-0.52	1.1
Stage 8	181.7	-0.35	0.87
Stage 8	181.5	-0.22	0.66
Stage 8	181.3	-0.12	0.47
Stage 8	181.1	-0.06	0.32
Stage 8	180.9	-0.02	0.19
Stage 8	180.7	0	0.09
Stage 8	180.5	0	0.02

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 8	198.7	0	0
Stage 8	198.5	0	0
Stage 8	198.5	0	0
Stage 8	198.3	0	0
Stage 8	198.3	0	0
Stage 8	198.1	0	0
Stage 8	198.1	0	0
Stage 8	198	0	0

4.3.9. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 9

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 9	198	0	-6.53
Stage 9	197.8	-1.31	-6.53
Stage 9	197.6	-4.3	-14.97
Stage 9	197.4	-8.93	-23.16
Stage 9	197.2	-15.15	-31.08
Stage 9	197	-7.28	39.35
Stage 9	196.8	-0.92	31.81
Stage 9	196.6	3.97	24.45
Stage 9	196.4	7.43	17.29
Stage 9	196.2	9.49	10.29
Stage 9	196	10.21	3.62
Stage 9	195.8	9.66	-2.75
Stage 9	195.6	7.89	-8.84
Stage 9	195.4	4.96	-14.69
Stage 9	195.2	0.89	-20.34
Stage 9	195	-4.3	-25.94
Stage 9	194.8	-10.62	-31.59
Stage 9	194.7	-14.2	-35.83
Stage 9	194.5	-3.91	51.46
Stage 9	194.3	5.27	45.91
Stage 9	194.1	13.23	39.79
Stage 9	193.9	19.85	33.11
Stage 9	193.7	25.02	25.84
Stage 9	193.5	28.62	17.98
Stage 9	193.3	30.52	9.54
Stage 9	193.1	30.63	0.53
Stage 9	192.9	28.82	-9.04
Stage 9	192.7	24.99	-19.14
Stage 9	192.5	19.05	-29.72
Stage 9	192.3	10.9	-40.73
Stage 9	192.2	5.98	-49.25
Stage 9	192	10.85	24.33
Stage 9	191.8	13.37	12.59
Stage 9	191.6	13.51	0.7
Stage 9	191.4	12.68	-4.11
Stage 9	191.2	11.42	-6.33
Stage 9	191	9.85	-7.86
Stage 9	190.8	8.08	-8.84
Stage 9	190.6	6.21	-9.36
Stage 9	190.4	4.31	-9.49
Stage 9	190.2	2.45	-9.3
Stage 9	190	0.68	-8.83
Stage 9	189.8	-0.94	-8.13
Stage 9	189.7	-1.69	-7.46
Stage 9	189.5	-3.03	-6.73
Stage 9	189.3	-4.16	-5.61
Stage 9	189.1	-5.03	-4.38
Stage 9	188.9	-5.64	-3.04
Stage 9	188.7	-5.97	-1.63
Stage 9	188.5	-6	-0.15
Stage 9	188.3	-5.76	1.18
Stage 9	188.1	-5.3	2.27
Stage 9	187.9	-4.68	3.12
Stage 9	187.7	-3.93	3.75
Stage 9	187.5	-3.09	4.18
Stage 9	187.3	-2.21	4.42
Stage 9	187.1	-1.32	4.47
Stage 9	186.9	-0.45	4.35
Stage 9	186.7	0.36	4.04
Stage 9	186.5	1.07	3.55
Stage 9	186.3	1.64	2.85
Stage 9	186.1	2.03	1.93
Stage 9	185.9	2.18	0.77
Stage 9	185.7	2.05	-0.65
Stage 9	185.5	1.58	-2.36
Stage 9	185.3	0.71	-4.38
Stage 9	185.1	-0.64	-6.73
Stage 9	184.9	-2.52	-9.4
Stage 9	184.7	-3.75	-6.16

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 9	184.5	-4.46	-3.55
Stage 9	184.3	-4.76	-1.51
Stage 9	184.1	-4.76	0.01
Stage 9	183.9	-4.54	1.1
Stage 9	183.7	-4.18	1.82
Stage 9	183.5	-3.73	2.25
Stage 9	183.3	-3.24	2.46
Stage 9	183.1	-2.74	2.48
Stage 9	182.9	-2.26	2.39
Stage 9	182.7	-1.82	2.21
Stage 9	182.5	-1.43	1.97
Stage 9	182.3	-1.08	1.71
Stage 9	182.1	-0.8	1.44
Stage 9	181.9	-0.56	1.18
Stage 9	181.7	-0.37	0.93
Stage 9	181.5	-0.23	0.7
Stage 9	181.3	-0.13	0.51
Stage 9	181.1	-0.06	0.34
Stage 9	180.9	-0.02	0.2
Stage 9	180.7	0	0.1
Stage 9	180.5	0	0.02

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 9	198.7	0	0
Stage 9	198.5	0	0
Stage 9	198.5	0	0
Stage 9	198.3	0	0
Stage 9	198.3	0	0
Stage 9	198.1	0	0
Stage 9	198.1	0	0
Stage 9	198	0	0

4.3.10. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 10

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 10	198	0	-6.99
Stage 10	197.8	-1.4	-6.99
Stage 10	197.6	-4.61	-16.03
Stage 10	197.4	-9.56	-24.79
Stage 10	197.2	-16.21	-33.24
Stage 10	197	-9.6	33.07
Stage 10	196.8	-4.58	25.07
Stage 10	196.6	-1.13	17.28
Stage 10	196.4	0.82	9.72
Stage 10	196.2	1.29	2.35
Stage 10	196	0.32	-4.85
Stage 10	195.8	-2.07	-11.92
Stage 10	195.6	-5.84	-18.84
Stage 10	195.4	-10.93	-25.46
Stage 10	195.2	-17.29	-31.78
Stage 10	195	-24.87	-37.94
Stage 10	194.8	-33.67	-43.99
Stage 10	194.7	-38.51	-48.38
Stage 10	194.5	-30.83	38.41
Stage 10	194.3	-24.22	33.02
Stage 10	194.1	-18.75	27.38
Stage 10	193.9	-14.44	21.52
Stage 10	193.7	-11.34	15.5
Stage 10	193.5	-9.47	9.38
Stage 10	193.3	-8.82	3.23
Stage 10	193.1	-9.4	-2.88
Stage 10	192.9	-11.25	-9.26
Stage 10	192.7	-14.44	-15.97
Stage 10	192.5	-19.04	-22.99
Stage 10	192.3	-25.11	-30.33
Stage 10	192.2	-28.71	-36.07
Stage 10	192	-8.97	98.73
Stage 10	191.8	9.15	90.6
Stage 10	191.6	25.58	82.14
Stage 10	191.4	40.25	73.37
Stage 10	191.2	53.11	64.27
Stage 10	191	64.08	54.86
Stage 10	190.8	73.11	45.13
Stage 10	190.6	80.12	35.08
Stage 10	190.4	85.06	24.71
Stage 10	190.2	87.87	14.02
Stage 10	190	88.47	3.01
Stage 10	189.8	86.8	-8.32
Stage 10	189.7	85.1	-17.05
Stage 10	189.5	79.92	-25.91
Stage 10	189.3	72.31	-38.03
Stage 10	189.1	62.22	-50.47
Stage 10	188.9	51.53	-53.43
Stage 10	188.7	40.69	-54.22
Stage 10	188.5	30.12	-52.84
Stage 10	188.3	20.26	-49.3
Stage 10	188.1	11.54	-43.59
Stage 10	187.9	4	-37.72
Stage 10	187.7	-2.41	-32.02
Stage 10	187.5	-7.71	-26.51
Stage 10	187.3	-12	-21.47
Stage 10	187.1	-15.41	-17.06
Stage 10	186.9	-18.07	-13.28
Stage 10	186.7	-20.09	-10.11
Stage 10	186.5	-21.6	-7.53
Stage 10	186.3	-22.7	-5.52
Stage 10	186.1	-23.51	-4.06
Stage 10	185.9	-24.14	-3.13
Stage 10	185.7	-24.68	-2.69
Stage 10	185.5	-25.22	-2.72
Stage 10	185.3	-25.86	-3.19
Stage 10	185.1	-26.7	-4.19
Stage 10	184.9	-27.94	-6.23
Stage 10	184.7	-28.18	-1.19

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 10	184.5	-27.55	3.14
Stage 10	184.3	-26.18	6.85
Stage 10	184.1	-24.23	9.77
Stage 10	183.9	-21.91	11.61
Stage 10	183.7	-19.39	12.56
Stage 10	183.5	-16.83	12.82
Stage 10	183.3	-14.32	12.54
Stage 10	183.1	-11.95	11.86
Stage 10	182.9	-9.77	10.92
Stage 10	182.7	-7.81	9.8
Stage 10	182.5	-6.09	8.59
Stage 10	182.3	-4.62	7.36
Stage 10	182.1	-3.39	6.15
Stage 10	181.9	-2.38	5
Stage 10	181.7	-1.6	3.95
Stage 10	181.5	-1	2.99
Stage 10	181.3	-0.57	2.16
Stage 10	181.1	-0.28	1.45
Stage 10	180.9	-0.1	0.87
Stage 10	180.7	-0.02	0.42
Stage 10	180.5	0	0.1

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 10	198.7	0	0
Stage 10	198.5	0	0
Stage 10	198.5	0	0
Stage 10	198.3	0	0
Stage 10	198.3	0	0
Stage 10	198.1	0	0
Stage 10	198.1	0	0
Stage 10	198	0	0

4.3.11. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 11

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 11	198	0	-6.97
Stage 11	197.8	-1.39	-6.97
Stage 11	197.6	-4.59	-15.96
Stage 11	197.4	-9.52	-24.66
Stage 11	197.2	-16.12	-33.03
Stage 11	197	-9.38	33.73
Stage 11	196.8	-4.21	25.84
Stage 11	196.6	-0.58	18.17
Stage 11	196.4	1.57	10.73
Stage 11	196.2	2.27	3.5
Stage 11	196	1.56	-3.55
Stage 11	195.8	-0.53	-10.46
Stage 11	195.6	-3.97	-17.22
Stage 11	195.4	-8.71	-23.67
Stage 11	195.2	-14.67	-29.82
Stage 11	195	-21.83	-35.81
Stage 11	194.8	-30.18	-41.71
Stage 11	194.7	-34.77	-45.99
Stage 11	194.5	-26.48	41.49
Stage 11	194.3	-19.23	36.21
Stage 11	194.1	-13.11	30.64
Stage 11	193.9	-8.14	24.81
Stage 11	193.7	-4.39	18.77
Stage 11	193.5	-1.88	12.57
Stage 11	193.3	-0.63	6.25
Stage 11	193.1	-0.65	-0.11
Stage 11	192.9	-2.02	-6.85
Stage 11	192.7	-4.82	-14.03
Stage 11	192.5	-9.16	-21.67
Stage 11	192.3	-15.11	-29.78
Stage 11	192.2	-18.74	-36.24
Stage 11	192	-0.78	89.77
Stage 11	191.8	15.29	80.39
Stage 11	191.6	29.39	70.47
Stage 11	191.4	41.39	60.01
Stage 11	191.2	51.19	48.99
Stage 11	191	58.67	37.42
Stage 11	190.8	63.73	25.3
Stage 11	190.6	66.26	12.63
Stage 11	190.4	66.15	-0.56
Stage 11	190.2	63.3	-14.25
Stage 11	190	57.62	-28.4
Stage 11	189.8	49.02	-42.97
Stage 11	189.7	43.6	-54.17
Stage 11	189.5	46.95	16.74
Stage 11	189.3	47.23	1.39
Stage 11	189.1	44.4	-14.15
Stage 11	188.9	39.92	-22.42
Stage 11	188.7	34.28	-28.17
Stage 11	188.5	28.01	-31.34
Stage 11	188.3	21.63	-31.91
Stage 11	188.1	15.66	-29.89
Stage 11	187.9	10.2	-27.26
Stage 11	187.7	5.33	-24.39
Stage 11	187.5	1.07	-21.3
Stage 11	187.3	-2.6	-18.32
Stage 11	187.1	-5.72	-15.62
Stage 11	186.9	-8.37	-13.24
Stage 11	186.7	-10.61	-11.18
Stage 11	186.5	-12.5	-9.47
Stage 11	186.3	-14.12	-8.12
Stage 11	186.1	-15.55	-7.12
Stage 11	185.9	-16.85	-6.5
Stage 11	185.7	-18.09	-6.23
Stage 11	185.5	-19.36	-6.33
Stage 11	185.3	-20.72	-6.79
Stage 11	185.1	-22.26	-7.71
Stage 11	184.9	-24.18	-9.61
Stage 11	184.7	-25.07	-4.42

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 11	184.5	-25.05	0.08
Stage 11	184.3	-24.26	3.97
Stage 11	184.1	-22.8	7.28
Stage 11	183.9	-20.9	9.5
Stage 11	183.7	-18.74	10.81
Stage 11	183.5	-16.46	11.4
Stage 11	183.3	-14.17	11.43
Stage 11	183.1	-11.97	11.03
Stage 11	182.9	-9.9	10.32
Stage 11	182.7	-8.02	9.41
Stage 11	182.5	-6.34	8.38
Stage 11	182.3	-4.89	7.29
Stage 11	182.1	-3.65	6.19
Stage 11	181.9	-2.62	5.13
Stage 11	181.7	-1.8	4.13
Stage 11	181.5	-1.16	3.21
Stage 11	181.3	-0.68	2.38
Stage 11	181.1	-0.35	1.66
Stage 11	180.9	-0.14	1.05
Stage 11	180.7	-0.03	0.54
Stage 11	180.5	0	0.14

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 11	198.7	0	0
Stage 11	198.5	0	0
Stage 11	198.5	0	0
Stage 11	198.3	0	0
Stage 11	198.3	0	0
Stage 11	198.1	0	0
Stage 11	198.1	0	0
Stage 11	198	0	0

4.3.12. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 12

Design Assumption: NTC2018: A2+M2+R1	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 12	198	0	-6.92
Stage 12	197.8	-1.38	-6.92
Stage 12	197.6	-4.56	-15.87
Stage 12	197.4	-9.46	-24.53
Stage 12	197.2	-16.04	-32.89
Stage 12	197	-9.27	33.87
Stage 12	196.8	-4.07	25.96
Stage 12	196.6	-0.42	18.25
Stage 12	196.4	1.73	10.76
Stage 12	196.2	2.42	3.46
Stage 12	196	1.68	-3.68
Stage 12	195.8	-0.45	-10.69
Stage 12	195.6	-3.97	-17.58
Stage 12	195.4	-8.8	-24.17
Stage 12	195.2	-14.9	-30.49
Stage 12	195	-22.23	-36.66
Stage 12	194.8	-30.78	-42.75
Stage 12	194.7	-35.5	-47.2
Stage 12	194.5	-27.69	39.05
Stage 12	194.3	-20.99	33.53
Stage 12	194.1	-15.45	27.7
Stage 12	193.9	-11.12	21.62
Stage 12	193.7	-8.06	15.31
Stage 12	193.5	-6.29	8.84
Stage 12	193.3	-5.84	2.26
Stage 12	193.1	-6.71	-4.35
Stage 12	192.9	-8.98	-11.32
Stage 12	192.7	-12.72	-18.69
Stage 12	192.5	-18.01	-26.48
Stage 12	192.3	-24.95	-34.68
Stage 12	192.2	-29.06	-41.14
Stage 12	192	-12.02	85.18
Stage 12	191.8	3.16	75.94
Stage 12	191.6	16.42	66.29
Stage 12	191.4	27.67	56.23
Stage 12	191.2	36.82	45.79
Stage 12	191	43.82	34.98
Stage 12	190.8	48.59	23.84
Stage 12	190.6	51.07	12.4
Stage 12	190.4	51.21	0.71
Stage 12	190.2	48.97	-11.19
Stage 12	190	44.33	-23.22
Stage 12	189.8	37.26	-35.32
Stage 12	189.7	32.83	-44.39
Stage 12	189.5	44.1	56.36
Stage 12	189.3	52.94	44.23
Stage 12	189.1	59.3	31.79
Stage 12	188.9	63.11	19.03
Stage 12	188.7	64.3	5.95
Stage 12	188.5	62.81	-7.45
Stage 12	188.3	58.57	-21.17
Stage 12	188.1	53.24	-26.65
Stage 12	187.9	47.05	-30.95
Stage 12	187.7	40.23	-34.09
Stage 12	187.5	33.02	-36.07
Stage 12	187.3	25.64	-36.88
Stage 12	187.1	18.34	-36.52
Stage 12	186.9	11.34	-35
Stage 12	186.7	4.88	-32.31
Stage 12	186.5	-0.81	-28.45
Stage 12	186.3	-5.82	-25.05
Stage 12	186.1	-10.28	-22.28
Stage 12	185.9	-14.31	-20.15
Stage 12	185.7	-18.04	-18.65
Stage 12	185.5	-21.6	-17.79
Stage 12	185.3	-25.1	-17.54
Stage 12	185.1	-28.68	-17.9
Stage 12	184.9	-32.45	-18.81
Stage 12	184.7	-34.72	-11.36

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 12	184.5	-35.73	-5.04
Stage 12	184.3	-35.68	0.24
Stage 12	184.1	-34.75	4.62
Stage 12	183.9	-33.11	8.21
Stage 12	183.7	-30.88	11.14
Stage 12	183.5	-28.18	13.52
Stage 12	183.3	-25.17	15.04
Stage 12	183.1	-22.04	15.68
Stage 12	182.9	-18.91	15.64
Stage 12	182.7	-15.9	15.07
Stage 12	182.5	-13.07	14.13
Stage 12	182.3	-10.49	12.92
Stage 12	182.1	-8.18	11.55
Stage 12	181.9	-6.16	10.09
Stage 12	181.7	-4.44	8.59
Stage 12	181.5	-3.02	7.1
Stage 12	181.3	-1.89	5.65
Stage 12	181.1	-1.04	4.26
Stage 12	180.9	-0.45	2.94
Stage 12	180.7	-0.11	1.7
Stage 12	180.5	0	0.54

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 12	198.7	0	0
Stage 12	198.5	0	0
Stage 12	198.5	0	0
Stage 12	198.3	0	0
Stage 12	198.3	0	0
Stage 12	198.1	0	0
Stage 12	198.1	0	0
Stage 12	198	0	0

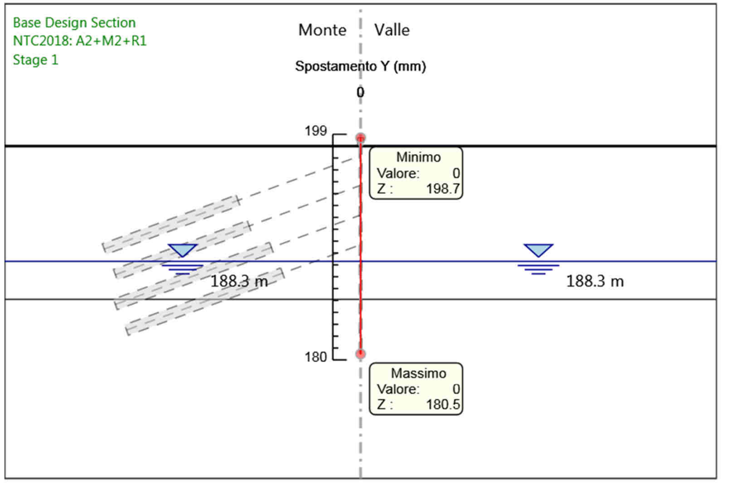
4.3.13. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 13

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 13	198	0	-6.15
Stage 13	197.8	-1.23	-6.15
Stage 13	197.6	-4.16	-14.63
Stage 13	197.4	-8.74	-22.92
Stage 13	197.2	-14.93	-30.96
Stage 13	197	-8.5	32.17
Stage 13	196.8	-3.59	24.54
Stage 13	196.6	-0.17	17.11
Stage 13	196.4	1.81	9.88
Stage 13	196.2	2.38	2.85
Stage 13	196	1.57	-4.02
Stage 13	195.8	-0.58	-10.76
Stage 13	195.6	-4.05	-17.37
Stage 13	195.4	-8.79	-23.68
Stage 13	195.2	-14.73	-29.71
Stage 13	195	-21.85	-35.58
Stage 13	194.8	-30.12	-41.38
Stage 13	194.7	-34.68	-45.59
Stage 13	194.5	-27.22	37.29
Stage 13	194.3	-20.8	32.09
Stage 13	194.1	-15.49	26.59
Stage 13	193.9	-11.32	20.83
Stage 13	193.7	-8.35	14.86
Stage 13	193.5	-6.6	8.72
Stage 13	193.3	-6.11	2.49
Stage 13	193.1	-6.86	-3.76
Stage 13	192.9	-8.93	-10.37
Stage 13	192.7	-12.41	-17.37
Stage 13	192.5	-17.36	-24.77
Stage 13	192.3	-23.88	-32.58
Stage 13	192.2	-27.75	-38.75
Stage 13	192	-11.2	82.76
Stage 13	191.8	3.58	73.92
Stage 13	191.6	16.52	64.67
Stage 13	191.4	27.52	55.02
Stage 13	191.2	36.52	44.98
Stage 13	191	43.43	34.58
Stage 13	190.8	48.2	23.86
Stage 13	190.6	50.77	12.84
Stage 13	190.4	51.08	1.56
Stage 13	190.2	49.1	-9.9
Stage 13	190	44.8	-21.51
Stage 13	189.8	38.17	-33.17
Stage 13	189.7	33.98	-41.91
Stage 13	189.5	44.74	53.82
Stage 13	189.3	53.17	42.14
Stage 13	189.1	59.2	30.14
Stage 13	188.9	62.76	17.82
Stage 13	188.7	63.79	5.18
Stage 13	188.5	62.24	-7.78
Stage 13	188.3	58.03	-21.06
Stage 13	188.1	52.71	-26.59
Stage 13	187.9	46.52	-30.94
Stage 13	187.7	39.7	-34.13
Stage 13	187.5	32.47	-36.13
Stage 13	187.3	25.08	-36.96
Stage 13	187.1	17.76	-36.61
Stage 13	186.9	10.74	-35.07
Stage 13	186.7	4.27	-32.35
Stage 13	186.5	-1.42	-28.44
Stage 13	186.3	-6.41	-24.97
Stage 13	186.1	-10.83	-22.1
Stage 13	185.9	-14.8	-19.84
Stage 13	185.7	-18.43	-18.19
Stage 13	185.5	-21.86	-17.14
Stage 13	185.3	-25.2	-16.68
Stage 13	185.1	-28.56	-16.79
Stage 13	184.9	-32.04	-17.43
Stage 13	184.7	-34.11	-10.36

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 13	184.5	-34.99	-4.38
Stage 13	184.3	-34.87	0.63
Stage 13	184.1	-33.91	4.78
Stage 13	183.9	-32.27	8.19
Stage 13	183.7	-30.07	10.99
Stage 13	183.5	-27.42	13.27
Stage 13	183.3	-24.48	14.72
Stage 13	183.1	-21.41	15.32
Stage 13	182.9	-18.36	15.26
Stage 13	182.7	-15.43	14.69
Stage 13	182.5	-12.67	13.75
Stage 13	182.3	-10.16	12.57
Stage 13	182.1	-7.92	11.22
Stage 13	181.9	-5.96	9.79
Stage 13	181.7	-4.29	8.33
Stage 13	181.5	-2.92	6.88
Stage 13	181.3	-1.83	5.47
Stage 13	181.1	-1	4.12
Stage 13	180.9	-0.43	2.84
Stage 13	180.7	-0.1	1.64
Stage 13	180.5	0	0.52

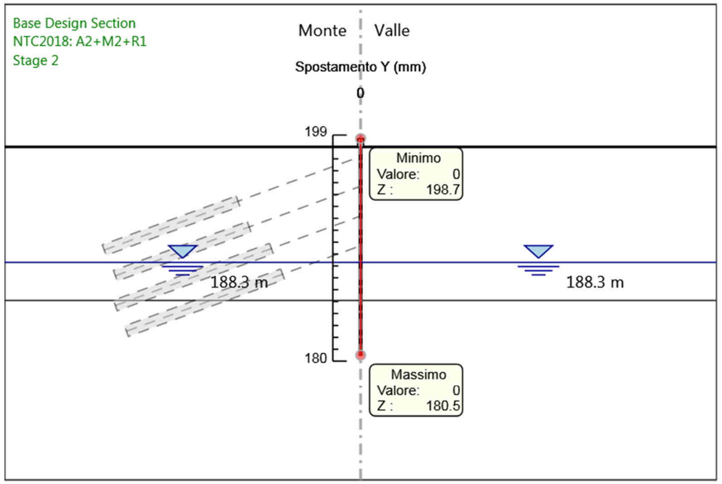
Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 13	198.7	0	0
Stage 13	198.5	0	0
Stage 13	198.5	0	0
Stage 13	198.3	0	0
Stage 13	198.3	0	0
Stage 13	198.1	0	0
Stage 13	198.1	0	0
Stage 13	198	0	0

4.3.14. Grafico Spostamento NTC2018: A2+M2+R1 - Stage: Stage 1



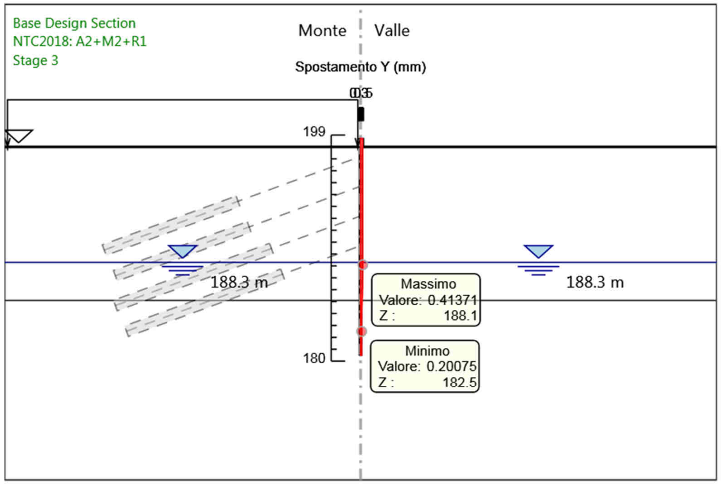
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 1
Spostamento orizzontale

4.3.15. Grafico Spostamento NTC2018: A2+M2+R1 - Stage: Stage 2



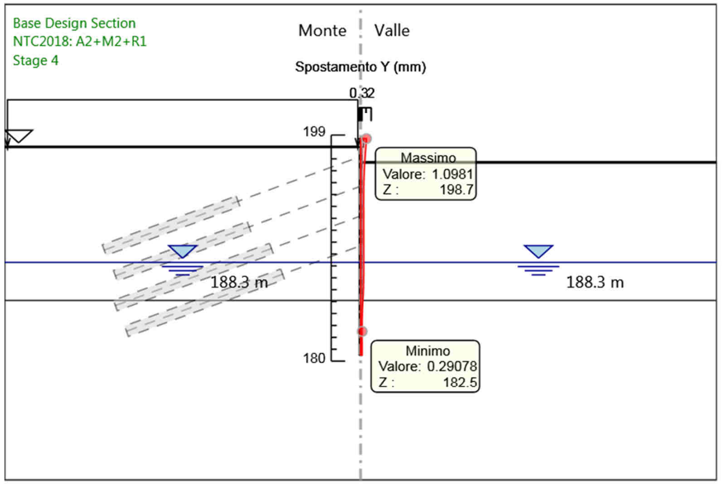
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 2
Spostamento orizzontale

4.3.16. Grafico Spostamento NTC2018: A2+M2+R1 - Stage: Stage 3



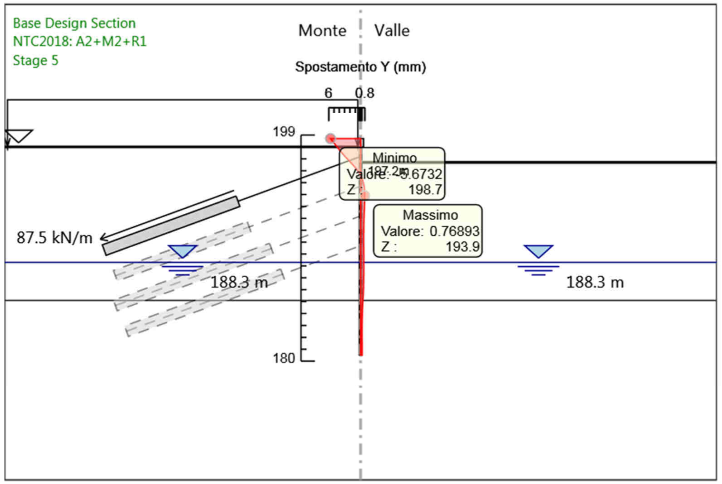
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 3
Spostamento orizzontale

4.3.17. Grafico Spostamento NTC2018: A2+M2+R1 - Stage: Stage 4



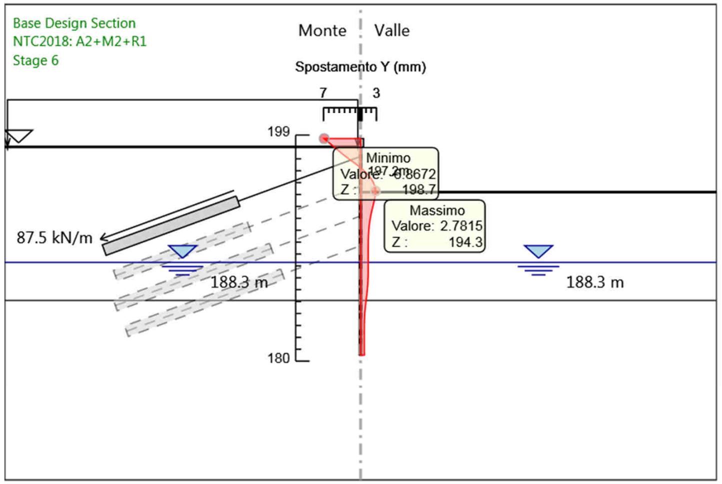
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 4
Spostamento orizzontale

4.3.18. Grafico Spostamento NTC2018: A2+M2+R1 - Stage: Stage 5



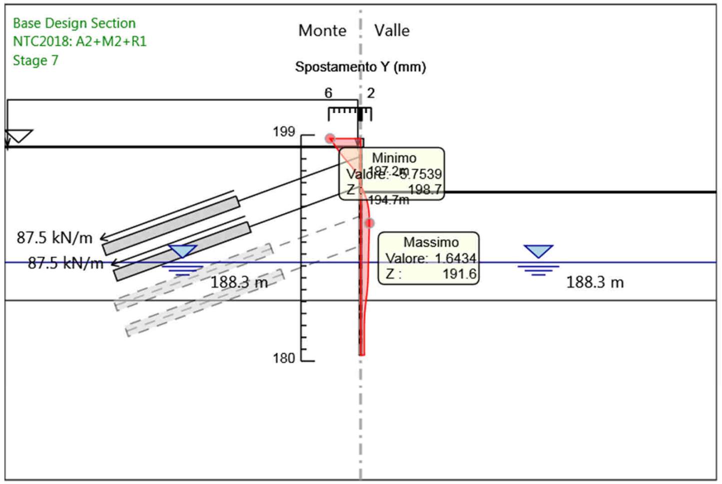
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 5
Spostamento orizzontale

4.3.19. Grafico Spostamento NTC2018: A2+M2+R1 - Stage: Stage 6



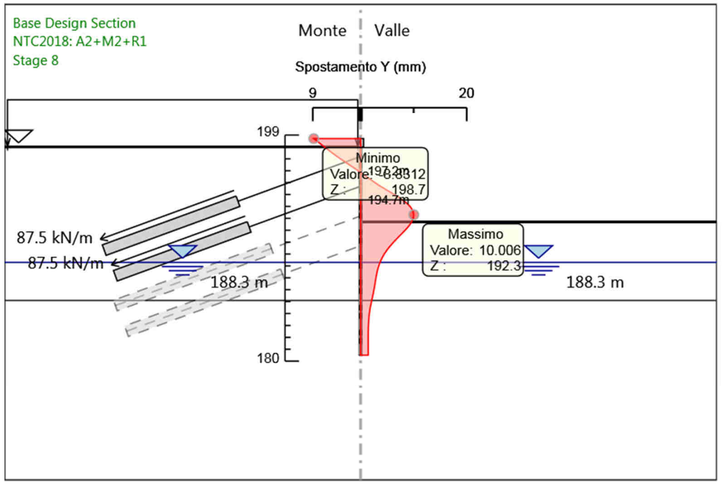
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 6
Spostamento orizzontale

4.3.20. Grafico Spostamento NTC2018: A2+M2+R1 - Stage: Stage 7



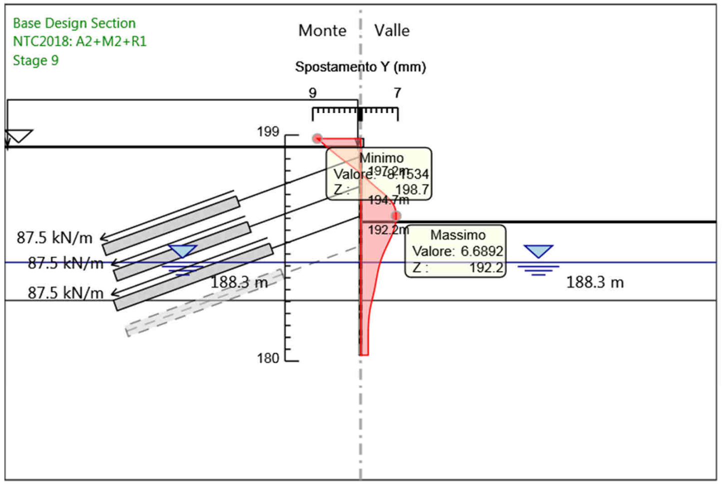
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 7
Spostamento orizzontale

4.3.21. Grafico Spostamento NTC2018: A2+M2+R1 - Stage: Stage 8



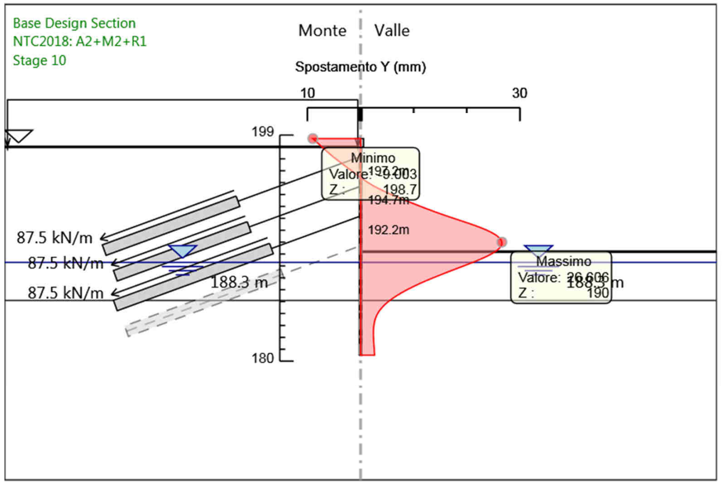
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 8
Spostamento orizzontale

4.3.22. Grafico Spostamento NTC2018: A2+M2+R1 - Stage: Stage 9



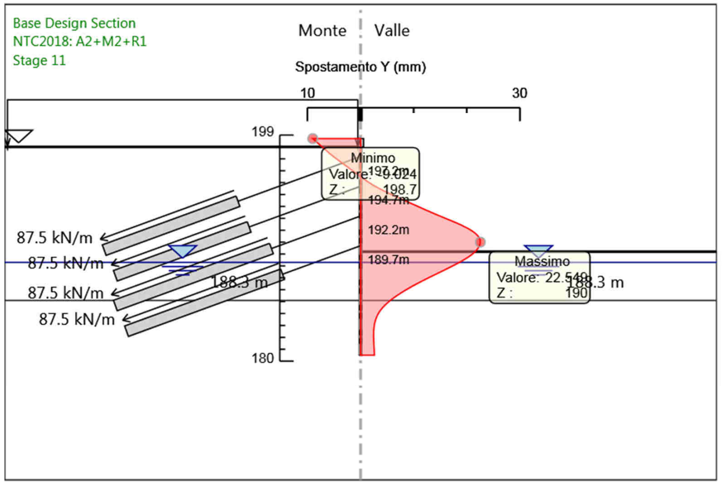
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 9
Spostamento orizzontale

4.3.23. Grafico Spostamento NTC2018: A2+M2+R1 - Stage: Stage 10



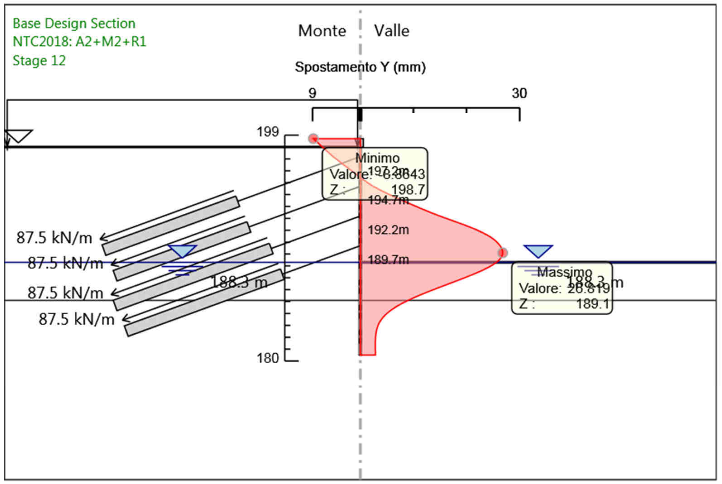
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 10
Spostamento orizzontale

4.3.24. Grafico Spostamento NTC2018: A2+M2+R1 - Stage: Stage 11



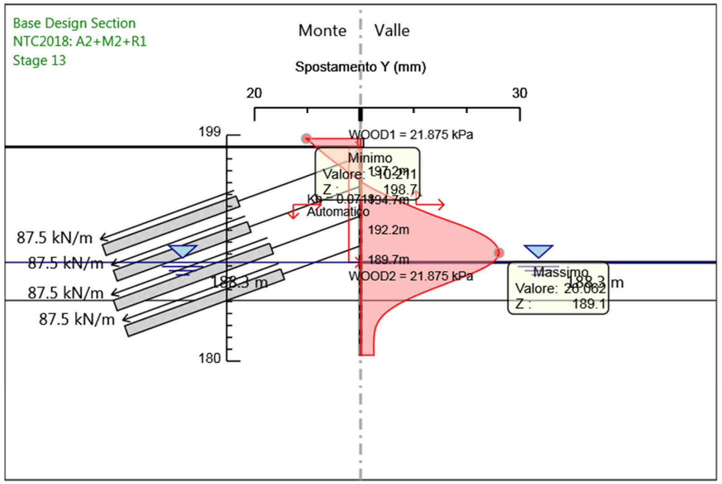
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 11
Spostamento orizzontale

4.3.25. Grafico Spostamento NTC2018: A2+M2+R1 - Stage: Stage 12



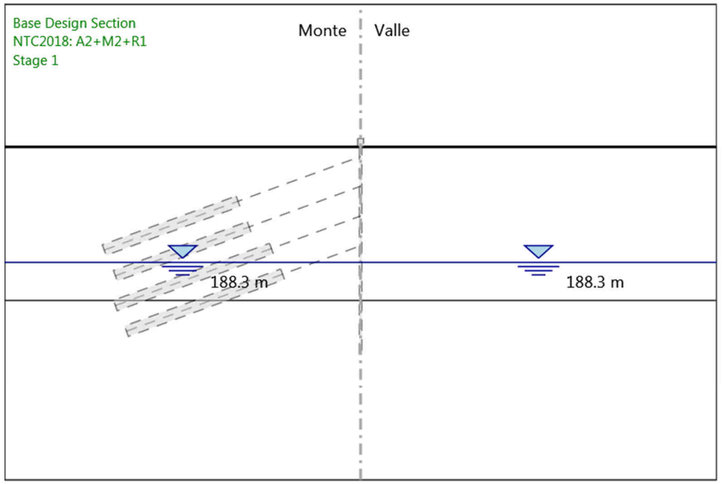
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 12
Spostamento orizzontale

4.3.26. Grafico Spostamento NTC2018: A2+M2+R1 - Stage: Stage 13



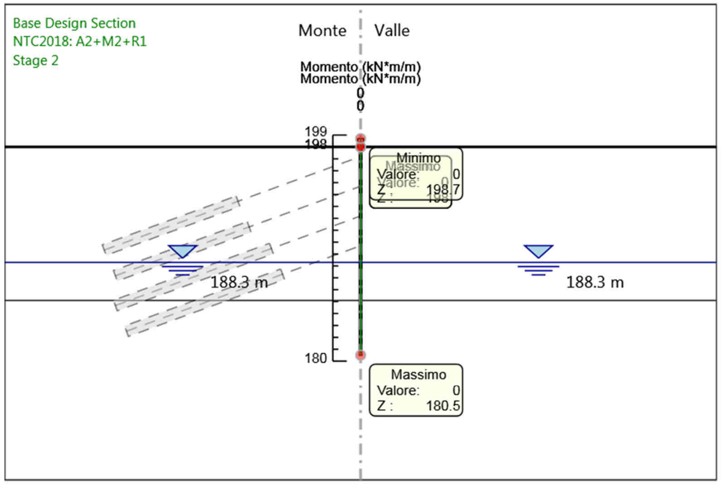
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 13
Spostamento orizzontale

4.3.27. Grafico Risultati Momento NTC2018: A2+M2+R1 - Stage: Stage 1



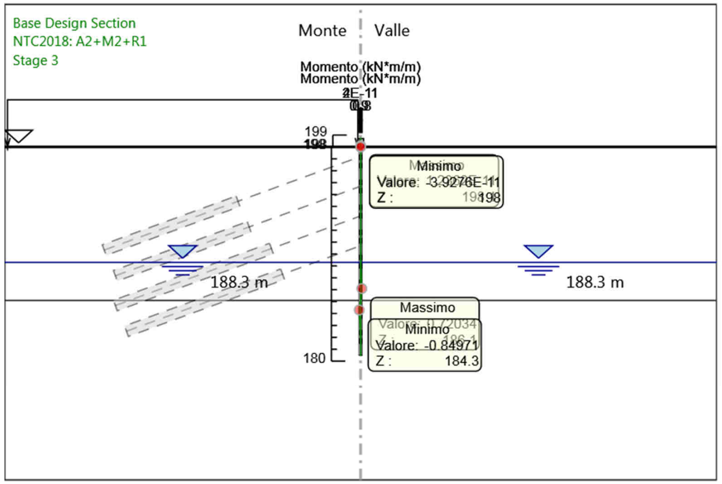
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 1
Momento

4.3.28. Grafico Risultati Momento NTC2018: A2+M2+R1 - Stage: Stage 2



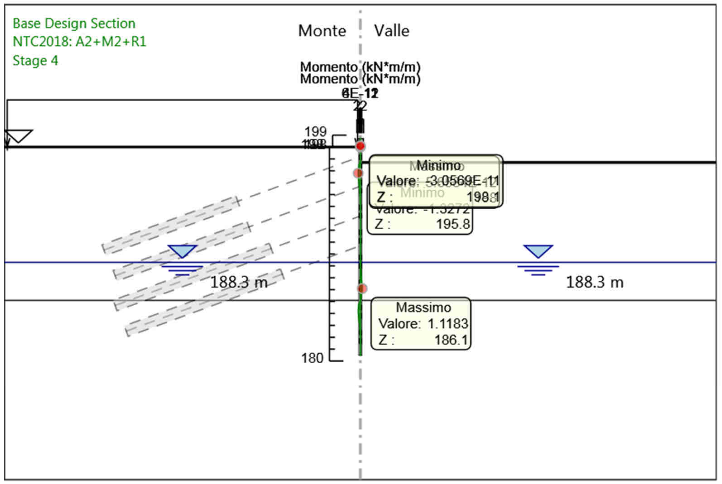
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 2
Momento

4.3.29. Grafico Risultati Momento NTC2018: A2+M2+R1 - Stage: Stage 3



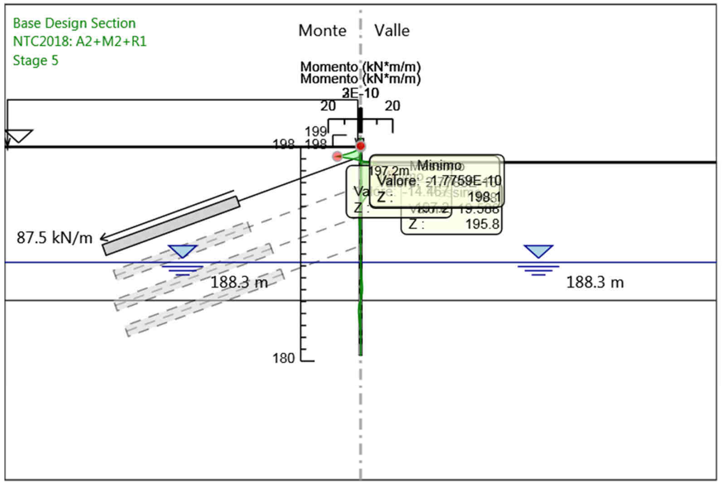
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 3
Momento

4.3.30. Grafico Risultati Momento NTC2018: A2+M2+R1 - Stage: Stage 4



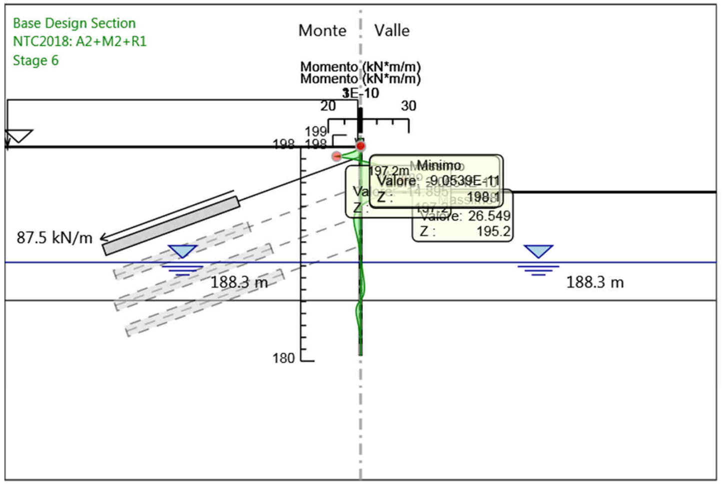
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 4
Momento

4.3.31. Grafico Risultati Momento NTC2018: A2+M2+R1 - Stage: Stage 5



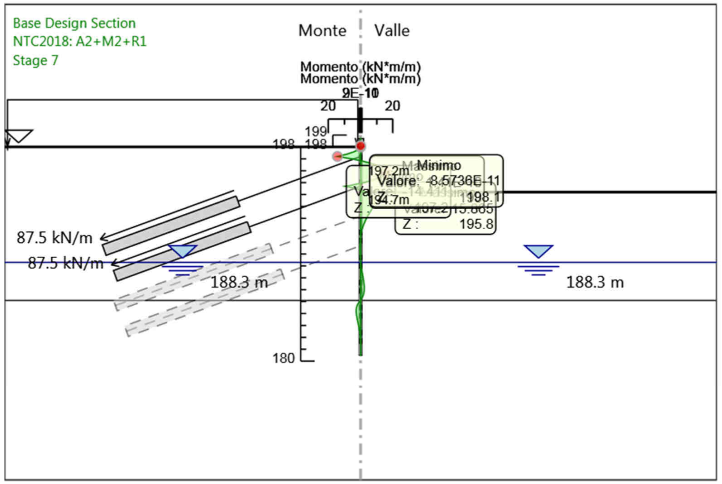
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 5
Momento

4.3.32. Grafico Risultati Momento NTC2018: A2+M2+R1 - Stage: Stage 6



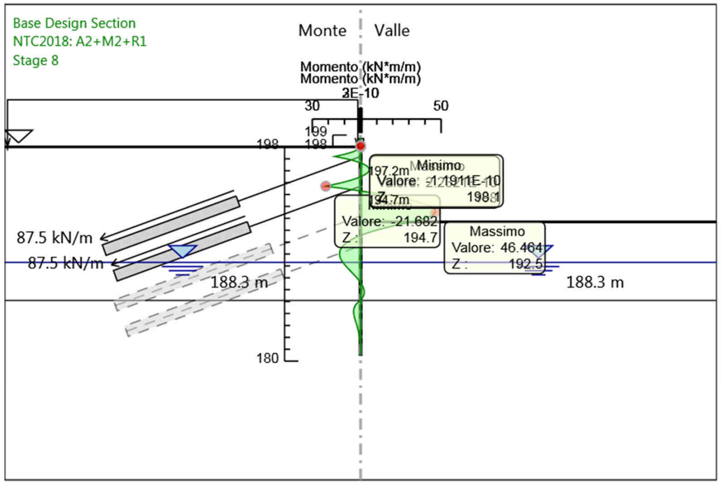
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 6
Momento

4.3.33. Grafico Risultati Momento NTC2018: A2+M2+R1 - Stage: Stage 7



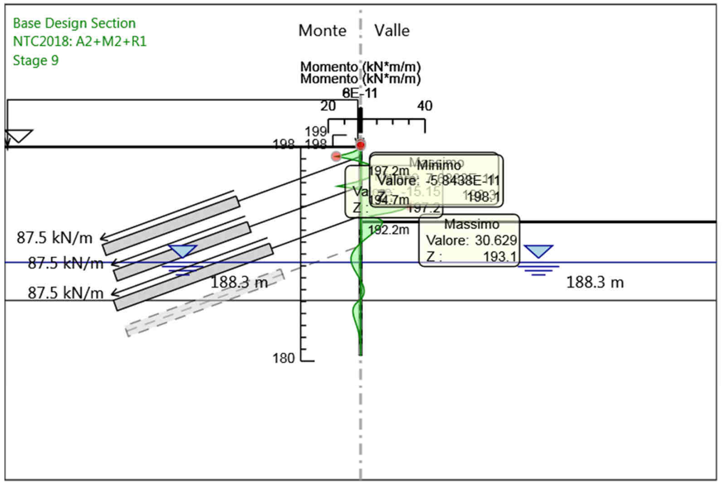
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 7
Momento

4.3.34. Grafico Risultati Momento NTC2018: A2+M2+R1 - Stage: Stage 8



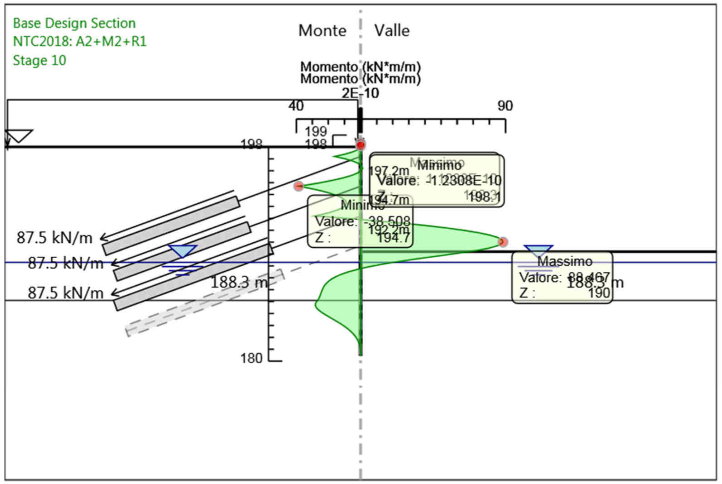
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 8
Momento

4.3.35. Grafico Risultati Momento NTC2018: A2+M2+R1 - Stage: Stage 9



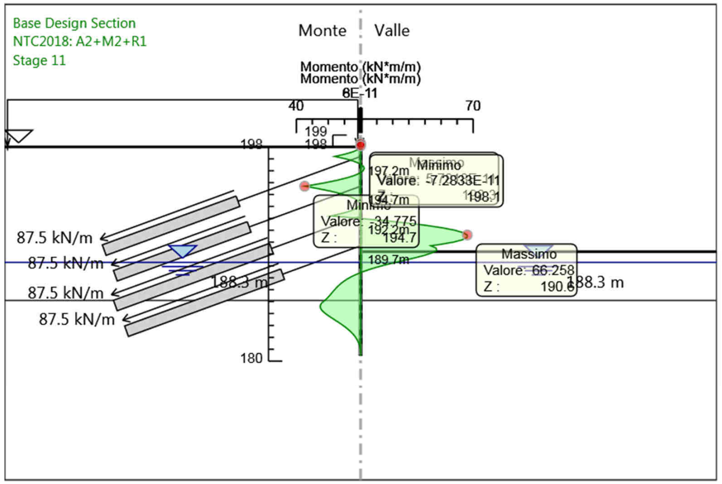
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 9
Momento

4.3.36. Grafico Risultati Momento NTC2018: A2+M2+R1 - Stage: Stage 10



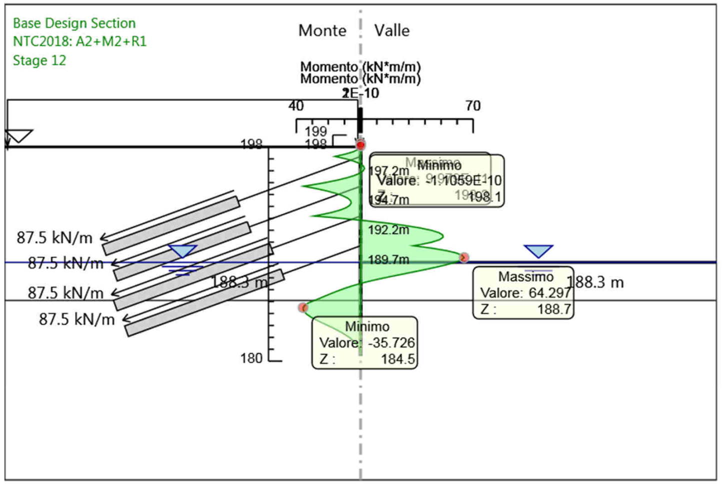
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 10
Momento

4.3.37. Grafico Risultati Momento NTC2018: A2+M2+R1 - Stage: Stage 11



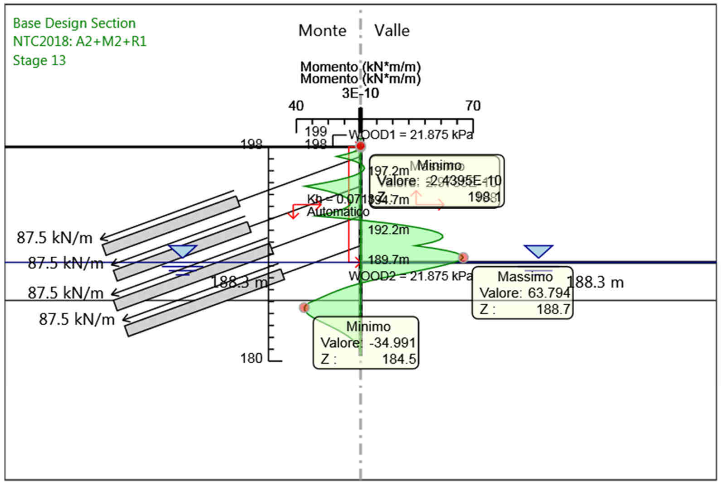
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 11
Momento

4.3.38. Grafico Risultati Momento NTC2018: A2+M2+R1 - Stage: Stage 12



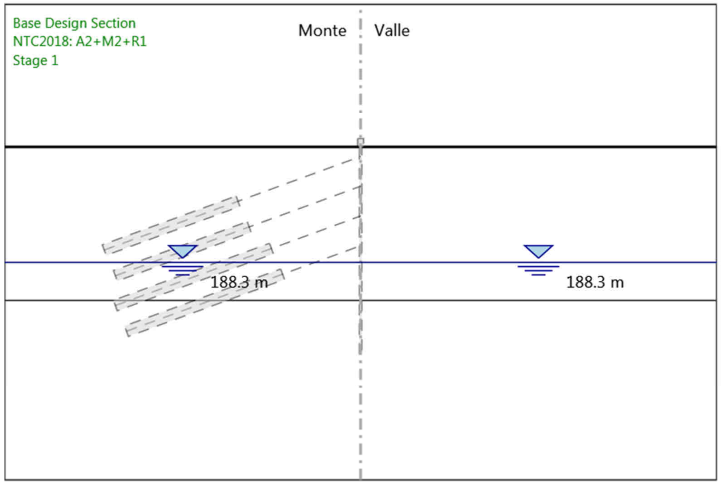
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 12
Momento

4.3.39. Grafico Risultati Momento NTC2018: A2+M2+R1 - Stage: Stage 13



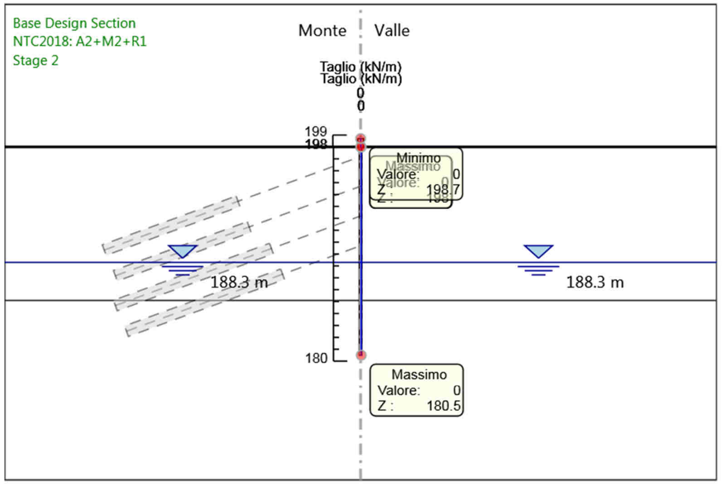
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 13
Momento

4.3.40. Grafico Risultati Taglio NTC2018: A2+M2+R1 - Stage: Stage 1



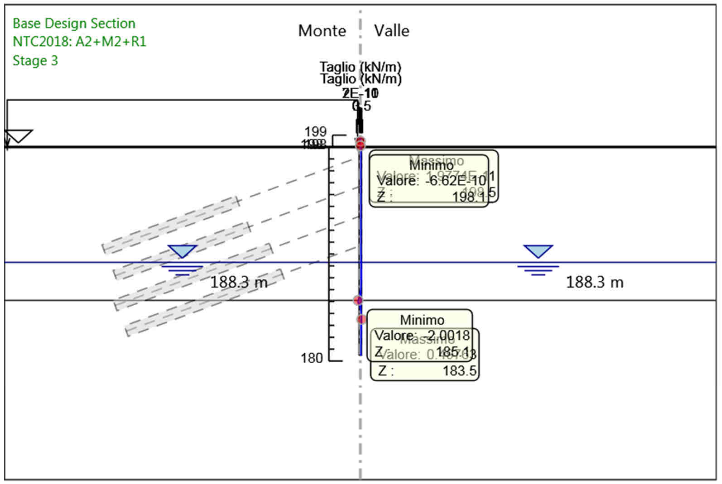
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 1
Taglio

4.3.41. Grafico Risultati Taglio NTC2018: A2+M2+R1 - Stage: Stage 2



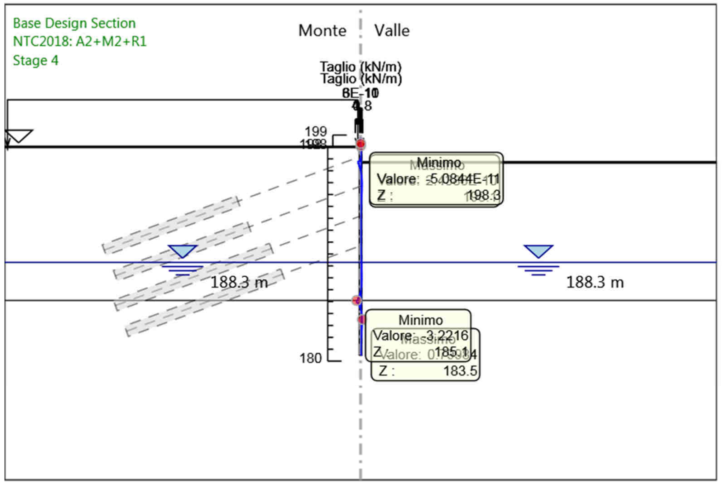
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 2
Taglio

4.3.42. Grafico Risultati Taglio NTC2018: A2+M2+R1 - Stage: Stage 3



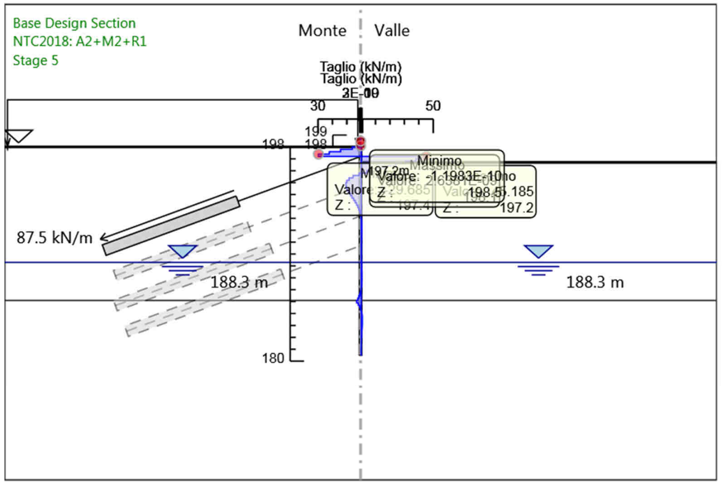
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 3
Taglio

4.3.43. Grafico Risultati Taglio NTC2018: A2+M2+R1 - Stage: Stage 4



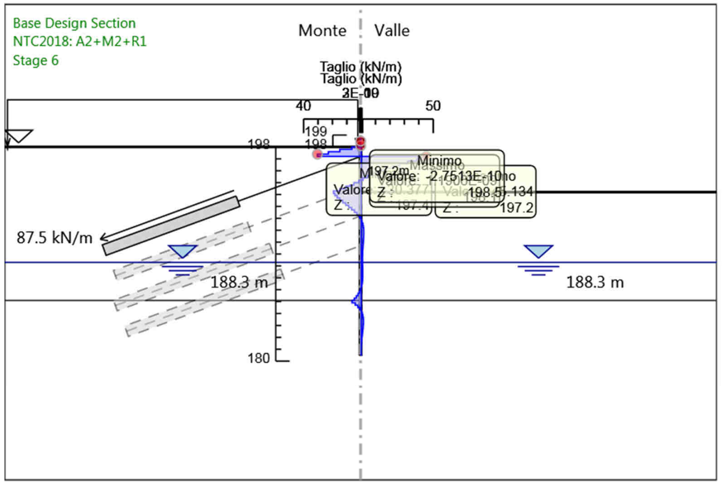
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 4
Taglio

4.3.44. Grafico Risultati Taglio NTC2018: A2+M2+R1 - Stage: Stage 5



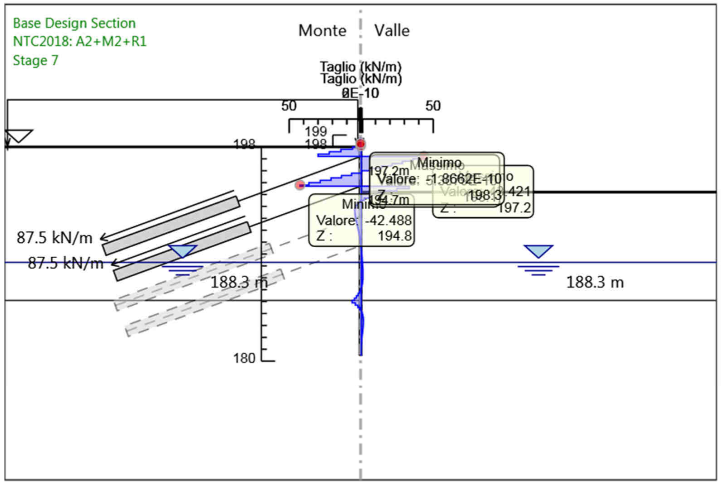
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 5
Taglio

4.3.45. Grafico Risultati Taglio NTC2018: A2+M2+R1 - Stage: Stage 6



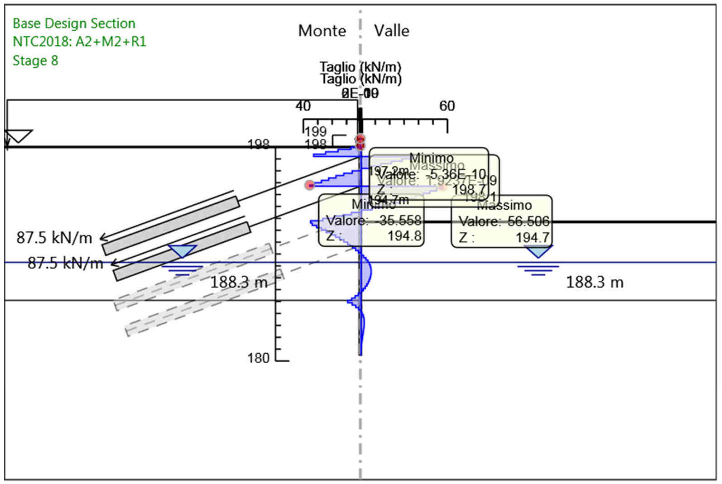
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 6
Taglio

4.3.46. Grafico Risultati Taglio NTC2018: A2+M2+R1 - Stage: Stage 7



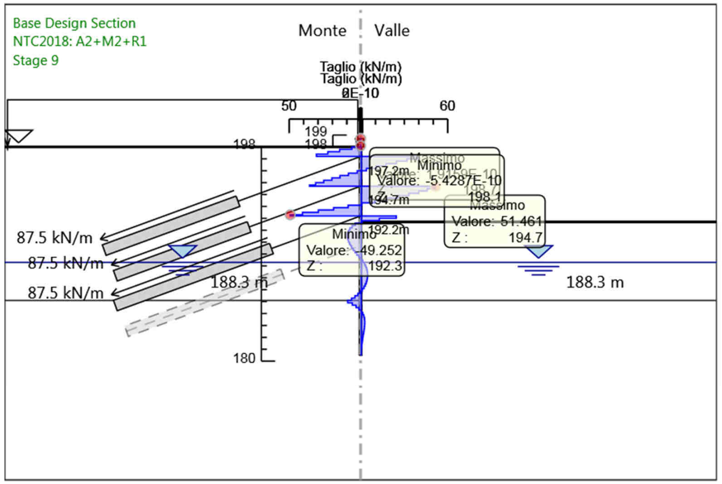
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 7
Taglio

4.3.47. Grafico Risultati Taglio NTC2018: A2+M2+R1 - Stage: Stage 8



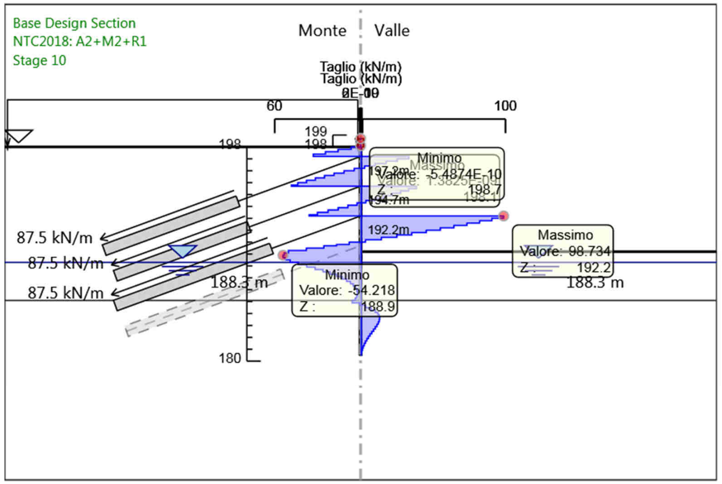
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 8
Taglio

4.3.48. Grafico Risultati Taglio NTC2018: A2+M2+R1 - Stage: Stage 9



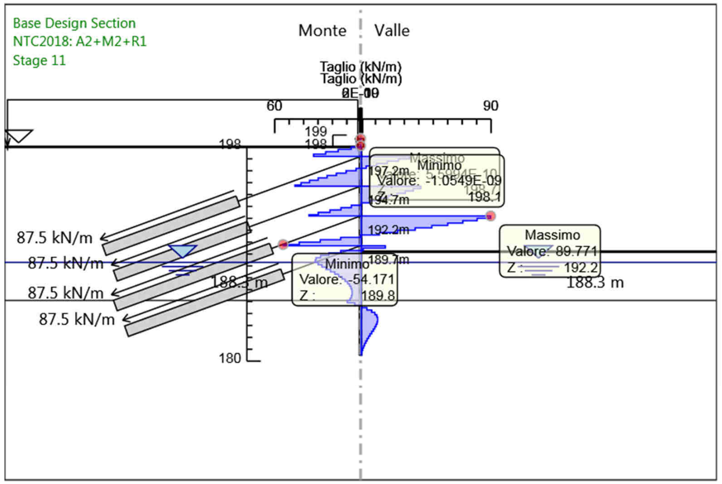
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 9
Taglio

4.3.49. Grafico Risultati Taglio NTC2018: A2+M2+R1 - Stage: Stage 10



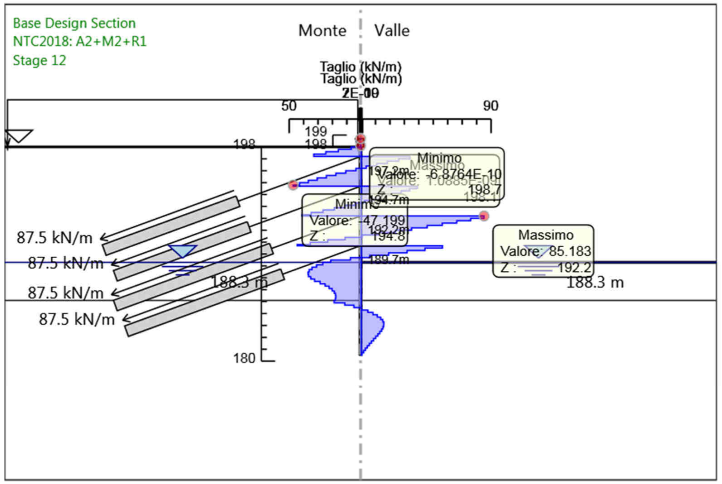
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 10
Taglio

4.3.50. Grafico Risultati Taglio NTC2018: A2+M2+R1 - Stage: Stage 11



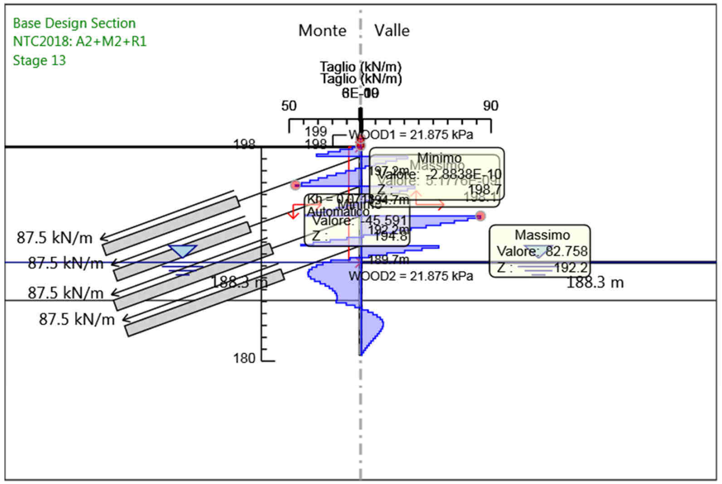
Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 11
Taglio

4.3.51. Grafico Risultati Taglio NTC2018: A2+M2+R1 - Stage: Stage 12



Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 12
Taglio

4.3.52. Grafico Risultati Taglio NTC2018: A2+M2+R1 - Stage: Stage 13



Design Assumption: NTC2018: A2+M2+R1
Stage: Stage 13
Taglio

4.3.53. Risultati Elementi strutturali - NTC2018: A2+M2+R1

Design Assumption: NTC2018: A2+M2+R1	Sollecitazione I-ordine
Stage	**Forza (kN/m)**
Stage 5	87.5
Stage 6	87.9398
Stage 7	86.08589
Stage 8	82.14347
Stage 9	83.14198
Stage 10	79.27892
Stage 11	79.67413
Stage 12	79.6673
Stage 13	75.4908

Design Assumption: NTC2018: A2+M2+R1	Sollecitazione II-ordine
Stage	**Forza (kN/m)**
Stage 7	87.5
Stage 8	101.5219
Stage 9	97.38326
Stage 10	96.92013
Stage 11	97.5588
Stage 12	96.42367
Stage 13	92.59333

Design Assumption: NTC2018: A2+M2+R1	Sollecitazione III-ordine
Stage	**Forza (kN/m)**
Stage 9	87.5
Stage 10	149.6939
Stage 11	141.1684
Stage 12	141.4705
Stage 13	136.0333

Design Assumption: NTC2018: A2+M2+R1	Sollecitazione IV-ordine
Stage	**Forza (kN/m)**
Stage 11	87.5
Stage 12	116.8304
Stage 13	111.1437

4.4. Risultati NTC2018: SISMICA STR

4.4.1. Tabella Risultati Paratia NTC2018: SISMICA STR - Left Wall - Stage: Stage 1

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 1	198	0	0
Stage 1	197.8	0	0
Stage 1	197.6	0	0
Stage 1	197.4	0	0
Stage 1	197.2	0	0
Stage 1	197	0	0
Stage 1	196.8	0	0
Stage 1	196.6	0	0
Stage 1	196.4	0	0
Stage 1	196.2	0	0
Stage 1	196	0	0
Stage 1	195.8	0	0
Stage 1	195.6	0	0
Stage 1	195.4	0	0
Stage 1	195.2	0	0
Stage 1	195	0	0
Stage 1	194.8	0	0
Stage 1	194.7	0	0
Stage 1	194.5	0	0
Stage 1	194.3	0	0
Stage 1	194.1	0	0
Stage 1	193.9	0	0
Stage 1	193.7	0	0
Stage 1	193.5	0	0
Stage 1	193.3	0	0
Stage 1	193.1	0	0
Stage 1	192.9	0	0
Stage 1	192.7	0	0
Stage 1	192.5	0	0
Stage 1	192.3	0	0
Stage 1	192.2	0	0
Stage 1	192	0	0
Stage 1	191.8	0	0
Stage 1	191.6	0	0
Stage 1	191.4	0	0
Stage 1	191.2	0	0
Stage 1	191	0	0
Stage 1	190.8	0	0
Stage 1	190.6	0	0
Stage 1	190.4	0	0
Stage 1	190.2	0	0
Stage 1	190	0	0
Stage 1	189.8	0	0
Stage 1	189.7	0	0
Stage 1	189.5	0	0
Stage 1	189.3	0	0
Stage 1	189.1	0	0
Stage 1	188.9	0	0
Stage 1	188.7	0	0
Stage 1	188.5	0	0
Stage 1	188.3	0	0
Stage 1	188.1	0	0
Stage 1	187.9	0	0
Stage 1	187.7	0	0
Stage 1	187.5	0	0
Stage 1	187.3	0	0
Stage 1	187.1	0	0
Stage 1	186.9	0	0
Stage 1	186.7	0	0
Stage 1	186.5	0	0
Stage 1	186.3	0	0
Stage 1	186.1	0	0
Stage 1	185.9	0	0
Stage 1	185.7	0	0
Stage 1	185.5	0	0
Stage 1	185.3	0	0

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 1	185.1	0	0
Stage 1	184.9	0	0
Stage 1	184.7	0	0
Stage 1	184.5	0	0
Stage 1	184.3	0	0
Stage 1	184.1	0	0
Stage 1	183.9	0	0
Stage 1	183.7	0	0
Stage 1	183.5	0	0
Stage 1	183.3	0	0
Stage 1	183.1	0	0
Stage 1	182.9	0	0
Stage 1	182.7	0	0
Stage 1	182.5	0	0
Stage 1	182.3	0	0
Stage 1	182.1	0	0
Stage 1	181.9	0	0
Stage 1	181.7	0	0
Stage 1	181.5	0	0
Stage 1	181.3	0	0
Stage 1	181.1	0	0
Stage 1	180.9	0	0
Stage 1	180.7	0	0
Stage 1	180.5	0	0

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 1	198.7	0	0
Stage 1	198.5	0	0
Stage 1	198.3	0	0
Stage 1	198.1	0	0
Stage 1	198	0	0

4.4.2. Tabella Risultati Paratia NTC2018: SISMICA STR - Left Wall - Stage: Stage 2

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	198	0	0
Stage 2	197.8	0	0
Stage 2	197.6	0	0
Stage 2	197.4	0	0
Stage 2	197.2	0	0
Stage 2	197	0	0
Stage 2	196.8	0	0
Stage 2	196.6	0	0
Stage 2	196.4	0	0
Stage 2	196.2	0	0
Stage 2	196	0	0
Stage 2	195.8	0	0
Stage 2	195.6	0	0
Stage 2	195.4	0	0
Stage 2	195.2	0	0
Stage 2	195	0	0
Stage 2	194.8	0	0
Stage 2	194.7	0	0
Stage 2	194.5	0	0
Stage 2	194.3	0	0
Stage 2	194.1	0	0
Stage 2	193.9	0	0
Stage 2	193.7	0	0
Stage 2	193.5	0	0
Stage 2	193.3	0	0
Stage 2	193.1	0	0
Stage 2	192.9	0	0
Stage 2	192.7	0	0
Stage 2	192.5	0	0
Stage 2	192.3	0	0
Stage 2	192.2	0	0
Stage 2	192	0	0
Stage 2	191.8	0	0
Stage 2	191.6	0	0
Stage 2	191.4	0	0
Stage 2	191.2	0	0
Stage 2	191	0	0
Stage 2	190.8	0	0
Stage 2	190.6	0	0
Stage 2	190.4	0	0
Stage 2	190.2	0	0
Stage 2	190	0	0
Stage 2	189.8	0	0
Stage 2	189.7	0	0
Stage 2	189.5	0	0
Stage 2	189.3	0	0
Stage 2	189.1	0	0
Stage 2	188.9	0	0
Stage 2	188.7	0	0
Stage 2	188.5	0	0
Stage 2	188.3	0	0
Stage 2	188.1	0	0
Stage 2	187.9	0	0
Stage 2	187.7	0	0
Stage 2	187.5	0	0
Stage 2	187.3	0	0
Stage 2	187.1	0	0
Stage 2	186.9	0	0
Stage 2	186.7	0	0
Stage 2	186.5	0	0
Stage 2	186.3	0	0
Stage 2	186.1	0	0
Stage 2	185.9	0	0
Stage 2	185.7	0	0
Stage 2	185.5	0	0
Stage 2	185.3	0	0
Stage 2	185.1	0	0
Stage 2	184.9	0	0
Stage 2	184.7	0	0

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	184.5	0	0
Stage 2	184.3	0	0
Stage 2	184.1	0	0
Stage 2	183.9	0	0
Stage 2	183.7	0	0
Stage 2	183.5	0	0
Stage 2	183.3	0	0
Stage 2	183.1	0	0
Stage 2	182.9	0	0
Stage 2	182.7	0	0
Stage 2	182.5	0	0
Stage 2	182.3	0	0
Stage 2	182.1	0	0
Stage 2	181.9	0	0
Stage 2	181.7	0	0
Stage 2	181.5	0	0
Stage 2	181.3	0	0
Stage 2	181.1	0	0
Stage 2	180.9	0	0
Stage 2	180.7	0	0
Stage 2	180.5	0	0

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	198.7	0	0
Stage 2	198.5	0	0
Stage 2	198.3	0	0
Stage 2	198.1	0	0
Stage 2	198	0	0

4.4.3. Tabella Risultati Paratia NTC2018: SISMICA STR - Left Wall - Stage: Stage 3

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 3	198	0	0
Stage 3	197.8	0	0
Stage 3	197.6	0	0
Stage 3	197.4	0	0
Stage 3	197.4	0	0
Stage 3	197.2	0	0
Stage 3	197	0	0
Stage 3	196.8	0	0
Stage 3	196.6	0	0
Stage 3	196.4	0	0
Stage 3	196.2	0	0
Stage 3	196	0	0
Stage 3	195.8	0	0
Stage 3	195.6	0	0
Stage 3	195.4	0	0
Stage 3	195.2	0	0
Stage 3	195	0	0
Stage 3	194.8	0	0
Stage 3	194.7	0	0
Stage 3	194.5	0	0
Stage 3	194.3	0	0
Stage 3	194.1	0	0
Stage 3	193.9	0	0
Stage 3	193.7	0	0
Stage 3	193.5	0	0
Stage 3	193.3	0	0
Stage 3	193.1	0	0
Stage 3	192.9	0	0
Stage 3	192.7	0	0
Stage 3	192.5	0	-0.01
Stage 3	192.3	0	-0.01
Stage 3	192.2	-0.01	-0.01
Stage 3	192	-0.01	-0.01
Stage 3	191.8	-0.01	-0.01
Stage 3	191.6	-0.01	-0.01
Stage 3	191.4	-0.02	-0.01
Stage 3	191.2	-0.02	-0.01
Stage 3	191	-0.02	-0.02
Stage 3	190.8	-0.02	-0.01
Stage 3	190.6	-0.03	-0.01
Stage 3	190.4	-0.03	-0.01
Stage 3	190.2	-0.03	-0.01
Stage 3	190	-0.03	0
Stage 3	189.8	-0.03	0.01
Stage 3	189.7	-0.03	0.02
Stage 3	189.5	-0.02	0.03
Stage 3	189.3	-0.01	0.04
Stage 3	189.1	0	0.06
Stage 3	188.9	0.02	0.09
Stage 3	188.7	0.04	0.11
Stage 3	188.5	0.07	0.14
Stage 3	188.3	0.1	0.17
Stage 3	188.1	0.15	0.21
Stage 3	187.9	0.19	0.24
Stage 3	187.7	0.25	0.28
Stage 3	187.5	0.31	0.31
Stage 3	187.3	0.38	0.33
Stage 3	187.1	0.45	0.35
Stage 3	186.9	0.52	0.35
Stage 3	186.7	0.58	0.33
Stage 3	186.5	0.64	0.28
Stage 3	186.3	0.68	0.2
Stage 3	186.1	0.69	0.08
Stage 3	185.9	0.67	-0.09
Stage 3	185.7	0.61	-0.32
Stage 3	185.5	0.49	-0.62
Stage 3	185.3	0.29	-0.98
Stage 3	185.1	0.01	-1.43
Stage 3	184.9	-0.39	-1.95

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 3	184.7	-0.63	-1.24
Stage 3	184.5	-0.77	-0.67
Stage 3	184.3	-0.82	-0.25
Stage 3	184.1	-0.81	0.06
Stage 3	183.9	-0.75	0.27
Stage 3	183.7	-0.67	0.4
Stage 3	183.5	-0.58	0.47
Stage 3	183.3	-0.48	0.49
Stage 3	183.1	-0.39	0.47
Stage 3	182.9	-0.3	0.43
Stage 3	182.7	-0.22	0.38
Stage 3	182.5	-0.16	0.32
Stage 3	182.3	-0.11	0.26
Stage 3	182.1	-0.07	0.2
Stage 3	181.9	-0.04	0.15
Stage 3	181.7	-0.02	0.1
Stage 3	181.5	-0.01	0.06
Stage 3	181.3	0	0.03
Stage 3	181.1	0	0.01
Stage 3	180.9	0	0
Stage 3	180.7	0	-0.01
Stage 3	180.5	0	-0.01

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 3	198.7	0	0
Stage 3	198.5	0	0
Stage 3	198.5	0	0
Stage 3	198.3	0	0
Stage 3	198.3	0	0
Stage 3	198.1	0	0
Stage 3	198.1	0	0
Stage 3	198	0	0

4.4.4. Tabella Risultati Paratia NTC2018: SISMICA STR - Left Wall - Stage: Stage 4

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 4	198	0	0
Stage 4	197.8	0	0
Stage 4	197.8	0	0
Stage 4	197.6	0	0
Stage 4	197.6	0	0
Stage 4	197.4	0	0
Stage 4	197.4	0	0
Stage 4	197.2	0	0
Stage 4	197.2	0	0
Stage 4	197	-0.02	-0.12
Stage 4	196.8	-0.17	-0.74
Stage 4	196.6	-0.54	-1.86
Stage 4	196.4	-0.83	-1.42
Stage 4	196.2	-1.01	-0.92
Stage 4	196	-1.11	-0.48
Stage 4	195.8	-1.13	-0.12
Stage 4	195.6	-1.1	0.15
Stage 4	195.4	-1.03	0.35
Stage 4	195.2	-0.94	0.48
Stage 4	195	-0.83	0.55
Stage 4	194.8	-0.71	0.58
Stage 4	194.7	-0.65	0.58
Stage 4	194.5	-0.54	0.56
Stage 4	194.3	-0.44	0.52
Stage 4	194.1	-0.34	0.47
Stage 4	193.9	-0.26	0.41
Stage 4	193.7	-0.19	0.35
Stage 4	193.5	-0.13	0.29
Stage 4	193.3	-0.08	0.23
Stage 4	193.1	-0.05	0.18
Stage 4	192.9	-0.02	0.14
Stage 4	192.7	0	0.1
Stage 4	192.5	0.01	0.06
Stage 4	192.3	0.02	0.03
Stage 4	192.2	0.02	0.02
Stage 4	192	0.02	0
Stage 4	191.8	0.02	-0.01
Stage 4	191.6	0.01	-0.03
Stage 4	191.4	0.01	-0.03
Stage 4	191.2	0	-0.04
Stage 4	191	-0.01	-0.04
Stage 4	190.8	-0.02	-0.04
Stage 4	190.6	-0.03	-0.04
Stage 4	190.4	-0.03	-0.04
Stage 4	190.2	-0.04	-0.03
Stage 4	190	-0.04	-0.02
Stage 4	189.8	-0.05	-0.01
Stage 4	189.7	-0.04	0.01
Stage 4	189.5	-0.04	0.02
Stage 4	189.3	-0.03	0.05
Stage 4	189.1	-0.01	0.08
Stage 4	188.9	0.01	0.11
Stage 4	188.7	0.04	0.16
Stage 4	188.5	0.08	0.2
Stage 4	188.3	0.13	0.26
Stage 4	188.1	0.19	0.31
Stage 4	187.9	0.27	0.37
Stage 4	187.7	0.35	0.43
Stage 4	187.5	0.45	0.48
Stage 4	187.3	0.56	0.53
Stage 4	187.1	0.67	0.56
Stage 4	186.9	0.78	0.56
Stage 4	186.7	0.89	0.54
Stage 4	186.5	0.98	0.47
Stage 4	186.3	1.05	0.35
Stage 4	186.1	1.09	0.16
Stage 4	185.9	1.07	-0.11
Stage 4	185.7	0.97	-0.47
Stage 4	185.5	0.78	-0.95
Stage 4	185.3	0.47	-1.55
Stage 4	185.1	0.01	-2.29
Stage 4	184.9	-0.62	-3.16
Stage 4	184.7	-1.01	-1.97
Stage 4	184.5	-1.22	-1.04
Stage 4	184.3	-1.29	-0.34
Stage 4	184.1	-1.26	0.16
Stage 4	183.9	-1.16	0.48
Stage 4	183.7	-1.02	0.68
Stage 4	183.5	-0.87	0.77
Stage 4	183.3	-0.71	0.78
Stage 4	183.1	-0.57	0.75
Stage 4	182.9	-0.43	0.67
Stage 4	182.7	-0.31	0.58
Stage 4	182.5	-0.22	0.48
Stage 4	182.3	-0.14	0.38
Stage 4	182.1	-0.08	0.29
Stage 4	181.9	-0.04	0.21
Stage 4	181.7	-0.01	0.14
Stage 4	181.5	0	0.08
Stage 4	181.3	0.01	0.03
Stage 4	181.1	0.01	0
Stage 4	180.9	0.01	-0.01
Stage 4	180.7	0	-0.02
Stage 4	180.5	0	-0.01

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 4	198.7	0	0
Stage 4	198.5	0	0
Stage 4	198.5	0	0
Stage 4	198.3	0	0
Stage 4	198.3	0	0
Stage 4	198.1	0	0
Stage 4	198.1	0	0
Stage 4	198	0	0

4.4.5. Tabella Risultati Paratia NTC2018: SISMICA STR - Left Wall - Stage: Stage 5

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 5	198	0	-6.33
Stage 5	197.8	-1.27	-6.33
Stage 5	197.6	-4.17	-14.53
Stage 5	197.4	-8.67	-22.49
Stage 5	197.2	-14.71	-30.18
Stage 5	197	-5.78	44.61
Stage 5	196.8	1.68	37.34
Stage 5	196.6	7.73	30.25
Stage 5	196.4	12.4	23.34
Stage 5	196.2	15.72	16.58
Stage 5	196	17.7	9.94
Stage 5	195.8	18.42	3.59
Stage 5	195.6	18.11	-1.53
Stage 5	195.4	17.01	-5.5
Stage 5	195.2	15.4	-8.06
Stage 5	195	13.5	-9.49
Stage 5	194.8	11.49	-10.05
Stage 5	194.7	10.5	-9.98
Stage 5	194.5	8.55	-9.72
Stage 5	194.3	6.75	-9.01
Stage 5	194.1	5.14	-8.06
Stage 5	193.9	3.74	-6.99
Stage 5	193.7	2.56	-5.9
Stage 5	193.5	1.6	-4.83
Stage 5	193.3	0.83	-3.83
Stage 5	193.1	0.24	-2.94
Stage 5	192.9	-0.19	-2.16
Stage 5	192.7	-0.49	-1.5
Stage 5	192.5	-0.68	-0.95
Stage 5	192.3	-0.78	-0.52
Stage 5	192.2	-0.81	-0.27
Stage 5	192	-0.82	-0.06
Stage 5	191.8	-0.79	0.15
Stage 5	191.6	-0.74	0.29
Stage 5	191.4	-0.66	0.37
Stage 5	191.2	-0.58	0.41
Stage 5	191	-0.5	0.42
Stage 5	190.8	-0.42	0.4
Stage 5	190.6	-0.34	0.37
Stage 5	190.4	-0.28	0.34
Stage 5	190.2	-0.22	0.29
Stage 5	190	-0.17	0.25
Stage 5	189.8	-0.12	0.22
Stage 5	189.7	-0.1	0.2
Stage 5	189.5	-0.07	0.18
Stage 5	189.3	-0.03	0.17
Stage 5	189.1	0	0.16
Stage 5	188.9	0.03	0.17
Stage 5	188.7	0.07	0.19
Stage 5	188.5	0.12	0.22
Stage 5	188.3	0.17	0.26
Stage 5	188.1	0.23	0.31
Stage 5	187.9	0.3	0.36
Stage 5	187.7	0.38	0.41
Stage 5	187.5	0.48	0.46
Stage 5	187.3	0.58	0.51
Stage 5	187.1	0.69	0.54
Stage 5	186.9	0.79	0.55
Stage 5	186.7	0.9	0.52
Stage 5	186.5	0.99	0.46
Stage 5	186.3	1.06	0.34
Stage 5	186.1	1.09	0.15
Stage 5	185.9	1.07	-0.11
Stage 5	185.7	0.97	-0.48
Stage 5	185.5	0.78	-0.95
Stage 5	185.3	0.47	-1.55
Stage 5	185.1	0.01	-2.29
Stage 5	184.9	-0.62	-3.16
Stage 5	184.7	-1.01	-1.97

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 5	184.5	-1.22	-1.04
Stage 5	184.3	-1.29	-0.34
Stage 5	184.1	-1.26	0.16
Stage 5	183.9	-1.16	0.49
Stage 5	183.7	-1.03	0.68
Stage 5	183.5	-0.87	0.77
Stage 5	183.3	-0.71	0.79
Stage 5	183.1	-0.57	0.75
Stage 5	182.9	-0.43	0.67
Stage 5	182.7	-0.31	0.58
Stage 5	182.5	-0.22	0.48
Stage 5	182.3	-0.14	0.38
Stage 5	182.1	-0.08	0.29
Stage 5	181.9	-0.04	0.21
Stage 5	181.7	-0.01	0.14
Stage 5	181.5	0	0.08
Stage 5	181.3	0.01	0.03
Stage 5	181.1	0.01	0
Stage 5	180.9	0.01	-0.01
Stage 5	180.7	0	-0.02
Stage 5	180.5	0	-0.01

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 5	198.7	0	0
Stage 5	198.5	0	0
Stage 5	198.5	0	0
Stage 5	198.3	0	0
Stage 5	198.3	0	0
Stage 5	198.1	0	0
Stage 5	198.1	0	0
Stage 5	198	0	0

4.4.6. Tabella Risultati Paratia NTC2018: SISMICA STR - Left Wall - Stage: Stage 6

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 6	198	0	-6.56
Stage 6	197.8	-1.31	-6.56
Stage 6	197.6	-4.31	-14.98
Stage 6	197.4	-8.92	-23.05
Stage 6	197.2	-15.07	-30.77
Stage 6	197	-6.17	44.53
Stage 6	196.8	1.38	37.73
Stage 6	196.6	7.66	31.41
Stage 6	196.4	12.77	25.54
Stage 6	196.2	16.79	20.12
Stage 6	196	19.81	15.1
Stage 6	195.8	21.9	10.42
Stage 6	195.6	23.1	6.01
Stage 6	195.4	23.48	1.91
Stage 6	195.2	23.17	-1.52
Stage 6	195	22.28	-4.48
Stage 6	194.8	20.85	-7.16
Stage 6	194.7	19.94	-9.08
Stage 6	194.5	17.74	-11.01
Stage 6	194.3	15	-13.69
Stage 6	194.1	11.67	-16.63
Stage 6	193.9	8.63	-15.2
Stage 6	193.7	5.97	-13.29
Stage 6	193.5	3.72	-11.25
Stage 6	193.3	1.88	-9.24
Stage 6	193.1	0.41	-7.34
Stage 6	192.9	-0.72	-5.63
Stage 6	192.7	-1.55	-4.13
Stage 6	192.5	-2.12	-2.85
Stage 6	192.3	-2.47	-1.78
Stage 6	192.2	-2.59	-1.14
Stage 6	192	-2.7	-0.56
Stage 6	191.8	-2.69	0.03
Stage 6	191.6	-2.6	0.47
Stage 6	191.4	-2.44	0.78
Stage 6	191.2	-2.24	0.98
Stage 6	191	-2.02	1.1
Stage 6	190.8	-1.8	1.14
Stage 6	190.6	-1.57	1.14
Stage 6	190.4	-1.35	1.1
Stage 6	190.2	-1.14	1.04
Stage 6	190	-0.94	0.97
Stage 6	189.8	-0.76	0.9
Stage 6	189.7	-0.68	0.85
Stage 6	189.5	-0.52	0.81
Stage 6	189.3	-0.37	0.76
Stage 6	189.1	-0.22	0.73
Stage 6	188.9	-0.07	0.72
Stage 6	188.7	0.07	0.73
Stage 6	188.5	0.23	0.76
Stage 6	188.3	0.39	0.81
Stage 6	188.1	0.56	0.88
Stage 6	187.9	0.75	0.94
Stage 6	187.7	0.95	1.01
Stage 6	187.5	1.17	1.07
Stage 6	187.3	1.39	1.11
Stage 6	187.1	1.61	1.11
Stage 6	186.9	1.83	1.07
Stage 6	186.7	2.02	0.97
Stage 6	186.5	2.18	0.79
Stage 6	186.3	2.28	0.51
Stage 6	186.1	2.3	0.1
Stage 6	185.9	2.21	-0.46
Stage 6	185.7	1.97	-1.19
Stage 6	185.5	1.55	-2.12
Stage 6	185.3	0.9	-3.26
Stage 6	185.1	-0.03	-4.64
Stage 6	184.9	-1.29	-6.27
Stage 6	184.7	-2.09	-4.04

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 6	184.5	-2.54	-2.26
Stage 6	184.3	-2.73	-0.9
Stage 6	184.1	-2.71	0.09
Stage 6	183.9	-2.55	0.78
Stage 6	183.7	-2.31	1.22
Stage 6	183.5	-2.02	1.46
Stage 6	183.3	-1.71	1.54
Stage 6	183.1	-1.4	1.52
Stage 6	182.9	-1.12	1.42
Stage 6	182.7	-0.86	1.27
Stage 6	182.5	-0.65	1.1
Stage 6	182.3	-0.46	0.92
Stage 6	182.1	-0.32	0.73
Stage 6	181.9	-0.2	0.57
Stage 6	181.7	-0.12	0.42
Stage 6	181.5	-0.06	0.29
Stage 6	181.3	-0.03	0.18
Stage 6	181.1	-0.01	0.1
Stage 6	180.9	0	0.04
Stage 6	180.7	0	0
Stage 6	180.5	0	-0.01

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 6	198.7	0	0
Stage 6	198.5	0	0
Stage 6	198.5	0	0
Stage 6	198.3	0	0
Stage 6	198.3	0	0
Stage 6	198.1	0	0
Stage 6	198.1	0	0
Stage 6	198	0	0

4.4.7. Tabella Risultati Paratia NTC2018: SISMICA STR - Left Wall - Stage: Stage 7

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 7	198	0	-6.05
Stage 7	197.8	-1.21	-6.05
Stage 7	197.6	-4.06	-14.22
Stage 7	197.4	-8.53	-22.36
Stage 7	197.2	-14.58	-30.28
Stage 7	197	-6.02	42.83
Stage 7	196.8	1.03	35.23
Stage 7	196.6	6.58	27.75
Stage 7	196.4	10.66	20.41
Stage 7	196.2	13.3	13.17
Stage 7	196	14.5	6
Stage 7	195.8	14.27	-1.14
Stage 7	195.6	12.6	-8.32
Stage 7	195.4	9.49	-15.58
Stage 7	195.2	4.89	-22.97
Stage 7	195	-1.21	-30.54
Stage 7	194.8	-8.85	-38.18
Stage 7	194.7	-13.23	-43.84
Stage 7	194.5	-6.68	32.74
Stage 7	194.3	-1.63	25.29
Stage 7	194.1	1.95	17.9
Stage 7	193.9	4.46	12.52
Stage 7	193.7	6.13	8.34
Stage 7	193.5	7.14	5.05
Stage 7	193.3	7.63	2.48
Stage 7	193.1	7.73	0.5
Stage 7	192.9	7.53	-0.98
Stage 7	192.7	7.13	-2.04
Stage 7	192.5	6.57	-2.77
Stage 7	192.3	5.93	-3.22
Stage 7	192.2	5.59	-3.39
Stage 7	192	4.89	-3.5
Stage 7	191.8	4.19	-3.49
Stage 7	191.6	3.52	-3.37
Stage 7	191.4	2.88	-3.17
Stage 7	191.2	2.3	-2.92
Stage 7	191	1.77	-2.63
Stage 7	190.8	1.31	-2.32
Stage 7	190.6	0.91	-2.01
Stage 7	190.4	0.57	-1.7
Stage 7	190.2	0.29	-1.4
Stage 7	190	0.06	-1.12
Stage 7	189.8	-0.11	-0.85
Stage 7	189.7	-0.17	-0.66
Stage 7	189.5	-0.27	-0.48
Stage 7	189.3	-0.32	-0.25
Stage 7	189.1	-0.33	-0.04
Stage 7	188.9	-0.3	0.16
Stage 7	188.7	-0.23	0.35
Stage 7	188.5	-0.12	0.52
Stage 7	188.3	0.02	0.69
Stage 7	188.1	0.19	0.85
Stage 7	187.9	0.38	0.99
Stage 7	187.7	0.6	1.11
Stage 7	187.5	0.84	1.2
Stage 7	187.3	1.1	1.26
Stage 7	187.1	1.35	1.28
Stage 7	186.9	1.6	1.25
Stage 7	186.7	1.83	1.14
Stage 7	186.5	2.02	0.95
Stage 7	186.3	2.15	0.66
Stage 7	186.1	2.2	0.24
Stage 7	185.9	2.13	-0.34
Stage 7	185.7	1.91	-1.08
Stage 7	185.5	1.51	-2.02
Stage 7	185.3	0.87	-3.18
Stage 7	185.1	-0.04	-4.57
Stage 7	184.9	-1.28	-6.21
Stage 7	184.7	-2.08	-3.99

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 7	184.5	-2.53	-2.23
Stage 7	184.3	-2.71	-0.89
Stage 7	184.1	-2.69	0.1
Stage 7	183.9	-2.53	0.78
Stage 7	183.7	-2.29	1.21
Stage 7	183.5	-2	1.45
Stage 7	183.3	-1.69	1.53
Stage 7	183.1	-1.39	1.51
Stage 7	182.9	-1.11	1.41
Stage 7	182.7	-0.86	1.26
Stage 7	182.5	-0.64	1.09
Stage 7	182.3	-0.46	0.91
Stage 7	182.1	-0.31	0.73
Stage 7	181.9	-0.2	0.56
Stage 7	181.7	-0.12	0.41
Stage 7	181.5	-0.06	0.28
Stage 7	181.3	-0.03	0.18
Stage 7	181.1	-0.01	0.09
Stage 7	180.9	0	0.04
Stage 7	180.7	0	0
Stage 7	180.5	0	-0.01

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 7	198.7	0	0
Stage 7	198.5	0	0
Stage 7	198.5	0	0
Stage 7	198.3	0	0
Stage 7	198.3	0	0
Stage 7	198.1	0	0
Stage 7	198.1	0	0
Stage 7	198	0	0

4.4.8. Tabella Risultati Paratia NTC2018: SISMICA STR - Left Wall - Stage: Stage 8

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 8	198	0	-6.71
Stage 8	197.8	-1.34	-6.71
Stage 8	197.6	-4.43	-15.42
Stage 8	197.4	-9.2	-23.88
Stage 8	197.2	-15.62	-32.08
Stage 8	197	-7.83	38.95
Stage 8	196.8	-1.59	31.16
Stage 8	196.6	3.12	23.56
Stage 8	196.4	6.35	16.14
Stage 8	196.2	8.13	8.89
Stage 8	196	8.5	1.85
Stage 8	195.8	7.5	-4.96
Stage 8	195.6	5.19	-11.59
Stage 8	195.4	1.57	-18.07
Stage 8	195.2	-3.31	-24.42
Stage 8	195	-9.45	-30.68
Stage 8	194.8	-16.79	-36.7
Stage 8	194.7	-20.88	-40.91
Stage 8	194.5	-12.17	43.55
Stage 8	194.3	-4.45	38.57
Stage 8	194.1	2.35	34.02
Stage 8	193.9	8.32	29.88
Stage 8	193.7	13.55	26.11
Stage 8	193.5	18.08	22.67
Stage 8	193.3	21.87	18.96
Stage 8	193.1	24.87	14.98
Stage 8	192.9	27.02	10.75
Stage 8	192.7	28.27	6.26
Stage 8	192.5	28.57	1.51
Stage 8	192.3	27.87	-3.51
Stage 8	192.2	27.13	-7.46
Stage 8	192	24.82	-11.51
Stage 8	191.8	21.39	-17.17
Stage 8	191.6	16.77	-23.1
Stage 8	191.4	12.37	-22.01
Stage 8	191.2	8.34	-20.12
Stage 8	191	4.79	-17.77
Stage 8	190.8	1.76	-15.12
Stage 8	190.6	-0.69	-12.3
Stage 8	190.4	-2.63	-9.7
Stage 8	190.2	-4.1	-7.34
Stage 8	190	-5.15	-5.25
Stage 8	189.8	-5.84	-3.43
Stage 8	189.7	-6.06	-2.25
Stage 8	189.5	-6.29	-1.16
Stage 8	189.3	-6.28	0.07
Stage 8	189.1	-6.06	1.09
Stage 8	188.9	-5.68	1.92
Stage 8	188.7	-5.16	2.59
Stage 8	188.5	-4.54	3.13
Stage 8	188.3	-3.83	3.54
Stage 8	188.1	-3.06	3.86
Stage 8	187.9	-2.24	4.05
Stage 8	187.7	-1.42	4.15
Stage 8	187.5	-0.59	4.14
Stage 8	187.3	0.22	4.05
Stage 8	187.1	0.99	3.85
Stage 8	186.9	1.7	3.55
Stage 8	186.7	2.33	3.13
Stage 8	186.5	2.84	2.57
Stage 8	186.3	3.21	1.84
Stage 8	186.1	3.4	0.93
Stage 8	185.9	3.36	-0.19
Stage 8	185.7	3.05	-1.56
Stage 8	185.5	2.41	-3.21
Stage 8	185.3	1.38	-5.15
Stage 8	185.1	-0.11	-7.42
Stage 8	184.9	-2.11	-10.02
Stage 8	184.7	-3.45	-6.68

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 8	184.5	-4.24	-3.98
Stage 8	184.3	-4.62	-1.87
Stage 8	184.1	-4.67	-0.28
Stage 8	183.9	-4.5	0.87
Stage 8	183.7	-4.17	1.65
Stage 8	183.5	-3.74	2.13
Stage 8	183.3	-3.27	2.37
Stage 8	183.1	-2.78	2.43
Stage 8	182.9	-2.31	2.36
Stage 8	182.7	-1.87	2.2
Stage 8	182.5	-1.48	1.98
Stage 8	182.3	-1.13	1.73
Stage 8	182.1	-0.84	1.47
Stage 8	181.9	-0.6	1.21
Stage 8	181.7	-0.4	0.96
Stage 8	181.5	-0.25	0.74
Stage 8	181.3	-0.15	0.54
Stage 8	181.1	-0.07	0.37
Stage 8	180.9	-0.03	0.23
Stage 8	180.7	-0.01	0.11
Stage 8	180.5	0	0.03

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 8	198.7	0	0
Stage 8	198.5	0	0
Stage 8	198.5	0	0
Stage 8	198.3	0	0
Stage 8	198.3	0	0
Stage 8	198.1	0	0
Stage 8	198.1	0	0
Stage 8	198	0	0

4.4.9. Tabella Risultati Paratia NTC2018: SISMICA STR - Left Wall - Stage: Stage 9

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 9	198	0	-6.31
Stage 9	197.8	-1.26	-6.31
Stage 9	197.6	-4.17	-14.53
Stage 9	197.4	-8.68	-22.57
Stage 9	197.2	-14.76	-30.39
Stage 9	197	-6.4	41.81
Stage 9	196.8	0.46	34.29
Stage 9	196.6	5.84	26.88
Stage 9	196.4	9.76	19.6
Stage 9	196.2	12.23	12.4
Stage 9	196	13.3	5.33
Stage 9	195.8	12.98	-1.61
Stage 9	195.6	11.28	-8.48
Stage 9	195.4	8.22	-15.32
Stage 9	195.2	3.78	-22.18
Stage 9	195	-2.04	-29.1
Stage 9	194.8	-9.23	-35.98
Stage 9	194.7	-13.33	-40.98
Stage 9	194.5	-5.5	39.13
Stage 9	194.3	1.05	32.75
Stage 9	194.1	6.35	26.54
Stage 9	193.9	10.45	20.48
Stage 9	193.7	13.35	14.5
Stage 9	193.5	15.06	8.56
Stage 9	193.3	15.47	2.06
Stage 9	193.1	14.48	-4.96
Stage 9	192.9	11.98	-12.51
Stage 9	192.7	7.87	-20.55
Stage 9	192.5	2.06	-29.03
Stage 9	192.3	-5.52	-37.9
Stage 9	192.2	-10	-44.78
Stage 9	192	-3.9	30.47
Stage 9	191.8	0.3	21
Stage 9	191.6	2.59	11.44
Stage 9	191.4	3.96	6.87
Stage 9	191.2	4.67	3.56
Stage 9	191	4.91	1.2
Stage 9	190.8	4.84	-0.34
Stage 9	190.6	4.61	-1.18
Stage 9	190.4	4.26	-1.74
Stage 9	190.2	3.84	-2.08
Stage 9	190	3.4	-2.22
Stage 9	189.8	2.95	-2.23
Stage 9	189.7	2.74	-2.14
Stage 9	189.5	2.34	-2.02
Stage 9	189.3	1.98	-1.78
Stage 9	189.1	1.69	-1.47
Stage 9	188.9	1.46	-1.13
Stage 9	188.7	1.31	-0.75
Stage 9	188.5	1.24	-0.36
Stage 9	188.3	1.24	0.04
Stage 9	188.1	1.33	0.43
Stage 9	187.9	1.49	0.79
Stage 9	187.7	1.71	1.09
Stage 9	187.5	1.98	1.34
Stage 9	187.3	2.28	1.51
Stage 9	187.1	2.6	1.59
Stage 9	186.9	2.91	1.57
Stage 9	186.7	3.19	1.41
Stage 9	186.5	3.41	1.11
Stage 9	186.3	3.54	0.62
Stage 9	186.1	3.52	-0.07
Stage 9	185.9	3.32	-1.01
Stage 9	185.7	2.88	-2.21
Stage 9	185.5	2.14	-3.71
Stage 9	185.3	1.03	-5.53
Stage 9	185.1	-0.5	-7.69
Stage 9	184.9	-2.54	-10.21
Stage 9	184.7	-3.89	-6.74

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 9	184.5	-4.68	-3.94
Stage 9	184.3	-5.03	-1.76
Stage 9	184.1	-5.06	-0.12
Stage 9	183.9	-4.84	1.06
Stage 9	183.7	-4.47	1.86
Stage 9	183.5	-4.01	2.34
Stage 9	183.3	-3.49	2.57
Stage 9	183.1	-2.97	2.62
Stage 9	182.9	-2.46	2.53
Stage 9	182.7	-1.99	2.35
Stage 9	182.5	-1.57	2.11
Stage 9	182.3	-1.2	1.84
Stage 9	182.1	-0.88	1.56
Stage 9	181.9	-0.63	1.28
Stage 9	181.7	-0.42	1.02
Stage 9	181.5	-0.27	0.78
Stage 9	181.3	-0.15	0.57
Stage 9	181.1	-0.08	0.39
Stage 9	180.9	-0.03	0.24
Stage 9	180.7	-0.01	0.12
Stage 9	180.5	0	0.03

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 9	198.7	0	0
Stage 9	198.5	0	0
Stage 9	198.5	0	0
Stage 9	198.3	0	0
Stage 9	198.3	0	0
Stage 9	198.1	0	0
Stage 9	198.1	0	0
Stage 9	198	0	0

4.4.10. Tabella Risultati Paratia NTC2018: SISMICA STR - Left Wall - Stage: Stage 10

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 10	198	0	-6.5
Stage 10	197.8	-1.3	-6.5
Stage 10	197.6	-4.3	-15.01
Stage 10	197.4	-8.98	-23.36
Stage 10	197.2	-15.28	-31.54
Stage 10	197	-7.5	38.9
Stage 10	196.8	-1.29	31.06
Stage 10	196.6	3.39	23.38
Stage 10	196.4	6.56	15.85
Stage 10	196.2	8.25	8.46
Stage 10	196	8.48	1.16
Stage 10	195.8	7.26	-6.08
Stage 10	195.6	4.6	-13.31
Stage 10	195.4	0.48	-20.59
Stage 10	195.2	-5.09	-27.89
Stage 10	195	-12.13	-35.2
Stage 10	194.8	-20.61	-42.4
Stage 10	194.7	-25.37	-47.58
Stage 10	194.5	-19.05	31.62
Stage 10	194.3	-14.01	25.17
Stage 10	194.1	-10.2	19.05
Stage 10	193.9	-7.55	13.25
Stage 10	193.7	-6	7.76
Stage 10	193.5	-5.49	2.54
Stage 10	193.3	-6.08	-2.93
Stage 10	193.1	-7.8	-8.61
Stage 10	192.9	-10.69	-14.43
Stage 10	192.7	-14.75	-20.31
Stage 10	192.5	-19.98	-26.18
Stage 10	192.3	-26.37	-31.92
Stage 10	192.2	-29.97	-36.04
Stage 10	192	-16.03	69.72
Stage 10	191.8	-3.22	64.06
Stage 10	191.6	8.41	58.14
Stage 10	191.4	18.8	51.96
Stage 10	191.2	27.91	45.52
Stage 10	191	35.67	38.82
Stage 10	190.8	42.04	31.86
Stage 10	190.6	46.97	24.64
Stage 10	190.4	50.4	17.16
Stage 10	190.2	52.29	9.42
Stage 10	190	52.57	1.42
Stage 10	189.8	51.2	-6.84
Stage 10	189.7	49.88	-13.23
Stage 10	189.5	45.93	-19.72
Stage 10	189.3	40.21	-28.63
Stage 10	189.1	32.65	-37.79
Stage 10	188.9	25.49	-35.82
Stage 10	188.7	18.9	-32.96
Stage 10	188.5	12.97	-29.64
Stage 10	188.3	7.76	-26.06
Stage 10	188.1	3.29	-22.33
Stage 10	187.9	-0.45	-18.69
Stage 10	187.7	-3.48	-15.17
Stage 10	187.5	-5.84	-11.79
Stage 10	187.3	-7.55	-8.55
Stage 10	187.1	-8.64	-5.44
Stage 10	186.9	-9.15	-2.57
Stage 10	186.7	-9.23	-0.39
Stage 10	186.5	-9.01	1.12
Stage 10	186.3	-8.62	1.95
Stage 10	186.1	-8.19	2.13
Stage 10	185.9	-7.86	1.65
Stage 10	185.7	-7.76	0.52
Stage 10	185.5	-8	-1.24
Stage 10	185.3	-8.73	-3.64
Stage 10	185.1	-10.07	-6.66
Stage 10	184.9	-12.12	-10.28
Stage 10	184.7	-13.18	-5.29

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 10	184.5	-13.45	-1.38
Stage 10	184.3	-13.14	1.57
Stage 10	184.1	-12.4	3.7
Stage 10	183.9	-11.38	5.12
Stage 10	183.7	-10.18	5.97
Stage 10	183.5	-8.91	6.35
Stage 10	183.3	-7.64	6.39
Stage 10	183.1	-6.41	6.15
Stage 10	182.9	-5.26	5.74
Stage 10	182.7	-4.22	5.2
Stage 10	182.5	-3.3	4.59
Stage 10	182.3	-2.51	3.95
Stage 10	182.1	-1.85	3.31
Stage 10	181.9	-1.31	2.71
Stage 10	181.7	-0.88	2.14
Stage 10	181.5	-0.55	1.63
Stage 10	181.3	-0.32	1.18
Stage 10	181.1	-0.16	0.8
Stage 10	180.9	-0.06	0.49
Stage 10	180.7	-0.01	0.24
Stage 10	180.5	0	0.06

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 10	198.7	0	0
Stage 10	198.5	0	0
Stage 10	198.5	0	0
Stage 10	198.3	0	0
Stage 10	198.3	0	0
Stage 10	198.1	0	0
Stage 10	198.1	0	0
Stage 10	198	0	0

4.4.11. Tabella Risultati Paratia NTC2018: SISMICA STR - Left Wall - Stage: Stage 11

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 11	198	0	-6.49
Stage 11	197.8	-1.3	-6.49
Stage 11	197.6	-4.29	-14.96
Stage 11	197.4	-8.94	-23.26
Stage 11	197.2	-15.22	-31.37
Stage 11	197	-7.33	39.45
Stage 11	196.8	-0.98	31.71
Stage 11	196.6	3.85	24.14
Stage 11	196.4	7.19	16.74
Stage 11	196.2	9.09	9.49
Stage 11	196	9.56	2.34
Stage 11	195.8	8.61	-4.74
Stage 11	195.6	6.25	-11.8
Stage 11	195.4	2.47	-18.9
Stage 11	195.2	-2.74	-26.03
Stage 11	195	-9.37	-33.16
Stage 11	194.8	-17.41	-40.19
Stage 11	194.7	-21.93	-45.26
Stage 11	194.5	-15	34.66
Stage 11	194.3	-9.33	28.34
Stage 11	194.1	-4.87	22.31
Stage 11	193.9	-1.56	16.56
Stage 11	193.7	0.66	11.07
Stage 11	193.5	1.82	5.79
Stage 11	193.3	1.85	0.18
Stage 11	193.1	0.71	-5.73
Stage 11	192.9	-1.67	-11.89
Stage 11	192.7	-5.32	-18.24
Stage 11	192.5	-10.26	-24.72
Stage 11	192.3	-16.51	-31.23
Stage 11	192.2	-20.11	-36.07
Stage 11	192	-7.79	61.6
Stage 11	191.8	3.14	54.67
Stage 11	191.6	12.59	47.25
Stage 11	191.4	20.46	39.33
Stage 11	191.2	26.64	30.9
Stage 11	191	31.03	21.96
Stage 11	190.8	33.53	12.51
Stage 11	190.6	34.04	2.55
Stage 11	190.4	32.46	-7.89
Stage 11	190.2	28.71	-18.78
Stage 11	190	22.69	-30.09
Stage 11	189.8	14.33	-41.78
Stage 11	189.7	9.26	-50.78
Stage 11	189.5	13.73	22.35
Stage 11	189.3	15.73	10.03
Stage 11	189.1	15.25	-2.43
Stage 11	188.9	14.12	-5.63
Stage 11	188.7	12.6	-7.59
Stage 11	188.5	10.86	-8.7
Stage 11	188.3	9.03	-9.14
Stage 11	188.1	7.24	-8.98
Stage 11	187.9	5.54	-8.51
Stage 11	187.7	3.99	-7.75
Stage 11	187.5	2.64	-6.73
Stage 11	187.3	1.54	-5.49
Stage 11	187.1	0.73	-4.06
Stage 11	186.9	0.22	-2.55
Stage 11	186.7	-0.07	-1.46
Stage 11	186.5	-0.23	-0.81
Stage 11	186.3	-0.36	-0.61
Stage 11	186.1	-0.54	-0.9
Stage 11	185.9	-0.87	-1.69
Stage 11	185.7	-1.48	-3
Stage 11	185.5	-2.45	-4.85
Stage 11	185.3	-3.9	-7.25
Stage 11	185.1	-5.94	-10.21
Stage 11	184.9	-8.68	-13.73
Stage 11	184.7	-10.38	-8.46

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 11	184.5	-11.22	-4.24
Stage 11	184.3	-11.42	-0.96
Stage 11	184.1	-11.11	1.5
Stage 11	183.9	-10.46	3.25
Stage 11	183.7	-9.58	4.42
Stage 11	183.5	-8.56	5.1
Stage 11	183.3	-7.48	5.4
Stage 11	183.1	-6.4	5.41
Stage 11	182.9	-5.36	5.2
Stage 11	182.7	-4.39	4.84
Stage 11	182.5	-3.51	4.39
Stage 11	182.3	-2.74	3.87
Stage 11	182.1	-2.07	3.34
Stage 11	181.9	-1.51	2.81
Stage 11	181.7	-1.05	2.29
Stage 11	181.5	-0.69	1.81
Stage 11	181.3	-0.41	1.38
Stage 11	181.1	-0.22	0.98
Stage 11	180.9	-0.09	0.64
Stage 11	180.7	-0.02	0.34
Stage 11	180.5	0	0.1

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 11	198.7	0	0
Stage 11	198.5	0	0
Stage 11	198.5	0	0
Stage 11	198.3	0	0
Stage 11	198.3	0	0
Stage 11	198.1	0	0
Stage 11	198.1	0	0
Stage 11	198	0	0

4.4.12. Tabella Risultati Paratia NTC2018: SISMICA STR - Left Wall - Stage: Stage 12

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 12	198	0	-6.46
Stage 12	197.8	-1.29	-6.46
Stage 12	197.6	-4.28	-14.92
Stage 12	197.4	-8.92	-23.2
Stage 12	197.2	-15.18	-31.31
Stage 12	197	-7.28	39.5
Stage 12	196.8	-0.93	31.75
Stage 12	196.6	3.9	24.16
Stage 12	196.4	7.25	16.73
Stage 12	196.2	9.13	9.43
Stage 12	196	9.58	2.23
Stage 12	195.8	8.6	-4.9
Stage 12	195.6	6.19	-12.04
Stage 12	195.4	2.35	-19.22
Stage 12	195.2	-2.94	-26.43
Stage 12	195	-9.67	-33.66
Stage 12	194.8	-17.83	-40.8
Stage 12	194.7	-22.42	-45.94
Stage 12	194.5	-15.74	33.38
Stage 12	194.3	-10.36	26.94
Stage 12	194.1	-6.2	20.78
Stage 12	193.9	-3.22	14.9
Stage 12	193.7	-1.36	9.28
Stage 12	193.5	-0.59	3.87
Stage 12	193.3	-0.96	-1.87
Stage 12	193.1	-2.54	-7.89
Stage 12	192.9	-5.37	-14.14
Stage 12	192.7	-9.48	-20.57
Stage 12	192.5	-14.9	-27.09
Stage 12	192.3	-21.62	-33.6
Stage 12	192.2	-25.46	-38.4
Stage 12	192	-13.49	59.84
Stage 12	191.8	-2.88	53.05
Stage 12	191.6	6.28	45.84
Stage 12	191.4	13.93	38.22
Stage 12	191.2	19.97	30.19
Stage 12	191	24.32	21.76
Stage 12	190.8	26.91	12.94
Stage 12	190.6	27.66	3.76
Stage 12	190.4	26.5	-5.76
Stage 12	190.2	23.39	-15.57
Stage 12	190	18.27	-25.62
Stage 12	189.8	11.1	-35.86
Stage 12	189.7	6.73	-43.62
Stage 12	189.5	15.75	45.08
Stage 12	189.3	22.69	34.7
Stage 12	189.1	27.57	24.39
Stage 12	188.9	30.4	14.18
Stage 12	188.7	31.22	4.08
Stage 12	188.5	30.04	-5.91
Stage 12	188.3	26.81	-16.12
Stage 12	188.1	23.29	-17.61
Stage 12	187.9	19.82	-17.38
Stage 12	187.7	16.49	-16.62
Stage 12	187.5	13.38	-15.55
Stage 12	187.3	10.52	-14.29
Stage 12	187.1	7.94	-12.92
Stage 12	186.9	5.64	-11.5
Stage 12	186.7	3.63	-10.07
Stage 12	186.5	1.89	-8.68
Stage 12	186.3	0.42	-7.33
Stage 12	186.1	-0.9	-6.62
Stage 12	185.9	-2.21	-6.58
Stage 12	185.7	-3.66	-7.24
Stage 12	185.5	-5.39	-8.62
Stage 12	185.3	-7.53	-10.73
Stage 12	185.1	-10.25	-13.57
Stage 12	184.9	-13.67	-17.13
Stage 12	184.7	-15.73	-10.29

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 12	184.5	-16.69	-4.8
Stage 12	184.3	-16.8	-0.53
Stage 12	184.1	-16.26	2.67
Stage 12	183.9	-15.27	4.95
Stage 12	183.7	-13.98	6.47
Stage 12	183.5	-12.51	7.36
Stage 12	183.3	-10.96	7.75
Stage 12	183.1	-9.41	7.75
Stage 12	182.9	-7.91	7.46
Stage 12	182.7	-6.52	6.97
Stage 12	182.5	-5.25	6.35
Stage 12	182.3	-4.12	5.64
Stage 12	182.1	-3.14	4.9
Stage 12	181.9	-2.31	4.15
Stage 12	181.7	-1.63	3.43
Stage 12	181.5	-1.08	2.74
Stage 12	181.3	-0.65	2.11
Stage 12	181.1	-0.35	1.53
Stage 12	180.9	-0.15	1.02
Stage 12	180.7	-0.03	0.56
Stage 12	180.5	0	0.17

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 12	198.7	0	0
Stage 12	198.5	0	0
Stage 12	198.5	0	0
Stage 12	198.3	0	0
Stage 12	198.3	0	0
Stage 12	198.1	0	0
Stage 12	198.1	0	0
Stage 12	198	0	0

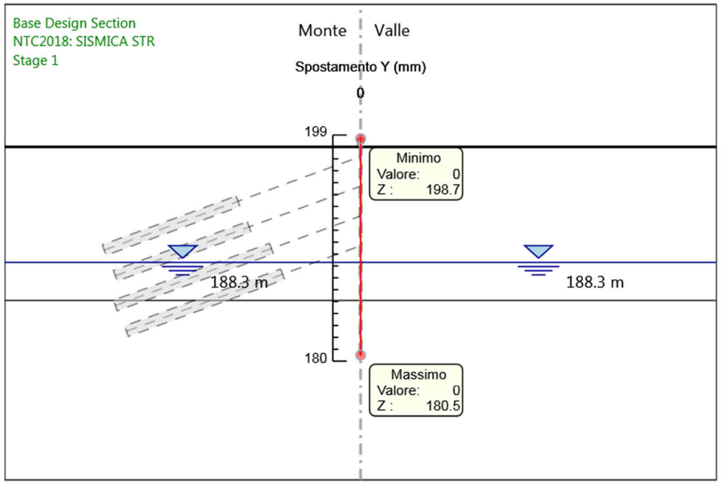
4.4.13. Tabella Risultati Paratia NTC2018: SISMICA STR - Left Wall - Stage: Stage 13

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 13	198	0	-6.07
Stage 13	197.8	-1.21	-6.07
Stage 13	197.6	-4.29	-15.38
Stage 13	197.4	-9.21	-24.61
Stage 13	197.2	-15.95	-33.69
Stage 13	197	-6.98	44.84
Stage 13	196.8	0.25	36.12
Stage 13	196.6	5.76	27.58
Stage 13	196.4	9.6	19.21
Stage 13	196.2	11.8	10.99
Stage 13	196	12.38	2.9
Stage 13	195.8	11.35	-5.14
Stage 13	195.6	8.72	-13.16
Stage 13	195.4	4.48	-21.22
Stage 13	195.2	-1.38	-29.31
Stage 13	195	-8.87	-37.43
Stage 13	194.8	-17.96	-45.46
Stage 13	194.7	-23.09	-51.28
Stage 13	194.5	-15.52	37.82
Stage 13	194.3	-9.43	30.46
Stage 13	194.1	-4.75	23.39
Stage 13	193.9	-1.44	16.58
Stage 13	193.7	0.57	10.02
Stage 13	193.5	1.3	3.66
Stage 13	193.3	0.69	-3.05
Stage 13	193.1	-1.32	-10.06
Stage 13	192.9	-4.79	-17.33
Stage 13	192.7	-9.75	-24.79
Stage 13	192.5	-16.22	-32.38
Stage 13	192.3	-24.22	-39.99
Stage 13	192.2	-28.78	-45.63
Stage 13	192	-15.22	67.81
Stage 13	191.8	-3.25	59.87
Stage 13	191.6	7.06	51.51
Stage 13	191.4	15.6	42.73
Stage 13	191.2	22.31	33.51
Stage 13	191	27.08	23.89
Stage 13	190.8	29.85	13.85
Stage 13	190.6	30.54	3.43
Stage 13	190.4	29.07	-7.36
Stage 13	190.2	25.37	-18.48
Stage 13	190	19.39	-29.88
Stage 13	189.8	11.09	-41.52
Stage 13	189.7	6.05	-50.37
Stage 13	189.5	16.63	52.86
Stage 13	189.3	24.82	40.97
Stage 13	189.1	30.64	29.09
Stage 13	188.9	34.09	17.26
Stage 13	188.7	35.19	5.49
Stage 13	188.5	33.94	-6.25
Stage 13	188.3	30.28	-18.27
Stage 13	188.1	26.16	-20.59
Stage 13	187.9	22.16	-19.99
Stage 13	187.7	18.37	-18.98
Stage 13	187.5	14.82	-17.76
Stage 13	187.3	11.52	-16.46
Stage 13	187.1	8.49	-15.17
Stage 13	186.9	5.7	-13.95
Stage 13	186.7	3.13	-12.83
Stage 13	186.5	0.76	-11.87
Stage 13	186.3	-1.46	-11.08
Stage 13	186.1	-3.55	-10.49
Stage 13	185.9	-5.58	-10.12
Stage 13	185.7	-7.57	-9.97
Stage 13	185.5	-9.58	-10.03
Stage 13	185.3	-11.77	-10.95
Stage 13	185.1	-14.31	-12.73
Stage 13	184.9	-17.38	-15.34
Stage 13	184.7	-19.26	-9.39

Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 13	184.5	-20.07	-4.07
Stage 13	184.3	-19.96	0.57
Stage 13	184.1	-19.15	4.01
Stage 13	183.9	-17.87	6.44
Stage 13	183.7	-16.26	8.01
Stage 13	183.5	-14.48	8.9
Stage 13	183.3	-12.64	9.23
Stage 13	183.1	-10.81	9.14
Stage 13	182.9	-9.06	8.74
Stage 13	182.7	-7.44	8.12
Stage 13	182.5	-5.97	7.35
Stage 13	182.3	-4.67	6.5
Stage 13	182.1	-3.55	5.62
Stage 13	181.9	-2.6	4.74
Stage 13	181.7	-1.82	3.9
Stage 13	181.5	-1.2	3.1
Stage 13	181.3	-0.72	2.37
Stage 13	181.1	-0.38	1.71
Stage 13	180.9	-0.16	1.12
Stage 13	180.7	-0.04	0.61
Stage 13	180.5	0	0.18

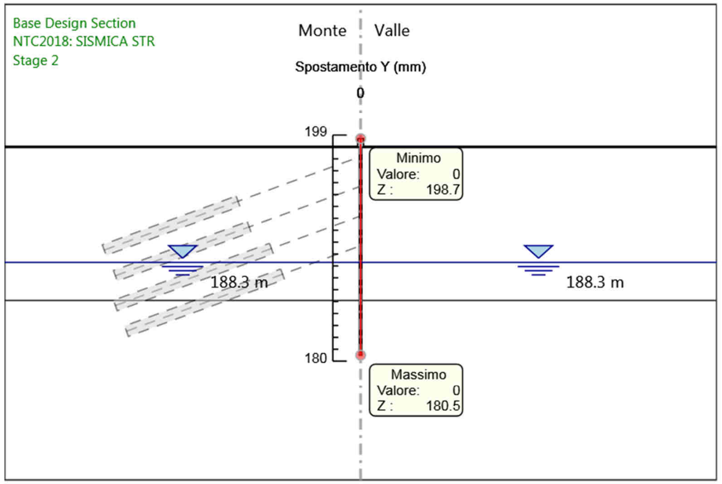
Design Assumption: NTC2018: SISMICA STR	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 13	198.7	0	0
Stage 13	198.5	0	0
Stage 13	198.5	0	0
Stage 13	198.3	0	0
Stage 13	198.3	0	0
Stage 13	198.1	0	0
Stage 13	198.1	0	0
Stage 13	198	0	0

4.4.14. Grafico Spostamento NTC2018: SISMICA STR - Stage: Stage 1



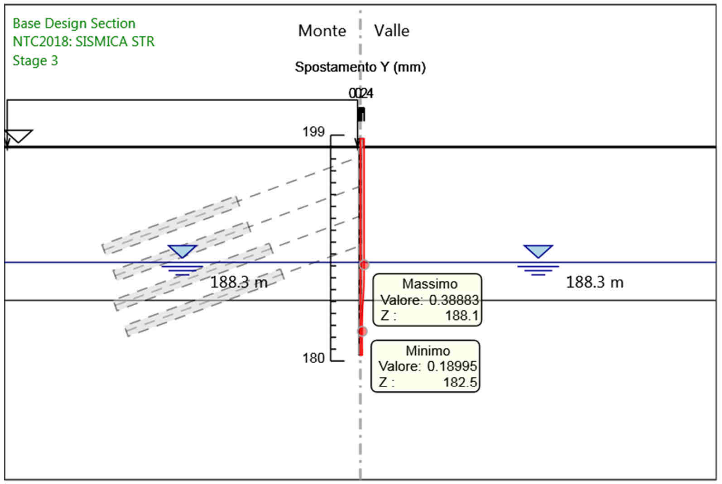
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 1
Spostamento orizzontale

4.4.15. Grafico Spostamento NTC2018: SISMICA STR - Stage: Stage 2



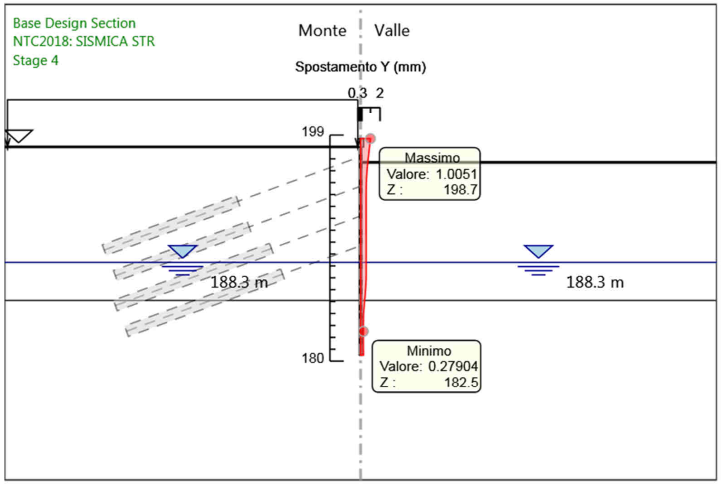
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 2
Spostamento orizzontale

4.4.16. Grafico Spostamento NTC2018: SISMICA STR - Stage: Stage 3



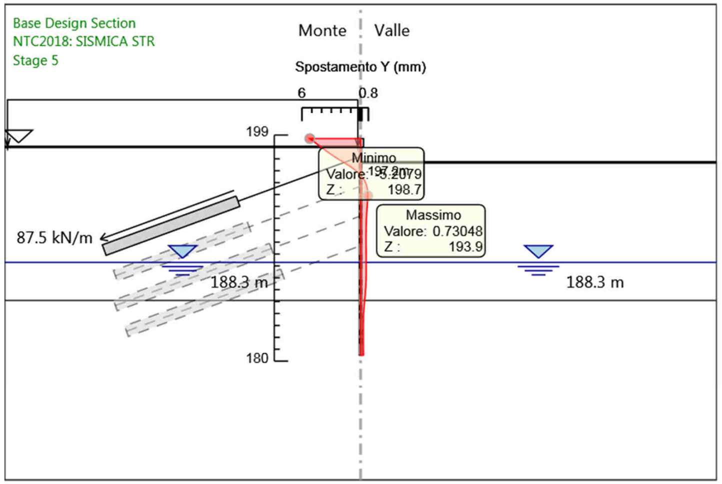
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 3
Spostamento orizzontale

4.4.17. Grafico Spostamento NTC2018: SISMICA STR - Stage: Stage 4



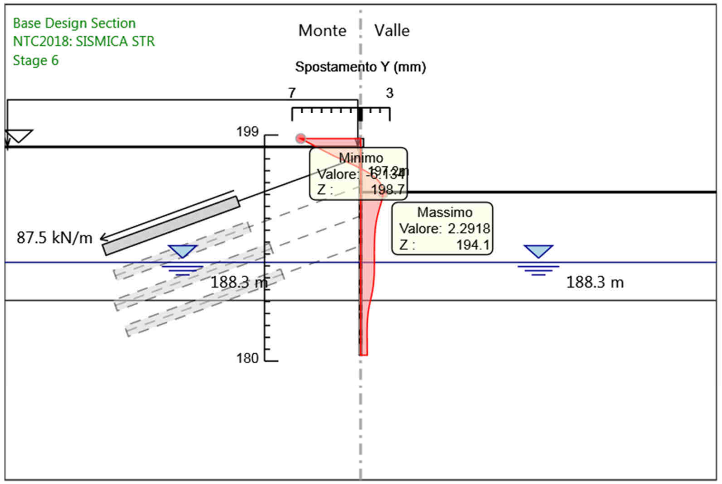
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 4
Spostamento orizzontale

4.4.18. Grafico Spostamento NTC2018: SISMICA STR - Stage: Stage 5



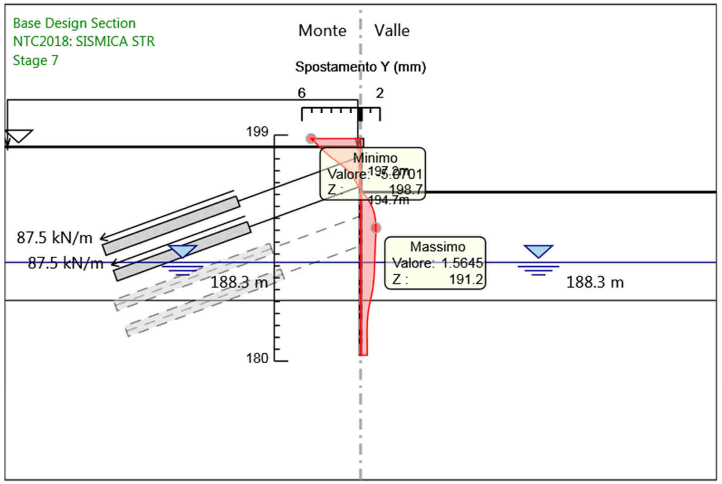
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 5
Spostamento orizzontale

4.4.19. Grafico Spostamento NTC2018: SISMICA STR - Stage: Stage 6



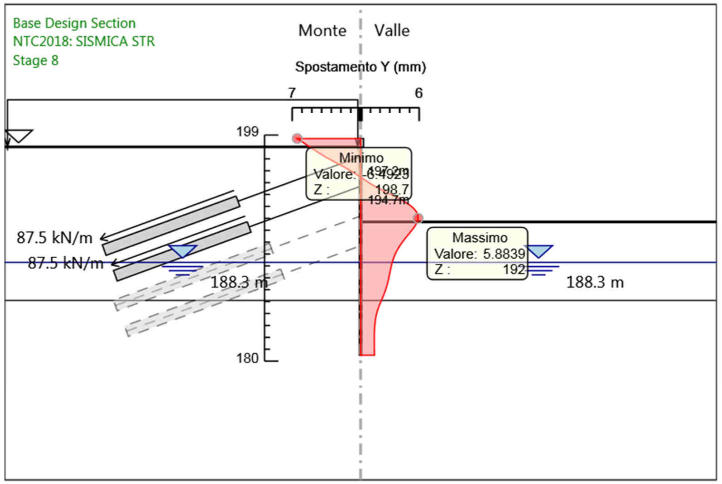
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 6
Spostamento orizzontale

4.4.20. Grafico Spostamento NTC2018: SISMICA STR - Stage: Stage 7



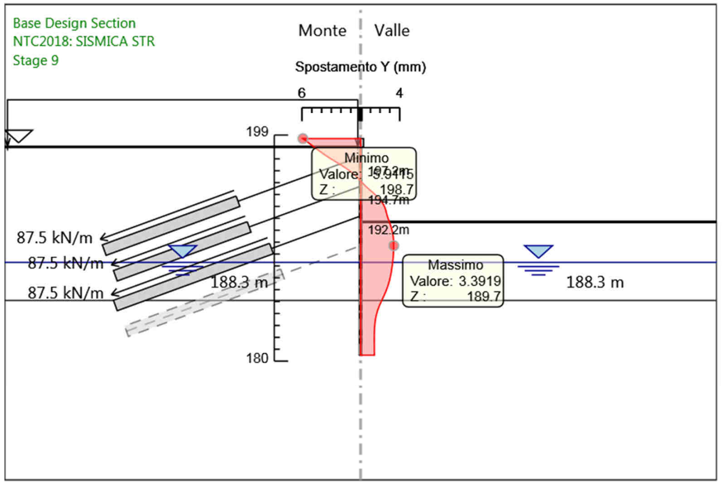
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 7
Spostamento orizzontale

4.4.21. Grafico Spostamento NTC2018: SISMICA STR - Stage: Stage 8



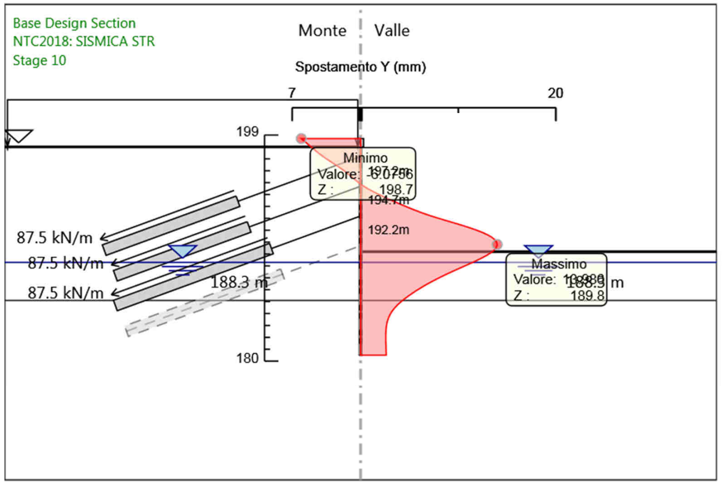
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 8
Spostamento orizzontale

4.4.22. Grafico Spostamento NTC2018: SISMICA STR - Stage: Stage 9



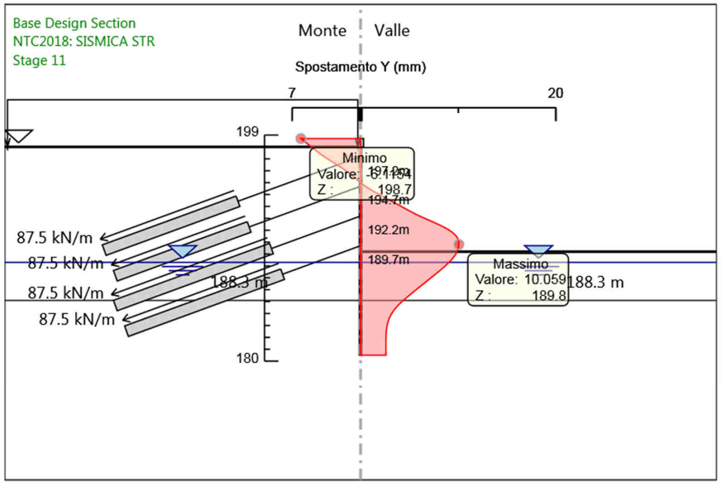
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 9
Spostamento orizzontale

4.4.23. Grafico Spostamento NTC2018: SISMICA STR - Stage: Stage 10



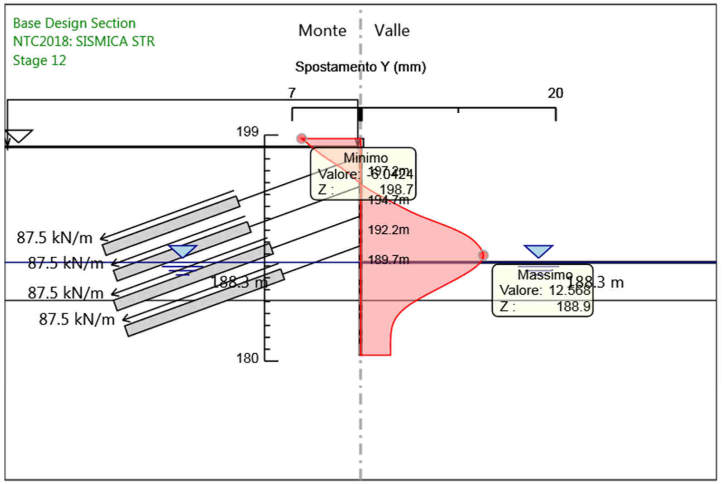
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 10
Spostamento orizzontale

4.4.24. Grafico Spostamento NTC2018: SISMICA STR - Stage: Stage 11



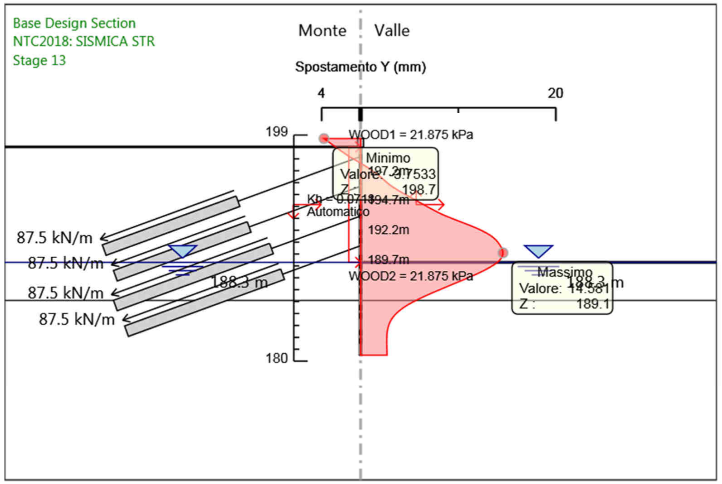
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 11
Spostamento orizzontale

4.4.25. Grafico Spostamento NTC2018: SISMICA STR - Stage: Stage 12



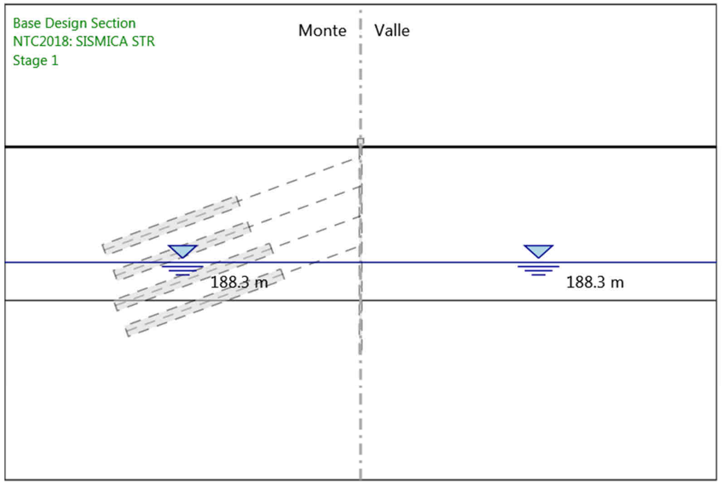
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 12
Spostamento orizzontale

4.4.26. Grafico Spostamento NTC2018: SISMICA STR - Stage: Stage 13



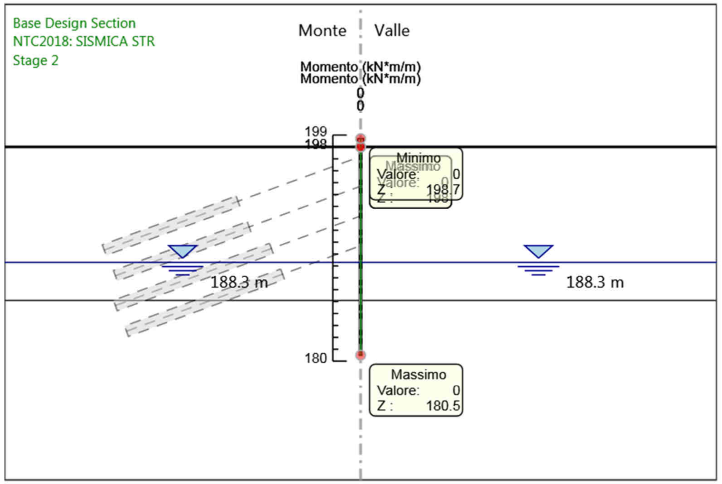
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 13
Spostamento orizzontale

4.4.27. Grafico Risultati Momento NTC2018: SISMICA STR - Stage: Stage 1



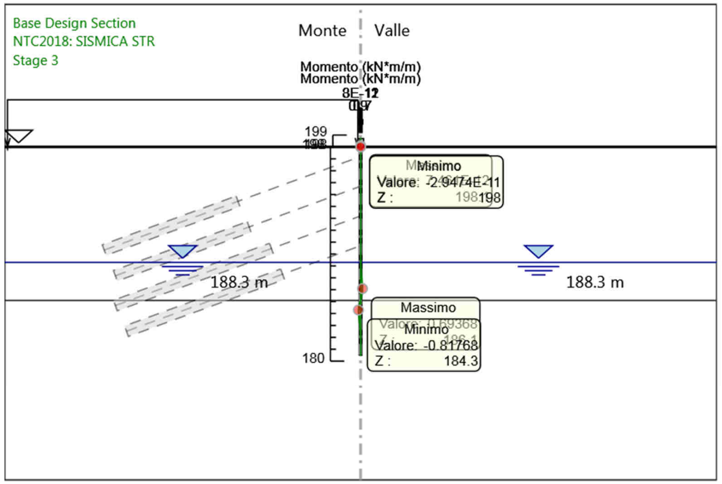
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 1
Momento

4.4.28. Grafico Risultati Momento NTC2018: SISMICA STR - Stage: Stage 2



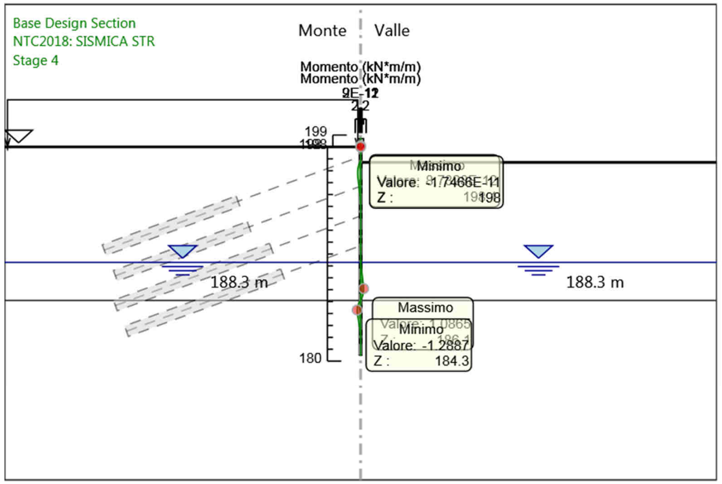
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 2
Momento

4.4.29. Grafico Risultati Momento NTC2018: SISMICA STR - Stage: Stage 3



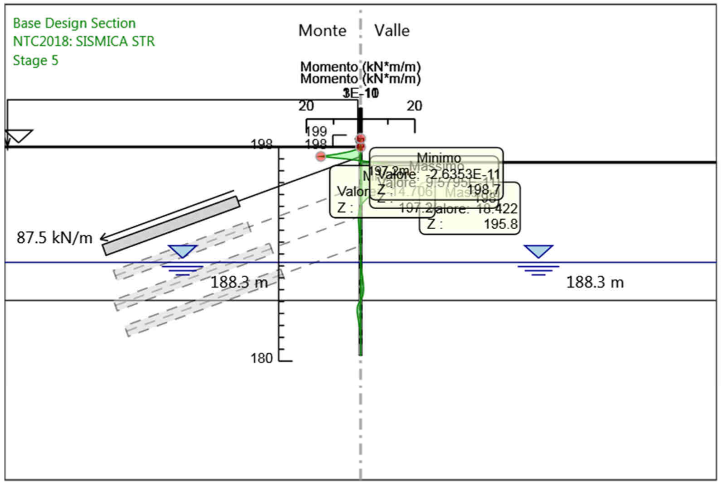
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 3
Momento

4.4.30. Grafico Risultati Momento NTC2018: SISMICA STR - Stage: Stage 4



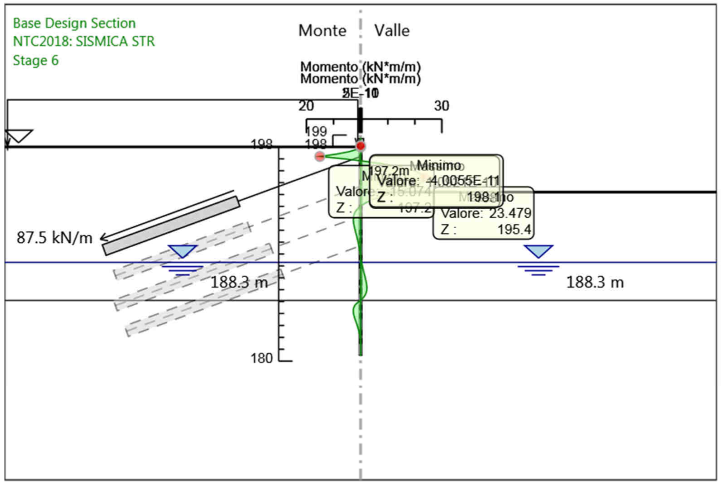
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 4
Momento

4.4.31. Grafico Risultati Momento NTC2018: SISMICA STR - Stage: Stage 5



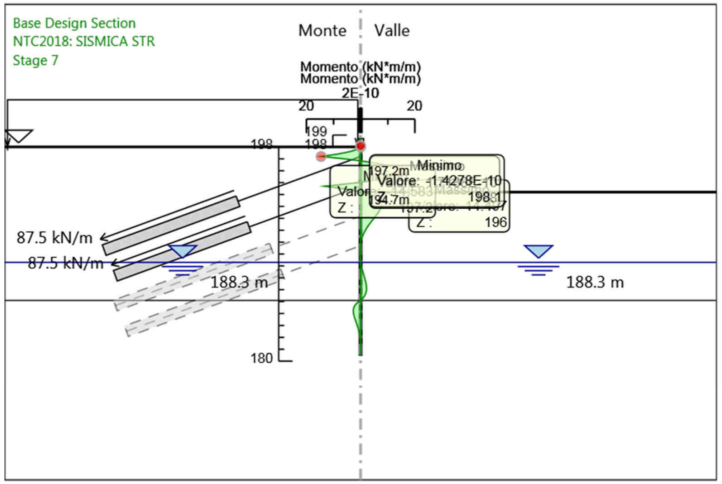
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 5
Momento

4.4.32. Grafico Risultati Momento NTC2018: SISMICA STR - Stage: Stage 6



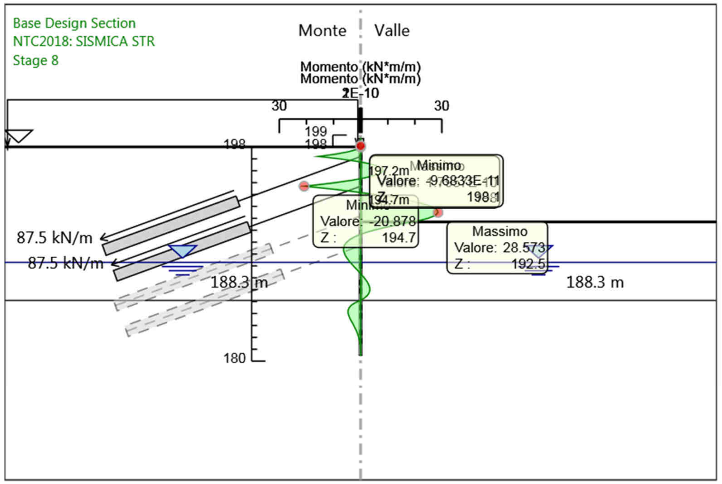
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 6
Momento

4.4.33. Grafico Risultati Momento NTC2018: SISMICA STR - Stage: Stage 7



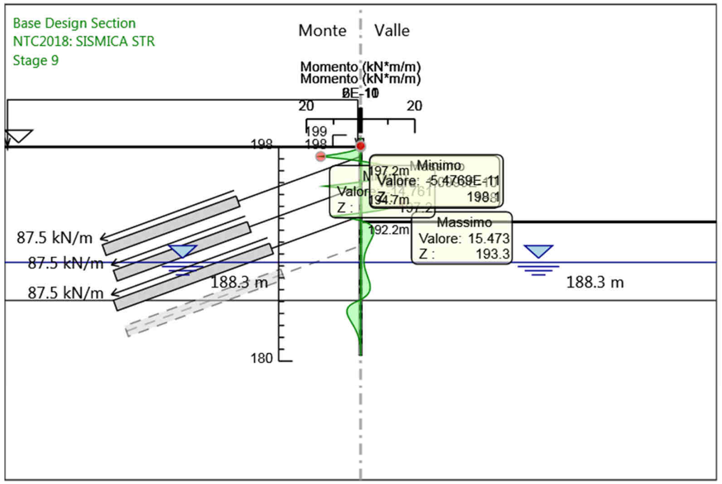
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 7
Momento

4.4.34. Grafico Risultati Momento NTC2018: SISMICA STR - Stage: Stage 8



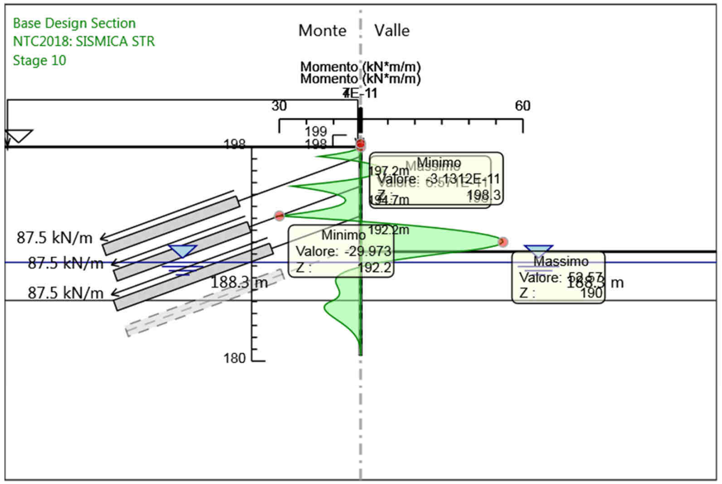
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 8
Momento

4.4.35. Grafico Risultati Momento NTC2018: SISMICA STR - Stage: Stage 9



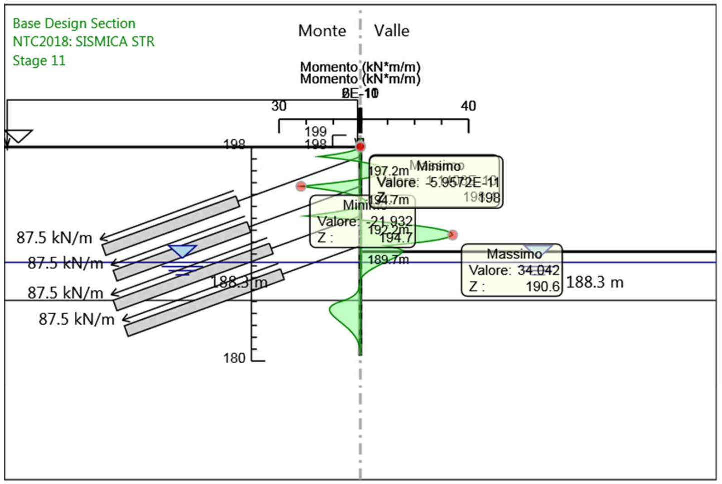
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 9
Momento

4.4.36. Grafico Risultati Momento NTC2018: SISMICA STR - Stage: Stage 10



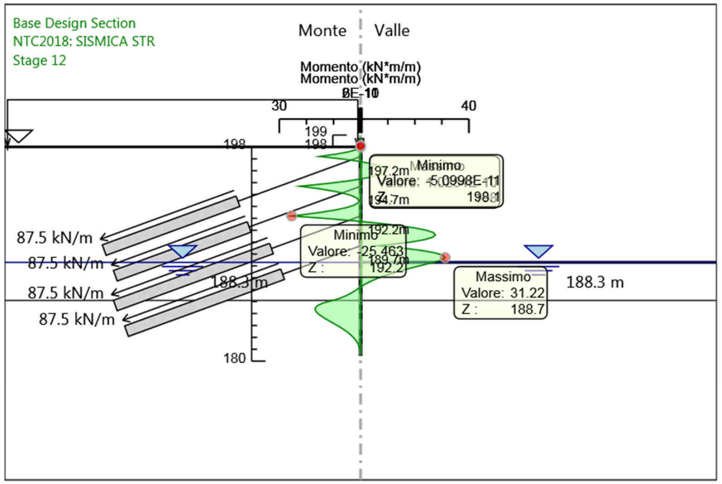
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 10
Momento

4.4.37. Grafico Risultati Momento NTC2018: SISMICA STR - Stage: Stage 11



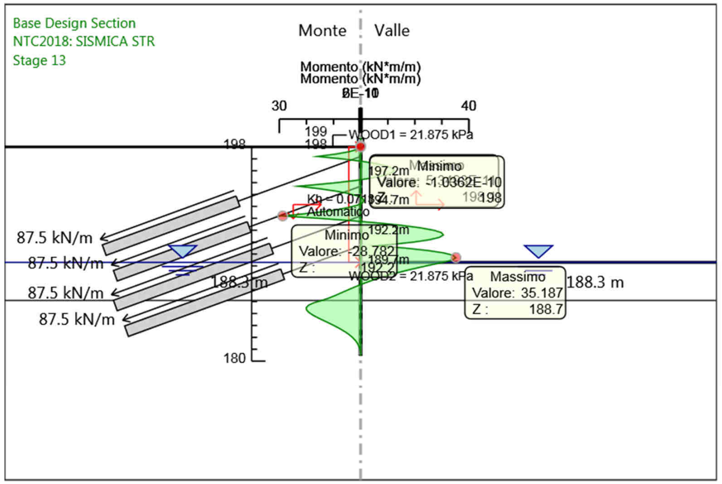
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 11
Momento

4.4.38. Grafico Risultati Momento NTC2018: SISMICA STR - Stage: Stage 12



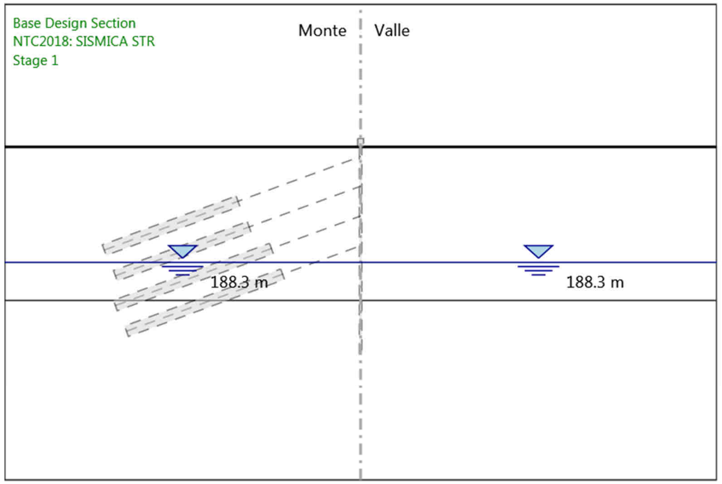
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 12
Momento

4.4.39. Grafico Risultati Momento NTC2018: SISMICA STR - Stage: Stage 13



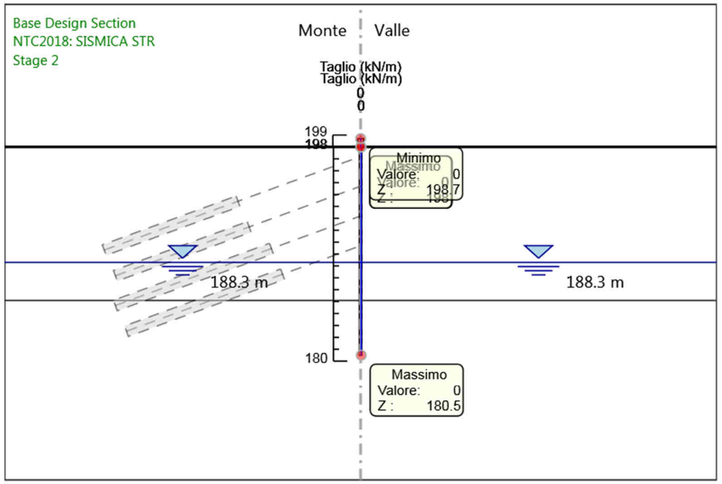
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 13
Momento

4.4.40. Grafico Risultati Taglio NTC2018: SISMICA STR - Stage: Stage 1



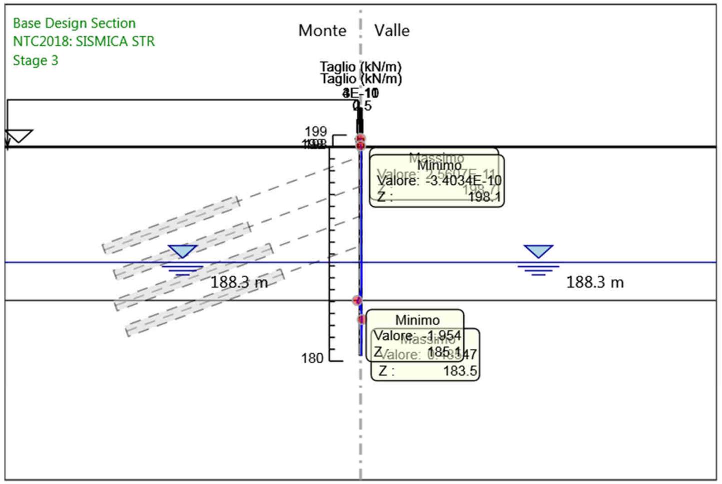
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 1
Taglio

4.4.41. Grafico Risultati Taglio NTC2018: SISMICA STR - Stage: Stage 2



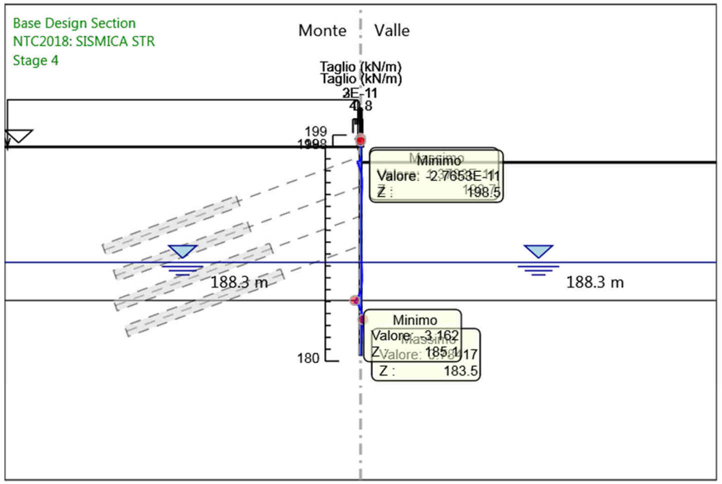
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 2
Taglio

4.4.42. Grafico Risultati Taglio NTC2018: SISMICA STR - Stage: Stage 3



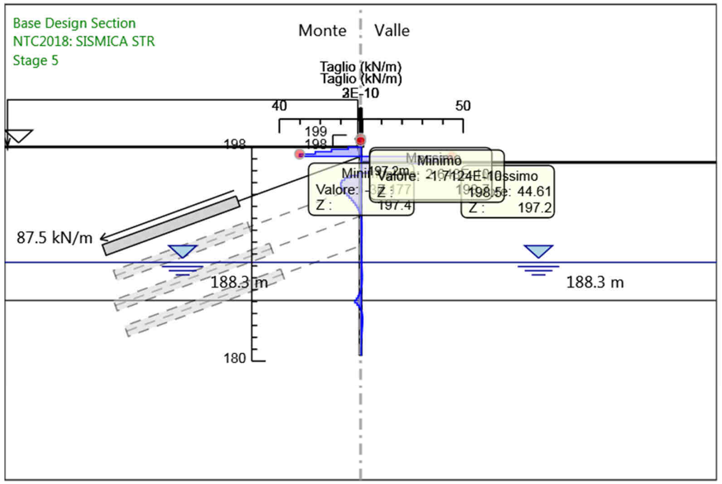
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 3
Taglio

4.4.43. Grafico Risultati Taglio NTC2018: SISMICA STR - Stage: Stage 4



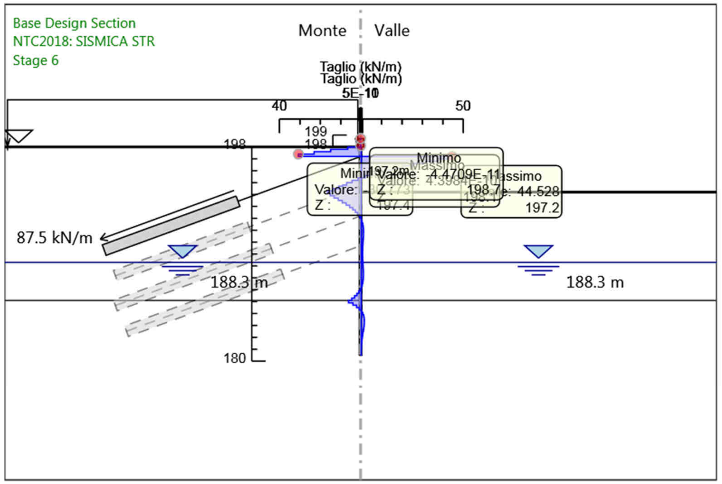
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 4
Taglio

4.4.44. Grafico Risultati Taglio NTC2018: SISMICA STR - Stage: Stage 5



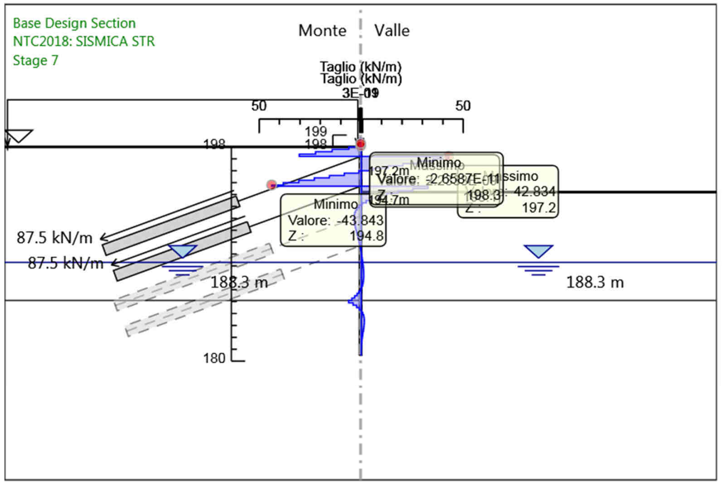
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 5
Taglio

4.4.45. Grafico Risultati Taglio NTC2018: SISMICA STR - Stage: Stage 6



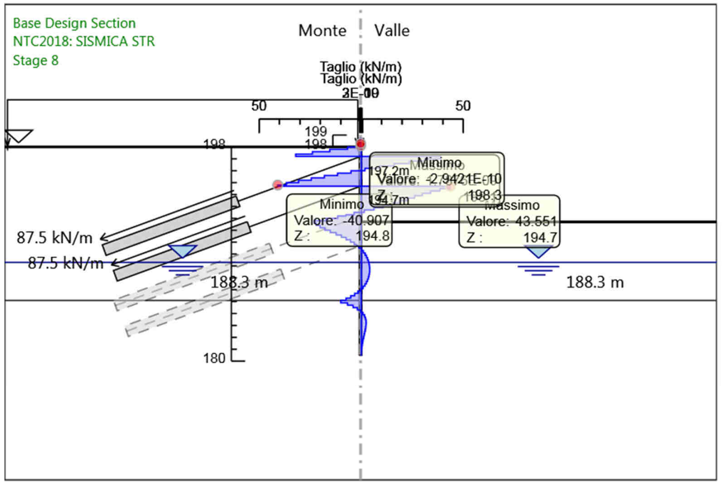
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 6
Taglio

4.4.46. Grafico Risultati Taglio NTC2018: SISMICA STR - Stage: Stage 7



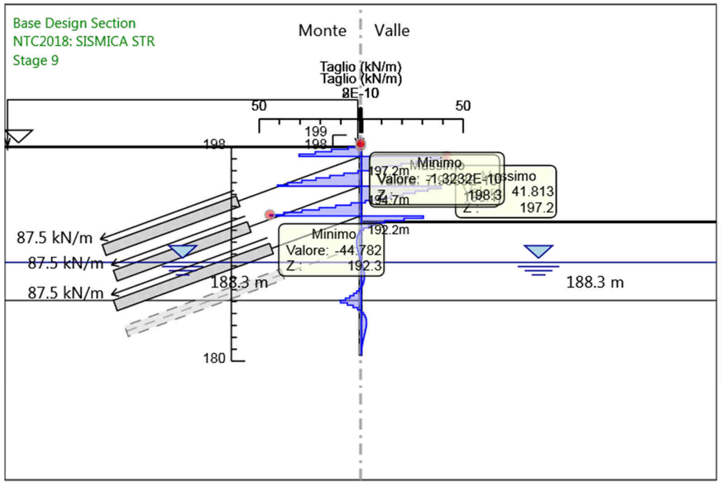
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 7
Taglio

4.4.47. Grafico Risultati Taglio NTC2018: SISMICA STR - Stage: Stage 8



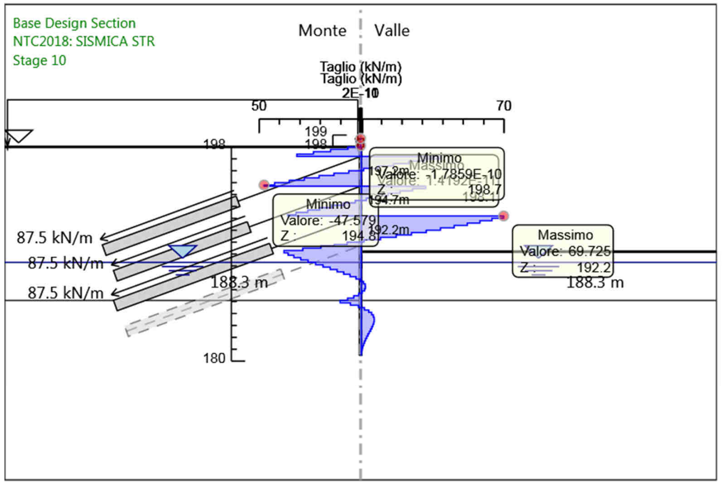
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 8
Taglio

4.4.48. Grafico Risultati Taglio NTC2018: SISMICA STR - Stage: Stage 9



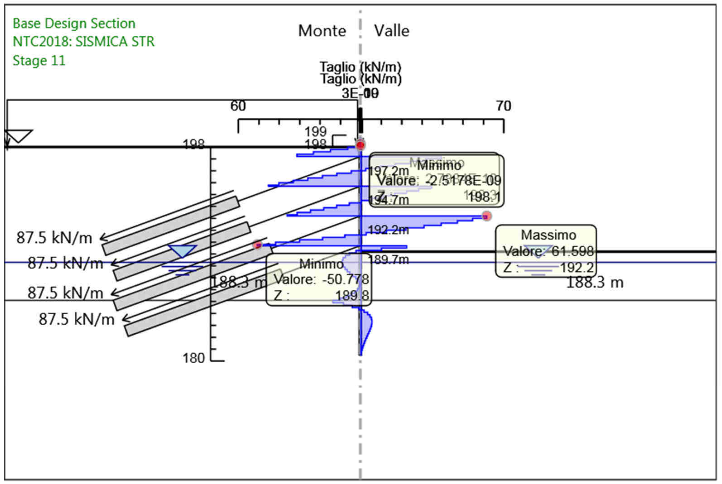
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 9
Taglio

4.4.49. Grafico Risultati Taglio NTC2018: SISMICA STR - Stage: Stage 10



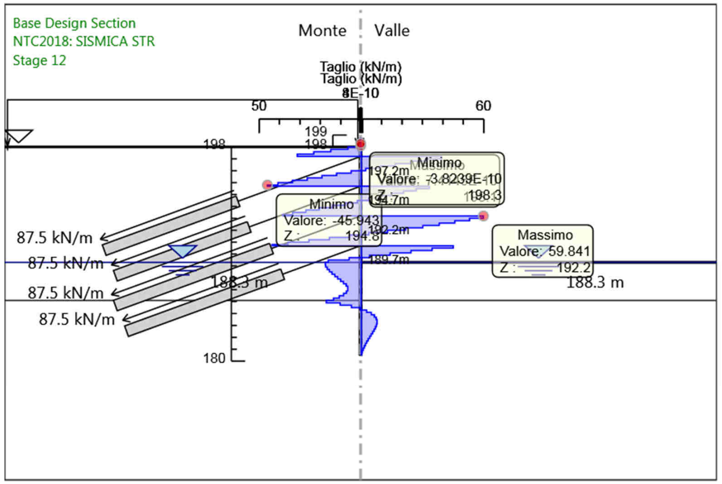
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 10
Taglio

4.4.50. Grafico Risultati Taglio NTC2018: SISMICA STR - Stage: Stage 11



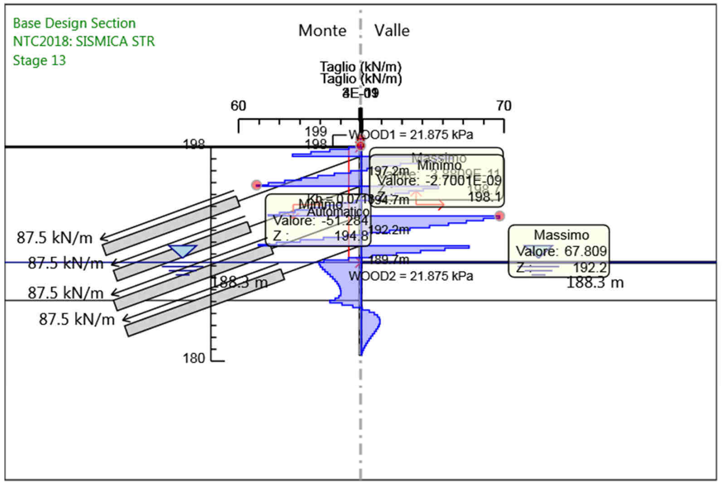
Design Assumption: NTC2018: SISMICA STR
Stage: Stage 11
Taglio

4.4.51. Grafico Risultati Taglio NTC2018: SISMICA STR - Stage: Stage 12



Design Assumption: NTC2018: SISMICA STR
Stage: Stage 12
Taglio

4.4.52. Grafico Risultati Taglio NTC2018: SISMICA STR - Stage: Stage 13



Design Assumption: NTC2018: SISMICA STR
Stage: Stage 13
Taglio

4.4.53. Risultati Elementi strutturali - NTC2018: SISMICA STR

Design Assumption: NTC2018: SISMICA STR	Sollecitazione I-ordine
Stage	Forza (kN/m)
Stage 5	87.5
Stage 6	87.8394
Stage 7	86.02197
Stage 8	84.04349
Stage 9	84.96123
Stage 10	83.43627
Stage 11	83.76372
Stage 12	83.74849
Stage 13	93.00665

Design Assumption: NTC2018: SISMICA STR	Sollecitazione II-ordine
Stage	**Forza (kN/m)**
Stage 7	87.5
Stage 8	94.1936
Stage 9	90.49837
Stage 10	89.67563
Stage 11	90.32568
Stage 12	89.78961
Stage 13	100.9196

Design Assumption: NTC2018: SISMICA STR	Sollecitazione III-ordine
Stage	**Forza (kN/m)**
Stage 9	87.5
Stage 10	116.8647
Stage 11	109.0848
Stage 12	109.6457
Stage 13	126.7103

Design Assumption: NTC2018: SISMICA STR	Sollecitazione IV-ordine
Stage	Forza (kN/m)
Stage 11	87.5
Stage 12	102.6862
Stage 13	119.3139

4.5. *Risultati NTC2018: SISMICA GEO*

4.5.1. Tabella Risultati Paratia NTC2018: SISMICA GEO - Left Wall - Stage: Stage 1

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	198	0	0
Stage 1	197.8	0	0
Stage 1	197.6	0	0
Stage 1	197.4	0	0
Stage 1	197.2	0	0
Stage 1	197	0	0
Stage 1	196.8	0	0
Stage 1	196.6	0	0
Stage 1	196.4	0	0
Stage 1	196.2	0	0
Stage 1	196	0	0
Stage 1	195.8	0	0
Stage 1	195.6	0	0
Stage 1	195.4	0	0
Stage 1	195.2	0	0
Stage 1	195	0	0
Stage 1	194.8	0	0
Stage 1	194.7	0	0
Stage 1	194.5	0	0
Stage 1	194.3	0	0
Stage 1	194.1	0	0
Stage 1	193.9	0	0
Stage 1	193.7	0	0
Stage 1	193.5	0	0
Stage 1	193.3	0	0
Stage 1	193.1	0	0
Stage 1	192.9	0	0
Stage 1	192.7	0	0
Stage 1	192.5	0	0
Stage 1	192.3	0	0
Stage 1	192.2	0	0
Stage 1	192	0	0
Stage 1	191.8	0	0
Stage 1	191.6	0	0
Stage 1	191.4	0	0
Stage 1	191.2	0	0
Stage 1	191	0	0
Stage 1	190.8	0	0
Stage 1	190.6	0	0
Stage 1	190.4	0	0
Stage 1	190.2	0	0
Stage 1	190	0	0
Stage 1	189.8	0	0
Stage 1	189.7	0	0
Stage 1	189.5	0	0
Stage 1	189.3	0	0
Stage 1	189.1	0	0
Stage 1	188.9	0	0
Stage 1	188.7	0	0
Stage 1	188.5	0	0
Stage 1	188.3	0	0
Stage 1	188.1	0	0
Stage 1	187.9	0	0
Stage 1	187.7	0	0
Stage 1	187.5	0	0
Stage 1	187.3	0	0
Stage 1	187.1	0	0
Stage 1	186.9	0	0
Stage 1	186.7	0	0
Stage 1	186.5	0	0
Stage 1	186.3	0	0
Stage 1	186.1	0	0
Stage 1	185.9	0	0
Stage 1	185.7	0	0
Stage 1	185.5	0	0
Stage 1	185.3	0	0

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	185.1	0	0
Stage 1	184.9	0	0
Stage 1	184.7	0	0
Stage 1	184.5	0	0
Stage 1	184.3	0	0
Stage 1	184.1	0	0
Stage 1	183.9	0	0
Stage 1	183.7	0	0
Stage 1	183.5	0	0
Stage 1	183.3	0	0
Stage 1	183.1	0	0
Stage 1	182.9	0	0
Stage 1	182.7	0	0
Stage 1	182.5	0	0
Stage 1	182.3	0	0
Stage 1	182.1	0	0
Stage 1	181.9	0	0
Stage 1	181.7	0	0
Stage 1	181.5	0	0
Stage 1	181.3	0	0
Stage 1	181.1	0	0
Stage 1	180.9	0	0
Stage 1	180.7	0	0
Stage 1	180.5	0	0

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	198.7	0	0
Stage 1	198.5	0	0
Stage 1	198.3	0	0
Stage 1	198.1	0	0
Stage 1	198	0	0

4.5.2. Tabella Risultati Paratia NTC2018: SISMICA GEO - Left Wall - Stage: Stage 2

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	198	0	0
Stage 2	197.8	0	0
Stage 2	197.6	0	0
Stage 2	197.4	0	0
Stage 2	197.2	0	0
Stage 2	197	0	0
Stage 2	196.8	0	0
Stage 2	196.6	0	0
Stage 2	196.4	0	0
Stage 2	196.2	0	0
Stage 2	196	0	0
Stage 2	195.8	0	0
Stage 2	195.6	0	0
Stage 2	195.4	0	0
Stage 2	195.2	0	0
Stage 2	195	0	0
Stage 2	194.8	0	0
Stage 2	194.7	0	0
Stage 2	194.5	0	0
Stage 2	194.3	0	0
Stage 2	194.1	0	0
Stage 2	193.9	0	0
Stage 2	193.7	0	0
Stage 2	193.5	0	0
Stage 2	193.3	0	0
Stage 2	193.1	0	0
Stage 2	192.9	0	0
Stage 2	192.7	0	0
Stage 2	192.5	0	0
Stage 2	192.3	0	0
Stage 2	192.2	0	0
Stage 2	192	0	0
Stage 2	191.8	0	0
Stage 2	191.6	0	0
Stage 2	191.4	0	0
Stage 2	191.2	0	0
Stage 2	191	0	0
Stage 2	190.8	0	0
Stage 2	190.6	0	0
Stage 2	190.4	0	0
Stage 2	190.2	0	0
Stage 2	190	0	0
Stage 2	189.8	0	0
Stage 2	189.7	0	0
Stage 2	189.5	0	0
Stage 2	189.3	0	0
Stage 2	189.1	0	0
Stage 2	188.9	0	0
Stage 2	188.7	0	0
Stage 2	188.5	0	0
Stage 2	188.3	0	0
Stage 2	188.1	0	0
Stage 2	187.9	0	0
Stage 2	187.7	0	0
Stage 2	187.5	0	0
Stage 2	187.3	0	0
Stage 2	187.1	0	0
Stage 2	186.9	0	0
Stage 2	186.7	0	0
Stage 2	186.5	0	0
Stage 2	186.3	0	0
Stage 2	186.1	0	0
Stage 2	185.9	0	0
Stage 2	185.7	0	0
Stage 2	185.5	0	0
Stage 2	185.3	0	0
Stage 2	185.1	0	0
Stage 2	184.9	0	0
Stage 2	184.7	0	0

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 2	184.5	0	0
Stage 2	184.3	0	0
Stage 2	184.1	0	0
Stage 2	183.9	0	0
Stage 2	183.7	0	0
Stage 2	183.5	0	0
Stage 2	183.3	0	0
Stage 2	183.1	0	0
Stage 2	182.9	0	0
Stage 2	182.7	0	0
Stage 2	182.5	0	0
Stage 2	182.3	0	0
Stage 2	182.1	0	0
Stage 2	181.9	0	0
Stage 2	181.7	0	0
Stage 2	181.5	0	0
Stage 2	181.3	0	0
Stage 2	181.1	0	0
Stage 2	180.9	0	0
Stage 2	180.7	0	0
Stage 2	180.5	0	0

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 2	198.7	0	0
Stage 2	198.5	0	0
Stage 2	198.3	0	0
Stage 2	198.1	0	0
Stage 2	198	0	0

4.5.3. Tabella Risultati Paratia NTC2018: SISMICA GEO - Left Wall - Stage: Stage 3

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 3	198	0	0
Stage 3	197.8	0	0
Stage 3	197.6	0	0
Stage 3	197.4	0	0
Stage 3	197.4	0	0
Stage 3	197.2	0	0
Stage 3	197	0	0
Stage 3	196.8	0	0
Stage 3	196.6	0	0
Stage 3	196.4	0	0
Stage 3	196.2	0	0
Stage 3	196	0	0
Stage 3	195.8	0	0
Stage 3	195.6	0	0
Stage 3	195.4	0	0
Stage 3	195.2	0	0
Stage 3	195	0	0
Stage 3	194.8	0	0
Stage 3	194.7	0	0
Stage 3	194.5	0	0
Stage 3	194.3	0	0
Stage 3	194.1	0	0
Stage 3	193.9	0	0
Stage 3	193.7	0	0
Stage 3	193.5	0	0
Stage 3	193.3	0	0
Stage 3	193.1	0	0
Stage 3	192.9	0	0
Stage 3	192.7	0	0
Stage 3	192.5	0	-0.01
Stage 3	192.3	0	-0.01
Stage 3	192.2	-0.01	-0.01
Stage 3	192	-0.01	-0.01
Stage 3	191.8	-0.01	-0.01
Stage 3	191.6	-0.01	-0.01
Stage 3	191.4	-0.02	-0.01
Stage 3	191.2	-0.02	-0.01
Stage 3	191	-0.02	-0.02
Stage 3	190.8	-0.02	-0.01
Stage 3	190.6	-0.03	-0.01
Stage 3	190.4	-0.03	-0.01
Stage 3	190.2	-0.03	-0.01
Stage 3	190	-0.03	0
Stage 3	189.8	-0.03	0.01
Stage 3	189.7	-0.03	0.02
Stage 3	189.5	-0.02	0.03
Stage 3	189.3	-0.01	0.04
Stage 3	189.1	0	0.06
Stage 3	188.9	0.02	0.09
Stage 3	188.7	0.04	0.11
Stage 3	188.5	0.07	0.14
Stage 3	188.3	0.1	0.17
Stage 3	188.1	0.15	0.21
Stage 3	187.9	0.19	0.24
Stage 3	187.7	0.25	0.28
Stage 3	187.5	0.31	0.31
Stage 3	187.3	0.38	0.33
Stage 3	187.1	0.45	0.35
Stage 3	186.9	0.52	0.35
Stage 3	186.7	0.58	0.33
Stage 3	186.5	0.64	0.28
Stage 3	186.3	0.68	0.2
Stage 3	186.1	0.69	0.08
Stage 3	185.9	0.67	-0.09
Stage 3	185.7	0.61	-0.32
Stage 3	185.5	0.49	-0.62
Stage 3	185.3	0.29	-0.98
Stage 3	185.1	0.01	-1.43
Stage 3	184.9	-0.39	-1.95

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	184.7	-0.63	-1.24
Stage 3	184.5	-0.77	-0.67
Stage 3	184.3	-0.82	-0.25
Stage 3	184.1	-0.81	0.06
Stage 3	183.9	-0.75	0.27
Stage 3	183.7	-0.67	0.4
Stage 3	183.5	-0.58	0.47
Stage 3	183.3	-0.48	0.49
Stage 3	183.1	-0.39	0.47
Stage 3	182.9	-0.3	0.43
Stage 3	182.7	-0.22	0.38
Stage 3	182.5	-0.16	0.32
Stage 3	182.3	-0.11	0.26
Stage 3	182.1	-0.07	0.2
Stage 3	181.9	-0.04	0.15
Stage 3	181.7	-0.02	0.1
Stage 3	181.5	-0.01	0.06
Stage 3	181.3	0	0.03
Stage 3	181.1	0	0.01
Stage 3	180.9	0	0
Stage 3	180.7	0	-0.01
Stage 3	180.5	0	-0.01

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	198.7	0	0
Stage 3	198.5	0	0
Stage 3	198.5	0	0
Stage 3	198.3	0	0
Stage 3	198.3	0	0
Stage 3	198.1	0	0
Stage 3	198.1	0	0
Stage 3	198	0	0

4.5.4. Tabella Risultati Paratia NTC2018: SISMICA GEO - Left Wall - Stage: Stage 4

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 4	198	0	0
Stage 4	197.8	0	0
Stage 4	197.8	0	0
Stage 4	197.6	0	0
Stage 4	197.6	0	0
Stage 4	197.4	0	0
Stage 4	197.4	0	0
Stage 4	197.2	0	0
Stage 4	197.2	0	0
Stage 4	197	-0.02	-0.12
Stage 4	196.8	-0.17	-0.74
Stage 4	196.6	-0.54	-1.86
Stage 4	196.4	-0.83	-1.42
Stage 4	196.2	-1.01	-0.92
Stage 4	196	-1.11	-0.48
Stage 4	195.8	-1.13	-0.12
Stage 4	195.6	-1.1	0.15
Stage 4	195.4	-1.03	0.35
Stage 4	195.2	-0.94	0.48
Stage 4	195	-0.83	0.55
Stage 4	194.8	-0.71	0.58
Stage 4	194.7	-0.65	0.58
Stage 4	194.5	-0.54	0.56
Stage 4	194.3	-0.44	0.52
Stage 4	194.1	-0.34	0.47
Stage 4	193.9	-0.26	0.41
Stage 4	193.7	-0.19	0.35
Stage 4	193.5	-0.13	0.29
Stage 4	193.3	-0.08	0.23
Stage 4	193.1	-0.05	0.18
Stage 4	192.9	-0.02	0.14
Stage 4	192.7	0	0.1
Stage 4	192.5	0.01	0.06
Stage 4	192.3	0.02	0.03
Stage 4	192.2	0.02	0.02
Stage 4	192	0.02	0
Stage 4	191.8	0.02	-0.01
Stage 4	191.6	0.01	-0.03
Stage 4	191.4	0.01	-0.03
Stage 4	191.2	0	-0.04
Stage 4	191	-0.01	-0.04
Stage 4	190.8	-0.02	-0.04
Stage 4	190.6	-0.03	-0.04
Stage 4	190.4	-0.03	-0.04
Stage 4	190.2	-0.04	-0.03
Stage 4	190	-0.04	-0.02
Stage 4	189.8	-0.05	-0.01
Stage 4	189.7	-0.04	0.01
Stage 4	189.5	-0.04	0.02
Stage 4	189.3	-0.03	0.05
Stage 4	189.1	-0.01	0.08
Stage 4	188.9	0.01	0.11
Stage 4	188.7	0.04	0.16
Stage 4	188.5	0.08	0.2
Stage 4	188.3	0.13	0.26
Stage 4	188.1	0.19	0.31
Stage 4	187.9	0.27	0.37
Stage 4	187.7	0.35	0.43
Stage 4	187.5	0.45	0.48
Stage 4	187.3	0.56	0.53
Stage 4	187.1	0.67	0.56
Stage 4	186.9	0.78	0.56
Stage 4	186.7	0.89	0.54
Stage 4	186.5	0.98	0.47
Stage 4	186.3	1.05	0.35
Stage 4	186.1	1.09	0.16
Stage 4	185.9	1.07	-0.11
Stage 4	185.7	0.97	-0.47
Stage 4	185.5	0.78	-0.95

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 4	185.3	0.47	-1.55
Stage 4	185.1	0.01	-2.29
Stage 4	184.9	-0.62	-3.16
Stage 4	184.7	-1.01	-1.97
Stage 4	184.5	-1.22	-1.04
Stage 4	184.3	-1.29	-0.34
Stage 4	184.1	-1.26	0.16
Stage 4	183.9	-1.16	0.48
Stage 4	183.7	-1.02	0.68
Stage 4	183.5	-0.87	0.77
Stage 4	183.3	-0.71	0.78
Stage 4	183.1	-0.57	0.75
Stage 4	182.9	-0.43	0.67
Stage 4	182.7	-0.31	0.58
Stage 4	182.5	-0.22	0.48
Stage 4	182.3	-0.14	0.38
Stage 4	182.1	-0.08	0.29
Stage 4	181.9	-0.04	0.21
Stage 4	181.7	-0.01	0.14
Stage 4	181.5	0	0.08
Stage 4	181.3	0.01	0.03
Stage 4	181.1	0.01	0
Stage 4	180.9	0.01	-0.01
Stage 4	180.7	0	-0.02
Stage 4	180.5	0	-0.01

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 4	198.7	0	0
Stage 4	198.5	0	0
Stage 4	198.5	0	0
Stage 4	198.3	0	0
Stage 4	198.3	0	0
Stage 4	198.1	0	0
Stage 4	198.1	0	0
Stage 4	198	0	0

4.5.5. Tabella Risultati Paratia NTC2018: SISMICA GEO - Left Wall - Stage: Stage 5

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 5	198	0	-6.33
Stage 5	197.8	-1.27	-6.33
Stage 5	197.6	-4.17	-14.53
Stage 5	197.4	-8.67	-22.49
Stage 5	197.2	-14.71	-30.18
Stage 5	197	-5.78	44.61
Stage 5	196.8	1.68	37.34
Stage 5	196.6	7.73	30.25
Stage 5	196.4	12.4	23.34
Stage 5	196.2	15.72	16.58
Stage 5	196	17.7	9.94
Stage 5	195.8	18.42	3.59
Stage 5	195.6	18.11	-1.53
Stage 5	195.4	17.01	-5.5
Stage 5	195.2	15.4	-8.06
Stage 5	195	13.5	-9.49
Stage 5	194.8	11.49	-10.05
Stage 5	194.7	10.5	-9.98
Stage 5	194.5	8.55	-9.72
Stage 5	194.3	6.75	-9.01
Stage 5	194.1	5.14	-8.06
Stage 5	193.9	3.74	-6.99
Stage 5	193.7	2.56	-5.9
Stage 5	193.5	1.6	-4.83
Stage 5	193.3	0.83	-3.83
Stage 5	193.1	0.24	-2.94
Stage 5	192.9	-0.19	-2.16
Stage 5	192.7	-0.49	-1.5
Stage 5	192.5	-0.68	-0.95
Stage 5	192.3	-0.78	-0.52
Stage 5	192.2	-0.81	-0.27
Stage 5	192	-0.82	-0.06
Stage 5	191.8	-0.79	0.15
Stage 5	191.6	-0.74	0.29
Stage 5	191.4	-0.66	0.37
Stage 5	191.2	-0.58	0.41
Stage 5	191	-0.5	0.42
Stage 5	190.8	-0.42	0.4
Stage 5	190.6	-0.34	0.37
Stage 5	190.4	-0.28	0.34
Stage 5	190.2	-0.22	0.29
Stage 5	190	-0.17	0.25
Stage 5	189.8	-0.12	0.22
Stage 5	189.7	-0.1	0.2
Stage 5	189.5	-0.07	0.18
Stage 5	189.3	-0.03	0.17
Stage 5	189.1	0	0.16
Stage 5	188.9	0.03	0.17
Stage 5	188.7	0.07	0.19
Stage 5	188.5	0.12	0.22
Stage 5	188.3	0.17	0.26
Stage 5	188.1	0.23	0.31
Stage 5	187.9	0.3	0.36
Stage 5	187.7	0.38	0.41
Stage 5	187.5	0.48	0.46
Stage 5	187.3	0.58	0.51
Stage 5	187.1	0.69	0.54
Stage 5	186.9	0.79	0.55
Stage 5	186.7	0.9	0.52
Stage 5	186.5	0.99	0.46
Stage 5	186.3	1.06	0.34
Stage 5	186.1	1.09	0.15
Stage 5	185.9	1.07	-0.11
Stage 5	185.7	0.97	-0.48
Stage 5	185.5	0.78	-0.95
Stage 5	185.3	0.47	-1.55
Stage 5	185.1	0.01	-2.29
Stage 5	184.9	-0.62	-3.16
Stage 5	184.7	-1.01	-1.97

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 5	184.5	-1.22	-1.04
Stage 5	184.3	-1.29	-0.34
Stage 5	184.1	-1.26	0.16
Stage 5	183.9	-1.16	0.49
Stage 5	183.7	-1.03	0.68
Stage 5	183.5	-0.87	0.77
Stage 5	183.3	-0.71	0.79
Stage 5	183.1	-0.57	0.75
Stage 5	182.9	-0.43	0.67
Stage 5	182.7	-0.31	0.58
Stage 5	182.5	-0.22	0.48
Stage 5	182.3	-0.14	0.38
Stage 5	182.1	-0.08	0.29
Stage 5	181.9	-0.04	0.21
Stage 5	181.7	-0.01	0.14
Stage 5	181.5	0	0.08
Stage 5	181.3	0.01	0.03
Stage 5	181.1	0.01	0
Stage 5	180.9	0.01	-0.01
Stage 5	180.7	0	-0.02
Stage 5	180.5	0	-0.01

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 5	198.7	0	0
Stage 5	198.5	0	0
Stage 5	198.5	0	0
Stage 5	198.3	0	0
Stage 5	198.3	0	0
Stage 5	198.1	0	0
Stage 5	198.1	0	0
Stage 5	198	0	0

4.5.6. Tabella Risultati Paratia NTC2018: SISMICA GEO - Left Wall - Stage: Stage 6

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 6	198	0	-6.56
Stage 6	197.8	-1.31	-6.56
Stage 6	197.6	-4.31	-14.98
Stage 6	197.4	-8.92	-23.05
Stage 6	197.2	-15.07	-30.77
Stage 6	197	-6.17	44.53
Stage 6	196.8	1.38	37.73
Stage 6	196.6	7.66	31.41
Stage 6	196.4	12.77	25.54
Stage 6	196.2	16.79	20.12
Stage 6	196	19.81	15.1
Stage 6	195.8	21.9	10.42
Stage 6	195.6	23.1	6.01
Stage 6	195.4	23.48	1.91
Stage 6	195.2	23.17	-1.52
Stage 6	195	22.28	-4.48
Stage 6	194.8	20.85	-7.16
Stage 6	194.7	19.94	-9.08
Stage 6	194.5	17.74	-11.01
Stage 6	194.3	15	-13.69
Stage 6	194.1	11.67	-16.63
Stage 6	193.9	8.63	-15.2
Stage 6	193.7	5.97	-13.29
Stage 6	193.5	3.72	-11.25
Stage 6	193.3	1.88	-9.24
Stage 6	193.1	0.41	-7.34
Stage 6	192.9	-0.72	-5.63
Stage 6	192.7	-1.55	-4.13
Stage 6	192.5	-2.12	-2.85
Stage 6	192.3	-2.47	-1.78
Stage 6	192.2	-2.59	-1.14
Stage 6	192	-2.7	-0.56
Stage 6	191.8	-2.69	0.03
Stage 6	191.6	-2.6	0.47
Stage 6	191.4	-2.44	0.78
Stage 6	191.2	-2.24	0.98
Stage 6	191	-2.02	1.1
Stage 6	190.8	-1.8	1.14
Stage 6	190.6	-1.57	1.14
Stage 6	190.4	-1.35	1.1
Stage 6	190.2	-1.14	1.04
Stage 6	190	-0.94	0.97
Stage 6	189.8	-0.76	0.9
Stage 6	189.7	-0.68	0.85
Stage 6	189.5	-0.52	0.81
Stage 6	189.3	-0.37	0.76
Stage 6	189.1	-0.22	0.73
Stage 6	188.9	-0.07	0.72
Stage 6	188.7	0.07	0.73
Stage 6	188.5	0.23	0.76
Stage 6	188.3	0.39	0.81
Stage 6	188.1	0.56	0.88
Stage 6	187.9	0.75	0.94
Stage 6	187.7	0.95	1.01
Stage 6	187.5	1.17	1.07
Stage 6	187.3	1.39	1.11
Stage 6	187.1	1.61	1.11
Stage 6	186.9	1.83	1.07
Stage 6	186.7	2.02	0.97
Stage 6	186.5	2.18	0.79
Stage 6	186.3	2.28	0.51
Stage 6	186.1	2.3	0.1
Stage 6	185.9	2.21	-0.46
Stage 6	185.7	1.97	-1.19
Stage 6	185.5	1.55	-2.12
Stage 6	185.3	0.9	-3.26
Stage 6	185.1	-0.03	-4.64
Stage 6	184.9	-1.29	-6.27
Stage 6	184.7	-2.09	-4.04

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 6	184.5	-2.54	-2.26
Stage 6	184.3	-2.73	-0.9
Stage 6	184.1	-2.71	0.09
Stage 6	183.9	-2.55	0.78
Stage 6	183.7	-2.31	1.22
Stage 6	183.5	-2.02	1.46
Stage 6	183.3	-1.71	1.54
Stage 6	183.1	-1.4	1.52
Stage 6	182.9	-1.12	1.42
Stage 6	182.7	-0.86	1.27
Stage 6	182.5	-0.65	1.1
Stage 6	182.3	-0.46	0.92
Stage 6	182.1	-0.32	0.73
Stage 6	181.9	-0.2	0.57
Stage 6	181.7	-0.12	0.42
Stage 6	181.5	-0.06	0.29
Stage 6	181.3	-0.03	0.18
Stage 6	181.1	-0.01	0.1
Stage 6	180.9	0	0.04
Stage 6	180.7	0	0
Stage 6	180.5	0	-0.01

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 6	198.7	0	0
Stage 6	198.5	0	0
Stage 6	198.5	0	0
Stage 6	198.3	0	0
Stage 6	198.3	0	0
Stage 6	198.1	0	0
Stage 6	198.1	0	0
Stage 6	198	0	0

4.5.7. Tabella Risultati Paratia NTC2018: SISMICA GEO - Left Wall - Stage: Stage 7

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	**Z (m)**	**Momento (kN*m/m)**	**Taglio (kN/m)**
Stage 7	198	0	-6.05
Stage 7	197.8	-1.21	-6.05
Stage 7	197.6	-4.06	-14.22
Stage 7	197.4	-8.53	-22.36
Stage 7	197.2	-14.58	-30.28
Stage 7	197	-6.02	42.83
Stage 7	196.8	1.03	35.23
Stage 7	196.6	6.58	27.75
Stage 7	196.4	10.66	20.41
Stage 7	196.2	13.3	13.17
Stage 7	196	14.5	6
Stage 7	195.8	14.27	-1.14
Stage 7	195.6	12.6	-8.32
Stage 7	195.4	9.49	-15.58
Stage 7	195.2	4.89	-22.97
Stage 7	195	-1.21	-30.54
Stage 7	194.8	-8.85	-38.18
Stage 7	194.7	-13.23	-43.84
Stage 7	194.5	-6.68	32.74
Stage 7	194.3	-1.63	25.29
Stage 7	194.1	1.95	17.9
Stage 7	193.9	4.46	12.52
Stage 7	193.7	6.13	8.34
Stage 7	193.5	7.14	5.05
Stage 7	193.3	7.63	2.48
Stage 7	193.1	7.73	0.5
Stage 7	192.9	7.53	-0.98
Stage 7	192.7	7.13	-2.04
Stage 7	192.5	6.57	-2.77
Stage 7	192.3	5.93	-3.22
Stage 7	192.2	5.59	-3.39
Stage 7	192	4.89	-3.5
Stage 7	191.8	4.19	-3.49
Stage 7	191.6	3.52	-3.37
Stage 7	191.4	2.88	-3.17
Stage 7	191.2	2.3	-2.92
Stage 7	191	1.77	-2.63
Stage 7	190.8	1.31	-2.32
Stage 7	190.6	0.91	-2.01
Stage 7	190.4	0.57	-1.7
Stage 7	190.2	0.29	-1.4
Stage 7	190	0.06	-1.12
Stage 7	189.8	-0.11	-0.85
Stage 7	189.7	-0.17	-0.66
Stage 7	189.5	-0.27	-0.48
Stage 7	189.3	-0.32	-0.25
Stage 7	189.1	-0.33	-0.04
Stage 7	188.9	-0.3	0.16
Stage 7	188.7	-0.23	0.35
Stage 7	188.5	-0.12	0.52
Stage 7	188.3	0.02	0.69
Stage 7	188.1	0.19	0.85
Stage 7	187.9	0.38	0.99
Stage 7	187.7	0.6	1.11
Stage 7	187.5	0.84	1.2
Stage 7	187.3	1.1	1.26
Stage 7	187.1	1.35	1.28
Stage 7	186.9	1.6	1.25
Stage 7	186.7	1.83	1.14
Stage 7	186.5	2.02	0.95
Stage 7	186.3	2.15	0.66
Stage 7	186.1	2.2	0.24
Stage 7	185.9	2.13	-0.34
Stage 7	185.7	1.91	-1.08
Stage 7	185.5	1.51	-2.02
Stage 7	185.3	0.87	-3.18
Stage 7	185.1	-0.04	-4.57
Stage 7	184.9	-1.28	-6.21
Stage 7	184.7	-2.08	-3.99

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 7	184.5	-2.53	-2.23
Stage 7	184.3	-2.71	-0.89
Stage 7	184.1	-2.69	0.1
Stage 7	183.9	-2.53	0.78
Stage 7	183.7	-2.29	1.21
Stage 7	183.5	-2	1.45
Stage 7	183.3	-1.69	1.53
Stage 7	183.1	-1.39	1.51
Stage 7	182.9	-1.11	1.41
Stage 7	182.7	-0.86	1.26
Stage 7	182.5	-0.64	1.09
Stage 7	182.3	-0.46	0.91
Stage 7	182.1	-0.31	0.73
Stage 7	181.9	-0.2	0.56
Stage 7	181.7	-0.12	0.41
Stage 7	181.5	-0.06	0.28
Stage 7	181.3	-0.03	0.18
Stage 7	181.1	-0.01	0.09
Stage 7	180.9	0	0.04
Stage 7	180.7	0	0
Stage 7	180.5	0	-0.01

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 7	198.7	0	0
Stage 7	198.5	0	0
Stage 7	198.5	0	0
Stage 7	198.3	0	0
Stage 7	198.3	0	0
Stage 7	198.1	0	0
Stage 7	198.1	0	0
Stage 7	198	0	0

4.5.8. Tabella Risultati Paratia NTC2018: SISMICA GEO - Left Wall - Stage: Stage 8

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 8	198	0	-6.71
Stage 8	197.8	-1.34	-6.71
Stage 8	197.6	-4.43	-15.42
Stage 8	197.4	-9.2	-23.88
Stage 8	197.2	-15.62	-32.08
Stage 8	197	-7.83	38.95
Stage 8	196.8	-1.59	31.16
Stage 8	196.6	3.12	23.56
Stage 8	196.4	6.35	16.14
Stage 8	196.2	8.13	8.89
Stage 8	196	8.5	1.85
Stage 8	195.8	7.5	-4.96
Stage 8	195.6	5.19	-11.59
Stage 8	195.4	1.57	-18.07
Stage 8	195.2	-3.31	-24.42
Stage 8	195	-9.45	-30.68
Stage 8	194.8	-16.79	-36.7
Stage 8	194.7	-20.88	-40.91
Stage 8	194.5	-12.17	43.55
Stage 8	194.3	-4.45	38.57
Stage 8	194.1	2.35	34.02
Stage 8	193.9	8.32	29.88
Stage 8	193.7	13.55	26.11
Stage 8	193.5	18.08	22.67
Stage 8	193.3	21.87	18.96
Stage 8	193.1	24.87	14.98
Stage 8	192.9	27.02	10.75
Stage 8	192.7	28.27	6.26
Stage 8	192.5	28.57	1.51
Stage 8	192.3	27.87	-3.51
Stage 8	192.2	27.13	-7.46
Stage 8	192	24.82	-11.51
Stage 8	191.8	21.39	-17.17
Stage 8	191.6	16.77	-23.1
Stage 8	191.4	12.37	-22.01
Stage 8	191.2	8.34	-20.12
Stage 8	191	4.79	-17.77
Stage 8	190.8	1.76	-15.12
Stage 8	190.6	-0.69	-12.3
Stage 8	190.4	-2.63	-9.7
Stage 8	190.2	-4.1	-7.34
Stage 8	190	-5.15	-5.25
Stage 8	189.8	-5.84	-3.43
Stage 8	189.7	-6.06	-2.25
Stage 8	189.5	-6.29	-1.16
Stage 8	189.3	-6.28	0.07
Stage 8	189.1	-6.06	1.09
Stage 8	188.9	-5.68	1.92
Stage 8	188.7	-5.16	2.59
Stage 8	188.5	-4.54	3.13
Stage 8	188.3	-3.83	3.54
Stage 8	188.1	-3.06	3.86
Stage 8	187.9	-2.24	4.05
Stage 8	187.7	-1.42	4.15
Stage 8	187.5	-0.59	4.14
Stage 8	187.3	0.22	4.05
Stage 8	187.1	0.99	3.85
Stage 8	186.9	1.7	3.55
Stage 8	186.7	2.33	3.13
Stage 8	186.5	2.84	2.57
Stage 8	186.3	3.21	1.84
Stage 8	186.1	3.4	0.93
Stage 8	185.9	3.36	-0.19
Stage 8	185.7	3.05	-1.56
Stage 8	185.5	2.41	-3.21
Stage 8	185.3	1.38	-5.15
Stage 8	185.1	-0.11	-7.42
Stage 8	184.9	-2.11	-10.02
Stage 8	184.7	-3.45	-6.68

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 8	184.5	-4.24	-3.98
Stage 8	184.3	-4.62	-1.87
Stage 8	184.1	-4.67	-0.28
Stage 8	183.9	-4.5	0.87
Stage 8	183.7	-4.17	1.65
Stage 8	183.5	-3.74	2.13
Stage 8	183.3	-3.27	2.37
Stage 8	183.1	-2.78	2.43
Stage 8	182.9	-2.31	2.36
Stage 8	182.7	-1.87	2.2
Stage 8	182.5	-1.48	1.98
Stage 8	182.3	-1.13	1.73
Stage 8	182.1	-0.84	1.47
Stage 8	181.9	-0.6	1.21
Stage 8	181.7	-0.4	0.96
Stage 8	181.5	-0.25	0.74
Stage 8	181.3	-0.15	0.54
Stage 8	181.1	-0.07	0.37
Stage 8	180.9	-0.03	0.23
Stage 8	180.7	-0.01	0.11
Stage 8	180.5	0	0.03

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 8	198.7	0	0
Stage 8	198.5	0	0
Stage 8	198.5	0	0
Stage 8	198.3	0	0
Stage 8	198.3	0	0
Stage 8	198.1	0	0
Stage 8	198.1	0	0
Stage 8	198	0	0

4.5.9. Tabella Risultati Paratia NTC2018: SISMICA GEO - Left Wall - Stage: Stage 9

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 9	198	0	-6.31
Stage 9	197.8	-1.26	-6.31
Stage 9	197.6	-4.17	-14.53
Stage 9	197.4	-8.68	-22.57
Stage 9	197.2	-14.76	-30.39
Stage 9	197	-6.4	41.81
Stage 9	196.8	0.46	34.29
Stage 9	196.6	5.84	26.88
Stage 9	196.4	9.76	19.6
Stage 9	196.2	12.23	12.4
Stage 9	196	13.3	5.33
Stage 9	195.8	12.98	-1.61
Stage 9	195.6	11.28	-8.48
Stage 9	195.4	8.22	-15.32
Stage 9	195.2	3.78	-22.18
Stage 9	195	-2.04	-29.1
Stage 9	194.8	-9.23	-35.98
Stage 9	194.7	-13.33	-40.98
Stage 9	194.5	-5.5	39.13
Stage 9	194.3	1.05	32.75
Stage 9	194.1	6.35	26.54
Stage 9	193.9	10.45	20.48
Stage 9	193.7	13.35	14.5
Stage 9	193.5	15.06	8.56
Stage 9	193.3	15.47	2.06
Stage 9	193.1	14.48	-4.96
Stage 9	192.9	11.98	-12.51
Stage 9	192.7	7.87	-20.55
Stage 9	192.5	2.06	-29.03
Stage 9	192.3	-5.52	-37.9
Stage 9	192.2	-10	-44.78
Stage 9	192	-3.9	30.47
Stage 9	191.8	0.3	21
Stage 9	191.6	2.59	11.44
Stage 9	191.4	3.96	6.87
Stage 9	191.2	4.67	3.56
Stage 9	191	4.91	1.2
Stage 9	190.8	4.84	-0.34
Stage 9	190.6	4.61	-1.18
Stage 9	190.4	4.26	-1.74
Stage 9	190.2	3.84	-2.08
Stage 9	190	3.4	-2.22
Stage 9	189.8	2.95	-2.23
Stage 9	189.7	2.74	-2.14
Stage 9	189.5	2.34	-2.02
Stage 9	189.3	1.98	-1.78
Stage 9	189.1	1.69	-1.47
Stage 9	188.9	1.46	-1.13
Stage 9	188.7	1.31	-0.75
Stage 9	188.5	1.24	-0.36
Stage 9	188.3	1.24	0.04
Stage 9	188.1	1.33	0.43
Stage 9	187.9	1.49	0.79
Stage 9	187.7	1.71	1.09
Stage 9	187.5	1.98	1.34
Stage 9	187.3	2.28	1.51
Stage 9	187.1	2.6	1.59
Stage 9	186.9	2.91	1.57
Stage 9	186.7	3.19	1.41
Stage 9	186.5	3.41	1.11
Stage 9	186.3	3.54	0.62
Stage 9	186.1	3.52	-0.07
Stage 9	185.9	3.32	-1.01
Stage 9	185.7	2.88	-2.21
Stage 9	185.5	2.14	-3.71
Stage 9	185.3	1.03	-5.53
Stage 9	185.1	-0.5	-7.69
Stage 9	184.9	-2.54	-10.21
Stage 9	184.7	-3.89	-6.74

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 9	184.5	-4.68	-3.94
Stage 9	184.3	-5.03	-1.76
Stage 9	184.1	-5.06	-0.12
Stage 9	183.9	-4.84	1.06
Stage 9	183.7	-4.47	1.86
Stage 9	183.5	-4.01	2.34
Stage 9	183.3	-3.49	2.57
Stage 9	183.1	-2.97	2.62
Stage 9	182.9	-2.46	2.53
Stage 9	182.7	-1.99	2.35
Stage 9	182.5	-1.57	2.11
Stage 9	182.3	-1.2	1.84
Stage 9	182.1	-0.88	1.56
Stage 9	181.9	-0.63	1.28
Stage 9	181.7	-0.42	1.02
Stage 9	181.5	-0.27	0.78
Stage 9	181.3	-0.15	0.57
Stage 9	181.1	-0.08	0.39
Stage 9	180.9	-0.03	0.24
Stage 9	180.7	-0.01	0.12
Stage 9	180.5	0	0.03

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 9	198.7	0	0
Stage 9	198.5	0	0
Stage 9	198.5	0	0
Stage 9	198.3	0	0
Stage 9	198.3	0	0
Stage 9	198.1	0	0
Stage 9	198.1	0	0
Stage 9	198	0	0

4.5.10. Tabella Risultati Paratia NTC2018: SISMICA GEO - Left Wall - Stage: Stage 10

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 10	198	0	-6.5
Stage 10	197.8	-1.3	-6.5
Stage 10	197.6	-4.3	-15.01
Stage 10	197.4	-8.98	-23.36
Stage 10	197.2	-15.28	-31.54
Stage 10	197	-7.5	38.9
Stage 10	196.8	-1.29	31.06
Stage 10	196.6	3.39	23.38
Stage 10	196.4	6.56	15.85
Stage 10	196.2	8.25	8.46
Stage 10	196	8.48	1.16
Stage 10	195.8	7.26	-6.08
Stage 10	195.6	4.6	-13.31
Stage 10	195.4	0.48	-20.59
Stage 10	195.2	-5.09	-27.89
Stage 10	195	-12.13	-35.2
Stage 10	194.8	-20.61	-42.4
Stage 10	194.7	-25.37	-47.58
Stage 10	194.5	-19.05	31.62
Stage 10	194.3	-14.01	25.17
Stage 10	194.1	-10.2	19.05
Stage 10	193.9	-7.55	13.25
Stage 10	193.7	-6	7.76
Stage 10	193.5	-5.49	2.54
Stage 10	193.3	-6.08	-2.93
Stage 10	193.1	-7.8	-8.61
Stage 10	192.9	-10.69	-14.43
Stage 10	192.7	-14.75	-20.31
Stage 10	192.5	-19.98	-26.18
Stage 10	192.3	-26.37	-31.92
Stage 10	192.2	-29.97	-36.04
Stage 10	192	-16.03	69.72
Stage 10	191.8	-3.22	64.06
Stage 10	191.6	8.41	58.14
Stage 10	191.4	18.8	51.96
Stage 10	191.2	27.91	45.52
Stage 10	191	35.67	38.82
Stage 10	190.8	42.04	31.86
Stage 10	190.6	46.97	24.64
Stage 10	190.4	50.4	17.16
Stage 10	190.2	52.29	9.42
Stage 10	190	52.57	1.42
Stage 10	189.8	51.2	-6.84
Stage 10	189.7	49.88	-13.23
Stage 10	189.5	45.93	-19.72
Stage 10	189.3	40.21	-28.63
Stage 10	189.1	32.65	-37.79
Stage 10	188.9	25.49	-35.82
Stage 10	188.7	18.9	-32.96
Stage 10	188.5	12.97	-29.64
Stage 10	188.3	7.76	-26.06
Stage 10	188.1	3.29	-22.33
Stage 10	187.9	-0.45	-18.69
Stage 10	187.7	-3.48	-15.17
Stage 10	187.5	-5.84	-11.79
Stage 10	187.3	-7.55	-8.55
Stage 10	187.1	-8.64	-5.44
Stage 10	186.9	-9.15	-2.57
Stage 10	186.7	-9.23	-0.39
Stage 10	186.5	-9.01	1.12
Stage 10	186.3	-8.62	1.95
Stage 10	186.1	-8.19	2.13
Stage 10	185.9	-7.86	1.65
Stage 10	185.7	-7.76	0.52
Stage 10	185.5	-8	-1.24
Stage 10	185.3	-8.73	-3.64
Stage 10	185.1	-10.07	-6.66
Stage 10	184.9	-12.12	-10.28
Stage 10	184.7	-13.18	-5.29

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 10	184.5	-13.45	-1.38
Stage 10	184.3	-13.14	1.57
Stage 10	184.1	-12.4	3.7
Stage 10	183.9	-11.38	5.12
Stage 10	183.7	-10.18	5.97
Stage 10	183.5	-8.91	6.35
Stage 10	183.3	-7.64	6.39
Stage 10	183.1	-6.41	6.15
Stage 10	182.9	-5.26	5.74
Stage 10	182.7	-4.22	5.2
Stage 10	182.5	-3.3	4.59
Stage 10	182.3	-2.51	3.95
Stage 10	182.1	-1.85	3.31
Stage 10	181.9	-1.31	2.71
Stage 10	181.7	-0.88	2.14
Stage 10	181.5	-0.55	1.63
Stage 10	181.3	-0.32	1.18
Stage 10	181.1	-0.16	0.8
Stage 10	180.9	-0.06	0.49
Stage 10	180.7	-0.01	0.24
Stage 10	180.5	0	0.06

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 10	198.7	0	0
Stage 10	198.5	0	0
Stage 10	198.5	0	0
Stage 10	198.3	0	0
Stage 10	198.3	0	0
Stage 10	198.1	0	0
Stage 10	198.1	0	0
Stage 10	198	0	0

4.5.11. Tabella Risultati Paratia NTC2018: SISMICA GEO - Left Wall - Stage: Stage 11

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 11	198	0	-6.49
Stage 11	197.8	-1.3	-6.49
Stage 11	197.6	-4.29	-14.96
Stage 11	197.4	-8.94	-23.26
Stage 11	197.2	-15.22	-31.37
Stage 11	197	-7.33	39.45
Stage 11	196.8	-0.98	31.71
Stage 11	196.6	3.85	24.14
Stage 11	196.4	7.19	16.74
Stage 11	196.2	9.09	9.49
Stage 11	196	9.56	2.34
Stage 11	195.8	8.61	-4.74
Stage 11	195.6	6.25	-11.8
Stage 11	195.4	2.47	-18.9
Stage 11	195.2	-2.74	-26.03
Stage 11	195	-9.37	-33.16
Stage 11	194.8	-17.41	-40.19
Stage 11	194.7	-21.93	-45.26
Stage 11	194.5	-15	34.66
Stage 11	194.3	-9.33	28.34
Stage 11	194.1	-4.87	22.31
Stage 11	193.9	-1.56	16.56
Stage 11	193.7	0.66	11.07
Stage 11	193.5	1.82	5.79
Stage 11	193.3	1.85	0.18
Stage 11	193.1	0.71	-5.73
Stage 11	192.9	-1.67	-11.89
Stage 11	192.7	-5.32	-18.24
Stage 11	192.5	-10.26	-24.72
Stage 11	192.3	-16.51	-31.23
Stage 11	192.2	-20.11	-36.07
Stage 11	192	-7.79	61.6
Stage 11	191.8	3.14	54.67
Stage 11	191.6	12.59	47.25
Stage 11	191.4	20.46	39.33
Stage 11	191.2	26.64	30.9
Stage 11	191	31.03	21.96
Stage 11	190.8	33.53	12.51
Stage 11	190.6	34.04	2.55
Stage 11	190.4	32.46	-7.89
Stage 11	190.2	28.71	-18.78
Stage 11	190	22.69	-30.09
Stage 11	189.8	14.33	-41.78
Stage 11	189.7	9.26	-50.78
Stage 11	189.5	13.73	22.35
Stage 11	189.3	15.73	10.03
Stage 11	189.1	15.25	-2.43
Stage 11	188.9	14.12	-5.63
Stage 11	188.7	12.6	-7.59
Stage 11	188.5	10.86	-8.7
Stage 11	188.3	9.03	-9.14
Stage 11	188.1	7.24	-8.98
Stage 11	187.9	5.54	-8.51
Stage 11	187.7	3.99	-7.75
Stage 11	187.5	2.64	-6.73
Stage 11	187.3	1.54	-5.49
Stage 11	187.1	0.73	-4.06
Stage 11	186.9	0.22	-2.55
Stage 11	186.7	-0.07	-1.46
Stage 11	186.5	-0.23	-0.81
Stage 11	186.3	-0.36	-0.61
Stage 11	186.1	-0.54	-0.9
Stage 11	185.9	-0.87	-1.69
Stage 11	185.7	-1.48	-3
Stage 11	185.5	-2.45	-4.85
Stage 11	185.3	-3.9	-7.25
Stage 11	185.1	-5.94	-10.21
Stage 11	184.9	-8.68	-13.73
Stage 11	184.7	-10.38	-8.46

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 11	184.5	-11.22	-4.24
Stage 11	184.3	-11.42	-0.96
Stage 11	184.1	-11.11	1.5
Stage 11	183.9	-10.46	3.25
Stage 11	183.7	-9.58	4.42
Stage 11	183.5	-8.56	5.1
Stage 11	183.3	-7.48	5.4
Stage 11	183.1	-6.4	5.41
Stage 11	182.9	-5.36	5.2
Stage 11	182.7	-4.39	4.84
Stage 11	182.5	-3.51	4.39
Stage 11	182.3	-2.74	3.87
Stage 11	182.1	-2.07	3.34
Stage 11	181.9	-1.51	2.81
Stage 11	181.7	-1.05	2.29
Stage 11	181.5	-0.69	1.81
Stage 11	181.3	-0.41	1.38
Stage 11	181.1	-0.22	0.98
Stage 11	180.9	-0.09	0.64
Stage 11	180.7	-0.02	0.34
Stage 11	180.5	0	0.1

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 11	198.7	0	0
Stage 11	198.5	0	0
Stage 11	198.5	0	0
Stage 11	198.3	0	0
Stage 11	198.3	0	0
Stage 11	198.1	0	0
Stage 11	198.1	0	0
Stage 11	198	0	0

4.5.12. Tabella Risultati Paratia NTC2018: SISMICA GEO - Left Wall - Stage: Stage 12

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 12	198	0	-6.46
Stage 12	197.8	-1.29	-6.46
Stage 12	197.6	-4.28	-14.92
Stage 12	197.4	-8.92	-23.2
Stage 12	197.2	-15.18	-31.31
Stage 12	197	-7.28	39.5
Stage 12	196.8	-0.93	31.75
Stage 12	196.6	3.9	24.16
Stage 12	196.4	7.25	16.73
Stage 12	196.2	9.13	9.43
Stage 12	196	9.58	2.23
Stage 12	195.8	8.6	-4.9
Stage 12	195.6	6.19	-12.04
Stage 12	195.4	2.35	-19.22
Stage 12	195.2	-2.94	-26.43
Stage 12	195	-9.67	-33.66
Stage 12	194.8	-17.83	-40.8
Stage 12	194.7	-22.42	-45.94
Stage 12	194.5	-15.74	33.38
Stage 12	194.3	-10.36	26.94
Stage 12	194.1	-6.2	20.78
Stage 12	193.9	-3.22	14.9
Stage 12	193.7	-1.36	9.28
Stage 12	193.5	-0.59	3.87
Stage 12	193.3	-0.96	-1.87
Stage 12	193.1	-2.54	-7.89
Stage 12	192.9	-5.37	-14.14
Stage 12	192.7	-9.48	-20.57
Stage 12	192.5	-14.9	-27.09
Stage 12	192.3	-21.62	-33.6
Stage 12	192.2	-25.46	-38.4
Stage 12	192	-13.49	59.84
Stage 12	191.8	-2.88	53.05
Stage 12	191.6	6.28	45.84
Stage 12	191.4	13.93	38.22
Stage 12	191.2	19.97	30.19
Stage 12	191	24.32	21.76
Stage 12	190.8	26.91	12.94
Stage 12	190.6	27.66	3.76
Stage 12	190.4	26.5	-5.76
Stage 12	190.2	23.39	-15.57
Stage 12	190	18.27	-25.62
Stage 12	189.8	11.1	-35.86
Stage 12	189.7	6.73	-43.62
Stage 12	189.5	15.75	45.08
Stage 12	189.3	22.69	34.7
Stage 12	189.1	27.57	24.39
Stage 12	188.9	30.4	14.18
Stage 12	188.7	31.22	4.08
Stage 12	188.5	30.04	-5.91
Stage 12	188.3	26.81	-16.12
Stage 12	188.1	23.29	-17.61
Stage 12	187.9	19.82	-17.38
Stage 12	187.7	16.49	-16.62
Stage 12	187.5	13.38	-15.55
Stage 12	187.3	10.52	-14.29
Stage 12	187.1	7.94	-12.92
Stage 12	186.9	5.64	-11.5
Stage 12	186.7	3.63	-10.07
Stage 12	186.5	1.89	-8.68
Stage 12	186.3	0.42	-7.33
Stage 12	186.1	-0.9	-6.62
Stage 12	185.9	-2.21	-6.58
Stage 12	185.7	-3.66	-7.24
Stage 12	185.5	-5.39	-8.62
Stage 12	185.3	-7.53	-10.73
Stage 12	185.1	-10.25	-13.57
Stage 12	184.9	-13.67	-17.13
Stage 12	184.7	-15.73	-10.29

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 12	184.5	-16.69	-4.8
Stage 12	184.3	-16.8	-0.53
Stage 12	184.1	-16.26	2.67
Stage 12	183.9	-15.27	4.95
Stage 12	183.7	-13.98	6.47
Stage 12	183.5	-12.51	7.36
Stage 12	183.3	-10.96	7.75
Stage 12	183.1	-9.41	7.75
Stage 12	182.9	-7.91	7.46
Stage 12	182.7	-6.52	6.97
Stage 12	182.5	-5.25	6.35
Stage 12	182.3	-4.12	5.64
Stage 12	182.1	-3.14	4.9
Stage 12	181.9	-2.31	4.15
Stage 12	181.7	-1.63	3.43
Stage 12	181.5	-1.08	2.74
Stage 12	181.3	-0.65	2.11
Stage 12	181.1	-0.35	1.53
Stage 12	180.9	-0.15	1.02
Stage 12	180.7	-0.03	0.56
Stage 12	180.5	0	0.17

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 12	198.7	0	0
Stage 12	198.5	0	0
Stage 12	198.5	0	0
Stage 12	198.3	0	0
Stage 12	198.3	0	0
Stage 12	198.1	0	0
Stage 12	198.1	0	0
Stage 12	198	0	0

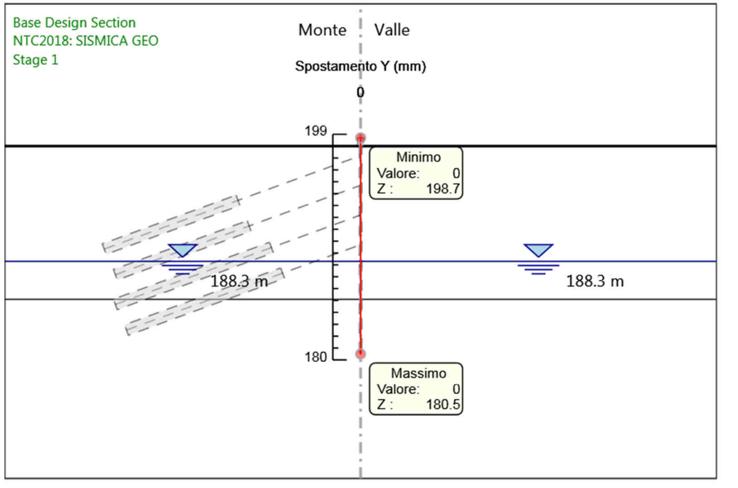
4.5.13. Tabella Risultati Paratia NTC2018: SISMICA GEO - Left Wall - Stage: Stage 13

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 13	198	0	-6.07
Stage 13	197.8	-1.21	-6.07
Stage 13	197.6	-4.29	-15.38
Stage 13	197.4	-9.21	-24.61
Stage 13	197.2	-15.95	-33.69
Stage 13	197	-6.98	44.84
Stage 13	196.8	0.25	36.12
Stage 13	196.6	5.76	27.58
Stage 13	196.4	9.6	19.21
Stage 13	196.2	11.8	10.99
Stage 13	196	12.38	2.9
Stage 13	195.8	11.35	-5.14
Stage 13	195.6	8.72	-13.16
Stage 13	195.4	4.48	-21.22
Stage 13	195.2	-1.38	-29.31
Stage 13	195	-8.87	-37.43
Stage 13	194.8	-17.96	-45.46
Stage 13	194.7	-23.09	-51.28
Stage 13	194.5	-15.52	37.82
Stage 13	194.3	-9.43	30.46
Stage 13	194.1	-4.75	23.39
Stage 13	193.9	-1.44	16.58
Stage 13	193.7	0.57	10.02
Stage 13	193.5	1.3	3.66
Stage 13	193.3	0.69	-3.05
Stage 13	193.1	-1.32	-10.06
Stage 13	192.9	-4.79	-17.33
Stage 13	192.7	-9.75	-24.79
Stage 13	192.5	-16.22	-32.38
Stage 13	192.3	-24.22	-39.99
Stage 13	192.2	-28.78	-45.63
Stage 13	192	-15.22	67.81
Stage 13	191.8	-3.25	59.87
Stage 13	191.6	7.06	51.51
Stage 13	191.4	15.6	42.73
Stage 13	191.2	22.31	33.51
Stage 13	191	27.08	23.89
Stage 13	190.8	29.85	13.85
Stage 13	190.6	30.54	3.43
Stage 13	190.4	29.07	-7.36
Stage 13	190.2	25.37	-18.48
Stage 13	190	19.39	-29.88
Stage 13	189.8	11.09	-41.52
Stage 13	189.7	6.05	-50.37
Stage 13	189.5	16.63	52.86
Stage 13	189.3	24.82	40.97
Stage 13	189.1	30.64	29.09
Stage 13	188.9	34.09	17.26
Stage 13	188.7	35.19	5.49
Stage 13	188.5	33.94	-6.25
Stage 13	188.3	30.28	-18.27
Stage 13	188.1	26.16	-20.59
Stage 13	187.9	22.16	-19.99
Stage 13	187.7	18.37	-18.98
Stage 13	187.5	14.82	-17.76
Stage 13	187.3	11.52	-16.46
Stage 13	187.1	8.49	-15.17
Stage 13	186.9	5.7	-13.95
Stage 13	186.7	3.13	-12.83
Stage 13	186.5	0.76	-11.87
Stage 13	186.3	-1.46	-11.08
Stage 13	186.1	-3.55	-10.49
Stage 13	185.9	-5.58	-10.12
Stage 13	185.7	-7.57	-9.97
Stage 13	185.5	-9.58	-10.03
Stage 13	185.3	-11.77	-10.95
Stage 13	185.1	-14.31	-12.73
Stage 13	184.9	-17.38	-15.34
Stage 13	184.7	-19.26	-9.39

Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 13	184.5	-20.07	-4.07
Stage 13	184.3	-19.96	0.57
Stage 13	184.1	-19.15	4.01
Stage 13	183.9	-17.87	6.44
Stage 13	183.7	-16.26	8.01
Stage 13	183.5	-14.48	8.9
Stage 13	183.3	-12.64	9.23
Stage 13	183.1	-10.81	9.14
Stage 13	182.9	-9.06	8.74
Stage 13	182.7	-7.44	8.12
Stage 13	182.5	-5.97	7.35
Stage 13	182.3	-4.67	6.5
Stage 13	182.1	-3.55	5.62
Stage 13	181.9	-2.6	4.74
Stage 13	181.7	-1.82	3.9
Stage 13	181.5	-1.2	3.1
Stage 13	181.3	-0.72	2.37
Stage 13	181.1	-0.38	1.71
Stage 13	180.9	-0.16	1.12
Stage 13	180.7	-0.04	0.61
Stage 13	180.5	0	0.18

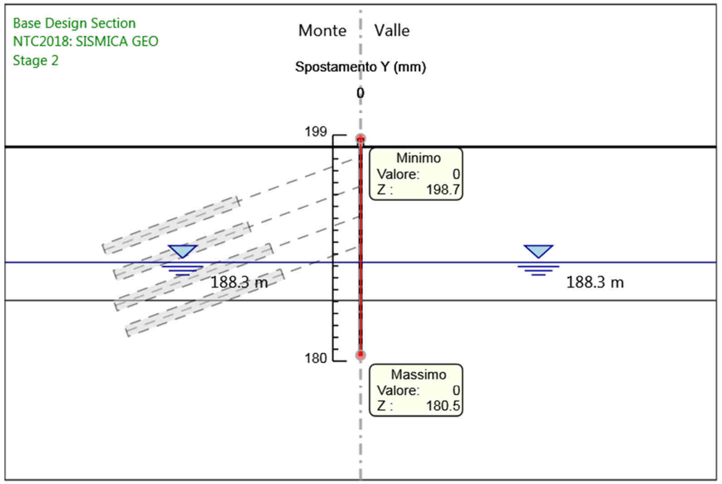
Design Assumption: NTC2018: SISMICA GEO	Risultati Paratia	Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 13	198.7	0	0
Stage 13	198.5	0	0
Stage 13	198.5	0	0
Stage 13	198.3	0	0
Stage 13	198.3	0	0
Stage 13	198.1	0	0
Stage 13	198.1	0	0
Stage 13	198	0	0

4.5.14. Grafico Spostamento NTC2018: SISMICA GEO - Stage: Stage 1



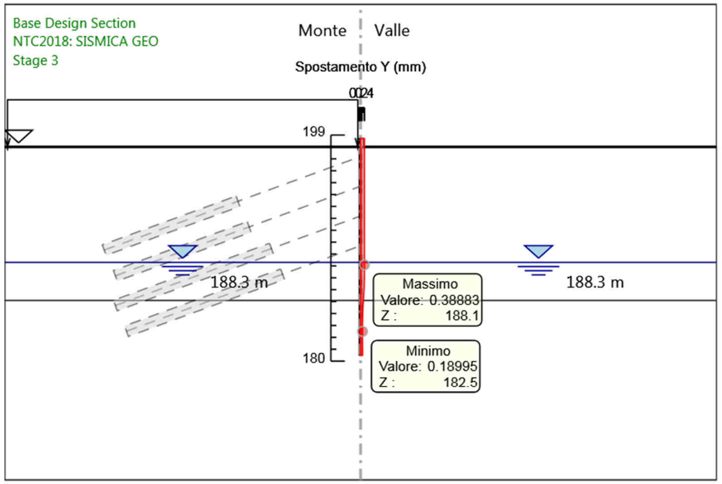
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 1
Spostamento orizzontale

4.5.15. Grafico Spostamento NTC2018: SISMICA GEO - Stage: Stage 2



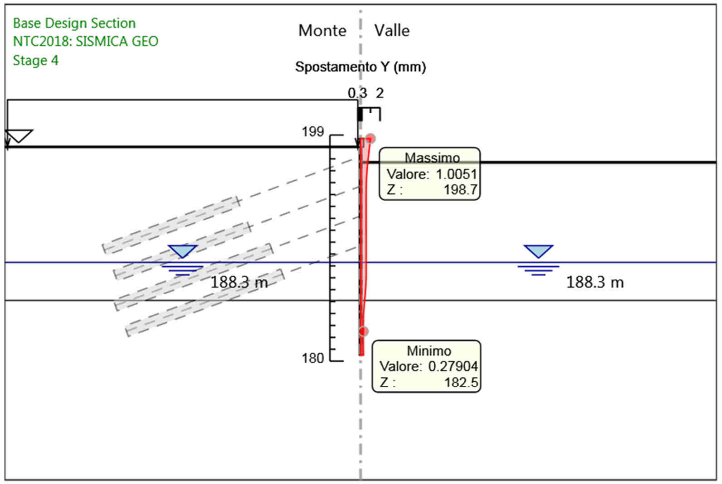
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 2
Spostamento orizzontale

4.5.16. Grafico Spostamento NTC2018: SISMICA GEO - Stage: Stage 3



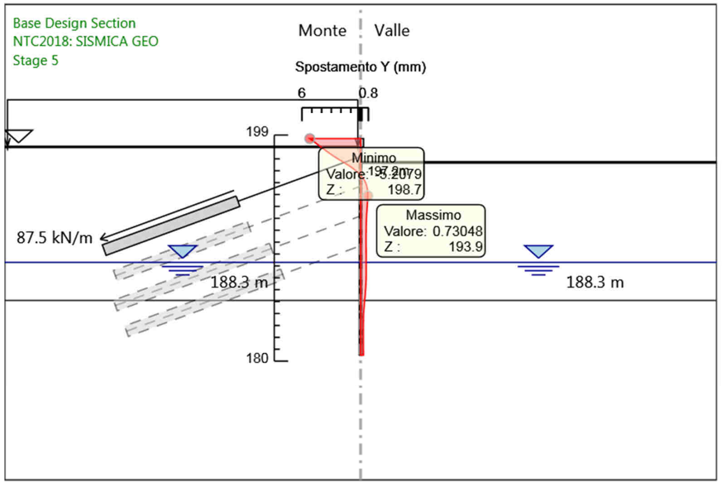
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 3
Spostamento orizzontale

4.5.17. Grafico Spostamento NTC2018: SISMICA GEO - Stage: Stage 4



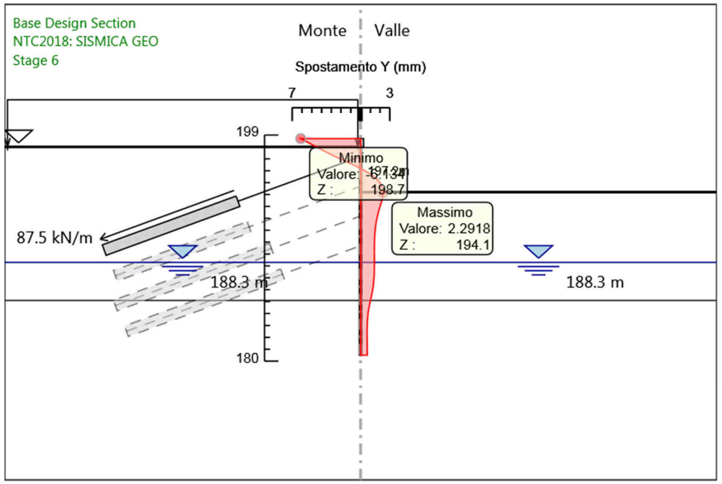
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 4
Spostamento orizzontale

4.5.18. Grafico Spostamento NTC2018: SISMICA GEO - Stage: Stage 5



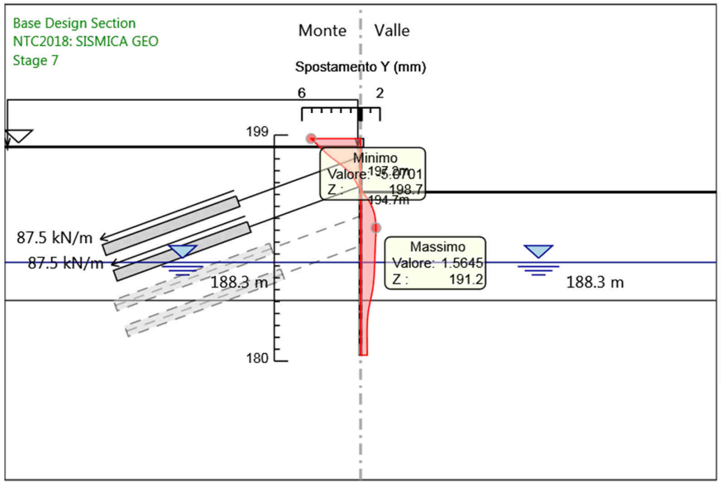
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 5
Spostamento orizzontale

4.5.19. Grafico Spostamento NTC2018: SISMICA GEO - Stage: Stage 6



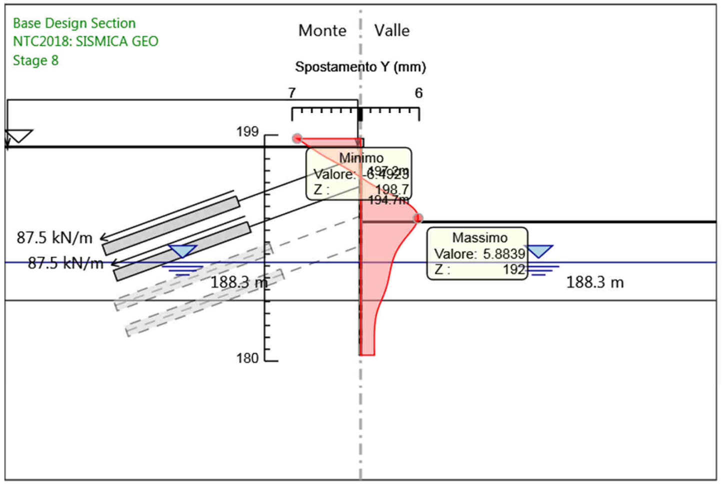
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 6
Spostamento orizzontale

4.5.20. Grafico Spostamento NTC2018: SISMICA GEO - Stage: Stage 7



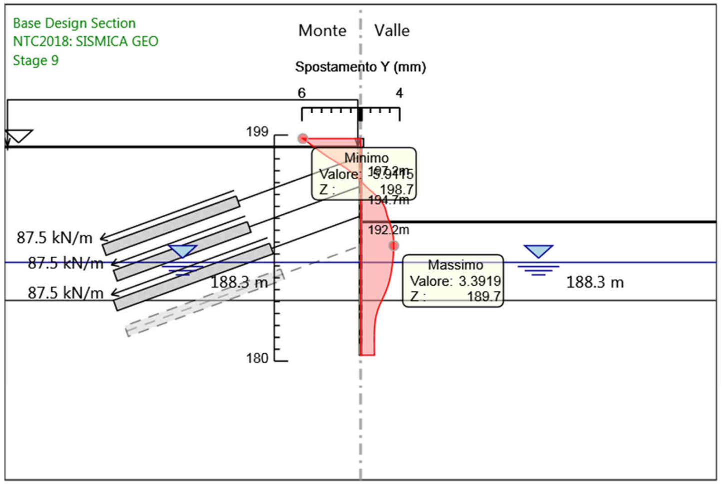
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 7
Spostamento orizzontale

4.5.21. Grafico Spostamento NTC2018: SISMICA GEO - Stage: Stage 8



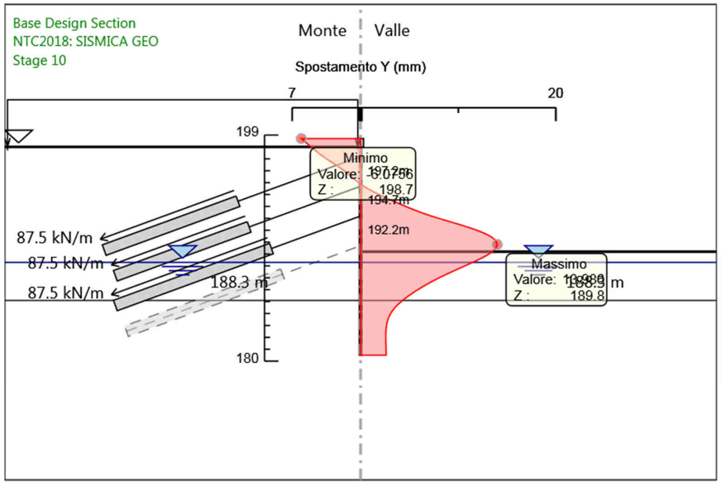
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 8
Spostamento orizzontale

4.5.22. Grafico Spostamento NTC2018: SISMICA GEO - Stage: Stage 9



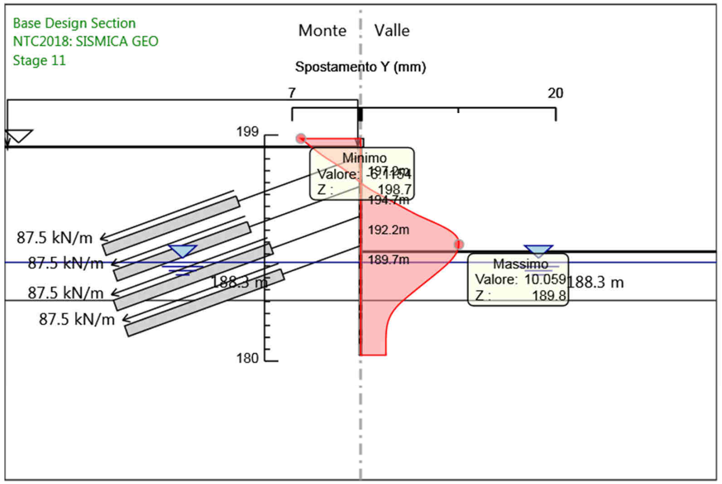
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 9
Spostamento orizzontale

4.5.23. Grafico Spostamento NTC2018: SISMICA GEO - Stage: Stage 10



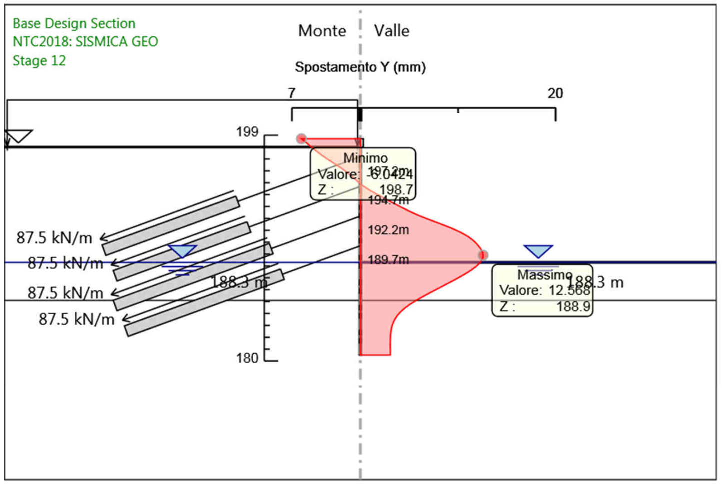
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 10
Spostamento orizzontale

4.5.24. Grafico Spostamento NTC2018: SISMICA GEO - Stage: Stage 11



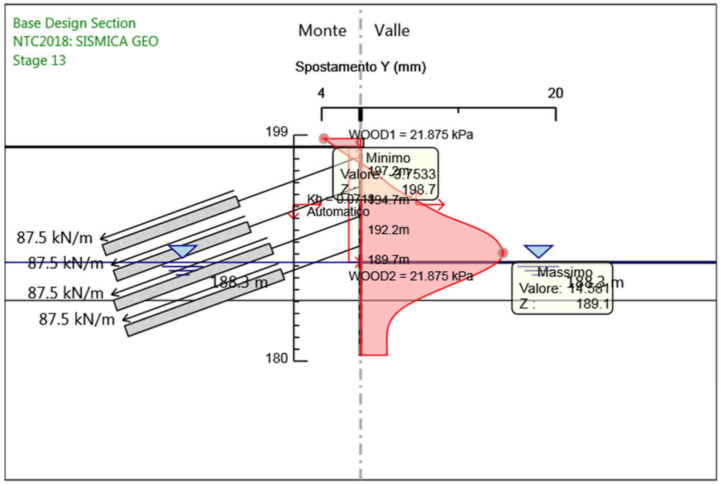
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 11
Spostamento orizzontale

4.5.25. Grafico Spostamento NTC2018: SISMICA GEO - Stage: Stage 12



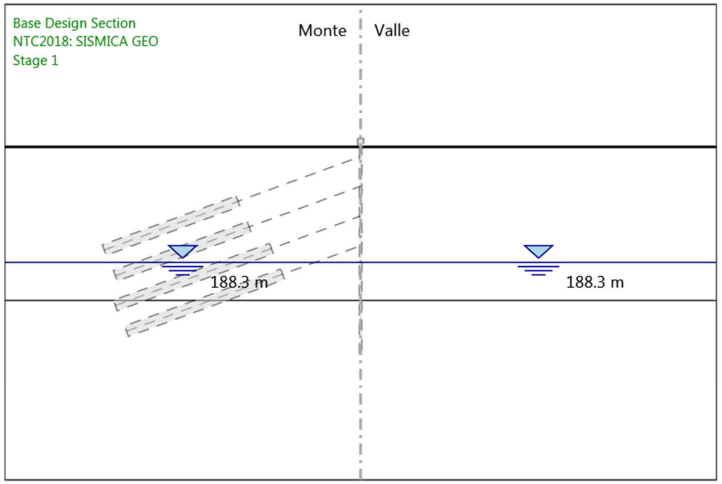
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 12
Spostamento orizzontale

4.5.26. Grafico Spostamento NTC2018: SISMICA GEO - Stage: Stage 13



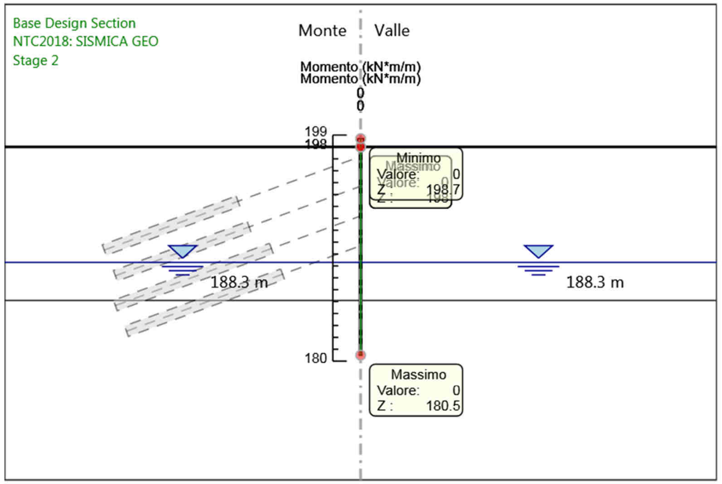
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 13
Spostamento orizzontale

4.5.27. Grafico Risultati Momento NTC2018: SISMICA GEO - Stage: Stage 1



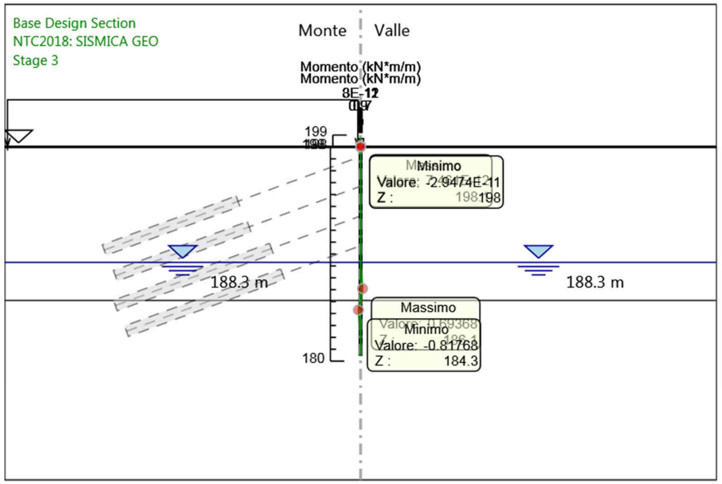
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 1
Momento

4.5.28. Grafico Risultati Momento NTC2018: SISMICA GEO - Stage: Stage 2



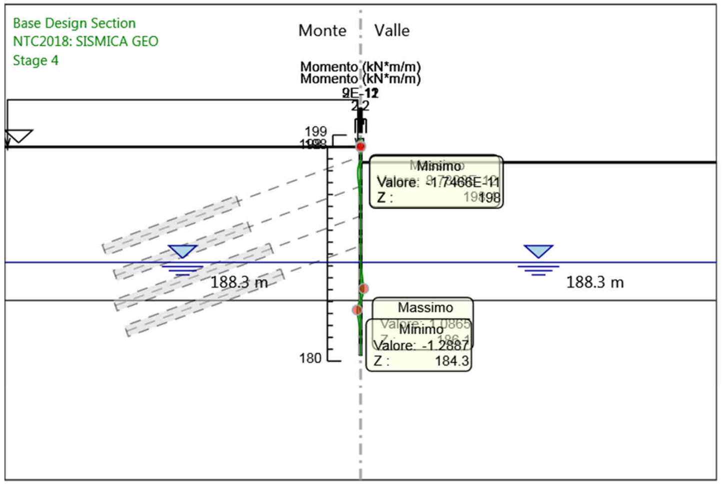
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 2
Momento

4.5.29. Grafico Risultati Momento NTC2018: SISMICA GEO - Stage: Stage 3



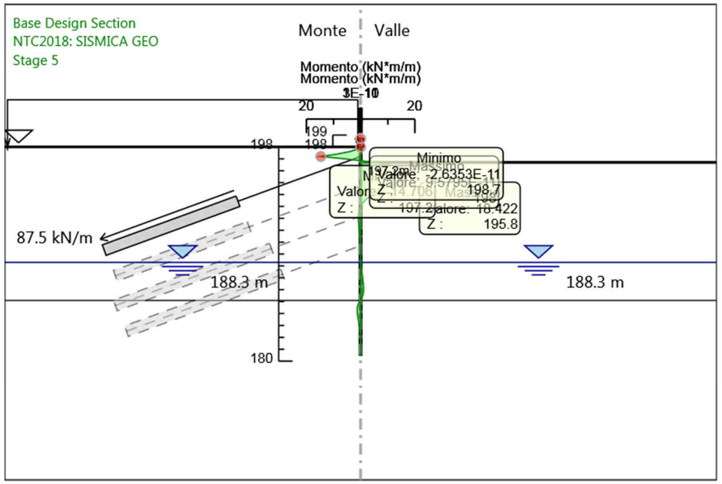
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 3
Momento

4.5.30. Grafico Risultati Momento NTC2018: SISMICA GEO - Stage: Stage 4



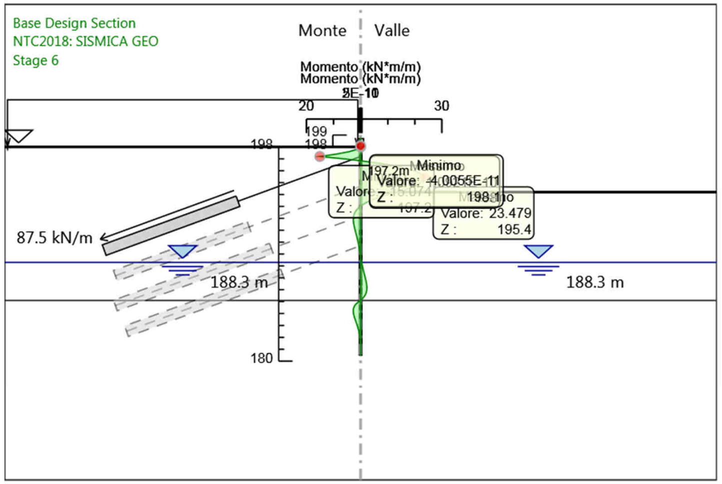
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 4
Momento

4.5.31. Grafico Risultati Momento NTC2018: SISMICA GEO - Stage: Stage 5



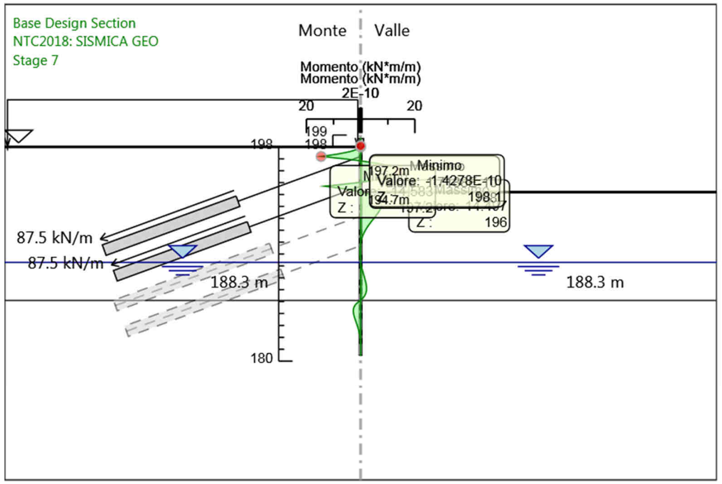
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 5
Momento

4.5.32. Grafico Risultati Momento NTC2018: SISMICA GEO - Stage: Stage 6



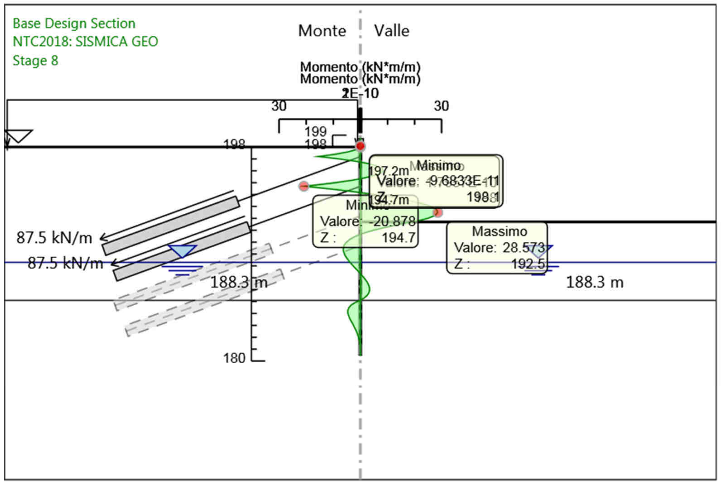
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 6
Momento

4.5.33. Grafico Risultati Momento NTC2018: SISMICA GEO - Stage: Stage 7



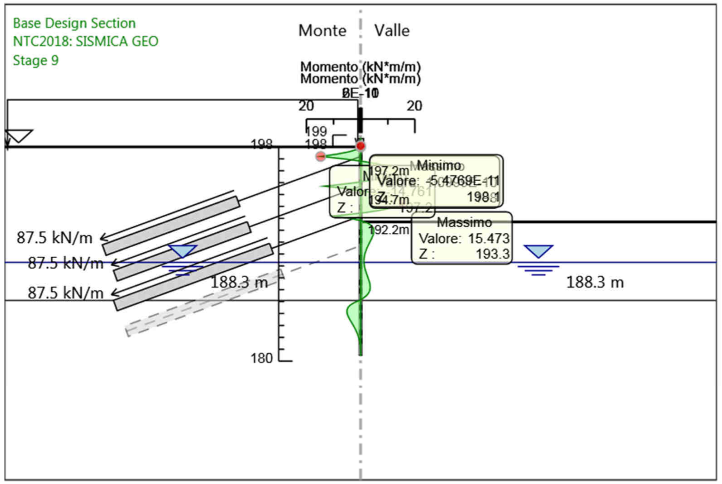
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 7
Momento

4.5.34. Grafico Risultati Momento NTC2018: SISMICA GEO - Stage: Stage 8



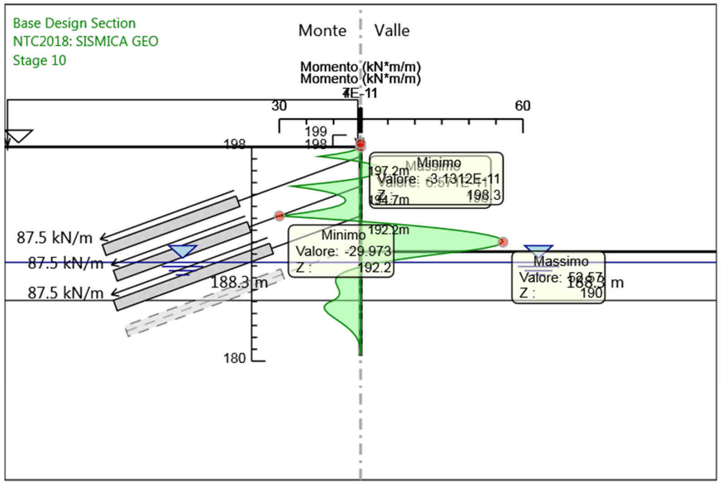
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 8
Momento

4.5.35. Grafico Risultati Momento NTC2018: SISMICA GEO - Stage: Stage 9



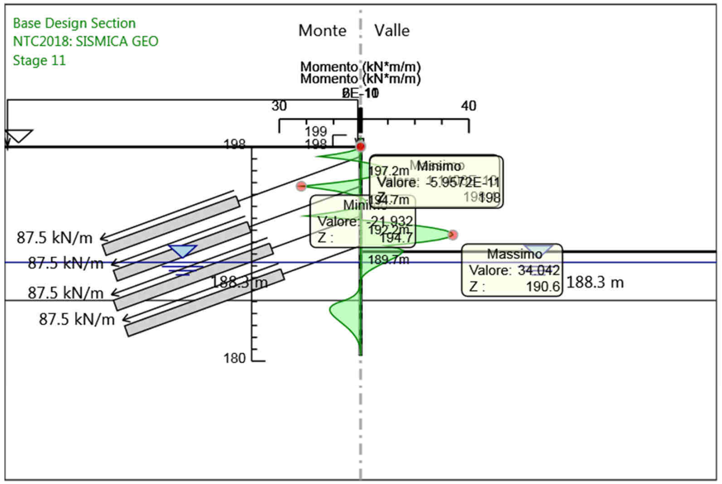
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 9
Momento

4.5.36. Grafico Risultati Momento NTC2018: SISMICA GEO - Stage: Stage 10



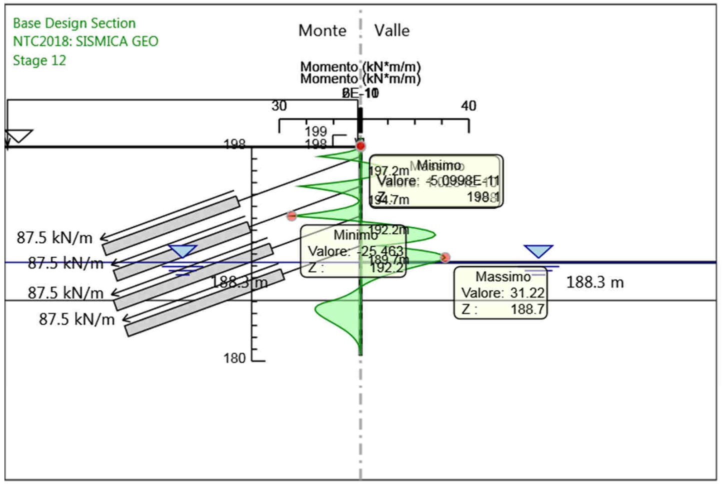
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 10
Momento

4.5.37. Grafico Risultati Momento NTC2018: SISMICA GEO - Stage: Stage 11



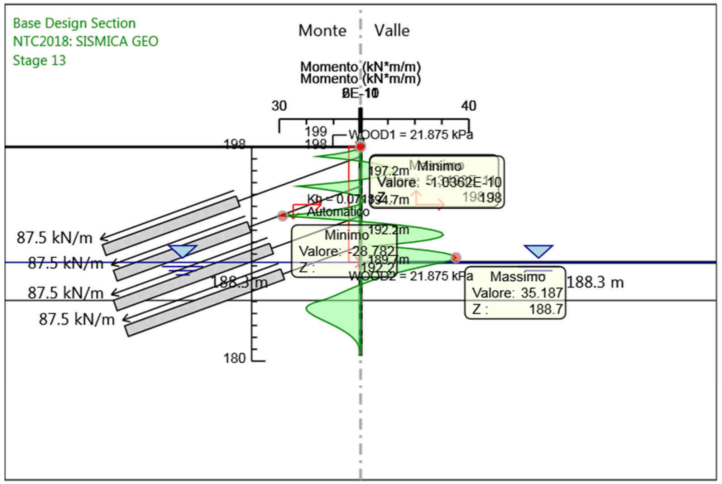
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 11
Momento

4.5.38. Grafico Risultati Momento NTC2018: SISMICA GEO - Stage: Stage 12



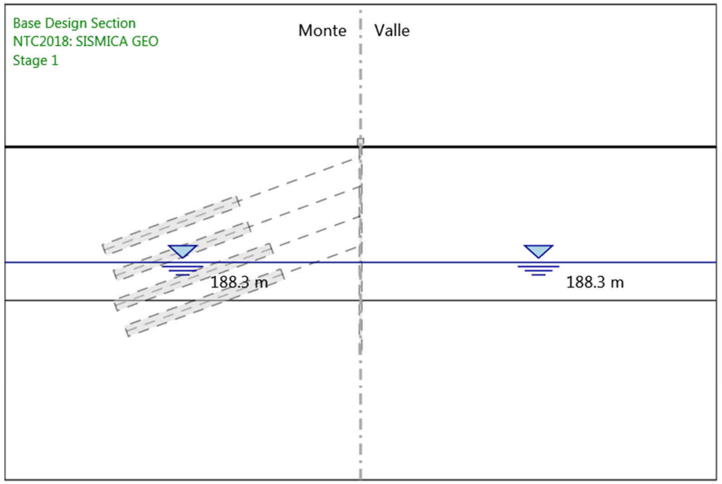
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 12
Momento

4.5.39. Grafico Risultati Momento NTC2018: SISMICA GEO - Stage: Stage 13



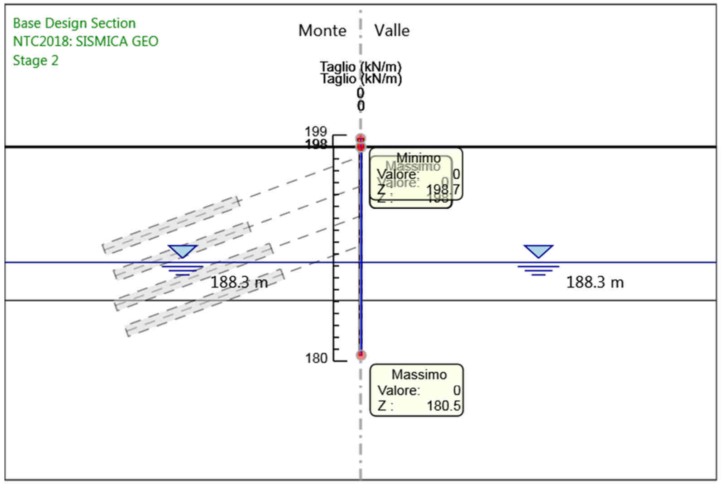
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 13
Momento

4.5.40. Grafico Risultati Taglio NTC2018: SISMICA GEO - Stage: Stage 1



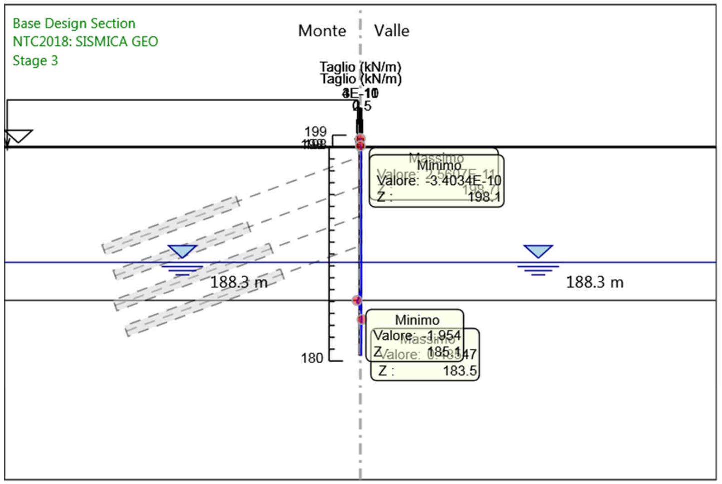
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 1
Taglio

4.5.41. Grafico Risultati Taglio NTC2018: SISMICA GEO - Stage: Stage 2



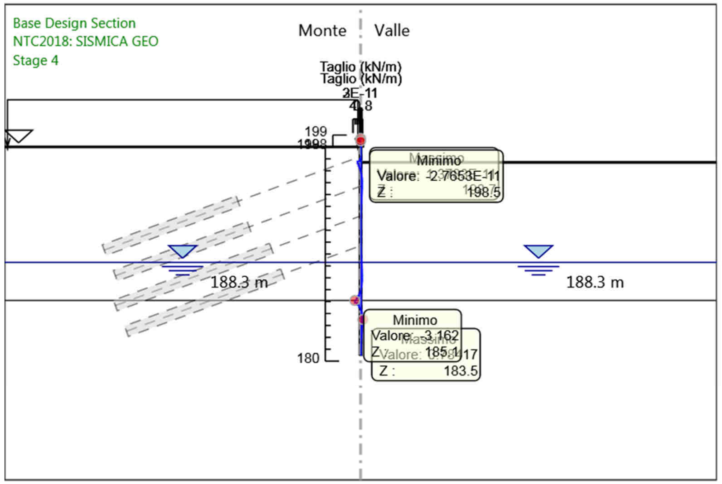
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 2
Taglio

4.5.42. Grafico Risultati Taglio NTC2018: SISMICA GEO - Stage: Stage 3



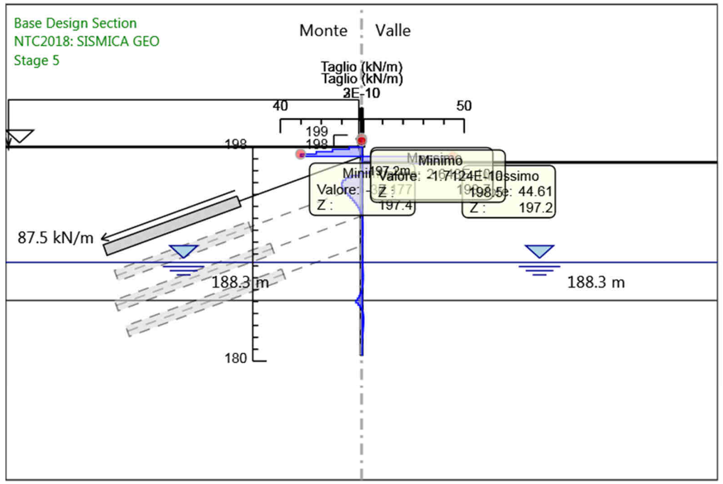
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 3
Taglio

4.5.43. Grafico Risultati Taglio NTC2018: SISMICA GEO - Stage: Stage 4



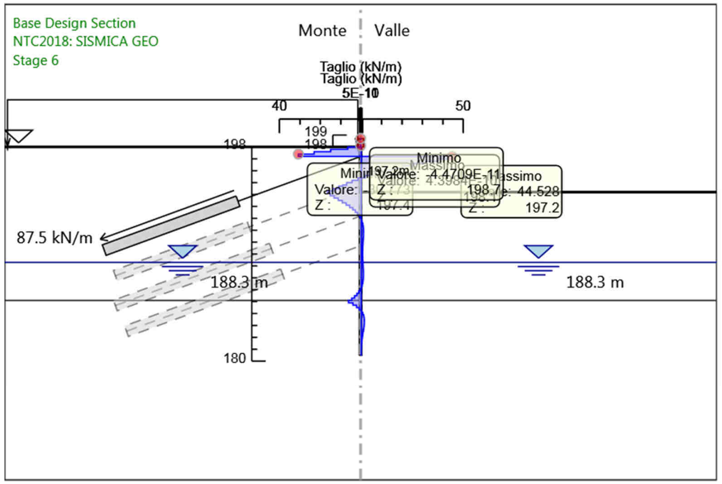
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 4
Taglio

4.5.44. Grafico Risultati Taglio NTC2018: SISMICA GEO - Stage: Stage 5



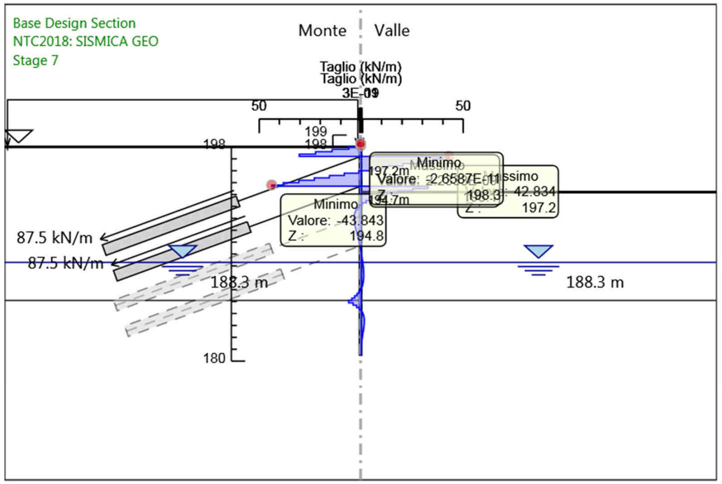
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 5
Taglio

4.5.45. Grafico Risultati Taglio NTC2018: SISMICA GEO - Stage: Stage 6



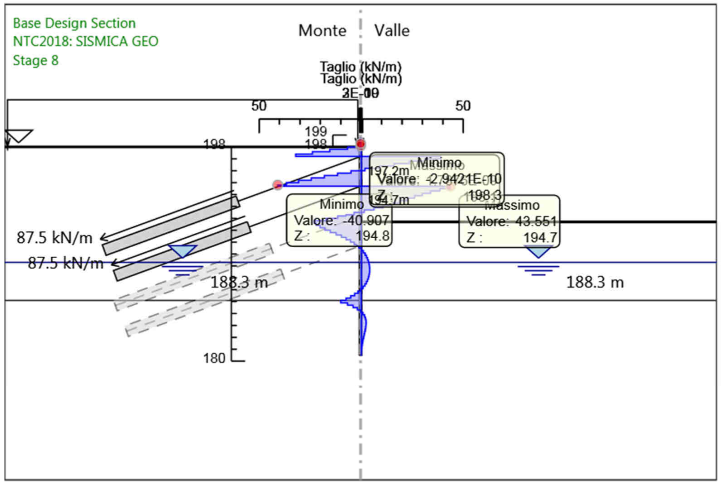
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 6
Taglio

4.5.46. Grafico Risultati Taglio NTC2018: SISMICA GEO - Stage: Stage 7



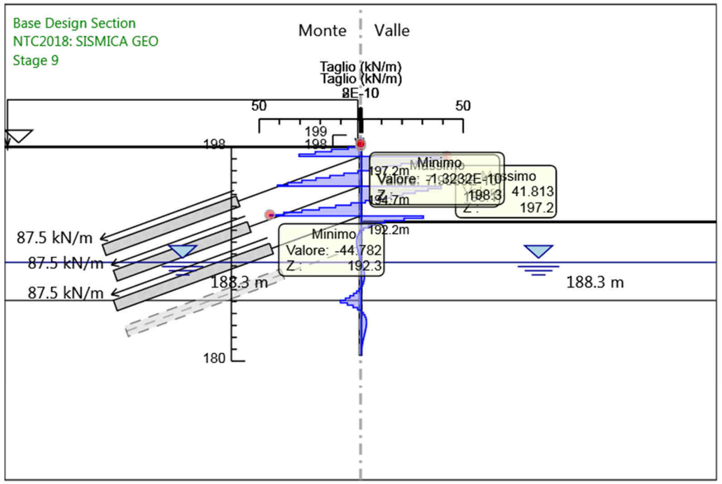
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 7
Taglio

4.5.47. Grafico Risultati Taglio NTC2018: SISMICA GEO - Stage: Stage 8



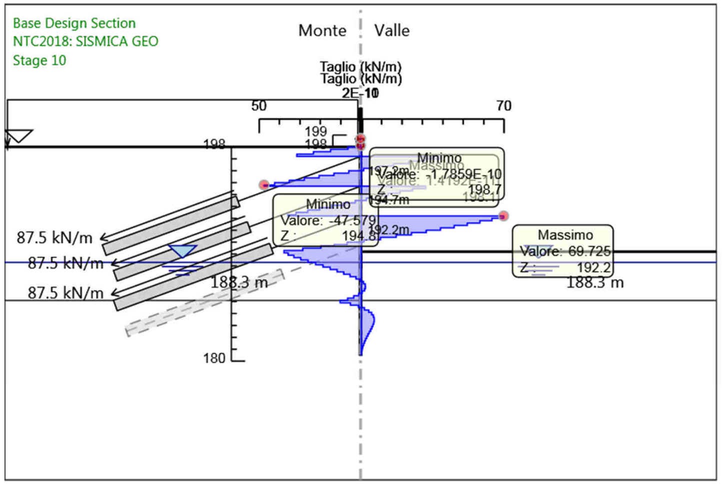
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 8
Taglio

4.5.48. Grafico Risultati Taglio NTC2018: SISMICA GEO - Stage: Stage 9



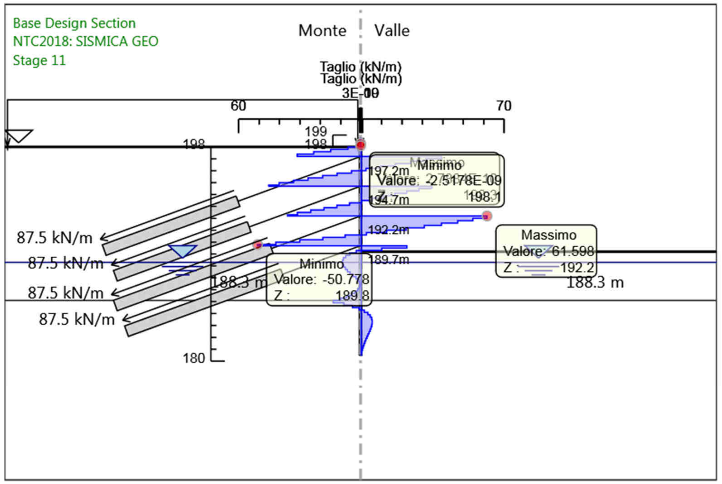
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 9
Taglio

4.5.49. Grafico Risultati Taglio NTC2018: SISMICA GEO - Stage: Stage 10



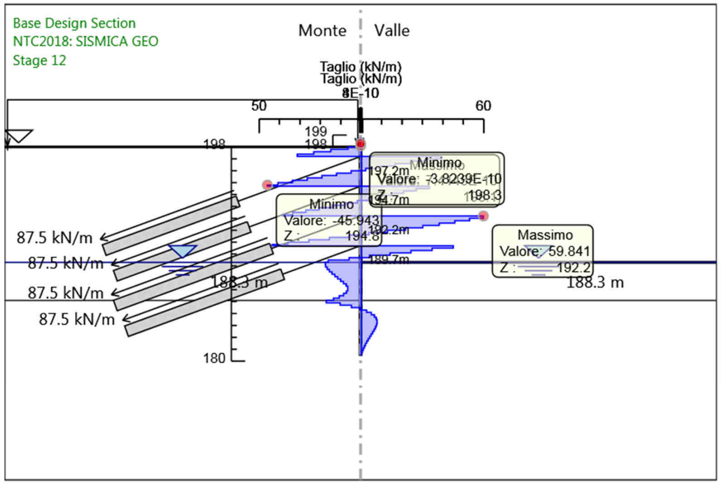
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 10
Taglio

4.5.50. Grafico Risultati Taglio NTC2018: SISMICA GEO - Stage: Stage 11



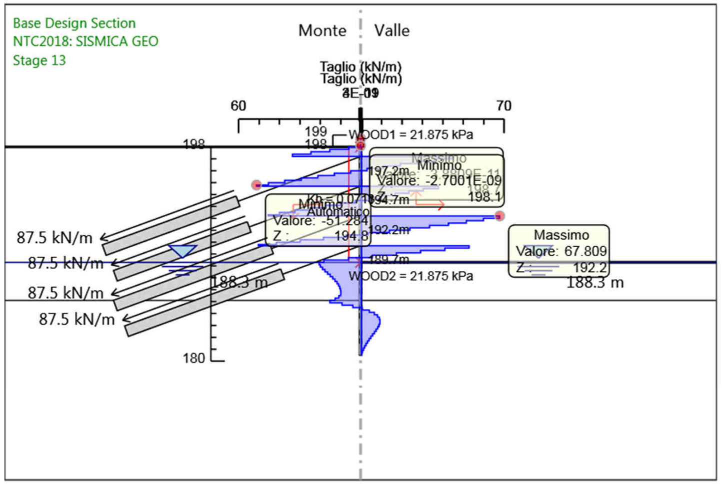
Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 11
Taglio

4.5.51. Grafico Risultati Taglio NTC2018: SISMICA GEO - Stage: Stage 12



Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 12
Taglio

4.5.52. Grafico Risultati Taglio NTC2018: SISMICA GEO - Stage: Stage 13



Design Assumption: NTC2018: SISMICA GEO
Stage: Stage 13
Taglio

4.5.53. Risultati Elementi strutturali - NTC2018: SISMICA GEO

Design Assumption: NTC2018: SISMICA GEO	Sollecitazione I-ordine
Stage	Forza (kN/m)
Stage 5	87.5
Stage 6	87.8394
Stage 7	86.02197
Stage 8	84.04349
Stage 9	84.96123
Stage 10	83.43627
Stage 11	83.76372
Stage 12	83.74849
Stage 13	93.00665

Design Assumption: NTC2018: SISMICA GEO	Sollecitazione II-ordine
Stage	Forza (kN/m)
Stage 7	87.5
Stage 8	94.1936
Stage 9	90.49837
Stage 10	89.67563
Stage 11	90.32568
Stage 12	89.78961
Stage 13	100.9196

Design Assumption: NTC2018: SISMICA GEO	Sollecitazione III-ordine
Stage	Forza (kN/m)
Stage 9	87.5
Stage 10	116.8647
Stage 11	109.0848
Stage 12	109.6457
Stage 13	126.7103

Design Assumption: NTC2018: SISMICA GEO	Sollecitazione IV-ordine
Stage	Forza (kN/m)
Stage 11	87.5
Stage 12	102.6862
Stage 13	119.3139

5. Normative adottate per le verifiche degli Elementi Strutturali

Normative Verifiche	
Calcestruzzo	NTC
Acciaio	NTC
Tirante	NTC

Coefficienti per Verifica Tiranti	
GEO FS	1
ξa3	1.8
γs	1.15

5.1. Riepilogo Stage / Design Assumption per Inviluppo

Design Assumption	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage 8	Stage 9	Stage 10	Stage 11	Stage 12	Stage 13
NTC2018: SLE (Rara/Frequente/Quasi Permanente)	V	V	V	V	V	V	V	V	V	V	V	V	V
NTC2018: A1+M1+R1 (R3 per tiranti)	V	V	V	V	V	V	V	V	V	V	V	V	V
NTC2018: A2+M2+R1	V	V	V	V	V	V	V	V	V	V	V	V	V
NTC2018: SISMICA STR	V	V	V	V	V	V	V	V	V	V	V	V	V
NTC2018: SISMICA GEO	V	V	V	V	V	V	V	V	V	V	V	V	V

5.2. Risultati SteelWorld

5.2.1. Tabella Inviluppi Tasso di Sfruttamento a Momento - SteelWorld : LEFT

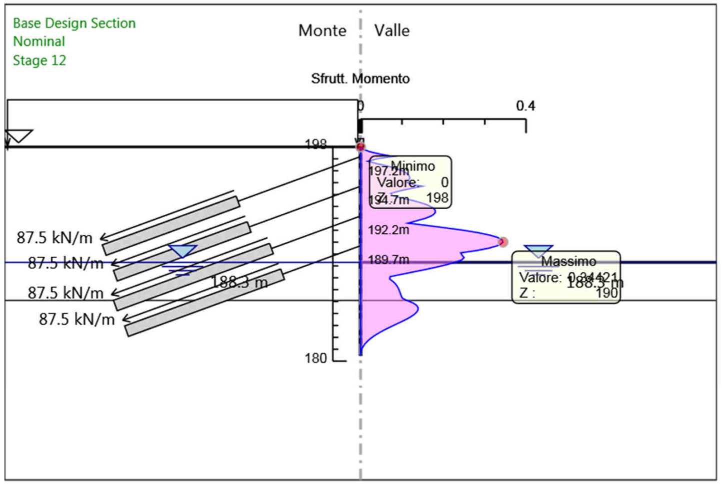
Inviluppi Tasso di Sfruttamento a Momento - SteelWorld	LEFT
Z (m)	Tasso di Sfruttamento a Momento - SteelWorld
198	0
197.8	0.007
197.6	0.022
197.4	0.047
197.2	0.079
197	0.04
196.8	0.018
196.6	0.039
196.4	0.065
196.2	0.085
196	0.1
195.8	0.111
195.6	0.117
195.4	0.119
195.2	0.117
195	0.113
194.8	0.131
194.7	0.15
194.5	0.12
194.3	0.094
194.1	0.073
193.9	0.077
193.7	0.101
193.5	0.126
193.3	0.147
193.1	0.163
192.9	0.174
192.7	0.18
192.5	0.181
192.3	0.176
192.2	0.171
192	0.157
191.8	0.136
191.6	0.114
191.4	0.161
191.2	0.207
191	0.249
190.8	0.284
190.6	0.312
190.4	0.331
190.2	0.342
190	0.344
189.8	0.338
189.7	0.331
189.5	0.311
189.3	0.281
189.1	0.242
188.9	0.246
188.7	0.25
188.5	0.244
188.3	0.228
188.1	0.207
187.9	0.183
187.7	0.157
187.5	0.128
187.3	0.1
187.1	0.071
186.9	0.07
186.7	0.078
186.5	0.084
186.3	0.088
186.1	0.091
185.9	0.094
185.7	0.096
185.5	0.098
185.3	0.101

Inviluppi Tasso di Sfruttamento a Momento - SteelWorld	LEFT
Z (m)	Tasso di Sfruttamento a Momento - SteelWorld
185.1	0.112
184.9	0.126
184.7	0.135
184.5	0.139
184.3	0.139
184.1	0.135
183.9	0.129
183.7	0.12
183.5	0.11
183.3	0.098
183.1	0.086
182.9	0.074
182.7	0.062
182.5	0.051
182.3	0.041
182.1	0.032
181.9	0.024
181.7	0.017
181.5	0.012
181.3	0.007
181.1	0.004
180.9	0.002
180.7	0
180.5	0

Inviluppi Tasso di Sfruttamento a Momento - SteelWorld	LEFT
Z (m)	Tasso di Sfruttamento a Momento - SteelWorld

5.2.2. Grafico Inviluppi Tasso di Sfruttamento a Momento - SteelWorld

Valore:
Z :



Inviluppi
Tasso di Sfruttamento a Momento - SteelWorld

5.2.1. Tabella Inviluppi Tasso di Sfruttamento a Taglio - SteelWorld : LEFT

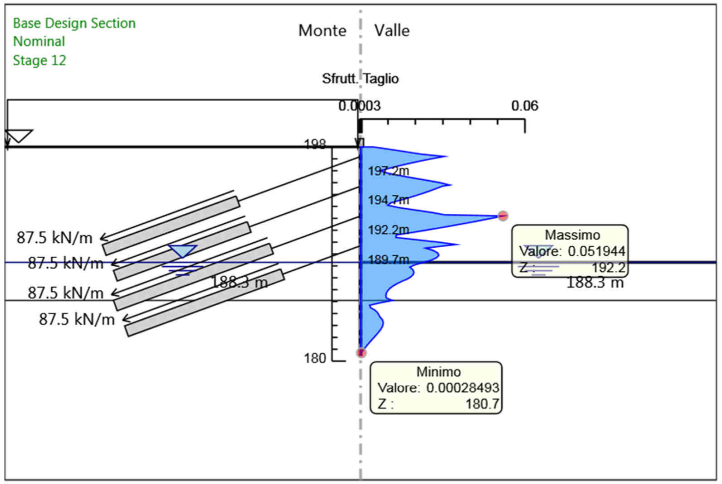
Inviluppi Tasso di Sfruttamento a Taglio - SteelWorld	LEFT
Z (m)	Tasso di Sfruttamento a Taglio - SteelWorld
198	0.005
197.8	0.011
197.6	0.016
197.4	0.022
197.2	0.031
197	0.026
196.8	0.021
196.6	0.017
196.4	0.014
196.2	0.01
196	0.007
195.8	0.01
195.6	0.014
195.4	0.019
195.2	0.024
195	0.029
194.8	0.033
194.7	0.03
194.5	0.028
194.3	0.025
194.1	0.023
193.9	0.02
193.7	0.017
193.5	0.014
193.3	0.011
193.1	0.01
192.9	0.014
192.7	0.02
192.5	0.026
192.3	0.031
192.2	0.052
192	0.048
191.8	0.043
191.6	0.039
191.4	0.034
191.2	0.029
191	0.024
190.8	0.018
190.6	0.013
190.4	0.013
190.2	0.021
190	0.029
189.8	0.035
189.7	0.031
189.5	0.024
189.3	0.027
189.1	0.028
188.9	0.029
188.7	0.028
188.5	0.026
188.3	0.023
188.1	0.02
187.9	0.018
187.7	0.019
187.5	0.019
187.3	0.019
187.1	0.018
186.9	0.017
186.7	0.015
186.5	0.013
186.3	0.012
186.1	0.011
185.9	0.01
185.7	0.009
185.5	0.009
185.3	0.009
185.1	0.012
184.9	0.007
184.7	0.003

Inviluppi Tasso di Sfruttamento a Taglio - SteelWorld	LEFT
Z (m)	Tasso di Sfruttamento a Taglio - SteelWorld
184.5	0.004
184.3	0.005
184.1	0.006
183.9	0.007
183.7	0.007
183.5	0.008
183.3	0.008
183.1	0.008
182.9	0.008
182.7	0.007
182.5	0.007
182.3	0.006
182.1	0.005
181.9	0.005
181.7	0.004
181.5	0.003
181.3	0.002
181.1	0.002
180.9	0.001
180.7	0
180.5	0

Inviluppi Tasso di Sfruttamento a Taglio - SteelWorld	LEFT
Z (m)	Tasso di Sfruttamento a Taglio - SteelWorld

5.2.2. Grafico Inviluppi Tasso di Sfruttamento a Taglio - SteelWorld

Valore:
Z :



Inviluppi
Tasso di Sfruttamento a Taglio - SteelWorld

6. Allegati

6.1. Design Assumption : Nominal - File di Paratie - File di input (.d)

```
* PARATIE ANALYSIS FOR DESIGN SECTION:Base Design Section USING ASSUMPTION: Nominal
 * Time:mercoledì 12 maggio 2021 13:04:20
 * 1: Defining general settings
 UNIT  m kN
 TITLE New Project
 DELTA 0.2
 option param itemax 40
 option control hinges 0 0.0001 0.001

 * 2: Defining wall(s)
 WALL LeftWall_32 0 180.5 198.7 1

 * 3: Defining surfaces for wall(s)
 SOIL 0_L LeftWall_32 180.5 198.7 1 0
 SOIL 0_R LeftWall_32 180.5 198.7 2 180

 * 4: Defining soil layers
 *
 * Soil Profile (unitàb_2_159_L_0)
 *
 LDATA unitàb_2_159_L_0 200 LeftWall_32
 ATREST 0.5 0.5 1
 WEIGHT 19.5 10.5 10
 PERMEABILITY 0.0001
 RESISTANCE 15 30 0 0 0
 TZDATA  LINEAR 0 0 0 0.5 0
 KSCALE  0 0
 YOUNG 10000 30000
 ENDL
 *
 * Soil Profile (unitàFAA_158_8_L_0)
 *
 LDATA unitàFAA_158_8_L_0 185.1 LeftWall_32
 ATREST 0.5 0.5 1
 WEIGHT 20 11 10
 PERMEABILITY 0.0001
 RESISTANCE 30 28 0 0 0
 TZDATA  LINEAR 0 0 0 0.5 0
 KSCALE  0 0
 YOUNG 20000 60000
 ENDL

 * 5: Defining structural materials
 * Steel material: 114 Name=S355 E=210000000 kPa
 MATERIAL S355_114 2.1E+08
 * Concrete material: 104 Name=C25/30 E=31475800 kPa
 MATERIAL C2530_104 3.1476E+07
 * Steel material: 108 Name=Fe360 E=206000200 kPa
 MATERIAL Fe360_108 2.06E+08
 * Concrete material: 106 Name=C32/40 E=33345800 kPa
 MATERIAL C3240_106 3.3346E+07
 * Rebar material: 124 Name=acciaio armonico E=200100000 kPa
 MATERIAL acciaioarmonico_124 2.001E+08
 * Concrete material: 103 Name=C20/25 E=29962000 kPa
 MATERIAL C2025_103 2.9962E+07

 * 6: Defining structural elements
 * 6.1: Beams and combined Wall Elements
 ** rev 2021 and later
 BEAM micropali_33 LeftWall_32 180.5 198 S355_114 0.099785 0.027247 8.2796E-05 2.098 00 00 0
 ** rev 2021 and later
 BEAM cordolo_sx_550 LeftWall_32 198 198.7 C3240_106 0.5 0.5 0.010417 12.5 00 00 0


 * 6.2: Supports
 WIRE I-ordine_15132 LeftWall_32 197.2 acciaioarmonico_124 1.8955E-05 87.5 20 0 0
 WIRE II-ordine_23753 LeftWall_32 194.7 acciaioarmonico_124 2.085E-05 87.5 20 0 0
 WIRE III-ordine_45144 LeftWall_32 192.2 acciaioarmonico_124 3.475E-05 87.5 20 0 0
 WIRE IV-ordine_46123 LeftWall_32 189.7 acciaioarmonico_124 3.9714E-05 87.5 20 0 0

 * 6.3: Strips

 * 7: Defining Steps
 STEP Stage1_31
 CHANGE unitàb_2_159_L_0 U-FRICT=30 LeftWall_32
 CHANGE unitàb_2_159_L_0 D-FRICT=30 LeftWall_32
 CHANGE unitàb_2_159_L_0 U-KA=0.333 LeftWall_32
 CHANGE unitàb_2_159_L_0 U-KP=4.288 LeftWall_32
 CHANGE unitàb_2_159_L_0 D-KA=0.333 LeftWall_32
```



```
CHANGE unitàb_2_159_L_0 D-KP=4.288 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-FRICT=28 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-FRICT=28 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KA=0.361 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KP=3.812 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KA=0.361 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KP=3.812 LeftWall_32
CHANGE unitàb_2_159_L_0 U-COHE=15 LeftWall_32
CHANGE unitàb_2_159_L_0 U-ADHES=0 LeftWall_32
CHANGE unitàb_2_159_L_0 D-COHE=15 LeftWall_32
CHANGE unitàb_2_159_L_0 D-ADHES=0 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-COHE=30 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-ADHES=0 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-COHE=30 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-ADHES=0 LeftWall_32
SETWALL LeftWall_32
GEOM 198 198
SURCHARGE 0 0 0 0
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage2_14403
SETWALL LeftWall_32
GEOM 198 198
SURCHARGE 0 0 0 0
WATER 188.3 0 180.5 0 0
ADD micropali_33 cordolo_sx_550
ENDSTEP

STEP Stage3_126774
SETWALL LeftWall_32
GEOM 198 198
SURCHARGE 20 198 0 198
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage4_14646
SETWALL LeftWall_32
GEOM 198 196.7
SURCHARGE 20 198 0 196.7
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage5_14889
SETWALL LeftWall_32
GEOM 198 196.7
SURCHARGE 20 198 0 196.7
WATER 188.3 0 180.5 0 0
ADD I-ordine_15132
ENDSTEP

STEP Stage6_18844
SETWALL LeftWall_32
GEOM 198 194.2
SURCHARGE 20 198 0 194.2
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage7_23510
SETWALL LeftWall_32
GEOM 198 194.2
SURCHARGE 20 198 0 194.2
WATER 188.3 0 180.5 0 0
ADD II-ordine_23753
ENDSTEP

STEP Stage8_37686
SETWALL LeftWall_32
GEOM 198 191.7
SURCHARGE 20 198 0 191.7
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage9_40353
SETWALL LeftWall_32
GEOM 198 191.7
SURCHARGE 20 198 0 191.7
WATER 188.3 0 180.5 0 0
ADD III-ordine_45144
ENDSTEP

STEP Stage10_45145
SETWALL LeftWall_32
GEOM 198 189.2
SURCHARGE 20 198 0 189.2
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage11_45873
SETWALL LeftWall_32
GEOM 198 189.2
SURCHARGE 20 198 0 189.2
WATER 188.3 0 180.5 0 0
ADD IV-ordine_46123
ENDSTEP
```

```
STEP Stage12_47080
SETWALL LeftWall_32
GEOM 198 188.3
SURCHARGE 20 198 0 188.3
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage13_47330
SETWALL LeftWall_32
GEOM 198 188.3
SURCHARGE 0 0 0 0
WATER 188.3 0 180.5 0 0
CHANGE unitàb_2_159_L_0 U-KAED=0.3894 LeftWall_32
CHANGE unitàb_2_159_L_0 U-KAEW=0.43601 LeftWall_32
CHANGE unitàb_2_159_L_0 U-KPED=4.2472 LeftWall_32
CHANGE unitàb_2_159_L_0 U-KPEW=4.0307 LeftWall_32
CHANGE unitàb_2_159_L_0 D-KAED=0.36549 LeftWall_32
CHANGE unitàb_2_159_L_0 D-KAEW=0.41371 LeftWall_32
CHANGE unitàb_2_159_L_0 D-KPED=3.9394 LeftWall_32
CHANGE unitàb_2_159_L_0 D-KPEW=3.7205 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KAED=0.41944 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KAEW=0.46708 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KPED=3.7687 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KPEW=3.5771 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KAED=0.39442 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KAEW=0.44167 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KPED=3.4958 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KPEW=3.3019 LeftWall_32
EQK 0.0713 0.03565 -0.03565 0 0.5 0 0.5 0 0
WOOD 21.875 21.875 188.3 198
* Include pressure contribution from wall: LeftWall_32
* Include wall contribution
DLOAD step LeftWall_32 188.3 0.14959 198 0.14959
ENDSTEP
```


6.2. Design Assumption : NTC2018: SLE (Rara/Frequente/Quasi Permanente) - File di Paratie - File di input (.d)

```
* PARATIE ANALYSIS FOR DESIGN SECTION:Base Design Section USING ASSUMPTION: NTC2018: SLE (Rara/Frequente/Quasi Permanente)
 * Time:mercoledì 12 maggio 2021 13:04:21
 * 1: Defining general settings
 UNIT  m kN
 TITLE New Project
 DELTA 0.2
 option param itemax 40
 option control hinges 0 0.0001 0.001

 * 2: Defining wall(s)
 WALL LeftWall_32 0 180.5 198.7 1

 * 3: Defining surfaces for wall(s)
 SOIL 0_L LeftWall_32 180.5 198.7 1 0
 SOIL 0_R LeftWall_32 180.5 198.7 2 180

 * 4: Defining soil layers
 *
 * Soil Profile (unitàb_2_159_L_0)
 *
 LDATA unitàb_2_159_L_0 200 LeftWall_32
 ATREST 0.5 0.5 1
 WEIGHT 19.5 10.5 10
 PERMEABILITY 0.0001
 RESISTANCE 15 30 0 0 0
 TZDATA  LINEAR 0 0 0 0.5 0
 KSCALE  0 0
 YOUNG 10000 30000
 ENDL
 *
 * Soil Profile (unitàFAA_158_8_L_0)
 *
 LDATA unitàFAA_158_8_L_0 185.1 LeftWall_32
 ATREST 0.5 0.5 1
 WEIGHT 20 11 10
 PERMEABILITY 0.0001
 RESISTANCE 30 28 0 0 0
 TZDATA  LINEAR 0 0 0 0.5 0
 KSCALE  0 0
 YOUNG 20000 60000
 ENDL

 * 5: Defining structural materials
 * Steel material: 114 Name=S355 E=210000000 kPa
 MATERIAL S355_114 2.1E+08
 * Concrete material: 104 Name=C25/30 E=31475800 kPa
 MATERIAL C2530_104 3.1476E+07
 * Steel material: 108 Name=Fe360 E=206000200 kPa
 MATERIAL Fe360_108 2.06E+08
 * Concrete material: 106 Name=C32/40 E=33345800 kPa
 MATERIAL C3240_106 3.3346E+07
 * Rebar material: 124 Name=acciaio armonico E=200100000 kPa
 MATERIAL acciaioarmonico_124 2.001E+08
 * Concrete material: 103 Name=C20/25 E=29962000 kPa
 MATERIAL C2025_103 2.9962E+07

 * 6: Defining structural elements
 * 6.1: Beams and combined Wall Elements
 ** rev 2021 and later
 BEAM micropali_33 LeftWall_32 180.5 198 S355_114 0.099785 0.027247 8.2796E-05 2.098 00 00 0
 ** rev 2021 and later
 BEAM cordolo_sx_550 LeftWall_32 198 198.7 C3240_106 0.5 0.5 0.010417 12.5 00 00 0


 * 6.2: Supports
 WIRE I-ordine_15132 LeftWall_32 197.2 acciaioarmonico_124 1.8955E-05 87.5 20 0 0
 WIRE II-ordine_23753 LeftWall_32 194.7 acciaioarmonico_124 2.085E-05 87.5 20 0 0
 WIRE III-ordine_45144 LeftWall_32 192.2 acciaioarmonico_124 3.475E-05 87.5 20 0 0
 WIRE IV-ordine_46123 LeftWall_32 189.7 acciaioarmonico_124 3.9714E-05 87.5 20 0 0



 * 6.3: Strips

 * 7: Defining Steps
 STEP Stage1_31
 CHANGE unitàb_2_159_L_0 U-FRICT=30 LeftWall_32
 CHANGE unitàb_2_159_L_0 D-FRICT=30 LeftWall_32
 CHANGE unitàb_2_159_L_0 U-KA=0.333 LeftWall_32
 CHANGE unitàb_2_159_L_0 U-KP=4.288 LeftWall_32
 CHANGE unitàb_2_159_L_0 D-KA=0.333 LeftWall_32
 CHANGE unitàb_2_159_L_0 D-KP=4.288 LeftWall_32
 CHANGE unitàFAA_158_8_L_0 U-FRICT=28 LeftWall_32
```

```
CHANGE unitàFAA_158_8_L_0 D-FRICT=28 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KA=0.361 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KP=3.812 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KA=0.361 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KP=3.812 LeftWall_32
CHANGE unitàb_2_159_L_0 U-COHE=15 LeftWall_32
CHANGE unitàb_2_159_L_0 U-ADHES=0 LeftWall_32
CHANGE unitàb_2_159_L_0 D-COHE=15 LeftWall_32
CHANGE unitàb_2_159_L_0 D-ADHES=0 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-COHE=30 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-ADHES=0 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-COHE=30 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-ADHES=0 LeftWall_32
SETWALL LeftWall_32
GEOM 198 198
SURCHARGE 0 0 0 0
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage2_14403
SETWALL LeftWall_32
GEOM 198 198
SURCHARGE 0 0 0 0
WATER 188.3 0 180.5 0 0
ADD micropali_33 cordolo_sx_550
ENDSTEP

STEP Stage3_126774
SETWALL LeftWall_32
GEOM 198 198
SURCHARGE 20 198 0 198
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage4_14646
SETWALL LeftWall_32
GEOM 198 196.7
SURCHARGE 20 198 0 196.7
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage5_14889
SETWALL LeftWall_32
GEOM 198 196.7
SURCHARGE 20 198 0 196.7
WATER 188.3 0 180.5 0 0
ADD I-ordine_15132
ENDSTEP

STEP Stage6_18844
SETWALL LeftWall_32
GEOM 198 194.2
SURCHARGE 20 198 0 194.2
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage7_23510
SETWALL LeftWall_32
GEOM 198 194.2
SURCHARGE 20 198 0 194.2
WATER 188.3 0 180.5 0 0
ADD II-ordine_23753
ENDSTEP

STEP Stage8_37686
SETWALL LeftWall_32
GEOM 198 191.7
SURCHARGE 20 198 0 191.7
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage9_40353
SETWALL LeftWall_32
GEOM 198 191.7
SURCHARGE 20 198 0 191.7
WATER 188.3 0 180.5 0 0
ADD III-ordine_45144
ENDSTEP

STEP Stage10_45145
SETWALL LeftWall_32
GEOM 198 189.2
SURCHARGE 20 198 0 189.2
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage11_45873
SETWALL LeftWall_32
GEOM 198 189.2
SURCHARGE 20 198 0 189.2
WATER 188.3 0 180.5 0 0
ADD IV-ordine_46123
ENDSTEP

STEP Stage12_47080
```



```
SETWALL LeftWall_32
GEOM 198 188.3
SURCHARGE 20 198 0 188.3
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage13_47330
SETWALL LeftWall_32
GEOM 198 188.3
SURCHARGE 0 0 0 0
WATER 188.3 0 180.5 0 0
ENDSTEP
```

6.3. Design Assumption : NTC2018: A1+M1+R1 (R3 per tiranti) - File di Paratie - File di input (.d)

```
* PARATIE ANALYSIS FOR DESIGN SECTION:Base Design Section USING ASSUMPTION: NTC2018: A1+M1+R1 (R3 per tiranti)
 * Time:mercoledì 12 maggio 2021 13:04:22
 * 1: Defining general settings
 UNIT  m kN
 TITLE New Project
 DELTA 0.2
 option param itemax 40
 option control hinges 0 0.0001 0.001

 * 2: Defining wall(s)
 WALL LeftWall_32 0 180.5 198.7 1

 * 3: Defining surfaces for wall(s)
 SOIL 0_L LeftWall_32 180.5 198.7 1 0
 SOIL 0_R LeftWall_32 180.5 198.7 2 180

 * 4: Defining soil layers
 *
 * Soil Profile (unitàb_2_159_L_0)
 *
 LDATA unitàb_2_159_L_0 200 LeftWall_32
 ATREST 0.5 0.5 1
 WEIGHT 19.5 10.5 10
 PERMEABILITY 0.0001
 RESISTANCE 15 30 0 0 0
 TZDATA  LINEAR 0 0 0 0.5 0
 KSCALE  0 0
 YOUNG 10000 30000
 ENDL
 *
 * Soil Profile (unitàFAA_158_8_L_0)
 *
 LDATA unitàFAA_158_8_L_0 185.1 LeftWall_32
 ATREST 0.5 0.5 1
 WEIGHT 20 11 10
 PERMEABILITY 0.0001
 RESISTANCE 30 28 0 0 0
 TZDATA  LINEAR 0 0 0 0.5 0
 KSCALE  0 0
 YOUNG 20000 60000
 ENDL

 * 5: Defining structural materials
 * Steel material: 114 Name=S355 E=210000000 kPa
 MATERIAL S355_114 2.1E+08
 * Concrete material: 104 Name=C25/30 E=31475800 kPa
 MATERIAL C2530_104 3.1476E+07
 * Steel material: 108 Name=Fe360 E=206000200 kPa
 MATERIAL Fe360_108 2.06E+08
 * Concrete material: 106 Name=C32/40 E=33345800 kPa
 MATERIAL C3240_106 3.3346E+07
 * Rebar material: 124 Name=acciaio armonico E=200100000 kPa
 MATERIAL acciaioarmonico_124 2.001E+08
 * Concrete material: 103 Name=C20/25 E=29962000 kPa
 MATERIAL C2025_103 2.9962E+07

 * 6: Defining structural elements
 * 6.1: Beams and combined Wall Elements
 ** rev 2021 and later
 BEAM micropali_33 LeftWall_32 180.5 198 S355_114 0.099785 0.027247 8.2796E-05 2.098 00 00 0
 ** rev 2021 and later
 BEAM cordolo_sx_550 LeftWall_32 198 198.7 C3240_106 0.5 0.5 0.010417 12.5 00 00 0


 * 6.2: Supports
 WIRE I-ordine_15132 LeftWall_32 197.2 acciaioarmonico_124 1.8955E-05 87.5 20 0 0
 WIRE II-ordine_23753 LeftWall_32 194.7 acciaioarmonico_124 2.085E-05 87.5 20 0 0
 WIRE III-ordine_45144 LeftWall_32 192.2 acciaioarmonico_124 3.475E-05 87.5 20 0 0
 WIRE IV-ordine_46123 LeftWall_32 189.7 acciaioarmonico_124 3.9714E-05 87.5 20 0 0


 * 6.3: Strips

 * 7: Defining Steps
 STEP Stage1_31
 CHANGE unitàb_2_159_L_0 U-FRICT=30 LeftWall_32
 CHANGE unitàb_2_159_L_0 D-FRICT=30 LeftWall_32
 CHANGE unitàb_2_159_L_0 U-KA=0.333 LeftWall_32
 CHANGE unitàb_2_159_L_0 U-KP=4.288 LeftWall_32
 CHANGE unitàb_2_159_L_0 D-KA=0.333 LeftWall_32
 CHANGE unitàb_2_159_L_0 D-KP=4.288 LeftWall_32
 CHANGE unitàFAA_158_8_L_0 U-FRICT=28 LeftWall_32
```



```
CHANGE unitàFAA_158_8_L_0 D-FRICT=28 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KA=0.361 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KP=3.812 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KA=0.361 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KP=3.812 LeftWall_32
CHANGE unitàb_2_159_L_0 U-COHE=15 LeftWall_32
CHANGE unitàb_2_159_L_0 U-ADHES=0 LeftWall_32
CHANGE unitàb_2_159_L_0 D-COHE=15 LeftWall_32
CHANGE unitàb_2_159_L_0 D-ADHES=0 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-COHE=30 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-ADHES=0 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-COHE=30 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-ADHES=0 LeftWall_32
SETWALL LeftWall_32
GEOM 198 198
SURCHARGE 0 0 0 0
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage2_14403
SETWALL LeftWall_32
GEOM 198 198
SURCHARGE 0 0 0 0
WATER 188.3 0 180.5 0 0
ADD micropali_33 cordolo_sx_550
ENDSTEP

STEP Stage3_126774
SETWALL LeftWall_32
GEOM 198 198
SURCHARGE 20 198 0 198
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage4_14646
SETWALL LeftWall_32
GEOM 198 196.7
SURCHARGE 20 198 0 196.7
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage5_14889
SETWALL LeftWall_32
GEOM 198 196.7
SURCHARGE 20 198 0 196.7
WATER 188.3 0 180.5 0 0
ADD I-ordine_15132
ENDSTEP

STEP Stage6_18844
SETWALL LeftWall_32
GEOM 198 194.2
SURCHARGE 20 198 0 194.2
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage7_23510
SETWALL LeftWall_32
GEOM 198 194.2
SURCHARGE 20 198 0 194.2
WATER 188.3 0 180.5 0 0
ADD II-ordine_23753
ENDSTEP

STEP Stage8_37686
SETWALL LeftWall_32
GEOM 198 191.7
SURCHARGE 20 198 0 191.7
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage9_40353
SETWALL LeftWall_32
GEOM 198 191.7
SURCHARGE 20 198 0 191.7
WATER 188.3 0 180.5 0 0
ADD III-ordine_45144
ENDSTEP

STEP Stage10_45145
SETWALL LeftWall_32
GEOM 198 189.2
SURCHARGE 20 198 0 189.2
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage11_45873
SETWALL LeftWall_32
GEOM 198 189.2
SURCHARGE 20 198 0 189.2
WATER 188.3 0 180.5 0 0
ADD IV-ordine_46123
ENDSTEP

STEP Stage12_47080
```

```
SETWALL LeftWall_32
GEOM 198 188.3
SURCHARGE 20 198 0 188.3
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage13_47330
SETWALL LeftWall_32
GEOM 198 188.3
SURCHARGE 0 0 0 0
WATER 188.3 0 180.5 0 0
ENDSTEP
```


6.4. Design Assumption : NTC2018: A2+M2+R1 - File di Paratie - File di input (.d)

```
* PARATIE ANALYSIS FOR DESIGN SECTION:Base Design Section USING ASSUMPTION: NTC2018: A2+M2+R1
 * Time:mercoledì 12 maggio 2021 13:04:23
 * 1: Defining general settings
 UNIT  m kN
 TITLE New Project
 DELTA 0.2
 option param itemax 40
 option control hinges 0 0.0001 0.001

 * 2: Defining wall(s)
 WALL LeftWall_32 0 180.5 198.7 1

 * 3: Defining surfaces for wall(s)
 SOIL 0_L LeftWall_32 180.5 198.7 1 0
 SOIL 0_R LeftWall_32 180.5 198.7 2 180

 * 4: Defining soil layers
 *
 * Soil Profile (unitàb_2_159_L_0)
 *
 LDATA unitàb_2_159_L_0 200 LeftWall_32
 ATREST 0.5 0.5 1
 WEIGHT 19.5 10.5 10
 PERMEABILITY 0.0001
 RESISTANCE 15 30 0 0 0
 TZDATA  LINEAR 0 0 0 0.5 0
 KSCALE  0 0
 YOUNG 10000 30000
 ENDL
 *
 * Soil Profile (unitàFAA_158_8_L_0)
 *
 LDATA unitàFAA_158_8_L_0 185.1 LeftWall_32
 ATREST 0.5 0.5 1
 WEIGHT 20 11 10
 PERMEABILITY 0.0001
 RESISTANCE 30 28 0 0 0
 TZDATA  LINEAR 0 0 0 0.5 0
 KSCALE  0 0
 YOUNG 20000 60000
 ENDL

 * 5: Defining structural materials
 * Steel material: 114 Name=S355 E=210000000 kPa
 MATERIAL S355_114 2.1E+08
 * Concrete material: 104 Name=C25/30 E=31475800 kPa
 MATERIAL C2530_104 3.1476E+07
 * Steel material: 108 Name=Fe360 E=206000200 kPa
 MATERIAL Fe360_108 2.06E+08
 * Concrete material: 106 Name=C32/40 E=33345800 kPa
 MATERIAL C3240_106 3.3346E+07
 * Rebar material: 124 Name=acciaio armonico E=200100000 kPa
 MATERIAL acciaioarmonico_124 2.001E+08
 * Concrete material: 103 Name=C20/25 E=29962000 kPa
 MATERIAL C2025_103 2.9962E+07

 * 6: Defining structural elements
 * 6.1: Beams and combined Wall Elements
 ** rev 2021 and later
 BEAM micropali_33 LeftWall_32 180.5 198 S355_114 0.099785 0.027247 8.2796E-05 2.098 00 00 0
 ** rev 2021 and later
 BEAM cordolo_sx_550 LeftWall_32 198 198.7 C3240_106 0.5 0.5 0.010417 12.5 00 00 0


 * 6.2: Supports
 WIRE I-ordine_15132 LeftWall_32 197.2 acciaioarmonico_124 1.8955E-05 87.5 20 0 0
 WIRE II-ordine_23753 LeftWall_32 194.7 acciaioarmonico_124 2.085E-05 87.5 20 0 0
 WIRE III-ordine_45144 LeftWall_32 192.2 acciaioarmonico_124 3.475E-05 87.5 20 0 0
 WIRE IV-ordine_46123 LeftWall_32 189.7 acciaioarmonico_124 3.9714E-05 87.5 20 0 0


 * 6.3: Strips

 * 7: Defining Steps
 STEP Stage1_31
 CHANGE unitàb_2_159_L_0 U-FRICT=24.791 LeftWall_32
 CHANGE unitàb_2_159_L_0 D-FRICT=24.791 LeftWall_32
 CHANGE unitàb_2_159_L_0 U-KA=0.409 LeftWall_32
 CHANGE unitàb_2_159_L_0 U-KP=3.185 LeftWall_32
 CHANGE unitàb_2_159_L_0 D-KA=0.409 LeftWall_32
 CHANGE unitàb_2_159_L_0 D-KP=3.185 LeftWall_32
 CHANGE unitàFAA_158_8_L_0 U-FRICT=23.043 LeftWall_32
```

```
CHANGE unitàFAA_158_8_L_0 D-FRICT=23.043 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KA=0.437 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KP=2.9 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KA=0.437 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KP=2.9 LeftWall_32
CHANGE unitàb_2_159_L_0 U-COHE=12 LeftWall_32
CHANGE unitàb_2_159_L_0 U-ADHES=0 LeftWall_32
CHANGE unitàb_2_159_L_0 D-COHE=12 LeftWall_32
CHANGE unitàb_2_159_L_0 D-ADHES=0 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-COHE=24 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-ADHES=0 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-COHE=24 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-ADHES=0 LeftWall_32
SETWALL LeftWall_32
GEOM 198 198
SURCHARGE 0 0 0 0
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage2_14403
SETWALL LeftWall_32
GEOM 198 198
SURCHARGE 0 0 0 0
WATER 188.3 0 180.5 0 0
ADD micropali_33 cordolo_sx_550
ENDSTEP

STEP Stage3_126774
SETWALL LeftWall_32
GEOM 198 198
SURCHARGE 20 198 0 198
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage4_14646
SETWALL LeftWall_32
GEOM 198 196.7
SURCHARGE 20 198 0 196.7
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage5_14889
SETWALL LeftWall_32
GEOM 198 196.7
SURCHARGE 20 198 0 196.7
WATER 188.3 0 180.5 0 0
ADD I-ordine_15132
ENDSTEP

STEP Stage6_18844
SETWALL LeftWall_32
GEOM 198 194.2
SURCHARGE 20 198 0 194.2
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage7_23510
SETWALL LeftWall_32
GEOM 198 194.2
SURCHARGE 20 198 0 194.2
WATER 188.3 0 180.5 0 0
ADD II-ordine_23753
ENDSTEP

STEP Stage8_37686
SETWALL LeftWall_32
GEOM 198 191.7
SURCHARGE 20 198 0 191.7
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage9_40353
SETWALL LeftWall_32
GEOM 198 191.7
SURCHARGE 20 198 0 191.7
WATER 188.3 0 180.5 0 0
ADD III-ordine_45144
ENDSTEP

STEP Stage10_45145
SETWALL LeftWall_32
GEOM 198 189.2
SURCHARGE 20 198 0 189.2
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage11_45873
SETWALL LeftWall_32
GEOM 198 189.2
SURCHARGE 20 198 0 189.2
WATER 188.3 0 180.5 0 0
ADD IV-ordine_46123
ENDSTEP

STEP Stage12_47080
```



```
SETWALL LeftWall_32
GEOM 198 188.3
SURCHARGE 20 198 0 188.3
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage13_47330
SETWALL LeftWall_32
GEOM 198 188.3
SURCHARGE 0 0 0 0
WATER 188.3 0 180.5 0 0
ENDSTEP
```

6.5. Design Assumption : NTC2018: SISMICA STR - File di Paratie - File di input (.d)

```
* PARATIE ANALYSIS FOR DESIGN SECTION:Base Design Section USING ASSUMPTION: NTC2018: SISMICA STR
 * Time:mercoledì 12 maggio 2021 13:04:24
 * 1: Defining general settings
 UNIT  m kN
 TITLE New Project
 DELTA 0.2
 option param itemax 40
 option control hinges 0 0.0001 0.001

 * 2: Defining wall(s)
 WALL LeftWall_32 0 180.5 198.7 1

 * 3: Defining surfaces for wall(s)
 SOIL 0_L LeftWall_32 180.5 198.7 1 0
 SOIL 0_R LeftWall_32 180.5 198.7 2 180

 * 4: Defining soil layers
 *
 * Soil Profile (unitàb_2_159_L_0)
 *
 LDATA unitàb_2_159_L_0 200 LeftWall_32
 ATREST 0.5 0.5 1
 WEIGHT 19.5 10.5 10
 PERMEABILITY 0.0001
 RESISTANCE 15 30 0 0 0
 TZDATA  LINEAR 0 0 0 0.5 0
 KSCALE  0 0
 YOUNG 10000 30000
 ENDL
 *
 * Soil Profile (unitàFAA_158_8_L_0)
 *
 LDATA unitàFAA_158_8_L_0 185.1 LeftWall_32
 ATREST 0.5 0.5 1
 WEIGHT 20 11 10
 PERMEABILITY 0.0001
 RESISTANCE 30 28 0 0 0
 TZDATA  LINEAR 0 0 0 0.5 0
 KSCALE  0 0
 YOUNG 20000 60000
 ENDL

 * 5: Defining structural materials
 * Steel material: 114 Name=S355 E=210000000 kPa
 MATERIAL S355_114 2.1E+08
 * Concrete material: 104 Name=C25/30 E=31475800 kPa
 MATERIAL C2530_104 3.1476E+07
 * Steel material: 108 Name=Fe360 E=206000200 kPa
 MATERIAL Fe360_108 2.06E+08
 * Concrete material: 106 Name=C32/40 E=33345800 kPa
 MATERIAL C3240_106 3.3346E+07
 * Rebar material: 124 Name=acciaio armonico E=200100000 kPa
 MATERIAL acciaioarmonico_124 2.001E+08
 * Concrete material: 103 Name=C20/25 E=29962000 kPa
 MATERIAL C2025_103 2.9962E+07

 * 6: Defining structural elements
 * 6.1: Beams and combined Wall Elements
 ** rev 2021 and later
 BEAM micropali_33 LeftWall_32 180.5 198 S355_114 0.099785 0.027247 8.2796E-05 2.098 00 00 0
 ** rev 2021 and later
 BEAM cordolo_sx_550 LeftWall_32 198 198.7 C3240_106 0.5 0.5 0.010417 12.5 00 00 0


 * 6.2: Supports
 WIRE I-ordine_15132 LeftWall_32 197.2 acciaioarmonico_124 1.8955E-05 87.5 20 0 0
 WIRE II-ordine_23753 LeftWall_32 194.7 acciaioarmonico_124 2.085E-05 87.5 20 0 0
 WIRE III-ordine_45144 LeftWall_32 192.2 acciaioarmonico_124 3.475E-05 87.5 20 0 0
 WIRE IV-ordine_46123 LeftWall_32 189.7 acciaioarmonico_124 3.9714E-05 87.5 20 0 0



 * 6.3: Strips

 * 7: Defining Steps
 STEP Stage1_31
 CHANGE unitàb_2_159_L_0 U-FRICT=30 LeftWall_32
 CHANGE unitàb_2_159_L_0 D-FRICT=30 LeftWall_32
 CHANGE unitàb_2_159_L_0 U-KA=0.333 LeftWall_32
 CHANGE unitàb_2_159_L_0 U-KP=4.288 LeftWall_32
 CHANGE unitàb_2_159_L_0 D-KA=0.333 LeftWall_32
 CHANGE unitàb_2_159_L_0 D-KP=4.288 LeftWall_32
 CHANGE unitàFAA_158_8_L_0 U-FRICT=28 LeftWall_32
```



```
CHANGE unitàFAA_158_8_L_0 D-FRICT=28 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KA=0.361 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KP=3.812 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KA=0.361 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KP=3.812 LeftWall_32
CHANGE unitàb_2_159_L_0 U-COHE=15 LeftWall_32
CHANGE unitàb_2_159_L_0 U-ADHES=0 LeftWall_32
CHANGE unitàb_2_159_L_0 D-COHE=15 LeftWall_32
CHANGE unitàb_2_159_L_0 D-ADHES=0 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-COHE=30 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-ADHES=0 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-COHE=30 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-ADHES=0 LeftWall_32
SETWALL LeftWall_32
GEOM 198 198
SURCHARGE 0 0 0 0
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage2_14403
SETWALL LeftWall_32
GEOM 198 198
SURCHARGE 0 0 0 0
WATER 188.3 0 180.5 0 0
ADD micropali_33 cordolo_sx_550
ENDSTEP

STEP Stage3_126774
SETWALL LeftWall_32
GEOM 198 198
SURCHARGE 20 198 0 198
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage4_14646
SETWALL LeftWall_32
GEOM 198 196.7
SURCHARGE 20 198 0 196.7
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage5_14889
SETWALL LeftWall_32
GEOM 198 196.7
SURCHARGE 20 198 0 196.7
WATER 188.3 0 180.5 0 0
ADD I-ordine_15132
ENDSTEP

STEP Stage6_18844
SETWALL LeftWall_32
GEOM 198 194.2
SURCHARGE 20 198 0 194.2
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage7_23510
SETWALL LeftWall_32
GEOM 198 194.2
SURCHARGE 20 198 0 194.2
WATER 188.3 0 180.5 0 0
ADD II-ordine_23753
ENDSTEP

STEP Stage8_37686
SETWALL LeftWall_32
GEOM 198 191.7
SURCHARGE 20 198 0 191.7
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage9_40353
SETWALL LeftWall_32
GEOM 198 191.7
SURCHARGE 20 198 0 191.7
WATER 188.3 0 180.5 0 0
ADD III-ordine_45144
ENDSTEP

STEP Stage10_45145
SETWALL LeftWall_32
GEOM 198 189.2
SURCHARGE 20 198 0 189.2
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage11_45873
SETWALL LeftWall_32
GEOM 198 189.2
SURCHARGE 20 198 0 189.2
WATER 188.3 0 180.5 0 0
ADD IV-ordine_46123
ENDSTEP

STEP Stage12_47080
```

```
SETWALL LeftWall_32
GEOM 198 188.3
SURCHARGE 20 198 0 188.3
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage13_47330
SETWALL LeftWall_32
GEOM 198 188.3
SURCHARGE 0 0 0 0
WATER 188.3 0 180.5 0 0
CHANGE unitàb_2_159_L_0 U-KAED=0.3894 LeftWall_32
CHANGE unitàb_2_159_L_0 U-KAEW=0.43601 LeftWall_32
CHANGE unitàb_2_159_L_0 U-KPED=4.2472 LeftWall_32
CHANGE unitàb_2_159_L_0 U-KPEW=4.0307 LeftWall_32
CHANGE unitàb_2_159_L_0 D-KAED=0.36549 LeftWall_32
CHANGE unitàb_2_159_L_0 D-KAEW=0.41371 LeftWall_32
CHANGE unitàb_2_159_L_0 D-KPED=3.9394 LeftWall_32
CHANGE unitàb_2_159_L_0 D-KPEW=3.7205 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KAED=0.41944 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KAEW=0.46708 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KPED=3.7687 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KPEW=3.5771 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KAED=0.39442 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KAEW=0.44167 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KPED=3.4958 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KPEW=3.3019 LeftWall_32
EQK 0.0713 0.03565 -0.03565 0 0.5 0 0.5 0 0
WOOD 21.875 21.875 188.3 198
* Include pressure contribution from wall: LeftWall_32
* Include wall contribution
DLOAD step LeftWall_32 188.3 0.14959 198 0.14959
ENDSTEP
```


6.6. Design Assumption : NTC2018: SISMICA GEO - File di Paratie - File di input (.d)

```
* PARATIE ANALYSIS FOR DESIGN SECTION:Base Design Section USING ASSUMPTION: NTC2018: SISMICA GEO
 * Time:mercoledì 12 maggio 2021 13:04:25
 * 1: Defining general settings
 UNIT  m kN
 TITLE New Project
 DELTA 0.2
 option param itemax 40
 option control hinges 0 0.0001 0.001

 * 2: Defining wall(s)
 WALL LeftWall_32 0 180.5 198.7 1

 * 3: Defining surfaces for wall(s)
 SOIL 0_L LeftWall_32 180.5 198.7 1 0
 SOIL 0_R LeftWall_32 180.5 198.7 2 180

 * 4: Defining soil layers
 *
 * Soil Profile (unitàb_2_159_L_0)
 *
LDATA unitàb_2_159_L_0 200 LeftWall_32
 ATREST 0.5 0.5 1
 WEIGHT 19.5 10.5 10
 PERMEABILITY 0.0001
 RESISTANCE 15 30 0 0 0
 TZDATA  LINEAR 0 0 0 0.5 0
 KSCALE  0 0
 YOUNG 10000 30000
 ENDL
 *
 * Soil Profile (unitàFAA_158_8_L_0)
 *
 LDATA unitàFAA_158_8_L_0 185.1 LeftWall_32
 ATREST 0.5 0.5 1
 WEIGHT 20 11 10
 PERMEABILITY 0.0001
 RESISTANCE 30 28 0 0 0
 TZDATA  LINEAR 0 0 0 0.5 0
 KSCALE  0 0
 YOUNG 20000 60000
 ENDL

 * 5: Defining structural materials
 * Steel material: 114 Name=S355 E=210000000 kPa
 MATERIAL S355_114 2.1E+08
 * Concrete material: 104 Name=C25/30 E=31475800 kPa
 MATERIAL C2530_104 3.1476E+07
 * Steel material: 108 Name=Fe360 E=206000200 kPa
 MATERIAL Fe360_108 2.06E+08
 * Concrete material: 106 Name=C32/40 E=33345800 kPa
 MATERIAL C3240_106 3.3346E+07
 * Rebar material: 124 Name=acciaio armonico E=200100000 kPa
 MATERIAL acciaioarmonico_124 2.001E+08
 * Concrete material: 103 Name=C20/25 E=29962000 kPa
 MATERIAL C2025_103 2.9962E+07

 * 6: Defining structural elements
 * 6.1: Beams and combined Wall Elements
 ** rev 2021 and later
 BEAM micropali_33 LeftWall_32 180.5 198 S355_114 0.099785 0.027247 8.2796E-05 2.098 00 00 0
 ** rev 2021 and later
 BEAM cordolo_sx_550 LeftWall_32 198 198.7 C3240_106 0.5 0.5 0.010417 12.5 00 00 0


 * 6.2: Supports
 WIRE I-ordine_15132 LeftWall_32 197.2 acciaioarmonico_124 1.8955E-05 87.5 20 0 0
 WIRE II-ordine_23753 LeftWall_32 194.7 acciaioarmonico_124 2.085E-05 87.5 20 0 0
 WIRE III-ordine_45144 LeftWall_32 192.2 acciaioarmonico_124 3.475E-05 87.5 20 0 0
 WIRE IV-ordine_46123 LeftWall_32 189.7 acciaioarmonico_124 3.9714E-05 87.5 20 0 0



 * 6.3: Strips

 * 7: Defining Steps
 STEP Stage1_31
 CHANGE unitàb_2_159_L_0 U-FRICT=30 LeftWall_32
 CHANGE unitàb_2_159_L_0 D-FRICT=30 LeftWall_32
 CHANGE unitàb_2_159_L_0 U-KA=0.333 LeftWall_32
 CHANGE unitàb_2_159_L_0 U-KP=4.288 LeftWall_32
 CHANGE unitàb_2_159_L_0 D-KA=0.333 LeftWall_32
 CHANGE unitàb_2_159_L_0 D-KP=4.288 LeftWall_32
 CHANGE unitàFAA_158_8_L_0 U-FRICT=28 LeftWall_32
```

```
CHANGE unitàFAA_158_8_L_0 D-FRICT=28 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KA=0.361 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KP=3.812 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KA=0.361 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KP=3.812 LeftWall_32
CHANGE unitàb_2_159_L_0 U-COHE=15 LeftWall_32
CHANGE unitàb_2_159_L_0 U-ADHES=0 LeftWall_32
CHANGE unitàb_2_159_L_0 D-COHE=15 LeftWall_32
CHANGE unitàb_2_159_L_0 D-ADHES=0 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-COHE=30 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-ADHES=0 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-COHE=30 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-ADHES=0 LeftWall_32
SETWALL LeftWall_32
GEOM 198 198
SURCHARGE 0 0 0 0
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage2_14403
SETWALL LeftWall_32
GEOM 198 198
SURCHARGE 0 0 0 0
WATER 188.3 0 180.5 0 0
ADD micropali_33 cordolo_sx_550
ENDSTEP

STEP Stage3_126774
SETWALL LeftWall_32
GEOM 198 198
SURCHARGE 20 198 0 198
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage4_14646
SETWALL LeftWall_32
GEOM 198 196.7
SURCHARGE 20 198 0 196.7
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage5_14889
SETWALL LeftWall_32
GEOM 198 196.7
SURCHARGE 20 198 0 196.7
WATER 188.3 0 180.5 0 0
ADD I-ordine_15132
ENDSTEP

STEP Stage6_18844
SETWALL LeftWall_32
GEOM 198 194.2
SURCHARGE 20 198 0 194.2
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage7_23510
SETWALL LeftWall_32
GEOM 198 194.2
SURCHARGE 20 198 0 194.2
WATER 188.3 0 180.5 0 0
ADD II-ordine_23753
ENDSTEP

STEP Stage8_37686
SETWALL LeftWall_32
GEOM 198 191.7
SURCHARGE 20 198 0 191.7
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage9_40353
SETWALL LeftWall_32
GEOM 198 191.7
SURCHARGE 20 198 0 191.7
WATER 188.3 0 180.5 0 0
ADD III-ordine_45144
ENDSTEP

STEP Stage10_45145
SETWALL LeftWall_32
GEOM 198 189.2
SURCHARGE 20 198 0 189.2
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage11_45873
SETWALL LeftWall_32
GEOM 198 189.2
SURCHARGE 20 198 0 189.2
WATER 188.3 0 180.5 0 0
ADD IV-ordine_46123
ENDSTEP

STEP Stage12_47080
```



```
SETWALL LeftWall_32
GEOM 198 188.3
SURCHARGE 20 198 0 188.3
WATER 188.3 0 180.5 0 0
ENDSTEP

STEP Stage13_47330
SETWALL LeftWall_32
GEOM 198 188.3
SURCHARGE 0 0 0 0
WATER 188.3 0 180.5 0 0
CHANGE unitàb_2_159_L_0 U-KAED=0.3894 LeftWall_32
CHANGE unitàb_2_159_L_0 U-KAEW=0.43601 LeftWall_32
CHANGE unitàb_2_159_L_0 U-KPED=4.2472 LeftWall_32
CHANGE unitàb_2_159_L_0 U-KPEW=4.0307 LeftWall_32
CHANGE unitàb_2_159_L_0 D-KAED=0.36549 LeftWall_32
CHANGE unitàb_2_159_L_0 D-KAEW=0.41371 LeftWall_32
CHANGE unitàb_2_159_L_0 D-KPED=3.9394 LeftWall_32
CHANGE unitàb_2_159_L_0 D-KPEW=3.7205 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KAED=0.41944 LeftWall_32
CHANGE unitàFAA_158_8_L_0 U-KAEW=0.46708 LeftWall_32
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CHANGE unitàFAA_158_8_L_0 U-KPEW=3.5771 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KAED=0.39442 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KAEW=0.44167 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KPED=3.4958 LeftWall_32
CHANGE unitàFAA_158_8_L_0 D-KPEW=3.3019 LeftWall_32
EQK 0.0713 0.03565 -0.03565 0 0.5 0 0.5 0 0
WOOD 21.875 21.875 188.3 198
* Include pressure contribution from wall: LeftWall_32
* Include wall contribution
DLOAD step LeftWall_32 188.3 0.14959 198 0.14959
ENDSTEP
```