

COMMITTENTE:



PROGETTAZIONE:



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PROGETTO DEFINITIVO

RADDOPPIO LINEA CODOGNO – CREMONA – MANTOVA
TRATTA PIADENA - MANTOVA

RI – OPERE DI SOSTEGNO SEDE FERROVIARIA E STRADALE
Relazione di calcolo muro di sostegno sede stradale-NV34

SCALA:

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Relazione di calcolo muro di sostegno sede stradale-NV34	COMMESSA NM25	LOTTO 03 D 26	CODIFICA CL	DOCUMENTO NV 34 05 001	REV. A	FOGLIO 2 di 135

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Relazione di calcolo muro di sostegno sede stradale-NV34

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1 PREMESSA

La presente relazione ha per oggetto il dimensionamento del muro di sostegno della sede stradale della nuova viabilità NV34, prevista nell'ambito della progettazione definitiva del Raddoppio Ferroviario Codogno-Cremona-Mantova, tratta Piadena Mantova.

L'opera è costituita da un muro a mensola in c.a. gettato in opera, di altezza massima 7,20m da estradosso fondazione. Il paramento ha spessore massimo in testa di 0,40m e prosegue con andamento verticale per i primi 60cm, in modo da consentire l'alloggiamento della canaletta; l'altezza restante prosegue con una pendenza 1:10 interna. La suola di fondazione ha spessore 1,20m e larghezza totale di 6,90m, con mensola di valle lunga 1,00m.

L'opera ricade in zona sismica e sono state pertanto considerate le azioni derivanti dall'analisi sismica, secondo quanto previsto dal D.M. 17/01/18.

Di seguito si riporta una sezione tipologica dell'intervento:

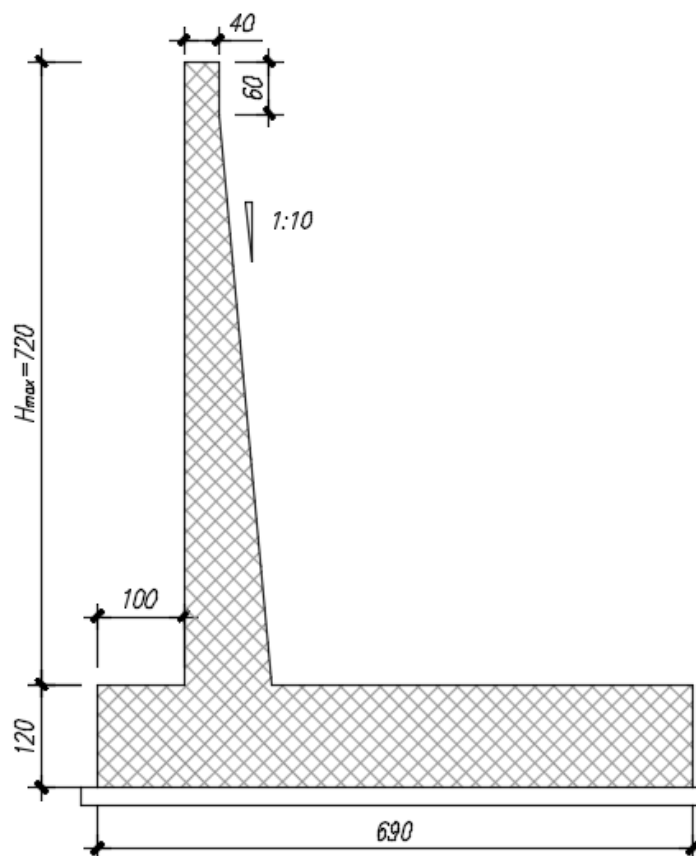


Figura 1 Sezione tipologica del muro

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2 NORMATIVE DI RIFERIMENTO

2.1 Normativa

Di seguito si riportano i riferimenti delle normative prese in considerazione per lo sviluppo delle analisi e delle verifiche in oggetto:

- LEGGE n. 1086 05.11.1971: “Norme per la disciplina delle opere in conglomerato cementizio armato, normale e precompresso ed a struttura metallica”.
- Decreto Ministeriale del 17 gennaio 2018: “Aggiornamento delle «Norme Tecniche per le Costruzioni»”, G.U. Serie Generale n.42 del 20.02.2008, Supplemento Ordinario n.8.
- Circolare 21 gennaio 2019 n.7 ” Istruzioni per l’applicazione dell’«Aggiornamento delle “Norme tecniche per le costruzioni”» di cui al decreto ministeriale 17 gennaio 2018”;
- RFI DTC SI MA IFS 001 C del 21.12.2018 - “Manuale di progettazione delle opere civili”.
- RFI DTC SI PS MA IFS 001 C del 21.12.2018 - “Manuale di progettazione delle opere civili – Sezione 3 – Corpo stradale”.
- RFI DTC SI CS MA IFS 001 C del 21.12.2018 - “Capitolato generale tecnico di appalto delle opere civili”.
- Regolamento (UE) N. 1299/2014 della Commissione del 18 novembre 2014 relativo alle specifiche tecniche di interoperabilità per il sottosistema «infrastruttura» del sistema ferroviario dell'Unione europea, modificato dal Regolamento di esecuzione (UE) N° 2019/776 della Commissione del 16 maggio 2019.UNI EN 1997-1: Eurocodice 7 – Progettazione geotecnica – Parte 1: Regole generali;
- UNI EN 1998-5: Eurocodice 8 – Progettazione delle strutture per la resistenza sismica – Parte 5: Fondazioni, strutture di contenimento ed aspetti geotecnici.

2.2 Elaborati progettuali di riferimento

Di seguito si riportano gli elaborati di progetto di riferimento:

Opere di sostegno sede stradale - NV34 - pianta e sezioni	N	M	2	5	0	3	D	2	6	B	Z	N	V	3	4	0	5	0	0	1	A
Relazione geotecnica generale	N	M	2	5	0	3	D	2	6	G	E	G	E	0	0	0	6	0	0	1	A

3 CARATTERISTICHE DEI MATERIALI

3.1 Calcestruzzo

3.1.1 Calcestruzzo per strutture in elevazione

Si prevede l'utilizzo di calcestruzzo avente classe di resistenza 32/40 ($R_{ck} \geq 40 \text{ N/mm}^2$) che presenta le seguenti caratteristiche:

Resistenza caratteristica a compressione (cilindrica)

$$f_{ck} = 0.83 \times R_{ck} = 33.20 \text{ N/mm}^2$$

Resistenza media a compressione

$$f_{cm} = f_{ck} + 8 = 41.20 \text{ N/mm}^2$$

Modulo elastico

$$E_{cm} = 22000 \times (f_{cm}/10)^{0.3} = 33643 \text{ N/mm}^2$$

Resistenza di calcolo a compressione

$$f_{cd} = a_{cc} \times f_{ck} / \gamma_c = 0.85 \times f_{ck} / 1.5 = 18.81 \text{ N/mm}^2$$

Resistenza a trazione media

$$f_{ctm} = 0.30 \times f_{ck}^{2/3} = 3.10 \text{ N/mm}^2$$

Resistenza a trazione

$$f_{ctk} = 0.7 \times f_{ctm} = 2.17 \text{ N/mm}^2$$

Resistenza a trazione di calcolo

$$f_{ctd} = f_{ctk} / \gamma_c = 1.45 \text{ N/mm}^2$$

3.1.2 Calcestruzzo per strutture in fondazione

Si prevede l'utilizzo di calcestruzzo avente classe di resistenza 30/37 ($R_{ck} \geq 37 \text{ N/mm}^2$) che presenta le seguenti caratteristiche:

Resistenza caratteristica a compressione (cilindrica)

$$f_{ck} = 0.83 \times R_{ck} = 30.71 \text{ N/mm}^2$$

Resistenza media a compressione

$$f_{cm} = f_{ck} + 8 = 38.71 \text{ N/mm}^2$$

Modulo elastico

$$E_{cm} = 22000 \times (f_{cm}/10)^{0.3} = 33019 \text{ N/mm}^2$$

Resistenza di calcolo a compressione

$$f_{cd} = a_{cc} \times f_{ck}/\gamma_c = 0.85 \times f_{ck}/1.5 = 17.40 \text{ N/mm}^2$$

Resistenza a trazione media

$$f_{ctm} = 0.30 \times f_{ck}^{2/3} = 2.94 \text{ N/mm}^2$$

Resistenza a trazione

$$f_{ctk} = 0.7 \times f_{ctm} = 2.06 \text{ N/mm}^2$$

Resistenza a trazione di calcolo

$$f_{ctd} = f_{ctk} / \gamma_c = 1.37 \text{ N/mm}^2$$

Calcestruzzo per magrone

Classe di resistenza = C12/15

3.2 Acciaio per cemento armato

Tipo	B450 (controllato in stabilimento)	
$f_{yk} =$	450 MPa	Tensione caratteristica di snervamento
$f_{yd} = f_{yk} / 1.15 =$	391.30 MPa	Resistenza di calcolo
$\sigma_s = 0.75 f_{yk} =$	337.50 MPa	Tensione limite in condizione di esercizio (comb. Rara)
$E_s =$	210000 MPa	Modulo elastico

3.3 Durabilità e prescrizioni sui materiali

Per garantire la durabilità delle strutture in calcestruzzo armato ordinario, esposte all'azione dell'ambiente, si devono adottare i provvedimenti atti a limitare gli effetti di degrado indotti dall'attacco chimico, fisico e derivante dalla corrosione delle armature e dai cicli di gelo e disgelo.

Per le opere della presente relazione, in base a quanto prescritto dal Capitolato di Costruzione RFI 2018, si adotta quanto segue:

Fondazione	Classe di esposizione	XC3
Elevazione	Classe di esposizione	XC4

3.4 Copriferro minimo e copriferro nominale

Al fine di preservare le armature dai fenomeni di aggressione ambientale, dovrà essere previsto un idoneo copriferro; definito come la distanza tra la superficie esterna dell'armatura, inclusi collegamenti e staffe, e la superficie di calcestruzzo più vicina.

In riferimento alla Tabella 2.5.2.2.3.2.-1 del Manuale di Progettazione delle Opere Civili Parte II - Sezione 2, per l'elemento strutturale in esame risulta un copriferro minimo $c_{min}=40mm$.

4 PARAMETRI SISMICI

La vita nominale (V_N) dell'opera è stata assunta pari a 50 anni. La classe d'uso assunta è la IV.

Vita nominale:	$V_N = 50$ anni
Classe d'uso	IV
Coefficiente d'uso	$C_u = 2.0$
Periodo di riferimento	$V_R = V_N \times C_u = 100$ anni
Categoria del suolo	D
Categoria topografica	T1
Stato Limite	SLV
Tempo di ritorno	949

Si assumono i parametri sismici corrispondenti al tratto A3, individuato dalla “Relazione geotecnica generale” dal km 82+000 al km 89+731 con il punto P4:

latitudine	= 45.159632;
longitudine	= 10.784886;
a_g	= 0.116 g;
F_0	= 2.565;
T^*c	= 0.306 s.
S	= 1.80
a_{max}	= 1,885 m/s ²

Facendo riferimento alle Norme Tecniche delle Costruzioni 2018, il coefficiente di riduzione dell'accelerazione massima attesa al sito (β_m) è pari a:

$\beta_m = 0.38$ nelle verifiche allo stato limite ultimo (SLU)

$\beta_m = 0.47$ nelle verifiche allo stato limite di esercizio (SLD).

per muri non liberi di subire spostamenti relativi rispetto al terreno, il coefficiente β_m assume valore unitario.

In accordo con il Manuale di Progettazione (SEZIONE III § 3.10.3.1), i coefficienti sismici orizzontale e verticale nel caso in esame risultano:

$$k_h = 2 \beta_m a_{max}/g = 0.76$$

$$k_v = \pm 0.5 k_h = 0.94$$

5 CARATTERIZZAZIONE GEOTECNICA

Le caratteristiche geotecniche del terreno in situ, in accordo con Relazione Geotecnica sono di seguito riportati:

UNITA'			WRs1	WRa1	Rs1	Rs2
Stratigrafia	DA	[m P.C.]	0.0	1.5	7.5	23.0
	A	[m P.C.]	1.5	7.5	23.0	35.0
Parametri di resistenza	γ_n	[kN/m ³]	19.0	19.0	19.0	19.0
	φ'	[°]	34.0	27.0	33.0	34.0
	c'	[kPa]	0	0	0	0
	c _u	[kPa]	-	70	-	-
Parametri di deformabilità	G ₀	[MPa]	30.0	50-70	80-110	130.0
	E _{op2}	[MPa]	15.0	25-35	40-55	65.0
	OCR	[-]	-	3.0	-	-
	CR	[-]	-	0.180	-	-
	RR	[-]	-	0.036	-	-
	C _{ac}	[%]	-	0.120	-	-
	k _v (*)	[m/s]	2.00E-07	5.00E-08	5.00E-07	1.00E-06

Tabella 1: Caratterizzazione geotecnica

I parametri geotecnici impiegati per il rilevato stradale sono:

$\gamma = 19.00 \text{ kN/m}^3$	peso di volume naturale
$\varphi' = 35^\circ$	angolo di resistenza al taglio
$c' = 0.00 \text{ kPa}$	coesione drenata

Si individua la presenza di falda a quota 7.0m da p.c.

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6 CRITERI DI CALCOLO

Sono state effettuate le verifiche con riferimento ai seguenti stati limite:

- scorrimento sul piano di posa;
- collasso per carico limite del complesso fondazione-terreno;
- ribaltamento;
- stabilità globale del complesso opera di sostegno-terreno;
- raggiungimento della resistenza negli elementi strutturali.

6.1 VERIFICHE GEOTECNICHE

6.1.1 Verifica a ribaltamento

La verifica a ribaltamento consiste nel determinare il momento risultante di tutte le forze che tendono a fare ribaltare il muro (momento ribaltante M_r) ed il momento risultante di tutte le forze che tendono a stabilizzare il muro (momento stabilizzante M_s) rispetto allo spigolo a valle della fondazione e verificare che il rapporto M_s/M_r sia maggiore di un determinato coefficiente di sicurezza η_r .

Deve quindi essere verificata la seguente disequaglianza

$$\frac{M_s}{M_r} \geq \eta_r$$

Il momento ribaltante M_r è dato dalla componente orizzontale della spinta S , dalle forze di inerzia del muro e del terreno gravante sulla fondazione di monte (caso di presenza di sisma) per i rispettivi bracci. Nel momento stabilizzante interviene il peso del muro (applicato nel baricentro) ed il peso del terreno gravante sulla fondazione di monte. Se sono presenti dei tiranti essi contribuiscono al momento stabilizzante. Questa verifica ha significato solo per fondazione superficiale e non per fondazione su pali.

6.1.2 Verifica a scorrimento

Per la verifica a scorrimento del muro lungo il piano di fondazione deve risultare che la somma di tutte le forze parallele al piano di posa che tendono a fare scorrere il muro deve essere minore di tutte le forze, parallele al piano di scorrimento, che si oppongono allo scivolamento, secondo un certo coefficiente di sicurezza. La verifica a scorrimento risulta soddisfatta se il rapporto fra la risultante delle forze resistenti allo scivolamento F_r e la risultante delle forze che tendono a fare scorrere il muro F_s risulta maggiore di un determinato coefficiente di sicurezza η_s

$$\frac{F_r}{F_s} \geq \eta_s$$

Le forze che intervengono nella F_s sono: la componente della spinta parallela al piano di fondazione e la componente delle forze d'inerzia parallela al piano di fondazione.

La forza resistente è data dalla resistenza d'attrito e dalla resistenza per adesione lungo la base della fondazione. Detta N la componente normale al piano di fondazione del carico totale gravante in fondazione e indicando con δ_f l'angolo d'attrito terreno-fondazione, con c_a l'adesione terreno-fondazione e con B_r la larghezza della fondazione reagente, la forza resistente può esprimersi come

$$F_r = N \operatorname{tg} \delta_f + c_a B_r$$

Per quanto riguarda l'angolo d'attrito terra-fondazione, δ_f , si assume un valore di δ_f pari all'angolo d'attrito del terreno di fondazione, trascurando il contributo della spinta passiva del terreno a valle.

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6.1.3 Verifica al carico limite

Il rapporto fra il carico limite in fondazione e la componente normale della risultante dei carichi trasmessi dal muro sul terreno di fondazione deve essere superiore a η_q . Cioè, detto Q_u , il carico limite ed R la risultante verticale dei carichi in fondazione, deve essere:

$$\frac{Q_u}{R} \geq \eta_q$$

dove R rappresenta la capacità portante ultima valutata con la teoria di Brinch-Hansen.

6.1.4 Verifica alla stabilità globale

La verifica alla stabilità globale del complesso muro+terreno deve fornire un coefficiente di sicurezza non inferiore a η_g . Viene usata la tecnica della suddivisione a strisce della superficie di scorrimento da analizzare. La superficie di scorrimento viene supposta circolare e determinata in modo tale da non avere intersezione con il profilo del muro o con i pali di fondazione. Si determina il minimo coefficiente di sicurezza su una maglia di centri di dimensioni 10x10 posta in prossimità della sommità del muro. Il numero di strisce è pari a 50. Si adotta per la verifica di stabilità globale il metodo di Bishop.

6.2 VERIFICHE STRUTTURALI

Le verifiche strutturali condotte sono le seguenti:

- Verifiche di stato limite di esercizio
 - Verifiche a fessurazione
 - Verifica delle tensioni
- Verifiche di stato limite di ultimo
 - Verifica a flessione
 - Verifica a taglio

6.2.1 Verifiche allo stato limite ultimo

6.2.1.1 Sollecitazioni flettenti

La verifica agli SLU è stata realizzata attraverso il calcolo dei domini di interazione N-M, ovvero il luogo dei punti rappresentativi di sollecitazioni che portano in crisi la sezione di verifica secondo i criteri di resistenza da normativa.

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Nel calcolo dei domini sono state mantenute le consuete ipotesi, tra cui:

- conservazione delle sezioni piane;
- legame costitutivo del calcestruzzo parabola-rettangolo non reagente a trazione, con plateau ad una deformazione pari a 0.002 e a rottura pari a 0.0035 ($\sigma_{\max} = 0.85 \times 0.83 \times R_{ck} / 1.5$);
- legame costitutivo dell'armatura d'acciaio elastico-perfettamente plastico con deformazione limite di rottura a 0.01 ($\sigma_{\max} = f_{yk} / 1.15$)

6.2.1.2 Sollecitazioni taglianti

La resistenza a taglio V_{Rd} di elementi sprovvisti di specifica armatura è stata calcolata sulla base della resistenza a trazione del calcestruzzo.

Con riferimento all'elemento fessurato da momento flettente, la resistenza al taglio si valuta con la seguente espressione:

$$V_{Rd} = \left\{ 0,18 \cdot k \cdot (100 \cdot \rho_1 \cdot f_{ck})^{1/3} / \gamma_c + 0,15 \cdot \sigma_{cp} \right\} \cdot b_w \cdot d \geq (v_{\min} + 0,15 \cdot \sigma_{cp}) \cdot b_w \cdot d$$

$$k = 1 + (200/d)^{1/2} \leq 2$$

$$v_{\min} = 0,035 k^{3/2} f_{ck}^{1/2}$$

dove:

d è l'altezza utile della sezione (in mm);

$\rho_1 = A_{sl} / (b_w \times d)$ è il rapporto geometrico di armatura longitudinale ($\leq 0,02$);

$\sigma_{cp} = N_{Ed} / A_c$ è la tensione media di compressione nella sezione ($\leq 0,2 f_{cd}$);

b_w è la larghezza minima della sezione (in mm).

La resistenza a taglio V_{Rd} di elementi strutturali dotati di specifica armatura a taglio deve essere valutata sulla base di una adeguata schematizzazione a traliccio. Gli elementi resistenti dell'ideale traliccio sono: le armature trasversali, le armature longitudinali, il corrente compresso di calcestruzzo e i puntoni d'anima inclinati. L'inclinazione θ dei puntoni di calcestruzzo rispetto all'asse della trave deve rispettare i limiti seguenti:

$$1 \leq \text{ctg} \theta \leq 2.5$$

La verifica di resistenza (SLU) è soddisfatta se è verificata la seguente relazione:

$$V_{Rd} \geq V_{Ed}$$

dove V_{Ed} è il valore di calcolo dello sforzo di taglio agente.

La resistenza di calcolo a "taglio trazione" dell'armatura trasversale è stata calcolata con la seguente relazione:

$$V_{Rsd} = 0,9 \cdot d \cdot \frac{A_{sw}}{s} \cdot f_{yd} \cdot (\text{ctg} \alpha + \text{ctg} \theta) \cdot \sin \alpha$$

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La resistenza di calcolo a “taglio compressione” del calcestruzzo d’anima è stata calcolata con la seguente relazione:

$$V_{Rcd} = 0,9 \cdot d \cdot b_w \cdot \alpha_c \cdot f'_{cd} \cdot (\operatorname{ctg} \alpha + \operatorname{ctg} \theta) / (1 + \operatorname{ctg}^2 \theta)$$

La resistenza al taglio della trave è la minore delle due relazioni sopra definite:

$$V_{Rd} = \min (V_{Rsd}, V_{Rcd})$$

In cui:

- d è l’altezza utile della sezione;
- b_w è la larghezza minima della sezione;
- σ_{cp} è la tensione media di compressione della sezione;
- A_{sw} è l’area dell’armatura trasversale;
- S è interasse tra due armature trasversali consecutive;
- α è l’angolo di inclinazione dell’armatura trasversale rispetto all’asse della trave;
- f'_{cd} è la resistenza a compressione ridotta del calcestruzzo d’anima ($f'_{cd}=0.5f_{cd}$);
- α è un coefficiente maggiorativo par ad 1 per membrature non compresse.

6.2.2 Verifiche allo stato limite di esercizio

Le condizioni ambientali, ai fini della protezione contro la corrosione delle armature, sono suddivise in ordinarie, aggressive e molto aggressive in relazione a quanto indicato dalla Tab. 4.1.III delle NTC2018:

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

Tabella 2 Descrizione delle condizioni ambientali (Tab. 4.1.III delle NTC18)

Nel caso in esame, le condizioni ambientali sono “*ordinarie*” per la fondazione e “*aggressive*” per il paramento.

6.2.2.1 Verifica a fessurazione

In relazione all’aggressività ambientale e alla sensibilità dell’acciaio, l’apertura limite delle fessure è pari a $w_l=0.2\text{mm}$ per la combinazione rara.

6.2.2.2 Verifica delle tensioni

I limiti tensionali considerati per i materiali sono relativi alla combinazione di carico quasi permanente e caratteristica.

Calcestruzzo:

Combinazione di azioni	Limite tensionale
Caratteristica (rara)	$\sigma_c \leq 0.55 f_{ck}$
Quasi permanente	$\sigma_c \leq 0.40 f_{ck}$

Acciaio:

Combinazione di azioni	Limite tensionale
Caratteristica (rara)	$\sigma_a \leq 0.75 f_{yk}$

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6.2.3 Verifiche in condizioni sismiche

È stato verificato che gli spostamenti permanenti allo SLD siano inferiori a 2cm, come prescritto nel Mdp Parte II – SEZIONE 3. Gli spostamenti sono stati determinati con la seguente relazione:

$$d = (S_s S_t B) e^{A(a_c/a_{max})}$$

dove:

S_s e S_t sono i coefficienti di amplificazione stratigrafica e topografica (§ 3.2.3.2 NTC2018);

a_{max} è l'accelerazione orizzontale massima attesa al sito (§ 7.11.6.2.1 NTC2018);

a_c è l'accelerazione critica e rappresenta il valore limite dell'accelerazione al di sotto del quale l'opera non subisce spostamenti;

A, B sono coefficienti raccolti nella seguente tabella in funzione di a_{max} e della categoria di sottosuolo (Rampello et al., 2008).

Sottosuolo	Cat. A		Cat. B		Cat. C, D, E	
a_{max}/g	A	B	A	B	A	B
0.3 – 0.4	-7.5	1.21	-7.9	1.06	-7.4	0.56
0.2 – 0.3	-7.42	1.28	-7.79	1.11	-7.54	0.58
0.1 – 0.2	-7.48	0.65	-7.86	0.73	-8.05	0.86
≤ 0.1	-7.87	0.28	-7.86	0.3	-8.07	0.44

Tabella 3: Coefficienti A e B da utilizzare per valutare gli spostamenti dei muri di sostegno nelle verifiche SLE

L'accelerazione critica a_c è stata determinata imponendo che, nella verifica allo scorrimento, effettuata prendendo a riferimento i valori caratteristici di azioni e resistenze (coefficienti γ_F e γ_M pari ad 1), il rapporto R_d/E_d sia pari a 1.

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7 ANALISI DEI CARICHI

Nel seguente paragrafo si descrivono le condizioni di carico elementari assunte per l'analisi delle sollecitazioni e per le verifiche della struttura in esame. Tali condizioni di carico elementari saranno opportunamente combinate secondo quanto previsto dalla normativa vigente.

7.1 CONDIZIONI DI CARICO ELEMENTARI

7.1.1 *Peso proprio del muro*

Il peso proprio del muro è stato considerato considerando un peso per unità di volume pari a $\gamma_{cls} = 25 \text{ kN/m}^3$.

7.1.2 *Peso del terrapieno*

Il peso proprio del terrapieno è stato considerato considerando un peso per unità di volume pari a $\gamma_t = 19 \text{ kN/m}^3$.

7.1.3 *Carichi permanenti non strutturali*

Si considera il peso proprio del pacchetto stradale posto a tergo dell'opera, attribuendo un peso per unità di volume pari a $\gamma_t = 18 \text{ kN/m}^3$ e uno spessore di 0.11m.

7.1.4 *Spinta da sovraccarico accidentale*

Il sovraccarico accidentale di superficie è assunto pari a 20 kPa, riproducente il traffico stradale attivo sull'eventuale carreggiata presente a tergo delle opere.

7.1.5 *Spinta del terreno in condizioni statiche*

La spinta del terreno agente sulla struttura è stata calcolata attraverso la teoria di Culmann che adotta le stesse ipotesi di base del metodo di Coulomb. La differenza sostanziale è che mentre Coulomb considera un terrapieno con superficie a pendenza costante e carico uniformemente distribuito (il che permette di ottenere una espressione in forma chiusa per il coefficiente di spinta) il metodo di Culmann consente di analizzare situazioni con profilo di forma generica e carichi sia concentrati che distribuiti comunque disposti. Inoltre, rispetto al metodo di Coulomb, risulta più immediato e lineare tener conto della coesione del masso spingente. Il metodo di Culmann, nato come metodo essenzialmente grafico, si è evoluto per essere trattato mediante analisi numerica (noto in questa forma come metodo del cuneo di tentativo). Come il metodo di Coulomb anche questo metodo considera una superficie di rottura rettilinea. I passi del procedimento risolutivo sono i seguenti:

- si impone una superficie di rottura e si considera il cuneo di spinta delimitato dalla superficie di rottura stessa, dalla parete su cui si calcola la spinta e dal profilo del terreno;

- si valutano tutte le forze agenti sul cuneo di spinta e cioè peso proprio (W), carichi sul terrapieno, resistenza per attrito e per coesione lungo la superficie di rottura (R e C) e resistenza per coesione lungo la parete (A);
- dalle equazioni di equilibrio si ricava il valore della spinta S sulla parete.

Questo processo viene iterato fino a trovare l'angolo di rottura per cui la spinta risulta massima.

La convergenza non si raggiunge se il terrapieno risulta inclinato di un angolo maggiore dell'angolo d'attrito del terreno.

Nei casi in cui è applicabile il metodo di Coulomb (profilo a monte rettilineo e carico uniformemente distribuito) i risultati ottenuti col metodo di Culmann coincidono con quelli del metodo di Coulomb, il cui coefficiente di spinta attiva è di seguito riportata:

$$K_a = \frac{\cos^2(\phi' - \alpha)}{\cos^2 \alpha \cdot \cos(\alpha + \delta) \cdot \left[1 + \sqrt{\frac{\sin(\phi' + \delta) \cdot \sin(\phi' - \beta)}{\cos(\alpha + \delta) \cdot \cos(\alpha - \beta)}} \right]^2}$$

dove:

- α è l'inclinazione del paramento interno del muro rispetto alla verticale;
- β è l'inclinazione del piano campagna rispetto all'orizzontale;
- ϕ è l'angolo d'attrito del terreno;
- δ è l'angolo d'attrito terreno-struttura (considerato $=0^\circ$)

Per le tipologie di muro con fondazione su pali si adotta un regime di spinte a riposo, dove il coefficiente di spinta k_0 vale.

$$k_0 = 1 - \sin \phi$$

7.1.6 Spinta della falda

Il pelo libero della falda è assunto al di sotto della quota di intradosso della fondazione.

7.1.7 Azioni sismiche

7.1.7.1 Forze inerziali

In condizioni sismiche le forze inerziali orizzontali e verticali sul paramento, soletta di fondazione ed il terreno di riempimento sono valutate attraverso le seguenti espressioni:

$$F_h = k_h W$$

$$F_v = k_v W$$

7.1.7.2 Spinta del terreno in condizioni sismiche

Se la struttura è libera di spostarsi, la sovra spinta sismica attiva agente sulle strutture è calcolata secondo l'approccio di Mononobe-Okabe. La spinta totale esercitata dal terrapieno sul muro è data da:

$$E_d = \frac{1}{2} \gamma (1 \pm k_v) K H^2$$

dove:

H altezza muro

k_v coefficiente sismico verticale

γ peso per unità di volume del terreno

K coefficienti di spinta attiva totale (statico + dinamico)

Il coefficiente di spinta attiva (k_a) è calcolato secondo la seguente relazione:

$$K_a = \frac{\sin^2(\psi + \varphi - \theta)}{\cos \theta \sin^2 \psi \sin(\psi - \theta - \delta) \left[1 + \sqrt{\frac{\sin(\varphi + \delta) \sin(\varphi - \varepsilon - \theta)}{\sin(\psi - \theta - \delta) \sin(\psi + \varepsilon)}} \right]^2}$$

dove:

ψ = angolo di inclinazione del paramento interno del muro rispetto all'orizzontale

δ = angolo di attrito terreno-muro, assunto pari a 0° in condizioni sismiche

φ = angolo di resistenza al taglio

ε = angolo di inclinazione, rispetto all'orizzontale, del terreno a monte del muro ($0-\varphi$)

$$\theta = \arctan \frac{k_h}{1 \pm k_v} \quad \text{per terreno sopra falda}$$

$$\theta = \arctan \frac{\gamma}{\gamma - \gamma_w} \frac{k_h}{1 \pm k_v} \quad \text{per terreno sotto falda}$$

dove:

k_h = coefficiente sismico orizzontale

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k_v = coefficiente sismico verticale

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

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

7.2 COMBINAZIONI DI CARICO

La verifica di stabilità globale del complesso opera di sostegno-terreno è stata effettuata secondo l'Approccio 1, con la Combinazione 2 (A2+M2+R2), tenendo conto dei coefficienti parziali riportati nelle Tabelle 6.2.I e 6.2.II per le azioni e i parametri geotecnici e nella Tab. 6.8.I delle NTC 2018 per le verifiche di sicurezza di opere di materiali sciolti e fronti di scavo. Le rimanenti verifiche sono state effettuate secondo l'Approccio 2, con la combinazione (A1+M1+R3), tenendo conto dei valori dei coefficienti parziali riportati nelle Tabelle 6.2.I, 6.2.II e 6.5.I.

Nelle verifiche in condizioni sismiche si è controllato che la resistenza del sistema sia maggiore delle azioni, ponendo pari all'unità i coefficienti parziali sulle azioni e sui parametri geotecnici e impiegando le resistenze di progetto con i coefficienti parziali γ_R indicati nella tabella 7.11.III delle NTC 2018.

Ai fini delle verifiche degli stati limite di esercizio si definiscono le seguenti combinazioni:

$$\begin{aligned}
 \text{Rara)} & \Rightarrow G1+G2 + Q_{k1} + \sum_i \psi_{0i} \cdot Q_{ki} \\
 \text{Frequente)} & \Rightarrow G1+G2 + \psi_{11} \cdot Q_{k1} + \sum_i \psi_{2i} \cdot Q_{ki} \\
 \text{Quasi permanente)} & \Rightarrow G1+G2 + \psi_{21} \cdot Q_{k1} + \sum_i \psi_{2i} \cdot Q_{ki}
 \end{aligned}$$

	Effetto	Coefficiente Parziale γ_F (o γ_E)	EQU	(A1)	(A2)
Carichi permanenti G_1	Favorevole	γ_{G1}	0,9	1,0	1,0
	Sfavorevole		1,1	1,3	1,0
Carichi permanenti $G_2^{(1)}$	Favorevole	γ_{G2}	0,8	0,8	0,8
	Sfavorevole		1,5	1,5	1,3
Azioni variabili Q	Favorevole	γ_{Q1}	0,0	0,0	0,0
	Sfavorevole		1,5	1,5	1,3

Tabella 4: Coefficienti parziali per le azioni o per l'effetto delle azioni (Tabella 6.2.I – NTC 2018)

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	γ_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

Tabella 5: Coefficienti parziali per i parametri geotecnici del terreno (Tabella 6.2.II – NTC 2018)

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	$\gamma_R = 1,4$

Tabella 6: Coefficienti parziali γ_R per le verifiche agli stati limite ultimi di muri di sostegno (Tabella 6.5.I – NTC 2018)

COEFFICIENTE	R2
γ_R	1,1

Tabella 7: Coefficienti parziali per le verifiche di sicurezza di opere di materiali sciolti e di fronti di scavo (Tabella 6.8.I – NTC 2018)

Verifica	Coefficiente parziale γ_R
Carico limite	1.2
Scorrimento	1.0
Ribaltamento	1.0
Resistenza del terreno a valle	1.2

Tabella 8: Coefficienti parziali γ_R per le verifiche degli stati limite (SLV) dei muri di sostegno. (Tabella 7.11.III – NTC 2018)

8 MODELLO DI CALCOLO

Il modello di calcolo è stato implementato tramite il software di calcolo specifico AZTEC MAX.

8.1 DATI

Materiali

Simbologia adottata

n° Indice materiale

Descr Descrizione del materiale

Calcestruzzo armato

C Classe di resistenza del cls

A Classe di resistenza dell'acciaio

γ Peso specifico, espresso in [kN/mc]

R_{ck} Resistenza caratteristica a compressione, espressa in [kPa]

E Modulo elastico, espresso in [kPa]

ν Coeff. di Poisson

n Coeff. di omogenizzazione acciaio/cls

ntc Coeff. di omogenizzazione cls teso/compresso

Calcestruzzo armato

n°	Descr	C	A	γ	R_{ck}	E	ν	n	ntc
				[kN/mc]	[kPa]	[kPa]			
1	C32/40	C32/40	B450C	24.5170	40000	33642648	0.30	15.00	0.50
5	C30/37	C30/37	B450C	24.5170	35000	32587986	0.30	15.00	0.50

Acciai

Descr	f_{yk}	f_{uk}
	[kPa]	[kPa]
B450C	450000	540000

Geometria profilo terreno a monte del muro

Simbologia adottata

(Sistema di riferimento con origine in testa al muro, ascissa X positiva verso monte, ordinata Y positiva verso l'alto)

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n° numero ordine del punto
X ascissa del punto espressa in [m]
Y ordinata del punto espressa in [m]
A inclinazione del tratto espressa in [°]

n°	X	Y	A
	[m]	[m]	[°]
1	0.00	0.00	0.000
2	32.00	0.00	0.000

Inclinazione terreno a valle del muro rispetto all'orizzontale 0.000 [°]

Falda

Simbologia adottata

(Sistema di riferimento con origine in testa al muro, ascissa X positiva verso monte, ordinata Y positiva verso l'alto)

n° numero ordine del punto
X ascissa del punto espressa in [m]
Y ordinata del punto espressa in [m]
A inclinazione del tratto espressa in [°]

n°	X	Y	A
	[m]	[m]	[°]
1	-5.00	-12.80	0.000
2	-1.08	-12.80	0.000
3	10.00	-12.80	0.000
4	15.00	-12.80	0.000

Geometria muro

Geometria paramento e fondazione

Lunghezza muro 1.00 [m]

Paramento

Relazione di calcolo muro di sostegno sede stradale-NV34

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Materiale

C32/40

Altezza paramento	7.20	[m]
Altezza paramento libero	7.20	[m]
Spessore in sommità	0.40	[m]
Spessore all'attacco con la fondazione	1.02	[m]
Inclinazione paramento esterno	0.00	[°]
Inclinazione paramento interno	4.90	[°]

Fondazione

Materiale

C30/37

Lunghezza mensola di valle	1.00	[m]
Lunghezza mensola di monte	4.87	[m]
Lunghezza totale	6.89	[m]
Inclinazione piano di posa	0.00	[°]
Spessore	1.20	[m]
Spessore magrone	0.20	[m]

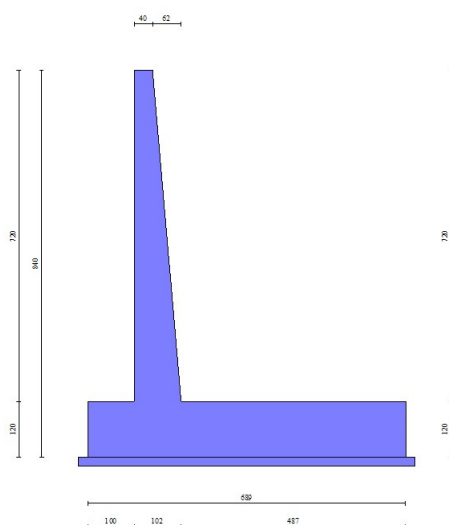


Fig. 1 - Sezione quotata del muro

Relazione di calcolo muro di sostegno sede stradale-NV34

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Descrizione terreni

Parametri di resistenza

Simbologia adottata

n°	Indice del terreno
Descr	Descrizione terreno
γ	Peso di volume del terreno espresso in [kN/mc]
γ_s	Peso di volume saturo del terreno espresso in [kN/mc]
ϕ	Angolo d'attrito interno espresso in [°]
δ	Angolo d'attrito terra-muro espresso in [°]
c	Coesione espressa in [kPa]
ca	Adesione terra-muro espressa in [kPa]

Per calcolo portanza con il metodo di Bustamante-Doix

Cesp	Coeff. di espansione laterale (solo per il metodo di Bustamante-Doix)
τ_l	Tensione tangenziale limite, espressa in [kPa]

n°	Descr	γ [kN/mc]	γ_{sat} [kN/mc]	ϕ [°]	δ [°]	c [kPa]	ca [kPa]	Cesp	τ_l [kPa]	
1	RILEVATO	19.0000	19.0000	35.000	0.000	0	0	---	---	
2	WRs1	19.0000	19.0000	34.000	34.000	0	0	---	---	
3	WRa1	19.0000	19.0000	27.000	27.000	0	0	---	---	
4	Rs1	19.0000	19.0000	33.000	33.000	0	0	---	---	
5	RS2	19.0000	19.0000	34.000	34.000	0	0	---	---	

Stratigrafia

Simbologia adottata

n°	Indice dello strato
H	Spessore dello strato espresso in [m]
α	Inclinazione espressa in [°]
Terreno	Terreno dello strato

Per calcolo pali (solo se presenti)

Kw	Costante di Winkler orizzontale espressa in Kg/cm ² /cm
Ks	Coefficiente di spinta
Cesp	Coefficiente di espansione laterale (per tutti i metodi tranne il metodo di Bustamante-Doix)

Per calcolo della spinta con coeff. di spinta definiti (usati solo se attiva l'opzione 'Usa coeff. di spinta da strato')

Kst _{sta} , Kst _{sis}	Coeff. di spinta statico e sismico
---	------------------------------------

n°	H	α	Terreno	Kw	Ks	Cesp	Kststa	Kstsis
	[m]	[°]		[Kg/cm ²]				
1	8.40	0.000	RILEVATO	---	---	---	---	---
2	0.80	0.000	WRs1	---	---	---	---	---
3	6.00	0.000	WRa1	---	---	---	---	---
4	15.50	0.000	Rs1	---	---	---	---	---
5	12.00	0.000	RS2	---	---	---	---	---

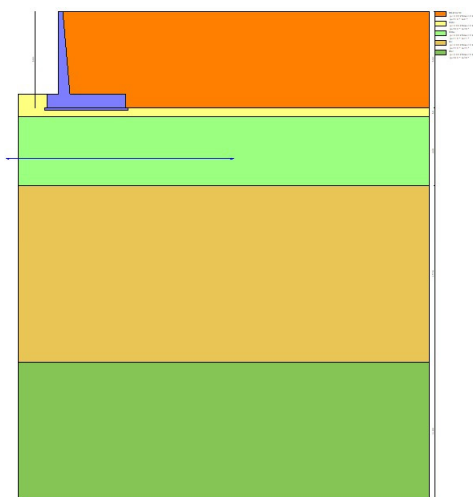


Fig. 2 - Stratigrafia

Condizioni di carico

Simbologia adottata

Carichi verticali positivi verso il basso.

Carichi orizzontali positivi verso sinistra.

Momento positivo senso antiorario.

X	Ascissa del punto di applicazione del carico concentrato espressa in [m]
F _x	Componente orizzontale del carico concentrato espressa in [kN]
F _y	Componente verticale del carico concentrato espressa in [kN]
M	Momento espresso in [kNm]
X _i	Ascissa del punto iniziale del carico ripartito espressa in [m]
X _r	Ascissa del punto finale del carico ripartito espressa in [m]
Q	Intensità del carico per x=X _i espressa in [kN]

Q_x Intensità del carico per $x=X_i$ espressa in [kN]

Condizione n° 1 (STRADA) - VARIABILE TF

Coeff. di combinazione $\Psi_0=1.00$ - $\Psi_1=1.00$ - $\Psi_2=1.00$

Carichi sul terreno

n°	Tipo	X	Fx	Fy	M	Xi	Xf	Qi	Qf
		[m]	[kN]	[kN]	[kNm]	[m]	[m]	[kN]	[kN]
1	Distribuito					4.70	9.70	20.0000	20.0000

Condizione n° 2 (PAVIMENTAZIONE STRADALE) - PERMANENTE NS

Carichi sul terreno

n°	Tipo	X	Fx	Fy	M	Xi	Xf	Qi	Qf
		[m]	[kN]	[kN]	[kNm]	[m]	[m]	[kN]	[kN]
1	Distribuito					0.50	13.90	2.0000	2.0000

Normativa

Normativa usata: **Norme Tecniche sulle Costruzioni 2018 (D.M. 17.01.2018) + Circolare C.S.LL.PP. 21/01/2019 n.7**

Coeff. parziali per le azioni o per l'effetto delle azioni

Carichi	Effetto		Combinazioni statiche					Combinazioni sismiche		
			HYD	UPL	EQU	A1	A2	EQU	A1	A2
Permanenti strutturali	Favorevoli	$\gamma_{G1,fav}$	1.00	0.90	1.00	1.00	1.00	1.00	1.00	1.00
Permanenti strutturali	Sfavorevoli	$\gamma_{G1,sfav}$	1.00	1.10	1.30	1.30	1.00	1.00	1.00	1.00
Permanenti non strutturali	Favorevoli	$\gamma_{G2,fav}$	0.00	0.80	0.80	0.80	0.80	0.00	0.00	0.00
Permanenti non strutturali	Sfavorevoli	$\gamma_{G2,sfav}$	1.00	1.50	1.50	1.50	1.30	1.00	1.00	1.00
Variabili	Favorevoli	$\gamma_{Q,fav}$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Variabili	Sfavorevoli	$\gamma_{Q,sfav}$	1.00	1.50	1.50	1.50	1.30	1.00	1.00	1.00
Variabili da traffico	Favorevoli	$\gamma_{QT,fav}$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Variabili da traffico	Sfavorevoli	$\gamma_{QT,sfav}$	1.00	1.50	1.35	1.35	1.15	1.00	1.00	1.00

Coeff. parziali per i parametri geotecnici del terreno

Parametro		Combinazioni statiche		Combinazioni sismiche	
		M1	M2	M1	M2
Tangente dell'angolo di attrito	$\gamma_{\tan(\psi)}$	1.00	1.25	1.00	1.00
Coesione efficace	γ_c	1.00	1.25	1.00	1.00
Resistenza non drenata	γ_{cu}	1.00	1.40	1.00	1.00
Peso nell'unità di volume	γ_γ	1.00	1.00	1.00	1.00

 ITALFERR GRUPPO FERROVIE DELLO STATO ITALIANE	RADDOPPIO LINEA COLOGNO – CREMONA – MANTOVA TRATTA PIADENA - MANTOVA					
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Coeff. parziali γ_R per le verifiche agli stati limite ultimi STR e GEO

Verifica	Combinazioni statiche			Combinazioni sismiche		
	R1	R2	R3	R1	R2	R3
Capacità portante	--	--	1.40	--	--	1.20
Scorrimento	--	--	1.10	--	--	1.00
Resistenza terreno a valle	--	--	1.40	--	--	1.20
Ribaltamento	--	--	1.15	--	--	1.00
Stabilità fronte di scavo	--	1.10	--	--	1.20	--

Descrizione combinazioni di carico

Con riferimento alle azioni elementari prima determinate, si sono considerate le seguenti combinazioni di carico:

- Combinazione fondamentale, impiegata per gli stati limite ultimi (SLU):

$$\gamma_{G1} G_1 + \gamma_{G2} G_2 + \gamma_{Q1} Q_{k1} + \gamma_{Q2} Q_{k2} + \gamma_{Q3} Q_{k3} + \dots$$

- Combinazione caratteristica, cosiddetta rara, impiegata per gli stati limite di esercizio (SLE) irreversibili:

$$G_1 + G_2 + Q_{k1} + \Psi_{0,2} Q_{k2} + \Psi_{0,3} Q_{k3} + \dots$$

- Combinazione frequente, impiegata per gli stati limite di esercizio (SLE) reversibili:

$$G_1 + G_2 + \Psi_{1,1} Q_{k1} + \Psi_{2,2} Q_{k2} + \Psi_{2,3} Q_{k3} + \dots$$

- Combinazione quasi permanente, impiegata per gli effetti di lungo periodo:

$$G_1 + G_2 + \Psi_{2,1} Q_{k1} + \Psi_{2,2} Q_{k2} + \Psi_{2,3} Q_{k3} + \dots$$

- Combinazione sismica, impiegata per gli stati limite ultimi connessi all'azione sismica E:

$$E + G_1 + G_2 + \Psi_{2,1} Q_{k1} + \Psi_{2,2} Q_{k2} + \Psi_{2,3} Q_{k3} + \dots$$

I valori dei coeff. $\Psi_{0,j}$, $\Psi_{1,j}$, $\Psi_{2,j}$ sono definiti nelle singole condizioni variabili. I valori dei coeff. γ_G e γ_Q , sono definiti nella tabella normativa.

In particolare si sono considerate le seguenti combinazioni:

Simbologia adottata

γ	Coefficiente di partecipazione della condizione
Ψ	Coefficiente di combinazione della condizione

Combinazione n° 1 - STR (A1-M1-R3)

Condizione	γ	Ψ	Effetto
Peso muro	1.00	--	Favorevole
Peso terrapieno	1.00	--	Favorevole
Spinta terreno	1.30	--	Sfavorevole
PAVIMENTAZIONE STRADALE	1.50	--	Sfavorevole
STRADA	1.35	1.00	Sfavorevole

Combinazione n° 2 - STR (A1-M1-R3) H + V

Condizione	γ	Ψ	Effetto
Peso muro	1.00	--	Favorevole
Peso terrapieno	1.00	--	Favorevole
Spinta terreno	1.00	--	Sfavorevole
STRADA	1.00	1.00	Sfavorevole
PAVIMENTAZIONE STRADALE	1.00	--	Sfavorevole

Combinazione n° 3 - STR (A1-M1-R3) H - V

Condizione	γ	Ψ	Effetto
Peso muro	1.00	--	Sfavorevole
Peso terrapieno	1.00	--	Sfavorevole
Spinta terreno	1.00	--	Sfavorevole
STRADA	1.00	1.00	Sfavorevole
PAVIMENTAZIONE STRADALE	1.00	--	Sfavorevole

Combinazione n° 4 - GEO (A2-M2-R2)

Condizione	γ	Ψ	Effetto
Peso muro	1.00	--	Sfavorevole
Peso terrapieno	1.00	--	Sfavorevole
Spinta terreno	1.00	--	Sfavorevole
PAVIMENTAZIONE STRADALE	1.30	--	Sfavorevole
STRADA	1.15	1.00	Sfavorevole

Combinazione n° 5 - GEO (A2-M2-R2) H + V

Condizione	γ	Ψ	Effetto
Peso muro	1.00	--	Sfavorevole

Condizione	γ	Ψ	Effetto
Peso terrapieno	1.00	--	Sfavorevole
Spinta terreno	1.00	--	Sfavorevole
STRADA	1.00	1.00	Sfavorevole
PAVIMENTAZIONE STRADALE	1.00	--	Sfavorevole

Combinazione n° 6 - GEO (A2-M2-R2) H - V

Condizione	γ	Ψ	Effetto
Peso muro	1.00	--	Sfavorevole
Peso terrapieno	1.00	--	Sfavorevole
Spinta terreno	1.00	--	Sfavorevole
STRADA	1.00	1.00	Sfavorevole
PAVIMENTAZIONE STRADALE	1.00	--	Sfavorevole

Combinazione n° 7 - EQU (A1-M1-R3)

Condizione	γ	Ψ	Effetto
Peso muro	1.00	--	Favorevole
Peso terrapieno	1.00	--	Favorevole
Spinta terreno	1.30	--	Sfavorevole
PAVIMENTAZIONE STRADALE	1.50	--	Sfavorevole
STRADA	1.35	1.00	Sfavorevole

Combinazione n° 8 - EQU (A1-M1-R3) H + V

Condizione	γ	Ψ	Effetto
Peso muro	1.00	--	Favorevole
Peso terrapieno	1.00	--	Favorevole
Spinta terreno	1.00	--	Sfavorevole
STRADA	1.00	1.00	Sfavorevole
PAVIMENTAZIONE STRADALE	1.00	--	Sfavorevole

Combinazione n° 9 - EQU (A1-M1-R3) H - V

Condizione	γ	Ψ	Effetto
Peso muro	1.00	--	Favorevole
Peso terrapieno	1.00	--	Favorevole
Spinta terreno	1.00	--	Sfavorevole
STRADA	1.00	1.00	Sfavorevole
PAVIMENTAZIONE STRADALE	1.00	--	Sfavorevole

Combinazione n° 10 - SLER

Condizione	γ	Ψ	Effetto
Peso muro	1.00	--	Sfavorevole
Peso terrapieno	1.00	--	Sfavorevole
Spinta terreno	1.00	--	Sfavorevole
PAVIMENTAZIONE STRADALE	1.00	--	Sfavorevole
STRADA	1.00	1.00	Sfavorevole

Combinazione n° 11 - SLEF

Condizione	γ	Ψ	Effetto
Peso muro	1.00	--	Sfavorevole
Peso terrapieno	1.00	--	Sfavorevole
Spinta terreno	1.00	--	Sfavorevole
PAVIMENTAZIONE STRADALE	1.00	--	Sfavorevole
STRADA	1.00	1.00	Sfavorevole

Combinazione n° 12 - SLEQ

Condizione	γ	Ψ	Effetto
Peso muro	1.00	--	Sfavorevole
Peso terrapieno	1.00	--	Sfavorevole
Spinta terreno	1.00	--	Sfavorevole
PAVIMENTAZIONE STRADALE	1.00	--	Sfavorevole
STRADA	1.00	1.00	Sfavorevole

Combinazione n° 13 - SLEQ H + V

Condizione	γ	Ψ	Effetto
Peso muro	1.00	--	Sfavorevole
Peso terrapieno	1.00	--	Sfavorevole
Spinta terreno	1.00	--	Sfavorevole
STRADA	1.00	1.00	Sfavorevole
PAVIMENTAZIONE STRADALE	1.00	--	Sfavorevole

Dati sismici

Comune	Mantova
Provincia	Mantova
Regione	Lombardia
Latitudine	45.159632
Longitudine	10.784886
Indice punti di interpolazione	13837 - 13615 - 13614 - 13836
Vita nominale	50 anni
Classe d'uso	IV
Tipo costruzione	Normali affollamenti
Vita di riferimento	100 anni

	Simbolo	U.M.		SLU	SLE
Accelerazione al suolo	a_g	[m/s ²]		1.156	0.509
Accelerazione al suolo	a_g/g	[%]		0.118	0.052
Massimo fattore amplificazione spettro orizzontale	F0			2.559	2.550
Periodo inizio tratto spettro a velocità costante	Tc*			0.304	0.282
Tipo di sottosuolo - Coefficiente stratigrafico	Ss		D	1.800	1.800
Categoria topografica - Coefficiente amplificazione topografica	St		T1	1.000	

Stato limite ...	Coeff. di riduzione β_m	kh	kv
Ultimo	0.760	16.122	8.061
Ultimo - Ribaltamento	1.000	21.213	10.607
Esercizio	0.940	8.774	4.387

Forma diagramma incremento sismico **Stessa forma del diagramma statico**

8.2 Verifiche geotecniche

Quadro riassuntivo coeff. di sicurezza calcolati

Simbologia adottata

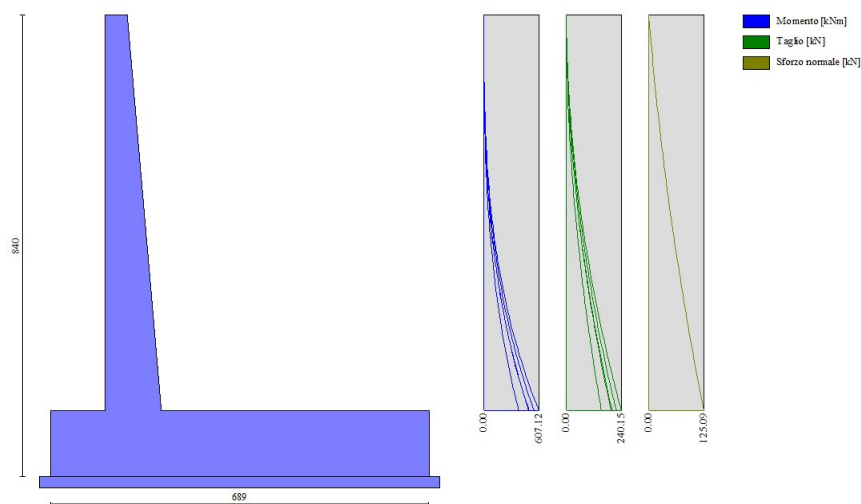
Cmb	Indice/Tipo combinazione
S	Sisma (H: componente orizzontale, V: componente verticale)
FS _{SCO}	Coeff. di sicurezza allo scorrimento
FS _{RIB}	Coeff. di sicurezza al ribaltamento
FS _{QLIM}	Coeff. di sicurezza a carico limite
FS _{STAB}	Coeff. di sicurezza a stabilità globale
FS _{HYD}	Coeff. di sicurezza a sifonamento
FS _{SUPL}	Coeff. di sicurezza a sollevamento

Cmb	Sismica	FS _{SCO}	FS _{RIB}	FS _{QLIM}	FS _{STAB}	FS _{HYD}	FS _{SUPL}
1 - STR (A1-M1-R3)		2.394		2.209			
2 - STR (A1-M1-R3)	H + V	1.594		1.204			
3 - STR (A1-M1-R3)	H - V	1.466		1.214			
4 - GEO (A2-M2-R2)					1.449		
5 - GEO (A2-M2-R2)	H + V				1.395		
6 - GEO (A2-M2-R2)	H - V				1.335		
7 - EQU (A1-M1-R3)			4.296				
8 - EQU (A1-M1-R3)	H + V		2.300				
9 - EQU (A1-M1-R3)	H - V		1.801				

8.3 Verifiche strutturali

8.3.1 Paramento

Nella figura seguente si riportano le sollecitazioni agenti sul paramento:



la sezione del paramento viene verificata a pressoflessione (SLU) tenendo conto di tali azioni:

M (kNm)	BxH (cm)	As	δ [cm]	A's	δ' [cm]	M _{resistente} / M _{agente}
607.12	100 x 102	10 ϕ 20	8.4	6 ϕ 20	8.4	>1

Verifica al taglio

T (kN)	BxH (cm)	As	T _{resistente} / T _{agente}
240.2	100 x 102	ϕ 12 / 20x40 cm	>1

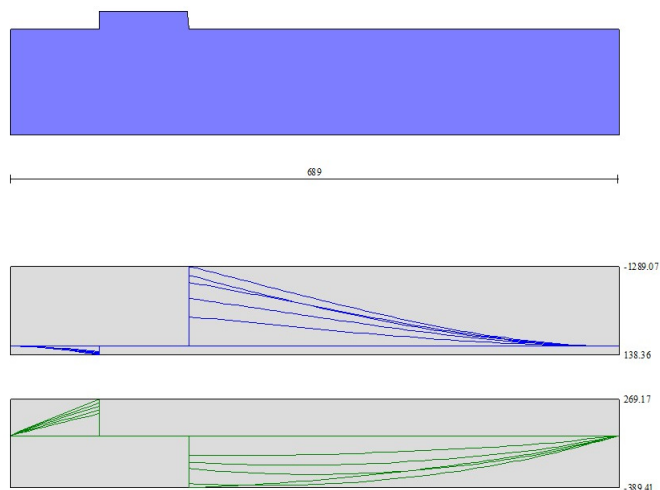
Verifica a SLE:

Verifica a fessurazione (SLE) rara, a favore di sicurezza si verifica le tensioni e le fessurazioni con la sola combinazione rara.

M (kNm)	BxH (cm)	As	δ [cm]	A's	δ' [cm]	σ_s [MPa]	σ_s lim [MPa]	σ_c [MPa]	σ_c lim [MPa]	w _k [mm]	w _{lim} [mm]
125.09	100 x 102	10 ϕ 20	8.4	6 ϕ 20	8.4	107.71	360	2.96	18.26	0.00	0.3

8.3.2 Fondazione

Nella seguente figura si riportano le sollecitazioni agenti sulla fondazione:



la sezione della fondazione viene verificata a pressoflessione (SLU) tenendo conto di tali azioni:

M (kNm)	BxH (cm)	As	δ [cm]	A's	δ' [cm]	$M_{resistente}/M_{agente}$
-1289	100 x 120	5 ϕ 26	8.7	5 ϕ 26	8.7	>1

Verifica al taglio

T (kN)	BxH (cm)	As	$T_{resistente}/T_{agente}$
389	100 x 120	ϕ 12 / 20x40 cm	>1

Verifica a SLE:

Verifica a fessurazione (SLE) rara, a favore di sicurezza si verifica le tensioni e le fessurazioni con la sola combinazione rara.

M (kNm)	BxH (cm)	As	δ [cm]	A's	δ' [cm]	σ_s [MPa]	σ_s lim [MPa]	σ_c [MPa]	σ_c lim [MPa]	wk [mm]	wlim [mm]
-481.65	100 x 120	5 ϕ 26	8.7	5 ϕ 26	8.7	165.7	360	2.86	18.26	0.00	0.3

9 ARMATURA E INCIDENZE

Elemento	Armatura		
	Lato terra	Lato scavo	Spilli
ELEVAZIONE	6Ø20	10Ø20	9Ø12/mq
	Lato superiore	Lato inferiore	Spilli
FONDAZIONE	5Ø26	5Ø26	9Ø12/mq

Elemento	Area [mc]	Lato	Armatura longitudinale	Armatura di ripartizione	Spilli	Sommano [kg]	Incidenza di progetto [kg/m³]
			Peso [kg]				
ELEVAZIONE	4.90	Terra	234.27	22.20	19.31	391.20	105
		Scavo	93.21	22.20			
FONDAZIONE	8.30	Sup	174.01	13.32	33.70	408.37	65
		Inf	174.01	13.32			

10 TABULATI DI CALCOLO

10.1 RISULTATI PER COMBINAZIONE

Spinta e forze

Simbologia adottata

Ic	Indice della combinazione
A	Tipo azione
I	Inclinazione della spinta, espressa in [°]
V	Valore dell'azione, espressa in [kN]
Cx, Cy	Componente in direzione X ed Y dell'azione, espressa in [kN]
Px, Py	Coordinata X ed Y del punto di applicazione dell'azione, espressa in [m]

Ic	A	V	I	Cx	Cy	Px	Py
		[kN]	[°]	[kN]	[kN]	[m]	[m]
1	Spinta statica	304.15	0.00	304.15	0.00	5.49	-5.28
	Peso/Inerzia muro			0.00	327.71/0.00	1.25	-6.40
	Peso/Inerzia terrapieno			0.00	744.65/0.00	2.90	-3.53
	Peso dell'acqua sulla fondazione di valle				0.00	0.00	0.00
	Resistenza passiva terreno antistante			-4.84			
2	Spinta statica	227.87	0.00	227.87	0.00	5.49	-5.31
	Incremento di spinta sismica		87.16	87.16	0.00	5.49	-5.60
	Peso/Inerzia muro			52.83	327.71/26.42	1.25	-6.40
	Peso/Inerzia terrapieno			117.07	726.18/58.54	2.90	-3.53
	Peso dell'acqua sulla fondazione di valle				0.00	0.00	0.00
	Resistenza passiva terreno antistante			-4.84			
3	Spinta statica	227.87	0.00	227.87	0.00	5.49	-5.31
	Incremento di spinta sismica		51.30	51.30	0.00	5.49	-5.60
	Peso/Inerzia muro			52.83	327.71/-26.42	1.25	-6.40
	Peso/Inerzia terrapieno			117.07	726.18/-58.54	2.90	-3.53
	Peso dell'acqua sulla fondazione di valle				0.00	0.00	0.00
	Resistenza passiva terreno antistante			-4.84			
10	Spinta statica	231.51	0.00	231.51	0.00	5.49	-5.29
	Peso/Inerzia muro			0.00	327.71/0.00	1.25	-6.40
	Peso/Inerzia terrapieno			0.00	734.16/0.00	2.90	-3.53
	Peso dell'acqua sulla fondazione di valle				0.00	0.00	0.00
	Resistenza passiva terreno antistante			-4.84			
11	Spinta statica	231.51	0.00	231.51	0.00	5.49	-5.29
	Peso/Inerzia muro			0.00	327.71/0.00	1.25	-6.40
	Peso/Inerzia terrapieno			0.00	734.16/0.00	2.90	-3.53
	Peso dell'acqua sulla fondazione di valle				0.00	0.00	0.00
	Resistenza passiva terreno antistante			-4.84			
12	Spinta statica	231.51	0.00	231.51	0.00	5.49	-5.29
	Peso/Inerzia muro			0.00	327.71/0.00	1.25	-6.40
	Peso/Inerzia terrapieno			0.00	734.16/0.00	2.90	-3.53
	Peso dell'acqua sulla fondazione di valle				0.00	0.00	0.00
	Resistenza passiva terreno antistante			-4.84			

Ic	A	V	I	Cx	Cy	Px	Py
		[kN]	[°]	[kN]	[kN]	[m]	[m]
13	Spinta statica	227.87	0.00	227.87	0.00	5.49	-5.31
	Incremento di spinta sismica		47.02	47.02	0.00	5.49	-5.60
	Peso/Inerzia muro			28.75	327.71/14.38	1.25	-6.40
	Peso/Inerzia terrapieno			63.71	726.18/31.86	2.90	-3.53
	Peso dell'acqua sulla fondazione di valle				0.00	0.00	0.00
	Resistenza passiva terreno antistante			-4.84			

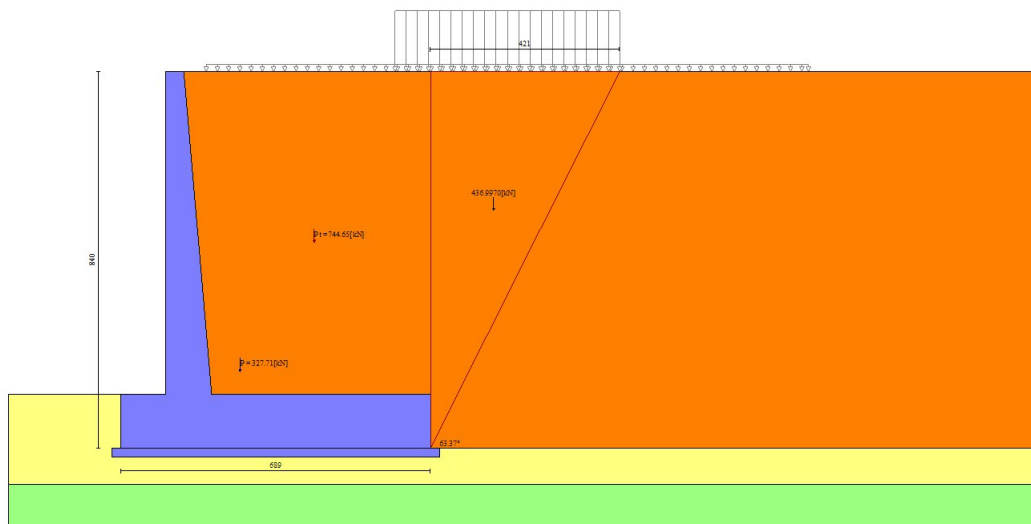


Fig. 3 - Cuneo di spinta (combinazione statica) (Combinazione n° 1)

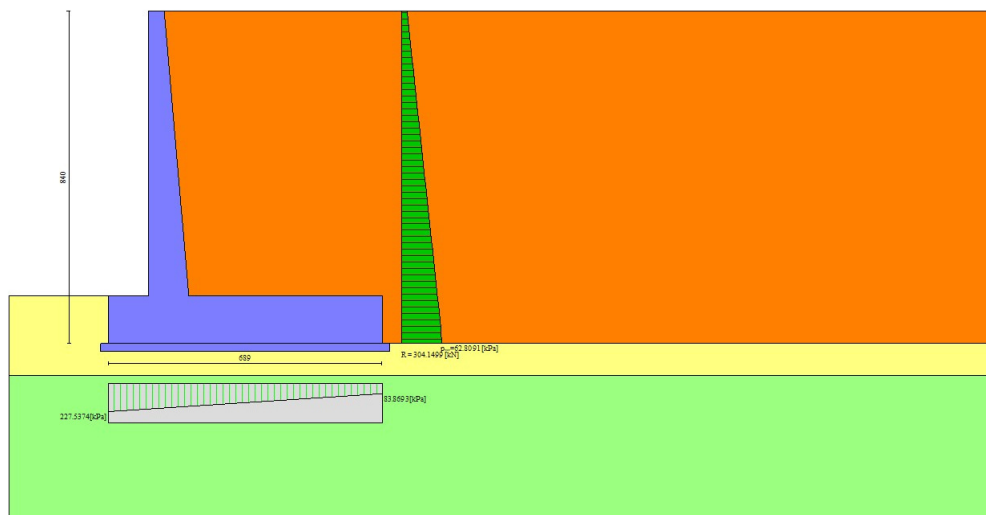


Fig. 4 - Diagramma delle pressioni (combinazione statica) (Combinazione n° 1)

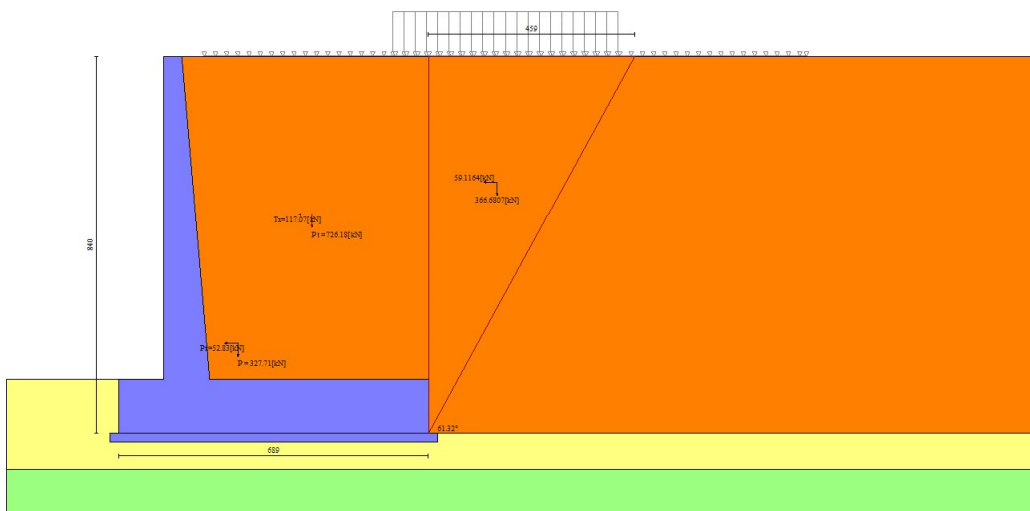


Fig. 5 - Cuneo di spinta (combinazione sismica) (Combinazione n° 2)

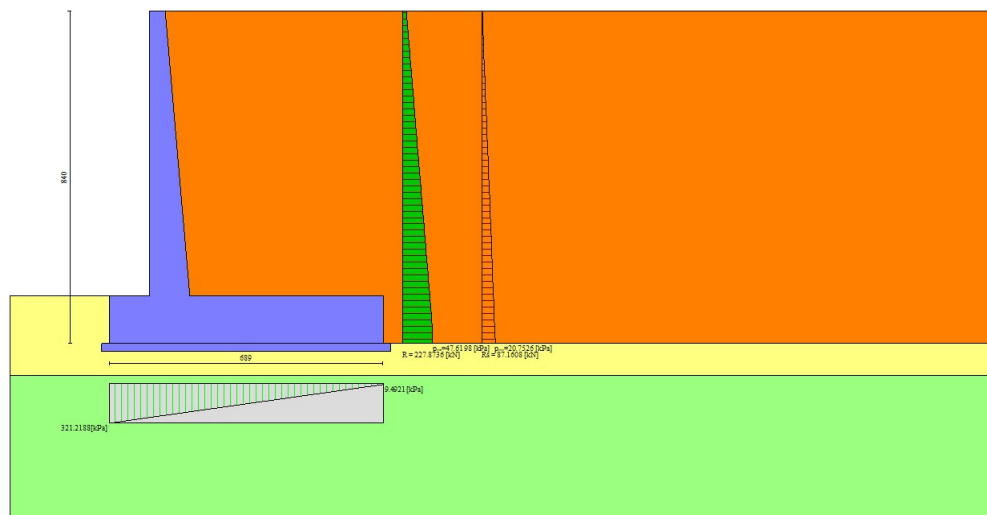


Fig. 6 - Diagramma delle pressioni (combinazione sismica) (Combinazione n° 2)

Risultanti globali

Simbologia adottata

Cmb	Indice/Tipo combinazione
N	Componente normale al piano di posa, espressa in [kN]
T	Componente parallela al piano di posa, espressa in [kN]
M _r	Momento ribaltante, espresso in [kNm]
M _s	Momento stabilizzante, espresso in [kNm]
ecc	Eccentricità risultante, espressa in [m]

Ic	N	T	M _r	M _s	ecc
	[kN]	[kN]	[kNm]	[kNm]	[m]
1 - STR (A1-M1-R3)	1072.37	304.15	948.01	4072.95	0.530
2 - STR (A1-M1-R3)	1138.85	484.94	1623.69	4313.24	1.082
3 - STR (A1-M1-R3)	968.94	449.08	1845.02	3991.49	1.228
4 - GEO (A2-M2-R2)	1067.23	300.69	953.42	4050.17	0.542
5 - GEO (A2-M2-R2)	1138.85	484.94	1623.69	4313.24	1.082
6 - GEO (A2-M2-R2)	968.94	449.08	1845.02	3991.49	1.228
7 - EQU (A1-M1-R3)	1072.37	304.15	948.01	4072.95	0.530
8 - EQU (A1-M1-R3)	1165.67	568.15	1919.90	4414.85	1.303
9 - EQU (A1-M1-R3)	942.11	522.72	2216.06	3991.49	1.559
10 - SLER	1061.87	231.51	718.94	4026.52	0.329
11 - SLEF	1061.87	231.51	718.94	4026.52	0.329
12 - SLEQ	1061.87	231.51	718.94	4026.52	0.329
13 - SLEQ	1100.13	367.36	1203.20	4166.59	0.750

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Verifiche geotecniche

Quadro riassuntivo coeff. di sicurezza calcolati

Simbologia adottata

Cmb	Indice/Tipo combinazione
S	Sisma (H: componente orizzontale, V: componente verticale)
FS _{SCO}	Coeff. di sicurezza allo scorrimento
FS _{RIB}	Coeff. di sicurezza al ribaltamento
FS _{QLIM}	Coeff. di sicurezza a carico limite
FS _{STAB}	Coeff. di sicurezza a stabilità globale
FS _{HYD}	Coeff. di sicurezza a sifonamento
FS _{SUPL}	Coeff. di sicurezza a sollevamento

Cmb	Sismica	FS _{SCO}	FS _{RIB}	FS _{QLIM}	FS _{STAB}	FS _{HYD}	FS _{SUPL}
1 - STR (A1-M1-R3)		2.394		2.209			
2 - STR (A1-M1-R3)	H + V	1.594		1.204			
3 - STR (A1-M1-R3)	H - V	1.466		1.214			
4 - GEO (A2-M2-R2)					1.449		
5 - GEO (A2-M2-R2)	H + V				1.395		
6 - GEO (A2-M2-R2)	H - V				1.335		
7 - EQU (A1-M1-R3)			4.296				
8 - EQU (A1-M1-R3)	H + V		2.300				
9 - EQU (A1-M1-R3)	H - V		1.801				

Verifica a scorrimento fondazione

Simbologia adottata

n°	Indice combinazione
R _{sa}	Resistenza allo scorrimento per attrito, espresso in [kN]
R _{pt}	Resistenza passiva terreno antistante, espresso in [kN]
R _{ps}	Resistenza passiva sperone, espresso in [kN]
R _p	Resistenza a carichi orizzontali pali (solo per fondazione mista), espresso in [kN]
R _t	Resistenza a carichi orizzontali tiranti (solo se presenti), espresso in [kN]
R	Resistenza allo scorrimento (somma di R _{sa} +R _{pt} +R _{ps} +R _p), espresso in [kN]
T	Carico parallelo al piano di posa, espresso in [kN]
FS	Fattore di sicurezza (rapporto R/T)

n°	R _{sa}	R _{pt}	R _{ps}	R _p	R _t	R	T	FS
	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	
1 - STR (A1-M1-R3)	723.32	4.84	0.00	--	--	728.16	304.15	2.394

	RADDOPPIO LINEA CODOGNO – CREMONA – MANTOVA TRATTA PIADENA - MANTOVA					
	Relazione di calcolo muro di sostegno sede stradale-NV34	COMMESSA NM25	LOTTO 03 D 26	CODIFICA CL	DOCUMENTO NV 34 05 001	REV. A

n°	Rsa [kN]	Rpt [kN]	Rps [kN]	Rp [kN]	Rt [kN]	R [kN]	T [kN]	FS
2 - STR (A1-M1-R3) H + V	768.16	4.84	0.00	--	--	773.00	484.94	1.594
3 - STR (A1-M1-R3) H - V	653.56	4.84	0.00	--	--	658.40	449.08	1.466

Verifica a carico limite

Simbologia adottata

n°	Indice combinazione
N	Carico normale totale al piano di posa, espresso in [kN]
Qu	carico limite del terreno, espresso in [kN]
Qd	Portanza di progetto, espresso in [kN]
FS	Fattore di sicurezza (rapporto tra il carico limie e carico agente al piano di posa)

n°	N [kN]	Qu [kN]	Qd [kN]	FS
1 - STR (A1-M1-R3)	1072.37	2368.34	1691.67	2.209
2 - STR (A1-M1-R3) H + V	1138.85	1371.35	1142.79	1.204
3 - STR (A1-M1-R3) H - V	968.94	1176.59	980.49	1.214

Dettagli calcolo portanza

Simbologia adottata

n°	Indice combinazione
Nc, Nq, Nγ	Fattori di capacità portante
ic, iq, iγ	Fattori di inclinazione del carico
dc, dq, dγ	Fattori di profondità del piano di posa
gc, gq, gγ	Fattori di inclinazione del profilo topografico
bc, bq, bγ	Fattori di inclinazione del piano di posa
sc, sq, sγ	Fattori di forma della fondazione
pc, pq, pγ	Fattori di riduzione per punzonamento secondo Vesic
Re	Fattore di riduzione capacità portante per eccentricità secondo Meyerhof
Ir, Irc	Indici di rigidezza per punzonamento secondo Vesic
rγ fattore	Fattori per tener conto dell'effetto piastra. Per fondazioni che hanno larghezza maggiore di 2 m, il terzo termine della formula trinomia 0.5BγN _y viene moltiplicato per questo
D	Affondamento del piano di posa, espresso in [m]
B'	Larghezza fondazione ridotta, espresso in [m]
H	Altezza del cuneo di rottura, espresso in [m]
γ	Peso di volume del terreno medio, espresso in [kN/mc]
φ	Angolo di attrito del terreno medio, espresso in [°]

	RADDOPPIO LINEA CODOGNO – CREMONA – MANTOVA TRATTA PIADENA - MANTOVA					
Relazione di calcolo muro di sostegno sede stradale-NV34	COMMESSA NM25	LOTTO 03 D 26	CODIFICA CL	DOCUMENTO NV 34 05 001	REV. A	FOGLIO 44 di 135

c Coesione del terreno medio, espresso in [kPa]

Per i coeff. che in tabella sono indicati con il simbolo '-'-' sono coeff. non presenti nel metodo scelto (Hansen).

n°	Nc Nq Ny	ic iq iy	dc dq dy	gc gq gy	bc bq by	sc sq sy	pc pq py	Ir	Irc	Re	ry
1	25.764	0.426	1.070	1.000	1.000	--	--	--	--	--	0.866
	14.688	0.465	1.052	1.000	1.000	--	--	--	--	--	
	10.908	0.331	1.000	1.000	1.000	--	--	--	--	--	
2	25.764	0.251	1.070	1.000	1.000	--	--	--	--	--	0.866
	14.688	0.302	1.052	1.000	1.000	--	--	--	--	--	
	10.908	0.170	1.000	1.000	1.000	--	--	--	--	--	
3	25.764	0.214	1.070	1.000	1.000	--	--	--	--	--	0.866
	14.688	0.268	1.052	1.000	1.000	--	--	--	--	--	
	10.908	0.141	1.000	1.000	1.000	--	--	--	--	--	

n°	D	B'	H	γ	φ	c
	[m]	[m]	[m]	[°]	[kN/mc]	[kPa]
1	1.20	6.89	5.73	16.73	27.98	0
2	1.20	6.89	5.73	16.73	27.98	0
3	1.20	6.89	5.73	16.73	27.98	0

Verifica a ribaltamento

Simbologia adottata

n°	Indice combinazione
Ms	Momento stabilizzante, espresso in [kNm]
Mr	Momento ribaltante, espresso in [kNm]
FS	Fattore di sicurezza (rapporto tra momento stabilizzante e momento ribaltante)

La verifica viene eseguita rispetto allo spigolo inferiore esterno della fondazione

n°	Ms	Mr	FS
	[kNm]	[kNm]	
7 - EQU (A1-M1-R3)	4072.95	948.01	4.296
8 - EQU (A1-M1-R3) H + V	4414.85	1919.90	2.300
9 - EQU (A1-M1-R3) H - V	3991.49	2216.06	1.801

Verifica stabilità globale muro + terreno

Simbologia adottata

Ic	Indice/Tipo combinazione
C	Centro superficie di scorrimento, espresso in [m]
R	Raggio, espresso in [m]
FS	Fattore di sicurezza

Ic	C	R	FS
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	RADDOPPIO LINEA CODOGNO – CREMONA – MANTOVA TRATTA PIADENA - MANTOVA					
	Relazione di calcolo muro di sostegno sede stradale-NV34	COMMESSA NM25	LOTTO 03 D 26	CODIFICA CL	DOCUMENTO NV 34 05 001	REV. A FOGLIO 45 di 135

	[m]	[m]	
4 - GEO (A2-M2-R2)	-1.50; 1.00	11.72	1.449
5 - GEO (A2-M2-R2) H + V	-2.00; 3.50	14.07	1.395
6 - GEO (A2-M2-R2) H - V	-2.00; 3.50	14.07	1.335

Dettagli strisce verifiche stabilità

Simbologia adottata

W	peso della striscia espresso in [kN]
Qy	carico sulla striscia espresso in [kN]
α	angolo fra la base della striscia e l'orizzontale espresso in [°] (positivo antiorario)
ϕ	angolo d'attrito del terreno lungo la base della striscia
c	coesione del terreno lungo la base della striscia espressa in [kPa]
b	larghezza della striscia espressa in [m]
u	pressione neutra lungo la base della striscia espressa in [kPa]
Tx; Ty	Resistenza al taglio fornita dai tiranti in direzione X ed Y espressa in [kPa]

Combinazione n° 4 - GEO (A2-M2-R2)

n°	W [kN]	Qy [kN]	b [m]	α [°]	ϕ [°]	c [kPa]	u [kPa]	Tx; Ty [kN]
1	25.54	9.29	10.19 - 0.80	76.507	29.256	0	0.0	
2	63.51	20.56	0.80	63.786	29.256	0	0.0	
3	84.99	20.56	0.80	55.841	29.256	0	0.0	
4	101.15	20.56	0.80	49.330	29.256	0	0.0	
5	114.12	20.56	0.80	43.606	29.256	0	0.0	
6	125.57	20.56	0.80	38.390	29.256	0	0.0	
7	139.04	17.53	0.80	33.530	28.352	0	0.0	
8	146.48	2.09	0.80	28.932	22.177	0	0.0	
9	152.67	2.09	0.80	24.531	22.177	0	0.0	
10	157.73	2.09	0.80	20.280	22.177	0	0.0	
11	161.76	2.09	0.80	16.144	22.177	0	0.0	
12	164.99	2.09	0.80	12.093	22.177	0	0.0	
13	189.11	0.14	0.80	8.102	22.177	0	0.0	
14	73.64	0.00	0.80	4.151	22.177	0	0.0	
15	55.94	0.00	0.80	0.220	22.177	0	0.0	
16	53.27	0.00	0.80	-3.710	22.177	0	0.0	
17	52.05	0.00	0.80	-7.658	22.177	0	0.0	
18	49.96	0.00	0.80	-11.643	22.177	0	0.0	
19	46.98	0.00	0.80	-15.686	22.177	0	0.0	
20	43.05	0.00	0.80	-19.812	22.177	0	0.0	
21	38.11	0.00	0.80	-24.048	22.177	0	0.0	
22	32.06	0.00	0.80	-28.430	22.177	0	0.0	
23	24.76	0.00	0.80	-33.003	28.352	0	0.0	
24	16.02	0.00	0.80	-37.830	28.352	0	0.0	
25	5.55	0.00	-9.89 - 0.80	-42.594	28.352	0	0.0	

Combinazione n° 5 - GEO (A2-M2-R2) H + V

n°	W [kN]	Qy [kN]	b [m]	α [°]	φ [°]	c [kPa]	u [kPa]	Tx; Ty [kN]
1	21.65	0.36	11.64 - 0.91	69.968	35.000	0	0.0	
2	57.49	0.36	0.91	60.935	35.000	0	0.0	
3	82.54	16.30	0.91	53.956	35.000	0	0.0	
4	102.16	18.59	0.91	48.024	35.000	0	0.0	
5	118.22	18.59	0.91	42.721	35.000	0	0.0	
6	131.64	18.59	0.91	37.843	35.000	0	0.0	
7	144.47	18.59	0.91	33.272	35.000	0	0.0	
8	158.53	11.51	0.91	28.930	34.000	0	0.0	
9	166.53	0.36	0.91	24.765	27.000	0	0.0	
10	173.16	0.36	0.91	20.736	27.000	0	0.0	
11	178.53	0.36	0.91	16.812	27.000	0	0.0	
12	182.73	0.36	0.91	12.968	27.000	0	0.0	
13	206.50	0.08	0.91	9.183	27.000	0	0.0	
14	82.88	0.00	0.91	5.438	27.000	0	0.0	
15	59.95	0.00	0.91	1.716	27.000	0	0.0	
16	58.08	0.00	0.91	-1.999	27.000	0	0.0	
17	57.01	0.00	0.91	-5.722	27.000	0	0.0	
18	54.90	0.00	0.91	-9.469	27.000	0	0.0	
19	51.73	0.00	0.91	-13.258	27.000	0	0.0	
20	47.44	0.00	0.91	-17.107	27.000	0	0.0	
21	41.97	0.00	0.91	-21.038	27.000	0	0.0	
22	35.24	0.00	0.91	-25.077	27.000	0	0.0	
23	27.13	0.00	0.91	-29.254	34.000	0	0.0	
24	17.46	0.00	0.91	-33.611	34.000	0	0.0	
25	6.01	0.00	-11.15 - 0.91	-37.741	34.000	0	0.0	

Combinazione n° 6 - GEO (A2-M2-R2) H - V

n°	W [kN]	Qy [kN]	b [m]	α [°]	φ [°]	c [kPa]	u [kPa]	Tx; Ty [kN]
1	21.65	0.36	11.64 - 0.91	69.968	35.000	0	0.0	
2	57.49	0.36	0.91	60.935	35.000	0	0.0	
3	82.54	16.30	0.91	53.956	35.000	0	0.0	
4	102.16	18.59	0.91	48.024	35.000	0	0.0	
5	118.22	18.59	0.91	42.721	35.000	0	0.0	
6	131.64	18.59	0.91	37.843	35.000	0	0.0	
7	144.47	18.59	0.91	33.272	35.000	0	0.0	
8	158.53	11.51	0.91	28.930	34.000	0	0.0	
9	166.53	0.36	0.91	24.765	27.000	0	0.0	
10	173.16	0.36	0.91	20.736	27.000	0	0.0	
11	178.53	0.36	0.91	16.812	27.000	0	0.0	
12	182.73	0.36	0.91	12.968	27.000	0	0.0	
13	206.50	0.08	0.91	9.183	27.000	0	0.0	
14	82.88	0.00	0.91	5.438	27.000	0	0.0	
15	59.95	0.00	0.91	1.716	27.000	0	0.0	
16	58.08	0.00	0.91	-1.999	27.000	0	0.0	
17	57.01	0.00	0.91	-5.722	27.000	0	0.0	
18	54.90	0.00	0.91	-9.469	27.000	0	0.0	
19	51.73	0.00	0.91	-13.258	27.000	0	0.0	
20	47.44	0.00	0.91	-17.107	27.000	0	0.0	
21	41.97	0.00	0.91	-21.038	27.000	0	0.0	
22	35.24	0.00	0.91	-25.077	27.000	0	0.0	
23	27.13	0.00	0.91	-29.254	34.000	0	0.0	
24	17.46	0.00	0.91	-33.611	34.000	0	0.0	
25	6.01	0.00	-11.15 - 0.91	-37.741	34.000	0	0.0	

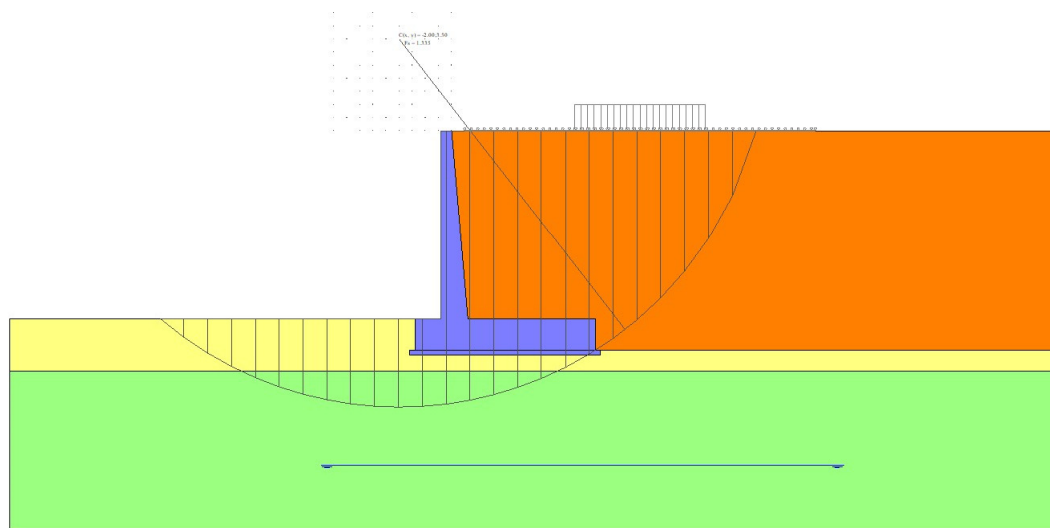


Fig. 7 - Stabilità fronte di scavo - Cerchio critico (Combinazione n° 6)

Spostamenti

Simbologia adottata

Cmb	Tipo combinazione
$a_{g,crit}$	accelerazione critica, espressa in $[m/s^2]$
Dmax	Spostamento orizzontale massimo, espressa in $[cm]$

Cmb	$a_{g,crit}$ $[m/s^2]$	Dmax $[cm]$
13 - SLEQ H + V	3.6948	0.0004

Sollecitazioni

Elementi calcolati a trave

Simbologia adottata

N	Sforzo normale, espresso in $[kN]$. Positivo se di compressione.
T	Taglio, espresso in $[kN]$. Positivo se diretto da monte verso valle
M	Momento, espresso in $[kNm]$. Positivo se tende le fibre contro terra (a monte)

Paramento

Combinazione n° 1 - STR (A1-M1-R3)

n°	X	N	T	M
	[m]	[kN]	[kN]	[kNm]
1	0.00	0.00	0.00	0.00
2	-0.10	0.99	0.04	0.00
3	-0.20	2.00	0.15	0.02
4	-0.30	3.04	0.34	0.05
5	-0.40	4.09	0.60	0.12
6	-0.50	5.17	0.94	0.21
7	-0.60	6.26	1.35	0.35
8	-0.70	7.38	1.84	0.54
9	-0.80	8.52	2.43	0.78
10	-0.90	9.68	3.11	1.10
11	-1.00	10.86	3.89	1.49
12	-1.10	12.06	4.76	1.97
13	-1.20	13.28	5.70	2.55
14	-1.30	14.52	6.72	3.23
15	-1.40	15.79	7.81	4.02
16	-1.50	17.07	8.98	4.93
17	-1.60	18.38	10.23	5.97
18	-1.70	19.71	11.55	7.14
19	-1.80	21.06	12.95	8.45
20	-1.90	22.43	14.42	9.91
21	-2.00	23.82	15.96	11.53
22	-2.10	25.23	17.58	13.31
23	-2.20	26.66	19.28	15.26
24	-2.30	28.12	21.05	17.40
25	-2.40	29.59	22.90	19.72
26	-2.50	31.09	24.82	22.23
27	-2.60	32.60	26.81	24.95
28	-2.70	34.14	28.89	27.88
29	-2.80	35.70	31.03	31.02
30	-2.90	37.28	33.25	34.39
31	-3.00	38.88	35.55	37.99
32	-3.10	40.50	37.92	41.84
33	-3.20	42.14	40.36	45.93
34	-3.30	43.81	42.88	50.27
35	-3.40	45.49	45.47	54.88
36	-3.50	47.20	48.14	59.76
37	-3.60	48.92	50.89	64.92
38	-3.70	50.67	53.70	70.36
39	-3.80	52.44	56.60	76.09
40	-3.90	54.23	59.57	82.13
41	-4.00	56.04	62.61	88.47
42	-4.10	57.87	65.73	95.13
43	-4.20	59.73	68.92	102.12
44	-4.30	61.60	72.18	109.43
45	-4.40	63.50	75.53	117.09
46	-4.50	65.41	78.94	125.08
47	-4.60	67.35	82.43	133.44
48	-4.70	69.31	86.00	142.15
49	-4.80	71.29	89.64	151.23
50	-4.90	73.29	93.36	160.69
51	-5.00	75.31	97.15	170.54
52	-5.10	77.35	101.01	180.77
53	-5.20	79.41	104.95	191.40
54	-5.30	81.50	108.96	202.44
55	-5.40	83.60	113.05	213.90
56	-5.50	85.73	117.22	225.77
57	-5.60	87.88	121.46	238.08
58	-5.70	90.04	125.77	250.82
59	-5.80	92.23	130.16	264.01

n°	X	N	T	M
	[m]	[kN]	[kN]	[kNm]
60	-5.90	94.44	134.62	277.65
61	-6.00	96.67	139.16	291.74
62	-6.10	98.93	143.77	306.31
63	-6.20	101.20	148.46	321.35
64	-6.30	103.49	153.22	336.87
65	-6.40	105.81	158.06	352.88
66	-6.50	108.15	162.97	369.39
67	-6.60	110.50	167.95	386.41
68	-6.70	112.88	173.01	403.93
69	-6.80	115.28	178.15	421.98
70	-6.90	117.70	183.36	440.55
71	-7.00	120.14	188.64	459.66
72	-7.10	122.61	194.00	479.31
73	-7.20	125.09	199.44	499.52

Combinazione n° 2 - STR (A1-M1-R3) H + V

n°	X	N	T	M
	[m]	[kN]	[kN]	[kNm]
1	0.00	0.00	0.00	0.00
2	-0.10	0.99	0.20	0.01
3	-0.20	2.00	0.49	0.05
4	-0.30	3.04	0.87	0.13
5	-0.40	4.09	1.34	0.26
6	-0.50	5.17	1.89	0.44
7	-0.60	6.26	2.53	0.68
8	-0.70	7.38	3.27	1.00
9	-0.80	8.52	4.09	1.40
10	-0.90	9.68	5.00	1.89
11	-1.00	10.86	6.00	2.49
12	-1.10	12.06	7.09	3.19
13	-1.20	13.28	8.27	4.01
14	-1.30	14.52	9.54	4.96
15	-1.40	15.79	10.90	6.05
16	-1.50	17.07	12.34	7.28
17	-1.60	18.38	13.88	8.66
18	-1.70	19.71	15.50	10.21
19	-1.80	21.06	17.21	11.94
20	-1.90	22.43	19.01	13.84
21	-2.00	23.82	20.89	15.93
22	-2.10	25.23	22.86	18.22
23	-2.20	26.66	24.93	20.72
24	-2.30	28.12	27.08	23.44
25	-2.40	29.59	29.31	26.38
26	-2.50	31.09	31.64	29.56
27	-2.60	32.60	34.05	32.98
28	-2.70	34.14	36.55	36.65
29	-2.80	35.70	39.14	40.59
30	-2.90	37.28	41.82	44.79
31	-3.00	38.88	44.58	49.27
32	-3.10	40.50	47.44	54.04
33	-3.20	42.14	50.38	59.11
34	-3.30	43.81	53.41	64.48
35	-3.40	45.49	56.52	70.17
36	-3.50	47.20	59.73	76.18
37	-3.60	48.92	63.02	82.52
38	-3.70	50.67	66.40	89.21
39	-3.80	52.44	69.87	96.24
40	-3.90	54.23	73.43	103.64
41	-4.00	56.04	77.07	111.40
42	-4.10	57.87	80.81	119.53
43	-4.20	59.73	84.63	128.06
44	-4.30	61.60	88.54	136.97

n°	X [m]	N [kN]	T [kN]	M [kNm]
45	-4.40	63.50	92.53	146.29
46	-4.50	65.41	96.62	156.03
47	-4.60	67.35	100.79	166.18
48	-4.70	69.31	105.05	176.77
49	-4.80	71.29	109.40	187.79
50	-4.90	73.29	113.84	199.26
51	-5.00	75.31	118.36	211.19
52	-5.10	77.35	122.97	223.58
53	-5.20	79.41	127.67	236.45
54	-5.30	81.50	132.46	249.80
55	-5.40	83.60	137.34	263.64
56	-5.50	85.73	142.30	277.99
57	-5.60	87.88	147.35	292.84
58	-5.70	90.04	152.50	308.21
59	-5.80	92.23	157.72	324.12
60	-5.90	94.44	163.04	340.55
61	-6.00	96.67	168.44	357.54
62	-6.10	98.93	173.94	375.07
63	-6.20	101.20	179.52	393.17
64	-6.30	103.49	185.18	411.85
65	-6.40	105.81	190.94	431.10
66	-6.50	108.15	196.78	450.95
67	-6.60	110.50	202.72	471.39
68	-6.70	112.88	208.74	492.44
69	-6.80	115.28	214.84	514.11
70	-6.90	117.70	221.04	536.40
71	-7.00	120.14	227.32	559.33
72	-7.10	122.61	233.70	582.90
73	-7.20	125.09	240.15	607.12

Combinazione n° 3 - STR (A1-M1-R3) H - V

n°	X [m]	N [kN]	T [kN]	M [kNm]
1	0.00	0.00	0.00	0.00
2	-0.10	0.99	0.20	0.01
3	-0.20	2.00	0.48	0.05
4	-0.30	3.04	0.83	0.13
5	-0.40	4.09	1.27	0.25
6	-0.50	5.17	1.79	0.42
7	-0.60	6.26	2.38	0.65
8	-0.70	7.38	3.06	0.95
9	-0.80	8.52	3.81	1.33
10	-0.90	9.68	4.65	1.79
11	-1.00	10.86	5.57	2.34
12	-1.10	12.06	6.57	3.00
13	-1.20	13.28	7.66	3.76
14	-1.30	14.52	8.82	4.65
15	-1.40	15.79	10.06	5.66
16	-1.50	17.07	11.38	6.80
17	-1.60	18.38	12.78	8.08
18	-1.70	19.71	14.26	9.51
19	-1.80	21.06	15.82	11.11
20	-1.90	22.43	17.46	12.86
21	-2.00	23.82	19.18	14.79
22	-2.10	25.23	20.98	16.91
23	-2.20	26.66	22.86	19.21
24	-2.30	28.12	24.82	21.71
25	-2.40	29.59	26.85	24.41
26	-2.50	31.09	28.97	27.33
27	-2.60	32.60	31.16	30.48
28	-2.70	34.14	33.44	33.85
29	-2.80	35.70	35.79	37.46

n°	X [m]	N [kN]	T [kN]	M [kNm]
30	-2.90	37.28	38.23	41.32
31	-3.00	38.88	40.74	45.43
32	-3.10	40.50	43.33	49.80
33	-3.20	42.14	46.00	54.44
34	-3.30	43.81	48.75	59.37
35	-3.40	45.49	51.59	64.57
36	-3.50	47.20	54.50	70.08
37	-3.60	48.92	57.49	75.88
38	-3.70	50.67	60.55	81.99
39	-3.80	52.44	63.70	88.43
40	-3.90	54.23	66.93	95.19
41	-4.00	56.04	70.24	102.28
42	-4.10	57.87	73.62	109.72
43	-4.20	59.73	77.09	117.50
44	-4.30	61.60	80.64	125.65
45	-4.40	63.50	84.26	134.16
46	-4.50	65.41	87.97	143.05
47	-4.60	67.35	91.75	152.32
48	-4.70	69.31	95.61	161.98
49	-4.80	71.29	99.56	172.04
50	-4.90	73.29	103.58	182.50
51	-5.00	75.31	107.68	193.39
52	-5.10	77.35	111.86	204.69
53	-5.20	79.41	116.12	216.42
54	-5.30	81.50	120.46	228.60
55	-5.40	83.60	124.88	241.22
56	-5.50	85.73	129.38	254.29
57	-5.60	87.88	133.96	267.83
58	-5.70	90.04	138.61	281.84
59	-5.80	92.23	143.35	296.33
60	-5.90	94.44	148.17	311.30
61	-6.00	96.67	153.06	326.77
62	-6.10	98.93	158.04	342.75
63	-6.20	101.20	163.09	359.23
64	-6.30	103.49	168.23	376.24
65	-6.40	105.81	173.44	393.77
66	-6.50	108.15	178.73	411.83
67	-6.60	110.50	184.10	430.44
68	-6.70	112.88	189.56	449.60
69	-6.80	115.28	195.09	469.32
70	-6.90	117.70	200.70	489.61
71	-7.00	120.14	206.39	510.48
72	-7.10	122.61	212.16	531.92
73	-7.20	125.09	218.01	553.96

Combinazione n° 10 - SLER

n°	X [m]	N [kN]	T [kN]	M [kNm]
1	0.00	0.00	0.00	0.00
2	-0.10	0.99	0.03	0.00
3	-0.20	2.00	0.12	0.02
4	-0.30	3.04	0.26	0.05
5	-0.40	4.09	0.46	0.10
6	-0.50	5.17	0.72	0.18
7	-0.60	6.26	1.04	0.29
8	-0.70	7.38	1.42	0.44
9	-0.80	8.52	1.87	0.64
10	-0.90	9.68	2.38	0.89
11	-1.00	10.86	2.98	1.20
12	-1.10	12.06	3.63	1.58
13	-1.20	13.28	4.35	2.03
14	-1.30	14.52	5.12	2.56

n°	X [m]	N [kN]	T [kN]	M [kNm]
15	-1.40	15.79	5.96	3.18
16	-1.50	17.07	6.85	3.89
17	-1.60	18.38	7.80	4.70
18	-1.70	19.71	8.81	5.61
19	-1.80	21.06	9.87	6.63
20	-1.90	22.43	10.99	7.77
21	-2.00	23.82	12.17	9.02
22	-2.10	25.23	13.41	10.41
23	-2.20	26.66	14.71	11.93
24	-2.30	28.12	16.06	13.58
25	-2.40	29.59	17.47	15.38
26	-2.50	31.09	18.94	17.33
27	-2.60	32.60	20.47	19.44
28	-2.70	34.14	22.05	21.71
29	-2.80	35.70	23.69	24.14
30	-2.90	37.28	25.39	26.75
31	-3.00	38.88	27.15	29.54
32	-3.10	40.50	28.96	32.52
33	-3.20	42.14	30.83	35.68
34	-3.30	43.81	32.76	39.05
35	-3.40	45.49	34.75	42.61
36	-3.50	47.20	36.79	46.39
37	-3.60	48.92	38.89	50.38
38	-3.70	50.67	41.05	54.59
39	-3.80	52.44	43.27	59.02
40	-3.90	54.23	45.54	63.69
41	-4.00	56.04	47.87	68.60
42	-4.10	57.87	50.26	73.75
43	-4.20	59.73	52.71	79.15
44	-4.30	61.60	55.21	84.80
45	-4.40	63.50	57.77	90.72
46	-4.50	65.41	60.39	96.90
47	-4.60	67.35	63.07	103.36
48	-4.70	69.31	65.80	110.10
49	-4.80	71.29	68.59	117.12
50	-4.90	73.29	71.44	124.43
51	-5.00	75.31	74.35	132.03
52	-5.10	77.35	77.31	139.94
53	-5.20	79.41	80.33	148.16
54	-5.30	81.50	83.41	156.69
55	-5.40	83.60	86.55	165.54
56	-5.50	85.73	89.74	174.72
57	-5.60	87.88	92.99	184.23
58	-5.70	90.04	96.30	194.07
59	-5.80	92.23	99.67	204.26
60	-5.90	94.44	103.09	214.80
61	-6.00	96.67	106.57	225.69
62	-6.10	98.93	110.11	236.94
63	-6.20	101.20	113.70	248.56
64	-6.30	103.49	117.36	260.55
65	-6.40	105.81	121.07	272.92
66	-6.50	108.15	124.84	285.68
67	-6.60	110.50	128.66	298.82
68	-6.70	112.88	132.55	312.36
69	-6.80	115.28	136.49	326.30
70	-6.90	117.70	140.49	340.65
71	-7.00	120.14	144.54	355.41
72	-7.10	122.61	148.66	370.59
73	-7.20	125.09	152.83	386.19

Combinazione n° 11 - SLEF

n°	X	N	T	M
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	[m]	[kN]	[kN]	[kNm]
1	0.00	0.00	0.00	0.00
2	-0.10	0.99	0.03	0.00
3	-0.20	2.00	0.12	0.02
4	-0.30	3.04	0.26	0.05
5	-0.40	4.09	0.46	0.10
6	-0.50	5.17	0.72	0.18
7	-0.60	6.26	1.04	0.29
8	-0.70	7.38	1.42	0.44
9	-0.80	8.52	1.87	0.64
10	-0.90	9.68	2.38	0.89
11	-1.00	10.86	2.98	1.20
12	-1.10	12.06	3.63	1.58
13	-1.20	13.28	4.35	2.03
14	-1.30	14.52	5.12	2.56
15	-1.40	15.79	5.96	3.18
16	-1.50	17.07	6.85	3.89
17	-1.60	18.38	7.80	4.70
18	-1.70	19.71	8.81	5.61
19	-1.80	21.06	9.87	6.63
20	-1.90	22.43	10.99	7.77
21	-2.00	23.82	12.17	9.02
22	-2.10	25.23	13.41	10.41
23	-2.20	26.66	14.71	11.93
24	-2.30	28.12	16.06	13.58
25	-2.40	29.59	17.47	15.38
26	-2.50	31.09	18.94	17.33
27	-2.60	32.60	20.47	19.44
28	-2.70	34.14	22.05	21.71
29	-2.80	35.70	23.69	24.14
30	-2.90	37.28	25.39	26.75
31	-3.00	38.88	27.15	29.54
32	-3.10	40.50	28.96	32.52
33	-3.20	42.14	30.83	35.68
34	-3.30	43.81	32.76	39.05
35	-3.40	45.49	34.75	42.61
36	-3.50	47.20	36.79	46.39
37	-3.60	48.92	38.89	50.38
38	-3.70	50.67	41.05	54.59
39	-3.80	52.44	43.27	59.02
40	-3.90	54.23	45.54	63.69
41	-4.00	56.04	47.87	68.60
42	-4.10	57.87	50.26	73.75
43	-4.20	59.73	52.71	79.15
44	-4.30	61.60	55.21	84.80
45	-4.40	63.50	57.77	90.72
46	-4.50	65.41	60.39	96.90
47	-4.60	67.35	63.07	103.36
48	-4.70	69.31	65.80	110.10
49	-4.80	71.29	68.59	117.12
50	-4.90	73.29	71.44	124.43
51	-5.00	75.31	74.35	132.03
52	-5.10	77.35	77.31	139.94
53	-5.20	79.41	80.33	148.16
54	-5.30	81.50	83.41	156.69
55	-5.40	83.60	86.55	165.54
56	-5.50	85.73	89.74	174.72
57	-5.60	87.88	92.99	184.23
58	-5.70	90.04	96.30	194.07
59	-5.80	92.23	99.67	204.26
60	-5.90	94.44	103.09	214.80
61	-6.00	96.67	106.57	225.69
62	-6.10	98.93	110.11	236.94
63	-6.20	101.20	113.70	248.56
64	-6.30	103.49	117.36	260.55
65	-6.40	105.81	121.07	272.92
66	-6.50	108.15	124.84	285.68
67	-6.60	110.50	128.66	298.82

n°	X	N	T	M
	[m]	[kN]	[kN]	[kNm]
68	-6.70	112.88	132.55	312.36
69	-6.80	115.28	136.49	326.30
70	-6.90	117.70	140.49	340.65
71	-7.00	120.14	144.54	355.41
72	-7.10	122.61	148.66	370.59
73	-7.20	125.09	152.83	386.19

Combinazione n° 12 - SLEQ

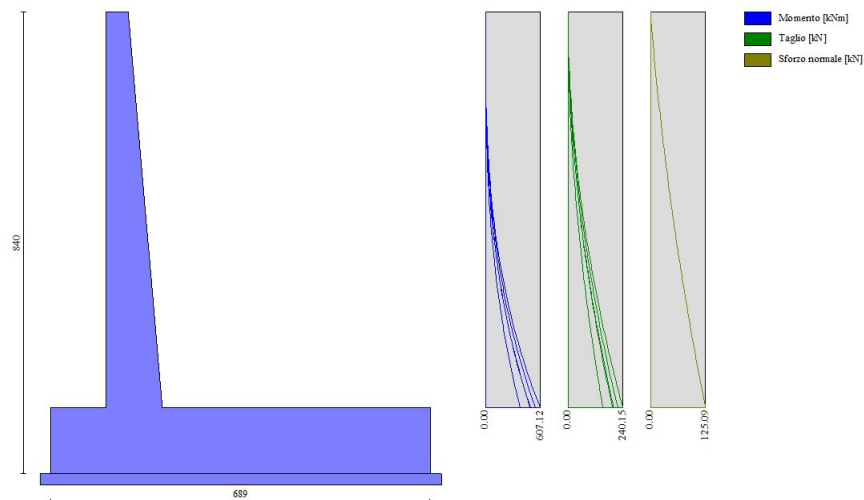
n°	X	N	T	M
	[m]	[kN]	[kN]	[kNm]
1	0.00	0.00	0.00	0.00
2	-0.10	0.99	0.03	0.00
3	-0.20	2.00	0.12	0.02
4	-0.30	3.04	0.26	0.05
5	-0.40	4.09	0.46	0.10
6	-0.50	5.17	0.72	0.18
7	-0.60	6.26	1.04	0.29
8	-0.70	7.38	1.42	0.44
9	-0.80	8.52	1.87	0.64
10	-0.90	9.68	2.38	0.89
11	-1.00	10.86	2.98	1.20
12	-1.10	12.06	3.63	1.58
13	-1.20	13.28	4.35	2.03
14	-1.30	14.52	5.12	2.56
15	-1.40	15.79	5.96	3.18
16	-1.50	17.07	6.85	3.89
17	-1.60	18.38	7.80	4.70
18	-1.70	19.71	8.81	5.61
19	-1.80	21.06	9.87	6.63
20	-1.90	22.43	10.99	7.77
21	-2.00	23.82	12.17	9.02
22	-2.10	25.23	13.41	10.41
23	-2.20	26.66	14.71	11.93
24	-2.30	28.12	16.06	13.58
25	-2.40	29.59	17.47	15.38
26	-2.50	31.09	18.94	17.33
27	-2.60	32.60	20.47	19.44
28	-2.70	34.14	22.05	21.71
29	-2.80	35.70	23.69	24.14
30	-2.90	37.28	25.39	26.75
31	-3.00	38.88	27.15	29.54
32	-3.10	40.50	28.96	32.52
33	-3.20	42.14	30.83	35.68
34	-3.30	43.81	32.76	39.05
35	-3.40	45.49	34.75	42.61
36	-3.50	47.20	36.79	46.39
37	-3.60	48.92	38.89	50.38
38	-3.70	50.67	41.05	54.59
39	-3.80	52.44	43.27	59.02
40	-3.90	54.23	45.54	63.69
41	-4.00	56.04	47.87	68.60
42	-4.10	57.87	50.26	73.75
43	-4.20	59.73	52.71	79.15
44	-4.30	61.60	55.21	84.80
45	-4.40	63.50	57.77	90.72
46	-4.50	65.41	60.39	96.90
47	-4.60	67.35	63.07	103.36
48	-4.70	69.31	65.80	110.10
49	-4.80	71.29	68.59	117.12
50	-4.90	73.29	71.44	124.43
51	-5.00	75.31	74.35	132.03
52	-5.10	77.35	77.31	139.94

n°	X [m]	N [kN]	T [kN]	M [kNm]
53	-5.20	79.41	80.33	148.16
54	-5.30	81.50	83.41	156.69
55	-5.40	83.60	86.55	165.54
56	-5.50	85.73	89.74	174.72
57	-5.60	87.88	92.99	184.23
58	-5.70	90.04	96.30	194.07
59	-5.80	92.23	99.67	204.26
60	-5.90	94.44	103.09	214.80
61	-6.00	96.67	106.57	225.69
62	-6.10	98.93	110.11	236.94
63	-6.20	101.20	113.70	248.56
64	-6.30	103.49	117.36	260.55
65	-6.40	105.81	121.07	272.92
66	-6.50	108.15	124.84	285.68
67	-6.60	110.50	128.66	298.82
68	-6.70	112.88	132.55	312.36
69	-6.80	115.28	136.49	326.30
70	-6.90	117.70	140.49	340.65
71	-7.00	120.14	144.54	355.41
72	-7.10	122.61	148.66	370.59
73	-7.20	125.09	152.83	386.19

Combinazione n° 13 - SLEQ H + V

n°	X [m]	N [kN]	T [kN]	M [kNm]
1	0.00	0.00	0.00	0.00
2	-0.10	0.99	0.12	0.01
3	-0.20	2.00	0.32	0.04
4	-0.30	3.04	0.59	0.09
5	-0.40	4.09	0.93	0.18
6	-0.50	5.17	1.34	0.31
7	-0.60	6.26	1.83	0.50
8	-0.70	7.38	2.39	0.74
9	-0.80	8.52	3.03	1.04
10	-0.90	9.68	3.74	1.42
11	-1.00	10.86	4.52	1.87
12	-1.10	12.06	5.38	2.42
13	-1.20	13.28	6.32	3.06
14	-1.30	14.52	7.32	3.80
15	-1.40	15.79	8.41	4.65
16	-1.50	17.07	9.56	5.62
17	-1.60	18.38	10.79	6.71
18	-1.70	19.71	12.09	7.93
19	-1.80	21.06	13.46	9.30
20	-1.90	22.43	14.91	10.81
21	-2.00	23.82	16.42	12.47
22	-2.10	25.23	18.01	14.30
23	-2.20	26.66	19.68	16.29
24	-2.30	28.12	21.42	18.47
25	-2.40	29.59	23.23	20.82
26	-2.50	31.09	25.11	23.37
27	-2.60	32.60	27.06	26.11
28	-2.70	34.14	29.09	29.06
29	-2.80	35.70	31.19	32.23
30	-2.90	37.28	33.37	35.61
31	-3.00	38.88	35.61	39.22
32	-3.10	40.50	37.93	43.07
33	-3.20	42.14	40.33	47.16
34	-3.30	43.81	42.79	51.50
35	-3.40	45.49	45.33	56.09
36	-3.50	47.20	47.94	60.95
37	-3.60	48.92	50.62	66.09

n°	X [m]	N [kN]	T [kN]	M [kNm]
38	-3.70	50.67	53.38	71.50
39	-3.80	52.44	56.21	77.20
40	-3.90	54.23	59.11	83.19
41	-4.00	56.04	62.09	89.49
42	-4.10	57.87	65.13	96.09
43	-4.20	59.73	68.25	103.02
44	-4.30	61.60	71.45	110.26
45	-4.40	63.50	74.71	117.84
46	-4.50	65.41	78.05	125.75
47	-4.60	67.35	81.47	134.01
48	-4.70	69.31	84.95	142.62
49	-4.80	71.29	88.51	151.60
50	-4.90	73.29	92.14	160.94
51	-5.00	75.31	95.84	170.66
52	-5.10	77.35	99.62	180.76
53	-5.20	79.41	103.47	191.24
54	-5.30	81.50	107.39	202.13
55	-5.40	83.60	111.38	213.42
56	-5.50	85.73	115.45	225.13
57	-5.60	87.88	119.59	237.25
58	-5.70	90.04	123.81	249.80
59	-5.80	92.23	128.09	262.79
60	-5.90	94.44	132.45	276.21
61	-6.00	96.67	136.88	290.09
62	-6.10	98.93	141.39	304.42
63	-6.20	101.20	145.96	319.22
64	-6.30	103.49	150.61	334.48
65	-6.40	105.81	155.34	350.23
66	-6.50	108.15	160.13	366.46
67	-6.60	110.50	165.00	383.19
68	-6.70	112.88	169.94	400.41
69	-6.80	115.28	174.96	418.15
70	-6.90	117.70	180.05	436.39
71	-7.00	120.14	185.21	455.17
72	-7.10	122.61	190.44	474.47
73	-7.20	125.09	195.74	494.31



 ITALFERR GRUPPO FERROVIE DELLO STATO ITALIANE	RADDOPPIO LINEA CODOGNO – CREMONA – MANTOVA TRATTA PIADENA - MANTOVA					
Relazione di calcolo muro di sostegno sede stradale-NV34	COMMESSA NM25	LOTTO 03 D 26	CODIFICA CL	DOCUMENTO NV 34 05 001	REV. A	FOGLIO 57 di 135

Fig. 8 - Paramento (Inviluppo)

Fondazione

Combinazione n° 1 - STR (A1-M1-R3)

n°	X	N	T	M
	[m]	[kN]	[kN]	[kNm]
1	-1.40	0.00	0.00	0.00
2	-1.30	0.00	19.71	0.99
3	-1.20	0.00	39.21	3.93
4	-1.10	0.00	58.50	8.82
5	-1.00	0.00	77.58	15.63
6	-0.90	0.00	96.45	24.33
7	-0.80	0.00	115.12	34.91
8	-0.70	0.00	133.57	47.35
9	-0.60	0.00	151.82	61.62
10	-0.50	0.00	169.86	77.70
11	-0.40	0.00	187.69	95.58
12	0.62	0.00	-389.41	-1149.00
13	0.72	0.00	-386.85	-1111.48
14	0.82	0.00	-384.07	-1074.23
15	0.92	0.00	-381.09	-1037.26
16	1.01	0.00	-377.90	-1000.59
17	1.11	0.00	-374.51	-964.26
18	1.21	0.00	-370.91	-928.27
19	1.31	0.00	-367.11	-892.65
20	1.41	0.00	-363.10	-857.42
21	1.51	0.00	-358.88	-822.59
22	1.61	0.00	-354.46	-788.20
23	1.71	0.00	-349.83	-754.25
24	1.81	0.00	-345.00	-720.78
25	1.91	0.00	-339.96	-687.80
26	2.01	0.00	-334.71	-655.32
27	2.11	0.00	-329.26	-623.38
28	2.21	0.00	-323.60	-592.00
29	2.31	0.00	-317.73	-561.18
30	2.41	0.00	-311.66	-530.96
31	2.51	0.00	-305.38	-501.35
32	2.61	0.00	-298.90	-472.37
33	2.70	0.00	-292.21	-444.05
34	2.80	0.00	-285.32	-416.41
35	2.90	0.00	-278.21	-389.46
36	3.00	0.00	-270.91	-363.23
37	3.10	0.00	-263.39	-337.73
38	3.20	0.00	-255.67	-312.99
39	3.30	0.00	-247.75	-289.03
40	3.40	0.00	-239.62	-265.86
41	3.50	0.00	-231.28	-243.52
42	3.60	0.00	-222.74	-222.01
43	3.70	0.00	-213.99	-201.36
44	3.80	0.00	-205.03	-181.59
45	3.90	0.00	-195.87	-162.73
46	4.00	0.00	-186.50	-144.78
47	4.10	0.00	-176.93	-127.77
48	4.20	0.00	-167.15	-111.73
49	4.29	0.00	-157.16	-96.67
50	4.39	0.00	-146.97	-82.61
51	4.49	0.00	-136.57	-69.57
52	4.59	0.00	-125.97	-57.58
53	4.69	0.00	-115.16	-46.65

n°	X	N	T	M
	[m]	[kN]	[kN]	[kNm]
54	4.79	0.00	-101.67	-35.95
55	4.89	0.00	-87.76	-26.54
56	4.99	0.00	-73.65	-18.51
57	5.09	0.00	-59.33	-11.90
58	5.19	0.00	-44.81	-6.73
59	5.29	0.00	-30.08	-3.00
60	5.39	0.00	-15.14	-0.75
61	5.49	0.00	0.00	0.00

Combinazione n° 2 - STR (A1-M1-R3) H + V

n°	X	N	T	M
	[m]	[kN]	[kN]	[kNm]
1	-1.40	0.00	0.00	0.00
2	-1.30	0.00	28.95	1.45
3	-1.20	0.00	57.45	5.78
4	-1.10	0.00	85.50	12.93
5	-1.00	0.00	113.10	22.86
6	-0.90	0.00	140.24	35.53
7	-0.80	0.00	166.93	50.89
8	-0.70	0.00	193.17	68.90
9	-0.60	0.00	218.96	89.51
10	-0.50	0.00	244.29	112.68
11	-0.40	0.00	269.17	138.36
12	0.62	0.00	-244.23	-1030.35
13	0.72	0.00	-250.30	-1006.55
14	0.82	0.00	-255.92	-982.17
15	0.92	0.00	-261.09	-957.26
16	1.01	0.00	-265.82	-931.85
17	1.11	0.00	-270.10	-906.00
18	1.21	0.00	-273.93	-879.75
19	1.31	0.00	-277.31	-853.13
20	1.41	0.00	-280.25	-826.20
21	1.51	0.00	-282.74	-799.00
22	1.61	0.00	-284.78	-771.58
23	1.71	0.00	-286.38	-743.98
24	1.81	0.00	-287.53	-716.24
25	1.91	0.00	-288.23	-688.40
26	2.01	0.00	-288.49	-660.52
27	2.11	0.00	-288.29	-632.64
28	2.21	0.00	-287.65	-604.80
29	2.31	0.00	-286.57	-577.04
30	2.41	0.00	-285.03	-549.41
31	2.51	0.00	-283.05	-521.96
32	2.61	0.00	-280.63	-494.73
33	2.70	0.00	-277.75	-467.76
34	2.80	0.00	-274.43	-441.10
35	2.90	0.00	-270.66	-414.79
36	3.00	0.00	-266.45	-388.88
37	3.10	0.00	-261.78	-363.41
38	3.20	0.00	-256.67	-338.42
39	3.30	0.00	-251.12	-313.96
40	3.40	0.00	-245.11	-290.08
41	3.50	0.00	-238.66	-266.82
42	3.60	0.00	-231.76	-244.22
43	3.70	0.00	-224.42	-222.33
44	3.80	0.00	-216.62	-201.20
45	3.90	0.00	-208.38	-180.85
46	4.00	0.00	-199.70	-161.35
47	4.10	0.00	-190.56	-142.74
48	4.20	0.00	-180.98	-125.05
49	4.29	0.00	-170.95	-108.34
50	4.39	0.00	-160.48	-92.65

n°	X [m]	N [kN]	T [kN]	M [kNm]
51	4.49	0.00	-149.56	-78.02
52	4.59	0.00	-138.19	-64.50
53	4.69	0.00	-126.37	-52.13
54	4.79	0.00	-112.28	-40.33
55	4.89	0.00	-97.58	-29.89
56	4.99	0.00	-82.43	-20.95
57	5.09	0.00	-66.84	-13.52
58	5.19	0.00	-50.80	-7.67
59	5.29	0.00	-34.31	-3.44
60	5.39	0.00	-17.38	-0.87
61	5.49	0.00	0.00	0.00

Combinazione n° 3 - STR (A1-M1-R3) H - V

n°	X [m]	N [kN]	T [kN]	M [kNm]
1	-1.40	0.00	0.00	0.00
2	-1.30	0.00	26.00	1.30
3	-1.20	0.00	51.56	5.18
4	-1.10	0.00	76.68	11.60
5	-1.00	0.00	101.36	20.51
6	-0.90	0.00	125.60	31.86
7	-0.80	0.00	149.41	45.61
8	-0.70	0.00	172.77	61.72
9	-0.60	0.00	195.70	80.15
10	-0.50	0.00	218.19	100.85
11	-0.40	0.00	240.23	123.77
12	0.62	0.00	-357.19	-1289.07
13	0.72	0.00	-360.60	-1254.18
14	0.82	0.00	-363.57	-1218.97
15	0.92	0.00	-366.12	-1183.49
16	1.01	0.00	-368.22	-1147.77
17	1.11	0.00	-369.90	-1111.87
18	1.21	0.00	-371.14	-1075.83
19	1.31	0.00	-371.94	-1039.68
20	1.41	0.00	-372.32	-1003.47
21	1.51	0.00	-372.26	-967.25
22	1.61	0.00	-371.76	-931.06
23	1.71	0.00	-370.84	-894.93
24	1.81	0.00	-369.48	-858.92
25	1.91	0.00	-367.68	-823.07
26	2.01	0.00	-365.46	-787.41
27	2.11	0.00	-362.80	-752.00
28	2.21	0.00	-359.70	-716.88
29	2.31	0.00	-356.17	-682.08
30	2.41	0.00	-352.21	-647.66
31	2.51	0.00	-347.82	-613.65
32	2.61	0.00	-342.99	-580.10
33	2.70	0.00	-337.73	-547.05
34	2.80	0.00	-332.04	-514.55
35	2.90	0.00	-325.91	-482.63
36	3.00	0.00	-319.35	-451.34
37	3.10	0.00	-312.35	-420.73
38	3.20	0.00	-304.93	-390.83
39	3.30	0.00	-297.07	-361.70
40	3.40	0.00	-288.77	-333.36
41	3.50	0.00	-280.04	-305.88
42	3.60	0.00	-270.88	-279.28
43	3.70	0.00	-261.29	-253.61
44	3.80	0.00	-251.26	-228.92
45	3.90	0.00	-240.80	-205.25
46	4.00	0.00	-229.90	-182.63
47	4.10	0.00	-218.57	-161.13

n°	X	N	T	M
	[m]	[kN]	[kN]	[kNm]
48	4.20	0.00	-206.81	-140.77
49	4.29	0.00	-194.62	-121.60
50	4.39	0.00	-181.99	-103.66
51	4.49	0.00	-168.92	-87.00
52	4.59	0.00	-155.43	-71.66
53	4.69	0.00	-141.50	-57.69
54	4.79	0.00	-125.31	-44.48
55	4.89	0.00	-108.52	-32.85
56	4.99	0.00	-91.31	-22.92
57	5.09	0.00	-73.66	-14.72
58	5.19	0.00	-55.57	-8.29
59	5.29	0.00	-37.10	-3.69
60	5.39	0.00	-18.55	-0.92
61	5.49	0.00	0.00	0.00

Combinazione n° 10 - SLER

n°	X	N	T	M
	[m]	[kN]	[kN]	[kNm]
1	-1.40	0.00	0.00	0.00
2	-1.30	0.00	16.83	0.84
3	-1.20	0.00	33.53	3.36
4	-1.10	0.00	50.10	7.54
5	-1.00	0.00	66.54	13.38
6	-0.90	0.00	82.86	20.85
7	-0.80	0.00	99.04	29.94
8	-0.70	0.00	115.10	40.65
9	-0.60	0.00	131.03	52.96
10	-0.50	0.00	146.83	66.85
11	-0.40	0.00	162.51	82.32
12	0.62	0.00	-147.12	-481.65
13	0.72	0.00	-147.47	-467.80
14	0.82	0.00	-147.71	-453.91
15	0.92	0.00	-147.81	-440.01
16	1.01	0.00	-147.79	-426.10
17	1.11	0.00	-147.64	-412.20
18	1.21	0.00	-147.37	-398.32
19	1.31	0.00	-146.97	-384.47
20	1.41	0.00	-146.44	-370.67
21	1.51	0.00	-145.79	-356.93
22	1.61	0.00	-145.01	-343.26
23	1.71	0.00	-144.10	-329.68
24	1.81	0.00	-143.06	-316.19
25	1.91	0.00	-141.90	-302.81
26	2.01	0.00	-140.62	-289.55
27	2.11	0.00	-139.20	-276.43
28	2.21	0.00	-137.66	-263.45
29	2.31	0.00	-135.99	-250.63
30	2.41	0.00	-134.20	-237.99
31	2.51	0.00	-132.28	-225.53
32	2.61	0.00	-130.23	-213.26
33	2.70	0.00	-128.06	-201.21
34	2.80	0.00	-125.75	-189.38
35	2.90	0.00	-123.33	-177.78
36	3.00	0.00	-120.77	-166.43
37	3.10	0.00	-118.09	-155.34
38	3.20	0.00	-115.28	-144.53
39	3.30	0.00	-112.35	-134.00
40	3.40	0.00	-109.29	-123.77
41	3.50	0.00	-106.10	-113.84
42	3.60	0.00	-102.79	-104.24
43	3.70	0.00	-99.34	-94.98
44	3.80	0.00	-95.78	-86.07

n°	X	N	T	M
	[m]	[kN]	[kN]	[kNm]
45	3.90	0.00	-92.08	-77.51
46	4.00	0.00	-88.26	-69.33
47	4.10	0.00	-84.31	-61.54
48	4.20	0.00	-80.24	-54.14
49	4.29	0.00	-76.04	-47.16
50	4.39	0.00	-71.71	-40.60
51	4.49	0.00	-67.26	-34.47
52	4.59	0.00	-62.68	-28.80
53	4.69	0.00	-57.97	-23.58
54	4.79	0.00	-51.30	-18.21
55	4.89	0.00	-44.35	-13.45
56	4.99	0.00	-37.28	-9.39
57	5.09	0.00	-30.08	-6.05
58	5.19	0.00	-22.75	-3.42
59	5.29	0.00	-15.29	-1.53
60	5.39	0.00	-7.71	-0.38
61	5.49	0.00	0.00	0.00

Combinazione n° 11 - SLEF

n°	X	N	T	M
	[m]	[kN]	[kN]	[kNm]
1	-1.40	0.00	0.00	0.00
2	-1.30	0.00	16.83	0.84
3	-1.20	0.00	33.53	3.36
4	-1.10	0.00	50.10	7.54
5	-1.00	0.00	66.54	13.38
6	-0.90	0.00	82.86	20.85
7	-0.80	0.00	99.04	29.94
8	-0.70	0.00	115.10	40.65
9	-0.60	0.00	131.03	52.96
10	-0.50	0.00	146.83	66.85
11	-0.40	0.00	162.51	82.32
12	0.62	0.00	-147.12	-481.65
13	0.72	0.00	-147.47	-467.80
14	0.82	0.00	-147.71	-453.91
15	0.92	0.00	-147.81	-440.01
16	1.01	0.00	-147.79	-426.10
17	1.11	0.00	-147.64	-412.20
18	1.21	0.00	-147.37	-398.32
19	1.31	0.00	-146.97	-384.47
20	1.41	0.00	-146.44	-370.67
21	1.51	0.00	-145.79	-356.93
22	1.61	0.00	-145.01	-343.26
23	1.71	0.00	-144.10	-329.68
24	1.81	0.00	-143.06	-316.19
25	1.91	0.00	-141.90	-302.81
26	2.01	0.00	-140.62	-289.55
27	2.11	0.00	-139.20	-276.43
28	2.21	0.00	-137.66	-263.45
29	2.31	0.00	-135.99	-250.63
30	2.41	0.00	-134.20	-237.99
31	2.51	0.00	-132.28	-225.53
32	2.61	0.00	-130.23	-213.26
33	2.70	0.00	-128.06	-201.21
34	2.80	0.00	-125.75	-189.38
35	2.90	0.00	-123.33	-177.78
36	3.00	0.00	-120.77	-166.43
37	3.10	0.00	-118.09	-155.34
38	3.20	0.00	-115.28	-144.53
39	3.30	0.00	-112.35	-134.00
40	3.40	0.00	-109.29	-123.77
41	3.50	0.00	-106.10	-113.84

n°	X [m]	N [kN]	T [kN]	M [kNm]
42	3.60	0.00	-102.79	-104.24
43	3.70	0.00	-99.34	-94.98
44	3.80	0.00	-95.78	-86.07
45	3.90	0.00	-92.08	-77.51
46	4.00	0.00	-88.26	-69.33
47	4.10	0.00	-84.31	-61.54
48	4.20	0.00	-80.24	-54.14
49	4.29	0.00	-76.04	-47.16
50	4.39	0.00	-71.71	-40.60
51	4.49	0.00	-67.26	-34.47
52	4.59	0.00	-62.68	-28.80
53	4.69	0.00	-57.97	-23.58
54	4.79	0.00	-51.30	-18.21
55	4.89	0.00	-44.35	-13.45
56	4.99	0.00	-37.28	-9.39
57	5.09	0.00	-30.08	-6.05
58	5.19	0.00	-22.75	-3.42
59	5.29	0.00	-15.29	-1.53
60	5.39	0.00	-7.71	-0.38
61	5.49	0.00	0.00	0.00

Combinazione n° 12 - SLEQ

n°	X [m]	N [kN]	T [kN]	M [kNm]
1	-1.40	0.00	0.00	0.00
2	-1.30	0.00	16.83	0.84
3	-1.20	0.00	33.53	3.36
4	-1.10	0.00	50.10	7.54
5	-1.00	0.00	66.54	13.38
6	-0.90	0.00	82.86	20.85
7	-0.80	0.00	99.04	29.94
8	-0.70	0.00	115.10	40.65
9	-0.60	0.00	131.03	52.96
10	-0.50	0.00	146.83	66.85
11	-0.40	0.00	162.51	82.32
12	0.62	0.00	-147.12	-481.65
13	0.72	0.00	-147.47	-467.80
14	0.82	0.00	-147.71	-453.91
15	0.92	0.00	-147.81	-440.01
16	1.01	0.00	-147.79	-426.10
17	1.11	0.00	-147.64	-412.20
18	1.21	0.00	-147.37	-398.32
19	1.31	0.00	-146.97	-384.47
20	1.41	0.00	-146.44	-370.67
21	1.51	0.00	-145.79	-356.93
22	1.61	0.00	-145.01	-343.26
23	1.71	0.00	-144.10	-329.68
24	1.81	0.00	-143.06	-316.19
25	1.91	0.00	-141.90	-302.81
26	2.01	0.00	-140.62	-289.55
27	2.11	0.00	-139.20	-276.43
28	2.21	0.00	-137.66	-263.45
29	2.31	0.00	-135.99	-250.63
30	2.41	0.00	-134.20	-237.99
31	2.51	0.00	-132.28	-225.53
32	2.61	0.00	-130.23	-213.26
33	2.70	0.00	-128.06	-201.21
34	2.80	0.00	-125.75	-189.38
35	2.90	0.00	-123.33	-177.78
36	3.00	0.00	-120.77	-166.43
37	3.10	0.00	-118.09	-155.34
38	3.20	0.00	-115.28	-144.53

n°	X [m]	N [kN]	T [kN]	M [kNm]
39	3.30	0.00	-112.35	-134.00
40	3.40	0.00	-109.29	-123.77
41	3.50	0.00	-106.10	-113.84
42	3.60	0.00	-102.79	-104.24
43	3.70	0.00	-99.34	-94.98
44	3.80	0.00	-95.78	-86.07
45	3.90	0.00	-92.08	-77.51
46	4.00	0.00	-88.26	-69.33
47	4.10	0.00	-84.31	-61.54
48	4.20	0.00	-80.24	-54.14
49	4.29	0.00	-76.04	-47.16
50	4.39	0.00	-71.71	-40.60
51	4.49	0.00	-67.26	-34.47
52	4.59	0.00	-62.68	-28.80
53	4.69	0.00	-57.97	-23.58
54	4.79	0.00	-51.30	-18.21
55	4.89	0.00	-44.35	-13.45
56	4.99	0.00	-37.28	-9.39
57	5.09	0.00	-30.08	-6.05
58	5.19	0.00	-22.75	-3.42
59	5.29	0.00	-15.29	-1.53
60	5.39	0.00	-7.71	-0.38
61	5.49	0.00	0.00	0.00

Combinazione n° 13 - SLEQ H + V

n°	X [m]	N [kN]	T [kN]	M [kNm]
1	-1.40	0.00	0.00	0.00
2	-1.30	0.00	23.32	1.17
3	-1.20	0.00	46.33	4.65
4	-1.10	0.00	69.04	10.42
5	-1.00	0.00	91.44	18.45
6	-0.90	0.00	113.55	28.70
7	-0.80	0.00	135.35	41.15
8	-0.70	0.00	156.85	55.76
9	-0.60	0.00	178.04	72.51
10	-0.50	0.00	198.93	91.36
11	-0.40	0.00	219.52	112.28
12	0.62	0.00	-198.14	-774.16
13	0.72	0.00	-201.60	-755.08
14	0.82	0.00	-204.77	-735.67
15	0.92	0.00	-207.63	-715.95
16	1.01	0.00	-210.19	-695.97
17	1.11	0.00	-212.46	-675.74
18	1.21	0.00	-214.42	-655.31
19	1.31	0.00	-216.09	-634.70
20	1.41	0.00	-217.46	-613.93
21	1.51	0.00	-218.52	-593.05
22	1.61	0.00	-219.29	-572.07
23	1.71	0.00	-219.76	-551.03
24	1.81	0.00	-219.93	-529.96
25	1.91	0.00	-219.80	-508.89
26	2.01	0.00	-219.37	-487.85
27	2.11	0.00	-218.64	-466.86
28	2.21	0.00	-217.61	-445.96
29	2.31	0.00	-216.28	-425.18
30	2.41	0.00	-214.66	-404.54
31	2.51	0.00	-212.73	-384.08
32	2.61	0.00	-210.51	-363.83
33	2.70	0.00	-207.98	-343.82
34	2.80	0.00	-205.16	-324.07
35	2.90	0.00	-202.03	-304.61

n°	X [m]	N [kN]	T [kN]	M [kNm]
36	3.00	0.00	-198.61	-285.48
37	3.10	0.00	-194.89	-266.71
38	3.20	0.00	-190.87	-248.32
39	3.30	0.00	-186.54	-230.34
40	3.40	0.00	-181.92	-212.81
41	3.50	0.00	-177.00	-195.75
42	3.60	0.00	-171.79	-179.20
43	3.70	0.00	-166.27	-163.18
44	3.80	0.00	-160.45	-147.73
45	3.90	0.00	-154.33	-132.86
46	4.00	0.00	-147.92	-118.62
47	4.10	0.00	-141.20	-105.04
48	4.20	0.00	-134.18	-92.13
49	4.29	0.00	-126.87	-79.94
50	4.39	0.00	-119.26	-68.49
51	4.49	0.00	-111.34	-57.81
52	4.59	0.00	-103.13	-47.93
53	4.69	0.00	-94.62	-38.88
54	4.79	0.00	-83.98	-30.06
55	4.89	0.00	-72.88	-22.26
56	4.99	0.00	-61.48	-15.59
57	5.09	0.00	-49.78	-10.05
58	5.19	0.00	-37.79	-5.70
59	5.29	0.00	-25.49	-2.55
60	5.39	0.00	-12.89	-0.64
61	5.49	0.00	0.00	0.00

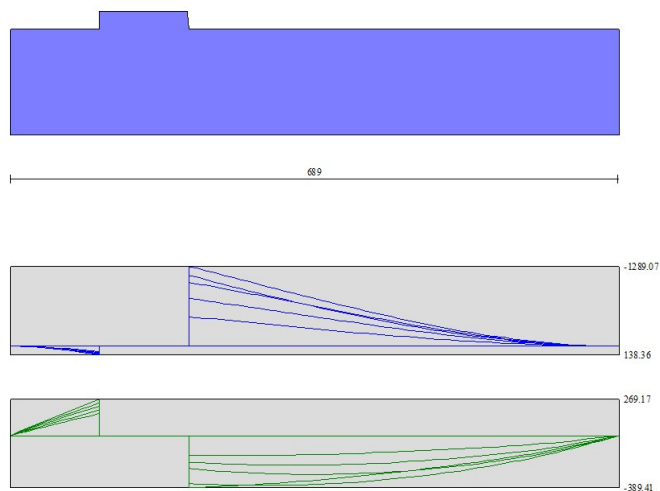


Fig. 9 - Fondazione (Inviluppo)

Verifiche a flessione

Elementi calcolati a trave

Simbologia adottata

n°	indice sezione
Y	ordinata sezione espressa in [m]
B	larghezza sezione espresso in [cm]
H	altezza sezione espressa in [cm]
Afi	area ferri inferiori espresso in [cmq]
Afs	area ferri superiori espressa in [cmq]
M	momento agente espressa in [kNm]
N	sforzo normale agente espressa in [kN]
Mu	momento ultimi espresso in [kNm]
Nu	sforzo normale ultimo espressa in [kN]
FS	fattore di sicurezza (rapporto tra sollecitazione ultima e sollecitazione agente)

Paramento

Combinazione n° 1 - STR (A1-M1-R3)

n°	Y	B	H	Afi	Afs	M	N	Mu	Nu	FS
	[m]	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kNm]	[kN]	
1	0.00	100	40	18.85	15.71	0.00	0.00	0.00	0.00	100000.000
2	-0.10	100	41	18.85	15.71	0.00	0.99	0.00	0.00	100000.000
3	-0.20	100	42	18.85	15.71	0.02	2.00	70.91	7630.58	3808.817
4	-0.30	100	43	18.85	15.71	0.05	3.04	136.31	7759.61	2555.339
5	-0.40	100	43	18.85	15.71	0.12	4.09	221.87	7888.64	1928.352
6	-0.50	100	44	18.85	15.71	0.21	5.17	322.70	7892.03	1527.647
7	-0.60	100	45	18.85	15.71	0.35	6.26	417.57	7483.19	1194.937
8	-0.70	100	46	18.85	15.71	0.54	7.38	511.89	7027.45	952.265
9	-0.80	100	47	18.85	15.71	0.78	8.52	601.66	6531.65	766.802
10	-0.90	100	48	18.85	15.71	1.10	9.68	684.01	6016.97	621.757
11	-1.00	100	49	18.85	15.71	1.49	10.86	757.62	5507.43	507.236
12	-1.10	100	49	18.85	15.71	1.97	12.06	822.37	5022.67	416.504
13	-1.20	100	50	18.85	15.71	2.55	13.28	869.98	4529.78	341.059
14	-1.30	100	51	18.85	18.85	3.23	14.52	913.70	4108.11	282.832
15	-1.40	100	52	18.85	18.85	4.02	15.79	911.72	3579.81	226.723
16	-1.50	100	53	18.85	18.85	4.93	17.07	893.68	3094.71	181.244
17	-1.60	100	54	18.85	18.85	5.97	18.38	864.72	2663.89	144.924
18	-1.70	100	55	18.85	18.85	7.14	19.71	831.30	2295.76	116.484
19	-1.80	100	55	18.85	18.85	8.45	21.06	800.61	1995.55	94.768
20	-1.90	100	56	18.85	18.85	9.91	22.43	766.52	1734.89	77.358
21	-2.00	100	57	18.85	18.85	11.53	23.82	736.42	1521.70	63.890
22	-2.10	100	58	18.85	18.85	13.31	25.23	705.34	1337.14	53.000
23	-2.20	100	59	18.85	18.85	15.26	26.66	682.31	1191.94	44.706
24	-2.30	100	60	18.85	18.85	17.40	28.12	665.00	1074.80	38.229
25	-2.40	100	61	18.85	18.85	19.72	29.59	651.98	978.48	33.068

n°	Y [m]	B [cm]	H [cm]	Afi [cmq]	Afs [cmq]	M [kNm]	N [kN]	Mu [kNm]	Nu [kN]	FS
26	-2.50	100	61	18.85	21.99	22.23	31.09	740.17	1034.96	33.294
27	-2.60	100	62	18.85	21.99	24.95	32.60	731.73	956.19	29.329
28	-2.70	100	63	18.85	21.99	27.88	34.14	725.62	888.65	26.030
29	-2.80	100	64	18.85	21.99	31.02	35.70	721.39	830.16	23.255
30	-2.90	100	65	18.85	21.99	34.39	37.28	718.70	779.03	20.898
31	-3.00	100	66	18.85	21.99	37.99	38.88	717.29	734.00	18.879
32	-3.10	100	67	18.85	21.99	41.84	40.50	716.95	694.06	17.137
33	-3.20	100	67	18.85	21.99	45.93	42.14	717.51	658.41	15.623
34	-3.30	100	68	18.85	21.99	50.27	43.81	718.85	626.41	14.299
35	-3.40	100	69	18.85	21.99	54.88	45.49	720.86	597.54	13.135
36	-3.50	100	70	18.85	21.99	59.76	47.20	723.21	571.19	12.102
37	-3.60	100	71	18.85	25.13	64.92	48.92	821.39	619.05	12.653
38	-3.70	100	72	18.85	25.13	70.36	50.67	825.28	594.37	11.730
39	-3.80	100	73	18.85	25.13	76.09	52.44	829.61	571.74	10.902
40	-3.90	100	73	18.85	25.13	82.13	54.23	834.33	550.92	10.159
41	-4.00	100	74	18.85	25.13	88.47	56.04	839.41	531.71	9.488
42	-4.10	100	75	18.85	25.13	95.13	57.87	843.85	513.35	8.870
43	-4.20	100	76	18.85	25.13	102.12	59.73	848.53	496.29	8.309
44	-4.30	100	77	18.85	25.13	109.43	61.60	853.48	480.44	7.799
45	-4.40	100	78	18.85	25.13	117.09	63.50	858.68	465.66	7.334
46	-4.50	100	79	18.85	25.13	125.08	65.41	864.09	451.87	6.908
47	-4.60	100	79	18.85	25.13	133.44	67.35	869.70	438.96	6.518
48	-4.70	100	80	18.85	25.13	142.15	69.31	875.50	426.86	6.159
49	-4.80	100	81	18.85	28.27	151.23	71.29	988.83	466.10	6.538
50	-4.90	100	82	18.85	28.27	160.69	73.29	995.72	454.11	6.196
51	-5.00	100	83	18.85	28.27	170.54	75.31	1002.77	442.82	5.880
52	-5.10	100	84	18.85	28.27	180.77	77.35	1009.97	432.15	5.587
53	-5.20	100	85	18.85	28.27	191.40	79.41	1017.29	422.07	5.315
54	-5.30	100	85	18.85	28.27	202.44	81.50	1024.74	412.52	5.062
55	-5.40	100	86	18.85	28.27	213.90	83.60	1032.29	403.47	4.826
56	-5.50	100	87	18.85	28.27	225.77	85.73	1039.96	394.88	4.606
57	-5.60	100	88	18.85	28.27	238.08	87.88	1047.71	386.71	4.401
58	-5.70	100	89	18.85	28.27	250.82	90.04	1055.56	378.94	4.208
59	-5.80	100	90	18.85	28.27	264.01	92.23	1063.50	371.54	4.028
60	-5.90	100	91	18.85	28.27	277.65	94.44	1071.51	364.48	3.859
61	-6.00	100	91	18.85	34.56	291.74	96.67	1313.08	435.11	4.501
62	-6.10	100	92	18.85	34.56	306.31	98.93	1323.06	427.30	4.319
63	-6.20	100	93	18.85	34.56	321.35	101.20	1333.11	419.83	4.148
64	-6.30	100	94	18.85	34.56	336.87	103.49	1343.24	412.67	3.987
65	-6.40	100	95	18.85	34.56	352.88	105.81	1353.44	405.82	3.835
66	-6.50	100	96	18.85	34.56	369.39	108.15	1363.70	399.25	3.692
67	-6.60	100	97	37.70	56.55	386.41	110.50	2223.81	635.96	5.755
68	-6.70	100	97	18.85	34.56	403.93	112.88	1384.39	386.88	3.427
69	-6.80	100	98	18.85	34.56	421.98	115.28	1394.82	381.05	3.305
70	-6.90	100	99	18.85	34.56	440.55	117.70	1405.31	375.45	3.190
71	-7.00	100	100	18.85	34.56	459.66	120.14	1415.84	370.06	3.080
72	-7.10	100	101	18.85	34.56	479.31	122.61	1426.41	364.87	2.976
73	-7.20	100	102	18.85	34.56	499.52	125.09	1437.03	359.86	2.877

Combinazione n° 2 - STR (A1-M1-R3) H + V

n°	Y [m]	B [cm]	H [cm]	Afi [cmq]	Afs [cmq]	M [kNm]	N [kN]	Mu [kNm]	Nu [kN]	FS
1	0.00	100	40	18.85	15.71	0.00	0.00	0.00	0.00	100000.000
2	-0.10	100	41	18.85	15.71	0.01	0.99	87.04	7501.55	7568.224
3	-0.20	100	42	18.85	15.71	0.05	2.00	197.96	7630.58	3808.817
4	-0.30	100	43	18.85	15.71	0.13	3.04	321.29	7484.58	2464.769
5	-0.40	100	43	18.85	15.71	0.26	4.09	431.69	6912.46	1689.728
6	-0.50	100	44	18.85	15.71	0.44	5.17	533.19	6315.18	1222.418
7	-0.60	100	45	18.85	15.71	0.68	6.26	620.95	5707.53	911.395
8	-0.70	100	46	18.85	15.71	1.00	7.38	695.37	5132.53	695.491
9	-0.80	100	47	18.85	15.71	1.40	8.52	755.90	4596.75	539.649

n°	Y [m]	B [cm]	H [cm]	Afi [cmq]	Afs [cmq]	M [kNm]	N [kN]	Mu [kNm]	Nu [kN]	FS
10	-0.90	100	48	18.85	15.71	1.89	9.68	788.99	4033.28	416.774
11	-1.00	100	49	18.85	15.71	2.49	10.86	784.85	3427.80	315.701
12	-1.10	100	49	18.85	15.71	3.19	12.06	758.86	2869.77	237.975
13	-1.20	100	50	18.85	15.71	4.01	13.28	720.97	2387.69	179.775
14	-1.30	100	51	18.85	18.85	4.96	14.52	756.34	2214.96	152.494
15	-1.40	100	52	18.85	18.85	6.05	15.79	726.68	1897.77	120.193
16	-1.50	100	53	18.85	18.85	7.28	17.07	692.11	1623.81	95.100
17	-1.60	100	54	18.85	18.85	8.66	18.38	663.04	1406.68	76.528
18	-1.70	100	55	18.85	18.85	10.21	19.71	634.74	1224.83	62.146
19	-1.80	100	55	18.85	18.85	11.94	21.06	614.26	1083.70	51.464
20	-1.90	100	56	18.85	18.85	13.84	22.43	599.28	971.17	43.304
21	-2.00	100	57	18.85	18.85	15.93	23.82	588.30	879.47	36.926
22	-2.10	100	58	18.85	18.85	18.22	25.23	580.35	803.41	31.845
23	-2.20	100	59	18.85	18.85	20.72	26.66	574.72	739.38	27.732
24	-2.30	100	60	18.85	18.85	23.44	28.12	570.92	684.76	24.356
25	-2.40	100	61	18.85	18.85	26.38	29.59	568.59	637.69	21.551
26	-2.50	100	61	18.85	21.99	29.56	31.09	654.01	687.76	22.125
27	-2.60	100	62	18.85	21.99	32.98	32.60	653.74	646.24	19.822
28	-2.70	100	63	18.85	21.99	36.65	34.14	654.43	609.56	17.855
29	-2.80	100	64	18.85	21.99	40.59	35.70	655.93	576.93	16.161
30	-2.90	100	65	18.85	21.99	44.79	37.28	658.11	547.73	14.693
31	-3.00	100	66	18.85	21.99	49.27	38.88	660.88	521.47	13.413
32	-3.10	100	67	18.85	21.99	54.04	40.50	663.59	497.30	12.279
33	-3.20	100	67	18.85	21.99	59.11	42.14	666.31	475.05	11.272
34	-3.30	100	68	18.85	21.99	64.48	43.81	669.44	454.79	10.382
35	-3.40	100	69	18.85	21.99	70.17	45.49	672.93	436.27	9.590
36	-3.50	100	70	18.85	21.99	76.18	47.20	676.75	419.28	8.883
37	-3.60	100	71	18.85	25.13	82.52	48.92	775.61	459.82	9.399
38	-3.70	100	72	18.85	25.13	89.21	50.67	780.62	443.41	8.751
39	-3.80	100	73	18.85	25.13	96.24	52.44	785.88	428.22	8.166
40	-3.90	100	73	18.85	25.13	103.64	54.23	791.38	414.12	7.636
41	-4.00	100	74	18.85	25.13	111.40	56.04	797.08	401.00	7.155
42	-4.10	100	75	18.85	25.13	119.53	57.87	802.97	388.77	6.718
43	-4.20	100	76	18.85	25.13	128.06	59.73	809.03	377.34	6.318
44	-4.30	100	77	18.85	25.13	136.97	61.60	815.25	366.64	5.952
45	-4.40	100	78	18.85	25.13	146.29	63.50	821.60	356.60	5.616
46	-4.50	100	79	18.85	25.13	156.03	65.41	828.09	347.16	5.307
47	-4.60	100	79	18.85	25.13	166.18	67.35	834.69	338.28	5.023
48	-4.70	100	80	18.85	25.13	176.77	69.31	841.40	329.90	4.760
49	-4.80	100	81	18.85	28.27	187.79	71.29	951.70	361.27	5.068
50	-4.90	100	82	18.85	28.27	199.26	73.29	959.47	352.88	4.815
51	-5.00	100	83	18.85	28.27	211.19	75.31	967.34	344.94	4.580
52	-5.10	100	84	18.85	28.27	223.58	77.35	975.29	337.41	4.362
53	-5.20	100	85	18.85	28.27	236.45	79.41	983.33	330.26	4.159
54	-5.30	100	85	18.85	28.27	249.80	81.50	991.44	323.46	3.969
55	-5.40	100	86	18.85	28.27	263.64	83.60	999.63	316.98	3.792
56	-5.50	100	87	18.85	28.27	277.99	85.73	1007.88	310.82	3.626
57	-5.60	100	88	18.85	28.27	292.84	87.88	1016.19	304.94	3.470
58	-5.70	100	89	18.85	28.27	308.21	90.04	1024.56	299.32	3.324
59	-5.80	100	90	18.85	28.27	324.12	92.23	1032.98	293.95	3.187
60	-5.90	100	91	18.85	28.27	340.55	94.44	1041.45	288.82	3.058
61	-6.00	100	91	18.85	34.56	357.54	96.67	1277.35	345.38	3.573
62	-6.10	100	92	18.85	34.56	375.07	98.93	1287.82	339.67	3.434
63	-6.20	100	93	18.85	34.56	393.17	101.20	1298.35	334.18	3.302
64	-6.30	100	94	18.85	34.56	411.85	103.49	1308.92	328.92	3.178
65	-6.40	100	95	18.85	34.56	431.10	105.81	1319.53	323.87	3.061
66	-6.50	100	96	18.85	34.56	450.95	108.15	1330.19	319.01	2.950
67	-6.60	100	97	37.70	56.55	471.39	110.50	2173.65	509.55	4.611
68	-6.70	100	97	18.85	34.56	492.44	112.88	1351.62	309.83	2.745
69	-6.80	100	98	18.85	34.56	514.11	115.28	1362.39	305.50	2.650
70	-6.90	100	99	18.85	34.56	536.40	117.70	1373.19	301.32	2.560
71	-7.00	100	100	18.85	34.56	559.33	120.14	1384.03	297.29	2.474
72	-7.10	100	101	18.85	34.56	582.90	122.61	1394.90	293.40	2.393
73	-7.20	100	102	18.85	34.56	607.12	125.09	1405.80	289.65	2.316

n°	Y	B	H	Afi	Afs	M	N	Mu	Nu	FS
	[m]	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kNm]	[kN]	
1	0.00	100	40	18.85	15.71	0.00	0.00	0.00	0.00	100000.000
2	-0.10	100	41	18.85	15.71	0.01	0.99	85.96	7501.55	7568.224
3	-0.20	100	42	18.85	15.71	0.05	2.00	193.62	7630.58	3808.817
4	-0.30	100	43	18.85	15.71	0.13	3.04	313.93	7535.37	2481.495
5	-0.40	100	43	18.85	15.71	0.25	4.09	421.14	6992.99	1709.413
6	-0.50	100	44	18.85	15.71	0.42	5.17	520.44	6426.49	1243.965
7	-0.60	100	45	18.85	15.71	0.65	6.26	608.33	5855.88	935.083
8	-0.70	100	46	18.85	15.71	0.95	7.38	683.51	5304.13	718.745
9	-0.80	100	47	18.85	15.71	1.33	8.52	748.01	4798.58	563.343
10	-0.90	100	48	18.85	15.71	1.79	9.68	794.89	4299.24	444.257
11	-1.00	100	49	18.85	15.71	2.34	10.86	798.89	3701.14	340.876
12	-1.10	100	49	18.85	15.71	3.00	12.06	782.91	3147.86	261.036
13	-1.20	100	50	18.85	15.71	3.76	13.28	752.71	2655.77	199.960
14	-1.30	100	51	18.85	18.85	4.65	14.52	789.52	2467.82	169.903
15	-1.40	100	52	18.85	18.85	5.66	15.79	758.13	2116.73	134.061
16	-1.50	100	53	18.85	18.85	6.80	17.07	728.66	1830.45	107.202
17	-1.60	100	54	18.85	18.85	8.08	18.38	699.66	1591.53	86.584
18	-1.70	100	55	18.85	18.85	9.51	19.71	671.14	1390.30	70.543
19	-1.80	100	55	18.85	18.85	11.11	21.06	645.70	1224.37	58.145
20	-1.90	100	56	18.85	18.85	12.86	22.43	627.00	1093.28	48.749
21	-2.00	100	57	18.85	18.85	14.79	23.82	613.15	987.22	41.450
22	-2.10	100	58	18.85	18.85	16.91	25.23	602.91	899.77	35.664
23	-2.20	100	59	18.85	18.85	19.21	26.66	595.44	826.50	31.000
24	-2.30	100	60	18.85	18.85	21.71	28.12	590.09	764.26	27.183
25	-2.40	100	61	18.85	18.85	24.41	29.59	586.48	710.79	24.022
26	-2.50	100	61	18.85	21.99	27.33	31.09	673.37	765.76	24.634
27	-2.60	100	62	18.85	21.99	30.48	32.60	672.02	718.87	22.050
28	-2.70	100	63	18.85	21.99	33.85	34.14	671.77	677.52	19.846
29	-2.80	100	64	18.85	21.99	37.46	35.70	672.44	640.82	17.951
30	-2.90	100	65	18.85	21.99	41.32	37.28	673.90	608.03	16.311
31	-3.00	100	66	18.85	21.99	45.43	38.88	676.04	578.58	14.882
32	-3.10	100	67	18.85	21.99	49.80	40.50	678.76	552.00	13.629
33	-3.20	100	67	18.85	21.99	54.44	42.14	681.80	527.76	12.523
34	-3.30	100	68	18.85	21.99	59.37	43.81	684.41	505.04	11.529
35	-3.40	100	69	18.85	21.99	64.57	45.49	687.44	484.30	10.646
36	-3.50	100	70	18.85	21.99	70.08	47.20	690.83	465.29	9.858
37	-3.60	100	71	18.85	25.13	75.88	48.92	790.03	509.39	10.412
38	-3.70	100	72	18.85	25.13	81.99	50.67	795.55	491.65	9.703
39	-3.80	100	73	18.85	25.13	88.43	52.44	800.62	474.80	9.054
40	-3.90	100	73	18.85	25.13	95.19	54.23	805.78	459.08	8.465
41	-4.00	100	74	18.85	25.13	102.28	56.04	811.17	444.46	7.931
42	-4.10	100	75	18.85	25.13	109.72	57.87	816.78	430.83	7.444
43	-4.20	100	76	18.85	25.13	117.50	59.73	822.57	418.11	7.000
44	-4.30	100	77	18.85	25.13	125.65	61.60	828.54	406.20	6.594
45	-4.40	100	78	18.85	25.13	134.16	63.50	834.67	395.03	6.221
46	-4.50	100	79	18.85	25.13	143.05	65.41	840.94	384.53	5.879
47	-4.60	100	79	18.85	25.13	152.32	67.35	847.34	374.66	5.563
48	-4.70	100	80	18.85	25.13	161.98	69.31	853.87	365.35	5.271
49	-4.80	100	81	18.85	28.27	172.04	71.29	965.43	400.03	5.612
50	-4.90	100	82	18.85	28.27	182.50	73.29	973.02	390.72	5.331
51	-5.00	100	83	18.85	28.27	193.39	75.31	980.72	381.91	5.071
52	-5.10	100	84	18.85	28.27	204.69	77.35	988.52	373.55	4.829
53	-5.20	100	85	18.85	28.27	216.42	79.41	996.41	365.61	4.604
54	-5.30	100	85	18.85	28.27	228.60	81.50	1004.38	358.07	4.394
55	-5.40	100	86	18.85	28.27	241.22	83.60	1012.44	350.89	4.197
56	-5.50	100	87	18.85	28.27	254.29	85.73	1020.56	344.06	4.013
57	-5.60	100	88	18.85	28.27	267.83	87.88	1028.76	337.54	3.841
58	-5.70	100	89	18.85	28.27	281.84	90.04	1037.01	331.31	3.679
59	-5.80	100	90	18.85	28.27	296.33	92.23	1045.33	325.36	3.528
60	-5.90	100	91	18.85	28.27	311.30	94.44	1053.71	319.67	3.385
61	-6.00	100	91	18.85	34.56	326.77	96.67	1292.03	382.24	3.954
62	-6.10	100	92	18.85	34.56	342.75	98.93	1302.40	375.91	3.800

n°	Y [m]	B [cm]	H [cm]	Afi [cmq]	Afs [cmq]	M [kNm]	N [kN]	Mu [kNm]	Nu [kN]	FS
63	-6.20	100	93	18.85	34.56	359.23	101.20	1312.82	369.84	3.655
64	-6.30	100	94	18.85	34.56	376.24	103.49	1323.30	364.01	3.517
65	-6.40	100	95	18.85	34.56	393.77	105.81	1333.82	358.41	3.387
66	-6.50	100	96	18.85	34.56	411.83	108.15	1344.40	353.03	3.264
67	-6.60	100	97	37.70	56.55	430.44	110.50	2195.07	563.52	5.100
68	-6.70	100	97	18.85	34.56	449.60	112.88	1365.68	342.88	3.038
69	-6.80	100	98	18.85	34.56	469.32	115.28	1376.38	338.08	2.933
70	-6.90	100	99	18.85	34.56	489.61	117.70	1387.12	333.46	2.833
71	-7.00	100	100	18.85	34.56	510.48	120.14	1397.89	329.00	2.738
72	-7.10	100	101	18.85	34.56	531.92	122.61	1408.70	324.70	2.648
73	-7.20	100	102	18.85	34.56	553.96	125.09	1419.54	320.54	2.563

Fondazione

Combinazione n° 1 - STR (A1-M1-R3)

n°	Y [m]	B [cm]	H [cm]	Afi [cmq]	Afs [cmq]	M [kNm]	N [kN]	Mu [kNm]	Nu [kN]	FS
1	-1.40	100	120	26.55	26.55	0.00	0.00	0.00	0.00	100000.000
2	-1.30	100	120	26.55	26.55	0.99	0.00	3966.97	0.00	4018.783
3	-1.20	100	120	26.55	26.55	3.93	0.00	3966.97	0.00	1008.247
4	-1.10	100	120	26.55	26.55	8.82	0.00	3966.97	0.00	449.699
5	-1.00	100	120	26.55	26.55	15.63	0.00	3966.97	0.00	253.856
6	-0.90	100	120	26.55	26.55	24.33	0.00	3966.97	0.00	163.048
7	-0.80	100	120	26.55	26.55	34.91	0.00	3966.97	0.00	113.634
8	-0.70	100	120	26.55	26.55	47.35	0.00	3966.97	0.00	83.787
9	-0.60	100	120	26.55	26.55	61.62	0.00	3966.97	0.00	64.381
10	-0.50	100	120	26.55	26.55	77.70	0.00	3966.97	0.00	51.053
11	-0.40	100	120	26.55	26.55	95.58	0.00	3966.97	0.00	41.503
12	0.62	100	120	26.55	26.55	-1149.00	0.00	-3966.97	0.00	3.453
13	0.72	100	120	26.55	26.55	-1111.48	0.00	-3966.97	0.00	3.569
14	0.82	100	120	26.55	26.55	-1074.23	0.00	-3966.97	0.00	3.693
15	0.92	100	120	26.55	26.55	-1037.26	0.00	-3966.97	0.00	3.824
16	1.01	100	120	26.55	26.55	-1000.59	0.00	-3966.97	0.00	3.965
17	1.11	100	120	26.55	26.55	-964.26	0.00	-3966.97	0.00	4.114
18	1.21	100	120	26.55	26.55	-928.27	0.00	-3966.97	0.00	4.274
19	1.31	100	120	26.55	26.55	-892.65	0.00	-3966.97	0.00	4.444
20	1.41	100	120	26.55	26.55	-857.42	0.00	-3966.97	0.00	4.627
21	1.51	100	120	26.55	26.55	-822.59	0.00	-3966.97	0.00	4.823
22	1.61	100	120	26.55	26.55	-788.20	0.00	-3966.97	0.00	5.033
23	1.71	100	120	26.55	26.55	-754.25	0.00	-3966.97	0.00	5.259
24	1.81	100	120	26.55	26.55	-720.78	0.00	-3966.97	0.00	5.504
25	1.91	100	120	26.55	26.55	-687.80	0.00	-3966.97	0.00	5.768
26	2.01	100	120	26.55	26.55	-655.32	0.00	-3966.97	0.00	6.053
27	2.11	100	120	26.55	26.55	-623.38	0.00	-3966.97	0.00	6.364
28	2.21	100	120	26.55	26.55	-592.00	0.00	-3966.97	0.00	6.701
29	2.31	100	120	26.55	26.55	-561.18	0.00	-3966.97	0.00	7.069
30	2.41	100	120	26.55	26.55	-530.96	0.00	-3966.97	0.00	7.471
31	2.51	100	120	26.55	26.55	-501.35	0.00	-3966.97	0.00	7.913
32	2.61	100	120	26.55	26.55	-472.37	0.00	-3966.97	0.00	8.398
33	2.70	100	120	26.55	26.55	-444.05	0.00	-3966.97	0.00	8.934
34	2.80	100	120	26.55	26.55	-416.41	0.00	-3966.97	0.00	9.527
35	2.90	100	120	26.55	26.55	-389.46	0.00	-3966.97	0.00	10.186
36	3.00	100	120	26.55	26.55	-363.23	0.00	-3966.97	0.00	10.921
37	3.10	100	120	26.55	26.55	-337.73	0.00	-3966.97	0.00	11.746
38	3.20	100	120	26.55	26.55	-312.99	0.00	-3966.97	0.00	12.674
39	3.30	100	120	26.55	26.55	-289.03	0.00	-3966.97	0.00	13.725
40	3.40	100	120	26.55	26.55	-265.86	0.00	-3966.97	0.00	14.921
41	3.50	100	120	26.55	26.55	-243.52	0.00	-3966.97	0.00	16.290

n°	Y [m]	B [cm]	H [cm]	Afi [cmq]	Afs [cmq]	M [kNm]	N [kN]	Mu [kNm]	Nu [kN]	FS
42	3.60	100	120	26.55	26.55	-222.01	0.00	-3966.97	0.00	17.868
43	3.70	100	120	26.55	26.55	-201.36	0.00	-3966.97	0.00	19.701
44	3.80	100	120	26.55	26.55	-181.59	0.00	-3966.97	0.00	21.845
45	3.90	100	120	26.55	26.55	-162.73	0.00	-3966.97	0.00	24.378
46	4.00	100	120	26.55	26.55	-144.78	0.00	-3966.97	0.00	27.400
47	4.10	100	120	26.55	26.55	-127.77	0.00	-3966.97	0.00	31.047
48	4.20	100	120	26.55	26.55	-111.73	0.00	-3966.97	0.00	35.505
49	4.29	100	120	26.55	26.55	-96.67	0.00	-3966.97	0.00	41.037
50	4.39	100	120	26.55	26.55	-82.61	0.00	-3966.97	0.00	48.021
51	4.49	100	120	26.55	26.55	-69.57	0.00	-3966.97	0.00	57.018
52	4.59	100	120	26.55	26.55	-57.58	0.00	-3966.97	0.00	68.893
53	4.69	100	120	26.55	26.55	-46.65	0.00	-3966.97	0.00	85.029
54	4.79	100	120	26.55	26.55	-35.95	0.00	-3966.97	0.00	110.343
55	4.89	100	120	26.55	26.55	-26.54	0.00	-3966.97	0.00	149.493
56	4.99	100	120	26.55	26.55	-18.51	0.00	-3966.97	0.00	214.278
57	5.09	100	120	26.55	26.55	-11.90	0.00	-3966.97	0.00	333.274
58	5.19	100	120	26.55	26.55	-6.73	0.00	-3966.97	0.00	589.781
59	5.29	100	120	26.55	26.55	-3.00	0.00	-3966.97	0.00	1320.974
60	5.39	100	120	26.55	26.55	-0.75	0.00	-3966.97	0.00	5259.984
61	5.49	100	120	0.00	0.00	0.00	0.00	0.00	0.00	100000.000

Combinazione n° 2 - STR (A1-M1-R3) H + V

n°	Y [m]	B [cm]	H [cm]	Afi [cmq]	Afs [cmq]	M [kNm]	N [kN]	Mu [kNm]	Nu [kN]	FS
1	-1.40	100	120	26.55	26.55	0.00	0.00	0.00	0.00	100000.000
2	-1.30	100	120	26.55	26.55	1.45	0.00	3966.97	0.00	2733.114
3	-1.20	100	120	26.55	26.55	5.78	0.00	3966.97	0.00	686.848
4	-1.10	100	120	26.55	26.55	12.93	0.00	3966.97	0.00	306.869
5	-1.00	100	120	26.55	26.55	22.86	0.00	3966.97	0.00	173.525
6	-0.90	100	120	26.55	26.55	35.53	0.00	3966.97	0.00	111.646
7	-0.80	100	120	26.55	26.55	50.89	0.00	3966.97	0.00	77.945
8	-0.70	100	120	26.55	26.55	68.90	0.00	3966.97	0.00	57.573
9	-0.60	100	120	26.55	26.55	89.51	0.00	3966.97	0.00	44.317
10	-0.50	100	120	26.55	26.55	112.68	0.00	3966.97	0.00	35.206
11	-0.40	100	120	26.55	26.55	138.36	0.00	3966.97	0.00	28.672
12	0.62	100	120	26.55	26.55	-1030.35	0.00	-3966.97	0.00	3.850
13	0.72	100	120	26.55	26.55	-1006.55	0.00	-3966.97	0.00	3.941
14	0.82	100	120	26.55	26.55	-982.17	0.00	-3966.97	0.00	4.039
15	0.92	100	120	26.55	26.55	-957.26	0.00	-3966.97	0.00	4.144
16	1.01	100	120	26.55	26.55	-931.85	0.00	-3966.97	0.00	4.257
17	1.11	100	120	26.55	26.55	-906.00	0.00	-3966.97	0.00	4.379
18	1.21	100	120	26.55	26.55	-879.75	0.00	-3966.97	0.00	4.509
19	1.31	100	120	26.55	26.55	-853.13	0.00	-3966.97	0.00	4.650
20	1.41	100	120	26.55	26.55	-826.20	0.00	-3966.97	0.00	4.801
21	1.51	100	120	26.55	26.55	-799.00	0.00	-3966.97	0.00	4.965
22	1.61	100	120	26.55	26.55	-771.58	0.00	-3966.97	0.00	5.141
23	1.71	100	120	26.55	26.55	-743.98	0.00	-3966.97	0.00	5.332
24	1.81	100	120	26.55	26.55	-716.24	0.00	-3966.97	0.00	5.539
25	1.91	100	120	26.55	26.55	-688.40	0.00	-3966.97	0.00	5.763
26	2.01	100	120	26.55	26.55	-660.52	0.00	-3966.97	0.00	6.006
27	2.11	100	120	26.55	26.55	-632.64	0.00	-3966.97	0.00	6.271
28	2.21	100	120	26.55	26.55	-604.80	0.00	-3966.97	0.00	6.559
29	2.31	100	120	26.55	26.55	-577.04	0.00	-3966.97	0.00	6.875
30	2.41	100	120	26.55	26.55	-549.41	0.00	-3966.97	0.00	7.220
31	2.51	100	120	26.55	26.55	-521.96	0.00	-3966.97	0.00	7.600
32	2.61	100	120	26.55	26.55	-494.73	0.00	-3966.97	0.00	8.018
33	2.70	100	120	26.55	26.55	-467.76	0.00	-3966.97	0.00	8.481
34	2.80	100	120	26.55	26.55	-441.10	0.00	-3966.97	0.00	8.993
35	2.90	100	120	26.55	26.55	-414.79	0.00	-3966.97	0.00	9.564
36	3.00	100	120	26.55	26.55	-388.88	0.00	-3966.97	0.00	10.201

Relazione di calcolo muro di sostegno sede stradale-NV34

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
NM25	03 D 26	CL	NV 34 05 001	A	71 di 135

n°	Y [m]	B [cm]	H [cm]	Afi [cmq]	Afs [cmq]	M [kNm]	N [kN]	Mu [kNm]	Nu [kN]	FS
37	3.10	100	120	26.55	26.55	-363.41	0.00	-3966.97	0.00	10.916
38	3.20	100	120	26.55	26.55	-338.42	0.00	-3966.97	0.00	11.722
39	3.30	100	120	26.55	26.55	-313.96	0.00	-3966.97	0.00	12.635
40	3.40	100	120	26.55	26.55	-290.08	0.00	-3966.97	0.00	13.675
41	3.50	100	120	26.55	26.55	-266.82	0.00	-3966.97	0.00	14.867
42	3.60	100	120	26.55	26.55	-244.22	0.00	-3966.97	0.00	16.243
43	3.70	100	120	26.55	26.55	-222.33	0.00	-3966.97	0.00	17.842
44	3.80	100	120	26.55	26.55	-201.20	0.00	-3966.97	0.00	19.717
45	3.90	100	120	26.55	26.55	-180.85	0.00	-3966.97	0.00	21.935
46	4.00	100	120	26.55	26.55	-161.35	0.00	-3966.97	0.00	24.586
47	4.10	100	120	26.55	26.55	-142.74	0.00	-3966.97	0.00	27.792
48	4.20	100	120	26.55	26.55	-125.05	0.00	-3966.97	0.00	31.722
49	4.29	100	120	26.55	26.55	-108.34	0.00	-3966.97	0.00	36.615
50	4.39	100	120	26.55	26.55	-92.65	0.00	-3966.97	0.00	42.816
51	4.49	100	120	26.55	26.55	-78.02	0.00	-3966.97	0.00	50.843
52	4.59	100	120	26.55	26.55	-64.50	0.00	-3966.97	0.00	61.500
53	4.69	100	120	26.55	26.55	-52.13	0.00	-3966.97	0.00	76.090
54	4.79	100	120	26.55	26.55	-40.33	0.00	-3966.97	0.00	98.371
55	4.89	100	120	26.55	26.55	-29.89	0.00	-3966.97	0.00	132.700
56	4.99	100	120	26.55	26.55	-20.95	0.00	-3966.97	0.00	189.399
57	5.09	100	120	26.55	26.55	-13.52	0.00	-3966.97	0.00	293.344
58	5.19	100	120	26.55	26.55	-7.67	0.00	-3966.97	0.00	516.970
59	5.29	100	120	26.55	26.55	-3.44	0.00	-3966.97	0.00	1153.166
60	5.39	100	120	26.55	26.55	-0.87	0.00	-3966.97	0.00	4573.280
61	5.49	100	120	0.00	0.00	0.00	0.00	0.00	0.00	100000.000

Combinazione n° 3 - STR (A1-M1-R3) H - V

n°	Y [m]	B [cm]	H [cm]	Afi [cmq]	Afs [cmq]	M [kNm]	N [kN]	Mu [kNm]	Nu [kN]	FS
1	-1.40	100	120	26.55	26.55	0.00	0.00	0.00	0.00	100000.000
2	-1.30	100	120	26.55	26.55	1.30	0.00	3966.97	0.00	3043.213
3	-1.20	100	120	26.55	26.55	5.18	0.00	3966.97	0.00	765.095
4	-1.10	100	120	26.55	26.55	11.60	0.00	3966.97	0.00	341.972
5	-1.00	100	120	26.55	26.55	20.51	0.00	3966.97	0.00	193.457
6	-0.90	100	120	26.55	26.55	31.86	0.00	3966.97	0.00	124.523
7	-0.80	100	120	26.55	26.55	45.61	0.00	3966.97	0.00	86.973
8	-0.70	100	120	26.55	26.55	61.72	0.00	3966.97	0.00	64.270
9	-0.60	100	120	26.55	26.55	80.15	0.00	3966.97	0.00	49.494
10	-0.50	100	120	26.55	26.55	100.85	0.00	3966.97	0.00	39.336
11	-0.40	100	120	26.55	26.55	123.77	0.00	3966.97	0.00	32.050
12	0.62	100	120	26.55	26.55	-1289.07	0.00	-3966.97	0.00	3.077
13	0.72	100	120	26.55	26.55	-1254.18	0.00	-3966.97	0.00	3.163
14	0.82	100	120	26.55	26.55	-1218.97	0.00	-3966.97	0.00	3.254
15	0.92	100	120	26.55	26.55	-1183.49	0.00	-3966.97	0.00	3.352
16	1.01	100	120	26.55	26.55	-1147.77	0.00	-3966.97	0.00	3.456
17	1.11	100	120	26.55	26.55	-1111.87	0.00	-3966.97	0.00	3.568
18	1.21	100	120	26.55	26.55	-1075.83	0.00	-3966.97	0.00	3.687
19	1.31	100	120	26.55	26.55	-1039.68	0.00	-3966.97	0.00	3.816
20	1.41	100	120	26.55	26.55	-1003.47	0.00	-3966.97	0.00	3.953
21	1.51	100	120	26.55	26.55	-967.25	0.00	-3966.97	0.00	4.101
22	1.61	100	120	26.55	26.55	-931.06	0.00	-3966.97	0.00	4.261
23	1.71	100	120	26.55	26.55	-894.93	0.00	-3966.97	0.00	4.433
24	1.81	100	120	26.55	26.55	-858.92	0.00	-3966.97	0.00	4.619
25	1.91	100	120	26.55	26.55	-823.07	0.00	-3966.97	0.00	4.820
26	2.01	100	120	26.55	26.55	-787.41	0.00	-3966.97	0.00	5.038
27	2.11	100	120	26.55	26.55	-752.00	0.00	-3966.97	0.00	5.275
28	2.21	100	120	26.55	26.55	-716.88	0.00	-3966.97	0.00	5.534
29	2.31	100	120	26.55	26.55	-682.08	0.00	-3966.97	0.00	5.816
30	2.41	100	120	26.55	26.55	-647.66	0.00	-3966.97	0.00	6.125
31	2.51	100	120	26.55	26.55	-613.65	0.00	-3966.97	0.00	6.465

n°	Y [m]	B [cm]	H [cm]	Afi [cmq]	Afs [cmq]	M [kNm]	N [kN]	Mu [kNm]	Nu [kN]	FS
32	2.61	100	120	26.55	26.55	-580.10	0.00	-3966.97	0.00	6.838
33	2.70	100	120	26.55	26.55	-547.05	0.00	-3966.97	0.00	7.252
34	2.80	100	120	26.55	26.55	-514.55	0.00	-3966.97	0.00	7.710
35	2.90	100	120	26.55	26.55	-482.63	0.00	-3966.97	0.00	8.219
36	3.00	100	120	26.55	26.55	-451.34	0.00	-3966.97	0.00	8.789
37	3.10	100	120	26.55	26.55	-420.73	0.00	-3966.97	0.00	9.429
38	3.20	100	120	26.55	26.55	-390.83	0.00	-3966.97	0.00	10.150
39	3.30	100	120	26.55	26.55	-361.70	0.00	-3966.97	0.00	10.968
40	3.40	100	120	26.55	26.55	-333.36	0.00	-3966.97	0.00	11.900
41	3.50	100	120	26.55	26.55	-305.88	0.00	-3966.97	0.00	12.969
42	3.60	100	120	26.55	26.55	-279.28	0.00	-3966.97	0.00	14.204
43	3.70	100	120	26.55	26.55	-253.61	0.00	-3966.97	0.00	15.642
44	3.80	100	120	26.55	26.55	-228.92	0.00	-3966.97	0.00	17.329
45	3.90	100	120	26.55	26.55	-205.25	0.00	-3966.97	0.00	19.328
46	4.00	100	120	26.55	26.55	-182.63	0.00	-3966.97	0.00	21.721
47	4.10	100	120	26.55	26.55	-161.13	0.00	-3966.97	0.00	24.620
48	4.20	100	120	26.55	26.55	-140.77	0.00	-3966.97	0.00	28.181
49	4.29	100	120	26.55	26.55	-121.60	0.00	-3966.97	0.00	32.624
50	4.39	100	120	26.55	26.55	-103.66	0.00	-3966.97	0.00	38.269
51	4.49	100	120	26.55	26.55	-87.00	0.00	-3966.97	0.00	45.596
52	4.59	100	120	26.55	26.55	-71.66	0.00	-3966.97	0.00	55.356
53	4.69	100	120	26.55	26.55	-57.69	0.00	-3966.97	0.00	68.768
54	4.79	100	120	26.55	26.55	-44.48	0.00	-3966.97	0.00	89.189
55	4.89	100	120	26.55	26.55	-32.85	0.00	-3966.97	0.00	120.743
56	4.99	100	120	26.55	26.55	-22.92	0.00	-3966.97	0.00	173.073
57	5.09	100	120	26.55	26.55	-14.72	0.00	-3966.97	0.00	269.504
58	5.19	100	120	26.55	26.55	-8.29	0.00	-3966.97	0.00	478.291
59	5.29	100	120	26.55	26.55	-3.69	0.00	-3966.97	0.00	1075.981
60	5.39	100	120	26.55	26.55	-0.92	0.00	-3966.97	0.00	4303.922
61	5.49	100	120	0.00	0.00	0.00	0.00	0.00	0.00	100000.000

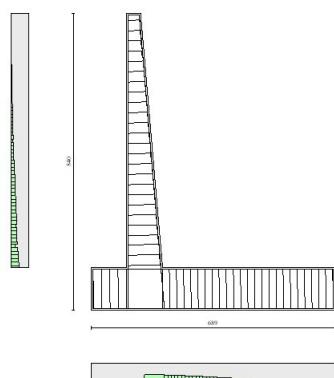


Fig. 10 - Paramento (Inviluppo)

Verifiche a taglio

Simbologia adottata

Is	indice sezione
Y	ordinata sezione espressa in [m]
B	larghezza sezione espresso in [cm]
H	altezza sezione espressa in [cm]
A _{sw}	area ferri a taglio espresso in [cmq]
cotθ	inclinazione delle bielle compresse, θ inclinazione dei puntoni di calcestruzzo
V _{Rcd}	resistenza di progetto a 'taglio compressione' espressa in [kN]
V _{Rsd}	resistenza di progetto a 'taglio trazione' espressa in [kN]
V _{Rd}	resistenza di progetto a taglio espresso in [kN]. Per elementi con armature trasversali resistenti al taglio (A _{sw} >0.0) V _{Rd} =min(V _{Rcd} , V _{Rsd}).
T	taglio agente espressa in [kN]
FS	fattore di sicurezza (rapporto tra sollecitazione resistente e sollecitazione agente)

Paramento

Combinazione n° 1 - STR (A1-M1-R3)

n°	Y	B	H	A _{sw}	s	cotθ	V _{Rcd}	V _{Rsd}	V _{Rd}	T	FS
	[m]	[cm]	[cm]	[cmq]	[cm]		[kN]	[kN]	[kN]	[kN]	
1	0.00	100	40	0.00	0.00	--	0.00	0.00	242.29	0.00	100.000
2	-0.10	100	41	0.00	0.00	--	0.00	0.00	245.00	0.04	6475.622
3	-0.20	100	42	0.00	0.00	--	0.00	0.00	247.68	0.15	1636.657
4	-0.30	100	43	0.00	0.00	--	0.00	0.00	250.35	0.34	737.250
5	-0.40	100	43	0.00	0.00	--	0.00	0.00	253.00	0.60	420.529
6	-0.50	100	44	0.00	0.00	--	0.00	0.00	255.63	0.94	272.542
7	-0.60	100	45	0.00	0.00	--	0.00	0.00	258.24	1.35	191.431
8	-0.70	100	46	0.00	0.00	--	0.00	0.00	260.83	1.84	141.455
9	-0.80	100	47	0.00	0.00	--	0.00	0.00	263.41	2.43	108.315
10	-0.90	100	48	0.00	0.00	--	0.00	0.00	265.97	3.11	85.409
11	-1.00	100	49	0.00	0.00	--	0.00	0.00	268.52	3.89	68.997
12	-1.10	100	49	0.00	0.00	--	0.00	0.00	271.05	4.76	56.991
13	-1.20	100	50	0.00	0.00	--	0.00	0.00	273.56	5.70	48.010
14	-1.30	100	51	0.00	0.00	--	0.00	0.00	284.13	6.72	42.300
15	-1.40	100	52	0.00	0.00	--	0.00	0.00	286.69	7.81	36.699
16	-1.50	100	53	0.00	0.00	--	0.00	0.00	289.23	8.98	32.200
17	-1.60	100	54	0.00	0.00	--	0.00	0.00	291.76	10.23	28.525
18	-1.70	100	55	0.00	0.00	--	0.00	0.00	294.28	11.55	25.480
19	-1.80	100	55	0.00	0.00	--	0.00	0.00	296.78	12.95	22.925
20	-1.90	100	56	0.00	0.00	--	0.00	0.00	299.28	14.42	20.759
21	-2.00	100	57	0.00	0.00	--	0.00	0.00	301.76	15.96	18.903
22	-2.10	100	58	0.00	0.00	--	0.00	0.00	304.23	17.58	17.301
23	-2.20	100	59	0.00	0.00	--	0.00	0.00	306.69	19.28	15.906
24	-2.30	100	60	0.00	0.00	--	0.00	0.00	309.14	21.05	14.684
25	-2.40	100	61	0.00	0.00	--	0.00	0.00	311.57	22.90	13.607
26	-2.50	100	61	0.00	0.00	--	0.00	0.00	322.37	24.82	12.989
27	-2.60	100	62	0.00	0.00	--	0.00	0.00	324.85	26.81	12.115
28	-2.70	100	63	0.00	0.00	--	0.00	0.00	327.32	28.89	11.332
29	-2.80	100	64	0.00	0.00	--	0.00	0.00	329.78	31.03	10.627

n°	Y [m]	B [cm]	H [cm]	A _{sw} [cmq]	s [cm]	cotθ	V _{Rcd} [kN]	V _{Rsd} [kN]	V _{Rd} [kN]	T [kN]	FS
30	-2.90	100	65	0.00	0.00	--	0.00	0.00	332.23	33.25	9.992
31	-3.00	100	66	0.00	0.00	--	0.00	0.00	334.67	35.55	9.415
32	-3.10	100	67	0.00	0.00	--	0.00	0.00	337.10	37.92	8.891
33	-3.20	100	67	0.00	0.00	--	0.00	0.00	339.52	40.36	8.412
34	-3.30	100	68	0.00	0.00	--	0.00	0.00	341.94	42.88	7.974
35	-3.40	100	69	0.00	0.00	--	0.00	0.00	344.34	45.47	7.572
36	-3.50	100	70	0.00	0.00	--	0.00	0.00	346.74	48.14	7.202
37	-3.60	100	71	0.00	0.00	--	0.00	0.00	357.69	50.89	7.029
38	-3.70	100	72	0.00	0.00	--	0.00	0.00	360.13	53.70	6.706
39	-3.80	100	73	0.00	0.00	--	0.00	0.00	362.56	56.60	6.406
40	-3.90	100	73	0.00	0.00	--	0.00	0.00	364.98	59.57	6.127
41	-4.00	100	74	0.00	0.00	--	0.00	0.00	367.39	62.61	5.868
42	-4.10	100	75	0.00	0.00	--	0.00	0.00	369.80	65.73	5.626
43	-4.20	100	76	0.00	0.00	--	0.00	0.00	372.20	68.92	5.401
44	-4.30	100	77	0.00	0.00	--	0.00	0.00	374.60	72.18	5.189
45	-4.40	100	78	0.00	0.00	--	0.00	0.00	376.99	75.53	4.991
46	-4.50	100	79	0.00	0.00	--	0.00	0.00	379.37	78.94	4.806
47	-4.60	100	79	0.00	0.00	--	0.00	0.00	381.74	82.43	4.631
48	-4.70	100	80	0.00	0.00	--	0.00	0.00	384.11	86.00	4.466
49	-4.80	100	81	0.00	0.00	--	0.00	0.00	395.23	89.64	4.409
50	-4.90	100	82	0.00	0.00	--	0.00	0.00	397.63	93.36	4.259
51	-5.00	100	83	0.00	0.00	--	0.00	0.00	400.03	97.15	4.118
52	-5.10	100	84	0.00	0.00	--	0.00	0.00	402.43	101.01	3.984
53	-5.20	100	85	0.00	0.00	--	0.00	0.00	404.82	104.95	3.857
54	-5.30	100	85	0.00	0.00	--	0.00	0.00	407.20	108.96	3.737
55	-5.40	100	86	0.00	0.00	--	0.00	0.00	409.58	113.05	3.623
56	-5.50	100	87	0.00	0.00	--	0.00	0.00	411.95	117.22	3.514
57	-5.60	100	88	0.00	0.00	--	0.00	0.00	414.32	121.46	3.411
58	-5.70	100	89	0.00	0.00	--	0.00	0.00	416.68	125.77	3.313
59	-5.80	100	90	0.00	0.00	--	0.00	0.00	419.04	130.16	3.219
60	-5.90	100	91	0.00	0.00	--	0.00	0.00	421.39	134.62	3.130
61	-6.00	100	91	0.00	0.00	--	0.00	0.00	441.20	139.16	3.171
62	-6.10	100	92	0.00	0.00	--	0.00	0.00	443.63	143.77	3.086
63	-6.20	100	93	0.00	0.00	--	0.00	0.00	446.06	148.46	3.005
64	-6.30	100	94	0.00	0.00	--	0.00	0.00	448.48	153.22	2.927
65	-6.40	100	95	0.00	0.00	--	0.00	0.00	450.90	158.06	2.853
66	-6.50	100	96	0.00	0.00	--	0.00	0.00	453.31	162.97	2.782
67	-6.60	100	97	0.00	0.00	--	0.00	0.00	547.38	167.95	3.259
68	-6.70	100	97	0.00	0.00	--	0.00	0.00	458.12	173.01	2.648
69	-6.80	100	98	0.00	0.00	--	0.00	0.00	460.52	178.15	2.585
70	-6.90	100	99	0.00	0.00	--	0.00	0.00	462.92	183.36	2.525
71	-7.00	100	100	0.00	0.00	--	0.00	0.00	465.31	188.64	2.467
72	-7.10	100	101	0.00	0.00	--	0.00	0.00	467.70	194.00	2.411
73	-7.20	100	102	0.00	0.00	--	0.00	0.00	470.09	199.44	2.357

Combinazione n° 2 - STR (A1-M1-R3) H + V

n°	Y [m]	B [cm]	H [cm]	A _{sw} [cmq]	s [cm]	cotθ	V _{Rcd} [kN]	V _{Rsd} [kN]	V _{Rd} [kN]	T [kN]	FS
1	0.00	100	40	0.00	0.00	--	0.00	0.00	242.29	0.00	100.000
2	-0.10	100	41	0.00	0.00	--	0.00	0.00	245.00	0.20	1210.185
3	-0.20	100	42	0.00	0.00	--	0.00	0.00	247.68	0.49	501.817
4	-0.30	100	43	0.00	0.00	--	0.00	0.00	250.35	0.87	286.880
5	-0.40	100	43	0.00	0.00	--	0.00	0.00	253.00	1.34	188.944
6	-0.50	100	44	0.00	0.00	--	0.00	0.00	255.63	1.89	135.041
7	-0.60	100	45	0.00	0.00	--	0.00	0.00	258.24	2.53	101.874
8	-0.70	100	46	0.00	0.00	--	0.00	0.00	260.83	3.27	79.873
9	-0.80	100	47	0.00	0.00	--	0.00	0.00	263.41	4.09	64.467
10	-0.90	100	48	0.00	0.00	--	0.00	0.00	265.97	5.00	53.231
11	-1.00	100	49	0.00	0.00	--	0.00	0.00	268.52	6.00	44.767
12	-1.10	100	49	0.00	0.00	--	0.00	0.00	271.05	7.09	38.231
13	-1.20	100	50	0.00	0.00	--	0.00	0.00	273.56	8.27	33.076
14	-1.30	100	51	0.00	0.00	--	0.00	0.00	284.13	9.54	29.782

n°	Y [m]	B [cm]	H [cm]	A _{sw} [cmq]	s [cm]	cotθ	V _{Rcd} [kN]	V _{Rsd} [kN]	V _{Rd} [kN]	T [kN]	FS
15	-1.40	100	52	0.00	0.00	--	0.00	0.00	286.69	10.90	26.307
16	-1.50	100	53	0.00	0.00	--	0.00	0.00	289.23	12.34	23.432
17	-1.60	100	54	0.00	0.00	--	0.00	0.00	291.76	13.88	21.025
18	-1.70	100	55	0.00	0.00	--	0.00	0.00	294.28	15.50	18.987
19	-1.80	100	55	0.00	0.00	--	0.00	0.00	296.78	17.21	17.247
20	-1.90	100	56	0.00	0.00	--	0.00	0.00	299.28	19.01	15.747
21	-2.00	100	57	0.00	0.00	--	0.00	0.00	301.76	20.89	14.444
22	-2.10	100	58	0.00	0.00	--	0.00	0.00	304.23	22.86	13.306
23	-2.20	100	59	0.00	0.00	--	0.00	0.00	306.69	24.93	12.304
24	-2.30	100	60	0.00	0.00	--	0.00	0.00	309.14	27.08	11.418
25	-2.40	100	61	0.00	0.00	--	0.00	0.00	311.57	29.31	10.629
26	-2.50	100	61	0.00	0.00	--	0.00	0.00	322.37	31.64	10.189
27	-2.60	100	62	0.00	0.00	--	0.00	0.00	324.85	34.05	9.540
28	-2.70	100	63	0.00	0.00	--	0.00	0.00	327.32	36.55	8.955
29	-2.80	100	64	0.00	0.00	--	0.00	0.00	329.78	39.14	8.425
30	-2.90	100	65	0.00	0.00	--	0.00	0.00	332.23	41.82	7.944
31	-3.00	100	66	0.00	0.00	--	0.00	0.00	334.67	44.58	7.506
32	-3.10	100	67	0.00	0.00	--	0.00	0.00	337.10	47.44	7.106
33	-3.20	100	67	0.00	0.00	--	0.00	0.00	339.52	50.38	6.739
34	-3.30	100	68	0.00	0.00	--	0.00	0.00	341.94	53.41	6.402
35	-3.40	100	69	0.00	0.00	--	0.00	0.00	344.34	56.52	6.092
36	-3.50	100	70	0.00	0.00	--	0.00	0.00	346.74	59.73	5.805
37	-3.60	100	71	0.00	0.00	--	0.00	0.00	357.69	63.02	5.676
38	-3.70	100	72	0.00	0.00	--	0.00	0.00	360.13	66.40	5.423
39	-3.80	100	73	0.00	0.00	--	0.00	0.00	362.56	69.87	5.189
40	-3.90	100	73	0.00	0.00	--	0.00	0.00	364.98	73.43	4.970
41	-4.00	100	74	0.00	0.00	--	0.00	0.00	367.39	77.07	4.767
42	-4.10	100	75	0.00	0.00	--	0.00	0.00	369.80	80.81	4.576
43	-4.20	100	76	0.00	0.00	--	0.00	0.00	372.20	84.63	4.398
44	-4.30	100	77	0.00	0.00	--	0.00	0.00	374.60	88.54	4.231
45	-4.40	100	78	0.00	0.00	--	0.00	0.00	376.99	92.53	4.074
46	-4.50	100	79	0.00	0.00	--	0.00	0.00	379.37	96.62	3.926
47	-4.60	100	79	0.00	0.00	--	0.00	0.00	381.74	100.79	3.787
48	-4.70	100	80	0.00	0.00	--	0.00	0.00	384.11	105.05	3.656
49	-4.80	100	81	0.00	0.00	--	0.00	0.00	395.23	109.40	3.613
50	-4.90	100	82	0.00	0.00	--	0.00	0.00	397.63	113.84	3.493
51	-5.00	100	83	0.00	0.00	--	0.00	0.00	400.03	118.36	3.380
52	-5.10	100	84	0.00	0.00	--	0.00	0.00	402.43	122.97	3.272
53	-5.20	100	85	0.00	0.00	--	0.00	0.00	404.82	127.67	3.171
54	-5.30	100	85	0.00	0.00	--	0.00	0.00	407.20	132.46	3.074
55	-5.40	100	86	0.00	0.00	--	0.00	0.00	409.58	137.34	2.982
56	-5.50	100	87	0.00	0.00	--	0.00	0.00	411.95	142.30	2.895
57	-5.60	100	88	0.00	0.00	--	0.00	0.00	414.32	147.35	2.812
58	-5.70	100	89	0.00	0.00	--	0.00	0.00	416.68	152.50	2.732
59	-5.80	100	90	0.00	0.00	--	0.00	0.00	419.04	157.72	2.657
60	-5.90	100	91	0.00	0.00	--	0.00	0.00	421.39	163.04	2.585
61	-6.00	100	91	0.00	0.00	--	0.00	0.00	441.20	168.44	2.619
62	-6.10	100	92	0.00	0.00	--	0.00	0.00	443.63	173.94	2.551
63	-6.20	100	93	0.00	0.00	--	0.00	0.00	446.06	179.52	2.485
64	-6.30	100	94	0.00	0.00	--	0.00	0.00	448.48	185.18	2.422
65	-6.40	100	95	0.00	0.00	--	0.00	0.00	450.90	190.94	2.361
66	-6.50	100	96	0.00	0.00	--	0.00	0.00	453.31	196.78	2.304
67	-6.60	100	97	0.00	0.00	--	0.00	0.00	547.38	202.72	2.700
68	-6.70	100	97	0.00	0.00	--	0.00	0.00	458.12	208.74	2.195
69	-6.80	100	98	0.00	0.00	--	0.00	0.00	460.52	214.84	2.144
70	-6.90	100	99	0.00	0.00	--	0.00	0.00	462.92	221.04	2.094
71	-7.00	100	100	0.00	0.00	--	0.00	0.00	465.31	227.32	2.047
72	-7.10	100	101	0.00	0.00	--	0.00	0.00	467.70	233.70	2.001
73	-7.20	100	102	0.00	0.00	--	0.00	0.00	470.09	240.15	1.957

Combinazione n° 3 - STR (A1-M1-R3) H - V

n°	Y	B	H	A _{sw}	s	cotθ	V _{Rcd}	V _{Rsd}	V _{Rd}	T	FS
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	[m]	[cm]	[cm]	[cmq]	[cm]		[kN]	[kN]	[kN]	[kN]	
1	0.00	100	40	0.00	0.00	--	0.00	0.00	242.29	0.00	100.000
2	-0.10	100	41	0.00	0.00	--	0.00	0.00	245.00	0.20	1236.277
3	-0.20	100	42	0.00	0.00	--	0.00	0.00	247.68	0.48	519.817
4	-0.30	100	43	0.00	0.00	--	0.00	0.00	250.35	0.83	300.104
5	-0.40	100	43	0.00	0.00	--	0.00	0.00	253.00	1.27	199.109
6	-0.50	100	44	0.00	0.00	--	0.00	0.00	255.63	1.79	143.117
7	-0.60	100	45	0.00	0.00	--	0.00	0.00	258.24	2.38	108.455
8	-0.70	100	46	0.00	0.00	--	0.00	0.00	260.83	3.06	85.344
9	-0.80	100	47	0.00	0.00	--	0.00	0.00	263.41	3.81	69.091
10	-0.90	100	48	0.00	0.00	--	0.00	0.00	265.97	4.65	57.192
11	-1.00	100	49	0.00	0.00	--	0.00	0.00	268.52	5.57	48.200
12	-1.10	100	49	0.00	0.00	--	0.00	0.00	271.05	6.57	41.238
13	-1.20	100	50	0.00	0.00	--	0.00	0.00	273.56	7.66	35.734
14	-1.30	100	51	0.00	0.00	--	0.00	0.00	284.13	8.82	32.221
15	-1.40	100	52	0.00	0.00	--	0.00	0.00	286.69	10.06	28.496
16	-1.50	100	53	0.00	0.00	--	0.00	0.00	289.23	11.38	25.411
17	-1.60	100	54	0.00	0.00	--	0.00	0.00	291.76	12.78	22.824
18	-1.70	100	55	0.00	0.00	--	0.00	0.00	294.28	14.26	20.631
19	-1.80	100	55	0.00	0.00	--	0.00	0.00	296.78	15.82	18.755
20	-1.90	100	56	0.00	0.00	--	0.00	0.00	299.28	17.46	17.138
21	-2.00	100	57	0.00	0.00	--	0.00	0.00	301.76	19.18	15.731
22	-2.10	100	58	0.00	0.00	--	0.00	0.00	304.23	20.98	14.501
23	-2.20	100	59	0.00	0.00	--	0.00	0.00	306.69	22.86	13.417
24	-2.30	100	60	0.00	0.00	--	0.00	0.00	309.14	24.82	12.458
25	-2.40	100	61	0.00	0.00	--	0.00	0.00	311.57	26.85	11.604
26	-2.50	100	61	0.00	0.00	--	0.00	0.00	322.37	28.97	11.129
27	-2.60	100	62	0.00	0.00	--	0.00	0.00	324.85	31.16	10.424
28	-2.70	100	63	0.00	0.00	--	0.00	0.00	327.32	33.44	9.789
29	-2.80	100	64	0.00	0.00	--	0.00	0.00	329.78	35.79	9.214
30	-2.90	100	65	0.00	0.00	--	0.00	0.00	332.23	38.23	8.691
31	-3.00	100	66	0.00	0.00	--	0.00	0.00	334.67	40.74	8.215
32	-3.10	100	67	0.00	0.00	--	0.00	0.00	337.10	43.33	7.780
33	-3.20	100	67	0.00	0.00	--	0.00	0.00	339.52	46.00	7.380
34	-3.30	100	68	0.00	0.00	--	0.00	0.00	341.94	48.75	7.013
35	-3.40	100	69	0.00	0.00	--	0.00	0.00	344.34	51.59	6.675
36	-3.50	100	70	0.00	0.00	--	0.00	0.00	346.74	54.50	6.363
37	-3.60	100	71	0.00	0.00	--	0.00	0.00	357.69	57.49	6.222
38	-3.70	100	72	0.00	0.00	--	0.00	0.00	360.13	60.55	5.947
39	-3.80	100	73	0.00	0.00	--	0.00	0.00	362.56	63.70	5.691
40	-3.90	100	73	0.00	0.00	--	0.00	0.00	364.98	66.93	5.453
41	-4.00	100	74	0.00	0.00	--	0.00	0.00	367.39	70.24	5.231
42	-4.10	100	75	0.00	0.00	--	0.00	0.00	369.80	73.62	5.023
43	-4.20	100	76	0.00	0.00	--	0.00	0.00	372.20	77.09	4.828
44	-4.30	100	77	0.00	0.00	--	0.00	0.00	374.60	80.64	4.646
45	-4.40	100	78	0.00	0.00	--	0.00	0.00	376.99	84.26	4.474
46	-4.50	100	79	0.00	0.00	--	0.00	0.00	379.37	87.97	4.313
47	-4.60	100	79	0.00	0.00	--	0.00	0.00	381.74	91.75	4.161
48	-4.70	100	80	0.00	0.00	--	0.00	0.00	384.11	95.61	4.017
49	-4.80	100	81	0.00	0.00	--	0.00	0.00	395.23	99.56	3.970
50	-4.90	100	82	0.00	0.00	--	0.00	0.00	397.63	103.58	3.839
51	-5.00	100	83	0.00	0.00	--	0.00	0.00	400.03	107.68	3.715
52	-5.10	100	84	0.00	0.00	--	0.00	0.00	402.43	111.86	3.598
53	-5.20	100	85	0.00	0.00	--	0.00	0.00	404.82	116.12	3.486
54	-5.30	100	85	0.00	0.00	--	0.00	0.00	407.20	120.46	3.380
55	-5.40	100	86	0.00	0.00	--	0.00	0.00	409.58	124.88	3.280
56	-5.50	100	87	0.00	0.00	--	0.00	0.00	411.95	129.38	3.184
57	-5.60	100	88	0.00	0.00	--	0.00	0.00	414.32	133.96	3.093
58	-5.70	100	89	0.00	0.00	--	0.00	0.00	416.68	138.61	3.006
59	-5.80	100	90	0.00	0.00	--	0.00	0.00	419.04	143.35	2.923
60	-5.90	100	91	0.00	0.00	--	0.00	0.00	421.39	148.17	2.844
61	-6.00	100	91	0.00	0.00	--	0.00	0.00	441.20	153.06	2.882
62	-6.10	100	92	0.00	0.00	--	0.00	0.00	443.63	158.04	2.807
63	-6.20	100	93	0.00	0.00	--	0.00	0.00	446.06	163.09	2.735
64	-6.30	100	94	0.00	0.00	--	0.00	0.00	448.48	168.23	2.666
65	-6.40	100	95	0.00	0.00	--	0.00	0.00	450.90	173.44	2.600
66	-6.50	100	96	0.00	0.00	--	0.00	0.00	453.31	178.73	2.536
67	-6.60	100	97	0.00	0.00	--	0.00	0.00	547.38	184.10	2.973

n°	Y	B	H	A _{sw}	s	cotθ	V _{Rcd}	V _{Rsd}	V _{Rd}	T	FS
	[m]	[cm]	[cm]	[cmq]	[cm]		[kN]	[kN]	[kN]	[kN]	
68	-6.70	100	97	0.00	0.00	--	0.00	0.00	458.12	189.56	2.417
69	-6.80	100	98	0.00	0.00	--	0.00	0.00	460.52	195.09	2.361
70	-6.90	100	99	0.00	0.00	--	0.00	0.00	462.92	200.70	2.307
71	-7.00	100	100	0.00	0.00	--	0.00	0.00	465.31	206.39	2.255
72	-7.10	100	101	0.00	0.00	--	0.00	0.00	467.70	212.16	2.205
73	-7.20	100	102	0.00	0.00	--	0.00	0.00	470.09	218.01	2.156

Fondazione

Combinazione n° 1 - STR (A1-M1-R3)

n°	Y	B	H	A _{sw}	s	cotθ	V _{Rcd}	V _{Rsd}	V _{Rd}	T	FS
	[m]	[cm]	[cm]	[cmq]	[cm]		[kN]	[kN]	[kN]	[kN]	
1	-1.40	100	120	0.00	0.00	--	0.00	0.00	471.13	0.00	100.000
2	-1.30	100	120	0.00	0.00	--	0.00	0.00	471.13	-19.71	23.906
3	-1.20	100	120	0.00	0.00	--	0.00	0.00	471.13	-39.21	12.017
4	-1.10	100	120	0.00	0.00	--	0.00	0.00	471.13	-58.50	8.054
5	-1.00	100	120	0.00	0.00	--	0.00	0.00	471.13	-77.58	6.073
6	-0.90	100	120	0.00	0.00	--	0.00	0.00	471.13	-96.45	4.885
7	-0.80	100	120	0.00	0.00	--	0.00	0.00	471.13	-115.12	4.093
8	-0.70	100	120	0.00	0.00	--	0.00	0.00	471.13	-133.57	3.527
9	-0.60	100	120	0.00	0.00	--	0.00	0.00	471.13	-151.82	3.103
10	-0.50	100	120	0.00	0.00	--	0.00	0.00	471.13	-169.86	2.774
11	-0.40	100	120	0.00	0.00	--	0.00	0.00	471.13	-187.69	2.510
12	0.62	100	120	0.00	0.00	--	0.00	0.00	471.13	-389.41	1.210
13	0.72	100	120	0.00	0.00	--	0.00	0.00	471.13	-386.85	1.218
14	0.82	100	120	0.00	0.00	--	0.00	0.00	471.13	-384.07	1.227
15	0.92	100	120	0.00	0.00	--	0.00	0.00	471.13	-381.09	1.236
16	1.01	100	120	0.00	0.00	--	0.00	0.00	471.13	-377.90	1.247
17	1.11	100	120	0.00	0.00	--	0.00	0.00	471.13	-374.51	1.258
18	1.21	100	120	0.00	0.00	--	0.00	0.00	471.13	-370.91	1.270
19	1.31	100	120	0.00	0.00	--	0.00	0.00	471.13	-367.11	1.283
20	1.41	100	120	0.00	0.00	--	0.00	0.00	471.13	-363.10	1.298
21	1.51	100	120	0.00	0.00	--	0.00	0.00	471.13	-358.88	1.313
22	1.61	100	120	0.00	0.00	--	0.00	0.00	471.13	-354.46	1.329
23	1.71	100	120	0.00	0.00	--	0.00	0.00	471.13	-349.83	1.347
24	1.81	100	120	0.00	0.00	--	0.00	0.00	471.13	-345.00	1.366
25	1.91	100	120	0.00	0.00	--	0.00	0.00	471.13	-339.96	1.386
26	2.01	100	120	0.00	0.00	--	0.00	0.00	471.13	-334.71	1.408
27	2.11	100	120	0.00	0.00	--	0.00	0.00	471.13	-329.26	1.431
28	2.21	100	120	0.00	0.00	--	0.00	0.00	471.13	-323.60	1.456
29	2.31	100	120	0.00	0.00	--	0.00	0.00	471.13	-317.73	1.483
30	2.41	100	120	0.00	0.00	--	0.00	0.00	471.13	-311.66	1.512
31	2.51	100	120	0.00	0.00	--	0.00	0.00	471.13	-305.38	1.543
32	2.61	100	120	0.00	0.00	--	0.00	0.00	471.13	-298.90	1.576
33	2.70	100	120	0.00	0.00	--	0.00	0.00	471.13	-292.21	1.612
34	2.80	100	120	0.00	0.00	--	0.00	0.00	471.13	-285.32	1.651
35	2.90	100	120	0.00	0.00	--	0.00	0.00	471.13	-278.21	1.693
36	3.00	100	120	0.00	0.00	--	0.00	0.00	471.13	-270.91	1.739
37	3.10	100	120	0.00	0.00	--	0.00	0.00	471.13	-263.39	1.789
38	3.20	100	120	0.00	0.00	--	0.00	0.00	471.13	-255.67	1.843
39	3.30	100	120	0.00	0.00	--	0.00	0.00	471.13	-247.75	1.902
40	3.40	100	120	0.00	0.00	--	0.00	0.00	471.13	-239.62	1.966
41	3.50	100	120	0.00	0.00	--	0.00	0.00	471.13	-231.28	2.037
42	3.60	100	120	0.00	0.00	--	0.00	0.00	471.13	-222.74	2.115
43	3.70	100	120	0.00	0.00	--	0.00	0.00	471.13	-213.99	2.202
44	3.80	100	120	0.00	0.00	--	0.00	0.00	471.13	-205.03	2.298
45	3.90	100	120	0.00	0.00	--	0.00	0.00	471.13	-195.87	2.405
46	4.00	100	120	0.00	0.00	--	0.00	0.00	471.13	-186.50	2.526

n°	Y [m]	B [cm]	H [cm]	A _{sw} [cmq]	s [cm]	cotθ	V _{Rcd} [kN]	V _{Rsd} [kN]	V _{Rd} [kN]	T [kN]	FS
47	4.10	100	120	0.00	0.00	--	0.00	0.00	471.13	-176.93	2.663
48	4.20	100	120	0.00	0.00	--	0.00	0.00	471.13	-167.15	2.819
49	4.29	100	120	0.00	0.00	--	0.00	0.00	471.13	-157.16	2.998
50	4.39	100	120	0.00	0.00	--	0.00	0.00	471.13	-146.97	3.206
51	4.49	100	120	0.00	0.00	--	0.00	0.00	471.13	-136.57	3.450
52	4.59	100	120	0.00	0.00	--	0.00	0.00	471.13	-125.97	3.740
53	4.69	100	120	0.00	0.00	--	0.00	0.00	471.13	-115.16	4.091
54	4.79	100	120	0.00	0.00	--	0.00	0.00	471.13	-101.67	4.634
55	4.89	100	120	0.00	0.00	--	0.00	0.00	471.13	-87.76	5.368
56	4.99	100	120	0.00	0.00	--	0.00	0.00	471.13	-73.65	6.397
57	5.09	100	120	0.00	0.00	--	0.00	0.00	471.13	-59.33	7.940
58	5.19	100	120	0.00	0.00	--	0.00	0.00	471.13	-44.81	10.514
59	5.29	100	120	0.00	0.00	--	0.00	0.00	471.13	-30.08	15.663
60	5.39	100	120	0.00	0.00	--	0.00	0.00	471.13	-15.14	31.114
61	5.49	100	120	0.00	0.00	--	0.00	0.00	373.54	0.00	100.000

Combinazione n° 2 - STR (A1-M1-R3) H + V

n°	Y [m]	B [cm]	H [cm]	A _{sw} [cmq]	s [cm]	cotθ	V _{Rcd} [kN]	V _{Rsd} [kN]	V _{Rd} [kN]	T [kN]	FS
1	-1.40	100	120	0.00	0.00	--	0.00	0.00	471.13	0.00	100.000
2	-1.30	100	120	0.00	0.00	--	0.00	0.00	471.13	-28.95	16.272
3	-1.20	100	120	0.00	0.00	--	0.00	0.00	471.13	-57.45	8.200
4	-1.10	100	120	0.00	0.00	--	0.00	0.00	471.13	-85.50	5.510
5	-1.00	100	120	0.00	0.00	--	0.00	0.00	471.13	-113.10	4.166
6	-0.90	100	120	0.00	0.00	--	0.00	0.00	471.13	-140.24	3.359
7	-0.80	100	120	0.00	0.00	--	0.00	0.00	471.13	-166.93	2.822
8	-0.70	100	120	0.00	0.00	--	0.00	0.00	471.13	-193.17	2.439
9	-0.60	100	120	0.00	0.00	--	0.00	0.00	471.13	-218.96	2.152
10	-0.50	100	120	0.00	0.00	--	0.00	0.00	471.13	-244.29	1.929
11	-0.40	100	120	0.00	0.00	--	0.00	0.00	471.13	-269.17	1.750
12	0.62	100	120	0.00	0.00	--	0.00	0.00	471.13	-244.23	1.929
13	0.72	100	120	0.00	0.00	--	0.00	0.00	471.13	-250.30	1.882
14	0.82	100	120	0.00	0.00	--	0.00	0.00	471.13	-255.92	1.841
15	0.92	100	120	0.00	0.00	--	0.00	0.00	471.13	-261.09	1.804
16	1.01	100	120	0.00	0.00	--	0.00	0.00	471.13	-265.82	1.772
17	1.11	100	120	0.00	0.00	--	0.00	0.00	471.13	-270.10	1.744
18	1.21	100	120	0.00	0.00	--	0.00	0.00	471.13	-273.93	1.720
19	1.31	100	120	0.00	0.00	--	0.00	0.00	471.13	-277.31	1.699
20	1.41	100	120	0.00	0.00	--	0.00	0.00	471.13	-280.25	1.681
21	1.51	100	120	0.00	0.00	--	0.00	0.00	471.13	-282.74	1.666
22	1.61	100	120	0.00	0.00	--	0.00	0.00	471.13	-284.78	1.654
23	1.71	100	120	0.00	0.00	--	0.00	0.00	471.13	-286.38	1.645
24	1.81	100	120	0.00	0.00	--	0.00	0.00	471.13	-287.53	1.639
25	1.91	100	120	0.00	0.00	--	0.00	0.00	471.13	-288.23	1.635
26	2.01	100	120	0.00	0.00	--	0.00	0.00	471.13	-288.49	1.633
27	2.11	100	120	0.00	0.00	--	0.00	0.00	471.13	-288.29	1.634
28	2.21	100	120	0.00	0.00	--	0.00	0.00	471.13	-287.65	1.638
29	2.31	100	120	0.00	0.00	--	0.00	0.00	471.13	-286.57	1.644
30	2.41	100	120	0.00	0.00	--	0.00	0.00	471.13	-285.03	1.653
31	2.51	100	120	0.00	0.00	--	0.00	0.00	471.13	-283.05	1.664
32	2.61	100	120	0.00	0.00	--	0.00	0.00	471.13	-280.63	1.679
33	2.70	100	120	0.00	0.00	--	0.00	0.00	471.13	-277.75	1.696
34	2.80	100	120	0.00	0.00	--	0.00	0.00	471.13	-274.43	1.717
35	2.90	100	120	0.00	0.00	--	0.00	0.00	471.13	-270.66	1.741
36	3.00	100	120	0.00	0.00	--	0.00	0.00	471.13	-266.45	1.768
37	3.10	100	120	0.00	0.00	--	0.00	0.00	471.13	-261.78	1.800
38	3.20	100	120	0.00	0.00	--	0.00	0.00	471.13	-256.67	1.836
39	3.30	100	120	0.00	0.00	--	0.00	0.00	471.13	-251.12	1.876
40	3.40	100	120	0.00	0.00	--	0.00	0.00	471.13	-245.11	1.922
41	3.50	100	120	0.00	0.00	--	0.00	0.00	471.13	-238.66	1.974
42	3.60	100	120	0.00	0.00	--	0.00	0.00	471.13	-231.76	2.033
43	3.70	100	120	0.00	0.00	--	0.00	0.00	471.13	-224.42	2.099

n°	Y [m]	B [cm]	H [cm]	A _{sw} [cmq]	s [cm]	cotθ	V _{Rcd} [kN]	V _{Rsd} [kN]	V _{Rd} [kN]	T [kN]	FS
44	3.80	100	120	0.00	0.00	--	0.00	0.00	471.13	-216.62	2.175
45	3.90	100	120	0.00	0.00	--	0.00	0.00	471.13	-208.38	2.261
46	4.00	100	120	0.00	0.00	--	0.00	0.00	471.13	-199.70	2.359
47	4.10	100	120	0.00	0.00	--	0.00	0.00	471.13	-190.56	2.472
48	4.20	100	120	0.00	0.00	--	0.00	0.00	471.13	-180.98	2.603
49	4.29	100	120	0.00	0.00	--	0.00	0.00	471.13	-170.95	2.756
50	4.39	100	120	0.00	0.00	--	0.00	0.00	471.13	-160.48	2.936
51	4.49	100	120	0.00	0.00	--	0.00	0.00	471.13	-149.56	3.150
52	4.59	100	120	0.00	0.00	--	0.00	0.00	471.13	-138.19	3.409
53	4.69	100	120	0.00	0.00	--	0.00	0.00	471.13	-126.37	3.728
54	4.79	100	120	0.00	0.00	--	0.00	0.00	471.13	-112.28	4.196
55	4.89	100	120	0.00	0.00	--	0.00	0.00	471.13	-97.58	4.828
56	4.99	100	120	0.00	0.00	--	0.00	0.00	471.13	-82.43	5.715
57	5.09	100	120	0.00	0.00	--	0.00	0.00	471.13	-66.84	7.048
58	5.19	100	120	0.00	0.00	--	0.00	0.00	471.13	-50.80	9.274
59	5.29	100	120	0.00	0.00	--	0.00	0.00	471.13	-34.31	13.730
60	5.39	100	120	0.00	0.00	--	0.00	0.00	471.13	-17.38	27.106
61	5.49	100	120	0.00	0.00	--	0.00	0.00	373.54	0.00	100.000

Combinazione n° 3 - STR (A1-M1-R3) H - V

n°	Y [m]	B [cm]	H [cm]	A _{sw} [cmq]	s [cm]	cotθ	V _{Rcd} [kN]	V _{Rsd} [kN]	V _{Rd} [kN]	T [kN]	FS
1	-1.40	100	120	0.00	0.00	--	0.00	0.00	471.13	0.00	100.000
2	-1.30	100	120	0.00	0.00	--	0.00	0.00	471.13	-26.00	18.122
3	-1.20	100	120	0.00	0.00	--	0.00	0.00	471.13	-51.56	9.138
4	-1.10	100	120	0.00	0.00	--	0.00	0.00	471.13	-76.68	6.144
5	-1.00	100	120	0.00	0.00	--	0.00	0.00	471.13	-101.36	4.648
6	-0.90	100	120	0.00	0.00	--	0.00	0.00	471.13	-125.60	3.751
7	-0.80	100	120	0.00	0.00	--	0.00	0.00	471.13	-149.41	3.153
8	-0.70	100	120	0.00	0.00	--	0.00	0.00	471.13	-172.77	2.727
9	-0.60	100	120	0.00	0.00	--	0.00	0.00	471.13	-195.70	2.407
10	-0.50	100	120	0.00	0.00	--	0.00	0.00	471.13	-218.19	2.159
11	-0.40	100	120	0.00	0.00	--	0.00	0.00	471.13	-240.23	1.961
12	0.62	100	120	0.00	0.00	--	0.00	0.00	471.13	-357.19	1.319
13	0.72	100	120	0.00	0.00	--	0.00	0.00	471.13	-360.60	1.307
14	0.82	100	120	0.00	0.00	--	0.00	0.00	471.13	-363.57	1.296
15	0.92	100	120	0.00	0.00	--	0.00	0.00	471.13	-366.12	1.287
16	1.01	100	120	0.00	0.00	--	0.00	0.00	471.13	-368.22	1.279
17	1.11	100	120	0.00	0.00	--	0.00	0.00	471.13	-369.90	1.274
18	1.21	100	120	0.00	0.00	--	0.00	0.00	471.13	-371.14	1.269
19	1.31	100	120	0.00	0.00	--	0.00	0.00	471.13	-371.94	1.267
20	1.41	100	120	0.00	0.00	--	0.00	0.00	471.13	-372.32	1.265
21	1.51	100	120	0.00	0.00	--	0.00	0.00	471.13	-372.26	1.266
22	1.61	100	120	0.00	0.00	--	0.00	0.00	471.13	-371.76	1.267
23	1.71	100	120	0.00	0.00	--	0.00	0.00	471.13	-370.84	1.270
24	1.81	100	120	0.00	0.00	--	0.00	0.00	471.13	-369.48	1.275
25	1.91	100	120	0.00	0.00	--	0.00	0.00	471.13	-367.68	1.281
26	2.01	100	120	0.00	0.00	--	0.00	0.00	471.13	-365.46	1.289
27	2.11	100	120	0.00	0.00	--	0.00	0.00	471.13	-362.80	1.299
28	2.21	100	120	0.00	0.00	--	0.00	0.00	471.13	-359.70	1.310
29	2.31	100	120	0.00	0.00	--	0.00	0.00	471.13	-356.17	1.323
30	2.41	100	120	0.00	0.00	--	0.00	0.00	471.13	-352.21	1.338
31	2.51	100	120	0.00	0.00	--	0.00	0.00	471.13	-347.82	1.355
32	2.61	100	120	0.00	0.00	--	0.00	0.00	471.13	-342.99	1.374
33	2.70	100	120	0.00	0.00	--	0.00	0.00	471.13	-337.73	1.395
34	2.80	100	120	0.00	0.00	--	0.00	0.00	471.13	-332.04	1.419
35	2.90	100	120	0.00	0.00	--	0.00	0.00	471.13	-325.91	1.446
36	3.00	100	120	0.00	0.00	--	0.00	0.00	471.13	-319.35	1.475
37	3.10	100	120	0.00	0.00	--	0.00	0.00	471.13	-312.35	1.508
38	3.20	100	120	0.00	0.00	--	0.00	0.00	471.13	-304.93	1.545
39	3.30	100	120	0.00	0.00	--	0.00	0.00	471.13	-297.07	1.586
40	3.40	100	120	0.00	0.00	--	0.00	0.00	471.13	-288.77	1.631

n°	Y [m]	B [cm]	H [cm]	A _{sw} [cmq]	s [cm]	cotθ	V _{Rcd} [kN]	V _{Rsd} [kN]	V _{Rd} [kN]	T [kN]	FS
41	3.50	100	120	0.00	0.00	--	0.00	0.00	471.13	-280.04	1.682
42	3.60	100	120	0.00	0.00	--	0.00	0.00	471.13	-270.88	1.739
43	3.70	100	120	0.00	0.00	--	0.00	0.00	471.13	-261.29	1.803
44	3.80	100	120	0.00	0.00	--	0.00	0.00	471.13	-251.26	1.875
45	3.90	100	120	0.00	0.00	--	0.00	0.00	471.13	-240.80	1.957
46	4.00	100	120	0.00	0.00	--	0.00	0.00	471.13	-229.90	2.049
47	4.10	100	120	0.00	0.00	--	0.00	0.00	471.13	-218.57	2.155
48	4.20	100	120	0.00	0.00	--	0.00	0.00	471.13	-206.81	2.278
49	4.29	100	120	0.00	0.00	--	0.00	0.00	471.13	-194.62	2.421
50	4.39	100	120	0.00	0.00	--	0.00	0.00	471.13	-181.99	2.589
51	4.49	100	120	0.00	0.00	--	0.00	0.00	471.13	-168.92	2.789
52	4.59	100	120	0.00	0.00	--	0.00	0.00	471.13	-155.43	3.031
53	4.69	100	120	0.00	0.00	--	0.00	0.00	471.13	-141.50	3.330
54	4.79	100	120	0.00	0.00	--	0.00	0.00	471.13	-125.31	3.760
55	4.89	100	120	0.00	0.00	--	0.00	0.00	471.13	-108.52	4.341
56	4.99	100	120	0.00	0.00	--	0.00	0.00	471.13	-91.31	5.160
57	5.09	100	120	0.00	0.00	--	0.00	0.00	471.13	-73.66	6.396
58	5.19	100	120	0.00	0.00	--	0.00	0.00	471.13	-55.57	8.478
59	5.29	100	120	0.00	0.00	--	0.00	0.00	471.13	-37.10	12.700
60	5.39	100	120	0.00	0.00	--	0.00	0.00	471.13	-18.55	25.401
61	5.49	100	120	0.00	0.00	--	0.00	0.00	373.54	0.00	100.000

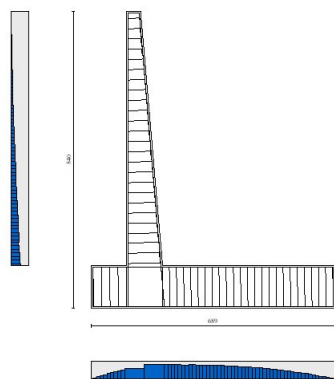


Fig. 11 - Paramento (Inviluppo)

Verifica delle tensioni

Simbologia adottata

n°	indice sezione
Y	ordinata sezione, espressa in [m]

	RADDOPPIO LINEA CODOGNO – CREMONA – MANTOVA TRATTA PIADENA - MANTOVA					
	Relazione di calcolo muro di sostegno sede stradale-NV34	COMMESSA NM25	LOTTO 03 D 26	CODIFICA CL	DOCUMENTO NV 34 05 001	REV. A FOGLIO 81 di 135

B	larghezza sezione, espresso in [cm]
H	altezza sezione, espressa in [cm]
Afi	area ferri inferiori, espresso in [cmq]
Afs	area ferri superiori, espressa in [cmq]
M	momento agente, espressa in [kNm]
N	sforzo normale agente, espressa in [kN]
σ_c	tensione di compressione nel cls, espressa in [kPa]
σ_{fi}	tensione nei ferri inferiori, espressa in [kPa]
σ_{fs}	tensione nei ferri superiori, espressa in [kPa]

Combinazioni SLER

Paramento

Combinazione n° 10 - SLER

Tensione massima di compressione nel calcestruzzo	19920	[kPa]
Tensione massima di trazione dell'acciaio	360000	[kPa]

n°	Y	B	H	Afi	Afs	M	N	σ_c	σ_{fi}	σ_{fs}
	[m]	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kPa]	[kPa]	[kPa]
1	0.00	100	40	18.85	15.71	0.00	0.00	0	0	0
2	-0.10	100	41	18.85	15.71	0.00	0.99	2	32	33
3	-0.20	100	42	18.85	15.71	0.02	2.00	5	60	68
4	-0.30	100	43	18.85	15.71	0.05	3.04	7	82	109
5	-0.40	100	43	18.85	15.71	0.10	4.09	11	97	154
6	-0.50	100	44	18.85	15.71	0.18	5.17	14	105	207
7	-0.60	100	45	18.85	15.71	0.29	6.26	19	103	268
8	-0.70	100	46	18.85	15.71	0.44	7.38	24	92	338
9	-0.80	100	47	18.85	15.71	0.64	8.52	30	69	418
10	-0.90	100	48	18.85	15.71	0.89	9.68	37	35	509
11	-1.00	100	49	18.85	15.71	1.20	10.86	45	23	616
12	-1.10	100	49	18.85	15.71	1.58	12.06	54	123	744
13	-1.20	100	50	18.85	15.71	2.03	13.28	66	284	897
14	-1.30	100	51	18.85	18.85	2.56	14.52	79	484	1066
15	-1.40	100	52	18.85	18.85	3.18	15.79	95	780	1265
16	-1.50	100	53	18.85	18.85	3.89	17.07	113	1162	1487
17	-1.60	100	54	18.85	18.85	4.70	18.38	132	1634	1731
18	-1.70	100	55	18.85	18.85	5.61	19.71	154	2197	1996
19	-1.80	100	55	18.85	18.85	6.63	21.06	177	2852	2282
20	-1.90	100	56	18.85	18.85	7.77	22.43	202	3600	2588
21	-2.00	100	57	18.85	18.85	9.02	23.82	228	4441	2914
22	-2.10	100	58	18.85	18.85	10.41	25.23	257	5375	3260
23	-2.20	100	59	18.85	18.85	11.93	26.66	287	6404	3625
24	-2.30	100	60	18.85	18.85	13.58	28.12	318	7528	4011
25	-2.40	100	61	18.85	18.85	15.38	29.59	352	8748	4416
26	-2.50	100	61	18.85	21.99	17.33	31.09	371	8793	4692

n°	Y	B	H	Afi	Afs	M	N	σ_c	σ_{fi}	σ_{fs}
	[m]	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kPa]	[kPa]	[kPa]
27	-2.60	100	62	18.85	21.99	19.44	32.60	405	10016	5120
28	-2.70	100	63	18.85	21.99	21.71	34.14	441	11325	5567
29	-2.80	100	64	18.85	21.99	24.14	35.70	479	12718	6033
30	-2.90	100	65	18.85	21.99	26.75	37.28	518	14198	6517
31	-3.00	100	66	18.85	21.99	29.54	38.88	559	15765	7021
32	-3.10	100	67	18.85	21.99	32.52	40.50	601	17419	7544
33	-3.20	100	67	18.85	21.99	35.68	42.14	644	19160	8085
34	-3.30	100	68	18.85	21.99	39.05	43.81	689	20991	8645
35	-3.40	100	69	18.85	21.99	42.61	45.49	736	22910	9224
36	-3.50	100	70	18.85	21.99	46.39	47.20	783	24919	9822
37	-3.60	100	71	18.85	25.13	50.38	48.92	799	23894	10121
38	-3.70	100	72	18.85	25.13	54.59	50.67	847	25823	10734
39	-3.80	100	73	18.85	25.13	59.02	52.44	897	27832	11364
40	-3.90	100	73	18.85	25.13	63.69	54.23	948	29921	12011
41	-4.00	100	74	18.85	25.13	68.60	56.04	1000	32091	12676
42	-4.10	100	75	18.85	25.13	73.75	57.87	1054	34343	13358
43	-4.20	100	76	18.85	25.13	79.15	59.73	1109	36675	14058
44	-4.30	100	77	18.85	25.13	84.80	61.60	1165	39090	14774
45	-4.40	100	78	18.85	25.13	90.72	63.50	1222	41586	15508
46	-4.50	100	79	18.85	25.13	96.90	65.41	1281	44164	16258
47	-4.60	100	79	18.85	25.13	103.36	67.35	1341	46825	17026
48	-4.70	100	80	18.85	25.13	110.10	69.31	1402	49569	17810
49	-4.80	100	81	18.85	28.27	117.12	71.29	1409	46933	18072
50	-4.90	100	82	18.85	28.27	124.43	73.29	1470	49534	18862
51	-5.00	100	83	18.85	28.27	132.03	75.31	1532	52210	19668
52	-5.10	100	84	18.85	28.27	139.94	77.35	1595	54960	20490
53	-5.20	100	85	18.85	28.27	148.16	79.41	1660	57786	21327
54	-5.30	100	85	18.85	28.27	156.69	81.50	1725	60686	22179
55	-5.40	100	86	18.85	28.27	165.54	83.60	1792	63661	23047
56	-5.50	100	87	18.85	28.27	174.72	85.73	1859	66712	23930
57	-5.60	100	88	18.85	28.27	184.23	87.88	1928	69838	24828
58	-5.70	100	89	18.85	28.27	194.07	90.04	1998	73040	25741
59	-5.80	100	90	18.85	28.27	204.26	92.23	2068	76318	26669
60	-5.90	100	91	18.85	28.27	214.80	94.44	2140	79671	27612
61	-6.00	100	91	18.85	34.56	225.69	96.67	2072	68816	27101
62	-6.10	100	92	18.85	34.56	236.94	98.93	2141	71710	28017
63	-6.20	100	93	18.85	34.56	248.56	101.20	2210	74668	28946
64	-6.30	100	94	18.85	34.56	260.55	103.49	2281	77689	29888
65	-6.40	100	95	18.85	34.56	272.92	105.81	2353	80772	30844
66	-6.50	100	96	18.85	34.56	285.68	108.15	2425	83919	31813
67	-6.60	100	97	37.70	56.55	298.82	110.50	1941	53841	25992
68	-6.70	100	97	18.85	34.56	312.36	112.88	2573	90401	33789
69	-6.80	100	98	18.85	34.56	326.30	115.28	2648	93737	34797
70	-6.90	100	99	18.85	34.56	340.65	117.70	2724	97137	35818
71	-7.00	100	100	18.85	34.56	355.41	120.14	2802	100600	36851
72	-7.10	100	101	18.85	34.56	370.59	122.61	2879	104126	37896
73	-7.20	100	102	18.85	34.56	386.19	125.09	2958	107715	38955

Fondazione

Combinazione n° 10 - SLER

Tensione massima di compressione nel calcestruzzo 17430 [kPa]

Tensione massima di trazione dell'acciaio 1255271 [kPa]

n°	Y	B	H	Afi	Afs	M	N	σc	σfi	σfs
	[m]	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kPa]	[kPa]	[kPa]
1	-1.40	100	120	26.55	26.55	0.00	0.00	0	0	0
2	-1.30	100	120	26.55	26.55	0.84	0.00	5	290	64
3	-1.20	100	120	26.55	26.55	3.36	0.00	20	1156	256
4	-1.10	100	120	26.55	26.55	7.54	0.00	45	2595	574
5	-1.00	100	120	26.55	26.55	13.38	0.00	79	4602	1017
6	-0.90	100	120	26.55	26.55	20.85	0.00	124	7172	1586
7	-0.80	100	120	26.55	26.55	29.94	0.00	178	10301	2277
8	-0.70	100	120	26.55	26.55	40.65	0.00	241	13984	3092
9	-0.60	100	120	26.55	26.55	52.96	0.00	314	18218	4028
10	-0.50	100	120	26.55	26.55	66.85	0.00	397	22998	5084
11	-0.40	100	120	26.55	26.55	82.32	0.00	489	28319	6261
12	0.62	100	120	26.55	26.55	-481.65	0.00	2860	36631	165689
13	0.72	100	120	26.55	26.55	-467.80	0.00	2778	35577	160922
14	0.82	100	120	26.55	26.55	-453.91	0.00	2695	34521	156145
15	0.92	100	120	26.55	26.55	-440.01	0.00	2613	33464	151362
16	1.01	100	120	26.55	26.55	-426.10	0.00	2530	32406	146577
17	1.11	100	120	26.55	26.55	-412.20	0.00	2447	31349	141796
18	1.21	100	120	26.55	26.55	-398.32	0.00	2365	30293	137021
19	1.31	100	120	26.55	26.55	-384.47	0.00	2283	29240	132258
20	1.41	100	120	26.55	26.55	-370.67	0.00	2201	28191	127511
21	1.51	100	120	26.55	26.55	-356.93	0.00	2119	27146	122785
22	1.61	100	120	26.55	26.55	-343.26	0.00	2038	26106	118082
23	1.71	100	120	26.55	26.55	-329.68	0.00	1957	25073	113409
24	1.81	100	120	26.55	26.55	-316.19	0.00	1877	24047	108769
25	1.91	100	120	26.55	26.55	-302.81	0.00	1798	23030	104166
26	2.01	100	120	26.55	26.55	-289.55	0.00	1719	22021	99606
27	2.11	100	120	26.55	26.55	-276.43	0.00	1641	21023	95091
28	2.21	100	120	26.55	26.55	-263.45	0.00	1564	20036	90627
29	2.31	100	120	26.55	26.55	-250.63	0.00	1488	19061	86218
30	2.41	100	120	26.55	26.55	-237.99	0.00	1413	18100	81868
31	2.51	100	120	26.55	26.55	-225.53	0.00	1339	17152	77581
32	2.61	100	120	26.55	26.55	-213.26	0.00	1266	16219	73362
33	2.70	100	120	26.55	26.55	-201.21	0.00	1195	15303	69216
34	2.80	100	120	26.55	26.55	-189.38	0.00	1124	14403	65146
35	2.90	100	120	26.55	26.55	-177.78	0.00	1056	13521	61157
36	3.00	100	120	26.55	26.55	-166.43	0.00	988	12658	57253
37	3.10	100	120	26.55	26.55	-155.34	0.00	922	11814	53438
38	3.20	100	120	26.55	26.55	-144.53	0.00	858	10992	49718
39	3.30	100	120	26.55	26.55	-134.00	0.00	796	10191	46095
40	3.40	100	120	26.55	26.55	-123.77	0.00	735	9413	42575
41	3.50	100	120	26.55	26.55	-113.84	0.00	676	8658	39162
42	3.60	100	120	26.55	26.55	-104.24	0.00	619	7928	35860
43	3.70	100	120	26.55	26.55	-94.98	0.00	564	7224	32673
44	3.80	100	120	26.55	26.55	-86.07	0.00	511	6546	29607
45	3.90	100	120	26.55	26.55	-77.51	0.00	460	5895	26664
46	4.00	100	120	26.55	26.55	-69.33	0.00	412	5273	23850
47	4.10	100	120	26.55	26.55	-61.54	0.00	365	4680	21169
48	4.20	100	120	26.55	26.55	-54.14	0.00	321	4118	18625
49	4.29	100	120	26.55	26.55	-47.16	0.00	280	3586	16222
50	4.39	100	120	26.55	26.55	-40.60	0.00	241	3087	13965
51	4.49	100	120	26.55	26.55	-34.47	0.00	205	2622	11858
52	4.59	100	120	26.55	26.55	-28.80	0.00	171	2190	9906
53	4.69	100	120	26.55	26.55	-23.58	0.00	140	1793	8112
54	4.79	100	120	26.55	26.55	-18.21	0.00	108	1385	6263
55	4.89	100	120	26.55	26.55	-13.45	0.00	80	1023	4627
56	4.99	100	120	26.55	26.55	-9.39	0.00	56	714	3231
57	5.09	100	120	26.55	26.55	-6.05	0.00	36	460	2080
58	5.19	100	120	26.55	26.55	-3.42	0.00	20	260	1176
59	5.29	100	120	26.55	26.55	-1.53	0.00	9	116	526
60	5.39	100	120	26.55	26.55	-0.38	0.00	2	29	132
61	5.49	100	120	0.00	0.00	0.00	0.00	0	0	0

Combinazioni SLEF

Paramento

Combinazione n° 11 - SLEF

Tensione massima di compressione nel calcestruzzo 33200 [kPa]

Tensione massima di trazione dell'acciaio 450000 [kPa]

n°	Y	B	H	Afi	Afs	M	N	σc	σfi	σfs
	[m]	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kPa]	[kPa]	[kPa]
1	0.00	100	40	18.85	15.71	0.00	0.00	0	0	0
2	-0.10	100	41	18.85	15.71	0.00	0.99	2	32	33
3	-0.20	100	42	18.85	15.71	0.02	2.00	5	60	68
4	-0.30	100	43	18.85	15.71	0.05	3.04	7	82	109
5	-0.40	100	43	18.85	15.71	0.10	4.09	11	97	154
6	-0.50	100	44	18.85	15.71	0.18	5.17	14	105	207
7	-0.60	100	45	18.85	15.71	0.29	6.26	19	103	268
8	-0.70	100	46	18.85	15.71	0.44	7.38	24	92	338
9	-0.80	100	47	18.85	15.71	0.64	8.52	30	69	418
10	-0.90	100	48	18.85	15.71	0.89	9.68	37	35	509
11	-1.00	100	49	18.85	15.71	1.20	10.86	45	23	616
12	-1.10	100	49	18.85	15.71	1.58	12.06	54	123	744
13	-1.20	100	50	18.85	15.71	2.03	13.28	66	284	897
14	-1.30	100	51	18.85	18.85	2.56	14.52	79	484	1066
15	-1.40	100	52	18.85	18.85	3.18	15.79	95	780	1265
16	-1.50	100	53	18.85	18.85	3.89	17.07	113	1162	1487
17	-1.60	100	54	18.85	18.85	4.70	18.38	132	1634	1731
18	-1.70	100	55	18.85	18.85	5.61	19.71	154	2197	1996
19	-1.80	100	55	18.85	18.85	6.63	21.06	177	2852	2282
20	-1.90	100	56	18.85	18.85	7.77	22.43	202	3600	2588
21	-2.00	100	57	18.85	18.85	9.02	23.82	228	4441	2914
22	-2.10	100	58	18.85	18.85	10.41	25.23	257	5375	3260
23	-2.20	100	59	18.85	18.85	11.93	26.66	287	6404	3625
24	-2.30	100	60	18.85	18.85	13.58	28.12	318	7528	4011
25	-2.40	100	61	18.85	18.85	15.38	29.59	352	8748	4416
26	-2.50	100	61	18.85	21.99	17.33	31.09	371	8793	4692
27	-2.60	100	62	18.85	21.99	19.44	32.60	405	10016	5120
28	-2.70	100	63	18.85	21.99	21.71	34.14	441	11325	5567
29	-2.80	100	64	18.85	21.99	24.14	35.70	479	12718	6033
30	-2.90	100	65	18.85	21.99	26.75	37.28	518	14198	6517
31	-3.00	100	66	18.85	21.99	29.54	38.88	559	15765	7021
32	-3.10	100	67	18.85	21.99	32.52	40.50	601	17419	7544
33	-3.20	100	67	18.85	21.99	35.68	42.14	644	19160	8085
34	-3.30	100	68	18.85	21.99	39.05	43.81	689	20991	8645
35	-3.40	100	69	18.85	21.99	42.61	45.49	736	22910	9224
36	-3.50	100	70	18.85	21.99	46.39	47.20	783	24919	9822
37	-3.60	100	71	18.85	25.13	50.38	48.92	799	23894	10121
38	-3.70	100	72	18.85	25.13	54.59	50.67	847	25823	10734
39	-3.80	100	73	18.85	25.13	59.02	52.44	897	27832	11364
40	-3.90	100	73	18.85	25.13	63.69	54.23	948	29921	12011
41	-4.00	100	74	18.85	25.13	68.60	56.04	1000	32091	12676
42	-4.10	100	75	18.85	25.13	73.75	57.87	1054	34343	13358
43	-4.20	100	76	18.85	25.13	79.15	59.73	1109	36675	14058
44	-4.30	100	77	18.85	25.13	84.80	61.60	1165	39090	14774
45	-4.40	100	78	18.85	25.13	90.72	63.50	1222	41586	15508

n°	Y [m]	B [cm]	H [cm]	Afi [cmq]	Afs [cmq]	M [kNm]	N [kN]	σc [kPa]	σfi [kPa]	σfs [kPa]
46	-4.50	100	79	18.85	25.13	96.90	65.41	1281	44164	16258
47	-4.60	100	79	18.85	25.13	103.36	67.35	1341	46825	17026
48	-4.70	100	80	18.85	25.13	110.10	69.31	1402	49569	17810
49	-4.80	100	81	18.85	28.27	117.12	71.29	1409	46933	18072
50	-4.90	100	82	18.85	28.27	124.43	73.29	1470	49534	18862
51	-5.00	100	83	18.85	28.27	132.03	75.31	1532	52210	19668
52	-5.10	100	84	18.85	28.27	139.94	77.35	1595	54960	20490
53	-5.20	100	85	18.85	28.27	148.16	79.41	1660	57786	21327
54	-5.30	100	85	18.85	28.27	156.69	81.50	1725	60686	22179
55	-5.40	100	86	18.85	28.27	165.54	83.60	1792	63661	23047
56	-5.50	100	87	18.85	28.27	174.72	85.73	1859	66712	23930
57	-5.60	100	88	18.85	28.27	184.23	87.88	1928	69838	24828
58	-5.70	100	89	18.85	28.27	194.07	90.04	1998	73040	25741
59	-5.80	100	90	18.85	28.27	204.26	92.23	2068	76318	26669
60	-5.90	100	91	18.85	28.27	214.80	94.44	2140	79671	27612
61	-6.00	100	91	18.85	34.56	225.69	96.67	2072	68816	27101
62	-6.10	100	92	18.85	34.56	236.94	98.93	2141	71710	28017
63	-6.20	100	93	18.85	34.56	248.56	101.20	2210	74668	28946
64	-6.30	100	94	18.85	34.56	260.55	103.49	2281	77689	29888
65	-6.40	100	95	18.85	34.56	272.92	105.81	2353	80772	30844
66	-6.50	100	96	18.85	34.56	285.68	108.15	2425	83919	31813
67	-6.60	100	97	37.70	56.55	298.82	110.50	1941	53841	25992
68	-6.70	100	97	18.85	34.56	312.36	112.88	2573	90401	33789
69	-6.80	100	98	18.85	34.56	326.30	115.28	2648	93737	34797
70	-6.90	100	99	18.85	34.56	340.65	117.70	2724	97137	35818
71	-7.00	100	100	18.85	34.56	355.41	120.14	2802	100600	36851
72	-7.10	100	101	18.85	34.56	370.59	122.61	2879	104126	37896
73	-7.20	100	102	18.85	34.56	386.19	125.09	2958	107715	38955

Fondazione

Combinazione n° 11 - SLEF

Tensione massima di compressione nel calcestruzzo 29050 [kPa]

Tensione massima di trazione dell'acciaio 1569089 [kPa]

n°	Y [m]	B [cm]	H [cm]	Afi [cmq]	Afs [cmq]	M [kNm]	N [kN]	σc [kPa]	σfi [kPa]	σfs [kPa]
1	-1.40	100	120	26.55	26.55	0.00	0.00	0	0	0
2	-1.30	100	120	26.55	26.55	0.84	0.00	5	290	64
3	-1.20	100	120	26.55	26.55	3.36	0.00	20	1156	256
4	-1.10	100	120	26.55	26.55	7.54	0.00	45	2595	574
5	-1.00	100	120	26.55	26.55	13.38	0.00	79	4602	1017
6	-0.90	100	120	26.55	26.55	20.85	0.00	124	7172	1586
7	-0.80	100	120	26.55	26.55	29.94	0.00	178	10301	2277
8	-0.70	100	120	26.55	26.55	40.65	0.00	241	13984	3092
9	-0.60	100	120	26.55	26.55	52.96	0.00	314	18218	4028
10	-0.50	100	120	26.55	26.55	66.85	0.00	397	22998	5084
11	-0.40	100	120	26.55	26.55	82.32	0.00	489	28319	6261
12	0.62	100	120	26.55	26.55	-481.65	0.00	2860	36631	165689
13	0.72	100	120	26.55	26.55	-467.80	0.00	2778	35577	160922
14	0.82	100	120	26.55	26.55	-453.91	0.00	2695	34521	156145
15	0.92	100	120	26.55	26.55	-440.01	0.00	2613	33464	151362
16	1.01	100	120	26.55	26.55	-426.10	0.00	2530	32406	146577

n°	Y [m]	B [cm]	H [cm]	Afi [cmq]	Afs [cmq]	M [kNm]	N [kN]	σc [kPa]	σfi [kPa]	σfs [kPa]
17	1.11	100	120	26.55	26.55	-412.20	0.00	2447	31349	141796
18	1.21	100	120	26.55	26.55	-398.32	0.00	2365	30293	137021
19	1.31	100	120	26.55	26.55	-384.47	0.00	2283	29240	132258
20	1.41	100	120	26.55	26.55	-370.67	0.00	2201	28191	127511
21	1.51	100	120	26.55	26.55	-356.93	0.00	2119	27146	122785
22	1.61	100	120	26.55	26.55	-343.26	0.00	2038	26106	118082
23	1.71	100	120	26.55	26.55	-329.68	0.00	1957	25073	113409
24	1.81	100	120	26.55	26.55	-316.19	0.00	1877	24047	108769
25	1.91	100	120	26.55	26.55	-302.81	0.00	1798	23030	104166
26	2.01	100	120	26.55	26.55	-289.55	0.00	1719	22021	99606
27	2.11	100	120	26.55	26.55	-276.43	0.00	1641	21023	95091
28	2.21	100	120	26.55	26.55	-263.45	0.00	1564	20036	90627
29	2.31	100	120	26.55	26.55	-250.63	0.00	1488	19061	86218
30	2.41	100	120	26.55	26.55	-237.99	0.00	1413	18100	81868
31	2.51	100	120	26.55	26.55	-225.53	0.00	1339	17152	77581
32	2.61	100	120	26.55	26.55	-213.26	0.00	1266	16219	73362
33	2.70	100	120	26.55	26.55	-201.21	0.00	1195	15303	69216
34	2.80	100	120	26.55	26.55	-189.38	0.00	1124	14403	65146
35	2.90	100	120	26.55	26.55	-177.78	0.00	1056	13521	61157
36	3.00	100	120	26.55	26.55	-166.43	0.00	988	12658	57253
37	3.10	100	120	26.55	26.55	-155.34	0.00	922	11814	53438
38	3.20	100	120	26.55	26.55	-144.53	0.00	858	10992	49718
39	3.30	100	120	26.55	26.55	-134.00	0.00	796	10191	46095
40	3.40	100	120	26.55	26.55	-123.77	0.00	735	9413	42575
41	3.50	100	120	26.55	26.55	-113.84	0.00	676	8658	39162
42	3.60	100	120	26.55	26.55	-104.24	0.00	619	7928	35860
43	3.70	100	120	26.55	26.55	-94.98	0.00	564	7224	32673
44	3.80	100	120	26.55	26.55	-86.07	0.00	511	6546	29607
45	3.90	100	120	26.55	26.55	-77.51	0.00	460	5895	26664
46	4.00	100	120	26.55	26.55	-69.33	0.00	412	5273	23850
47	4.10	100	120	26.55	26.55	-61.54	0.00	365	4680	21169
48	4.20	100	120	26.55	26.55	-54.14	0.00	321	4118	18625
49	4.29	100	120	26.55	26.55	-47.16	0.00	280	3586	16222
50	4.39	100	120	26.55	26.55	-40.60	0.00	241	3087	13965
51	4.49	100	120	26.55	26.55	-34.47	0.00	205	2622	11858
52	4.59	100	120	26.55	26.55	-28.80	0.00	171	2190	9906
53	4.69	100	120	26.55	26.55	-23.58	0.00	140	1793	8112
54	4.79	100	120	26.55	26.55	-18.21	0.00	108	1385	6263
55	4.89	100	120	26.55	26.55	-13.45	0.00	80	1023	4627
56	4.99	100	120	26.55	26.55	-9.39	0.00	56	714	3231
57	5.09	100	120	26.55	26.55	-6.05	0.00	36	460	2080
58	5.19	100	120	26.55	26.55	-3.42	0.00	20	260	1176
59	5.29	100	120	26.55	26.55	-1.53	0.00	9	116	526
60	5.39	100	120	26.55	26.55	-0.38	0.00	2	29	132
61	5.49	100	120	0.00	0.00	0.00	0.00	0	0	0

Combinazioni SLEQ

Paramento

Combinazione n° 12 - SLEQ

Tensione massima di compressione nel calcestruzzo	14940	[kPa]
Tensione massima di trazione dell'acciaio	450000	[kPa]

n°	Y	B	H	Afi	Afs	M	N	σc	σfi	σfs
	[m]	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kPa]	[kPa]	[kPa]
1	0.00	100	40	18.85	15.71	0.00	0.00	0	0	0
2	-0.10	100	41	18.85	15.71	0.00	0.99	2	32	33
3	-0.20	100	42	18.85	15.71	0.02	2.00	5	60	68
4	-0.30	100	43	18.85	15.71	0.05	3.04	7	82	109
5	-0.40	100	43	18.85	15.71	0.10	4.09	11	97	154
6	-0.50	100	44	18.85	15.71	0.18	5.17	14	105	207
7	-0.60	100	45	18.85	15.71	0.29	6.26	19	103	268
8	-0.70	100	46	18.85	15.71	0.44	7.38	24	92	338
9	-0.80	100	47	18.85	15.71	0.64	8.52	30	69	418
10	-0.90	100	48	18.85	15.71	0.89	9.68	37	35	509
11	-1.00	100	49	18.85	15.71	1.20	10.86	45	23	616
12	-1.10	100	49	18.85	15.71	1.58	12.06	54	123	744
13	-1.20	100	50	18.85	15.71	2.03	13.28	66	284	897
14	-1.30	100	51	18.85	18.85	2.56	14.52	79	484	1066
15	-1.40	100	52	18.85	18.85	3.18	15.79	95	780	1265
16	-1.50	100	53	18.85	18.85	3.89	17.07	113	1162	1487
17	-1.60	100	54	18.85	18.85	4.70	18.38	132	1634	1731
18	-1.70	100	55	18.85	18.85	5.61	19.71	154	2197	1996
19	-1.80	100	55	18.85	18.85	6.63	21.06	177	2852	2282
20	-1.90	100	56	18.85	18.85	7.77	22.43	202	3600	2588
21	-2.00	100	57	18.85	18.85	9.02	23.82	228	4441	2914
22	-2.10	100	58	18.85	18.85	10.41	25.23	257	5375	3260
23	-2.20	100	59	18.85	18.85	11.93	26.66	287	6404	3625
24	-2.30	100	60	18.85	18.85	13.58	28.12	318	7528	4011
25	-2.40	100	61	18.85	18.85	15.38	29.59	352	8748	4416
26	-2.50	100	61	18.85	21.99	17.33	31.09	371	8793	4692
27	-2.60	100	62	18.85	21.99	19.44	32.60	405	10016	5120
28	-2.70	100	63	18.85	21.99	21.71	34.14	441	11325	5567
29	-2.80	100	64	18.85	21.99	24.14	35.70	479	12718	6033
30	-2.90	100	65	18.85	21.99	26.75	37.28	518	14198	6517
31	-3.00	100	66	18.85	21.99	29.54	38.88	559	15765	7021
32	-3.10	100	67	18.85	21.99	32.52	40.50	601	17419	7544
33	-3.20	100	67	18.85	21.99	35.68	42.14	644	19160	8085
34	-3.30	100	68	18.85	21.99	39.05	43.81	689	20991	8645
35	-3.40	100	69	18.85	21.99	42.61	45.49	736	22910	9224
36	-3.50	100	70	18.85	21.99	46.39	47.20	783	24919	9822
37	-3.60	100	71	18.85	25.13	50.38	48.92	799	23894	10121
38	-3.70	100	72	18.85	25.13	54.59	50.67	847	25823	10734
39	-3.80	100	73	18.85	25.13	59.02	52.44	897	27832	11364
40	-3.90	100	73	18.85	25.13	63.69	54.23	948	29921	12011
41	-4.00	100	74	18.85	25.13	68.60	56.04	1000	32091	12676
42	-4.10	100	75	18.85	25.13	73.75	57.87	1054	34343	13358
43	-4.20	100	76	18.85	25.13	79.15	59.73	1109	36675	14058
44	-4.30	100	77	18.85	25.13	84.80	61.60	1165	39090	14774
45	-4.40	100	78	18.85	25.13	90.72	63.50	1222	41586	15508
46	-4.50	100	79	18.85	25.13	96.90	65.41	1281	44164	16258
47	-4.60	100	79	18.85	25.13	103.36	67.35	1341	46825	17026
48	-4.70	100	80	18.85	25.13	110.10	69.31	1402	49569	17810
49	-4.80	100	81	18.85	28.27	117.12	71.29	1409	46933	18072
50	-4.90	100	82	18.85	28.27	124.43	73.29	1470	49534	18862
51	-5.00	100	83	18.85	28.27	132.03	75.31	1532	52210	19668
52	-5.10	100	84	18.85	28.27	139.94	77.35	1595	54960	20490
53	-5.20	100	85	18.85	28.27	148.16	79.41	1660	57786	21327
54	-5.30	100	85	18.85	28.27	156.69	81.50	1725	60686	22179
55	-5.40	100	86	18.85	28.27	165.54	83.60	1792	63661	23047
56	-5.50	100	87	18.85	28.27	174.72	85.73	1859	66712	23930
57	-5.60	100	88	18.85	28.27	184.23	87.88	1928	69838	24828
58	-5.70	100	89	18.85	28.27	194.07	90.04	1998	73040	25741
59	-5.80	100	90	18.85	28.27	204.26	92.23	2068	76318	26669
60	-5.90	100	91	18.85	28.27	214.80	94.44	2140	79671	27612
61	-6.00	100	91	18.85	34.56	225.69	96.67	2072	68816	27101
62	-6.10	100	92	18.85	34.56	236.94	98.93	2141	71710	28017
63	-6.20	100	93	18.85	34.56	248.56	101.20	2210	74668	28946

n°	Y	B	H	Afi	Afs	M	N	σc	σfi	σfs
	[m]	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kPa]	[kPa]	[kPa]
64	-6.30	100	94	18.85	34.56	260.55	103.49	2281	77689	29888
65	-6.40	100	95	18.85	34.56	272.92	105.81	2353	80772	30844
66	-6.50	100	96	18.85	34.56	285.68	108.15	2425	83919	31813
67	-6.60	100	97	37.70	56.55	298.82	110.50	1941	53841	25992
68	-6.70	100	97	18.85	34.56	312.36	112.88	2573	90401	33789
69	-6.80	100	98	18.85	34.56	326.30	115.28	2648	93737	34797
70	-6.90	100	99	18.85	34.56	340.65	117.70	2724	97137	35818
71	-7.00	100	100	18.85	34.56	355.41	120.14	2802	100600	36851
72	-7.10	100	101	18.85	34.56	370.59	122.61	2879	104126	37896
73	-7.20	100	102	18.85	34.56	386.19	125.09	2958	107715	38955

Combinazione n° 13 - SLEQ H + V

Tensione massima di compressione nel calcestruzzo 14940 [kPa]

Tensione massima di trazione dell'acciaio 450000 [kPa]

n°	Y	B	H	Afi	Afs	M	N	σc	σfi	σfs
	[m]	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kPa]	[kPa]	[kPa]
1	0.00	100	40	18.85	15.71	0.00	0.00	0	0	0
2	-0.10	100	41	18.85	15.71	0.01	0.99	2	30	34
3	-0.20	100	42	18.85	15.71	0.04	2.00	5	53	75
4	-0.30	100	43	18.85	15.71	0.09	3.04	9	67	123
5	-0.40	100	43	18.85	15.71	0.18	4.09	13	70	181
6	-0.50	100	44	18.85	15.71	0.31	5.17	18	61	250
7	-0.60	100	45	18.85	15.71	0.50	6.26	24	40	331
8	-0.70	100	46	18.85	15.71	0.74	7.38	31	0	426
9	-0.80	100	47	18.85	15.71	1.04	8.52	40	79	542
10	-0.90	100	48	18.85	15.71	1.42	9.68	51	220	685
11	-1.00	100	49	18.85	15.71	1.87	10.86	64	446	857
12	-1.10	100	49	18.85	15.71	2.42	12.06	81	775	1058
13	-1.20	100	50	18.85	15.71	3.06	13.28	99	1220	1287
14	-1.30	100	51	18.85	18.85	3.80	14.52	117	1568	1505
15	-1.40	100	52	18.85	18.85	4.65	15.79	139	2155	1774
16	-1.50	100	53	18.85	18.85	5.62	17.07	163	2846	2066
17	-1.60	100	54	18.85	18.85	6.71	18.38	189	3644	2383
18	-1.70	100	55	18.85	18.85	7.93	19.71	217	4549	2723
19	-1.80	100	55	18.85	18.85	9.30	21.06	248	5565	3088
20	-1.90	100	56	18.85	18.85	10.81	22.43	280	6692	3477
21	-2.00	100	57	18.85	18.85	12.47	23.82	314	7931	3890
22	-2.10	100	58	18.85	18.85	14.30	25.23	351	9286	4328
23	-2.20	100	59	18.85	18.85	16.29	26.66	389	10757	4790
24	-2.30	100	60	18.85	18.85	18.47	28.12	430	12347	5277
25	-2.40	100	61	18.85	18.85	20.82	29.59	472	14056	5788
26	-2.50	100	61	18.85	21.99	23.37	31.09	494	13805	6122
27	-2.60	100	62	18.85	21.99	26.11	32.60	538	15491	6663
28	-2.70	100	63	18.85	21.99	29.06	34.14	584	17285	7227
29	-2.80	100	64	18.85	21.99	32.23	35.70	632	19185	7816
30	-2.90	100	65	18.85	21.99	35.61	37.28	681	21195	8428
31	-3.00	100	66	18.85	21.99	39.22	38.88	733	23313	9064
32	-3.10	100	67	18.85	21.99	43.07	40.50	786	25543	9723
33	-3.20	100	67	18.85	21.99	47.16	42.14	842	27883	10407
34	-3.30	100	68	18.85	21.99	51.50	43.81	899	30336	11113
35	-3.40	100	69	18.85	21.99	56.09	45.49	958	32901	11844
36	-3.50	100	70	18.85	21.99	60.95	47.20	1018	35579	12597
37	-3.60	100	71	18.85	25.13	66.09	48.92	1035	33872	12963
38	-3.70	100	72	18.85	25.13	71.50	50.67	1097	36432	13736
39	-3.80	100	73	18.85	25.13	77.20	52.44	1159	39094	14530
40	-3.90	100	73	18.85	25.13	83.19	54.23	1224	41857	15347

n°	Y	B	H	Afi	Afs	M	N	σc	σfi	σfs
	[m]	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kPa]	[kPa]	[kPa]
41	-4.00	100	74	18.85	25.13	89.49	56.04	1290	44723	16185
42	-4.10	100	75	18.85	25.13	96.09	57.87	1358	47692	17046
43	-4.20	100	76	18.85	25.13	103.02	59.73	1427	50764	17928
44	-4.30	100	77	18.85	25.13	110.26	61.60	1498	53940	18831
45	-4.40	100	78	18.85	25.13	117.84	63.50	1571	57220	19756
46	-4.50	100	79	18.85	25.13	125.75	65.41	1645	60605	20702
47	-4.60	100	79	18.85	25.13	134.01	67.35	1721	64094	21669
48	-4.70	100	80	18.85	25.13	142.62	69.31	1798	67689	22657
49	-4.80	100	81	18.85	28.27	151.60	71.29	1805	63885	22976
50	-4.90	100	82	18.85	28.27	160.94	73.29	1882	67286	23972
51	-5.00	100	83	18.85	28.27	170.66	75.31	1960	70781	24988
52	-5.10	100	84	18.85	28.27	180.76	77.35	2040	74371	26023
53	-5.20	100	85	18.85	28.27	191.24	79.41	2121	78057	27078
54	-5.30	100	85	18.85	28.27	202.13	81.50	2204	81837	28153
55	-5.40	100	86	18.85	28.27	213.42	83.60	2288	85714	29246
56	-5.50	100	87	18.85	28.27	225.13	85.73	2373	89686	30359
57	-5.60	100	88	18.85	28.27	237.25	87.88	2460	93754	31491
58	-5.70	100	89	18.85	28.27	249.80	90.04	2548	97919	32642
59	-5.80	100	90	18.85	28.27	262.79	92.23	2638	102179	33811
60	-5.90	100	91	18.85	28.27	276.21	94.44	2728	106537	34999
61	-6.00	100	91	18.85	34.56	290.09	96.67	2637	91803	34331
62	-6.10	100	92	18.85	34.56	304.42	98.93	2724	95559	35485
63	-6.20	100	93	18.85	34.56	319.22	101.20	2812	99395	36655
64	-6.30	100	94	18.85	34.56	334.48	103.49	2901	103311	37843
65	-6.40	100	95	18.85	34.56	350.23	105.81	2992	107307	39047
66	-6.50	100	96	18.85	34.56	366.46	108.15	3083	111383	40267
67	-6.60	100	97	37.70	56.55	383.19	110.50	2459	71321	32816
68	-6.70	100	97	18.85	34.56	400.41	112.88	3270	119776	42758
69	-6.80	100	98	18.85	34.56	418.15	115.28	3365	124093	44027
70	-6.90	100	99	18.85	34.56	436.39	117.70	3461	128491	45313
71	-7.00	100	100	18.85	34.56	455.17	120.14	3558	132969	46614
72	-7.10	100	101	18.85	34.56	474.47	122.61	3656	137529	47932
73	-7.20	100	102	18.85	34.56	494.31	125.09	3756	142169	49265

Fondazione

Combinazione n° 12 - SLEQ

Tensione massima di compressione nel calcestruzzo 13073 [kPa]

Tensione massima di trazione dell'acciaio 1569089 [kPa]

n°	Y	B	H	Afi	Afs	M	N	σc	σfi	σfs
	[m]	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kPa]	[kPa]	[kPa]
1	-1.40	100	120	26.55	26.55	0.00	0.00	0	0	0
2	-1.30	100	120	26.55	26.55	0.84	0.00	5	290	64
3	-1.20	100	120	26.55	26.55	3.36	0.00	20	1156	256
4	-1.10	100	120	26.55	26.55	7.54	0.00	45	2595	574
5	-1.00	100	120	26.55	26.55	13.38	0.00	79	4602	1017
6	-0.90	100	120	26.55	26.55	20.85	0.00	124	7172	1586
7	-0.80	100	120	26.55	26.55	29.94	0.00	178	10301	2277
8	-0.70	100	120	26.55	26.55	40.65	0.00	241	13984	3092
9	-0.60	100	120	26.55	26.55	52.96	0.00	314	18218	4028
10	-0.50	100	120	26.55	26.55	66.85	0.00	397	22998	5084
11	-0.40	100	120	26.55	26.55	82.32	0.00	489	28319	6261

n°	Y	B	H	Afi	Afs	M	N	σc	σfi	σfs
	[m]	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kPa]	[kPa]	[kPa]
12	0.62	100	120	26.55	26.55	-481.65	0.00	2860	36631	165689
13	0.72	100	120	26.55	26.55	-467.80	0.00	2778	35577	160922
14	0.82	100	120	26.55	26.55	-453.91	0.00	2695	34521	156145
15	0.92	100	120	26.55	26.55	-440.01	0.00	2613	33464	151362
16	1.01	100	120	26.55	26.55	-426.10	0.00	2530	32406	146577
17	1.11	100	120	26.55	26.55	-412.20	0.00	2447	31349	141796
18	1.21	100	120	26.55	26.55	-398.32	0.00	2365	30293	137021
19	1.31	100	120	26.55	26.55	-384.47	0.00	2283	29240	132258
20	1.41	100	120	26.55	26.55	-370.67	0.00	2201	28191	127511
21	1.51	100	120	26.55	26.55	-356.93	0.00	2119	27146	122785
22	1.61	100	120	26.55	26.55	-343.26	0.00	2038	26106	118082
23	1.71	100	120	26.55	26.55	-329.68	0.00	1957	25073	113409
24	1.81	100	120	26.55	26.55	-316.19	0.00	1877	24047	108769
25	1.91	100	120	26.55	26.55	-302.81	0.00	1798	23030	104166
26	2.01	100	120	26.55	26.55	-289.55	0.00	1719	22021	99606
27	2.11	100	120	26.55	26.55	-276.43	0.00	1641	21023	95091
28	2.21	100	120	26.55	26.55	-263.45	0.00	1564	20036	90627
29	2.31	100	120	26.55	26.55	-250.63	0.00	1488	19061	86218
30	2.41	100	120	26.55	26.55	-237.99	0.00	1413	18100	81868
31	2.51	100	120	26.55	26.55	-225.53	0.00	1339	17152	77581
32	2.61	100	120	26.55	26.55	-213.26	0.00	1266	16219	73362
33	2.70	100	120	26.55	26.55	-201.21	0.00	1195	15303	69216
34	2.80	100	120	26.55	26.55	-189.38	0.00	1124	14403	65146
35	2.90	100	120	26.55	26.55	-177.78	0.00	1056	13521	61157
36	3.00	100	120	26.55	26.55	-166.43	0.00	988	12658	57253
37	3.10	100	120	26.55	26.55	-155.34	0.00	922	11814	53438
38	3.20	100	120	26.55	26.55	-144.53	0.00	858	10992	49718
39	3.30	100	120	26.55	26.55	-134.00	0.00	796	10191	46095
40	3.40	100	120	26.55	26.55	-123.77	0.00	735	9413	42575
41	3.50	100	120	26.55	26.55	-113.84	0.00	676	8658	39162
42	3.60	100	120	26.55	26.55	-104.24	0.00	619	7928	35860
43	3.70	100	120	26.55	26.55	-94.98	0.00	564	7224	32673
44	3.80	100	120	26.55	26.55	-86.07	0.00	511	6546	29607
45	3.90	100	120	26.55	26.55	-77.51	0.00	460	5895	26664
46	4.00	100	120	26.55	26.55	-69.33	0.00	412	5273	23850
47	4.10	100	120	26.55	26.55	-61.54	0.00	365	4680	21169
48	4.20	100	120	26.55	26.55	-54.14	0.00	321	4118	18625
49	4.29	100	120	26.55	26.55	-47.16	0.00	280	3586	16222
50	4.39	100	120	26.55	26.55	-40.60	0.00	241	3087	13965
51	4.49	100	120	26.55	26.55	-34.47	0.00	205	2622	11858
52	4.59	100	120	26.55	26.55	-28.80	0.00	171	2190	9906
53	4.69	100	120	26.55	26.55	-23.58	0.00	140	1793	8112
54	4.79	100	120	26.55	26.55	-18.21	0.00	108	1385	6263
55	4.89	100	120	26.55	26.55	-13.45	0.00	80	1023	4627
56	4.99	100	120	26.55	26.55	-9.39	0.00	56	714	3231
57	5.09	100	120	26.55	26.55	-6.05	0.00	36	460	2080
58	5.19	100	120	26.55	26.55	-3.42	0.00	20	260	1176
59	5.29	100	120	26.55	26.55	-1.53	0.00	9	116	526
60	5.39	100	120	26.55	26.55	-0.38	0.00	2	29	132
61	5.49	100	120	0.00	0.00	0.00	0.00	0	0	0

Combinazione n° 13 - SLEQ H + V

Tensione massima di compressione nel calcestruzzo 13073 [kPa]

Tensione massima di trazione dell'acciaio 1569089 [kPa]

n°	Y	B	H	Afi	Afs	M	N	σc	σfi	σfs
	[m]	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kPa]	[kPa]	[kPa]

n°	Y [m]	B [cm]	H [cm]	Afi [cmq]	Afs [cmq]	M [kNm]	N [kN]	σc [kPa]	σfi [kPa]	σfs [kPa]
1	-1.40	100	120	26.55	26.55	0.00	0.00	0	0	0
2	-1.30	100	120	26.55	26.55	1.17	0.00	7	402	89
3	-1.20	100	120	26.55	26.55	4.65	0.00	28	1601	354
4	-1.10	100	120	26.55	26.55	10.42	0.00	62	3586	793
5	-1.00	100	120	26.55	26.55	18.45	0.00	110	6347	1403
6	-0.90	100	120	26.55	26.55	28.70	0.00	170	9874	2183
7	-0.80	100	120	26.55	26.55	41.15	0.00	244	14156	3130
8	-0.70	100	120	26.55	26.55	55.76	0.00	331	19182	4241
9	-0.60	100	120	26.55	26.55	72.51	0.00	431	24943	5515
10	-0.50	100	120	26.55	26.55	91.36	0.00	542	31428	6948
11	-0.40	100	120	26.55	26.55	112.28	0.00	667	38626	8540
12	0.62	100	120	26.55	26.55	-774.16	0.00	4597	58878	266312
13	0.72	100	120	26.55	26.55	-755.08	0.00	4483	57426	259747
14	0.82	100	120	26.55	26.55	-735.67	0.00	4368	55950	253068
15	0.92	100	120	26.55	26.55	-715.95	0.00	4251	54450	246287
16	1.01	100	120	26.55	26.55	-695.97	0.00	4132	52931	239413
17	1.11	100	120	26.55	26.55	-675.74	0.00	4012	51393	232456
18	1.21	100	120	26.55	26.55	-655.31	0.00	3891	49839	225427
19	1.31	100	120	26.55	26.55	-634.70	0.00	3769	48271	218336
20	1.41	100	120	26.55	26.55	-613.93	0.00	3645	46692	211192
21	1.51	100	120	26.55	26.55	-593.05	0.00	3521	45103	204008
22	1.61	100	120	26.55	26.55	-572.07	0.00	3397	43508	196792
23	1.71	100	120	26.55	26.55	-551.03	0.00	3272	41908	189555
24	1.81	100	120	26.55	26.55	-529.96	0.00	3147	40305	182307
25	1.91	100	120	26.55	26.55	-508.89	0.00	3022	38703	175058
26	2.01	100	120	26.55	26.55	-487.85	0.00	2897	37102	167819
27	2.11	100	120	26.55	26.55	-466.86	0.00	2772	35506	160599
28	2.21	100	120	26.55	26.55	-445.96	0.00	2648	33917	153410
29	2.31	100	120	26.55	26.55	-425.18	0.00	2525	32336	146261
30	2.41	100	120	26.55	26.55	-404.54	0.00	2402	30767	139163
31	2.51	100	120	26.55	26.55	-384.08	0.00	2281	29211	132125
32	2.61	100	120	26.55	26.55	-363.83	0.00	2160	27671	125158
33	2.70	100	120	26.55	26.55	-343.82	0.00	2041	26148	118273
34	2.80	100	120	26.55	26.55	-324.07	0.00	1924	24646	111478
35	2.90	100	120	26.55	26.55	-304.61	0.00	1809	23167	104786
36	3.00	100	120	26.55	26.55	-285.48	0.00	1695	21712	98205
37	3.10	100	120	26.55	26.55	-266.71	0.00	1584	20284	91747
38	3.20	100	120	26.55	26.55	-248.32	0.00	1474	18885	85421
39	3.30	100	120	26.55	26.55	-230.34	0.00	1368	17518	79238
40	3.40	100	120	26.55	26.55	-212.81	0.00	1264	16185	73207
41	3.50	100	120	26.55	26.55	-195.75	0.00	1162	14888	67340
42	3.60	100	120	26.55	26.55	-179.20	0.00	1064	13629	61645
43	3.70	100	120	26.55	26.55	-163.18	0.00	969	12411	56135
44	3.80	100	120	26.55	26.55	-147.73	0.00	877	11235	50818
45	3.90	100	120	26.55	26.55	-132.86	0.00	789	10105	45705
46	4.00	100	120	26.55	26.55	-118.62	0.00	704	9022	40807
47	4.10	100	120	26.55	26.55	-105.04	0.00	624	7988	36133
48	4.20	100	120	26.55	26.55	-92.13	0.00	547	7007	31694
49	4.29	100	120	26.55	26.55	-79.94	0.00	475	6080	27499
50	4.39	100	120	26.55	26.55	-68.49	0.00	407	5209	23560
51	4.49	100	120	26.55	26.55	-57.81	0.00	343	4397	19886
52	4.59	100	120	26.55	26.55	-47.93	0.00	285	3645	16488
53	4.69	100	120	26.55	26.55	-38.88	0.00	231	2957	13376
54	4.79	100	120	26.55	26.55	-30.06	0.00	178	2286	10341
55	4.89	100	120	26.55	26.55	-22.26	0.00	132	1693	7659
56	4.99	100	120	26.55	26.55	-15.59	0.00	93	1185	5361
57	5.09	100	120	26.55	26.55	-10.05	0.00	60	765	3459
58	5.19	100	120	26.55	26.55	-5.70	0.00	34	434	1961
59	5.29	100	120	26.55	26.55	-2.55	0.00	15	194	878
60	5.39	100	120	26.55	26.55	-0.64	0.00	4	49	221
61	5.49	100	120	0.00	0.00	0.00	0.00	0	0	0

Simbologia adottata

n°	indice sezione
Y	ordinata sezione espressa in [m]
B	larghezza sezione espresso in [cm]
H	altezza sezione espressa in [cm]
Af	area ferri zona tesa espresso in [cmq]
Aeff	area efficace espressa in [cmq]
M	momento agente espressa in [kNm]
Mpf	momento di prima fessurazione espressa in [kNm]
ε	deformazione espresso in %
Sm	spaziatura tra le fessure espressa in [mm]
w	apertura delle fessure espressa in [mm]

Combinazioni SLER

Paramento

Combinazione n° 10 - SLER

Apertura limite fessure $w_{lim}=0.40$

n°	Y	B	H	Af	Aeff	M	Mpf	ε	Sm	w
	[m]	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kNm]	[%]	[mm]	[mm]
1	0.00	100	40	0.00	0.00	0.00	0.00	---	---	0.000
2	-0.10	100	41	0.00	0.00	0.00	4.57	0.000000	0.00	0.000
3	-0.20	100	42	0.00	0.00	0.02	13.00	0.000000	0.00	0.000
4	-0.30	100	43	0.00	0.00	0.05	26.90	0.000000	0.00	0.000
5	-0.40	100	43	0.00	0.00	0.10	49.25	0.000000	0.00	0.000
6	-0.50	100	44	0.00	0.00	0.18	86.29	0.000000	0.00	0.000
7	-0.60	100	45	0.00	0.00	0.29	152.89	0.000000	0.00	0.000
8	-0.70	100	46	0.00	0.00	0.44	295.46	0.000000	0.00	0.000
9	-0.80	100	47	0.00	0.00	0.64	770.29	0.000000	0.00	0.000
10	-0.90	100	48	0.00	0.00	0.89	7543.67	0.000000	0.00	0.000
11	-1.00	100	49	15.71	875.00	1.20	878.54	0.000000	0.00	0.000
12	-1.10	100	49	15.71	875.00	1.58	538.78	0.000000	0.00	0.000
13	-1.20	100	50	15.71	875.00	2.03	421.65	0.000000	0.00	0.000
14	-1.30	100	51	18.85	875.00	2.56	371.79	0.000000	0.00	0.000
15	-1.40	100	52	18.85	875.00	3.18	339.19	0.000000	0.00	0.000
16	-1.50	100	53	18.85	875.00	3.89	319.31	0.000000	0.00	0.000
17	-1.60	100	54	18.85	875.00	4.70	306.81	0.000000	0.00	0.000
18	-1.70	100	55	18.85	875.00	5.61	298.97	0.000000	0.00	0.000
19	-1.80	100	55	18.85	875.00	6.63	294.27	0.000000	0.00	0.000
20	-1.90	100	56	18.85	875.00	7.77	291.79	0.000000	0.00	0.000
21	-2.00	100	57	18.85	875.00	9.02	290.95	0.000000	0.00	0.000
22	-2.10	100	58	18.85	875.00	10.41	291.36	0.000000	0.00	0.000

Relazione di calcolo muro di sostegno sede stradale-NV34

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
NM25	03 D 26	CL	NV 34 05 001	A	93 di 135

n°	Y	B	H	Af	Aeff	M	Mpf	ε	Sm	w
	[m]	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kNm]	[%]	[mm]	[mm]
23	-2.20	100	59	18.85	875.00	11.93	292.74	0.000000	0.00	0.000
24	-2.30	100	60	18.85	875.00	13.58	294.90	0.000000	0.00	0.000
25	-2.40	100	61	18.85	875.00	15.38	297.70	0.000000	0.00	0.000
26	-2.50	100	61	21.99	875.00	17.33	307.15	0.000000	0.00	0.000
27	-2.60	100	62	21.99	875.00	19.44	310.97	0.000000	0.00	0.000
28	-2.70	100	63	21.99	875.00	21.71	315.18	0.000000	0.00	0.000
29	-2.80	100	64	21.99	875.00	24.14	319.73	0.000000	0.00	0.000
30	-2.90	100	65	21.99	875.00	26.75	324.59	0.000000	0.00	0.000
31	-3.00	100	66	21.99	875.00	29.54	329.71	0.000000	0.00	0.000
32	-3.10	100	67	21.99	875.00	32.52	335.08	0.000000	0.00	0.000
33	-3.20	100	67	21.99	875.00	35.68	340.67	0.000000	0.00	0.000
34	-3.30	100	68	21.99	875.00	39.05	346.46	0.000000	0.00	0.000
35	-3.40	100	69	21.99	875.00	42.61	352.43	0.000000	0.00	0.000
36	-3.50	100	70	21.99	875.00	46.39	358.58	0.000000	0.00	0.000
37	-3.60	100	71	25.13	875.00	50.38	371.62	0.000000	0.00	0.000
38	-3.70	100	72	25.13	875.00	54.59	378.16	0.000000	0.00	0.000
39	-3.80	100	73	25.13	875.00	59.02	384.84	0.000000	0.00	0.000
40	-3.90	100	73	25.13	875.00	63.69	391.66	0.000000	0.00	0.000
41	-4.00	100	74	25.13	875.00	68.60	398.62	0.000000	0.00	0.000
42	-4.10	100	75	25.13	875.00	73.75	405.71	0.000000	0.00	0.000
43	-4.20	100	76	25.13	875.00	79.15	412.92	0.000000	0.00	0.000
44	-4.30	100	77	25.13	875.00	84.80	420.25	0.000000	0.00	0.000
45	-4.40	100	78	25.13	875.00	90.72	427.69	0.000000	0.00	0.000
46	-4.50	100	79	25.13	875.00	96.90	435.25	0.000000	0.00	0.000
47	-4.60	100	79	25.13	875.00	103.36	442.92	0.000000	0.00	0.000
48	-4.70	100	80	25.13	875.00	110.10	450.70	0.000000	0.00	0.000
49	-4.80	100	81	28.27	875.00	117.12	466.17	0.000000	0.00	0.000
50	-4.90	100	82	28.27	875.00	124.43	474.23	0.000000	0.00	0.000
51	-5.00	100	83	28.27	875.00	132.03	482.39	0.000000	0.00	0.000
52	-5.10	100	84	28.27	875.00	139.94	490.65	0.000000	0.00	0.000
53	-5.20	100	85	28.27	875.00	148.16	499.01	0.000000	0.00	0.000
54	-5.30	100	85	28.27	875.00	156.69	507.47	0.000000	0.00	0.000
55	-5.40	100	86	28.27	875.00	165.54	516.02	0.000000	0.00	0.000
56	-5.50	100	87	28.27	875.00	174.72	524.67	0.000000	0.00	0.000
57	-5.60	100	88	28.27	875.00	184.23	533.41	0.000000	0.00	0.000
58	-5.70	100	89	28.27	875.00	194.07	542.24	0.000000	0.00	0.000
59	-5.80	100	90	28.27	875.00	204.26	551.16	0.000000	0.00	0.000
60	-5.90	100	91	28.27	875.00	214.80	560.17	0.000000	0.00	0.000
61	-6.00	100	91	34.56	875.00	225.69	586.35	0.000000	0.00	0.000
62	-6.10	100	92	34.56	875.00	236.94	595.70	0.000000	0.00	0.000
63	-6.20	100	93	34.56	875.00	248.56	605.15	0.000000	0.00	0.000
64	-6.30	100	94	34.56	875.00	260.55	614.68	0.000000	0.00	0.000
65	-6.40	100	95	34.56	875.00	272.92	624.29	0.000000	0.00	0.000
66	-6.50	100	96	34.56	875.00	285.68	634.00	0.000000	0.00	0.000
67	-6.60	100	97	56.55	875.00	298.82	736.13	0.000000	0.00	0.000
68	-6.70	100	97	34.56	875.00	312.36	653.67	0.000000	0.00	0.000
69	-6.80	100	98	34.56	875.00	326.30	663.63	0.000000	0.00	0.000
70	-6.90	100	99	34.56	875.00	340.65	673.68	0.000000	0.00	0.000
71	-7.00	100	100	34.56	875.00	355.41	683.81	0.000000	0.00	0.000
72	-7.10	100	101	34.56	875.00	370.59	694.03	0.000000	0.00	0.000
73	-7.20	100	102	34.56	875.00	386.19	704.33	0.000000	0.00	0.000

Fondazione
Combinazione n° 10 - SLER

 Apertura limite fessure $w_{lim}=0.40$

Relazione di calcolo muro di sostegno sede stradale-NV34

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
NM25	03 D 26	CL	NV 34 05 001	A	94 di 135

n°	Y [m]	B [cm]	H [cm]	Af [cmq]	Aeff [cmq]	M [kNm]	Mpf [kNm]	ε [%]	Sm [mm]	w [mm]
1	-1.40	100	120	0.00	0.00	0.00	0.00	---	---	0.000
2	-1.30	100	120	26.55	875.00	0.84	808.11	0.000000	0.00	0.000
3	-1.20	100	120	26.55	875.00	3.36	808.11	0.000000	0.00	0.000
4	-1.10	100	120	26.55	875.00	7.54	808.11	0.000000	0.00	0.000
5	-1.00	100	120	26.55	875.00	13.38	808.11	0.000000	0.00	0.000
6	-0.90	100	120	26.55	875.00	20.85	808.11	0.000000	0.00	0.000
7	-0.80	100	120	26.55	875.00	29.94	808.11	0.000000	0.00	0.000
8	-0.70	100	120	26.55	875.00	40.65	808.11	0.000000	0.00	0.000
9	-0.60	100	120	26.55	875.00	52.96	808.11	0.000000	0.00	0.000
10	-0.50	100	120	26.55	875.00	66.85	808.11	0.000000	0.00	0.000
11	-0.40	100	120	26.55	875.00	82.32	808.11	0.000000	0.00	0.000
12	0.62	100	120	26.55	875.00	-481.65	-808.11	0.000000	0.00	0.000
13	0.72	100	120	26.55	875.00	-467.80	-808.11	0.000000	0.00	0.000
14	0.82	100	120	26.55	875.00	-453.91	-808.11	0.000000	0.00	0.000
15	0.92	100	120	26.55	875.00	-440.01	-808.11	0.000000	0.00	0.000
16	1.01	100	120	26.55	875.00	-426.10	-808.11	0.000000	0.00	0.000
17	1.11	100	120	26.55	875.00	-412.20	-808.11	0.000000	0.00	0.000
18	1.21	100	120	26.55	875.00	-398.32	-808.11	0.000000	0.00	0.000
19	1.31	100	120	26.55	875.00	-384.47	-808.11	0.000000	0.00	0.000
20	1.41	100	120	26.55	875.00	-370.67	-808.11	0.000000	0.00	0.000
21	1.51	100	120	26.55	875.00	-356.93	-808.11	0.000000	0.00	0.000
22	1.61	100	120	26.55	875.00	-343.26	-808.11	0.000000	0.00	0.000
23	1.71	100	120	26.55	875.00	-329.68	-808.11	0.000000	0.00	0.000
24	1.81	100	120	26.55	875.00	-316.19	-808.11	0.000000	0.00	0.000
25	1.91	100	120	26.55	875.00	-302.81	-808.11	0.000000	0.00	0.000
26	2.01	100	120	26.55	875.00	-289.55	-808.11	0.000000	0.00	0.000
27	2.11	100	120	26.55	875.00	-276.43	-808.11	0.000000	0.00	0.000
28	2.21	100	120	26.55	875.00	-263.45	-808.11	0.000000	0.00	0.000
29	2.31	100	120	26.55	875.00	-250.63	-808.11	0.000000	0.00	0.000
30	2.41	100	120	26.55	875.00	-237.99	-808.11	0.000000	0.00	0.000
31	2.51	100	120	26.55	875.00	-225.53	-808.11	0.000000	0.00	0.000
32	2.61	100	120	26.55	875.00	-213.26	-808.11	0.000000	0.00	0.000
33	2.70	100	120	26.55	875.00	-201.21	-808.11	0.000000	0.00	0.000
34	2.80	100	120	26.55	875.00	-189.38	-808.11	0.000000	0.00	0.000
35	2.90	100	120	26.55	875.00	-177.78	-808.11	0.000000	0.00	0.000
36	3.00	100	120	26.55	875.00	-166.43	-808.11	0.000000	0.00	0.000
37	3.10	100	120	26.55	875.00	-155.34	-808.11	0.000000	0.00	0.000
38	3.20	100	120	26.55	875.00	-144.53	-808.11	0.000000	0.00	0.000
39	3.30	100	120	26.55	875.00	-134.00	-808.11	0.000000	0.00	0.000
40	3.40	100	120	26.55	875.00	-123.77	-808.11	0.000000	0.00	0.000
41	3.50	100	120	26.55	875.00	-113.84	-808.11	0.000000	0.00	0.000
42	3.60	100	120	26.55	875.00	-104.24	-808.11	0.000000	0.00	0.000
43	3.70	100	120	26.55	875.00	-94.98	-808.11	0.000000	0.00	0.000
44	3.80	100	120	26.55	875.00	-86.07	-808.11	0.000000	0.00	0.000
45	3.90	100	120	26.55	875.00	-77.51	-808.11	0.000000	0.00	0.000
46	4.00	100	120	26.55	875.00	-69.33	-808.11	0.000000	0.00	0.000
47	4.10	100	120	26.55	875.00	-61.54	-808.11	0.000000	0.00	0.000
48	4.20	100	120	26.55	875.00	-54.14	-808.11	0.000000	0.00	0.000
49	4.29	100	120	26.55	875.00	-47.16	-808.11	0.000000	0.00	0.000
50	4.39	100	120	26.55	875.00	-40.60	-808.11	0.000000	0.00	0.000
51	4.49	100	120	26.55	875.00	-34.47	-808.11	0.000000	0.00	0.000
52	4.59	100	120	26.55	875.00	-28.80	-808.11	0.000000	0.00	0.000
53	4.69	100	120	26.55	875.00	-23.58	-808.11	0.000000	0.00	0.000
54	4.79	100	120	26.55	875.00	-18.21	-808.11	0.000000	0.00	0.000
55	4.89	100	120	26.55	875.00	-13.45	-808.11	0.000000	0.00	0.000
56	4.99	100	120	26.55	875.00	-9.39	-808.11	0.000000	0.00	0.000
57	5.09	100	120	26.55	875.00	-6.05	-808.11	0.000000	0.00	0.000
58	5.19	100	120	26.55	875.00	-3.42	-808.11	0.000000	0.00	0.000
59	5.29	100	120	26.55	875.00	-1.53	-808.11	0.000000	0.00	0.000
60	5.39	100	120	26.55	875.00	-0.38	-808.11	0.000000	0.00	0.000
61	5.49	100	120	0.00	0.00	0.00	0.00	---	---	0.000

Paramento

Combinazione n° 11 - SLEF

 Apertura limite fessure $w_{lim}=0.40$

n°	Y [m]	B [cm]	H [cm]	Af [cmq]	Aeff [cmq]	M [kNm]	Mpf [kNm]	ε [%]	Sm [mm]	w [mm]
1	0.00	100	40	0.00	0.00	0.00	0.00	---	---	0.000
2	-0.10	100	41	0.00	0.00	0.00	4.57	0.000000	0.00	0.000
3	-0.20	100	42	0.00	0.00	0.02	13.00	0.000000	0.00	0.000
4	-0.30	100	43	0.00	0.00	0.05	26.90	0.000000	0.00	0.000
5	-0.40	100	43	0.00	0.00	0.10	49.25	0.000000	0.00	0.000
6	-0.50	100	44	0.00	0.00	0.18	86.29	0.000000	0.00	0.000
7	-0.60	100	45	0.00	0.00	0.29	152.89	0.000000	0.00	0.000
8	-0.70	100	46	0.00	0.00	0.44	295.46	0.000000	0.00	0.000
9	-0.80	100	47	0.00	0.00	0.64	770.29	0.000000	0.00	0.000
10	-0.90	100	48	0.00	0.00	0.89	7543.67	0.000000	0.00	0.000
11	-1.00	100	49	15.71	875.00	1.20	878.54	0.000000	0.00	0.000
12	-1.10	100	49	15.71	875.00	1.58	538.78	0.000000	0.00	0.000
13	-1.20	100	50	15.71	875.00	2.03	421.65	0.000000	0.00	0.000
14	-1.30	100	51	18.85	875.00	2.56	371.79	0.000000	0.00	0.000
15	-1.40	100	52	18.85	875.00	3.18	339.19	0.000000	0.00	0.000
16	-1.50	100	53	18.85	875.00	3.89	319.31	0.000000	0.00	0.000
17	-1.60	100	54	18.85	875.00	4.70	306.81	0.000000	0.00	0.000
18	-1.70	100	55	18.85	875.00	5.61	298.97	0.000000	0.00	0.000
19	-1.80	100	55	18.85	875.00	6.63	294.27	0.000000	0.00	0.000
20	-1.90	100	56	18.85	875.00	7.77	291.79	0.000000	0.00	0.000
21	-2.00	100	57	18.85	875.00	9.02	290.95	0.000000	0.00	0.000
22	-2.10	100	58	18.85	875.00	10.41	291.36	0.000000	0.00	0.000
23	-2.20	100	59	18.85	875.00	11.93	292.74	0.000000	0.00	0.000
24	-2.30	100	60	18.85	875.00	13.58	294.90	0.000000	0.00	0.000
25	-2.40	100	61	18.85	875.00	15.38	297.70	0.000000	0.00	0.000
26	-2.50	100	61	21.99	875.00	17.33	307.15	0.000000	0.00	0.000
27	-2.60	100	62	21.99	875.00	19.44	310.97	0.000000	0.00	0.000
28	-2.70	100	63	21.99	875.00	21.71	315.18	0.000000	0.00	0.000
29	-2.80	100	64	21.99	875.00	24.14	319.73	0.000000	0.00	0.000
30	-2.90	100	65	21.99	875.00	26.75	324.59	0.000000	0.00	0.000
31	-3.00	100	66	21.99	875.00	29.54	329.71	0.000000	0.00	0.000
32	-3.10	100	67	21.99	875.00	32.52	335.08	0.000000	0.00	0.000
33	-3.20	100	67	21.99	875.00	35.68	340.67	0.000000	0.00	0.000
34	-3.30	100	68	21.99	875.00	39.05	346.46	0.000000	0.00	0.000
35	-3.40	100	69	21.99	875.00	42.61	352.43	0.000000	0.00	0.000
36	-3.50	100	70	21.99	875.00	46.39	358.58	0.000000	0.00	0.000
37	-3.60	100	71	25.13	875.00	50.38	371.62	0.000000	0.00	0.000
38	-3.70	100	72	25.13	875.00	54.59	378.16	0.000000	0.00	0.000
39	-3.80	100	73	25.13	875.00	59.02	384.84	0.000000	0.00	0.000
40	-3.90	100	73	25.13	875.00	63.69	391.66	0.000000	0.00	0.000
41	-4.00	100	74	25.13	875.00	68.60	398.62	0.000000	0.00	0.000
42	-4.10	100	75	25.13	875.00	73.75	405.71	0.000000	0.00	0.000
43	-4.20	100	76	25.13	875.00	79.15	412.92	0.000000	0.00	0.000
44	-4.30	100	77	25.13	875.00	84.80	420.25	0.000000	0.00	0.000
45	-4.40	100	78	25.13	875.00	90.72	427.69	0.000000	0.00	0.000
46	-4.50	100	79	25.13	875.00	96.90	435.25	0.000000	0.00	0.000
47	-4.60	100	79	25.13	875.00	103.36	442.92	0.000000	0.00	0.000
48	-4.70	100	80	25.13	875.00	110.10	450.70	0.000000	0.00	0.000
49	-4.80	100	81	28.27	875.00	117.12	466.17	0.000000	0.00	0.000
50	-4.90	100	82	28.27	875.00	124.43	474.23	0.000000	0.00	0.000
51	-5.00	100	83	28.27	875.00	132.03	482.39	0.000000	0.00	0.000
52	-5.10	100	84	28.27	875.00	139.94	490.65	0.000000	0.00	0.000

Relazione di calcolo muro di sostegno sede stradale-NV34

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
NM25	03 D 26	CL	NV 34 05 001	A	96 di 135

n°	Y	B	H	Af	Aeff	M	Mpf	ε	Sm	w
	[m]	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kNm]	[%]	[mm]	[mm]
53	-5.20	100	85	28.27	875.00	148.16	499.01	0.000000	0.00	0.000
54	-5.30	100	85	28.27	875.00	156.69	507.47	0.000000	0.00	0.000
55	-5.40	100	86	28.27	875.00	165.54	516.02	0.000000	0.00	0.000
56	-5.50	100	87	28.27	875.00	174.72	524.67	0.000000	0.00	0.000
57	-5.60	100	88	28.27	875.00	184.23	533.41	0.000000	0.00	0.000
58	-5.70	100	89	28.27	875.00	194.07	542.24	0.000000	0.00	0.000
59	-5.80	100	90	28.27	875.00	204.26	551.16	0.000000	0.00	0.000
60	-5.90	100	91	28.27	875.00	214.80	560.17	0.000000	0.00	0.000
61	-6.00	100	91	34.56	875.00	225.69	586.35	0.000000	0.00	0.000
62	-6.10	100	92	34.56	875.00	236.94	595.70	0.000000	0.00	0.000
63	-6.20	100	93	34.56	875.00	248.56	605.15	0.000000	0.00	0.000
64	-6.30	100	94	34.56	875.00	260.55	614.68	0.000000	0.00	0.000
65	-6.40	100	95	34.56	875.00	272.92	624.29	0.000000	0.00	0.000
66	-6.50	100	96	34.56	875.00	285.68	634.00	0.000000	0.00	0.000
67	-6.60	100	97	56.55	875.00	298.82	736.13	0.000000	0.00	0.000
68	-6.70	100	97	34.56	875.00	312.36	653.67	0.000000	0.00	0.000
69	-6.80	100	98	34.56	875.00	326.30	663.63	0.000000	0.00	0.000
70	-6.90	100	99	34.56	875.00	340.65	673.68	0.000000	0.00	0.000
71	-7.00	100	100	34.56	875.00	355.41	683.81	0.000000	0.00	0.000
72	-7.10	100	101	34.56	875.00	370.59	694.03	0.000000	0.00	0.000
73	-7.20	100	102	34.56	875.00	386.19	704.33	0.000000	0.00	0.000

Fondazione

Combinazione n° 11 - SLEF

Apertura limite fessure $w_{lim}=0.40$

n°	Y	B	H	Af	Aeff	M	Mpf	ε	Sm	w
	[m]	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kNm]	[%]	[mm]	[mm]
1	-1.40	100	120	0.00	0.00	0.00	0.00	---	---	0.000
2	-1.30	100	120	26.55	875.00	0.84	808.11	0.000000	0.00	0.000
3	-1.20	100	120	26.55	875.00	3.36	808.11	0.000000	0.00	0.000
4	-1.10	100	120	26.55	875.00	7.54	808.11	0.000000	0.00	0.000
5	-1.00	100	120	26.55	875.00	13.38	808.11	0.000000	0.00	0.000
6	-0.90	100	120	26.55	875.00	20.85	808.11	0.000000	0.00	0.000
7	-0.80	100	120	26.55	875.00	29.94	808.11	0.000000	0.00	0.000
8	-0.70	100	120	26.55	875.00	40.65	808.11	0.000000	0.00	0.000
9	-0.60	100	120	26.55	875.00	52.96	808.11	0.000000	0.00	0.000
10	-0.50	100	120	26.55	875.00	66.85	808.11	0.000000	0.00	0.000
11	-0.40	100	120	26.55	875.00	82.32	808.11	0.000000	0.00	0.000
12	0.62	100	120	26.55	875.00	-481.65	-808.11	0.000000	0.00	0.000
13	0.72	100	120	26.55	875.00	-467.80	-808.11	0.000000	0.00	0.000
14	0.82	100	120	26.55	875.00	-453.91	-808.11	0.000000	0.00	0.000
15	0.92	100	120	26.55	875.00	-440.01	-808.11	0.000000	0.00	0.000
16	1.01	100	120	26.55	875.00	-426.10	-808.11	0.000000	0.00	0.000
17	1.11	100	120	26.55	875.00	-412.20	-808.11	0.000000	0.00	0.000
18	1.21	100	120	26.55	875.00	-398.32	-808.11	0.000000	0.00	0.000
19	1.31	100	120	26.55	875.00	-384.47	-808.11	0.000000	0.00	0.000
20	1.41	100	120	26.55	875.00	-370.67	-808.11	0.000000	0.00	0.000
21	1.51	100	120	26.55	875.00	-356.93	-808.11	0.000000	0.00	0.000
22	1.61	100	120	26.55	875.00	-343.26	-808.11	0.000000	0.00	0.000
23	1.71	100	120	26.55	875.00	-329.68	-808.11	0.000000	0.00	0.000
24	1.81	100	120	26.55	875.00	-316.19	-808.11	0.000000	0.00	0.000
25	1.91	100	120	26.55	875.00	-302.81	-808.11	0.000000	0.00	0.000
26	2.01	100	120	26.55	875.00	-289.55	-808.11	0.000000	0.00	0.000
27	2.11	100	120	26.55	875.00	-276.43	-808.11	0.000000	0.00	0.000

Relazione di calcolo muro di sostegno sede stradale-NV34

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
NM25	03 D 26	CL	NV 34 05 001	A	97 di 135

n°	Y [m]	B [cm]	H [cm]	Af [cmq]	Aeff [cmq]	M [kNm]	Mpf [kNm]	ε [%]	Sm [mm]	w [mm]
28	2.21	100	120	26.55	875.00	-263.45	-808.11	0.000000	0.00	0.000
29	2.31	100	120	26.55	875.00	-250.63	-808.11	0.000000	0.00	0.000
30	2.41	100	120	26.55	875.00	-237.99	-808.11	0.000000	0.00	0.000
31	2.51	100	120	26.55	875.00	-225.53	-808.11	0.000000	0.00	0.000
32	2.61	100	120	26.55	875.00	-213.26	-808.11	0.000000	0.00	0.000
33	2.70	100	120	26.55	875.00	-201.21	-808.11	0.000000	0.00	0.000
34	2.80	100	120	26.55	875.00	-189.38	-808.11	0.000000	0.00	0.000
35	2.90	100	120	26.55	875.00	-177.78	-808.11	0.000000	0.00	0.000
36	3.00	100	120	26.55	875.00	-166.43	-808.11	0.000000	0.00	0.000
37	3.10	100	120	26.55	875.00	-155.34	-808.11	0.000000	0.00	0.000
38	3.20	100	120	26.55	875.00	-144.53	-808.11	0.000000	0.00	0.000
39	3.30	100	120	26.55	875.00	-134.00	-808.11	0.000000	0.00	0.000
40	3.40	100	120	26.55	875.00	-123.77	-808.11	0.000000	0.00	0.000
41	3.50	100	120	26.55	875.00	-113.84	-808.11	0.000000	0.00	0.000
42	3.60	100	120	26.55	875.00	-104.24	-808.11	0.000000	0.00	0.000
43	3.70	100	120	26.55	875.00	-94.98	-808.11	0.000000	0.00	0.000
44	3.80	100	120	26.55	875.00	-86.07	-808.11	0.000000	0.00	0.000
45	3.90	100	120	26.55	875.00	-77.51	-808.11	0.000000	0.00	0.000
46	4.00	100	120	26.55	875.00	-69.33	-808.11	0.000000	0.00	0.000
47	4.10	100	120	26.55	875.00	-61.54	-808.11	0.000000	0.00	0.000
48	4.20	100	120	26.55	875.00	-54.14	-808.11	0.000000	0.00	0.000
49	4.29	100	120	26.55	875.00	-47.16	-808.11	0.000000	0.00	0.000
50	4.39	100	120	26.55	875.00	-40.60	-808.11	0.000000	0.00	0.000
51	4.49	100	120	26.55	875.00	-34.47	-808.11	0.000000	0.00	0.000
52	4.59	100	120	26.55	875.00	-28.80	-808.11	0.000000	0.00	0.000
53	4.69	100	120	26.55	875.00	-23.58	-808.11	0.000000	0.00	0.000
54	4.79	100	120	26.55	875.00	-18.21	-808.11	0.000000	0.00	0.000
55	4.89	100	120	26.55	875.00	-13.45	-808.11	0.000000	0.00	0.000
56	4.99	100	120	26.55	875.00	-9.39	-808.11	0.000000	0.00	0.000
57	5.09	100	120	26.55	875.00	-6.05	-808.11	0.000000	0.00	0.000
58	5.19	100	120	26.55	875.00	-3.42	-808.11	0.000000	0.00	0.000
59	5.29	100	120	26.55	875.00	-1.53	-808.11	0.000000	0.00	0.000
60	5.39	100	120	26.55	875.00	-0.38	-808.11	0.000000	0.00	0.000
61	5.49	100	120	0.00	0.00	0.00	0.00	---	---	0.000

Combinazioni SLEQ

Paramento

Combinazione n° 12 - SLEQ

Apertura limite fessure $w_{lim}=0.30$

n°	Y [m]	B [cm]	H [cm]	Af [cmq]	Aeff [cmq]	M [kNm]	Mpf [kNm]	ε [%]	Sm [mm]	w [mm]
1	0.00	100	40	0.00	0.00	0.00	0.00	---	---	0.000
2	-0.10	100	41	0.00	0.00	0.00	4.57	0.000000	0.00	0.000
3	-0.20	100	42	0.00	0.00	0.02	13.00	0.000000	0.00	0.000
4	-0.30	100	43	0.00	0.00	0.05	26.90	0.000000	0.00	0.000
5	-0.40	100	43	0.00	0.00	0.10	49.25	0.000000	0.00	0.000
6	-0.50	100	44	0.00	0.00	0.18	86.29	0.000000	0.00	0.000
7	-0.60	100	45	0.00	0.00	0.29	152.89	0.000000	0.00	0.000
8	-0.70	100	46	0.00	0.00	0.44	295.46	0.000000	0.00	0.000
9	-0.80	100	47	0.00	0.00	0.64	770.29	0.000000	0.00	0.000

n°	Y	B	H	Af	Aeff	M	Mpf	ε	Sm	w
	[m]	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kNm]	[%]	[mm]	[mm]
10	-0.90	100	48	0.00	0.00	0.89	7543.67	0.000000	0.00	0.000
11	-1.00	100	49	15.71	875.00	1.20	878.54	0.000000	0.00	0.000
12	-1.10	100	49	15.71	875.00	1.58	538.78	0.000000	0.00	0.000
13	-1.20	100	50	15.71	875.00	2.03	421.65	0.000000	0.00	0.000
14	-1.30	100	51	18.85	875.00	2.56	371.79	0.000000	0.00	0.000
15	-1.40	100	52	18.85	875.00	3.18	339.19	0.000000	0.00	0.000
16	-1.50	100	53	18.85	875.00	3.89	319.31	0.000000	0.00	0.000
17	-1.60	100	54	18.85	875.00	4.70	306.81	0.000000	0.00	0.000
18	-1.70	100	55	18.85	875.00	5.61	298.97	0.000000	0.00	0.000
19	-1.80	100	55	18.85	875.00	6.63	294.27	0.000000	0.00	0.000
20	-1.90	100	56	18.85	875.00	7.77	291.79	0.000000	0.00	0.000
21	-2.00	100	57	18.85	875.00	9.02	290.95	0.000000	0.00	0.000
22	-2.10	100	58	18.85	875.00	10.41	291.36	0.000000	0.00	0.000
23	-2.20	100	59	18.85	875.00	11.93	292.74	0.000000	0.00	0.000
24	-2.30	100	60	18.85	875.00	13.58	294.90	0.000000	0.00	0.000
25	-2.40	100	61	18.85	875.00	15.38	297.70	0.000000	0.00	0.000
26	-2.50	100	61	21.99	875.00	17.33	307.15	0.000000	0.00	0.000
27	-2.60	100	62	21.99	875.00	19.44	310.97	0.000000	0.00	0.000
28	-2.70	100	63	21.99	875.00	21.71	315.18	0.000000	0.00	0.000
29	-2.80	100	64	21.99	875.00	24.14	319.73	0.000000	0.00	0.000
30	-2.90	100	65	21.99	875.00	26.75	324.59	0.000000	0.00	0.000
31	-3.00	100	66	21.99	875.00	29.54	329.71	0.000000	0.00	0.000
32	-3.10	100	67	21.99	875.00	32.52	335.08	0.000000	0.00	0.000
33	-3.20	100	67	21.99	875.00	35.68	340.67	0.000000	0.00	0.000
34	-3.30	100	68	21.99	875.00	39.05	346.46	0.000000	0.00	0.000
35	-3.40	100	69	21.99	875.00	42.61	352.43	0.000000	0.00	0.000
36	-3.50	100	70	21.99	875.00	46.39	358.58	0.000000	0.00	0.000
37	-3.60	100	71	25.13	875.00	50.38	371.62	0.000000	0.00	0.000
38	-3.70	100	72	25.13	875.00	54.59	378.16	0.000000	0.00	0.000
39	-3.80	100	73	25.13	875.00	59.02	384.84	0.000000	0.00	0.000
40	-3.90	100	73	25.13	875.00	63.69	391.66	0.000000	0.00	0.000
41	-4.00	100	74	25.13	875.00	68.60	398.62	0.000000	0.00	0.000
42	-4.10	100	75	25.13	875.00	73.75	405.71	0.000000	0.00	0.000
43	-4.20	100	76	25.13	875.00	79.15	412.92	0.000000	0.00	0.000
44	-4.30	100	77	25.13	875.00	84.80	420.25	0.000000	0.00	0.000
45	-4.40	100	78	25.13	875.00	90.72	427.69	0.000000	0.00	0.000
46	-4.50	100	79	25.13	875.00	96.90	435.25	0.000000	0.00	0.000
47	-4.60	100	79	25.13	875.00	103.36	442.92	0.000000	0.00	0.000
48	-4.70	100	80	25.13	875.00	110.10	450.70	0.000000	0.00	0.000
49	-4.80	100	81	28.27	875.00	117.12	466.17	0.000000	0.00	0.000
50	-4.90	100	82	28.27	875.00	124.43	474.23	0.000000	0.00	0.000
51	-5.00	100	83	28.27	875.00	132.03	482.39	0.000000	0.00	0.000
52	-5.10	100	84	28.27	875.00	139.94	490.65	0.000000	0.00	0.000
53	-5.20	100	85	28.27	875.00	148.16	499.01	0.000000	0.00	0.000
54	-5.30	100	85	28.27	875.00	156.69	507.47	0.000000	0.00	0.000
55	-5.40	100	86	28.27	875.00	165.54	516.02	0.000000	0.00	0.000
56	-5.50	100	87	28.27	875.00	174.72	524.67	0.000000	0.00	0.000
57	-5.60	100	88	28.27	875.00	184.23	533.41	0.000000	0.00	0.000
58	-5.70	100	89	28.27	875.00	194.07	542.24	0.000000	0.00	0.000
59	-5.80	100	90	28.27	875.00	204.26	551.16	0.000000	0.00	0.000
60	-5.90	100	91	28.27	875.00	214.80	560.17	0.000000	0.00	0.000
61	-6.00	100	91	34.56	875.00	225.69	586.35	0.000000	0.00	0.000
62	-6.10	100	92	34.56	875.00	236.94	595.70	0.000000	0.00	0.000
63	-6.20	100	93	34.56	875.00	248.56	605.15	0.000000	0.00	0.000
64	-6.30	100	94	34.56	875.00	260.55	614.68	0.000000	0.00	0.000
65	-6.40	100	95	34.56	875.00	272.92	624.29	0.000000	0.00	0.000
66	-6.50	100	96	34.56	875.00	285.68	634.00	0.000000	0.00	0.000
67	-6.60	100	97	56.55	875.00	298.82	736.13	0.000000	0.00	0.000
68	-6.70	100	97	34.56	875.00	312.36	653.67	0.000000	0.00	0.000
69	-6.80	100	98	34.56	875.00	326.30	663.63	0.000000	0.00	0.000
70	-6.90	100	99	34.56	875.00	340.65	673.68	0.000000	0.00	0.000
71	-7.00	100	100	34.56	875.00	355.41	683.81	0.000000	0.00	0.000
72	-7.10	100	101	34.56	875.00	370.59	694.03	0.000000	0.00	0.000
73	-7.20	100	102	34.56	875.00	386.19	704.33	0.000000	0.00	0.000

Apertura limite fessure $w_{lim}=0.30$

n°	Y	B	H	Af	Aeff	M	Mpf	ε	Sm	w
	[m]	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kNm]	[%]	[mm]	[mm]
1	0.00	100	40	0.00	0.00	0.00	0.00	---	---	0.000
2	-0.10	100	41	0.00	0.00	0.01	12.06	0.000000	0.00	0.000
3	-0.20	100	42	0.00	0.00	0.04	32.84	0.000000	0.00	0.000
4	-0.30	100	43	0.00	0.00	0.09	69.92	0.000000	0.00	0.000
5	-0.40	100	43	0.00	0.00	0.18	144.07	0.000000	0.00	0.000
6	-0.50	100	44	0.00	0.00	0.31	339.24	0.000000	0.00	0.000
7	-0.60	100	45	0.00	0.00	0.50	1792.63	0.000000	0.00	0.000
8	-0.70	100	46	0.00	0.00	0.74	1039.14	0.000000	0.00	0.000
9	-0.80	100	47	15.71	875.00	1.04	508.07	0.000000	0.00	0.000
10	-0.90	100	48	15.71	875.00	1.42	377.30	0.000000	0.00	0.000
11	-1.00	100	49	15.71	875.00	1.87	320.60	0.000000	0.00	0.000
12	-1.10	100	49	15.71	875.00	2.42	290.53	0.000000	0.00	0.000
13	-1.20	100	50	15.71	875.00	3.06	273.06	0.000000	0.00	0.000
14	-1.30	100	51	18.85	875.00	3.80	268.36	0.000000	0.00	0.000
15	-1.40	100	52	18.85	875.00	4.65	262.03	0.000000	0.00	0.000
16	-1.50	100	53	18.85	875.00	5.62	258.55	0.000000	0.00	0.000
17	-1.60	100	54	18.85	875.00	6.71	257.06	0.000000	0.00	0.000
18	-1.70	100	55	18.85	875.00	7.93	257.03	0.000000	0.00	0.000
19	-1.80	100	55	18.85	875.00	9.30	258.08	0.000000	0.00	0.000
20	-1.90	100	56	18.85	875.00	10.81	259.99	0.000000	0.00	0.000
21	-2.00	100	57	18.85	875.00	12.47	262.58	0.000000	0.00	0.000
22	-2.10	100	58	18.85	875.00	14.30	265.72	0.000000	0.00	0.000
23	-2.20	100	59	18.85	875.00	16.29	269.32	0.000000	0.00	0.000
24	-2.30	100	60	18.85	875.00	18.47	273.31	0.000000	0.00	0.000
25	-2.40	100	61	18.85	875.00	20.82	277.64	0.000000	0.00	0.000
26	-2.50	100	61	21.99	875.00	23.37	288.07	0.000000	0.00	0.000
27	-2.60	100	62	21.99	875.00	26.11	293.01	0.000000	0.00	0.000
28	-2.70	100	63	21.99	875.00	29.06	298.19	0.000000	0.00	0.000
29	-2.80	100	64	21.99	875.00	32.23	303.58	0.000000	0.00	0.000
30	-2.90	100	65	21.99	875.00	35.61	309.17	0.000000	0.00	0.000
31	-3.00	100	66	21.99	875.00	39.22	314.94	0.000000	0.00	0.000
32	-3.10	100	67	21.99	875.00	43.07	320.88	0.000000	0.00	0.000
33	-3.20	100	67	21.99	875.00	47.16	326.97	0.000000	0.00	0.000
34	-3.30	100	68	21.99	875.00	51.50	333.21	0.000000	0.00	0.000
35	-3.40	100	69	21.99	875.00	56.09	339.59	0.000000	0.00	0.000
36	-3.50	100	70	21.99	875.00	60.95	346.10	0.000000	0.00	0.000
37	-3.60	100	71	25.13	875.00	66.09	359.27	0.000000	0.00	0.000
38	-3.70	100	72	25.13	875.00	71.50	366.10	0.000000	0.00	0.000
39	-3.80	100	73	25.13	875.00	77.20	373.06	0.000000	0.00	0.000
40	-3.90	100	73	25.13	875.00	83.19	380.13	0.000000	0.00	0.000
41	-4.00	100	74	25.13	875.00	89.49	387.31	0.000000	0.00	0.000
42	-4.10	100	75	25.13	875.00	96.09	394.60	0.000000	0.00	0.000
43	-4.20	100	76	25.13	875.00	103.02	402.00	0.000000	0.00	0.000
44	-4.30	100	77	25.13	875.00	110.26	409.50	0.000000	0.00	0.000
45	-4.40	100	78	25.13	875.00	117.84	417.10	0.000000	0.00	0.000
46	-4.50	100	79	25.13	875.00	125.75	424.80	0.000000	0.00	0.000
47	-4.60	100	79	25.13	875.00	134.01	432.59	0.000000	0.00	0.000
48	-4.70	100	80	25.13	875.00	142.62	440.49	0.000000	0.00	0.000
49	-4.80	100	81	28.27	875.00	151.60	455.92	0.000000	0.00	0.000
50	-4.90	100	82	28.27	875.00	160.94	464.08	0.000000	0.00	0.000
51	-5.00	100	83	28.27	875.00	170.66	472.34	0.000000	0.00	0.000
52	-5.10	100	84	28.27	875.00	180.76	480.68	0.000000	0.00	0.000
53	-5.20	100	85	28.27	875.00	191.24	489.12	0.000000	0.00	0.000
54	-5.30	100	85	28.27	875.00	202.13	497.65	0.000000	0.00	0.000
55	-5.40	100	86	28.27	875.00	213.42	506.26	0.000000	0.00	0.000
56	-5.50	100	87	28.27	875.00	225.13	514.97	0.000000	0.00	0.000
57	-5.60	100	88	28.27	875.00	237.25	523.76	0.000000	0.00	0.000
58	-5.70	100	89	28.27	875.00	249.80	532.64	0.000000	0.00	0.000
59	-5.80	100	90	28.27	875.00	262.79	541.60	0.000000	0.00	0.000

Relazione di calcolo muro di sostegno sede stradale-NV34

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
NM25	03 D 26	CL	NV 34 05 001	A	100 di 135

n°	Y	B	H	Af	Aeff	M	Mpf	ε	Sm	w
	[m]	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kNm]	[%]	[mm]	[mm]
60	-5.90	100	91	28.27	875.00	276.21	550.65	0.000000	0.00	0.000
61	-6.00	100	91	34.56	875.00	290.09	576.61	0.000000	0.00	0.000
62	-6.10	100	92	34.56	875.00	304.42	585.99	0.000000	0.00	0.000
63	-6.20	100	93	34.56	875.00	319.22	595.46	0.000000	0.00	0.000
64	-6.30	100	94	34.56	875.00	334.48	605.02	0.000000	0.00	0.000
65	-6.40	100	95	34.56	875.00	350.23	614.66	0.000000	0.00	0.000
66	-6.50	100	96	34.56	875.00	366.46	624.38	0.000000	0.00	0.000
67	-6.60	100	97	56.55	875.00	383.19	724.33	0.000000	0.00	0.000
68	-6.70	100	97	34.56	875.00	400.41	644.08	0.000000	0.00	0.000
69	-6.80	100	98	34.56	875.00	418.15	654.05	0.000000	0.00	0.000
70	-6.90	100	99	34.56	875.00	436.39	664.11	0.000000	0.00	0.000
71	-7.00	100	100	34.56	875.00	455.17	674.24	0.000000	0.00	0.000
72	-7.10	100	101	34.56	875.00	474.47	684.46	0.000000	0.00	0.000
73	-7.20	100	102	34.56	875.00	494.31	694.76	0.000000	0.00	0.000

Fondazione

Combinazione n° 12 - SLEQ

Apertura limite fessure $w_{lim}=0.30$

n°	Y	B	H	Af	Aeff	M	Mpf	ε	Sm	w
	[m]	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kNm]	[%]	[mm]	[mm]
1	-1.40	100	120	0.00	0.00	0.00	0.00	---	---	0.000
2	-1.30	100	120	26.55	875.00	0.84	808.11	0.000000	0.00	0.000
3	-1.20	100	120	26.55	875.00	3.36	808.11	0.000000	0.00	0.000
4	-1.10	100	120	26.55	875.00	7.54	808.11	0.000000	0.00	0.000
5	-1.00	100	120	26.55	875.00	13.38	808.11	0.000000	0.00	0.000
6	-0.90	100	120	26.55	875.00	20.85	808.11	0.000000	0.00	0.000
7	-0.80	100	120	26.55	875.00	29.94	808.11	0.000000	0.00	0.000
8	-0.70	100	120	26.55	875.00	40.65	808.11	0.000000	0.00	0.000
9	-0.60	100	120	26.55	875.00	52.96	808.11	0.000000	0.00	0.000
10	-0.50	100	120	26.55	875.00	66.85	808.11	0.000000	0.00	0.000
11	-0.40	100	120	26.55	875.00	82.32	808.11	0.000000	0.00	0.000
12	0.62	100	120	26.55	875.00	-481.65	-808.11	0.000000	0.00	0.000
13	0.72	100	120	26.55	875.00	-467.80	-808.11	0.000000	0.00	0.000
14	0.82	100	120	26.55	875.00	-453.91	-808.11	0.000000	0.00	0.000
15	0.92	100	120	26.55	875.00	-440.01	-808.11	0.000000	0.00	0.000
16	1.01	100	120	26.55	875.00	-426.10	-808.11	0.000000	0.00	0.000
17	1.11	100	120	26.55	875.00	-412.20	-808.11	0.000000	0.00	0.000
18	1.21	100	120	26.55	875.00	-398.32	-808.11	0.000000	0.00	0.000
19	1.31	100	120	26.55	875.00	-384.47	-808.11	0.000000	0.00	0.000
20	1.41	100	120	26.55	875.00	-370.67	-808.11	0.000000	0.00	0.000
21	1.51	100	120	26.55	875.00	-356.93	-808.11	0.000000	0.00	0.000
22	1.61	100	120	26.55	875.00	-343.26	-808.11	0.000000	0.00	0.000
23	1.71	100	120	26.55	875.00	-329.68	-808.11	0.000000	0.00	0.000
24	1.81	100	120	26.55	875.00	-316.19	-808.11	0.000000	0.00	0.000
25	1.91	100	120	26.55	875.00	-302.81	-808.11	0.000000	0.00	0.000
26	2.01	100	120	26.55	875.00	-289.55	-808.11	0.000000	0.00	0.000
27	2.11	100	120	26.55	875.00	-276.43	-808.11	0.000000	0.00	0.000
28	2.21	100	120	26.55	875.00	-263.45	-808.11	0.000000	0.00	0.000
29	2.31	100	120	26.55	875.00	-250.63	-808.11	0.000000	0.00	0.000
30	2.41	100	120	26.55	875.00	-237.99	-808.11	0.000000	0.00	0.000
31	2.51	100	120	26.55	875.00	-225.53	-808.11	0.000000	0.00	0.000
32	2.61	100	120	26.55	875.00	-213.26	-808.11	0.000000	0.00	0.000
33	2.70	100	120	26.55	875.00	-201.21	-808.11	0.000000	0.00	0.000
34	2.80	100	120	26.55	875.00	-189.38	-808.11	0.000000	0.00	0.000

Relazione di calcolo muro di sostegno sede stradale-NV34

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
NM25	03 D 26	CL	NV 34 05 001	A	101 di 135

n°	Y [m]	B [cm]	H [cm]	Af [cmq]	Aeff [cmq]	M [kNm]	Mpf [kNm]	ε [%]	Sm [mm]	w [mm]
35	2.90	100	120	26.55	875.00	-177.78	-808.11	0.000000	0.00	0.000
36	3.00	100	120	26.55	875.00	-166.43	-808.11	0.000000	0.00	0.000
37	3.10	100	120	26.55	875.00	-155.34	-808.11	0.000000	0.00	0.000
38	3.20	100	120	26.55	875.00	-144.53	-808.11	0.000000	0.00	0.000
39	3.30	100	120	26.55	875.00	-134.00	-808.11	0.000000	0.00	0.000
40	3.40	100	120	26.55	875.00	-123.77	-808.11	0.000000	0.00	0.000
41	3.50	100	120	26.55	875.00	-113.84	-808.11	0.000000	0.00	0.000
42	3.60	100	120	26.55	875.00	-104.24	-808.11	0.000000	0.00	0.000
43	3.70	100	120	26.55	875.00	-94.98	-808.11	0.000000	0.00	0.000
44	3.80	100	120	26.55	875.00	-86.07	-808.11	0.000000	0.00	0.000
45	3.90	100	120	26.55	875.00	-77.51	-808.11	0.000000	0.00	0.000
46	4.00	100	120	26.55	875.00	-69.33	-808.11	0.000000	0.00	0.000
47	4.10	100	120	26.55	875.00	-61.54	-808.11	0.000000	0.00	0.000
48	4.20	100	120	26.55	875.00	-54.14	-808.11	0.000000	0.00	0.000
49	4.29	100	120	26.55	875.00	-47.16	-808.11	0.000000	0.00	0.000
50	4.39	100	120	26.55	875.00	-40.60	-808.11	0.000000	0.00	0.000
51	4.49	100	120	26.55	875.00	-34.47	-808.11	0.000000	0.00	0.000
52	4.59	100	120	26.55	875.00	-28.80	-808.11	0.000000	0.00	0.000
53	4.69	100	120	26.55	875.00	-23.58	-808.11	0.000000	0.00	0.000
54	4.79	100	120	26.55	875.00	-18.21	-808.11	0.000000	0.00	0.000
55	4.89	100	120	26.55	875.00	-13.45	-808.11	0.000000	0.00	0.000
56	4.99	100	120	26.55	875.00	-9.39	-808.11	0.000000	0.00	0.000
57	5.09	100	120	26.55	875.00	-6.05	-808.11	0.000000	0.00	0.000
58	5.19	100	120	26.55	875.00	-3.42	-808.11	0.000000	0.00	0.000
59	5.29	100	120	26.55	875.00	-1.53	-808.11	0.000000	0.00	0.000
60	5.39	100	120	26.55	875.00	-0.38	-808.11	0.000000	0.00	0.000
61	5.49	100	120	0.00	0.00	0.00	0.00	---	---	0.000

Combinazione n° 13 - SLEQ H + V

Apertura limite fessure $w_{lim}=0.30$

n°	Y [m]	B [cm]	H [cm]	Af [cmq]	Aeff [cmq]	M [kNm]	Mpf [kNm]	ε [%]	Sm [mm]	w [mm]
1	-1.40	100	120	0.00	0.00	0.00	0.00	---	---	0.000
2	-1.30	100	120	26.55	875.00	1.17	808.11	0.000000	0.00	0.000
3	-1.20	100	120	26.55	875.00	4.65	808.11	0.000000	0.00	0.000
4	-1.10	100	120	26.55	875.00	10.42	808.11	0.000000	0.00	0.000
5	-1.00	100	120	26.55	875.00	18.45	808.11	0.000000	0.00	0.000
6	-0.90	100	120	26.55	875.00	28.70	808.11	0.000000	0.00	0.000
7	-0.80	100	120	26.55	875.00	41.15	808.11	0.000000	0.00	0.000
8	-0.70	100	120	26.55	875.00	55.76	808.11	0.000000	0.00	0.000
9	-0.60	100	120	26.55	875.00	72.51	808.11	0.000000	0.00	0.000
10	-0.50	100	120	26.55	875.00	91.36	808.11	0.000000	0.00	0.000
11	-0.40	100	120	26.55	875.00	112.28	808.11	0.000000	0.00	0.000
12	0.62	100	120	26.55	875.00	-774.16	-808.11	0.000000	0.00	0.000
13	0.72	100	120	26.55	875.00	-755.08	-808.11	0.000000	0.00	0.000
14	0.82	100	120	26.55	875.00	-735.67	-808.11	0.000000	0.00	0.000
15	0.92	100	120	26.55	875.00	-715.95	-808.11	0.000000	0.00	0.000
16	1.01	100	120	26.55	875.00	-695.97	-808.11	0.000000	0.00	0.000
17	1.11	100	120	26.55	875.00	-675.74	-808.11	0.000000	0.00	0.000
18	1.21	100	120	26.55	875.00	-655.31	-808.11	0.000000	0.00	0.000
19	1.31	100	120	26.55	875.00	-634.70	-808.11	0.000000	0.00	0.000
20	1.41	100	120	26.55	875.00	-613.93	-808.11	0.000000	0.00	0.000
21	1.51	100	120	26.55	875.00	-593.05	-808.11	0.000000	0.00	0.000
22	1.61	100	120	26.55	875.00	-572.07	-808.11	0.000000	0.00	0.000
23	1.71	100	120	26.55	875.00	-551.03	-808.11	0.000000	0.00	0.000
24	1.81	100	120	26.55	875.00	-529.96	-808.11	0.000000	0.00	0.000
25	1.91	100	120	26.55	875.00	-508.89	-808.11	0.000000	0.00	0.000
26	2.01	100	120	26.55	875.00	-487.85	-808.11	0.000000	0.00	0.000
27	2.11	100	120	26.55	875.00	-466.86	-808.11	0.000000	0.00	0.000

Relazione di calcolo muro di sostegno sede stradale-NV34

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
NM25	03 D 26	CL	NV 34 05 001	A	102 di 135

n°	Y [m]	B [cm]	H [cm]	Af [cmq]	Aeff [cmq]	M [kNm]	Mpf [kNm]	ε [%]	Sm [mm]	w [mm]
28	2.21	100	120	26.55	875.00	-445.96	-808.11	0.000000	0.00	0.000
29	2.31	100	120	26.55	875.00	-425.18	-808.11	0.000000	0.00	0.000
30	2.41	100	120	26.55	875.00	-404.54	-808.11	0.000000	0.00	0.000
31	2.51	100	120	26.55	875.00	-384.08	-808.11	0.000000	0.00	0.000
32	2.61	100	120	26.55	875.00	-363.83	-808.11	0.000000	0.00	0.000
33	2.70	100	120	26.55	875.00	-343.82	-808.11	0.000000	0.00	0.000
34	2.80	100	120	26.55	875.00	-324.07	-808.11	0.000000	0.00	0.000
35	2.90	100	120	26.55	875.00	-304.61	-808.11	0.000000	0.00	0.000
36	3.00	100	120	26.55	875.00	-285.48	-808.11	0.000000	0.00	0.000
37	3.10	100	120	26.55	875.00	-266.71	-808.11	0.000000	0.00	0.000
38	3.20	100	120	26.55	875.00	-248.32	-808.11	0.000000	0.00	0.000
39	3.30	100	120	26.55	875.00	-230.34	-808.11	0.000000	0.00	0.000
40	3.40	100	120	26.55	875.00	-212.81	-808.11	0.000000	0.00	0.000
41	3.50	100	120	26.55	875.00	-195.75	-808.11	0.000000	0.00	0.000
42	3.60	100	120	26.55	875.00	-179.20	-808.11	0.000000	0.00	0.000
43	3.70	100	120	26.55	875.00	-163.18	-808.11	0.000000	0.00	0.000
44	3.80	100	120	26.55	875.00	-147.73	-808.11	0.000000	0.00	0.000
45	3.90	100	120	26.55	875.00	-132.86	-808.11	0.000000	0.00	0.000
46	4.00	100	120	26.55	875.00	-118.62	-808.11	0.000000	0.00	0.000
47	4.10	100	120	26.55	875.00	-105.04	-808.11	0.000000	0.00	0.000
48	4.20	100	120	26.55	875.00	-92.13	-808.11	0.000000	0.00	0.000
49	4.29	100	120	26.55	875.00	-79.94	-808.11	0.000000	0.00	0.000
50	4.39	100	120	26.55	875.00	-68.49	-808.11	0.000000	0.00	0.000
51	4.49	100	120	26.55	875.00	-57.81	-808.11	0.000000	0.00	0.000
52	4.59	100	120	26.55	875.00	-47.93	-808.11	0.000000	0.00	0.000
53	4.69	100	120	26.55	875.00	-38.88	-808.11	0.000000	0.00	0.000
54	4.79	100	120	26.55	875.00	-30.06	-808.11	0.000000	0.00	0.000
55	4.89	100	120	26.55	875.00	-22.26	-808.11	0.000000	0.00	0.000
56	4.99	100	120	26.55	875.00	-15.59	-808.11	0.000000	0.00	0.000
57	5.09	100	120	26.55	875.00	-10.05	-808.11	0.000000	0.00	0.000
58	5.19	100	120	26.55	875.00	-5.70	-808.11	0.000000	0.00	0.000
59	5.29	100	120	26.55	875.00	-2.55	-808.11	0.000000	0.00	0.000
60	5.39	100	120	26.55	875.00	-0.64	-808.11	0.000000	0.00	0.000
61	5.49	100	120	0.00	0.00	0.00	0.00	---	---	0.000

10.2 RISULTATI PER INVILUPPO

Spinta e forze

Simbologia adottata

Ic	Indice della combinazione
A	Tipo azione
I	Inclinazione della spinta, espressa in [°]
V	Valore dell'azione, espressa in [kN]
Cx, Cy	Componente in direzione X ed Y dell'azione, espressa in [kN]
Px, Py	Coordinata X ed Y del punto di applicazione dell'azione, espressa in [m]

Ic	A	V [kN]	I [°]	Cx [kN]	Cy [kN]	Px [m]	Py [m]
2	Spinta statica	227.87	0.00	227.87	0.00	5.49	-5.31
	Incremento di spinta sismica		87.16	87.16	0.00	5.49	-5.60
	Peso/Inerzia muro			52.83	327.71/26.42	1.25	-6.40
	Peso/Inerzia terrapieno			117.07	726.18/58.54	2.90	-3.53

Ic	A	V	I	Cx	Cy	Px	Py
		[kN]	[°]	[kN]	[kN]	[m]	[m]
	Peso dell'acqua sulla fondazione di valle				0.00	0.00	0.00
	Resistenza passiva terreno antistante			-4.84			

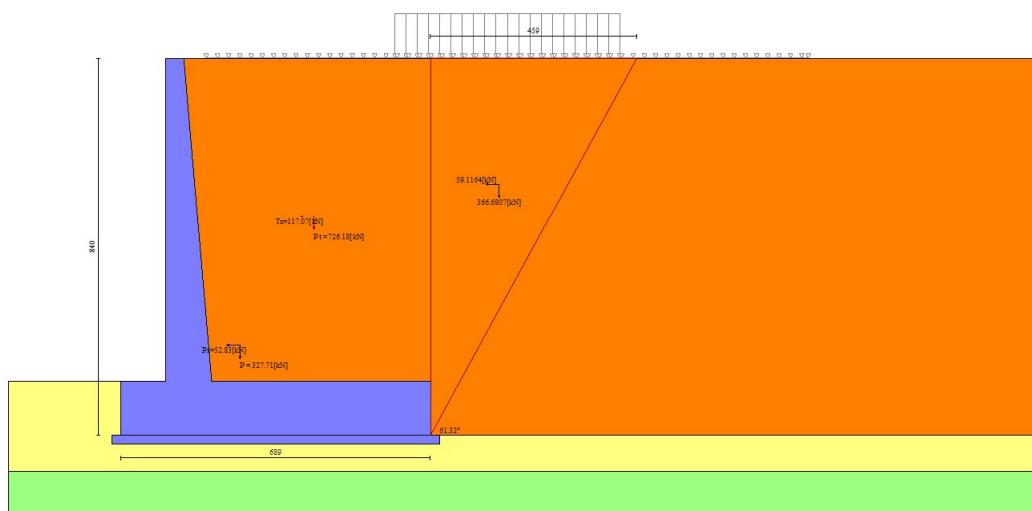


Fig. 12 - Cuneo di spinta (combinazione sismica) (Combinazione n° 2)

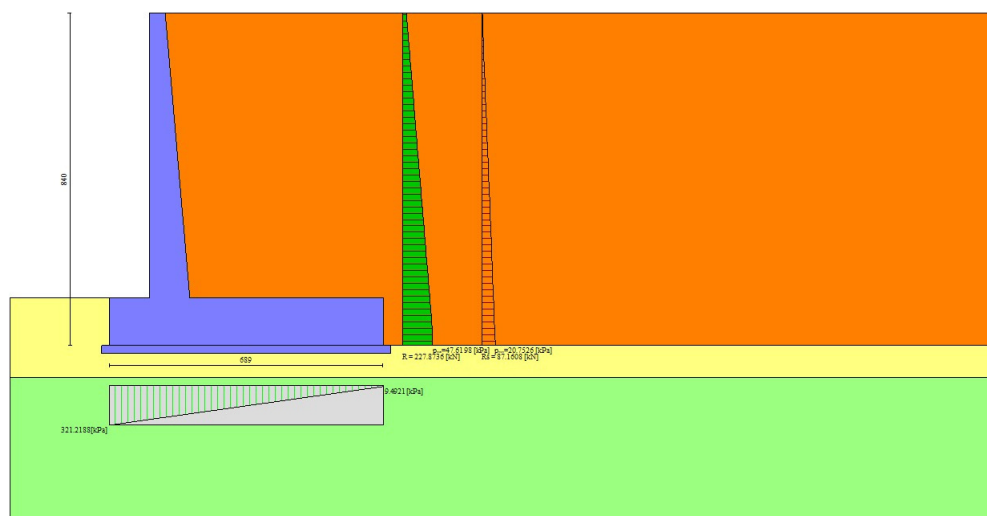


Fig. 13 - Diagramma delle pressioni (combinazione sismica) (Combinazione n° 2)

Risultanti globali

Simbologia adottata

Cmb	Indice/Tipo combinazione
N	Componente normale al piano di posa, espressa in [kN]
T	Componente parallela al piano di posa, espressa in [kN]
M _r	Momento ribaltante, espresso in [kNm]
M _s	Momento stabilizzante, espresso in [kNm]
ecc	Eccentricità risultante, espressa in [m]

Ic	N	T	M _r	M _s	ecc
	[kN]	[kN]	[kNm]	[kNm]	[m]
1 - STR (A1-M1-R3)	1072.37	304.15	948.01	4072.95	0.530
2 - STR (A1-M1-R3)	1138.85	484.94	1623.69	4313.24	1.082
3 - STR (A1-M1-R3)	968.94	449.08	1845.02	3991.49	1.228
4 - GEO (A2-M2-R2)	1067.23	300.69	953.42	4050.17	0.542
5 - GEO (A2-M2-R2)	1138.85	484.94	1623.69	4313.24	1.082
6 - GEO (A2-M2-R2)	968.94	449.08	1845.02	3991.49	1.228
7 - EQU (A1-M1-R3)	1072.37	304.15	948.01	4072.95	0.530
8 - EQU (A1-M1-R3)	1165.67	568.15	1919.90	4414.85	1.303
9 - EQU (A1-M1-R3)	942.11	522.72	2216.06	3991.49	1.559
10 - SLER	1061.87	231.51	718.94	4026.52	0.329
11 - SLEF	1061.87	231.51	718.94	4026.52	0.329
12 - SLEQ	1061.87	231.51	718.94	4026.52	0.329
13 - SLEQ	1100.13	367.36	1203.20	4166.59	0.750

Verifiche geotecniche

Quadro riassuntivo coeff. di sicurezza calcolati

Simbologia adottata

Cmb	Indice/Tipo combinazione
S	Sisma (H: componente orizzontale, V: componente verticale)
FS _{SCO}	Coeff. di sicurezza allo scorrimento
FS _{RIB}	Coeff. di sicurezza al ribaltamento
FS _{QLIM}	Coeff. di sicurezza a carico limite
FS _{STAB}	Coeff. di sicurezza a stabilità globale
FS _{HYD}	Coeff. di sicurezza a sifonamento
FS _{UPL}	Coeff. di sicurezza a sollevamento

Cmb	Sismica	FS _{SCO}	FS _{RIB}	FS _{QLIM}	FS _{STAB}	FS _{HYD}	FS _{SUPL}
1 - STR (A1-M1-R3)		2.394		2.209			
2 - STR (A1-M1-R3)	H + V	1.594		1.204			
3 - STR (A1-M1-R3)	H - V	1.466		1.214			
4 - GEO (A2-M2-R2)					1.449		
5 - GEO (A2-M2-R2)	H + V				1.395		
6 - GEO (A2-M2-R2)	H - V				1.335		
7 - EQU (A1-M1-R3)			4.296				
8 - EQU (A1-M1-R3)	H + V		2.300				
9 - EQU (A1-M1-R3)	H - V		1.801				

Verifica a scorrimento fondazione

Simbologia adottata

n°	Indice combinazione
Rsa	Resistenza allo scorrimento per attrito, espresso in [kN]
Rpt	Resistenza passiva terreno antistante, espresso in [kN]
Rps	Resistenza passiva sperone, espresso in [kN]
Rp	Resistenza a carichi orizzontali pali (solo per fondazione mista), espresso in [kN]
Rt	Resistenza a carichi orizzontali tiranti (solo se presenti), espresso in [kN]
R	Resistenza allo scorrimento (somma di Rsa+Rpt+Rps+Rp), espresso in [kN]
T	Carico parallelo al piano di posa, espresso in [kN]
FS	Fattore di sicurezza (rapporto R/T)

n°	Rsa	Rpt	Rps	Rp	Rt	R	T	FS
	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	
3 - STR (A1-M1-R3) H - V	653.56	4.84	0.00	--	--	658.40	449.08	1.466

Verifica a carico limite

Simbologia adottata

n°	Indice combinazione
N	Carico normale totale al piano di posa, espresso in [kN]
Qu	carico limite del terreno, espresso in [kN]
Qd	Portanza di progetto, espresso in [kN]
FS	Fattore di sicurezza (rapporto tra il carico limie e carico agente al piano di posa)

n°	N	Qu	Qd	FS
	[kN]	[kN]	[kN]	
2 - STR (A1-M1-R3) H + V	1138.85	1371.35	1142.79	1.204

Dettagli calcolo portanza

Simbologia adottata

n°	Indice combinazione
N_c, N_q, N_{γ}	Fattori di capacità portante
i_c, i_q, i_{γ}	Fattori di inclinazione del carico
d_c, d_q, d_{γ}	Fattori di profondità del piano di posa
g_c, g_q, g_{γ}	Fattori di inclinazione del profilo topografico
b_c, b_q, b_{γ}	Fattori di inclinazione del piano di posa
s_c, s_q, s_{γ}	Fattori di forma della fondazione
p_c, p_q, p_{γ}	Fattori di riduzione per punzonamento secondo Vesic
R_e	Fattore di riduzione capacità portante per eccentricità secondo Meyerhof
I_r, I_{rc}	Indici di rigidezza per punzonamento secondo Vesic
r_{γ} fattore	Fattori per tener conto dell'effetto piastra. Per fondazioni che hanno larghezza maggiore di 2 m, il terzo termine della formula trinomia $0.5B_{\gamma}N_{\gamma}$ viene moltiplicato per questo
D	Affondamento del piano di posa, espresso in [m]
B'	Larghezza fondazione ridotta, espresso in [m]
H	Altezza del cuneo di rottura, espresso in [m]
γ	Peso di volume del terreno medio, espresso in [kN/mc]
ϕ	Angolo di attrito del terreno medio, espresso in [°]
c	Coesione del terreno medio, espresso in [kPa]

Per i coeff. che in tabella sono indicati con il simbolo '-' sono coeff. non presenti nel metodo scelto (Hansen).

n°	N_c N_q N_{γ}	i_c i_q i_{γ}	d_c d_q d_{γ}	g_c g_q g_{γ}	b_c b_q b_{γ}	s_c s_q s_{γ}	p_c p_q p_{γ}	I_r	I_{rc}	R_e	r_{γ}
2	25.764 14.688 10.908	0.251 0.302 0.170	1.070 1.052 1.000	1.000 1.000 1.000	1.000 1.000 1.000	-- -- --	-- -- --	--	--	--	0.866

n°	D	B'	H	γ	ϕ	c
	[m]	[m]	[m]	[°]	[kN/mc]	[kPa]
2	1.20	6.89	5.73	16.73	27.98	0

Verifica a ribaltamento

Simbologia adottata

n°	Indice combinazione
M_s	Momento stabilizzante, espresso in [kNm]
M_r	Momento ribaltante, espresso in [kNm]
FS	Fattore di sicurezza (rapporto tra momento stabilizzante e momento ribaltante)

 GRUPPO FERROVIE DELLO STATO ITALIANE	RADDOPPIO LINEA CODOGNO – CREMONA – MANTOVA TRATTA PIADENA - MANTOVA					
	Relazione di calcolo muro di sostegno sede stradale-NV34	COMMESSA NM25	LOTTO 03 D 26	CODIFICA CL	DOCUMENTO NV 34 05 001	REV. A FOGLIO 107 di 135

La verifica viene eseguita rispetto allo spigolo inferiore esterno della fondazione

n°	Ms	Mr	FS
	[kNm]	[kNm]	
9 - EQU (A1-M1-R3) H - V	3991.49	2216.06	1.801

Verifica stabilità globale muro + terreno

Simbologia adottata

Ic	Indice/Tipo combinazione
C	Centro superficie di scorrimento, espresso in [m]
R	Raggio, espresso in [m]
FS	Fattore di sicurezza

Ic	C	R	FS
	[m]	[m]	
6 - GEO (A2-M2-R2) H - V	-2.00; 3.50	14.07	1.335

Dettagli strisce verifiche stabilità

Simbologia adottata

Le ascisse X sono considerate positive verso monte	
Le ordinate Y sono considerate positive verso l'alto	
Origine in testa al muro (spigolo contro terra)	
W	peso della striscia espresso in [kN]
Qy	carico sulla striscia espresso in [kN]
α	angolo fra la base della striscia e l'orizzontale espresso in [°] (positivo antiorario)
φ	angolo d'attrito del terreno lungo la base della striscia
c	coesione del terreno lungo la base della striscia espressa in [kPa]
b	larghezza della striscia espressa in [m]
u	pressione neutra lungo la base della striscia espressa in [kPa]
Tx; Ty	Resistenza al taglio fornita dai tiranti in direzione X ed Y espressa in [kPa]

n°	W	Qy	b	α	φ	c	u	Tx; Ty
	[kN]	[kN]	[m]	[°]	[°]	[kPa]	[kPa]	[kN]
1	21.65	0.36	11.64 - 0.91	69.968	35.000	0	0.0	
2	57.49	0.36	0.91	60.935	35.000	0	0.0	
3	82.54	16.30	0.91	53.956	35.000	0	0.0	
4	102.16	18.59	0.91	48.024	35.000	0	0.0	
5	118.22	18.59	0.91	42.721	35.000	0	0.0	
6	131.64	18.59	0.91	37.843	35.000	0	0.0	
7	144.47	18.59	0.91	33.272	35.000	0	0.0	

n°	W [kN]	Qy [kN]	b [m]	α [°]	ϕ [°]	c [kPa]	u [kPa]	Tx; Ty [kN]
8	158.53	11.51	0.91	28.930	34.000	0	0.0	
9	166.53	0.36	0.91	24.765	27.000	0	0.0	
10	173.16	0.36	0.91	20.736	27.000	0	0.0	
11	178.53	0.36	0.91	16.812	27.000	0	0.0	
12	182.73	0.36	0.91	12.968	27.000	0	0.0	
13	206.50	0.08	0.91	9.183	27.000	0	0.0	
14	82.88	0.00	0.91	5.438	27.000	0	0.0	
15	59.95	0.00	0.91	1.716	27.000	0	0.0	
16	58.08	0.00	0.91	-1.999	27.000	0	0.0	
17	57.01	0.00	0.91	-5.722	27.000	0	0.0	
18	54.90	0.00	0.91	-9.469	27.000	0	0.0	
19	51.73	0.00	0.91	-13.258	27.000	0	0.0	
20	47.44	0.00	0.91	-17.107	27.000	0	0.0	
21	41.97	0.00	0.91	-21.038	27.000	0	0.0	
22	35.24	0.00	0.91	-25.077	27.000	0	0.0	
23	27.13	0.00	0.91	-29.254	34.000	0	0.0	
24	17.46	0.00	0.91	-33.611	34.000	0	0.0	
25	6.01	0.00	-11.15 - 0.91	-37.741	34.000	0	0.0	

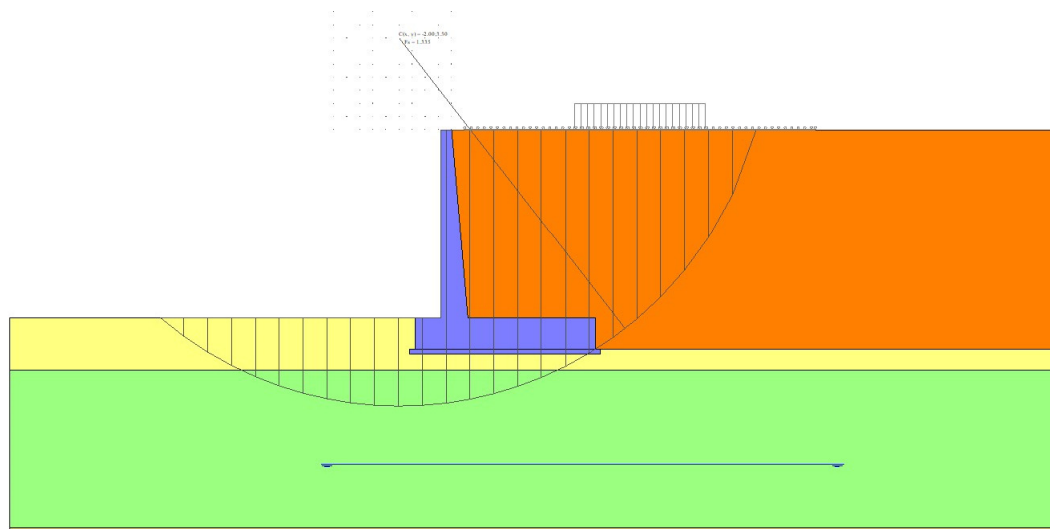


Fig. 14 - Stabilità fronte di scavo - Cerchio critico (Combinazione n° 6)

Sollecitazioni

Elementi calcolati a trave

Simbologia adottata

- N Sforzo normale, espresso in [kN]. Positivo se di compressione.
- T Taglio, espresso in [kN]. Positivo se diretto da monte verso valle

Paramento

n°	X	N _{min}	N _{max}	T _{min}	T _{max}	M _{min}	M _{max}
	[m]	[kN]	[kN]	[kN]	[kN]	[kNm]	[kNm]
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	-0.10	0.99	0.99	0.03	0.20	0.00	0.01
3	-0.20	2.00	2.00	0.12	0.49	0.02	0.05
4	-0.30	3.04	3.04	0.26	0.87	0.05	0.13
5	-0.40	4.09	4.09	0.46	1.34	0.10	0.26
6	-0.50	5.17	5.17	0.72	1.89	0.18	0.44
7	-0.60	6.26	6.26	1.04	2.53	0.29	0.68
8	-0.70	7.38	7.38	1.42	3.27	0.44	1.00
9	-0.80	8.52	8.52	1.87	4.09	0.64	1.40
10	-0.90	9.68	9.68	2.38	5.00	0.89	1.89
11	-1.00	10.86	10.86	2.98	6.00	1.20	2.49
12	-1.10	12.06	12.06	3.63	7.09	1.58	3.19
13	-1.20	13.28	13.28	4.35	8.27	2.03	4.01
14	-1.30	14.52	14.52	5.12	9.54	2.56	4.96
15	-1.40	15.79	15.79	5.96	10.90	3.18	6.05
16	-1.50	17.07	17.07	6.85	12.34	3.89	7.28
17	-1.60	18.38	18.38	7.80	13.88	4.70	8.66
18	-1.70	19.71	19.71	8.81	15.50	5.61	10.21
19	-1.80	21.06	21.06	9.87	17.21	6.63	11.94
20	-1.90	22.43	22.43	10.99	19.01	7.77	13.84
21	-2.00	23.82	23.82	12.17	20.89	9.02	15.93
22	-2.10	25.23	25.23	13.41	22.86	10.41	18.22
23	-2.20	26.66	26.66	14.71	24.93	11.93	20.72
24	-2.30	28.12	28.12	16.06	27.08	13.58	23.44
25	-2.40	29.59	29.59	17.47	29.31	15.38	26.38
26	-2.50	31.09	31.09	18.94	31.64	17.33	29.56
27	-2.60	32.60	32.60	20.47	34.05	19.44	32.98
28	-2.70	34.14	34.14	22.05	36.55	21.71	36.65
29	-2.80	35.70	35.70	23.69	39.14	24.14	40.59
30	-2.90	37.28	37.28	25.39	41.82	26.75	44.79
31	-3.00	38.88	38.88	27.15	44.58	29.54	49.27
32	-3.10	40.50	40.50	28.96	47.44	32.52	54.04
33	-3.20	42.14	42.14	30.83	50.38	35.68	59.11
34	-3.30	43.81	43.81	32.76	53.41	39.05	64.48
35	-3.40	45.49	45.49	34.75	56.52	42.61	70.17
36	-3.50	47.20	47.20	36.79	59.73	46.39	76.18
37	-3.60	48.92	48.92	38.89	63.02	50.38	82.52
38	-3.70	50.67	50.67	41.05	66.40	54.59	89.21
39	-3.80	52.44	52.44	43.27	69.87	59.02	96.24
40	-3.90	54.23	54.23	45.54	73.43	63.69	103.64
41	-4.00	56.04	56.04	47.87	77.07	68.60	111.40
42	-4.10	57.87	57.87	50.26	80.81	73.75	119.53
43	-4.20	59.73	59.73	52.71	84.63	79.15	128.06
44	-4.30	61.60	61.60	55.21	88.54	84.80	136.97
45	-4.40	63.50	63.50	57.77	92.53	90.72	146.29
46	-4.50	65.41	65.41	60.39	96.62	96.90	156.03
47	-4.60	67.35	67.35	63.07	100.79	103.36	166.18
48	-4.70	69.31	69.31	65.80	105.05	110.10	176.77
49	-4.80	71.29	71.29	68.59	109.40	117.12	187.79
50	-4.90	73.29	73.29	71.44	113.84	124.43	199.26
51	-5.00	75.31	75.31	74.35	118.36	132.03	211.19
52	-5.10	77.35	77.35	77.31	122.97	139.94	223.58
53	-5.20	79.41	79.41	80.33	127.67	148.16	236.45
54	-5.30	81.50	81.50	83.41	132.46	156.69	249.80
55	-5.40	83.60	83.60	86.55	137.34	165.54	263.64
56	-5.50	85.73	85.73	89.74	142.30	174.72	277.99
57	-5.60	87.88	87.88	92.99	147.35	184.23	292.84
58	-5.70	90.04	90.04	96.30	152.50	194.07	308.21

n°	X [m]	Nmin [kN]	Nmax [kN]	Tmin [kN]	Tmax [kN]	Mmin [kNm]	Mmax [kNm]
59	-5.80	92.23	92.23	99.67	157.72	204.26	324.12
60	-5.90	94.44	94.44	103.09	163.04	214.80	340.55
61	-6.00	96.67	96.67	106.57	168.44	225.69	357.54
62	-6.10	98.93	98.93	110.11	173.94	236.94	375.07
63	-6.20	101.20	101.20	113.70	179.52	248.56	393.17
64	-6.30	103.49	103.49	117.36	185.18	260.55	411.85
65	-6.40	105.81	105.81	121.07	190.94	272.92	431.10
66	-6.50	108.15	108.15	124.84	196.78	285.68	450.95
67	-6.60	110.50	110.50	128.66	202.72	298.82	471.39
68	-6.70	112.88	112.88	132.55	208.74	312.36	492.44
69	-6.80	115.28	115.28	136.49	214.84	326.30	514.11
70	-6.90	117.70	117.70	140.49	221.04	340.65	536.40
71	-7.00	120.14	120.14	144.54	227.32	355.41	559.33
72	-7.10	122.61	122.61	148.66	233.70	370.59	582.90
73	-7.20	125.09	125.09	152.83	240.15	386.19	607.12

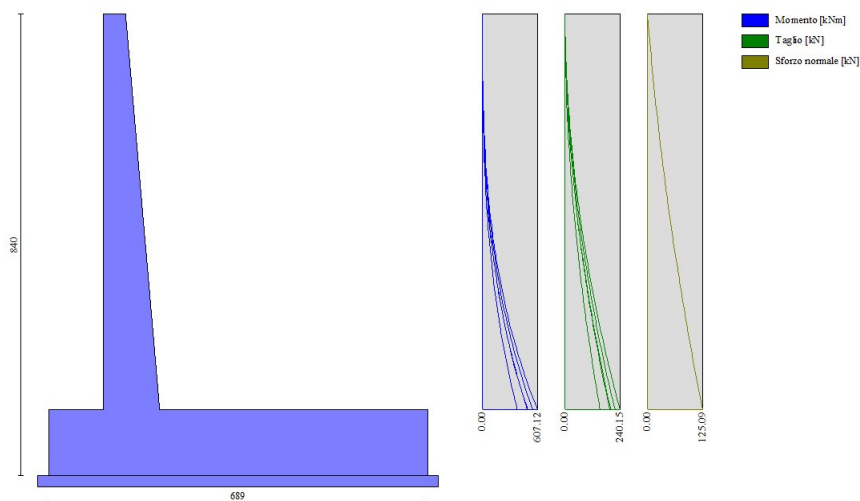


Fig. 15 - Paramento

Fondazione

n°	X [m]	Nmin [kN]	Nmax [kN]	Tmin [kN]	Tmax [kN]	Mmin [kNm]	Mmax [kNm]
1	-1.40	0.00	0.00	0.00	0.00	0.00	0.00
2	-1.30	0.00	0.00	16.83	28.95	0.84	1.45
3	-1.20	0.00	0.00	33.53	57.45	3.36	5.78
4	-1.10	0.00	0.00	50.10	85.50	7.54	12.93
5	-1.00	0.00	0.00	66.54	113.10	13.38	22.86
6	-0.90	0.00	0.00	82.86	140.24	20.85	35.53
7	-0.80	0.00	0.00	99.04	166.93	29.94	50.89
8	-0.70	0.00	0.00	115.10	193.17	40.65	68.90
9	-0.60	0.00	0.00	131.03	218.96	52.96	89.51
10	-0.50	0.00	0.00	146.83	244.29	66.85	112.68

n°	X [m]	Nmin [kN]	Nmax [kN]	Tmin [kN]	Tmax [kN]	Mmin [kNm]	Mmax [kNm]
11	-0.40	0.00	0.00	162.51	269.17	82.32	138.36
12	0.62	0.00	0.00	-389.41	-147.12	-1289.07	-481.65
13	0.72	0.00	0.00	-386.85	-147.47	-1254.18	-467.80
14	0.82	0.00	0.00	-384.07	-147.71	-1218.97	-453.91
15	0.92	0.00	0.00	-381.09	-147.81	-1183.49	-440.01
16	1.01	0.00	0.00	-377.90	-147.79	-1147.77	-426.10
17	1.11	0.00	0.00	-374.51	-147.64	-1111.87	-412.20
18	1.21	0.00	0.00	-371.14	-147.37	-1075.83	-398.32
19	1.31	0.00	0.00	-371.94	-146.97	-1039.68	-384.47
20	1.41	0.00	0.00	-372.32	-146.44	-1003.47	-370.67
21	1.51	0.00	0.00	-372.26	-145.79	-967.25	-356.93
22	1.61	0.00	0.00	-371.76	-145.01	-931.06	-343.26
23	1.71	0.00	0.00	-370.84	-144.10	-894.93	-329.68
24	1.81	0.00	0.00	-369.48	-143.06	-858.92	-316.19
25	1.91	0.00	0.00	-367.68	-141.90	-823.07	-302.81
26	2.01	0.00	0.00	-365.46	-140.62	-787.41	-289.55
27	2.11	0.00	0.00	-362.80	-139.20	-752.00	-276.43
28	2.21	0.00	0.00	-359.70	-137.66	-716.88	-263.45
29	2.31	0.00	0.00	-356.17	-135.99	-682.08	-250.63
30	2.41	0.00	0.00	-352.21	-134.20	-647.66	-237.99
31	2.51	0.00	0.00	-347.82	-132.28	-613.65	-225.53
32	2.61	0.00	0.00	-342.99	-130.23	-580.10	-213.26
33	2.70	0.00	0.00	-337.73	-128.06	-547.05	-201.21
34	2.80	0.00	0.00	-332.04	-125.75	-514.55	-189.38
35	2.90	0.00	0.00	-325.91	-123.33	-482.63	-177.78
36	3.00	0.00	0.00	-319.35	-120.77	-451.34	-166.43
37	3.10	0.00	0.00	-312.35	-118.09	-420.73	-155.34
38	3.20	0.00	0.00	-304.93	-115.28	-390.83	-144.53
39	3.30	0.00	0.00	-297.07	-112.35	-361.70	-134.00
40	3.40	0.00	0.00	-288.77	-109.29	-333.36	-123.77
41	3.50	0.00	0.00	-280.04	-106.10	-305.88	-113.84
42	3.60	0.00	0.00	-270.88	-102.79	-279.28	-104.24
43	3.70	0.00	0.00	-261.29	-99.34	-253.61	-94.98
44	3.80	0.00	0.00	-251.26	-95.78	-228.92	-86.07
45	3.90	0.00	0.00	-240.80	-92.08	-205.25	-77.51
46	4.00	0.00	0.00	-229.90	-88.26	-182.63	-69.33
47	4.10	0.00	0.00	-218.57	-84.31	-161.13	-61.54
48	4.20	0.00	0.00	-206.81	-80.24	-140.77	-54.14
49	4.29	0.00	0.00	-194.62	-76.04	-121.60	-47.16
50	4.39	0.00	0.00	-181.99	-71.71	-103.66	-40.60
51	4.49	0.00	0.00	-168.92	-67.26	-87.00	-34.47
52	4.59	0.00	0.00	-155.43	-62.68	-71.66	-28.80
53	4.69	0.00	0.00	-141.50	-57.97	-57.69	-23.58
54	4.79	0.00	0.00	-125.31	-51.30	-44.48	-18.21
55	4.89	0.00	0.00	-108.52	-44.35	-32.85	-13.45
56	4.99	0.00	0.00	-91.31	-37.28	-22.92	-9.39
57	5.09	0.00	0.00	-73.66	-30.08	-14.72	-6.05
58	5.19	0.00	0.00	-55.57	-22.75	-8.29	-3.42
59	5.29	0.00	0.00	-37.10	-15.29	-3.69	-1.53
60	5.39	0.00	0.00	-18.55	-7.71	-0.92	-0.38
61	5.49	0.00	0.00	0.00	0.00	0.00	0.00

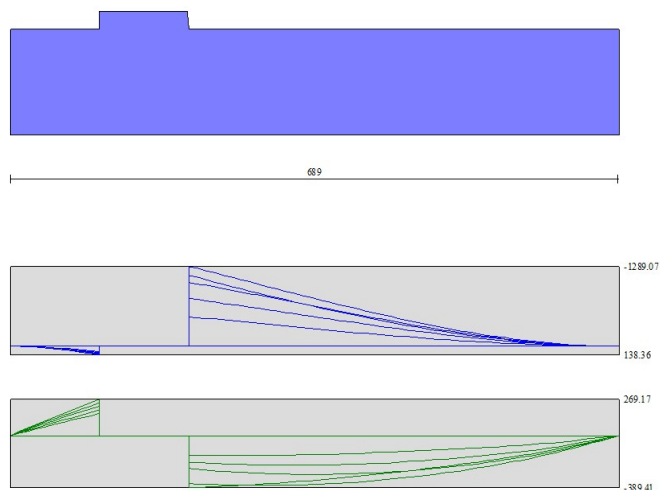


Fig. 16 - Fondazione

Verifiche strutturali

Verifiche a flessione

Elementi calcolati a trave

Simbologia adottata

n°	indice sezione
Y	ordinata sezione espressa in [m]
B	larghezza sezione espresso in [cm]
H	altezza sezione espressa in [cm]
Afi	area ferri inferiori espresso in [cmq]
Afs	area ferri superiori espressa in [cmq]
M	momento agente espressa in [kNm]
N	sforzo normale agente espressa in [kN]
Mu	momento ultimi espresso in [kNm]
Nu	sforzo normale ultimo espressa in [kN]
FS	fattore di sicurezza (rapporto tra sollecitazione ultima e sollecitazione agente)

Paramento

n°	B	H	Afi	Afs	M	N	Mu	Nu	FS
	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kNm]	[kN]	
1	100	40	18.85	15.71	0.00	0.00	0.00	0.00	100000.000
2	100	41	18.85	15.71	0.01	0.99	85.96	7501.55	7568.224
3	100	42	18.85	15.71	0.05	2.00	197.96	7630.58	3808.817
4	100	43	18.85	15.71	0.13	3.04	321.29	7484.58	2464.769
5	100	43	18.85	15.71	0.26	4.09	431.69	6912.46	1689.728
6	100	44	18.85	15.71	0.44	5.17	533.19	6315.18	1222.418
7	100	45	18.85	15.71	0.68	6.26	620.95	5707.53	911.395
8	100	46	18.85	15.71	1.00	7.38	695.37	5132.53	695.491
9	100	47	18.85	15.71	1.40	8.52	755.90	4596.75	539.649
10	100	48	18.85	15.71	1.89	9.68	788.99	4033.28	416.774
11	100	49	18.85	15.71	2.49	10.86	784.85	3427.80	315.701
12	100	49	18.85	15.71	3.19	12.06	758.86	2869.77	237.975
13	100	50	18.85	15.71	4.01	13.28	720.97	2387.69	179.775
14	100	51	18.85	18.85	4.96	14.52	756.34	2214.96	152.494
15	100	52	18.85	18.85	6.05	15.79	726.68	1897.77	120.193
16	100	53	18.85	18.85	7.28	17.07	692.11	1623.81	95.100
17	100	54	18.85	18.85	8.66	18.38	663.04	1406.68	76.528
18	100	55	18.85	18.85	10.21	19.71	634.74	1224.83	62.146
19	100	55	18.85	18.85	11.94	21.06	614.26	1083.70	51.464
20	100	56	18.85	18.85	13.84	22.43	599.28	971.17	43.304
21	100	57	18.85	18.85	15.93	23.82	588.30	879.47	36.926
22	100	58	18.85	18.85	18.22	25.23	580.35	803.41	31.845
23	100	59	18.85	18.85	20.72	26.66	574.72	739.38	27.732
24	100	60	18.85	18.85	23.44	28.12	570.92	684.76	24.356
25	100	61	18.85	18.85	26.38	29.59	568.59	637.69	21.551
26	100	61	18.85	21.99	29.56	31.09	654.01	687.76	22.125
27	100	62	18.85	21.99	32.98	32.60	653.74	646.24	19.822
28	100	63	18.85	21.99	36.65	34.14	654.43	609.56	17.855
29	100	64	18.85	21.99	40.59	35.70	655.93	576.93	16.161
30	100	65	18.85	21.99	44.79	37.28	658.11	547.73	14.693
31	100	66	18.85	21.99	49.27	38.88	660.88	521.47	13.413
32	100	67	18.85	21.99	54.04	40.50	663.59	497.30	12.279
33	100	67	18.85	21.99	59.11	42.14	666.31	475.05	11.272
34	100	68	18.85	21.99	64.48	43.81	669.44	454.79	10.382
35	100	69	18.85	21.99	70.17	45.49	672.93	436.27	9.590
36	100	70	18.85	21.99	76.18	47.20	676.75	419.28	8.883
37	100	71	18.85	25.13	82.52	48.92	775.61	459.82	9.399
38	100	72	18.85	25.13	89.21	50.67	780.62	443.41	8.751
39	100	73	18.85	25.13	96.24	52.44	785.88	428.22	8.166
40	100	73	18.85	25.13	103.64	54.23	791.38	414.12	7.636
41	100	74	18.85	25.13	111.40	56.04	797.08	401.00	7.155
42	100	75	18.85	25.13	119.53	57.87	802.97	388.77	6.718
43	100	76	18.85	25.13	128.06	59.73	809.03	377.34	6.318
44	100	77	18.85	25.13	136.97	61.60	815.25	366.64	5.952
45	100	78	18.85	25.13	146.29	63.50	821.60	356.60	5.616
46	100	79	18.85	25.13	156.03	65.41	828.09	347.16	5.307
47	100	79	18.85	25.13	166.18	67.35	834.69	338.28	5.023
48	100	80	18.85	25.13	176.77	69.31	841.40	329.90	4.760
49	100	81	18.85	28.27	187.79	71.29	951.70	361.27	5.068
50	100	82	18.85	28.27	199.26	73.29	959.47	352.88	4.815
51	100	83	18.85	28.27	211.19	75.31	967.34	344.94	4.580
52	100	84	18.85	28.27	223.58	77.35	975.29	337.41	4.362
53	100	85	18.85	28.27	236.45	79.41	983.33	330.26	4.159
54	100	85	18.85	28.27	249.80	81.50	991.44	323.46	3.969
55	100	86	18.85	28.27	263.64	83.60	999.63	316.98	3.792
56	100	87	18.85	28.27	277.99	85.73	1007.88	310.82	3.626
57	100	88	18.85	28.27	292.84	87.88	1016.19	304.94	3.470
58	100	89	18.85	28.27	308.21	90.04	1024.56	299.32	3.324
59	100	90	18.85	28.27	324.12	92.23	1032.98	293.95	3.187
60	100	91	18.85	28.27	340.55	94.44	1041.45	288.82	3.058
61	100	91	18.85	34.56	357.54	96.67	1277.35	345.38	3.573
62	100	92	18.85	34.56	375.07	98.93	1287.82	339.67	3.434
63	100	93	18.85	34.56	393.17	101.20	1298.35	334.18	3.302
64	100	94	18.85	34.56	411.85	103.49	1308.92	328.92	3.178

n°	B	H	Afi	Afs	M	N	Mu	Nu	FS
	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kNm]	[kN]	
65	100	95	18.85	34.56	431.10	105.81	1319.53	323.87	3.061
66	100	96	18.85	34.56	450.95	108.15	1330.19	319.01	2.950
67	100	97	37.70	56.55	471.39	110.50	2173.65	509.55	4.611
68	100	97	18.85	34.56	492.44	112.88	1351.62	309.83	2.745
69	100	98	18.85	34.56	514.11	115.28	1362.39	305.50	2.650
70	100	99	18.85	34.56	536.40	117.70	1373.19	301.32	2.560
71	100	100	18.85	34.56	559.33	120.14	1384.03	297.29	2.474
72	100	101	18.85	34.56	582.90	122.61	1394.90	293.40	2.393
73	100	102	18.85	34.56	607.12	125.09	1405.80	289.65	2.316

Fondazione

n°	B	H	Afi	Afs	M	N	Mu	Nu	FS
	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kNm]	[kN]	
1	100	120	26.55	26.55	0.00	0.00	0.00	0.00	100000.000
2	100	120	26.55	26.55	1.45	0.00	3966.97	0.00	2733.114
3	100	120	26.55	26.55	5.78	0.00	3966.97	0.00	686.848
4	100	120	26.55	26.55	12.93	0.00	3966.97	0.00	306.869
5	100	120	26.55	26.55	22.86	0.00	3966.97	0.00	173.525
6	100	120	26.55	26.55	35.53	0.00	3966.97	0.00	111.646
7	100	120	26.55	26.55	50.89	0.00	3966.97	0.00	77.945
8	100	120	26.55	26.55	68.90	0.00	3966.97	0.00	57.573
9	100	120	26.55	26.55	89.51	0.00	3966.97	0.00	44.317
10	100	120	26.55	26.55	112.68	0.00	3966.97	0.00	35.206
11	100	120	26.55	26.55	138.36	0.00	3966.97	0.00	28.672
12	100	120	26.55	26.55	-1289.07	0.00	-3966.97	0.00	3.077
13	100	120	26.55	26.55	-1254.18	0.00	-3966.97	0.00	3.163
14	100	120	26.55	26.55	-1218.97	0.00	-3966.97	0.00	3.254
15	100	120	26.55	26.55	-1183.49	0.00	-3966.97	0.00	3.352
16	100	120	26.55	26.55	-1147.77	0.00	-3966.97	0.00	3.456
17	100	120	26.55	26.55	-1111.87	0.00	-3966.97	0.00	3.568
18	100	120	26.55	26.55	-1075.83	0.00	-3966.97	0.00	3.687
19	100	120	26.55	26.55	-1039.68	0.00	-3966.97	0.00	3.816
20	100	120	26.55	26.55	-1003.47	0.00	-3966.97	0.00	3.953
21	100	120	26.55	26.55	-967.25	0.00	-3966.97	0.00	4.101
22	100	120	26.55	26.55	-931.06	0.00	-3966.97	0.00	4.261
23	100	120	26.55	26.55	-894.93	0.00	-3966.97	0.00	4.433
24	100	120	26.55	26.55	-858.92	0.00	-3966.97	0.00	4.619
25	100	120	26.55	26.55	-823.07	0.00	-3966.97	0.00	4.820
26	100	120	26.55	26.55	-787.41	0.00	-3966.97	0.00	5.038
27	100	120	26.55	26.55	-752.00	0.00	-3966.97	0.00	5.275
28	100	120	26.55	26.55	-716.88	0.00	-3966.97	0.00	5.534
29	100	120	26.55	26.55	-682.08	0.00	-3966.97	0.00	5.816
30	100	120	26.55	26.55	-647.66	0.00	-3966.97	0.00	6.125
31	100	120	26.55	26.55	-613.65	0.00	-3966.97	0.00	6.465
32	100	120	26.55	26.55	-580.10	0.00	-3966.97	0.00	6.838
33	100	120	26.55	26.55	-547.05	0.00	-3966.97	0.00	7.252
34	100	120	26.55	26.55	-514.55	0.00	-3966.97	0.00	7.710
35	100	120	26.55	26.55	-482.63	0.00	-3966.97	0.00	8.219
36	100	120	26.55	26.55	-451.34	0.00	-3966.97	0.00	8.789
37	100	120	26.55	26.55	-420.73	0.00	-3966.97	0.00	9.429
38	100	120	26.55	26.55	-390.83	0.00	-3966.97	0.00	10.150
39	100	120	26.55	26.55	-361.70	0.00	-3966.97	0.00	10.968
40	100	120	26.55	26.55	-333.36	0.00	-3966.97	0.00	11.900
41	100	120	26.55	26.55	-305.88	0.00	-3966.97	0.00	12.969
42	100	120	26.55	26.55	-279.28	0.00	-3966.97	0.00	14.204
43	100	120	26.55	26.55	-253.61	0.00	-3966.97	0.00	15.642
44	100	120	26.55	26.55	-228.92	0.00	-3966.97	0.00	17.329
45	100	120	26.55	26.55	-205.25	0.00	-3966.97	0.00	19.328
46	100	120	26.55	26.55	-182.63	0.00	-3966.97	0.00	21.721
47	100	120	26.55	26.55	-161.13	0.00	-3966.97	0.00	24.620

n°	B	H	Afi	Afs	M	N	Mu	Nu	FS
	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kNm]	[kN]	
48	100	120	26.55	26.55	-140.77	0.00	-3966.97	0.00	28.181
49	100	120	26.55	26.55	-121.60	0.00	-3966.97	0.00	32.624
50	100	120	26.55	26.55	-103.66	0.00	-3966.97	0.00	38.269
51	100	120	26.55	26.55	-87.00	0.00	-3966.97	0.00	45.596
52	100	120	26.55	26.55	-71.66	0.00	-3966.97	0.00	55.356
53	100	120	26.55	26.55	-57.69	0.00	-3966.97	0.00	68.768
54	100	120	26.55	26.55	-44.48	0.00	-3966.97	0.00	89.189
55	100	120	26.55	26.55	-32.85	0.00	-3966.97	0.00	120.743
56	100	120	26.55	26.55	-22.92	0.00	-3966.97	0.00	173.073
57	100	120	26.55	26.55	-14.72	0.00	-3966.97	0.00	269.504
58	100	120	26.55	26.55	-8.29	0.00	-3966.97	0.00	478.291
59	100	120	26.55	26.55	-3.69	0.00	-3966.97	0.00	1075.981
60	100	120	26.55	26.55	-0.92	0.00	-3966.97	0.00	4303.922
61	100	120	0.00	0.00	0.00	0.00	0.00	0.00	100000.000

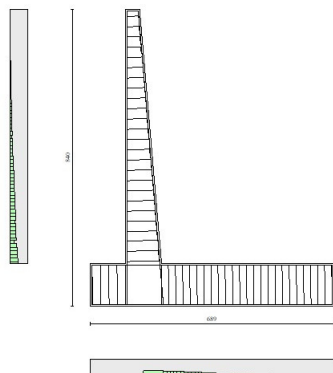


Fig. 17 - Paramento (Inviluppo)

Verifiche a taglio

Simbologia adottata

Is	indice sezione
Y	ordinata sezione espressa in [m]
B	larghezza sezione espresso in [cm]
H	altezza sezione espressa in [cm]
Asw	area ferri a taglio espresso in [cmq]

Relazione di calcolo muro di sostegno sede stradale-NV34

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
NM25	03 D 26	CL	NV 34 05 001	A	116 di 135

$\cot\theta$ inclinazione delle bielle compresse, θ inclinazione dei puntoni di calcestruzzo
 V_{Rcd} resistenza di progetto a 'taglio compressione' espressa in [kN]
 V_{Rsd} resistenza di progetto a 'taglio trazione' espressa in [kN]
 V_{Rd} resistenza di progetto a taglio espresso in [kN]. Per elementi con armature trasversali resistenti al taglio ($A_{sw}>0.0$) $V_{Rd}=\min(V_{Rcd}, V_{Rsd})$.
 T taglio agente espressa in [kN]
 FS fattore di sicurezza (rapporto tra sollecitazione resistente e sollecitazione agente)

Paramento

n°	B	H	A _{sw}	cotθ	V _{Rcd}	V _{Rsd}	V _{Rd}	T	FS
	[cm]	[cm]	[cmq]		[kN]	[kN]	[kN]	[kN]	
1	100	40	0.00	--	0.00	0.00	242.29	0.00	100.000
2	100	41	0.00	--	0.00	0.00	245.00	0.20	1210.185
3	100	42	0.00	--	0.00	0.00	247.68	0.49	501.817
4	100	43	0.00	--	0.00	0.00	250.35	0.87	286.880
5	100	43	0.00	--	0.00	0.00	253.00	1.34	188.944
6	100	44	0.00	--	0.00	0.00	255.63	1.89	135.041
7	100	45	0.00	--	0.00	0.00	258.24	2.53	101.874
8	100	46	0.00	--	0.00	0.00	260.83	3.27	79.873
9	100	47	0.00	--	0.00	0.00	263.41	4.09	64.467
10	100	48	0.00	--	0.00	0.00	265.97	5.00	53.231
11	100	49	0.00	--	0.00	0.00	268.52	6.00	44.767
12	100	49	0.00	--	0.00	0.00	271.05	7.09	38.231
13	100	50	0.00	--	0.00	0.00	273.56	8.27	33.076
14	100	51	0.00	--	0.00	0.00	284.13	9.54	29.782
15	100	52	0.00	--	0.00	0.00	286.69	10.90	26.307
16	100	53	0.00	--	0.00	0.00	289.23	12.34	23.432
17	100	54	0.00	--	0.00	0.00	291.76	13.88	21.025
18	100	55	0.00	--	0.00	0.00	294.28	15.50	18.987
19	100	55	0.00	--	0.00	0.00	296.78	17.21	17.247
20	100	56	0.00	--	0.00	0.00	299.28	19.01	15.747
21	100	57	0.00	--	0.00	0.00	301.76	20.89	14.444
22	100	58	0.00	--	0.00	0.00	304.23	22.86	13.306
23	100	59	0.00	--	0.00	0.00	306.69	24.93	12.304
24	100	60	0.00	--	0.00	0.00	309.14	27.08	11.418
25	100	61	0.00	--	0.00	0.00	311.57	29.31	10.629
26	100	61	0.00	--	0.00	0.00	322.37	31.64	10.189
27	100	62	0.00	--	0.00	0.00	324.85	34.05	9.540
28	100	63	0.00	--	0.00	0.00	327.32	36.55	8.955
29	100	64	0.00	--	0.00	0.00	329.78	39.14	8.425
30	100	65	0.00	--	0.00	0.00	332.23	41.82	7.944
31	100	66	0.00	--	0.00	0.00	334.67	44.58	7.506
32	100	67	0.00	--	0.00	0.00	337.10	47.44	7.106
33	100	67	0.00	--	0.00	0.00	339.52	50.38	6.739
34	100	68	0.00	--	0.00	0.00	341.94	53.41	6.402
35	100	69	0.00	--	0.00	0.00	344.34	56.52	6.092
36	100	70	0.00	--	0.00	0.00	346.74	59.73	5.805
37	100	71	0.00	--	0.00	0.00	357.69	63.02	5.676
38	100	72	0.00	--	0.00	0.00	360.13	66.40	5.423
39	100	73	0.00	--	0.00	0.00	362.56	69.87	5.189
40	100	73	0.00	--	0.00	0.00	364.98	73.43	4.970
41	100	74	0.00	--	0.00	0.00	367.39	77.07	4.767
42	100	75	0.00	--	0.00	0.00	369.80	80.81	4.576
43	100	76	0.00	--	0.00	0.00	372.20	84.63	4.398
44	100	77	0.00	--	0.00	0.00	374.60	88.54	4.231
45	100	78	0.00	--	0.00	0.00	376.99	92.53	4.074
46	100	79	0.00	--	0.00	0.00	379.37	96.62	3.926
47	100	79	0.00	--	0.00	0.00	381.74	100.79	3.787
48	100	80	0.00	--	0.00	0.00	384.11	105.05	3.656
49	100	81	0.00	--	0.00	0.00	395.23	109.40	3.613

n°	B [cm]	H [cm]	A _{sw} [cmq]	cotθ	V _{Rcd} [kN]	V _{Rsd} [kN]	V _{Rd} [kN]	T [kN]	FS
50	100	82	0.00	--	0.00	0.00	397.63	113.84	3.493
51	100	83	0.00	--	0.00	0.00	400.03	118.36	3.380
52	100	84	0.00	--	0.00	0.00	402.43	122.97	3.272
53	100	85	0.00	--	0.00	0.00	404.82	127.67	3.171
54	100	85	0.00	--	0.00	0.00	407.20	132.46	3.074
55	100	86	0.00	--	0.00	0.00	409.58	137.34	2.982
56	100	87	0.00	--	0.00	0.00	411.95	142.30	2.895
57	100	88	0.00	--	0.00	0.00	414.32	147.35	2.812
58	100	89	0.00	--	0.00	0.00	416.68	152.50	2.732
59	100	90	0.00	--	0.00	0.00	419.04	157.72	2.657
60	100	91	0.00	--	0.00	0.00	421.39	163.04	2.585
61	100	91	0.00	--	0.00	0.00	441.20	168.44	2.619
62	100	92	0.00	--	0.00	0.00	443.63	173.94	2.551
63	100	93	0.00	--	0.00	0.00	446.06	179.52	2.485
64	100	94	0.00	--	0.00	0.00	448.48	185.18	2.422
65	100	95	0.00	--	0.00	0.00	450.90	190.94	2.361
66	100	96	0.00	--	0.00	0.00	453.31	196.78	2.304
67	100	97	0.00	--	0.00	0.00	547.38	202.72	2.700
68	100	97	0.00	--	0.00	0.00	458.12	208.74	2.195
69	100	98	0.00	--	0.00	0.00	460.52	214.84	2.144
70	100	99	0.00	--	0.00	0.00	462.92	221.04	2.094
71	100	100	0.00	--	0.00	0.00	465.31	227.32	2.047
72	100	101	0.00	--	0.00	0.00	467.70	233.70	2.001
73	100	102	0.00	--	0.00	0.00	470.09	240.15	1.957

Fondazione

n°	B [cm]	H [cm]	A _{sw} [cmq]	cotθ	V _{Rcd} [kN]	V _{Rsd} [kN]	V _{Rd} [kN]	T [kN]	FS
1	100	120	0.00	--	0.00	0.00	471.13	0.00	100.000
2	100	120	0.00	--	0.00	0.00	471.13	-28.95	16.272
3	100	120	0.00	--	0.00	0.00	471.13	-57.45	8.200
4	100	120	0.00	--	0.00	0.00	471.13	-85.50	5.510
5	100	120	0.00	--	0.00	0.00	471.13	-113.10	4.166
6	100	120	0.00	--	0.00	0.00	471.13	-140.24	3.359
7	100	120	0.00	--	0.00	0.00	471.13	-166.93	2.822
8	100	120	0.00	--	0.00	0.00	471.13	-193.17	2.439
9	100	120	0.00	--	0.00	0.00	471.13	-218.96	2.152
10	100	120	0.00	--	0.00	0.00	471.13	-244.29	1.929
11	100	120	0.00	--	0.00	0.00	471.13	-269.17	1.750
12	100	120	0.00	--	0.00	0.00	471.13	-389.41	1.210
13	100	120	0.00	--	0.00	0.00	471.13	-386.85	1.218
14	100	120	0.00	--	0.00	0.00	471.13	-384.07	1.227
15	100	120	0.00	--	0.00	0.00	471.13	-381.09	1.236
16	100	120	0.00	--	0.00	0.00	471.13	-377.90	1.247
17	100	120	0.00	--	0.00	0.00	471.13	-374.51	1.258
18	100	120	0.00	--	0.00	0.00	471.13	-371.14	1.269
19	100	120	0.00	--	0.00	0.00	471.13	-371.94	1.267
20	100	120	0.00	--	0.00	0.00	471.13	-372.32	1.265
21	100	120	0.00	--	0.00	0.00	471.13	-372.26	1.266
22	100	120	0.00	--	0.00	0.00	471.13	-371.76	1.267
23	100	120	0.00	--	0.00	0.00	471.13	-370.84	1.270
24	100	120	0.00	--	0.00	0.00	471.13	-369.48	1.275
25	100	120	0.00	--	0.00	0.00	471.13	-367.68	1.281
26	100	120	0.00	--	0.00	0.00	471.13	-365.46	1.289
27	100	120	0.00	--	0.00	0.00	471.13	-362.80	1.299
28	100	120	0.00	--	0.00	0.00	471.13	-359.70	1.310
29	100	120	0.00	--	0.00	0.00	471.13	-356.17	1.323
30	100	120	0.00	--	0.00	0.00	471.13	-352.21	1.338
31	100	120	0.00	--	0.00	0.00	471.13	-347.82	1.355
32	100	120	0.00	--	0.00	0.00	471.13	-342.99	1.374
33	100	120	0.00	--	0.00	0.00	471.13	-337.73	1.395

n°	B [cm]	H [cm]	A _{sw} [cmq]	cotθ	V _{Rcd} [kN]	V _{Rsd} [kN]	V _{Rd} [kN]	T [kN]	FS
34	100	120	0.00	--	0.00	0.00	471.13	-332.04	1.419
35	100	120	0.00	--	0.00	0.00	471.13	-325.91	1.446
36	100	120	0.00	--	0.00	0.00	471.13	-319.35	1.475
37	100	120	0.00	--	0.00	0.00	471.13	-312.35	1.508
38	100	120	0.00	--	0.00	0.00	471.13	-304.93	1.545
39	100	120	0.00	--	0.00	0.00	471.13	-297.07	1.586
40	100	120	0.00	--	0.00	0.00	471.13	-288.77	1.631
41	100	120	0.00	--	0.00	0.00	471.13	-280.04	1.682
42	100	120	0.00	--	0.00	0.00	471.13	-270.88	1.739
43	100	120	0.00	--	0.00	0.00	471.13	-261.29	1.803
44	100	120	0.00	--	0.00	0.00	471.13	-251.26	1.875
45	100	120	0.00	--	0.00	0.00	471.13	-240.80	1.957
46	100	120	0.00	--	0.00	0.00	471.13	-229.90	2.049
47	100	120	0.00	--	0.00	0.00	471.13	-218.57	2.155
48	100	120	0.00	--	0.00	0.00	471.13	-206.81	2.278
49	100	120	0.00	--	0.00	0.00	471.13	-194.62	2.421
50	100	120	0.00	--	0.00	0.00	471.13	-181.99	2.589
51	100	120	0.00	--	0.00	0.00	471.13	-168.92	2.789
52	100	120	0.00	--	0.00	0.00	471.13	-155.43	3.031
53	100	120	0.00	--	0.00	0.00	471.13	-141.50	3.330
54	100	120	0.00	--	0.00	0.00	471.13	-125.31	3.760
55	100	120	0.00	--	0.00	0.00	471.13	-108.52	4.341
56	100	120	0.00	--	0.00	0.00	471.13	-91.31	5.160
57	100	120	0.00	--	0.00	0.00	471.13	-73.66	6.396
58	100	120	0.00	--	0.00	0.00	471.13	-55.57	8.478
59	100	120	0.00	--	0.00	0.00	471.13	-37.10	12.700
60	100	120	0.00	--	0.00	0.00	471.13	-18.55	25.401
61	100	120	0.00	--	0.00	0.00	373.54	0.00	100.000

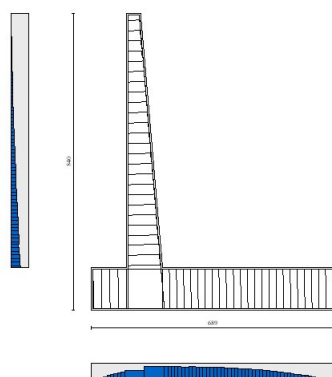


Fig. 18 - Paramento (Inviluppo)

 GRUPPO FERROVIE DELLO STATO ITALIANE	RADDOPPIO LINEA CODOGNO – CREMONA – MANTOVA TRATTA PIADENA - MANTOVA					
Relazione di calcolo muro di sostegno sede stradale-NV34	COMMESSA NM25	LOTTO 03 D 26	CODIFICA CL	DOCUMENTO NV 34 05 001	REV. A	FOGLIO 119 di 135

Simbologia adottata

n°	indice sezione
Y	ordinata sezione, espressa in [m]
B	larghezza sezione, espresso in [cm]
H	altezza sezione, espressa in [cm]
Afi	area ferri inferiori, espresso in [cmq]
Afs	area ferri superiori, espressa in [cmq]
M	momento agente, espressa in [kNm]
N	sforzo normale agente, espressa in [kN]
σ_c	tensione di compressione nel cls, espressa in [kPa]
σ_{fi}	tensione nei ferri inferiori, espressa in [kPa]
σ_{fs}	tensione nei ferri superiori, espressa in [kPa]

Combinazioni SLER

Paramento

Tensione massima di compressione nel calcestruzzo	19920	[kPa]
Tensione massima di trazione dell'acciaio	360000	[kPa]

n°	B	H	Afi	Afs	M	N	σ_c	σ_{fi}	σ_{fs}
	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kPa]	[kPa]	[kPa]
1	100	40	18.85	15.71	0.00	0.00	0 (10)	0 (10)	0 (10)
2	100	41	18.85	15.71	0.00	0.99	2 (10)	32 (10)	33 (10)
3	100	42	18.85	15.71	0.02	2.00	5 (10)	60 (10)	68 (10)
4	100	43	18.85	15.71	0.05	3.04	7 (10)	82 (10)	109 (10)
5	100	43	18.85	15.71	0.10	4.09	11 (10)	97 (10)	154 (10)
6	100	44	18.85	15.71	0.18	5.17	14 (10)	105 (10)	207 (10)
7	100	45	18.85	15.71	0.29	6.26	19 (10)	103 (10)	268 (10)
8	100	46	18.85	15.71	0.44	7.38	24 (10)	92 (10)	338 (10)
9	100	47	18.85	15.71	0.64	8.52	30 (10)	69 (10)	418 (10)
10	100	48	18.85	15.71	0.89	9.68	37 (10)	35 (10)	509 (10)
11	100	49	18.85	15.71	1.20	10.86	45 (10)	23 (10)	616 (10)
12	100	49	18.85	15.71	1.58	12.06	54 (10)	123 (10)	744 (10)
13	100	50	18.85	15.71	2.03	13.28	66 (10)	284 (10)	897 (10)
14	100	51	18.85	18.85	2.56	14.52	79 (10)	484 (10)	1066 (10)
15	100	52	18.85	18.85	3.18	15.79	95 (10)	780 (10)	1265 (10)
16	100	53	18.85	18.85	3.89	17.07	113 (10)	1162 (10)	1487 (10)
17	100	54	18.85	18.85	4.70	18.38	132 (10)	1634 (10)	1731 (10)
18	100	55	18.85	18.85	5.61	19.71	154 (10)	2197 (10)	1996 (10)
19	100	55	18.85	18.85	6.63	21.06	177 (10)	2852 (10)	2282 (10)
20	100	56	18.85	18.85	7.77	22.43	202 (10)	3600 (10)	2588 (10)
21	100	57	18.85	18.85	9.02	23.82	228 (10)	4441 (10)	2914 (10)
22	100	58	18.85	18.85	10.41	25.23	257 (10)	5375 (10)	3260 (10)

n°	B [cm]	H [cm]	Afi [cmq]	Afs [cmq]	M [kNm]	N [kN]	σ_c [kPa]	σ_{fi} [kPa]	σ_{fs} [kPa]
23	100	59	18.85	18.85	11.93	26.66	287 (10)	6404 (10)	3625 (10)
24	100	60	18.85	18.85	13.58	28.12	318 (10)	7528 (10)	4011 (10)
25	100	61	18.85	18.85	15.38	29.59	352 (10)	8748 (10)	4416 (10)
26	100	61	18.85	21.99	17.33	31.09	371 (10)	8793 (10)	4692 (10)
27	100	62	18.85	21.99	19.44	32.60	405 (10)	10016 (10)	5120 (10)
28	100	63	18.85	21.99	21.71	34.14	441 (10)	11325 (10)	5567 (10)
29	100	64	18.85	21.99	24.14	35.70	479 (10)	12718 (10)	6033 (10)
30	100	65	18.85	21.99	26.75	37.28	518 (10)	14198 (10)	6517 (10)
31	100	66	18.85	21.99	29.54	38.88	559 (10)	15765 (10)	7021 (10)
32	100	67	18.85	21.99	32.52	40.50	601 (10)	17419 (10)	7544 (10)
33	100	67	18.85	21.99	35.68	42.14	644 (10)	19160 (10)	8085 (10)
34	100	68	18.85	21.99	39.05	43.81	689 (10)	20991 (10)	8645 (10)
35	100	69	18.85	21.99	42.61	45.49	736 (10)	22910 (10)	9224 (10)
36	100	70	18.85	21.99	46.39	47.20	783 (10)	24919 (10)	9822 (10)
37	100	71	18.85	25.13	50.38	48.92	799 (10)	23894 (10)	10121 (10)
38	100	72	18.85	25.13	54.59	50.67	847 (10)	25823 (10)	10734 (10)
39	100	73	18.85	25.13	59.02	52.44	897 (10)	27832 (10)	11364 (10)
40	100	73	18.85	25.13	63.69	54.23	948 (10)	29921 (10)	12011 (10)
41	100	74	18.85	25.13	68.60	56.04	1000 (10)	32091 (10)	12676 (10)
42	100	75	18.85	25.13	73.75	57.87	1054 (10)	34343 (10)	13358 (10)
43	100	76	18.85	25.13	79.15	59.73	1109 (10)	36675 (10)	14058 (10)
44	100	77	18.85	25.13	84.80	61.60	1165 (10)	39090 (10)	14774 (10)
45	100	78	18.85	25.13	90.72	63.50	1222 (10)	41586 (10)	15508 (10)
46	100	79	18.85	25.13	96.90	65.41	1281 (10)	44164 (10)	16258 (10)
47	100	79	18.85	25.13	103.36	67.35	1341 (10)	46825 (10)	17026 (10)
48	100	80	18.85	25.13	110.10	69.31	1402 (10)	49569 (10)	17810 (10)
49	100	81	18.85	28.27	117.12	71.29	1409 (10)	46933 (10)	18072 (10)
50	100	82	18.85	28.27	124.43	73.29	1470 (10)	49534 (10)	18862 (10)
51	100	83	18.85	28.27	132.03	75.31	1532 (10)	52210 (10)	19668 (10)
52	100	84	18.85	28.27	139.94	77.35	1595 (10)	54960 (10)	20490 (10)
53	100	85	18.85	28.27	148.16	79.41	1660 (10)	57786 (10)	21327 (10)
54	100	85	18.85	28.27	156.69	81.50	1725 (10)	60686 (10)	22179 (10)
55	100	86	18.85	28.27	165.54	83.60	1792 (10)	63661 (10)	23047 (10)
56	100	87	18.85	28.27	174.72	85.73	1859 (10)	66712 (10)	23930 (10)
57	100	88	18.85	28.27	184.23	87.88	1928 (10)	69838 (10)	24828 (10)
58	100	89	18.85	28.27	194.07	90.04	1998 (10)	73040 (10)	25741 (10)
59	100	90	18.85	28.27	204.26	92.23	2068 (10)	76318 (10)	26669 (10)
60	100	91	18.85	28.27	214.80	94.44	2140 (10)	79671 (10)	27612 (10)
61	100	91	18.85	34.56	225.69	96.67	2072 (10)	68816 (10)	27101 (10)
62	100	92	18.85	34.56	236.94	98.93	2141 (10)	71710 (10)	28017 (10)
63	100	93	18.85	34.56	248.56	101.20	2210 (10)	74668 (10)	28946 (10)
64	100	94	18.85	34.56	260.55	103.49	2281 (10)	77689 (10)	29888 (10)
65	100	95	18.85	34.56	272.92	105.81	2353 (10)	80772 (10)	30844 (10)
66	100	96	18.85	34.56	285.68	108.15	2425 (10)	83919 (10)	31813 (10)
67	100	97	37.70	56.55	298.82	110.50	1941 (10)	53841 (10)	25992 (10)
68	100	97	18.85	34.56	312.36	112.88	2573 (10)	90401 (10)	33789 (10)
69	100	98	18.85	34.56	326.30	115.28	2648 (10)	93737 (10)	34797 (10)
70	100	99	18.85	34.56	340.65	117.70	2724 (10)	97137 (10)	35818 (10)
71	100	100	18.85	34.56	355.41	120.14	2802 (10)	100600 (10)	36851 (10)
72	100	101	18.85	34.56	370.59	122.61	2879 (10)	104126 (10)	37896 (10)
73	100	102	18.85	34.56	386.19	125.09	2958 (10)	107715 (10)	38955 (10)

Fondazione

Tensione massima di compressione nel calcestruzzo 17430 [kPa]

Tensione massima di trazione dell'acciaio 1255271 [kPa]

n°	B [cm]	H [cm]	Afi [cmq]	Afs [cmq]	M [kNm]	N [kN]	σc [kPa]	σfi [kPa]	σfs [kPa]
1	100	120	26.55	26.55	0.00	0.00	0 (10)	0 (10)	0 (10)
2	100	120	26.55	26.55	0.84	0.00	5 (10)	290 (10)	64 (10)
3	100	120	26.55	26.55	3.36	0.00	20 (10)	1156 (10)	256 (10)
4	100	120	26.55	26.55	7.54	0.00	45 (10)	2595 (10)	574 (10)
5	100	120	26.55	26.55	13.38	0.00	79 (10)	4602 (10)	1017 (10)
6	100	120	26.55	26.55	20.85	0.00	124 (10)	7172 (10)	1586 (10)
7	100	120	26.55	26.55	29.94	0.00	178 (10)	10301 (10)	2277 (10)
8	100	120	26.55	26.55	40.65	0.00	241 (10)	13984 (10)	3092 (10)
9	100	120	26.55	26.55	52.96	0.00	314 (10)	18218 (10)	4028 (10)
10	100	120	26.55	26.55	66.85	0.00	397 (10)	22998 (10)	5084 (10)
11	100	120	26.55	26.55	82.32	0.00	489 (10)	28319 (10)	6261 (10)
12	100	120	26.55	26.55	-481.65	0.00	2860 (10)	36631 (10)	165689 (10)
13	100	120	26.55	26.55	-467.80	0.00	2778 (10)	35577 (10)	160922 (10)
14	100	120	26.55	26.55	-453.91	0.00	2695 (10)	34521 (10)	156145 (10)
15	100	120	26.55	26.55	-440.01	0.00	2613 (10)	33464 (10)	151362 (10)
16	100	120	26.55	26.55	-426.10	0.00	2530 (10)	32406 (10)	146577 (10)
17	100	120	26.55	26.55	-412.20	0.00	2447 (10)	31349 (10)	141796 (10)
18	100	120	26.55	26.55	-398.32	0.00	2365 (10)	30293 (10)	137021 (10)
19	100	120	26.55	26.55	-384.47	0.00	2283 (10)	29240 (10)	132258 (10)
20	100	120	26.55	26.55	-370.67	0.00	2201 (10)	28191 (10)	127511 (10)
21	100	120	26.55	26.55	-356.93	0.00	2119 (10)	27146 (10)	122785 (10)
22	100	120	26.55	26.55	-343.26	0.00	2038 (10)	26106 (10)	118082 (10)
23	100	120	26.55	26.55	-329.68	0.00	1957 (10)	25073 (10)	113409 (10)
24	100	120	26.55	26.55	-316.19	0.00	1877 (10)	24047 (10)	108769 (10)
25	100	120	26.55	26.55	-302.81	0.00	1798 (10)	23030 (10)	104166 (10)
26	100	120	26.55	26.55	-289.55	0.00	1719 (10)	22021 (10)	99606 (10)
27	100	120	26.55	26.55	-276.43	0.00	1641 (10)	21023 (10)	95091 (10)
28	100	120	26.55	26.55	-263.45	0.00	1564 (10)	20036 (10)	90627 (10)
29	100	120	26.55	26.55	-250.63	0.00	1488 (10)	19061 (10)	86218 (10)
30	100	120	26.55	26.55	-237.99	0.00	1413 (10)	18100 (10)	81868 (10)
31	100	120	26.55	26.55	-225.53	0.00	1339 (10)	17152 (10)	77581 (10)
32	100	120	26.55	26.55	-213.26	0.00	1266 (10)	16219 (10)	73362 (10)
33	100	120	26.55	26.55	-201.21	0.00	1195 (10)	15303 (10)	69216 (10)
34	100	120	26.55	26.55	-189.38	0.00	1124 (10)	14403 (10)	65146 (10)
35	100	120	26.55	26.55	-177.78	0.00	1056 (10)	13521 (10)	61157 (10)
36	100	120	26.55	26.55	-166.43	0.00	988 (10)	12658 (10)	57253 (10)
37	100	120	26.55	26.55	-155.34	0.00	922 (10)	11814 (10)	53438 (10)
38	100	120	26.55	26.55	-144.53	0.00	858 (10)	10992 (10)	49718 (10)
39	100	120	26.55	26.55	-134.00	0.00	796 (10)	10191 (10)	46095 (10)
40	100	120	26.55	26.55	-123.77	0.00	735 (10)	9413 (10)	42575 (10)
41	100	120	26.55	26.55	-113.84	0.00	676 (10)	8658 (10)	39162 (10)
42	100	120	26.55	26.55	-104.24	0.00	619 (10)	7928 (10)	35860 (10)
43	100	120	26.55	26.55	-94.98	0.00	564 (10)	7224 (10)	32673 (10)
44	100	120	26.55	26.55	-86.07	0.00	511 (10)	6546 (10)	29607 (10)
45	100	120	26.55	26.55	-77.51	0.00	460 (10)	5895 (10)	26664 (10)
46	100	120	26.55	26.55	-69.33	0.00	412 (10)	5273 (10)	23850 (10)
47	100	120	26.55	26.55	-61.54	0.00	365 (10)	4680 (10)	21169 (10)
48	100	120	26.55	26.55	-54.14	0.00	321 (10)	4118 (10)	18625 (10)
49	100	120	26.55	26.55	-47.16	0.00	280 (10)	3586 (10)	16222 (10)
50	100	120	26.55	26.55	-40.60	0.00	241 (10)	3087 (10)	13965 (10)
51	100	120	26.55	26.55	-34.47	0.00	205 (10)	2622 (10)	11858 (10)
52	100	120	26.55	26.55	-28.80	0.00	171 (10)	2190 (10)	9906 (10)
53	100	120	26.55	26.55	-23.58	0.00	140 (10)	1793 (10)	8112 (10)
54	100	120	26.55	26.55	-18.21	0.00	108 (10)	1385 (10)	6263 (10)
55	100	120	26.55	26.55	-13.45	0.00	80 (10)	1023 (10)	4627 (10)
56	100	120	26.55	26.55	-9.39	0.00	56 (10)	714 (10)	3231 (10)
57	100	120	26.55	26.55	-6.05	0.00	36 (10)	460 (10)	2080 (10)
58	100	120	26.55	26.55	-3.42	0.00	20 (10)	260 (10)	1176 (10)
59	100	120	26.55	26.55	-1.53	0.00	9 (10)	116 (10)	526 (10)
60	100	120	26.55	26.55	-0.38	0.00	2 (10)	29 (10)	132 (10)
61	100	120	0.00	0.00	0.00	0.00	0 (10)	0 (10)	0 (10)

Paramento

Tensione massima di compressione nel calcestruzzo 33200 [kPa]

Tensione massima di trazione dell'acciaio 450000 [kPa]

n°	B [cm]	H [cm]	Afi [cmq]	Afs [cmq]	M [kNm]	N [kN]	σc [kPa]	σfi [kPa]	σfs [kPa]
1	100	40	18.85	15.71	0.00	0.00	0 (11)	0 (11)	0 (11)
2	100	41	18.85	15.71	0.00	0.99	2 (11)	32 (11)	33 (11)
3	100	42	18.85	15.71	0.02	2.00	5 (11)	60 (11)	68 (11)
4	100	43	18.85	15.71	0.05	3.04	7 (11)	82 (11)	109 (11)
5	100	43	18.85	15.71	0.10	4.09	11 (11)	97 (11)	154 (11)
6	100	44	18.85	15.71	0.18	5.17	14 (11)	105 (11)	207 (11)
7	100	45	18.85	15.71	0.29	6.26	19 (11)	103 (11)	268 (11)
8	100	46	18.85	15.71	0.44	7.38	24 (11)	92 (11)	338 (11)
9	100	47	18.85	15.71	0.64	8.52	30 (11)	69 (11)	418 (11)
10	100	48	18.85	15.71	0.89	9.68	37 (11)	35 (11)	509 (11)
11	100	49	18.85	15.71	1.20	10.86	45 (11)	23 (11)	616 (11)
12	100	49	18.85	15.71	1.58	12.06	54 (11)	123 (11)	744 (11)
13	100	50	18.85	15.71	2.03	13.28	66 (11)	284 (11)	897 (11)
14	100	51	18.85	18.85	2.56	14.52	79 (11)	484 (11)	1066 (11)
15	100	52	18.85	18.85	3.18	15.79	95 (11)	780 (11)	1265 (11)
16	100	53	18.85	18.85	3.89	17.07	113 (11)	1162 (11)	1487 (11)
17	100	54	18.85	18.85	4.70	18.38	132 (11)	1634 (11)	1731 (11)
18	100	55	18.85	18.85	5.61	19.71	154 (11)	2197 (11)	1996 (11)
19	100	55	18.85	18.85	6.63	21.06	177 (11)	2852 (11)	2282 (11)
20	100	56	18.85	18.85	7.77	22.43	202 (11)	3600 (11)	2588 (11)
21	100	57	18.85	18.85	9.02	23.82	228 (11)	4441 (11)	2914 (11)
22	100	58	18.85	18.85	10.41	25.23	257 (11)	5375 (11)	3260 (11)
23	100	59	18.85	18.85	11.93	26.66	287 (11)	6404 (11)	3625 (11)
24	100	60	18.85	18.85	13.58	28.12	318 (11)	7528 (11)	4011 (11)
25	100	61	18.85	18.85	15.38	29.59	352 (11)	8748 (11)	4416 (11)
26	100	61	18.85	21.99	17.33	31.09	371 (11)	8793 (11)	4692 (11)
27	100	62	18.85	21.99	19.44	32.60	405 (11)	10016 (11)	5120 (11)
28	100	63	18.85	21.99	21.71	34.14	441 (11)	11325 (11)	5567 (11)
29	100	64	18.85	21.99	24.14	35.70	479 (11)	12718 (11)	6033 (11)
30	100	65	18.85	21.99	26.75	37.28	518 (11)	14198 (11)	6517 (11)
31	100	66	18.85	21.99	29.54	38.88	559 (11)	15765 (11)	7021 (11)
32	100	67	18.85	21.99	32.52	40.50	601 (11)	17419 (11)	7544 (11)
33	100	67	18.85	21.99	35.68	42.14	644 (11)	19160 (11)	8085 (11)
34	100	68	18.85	21.99	39.05	43.81	689 (11)	20991 (11)	8645 (11)
35	100	69	18.85	21.99	42.61	45.49	736 (11)	22910 (11)	9224 (11)
36	100	70	18.85	21.99	46.39	47.20	783 (11)	24919 (11)	9822 (11)
37	100	71	18.85	25.13	50.38	48.92	799 (11)	23894 (11)	10121 (11)
38	100	72	18.85	25.13	54.59	50.67	847 (11)	25823 (11)	10734 (11)
39	100	73	18.85	25.13	59.02	52.44	897 (11)	27832 (11)	11364 (11)
40	100	73	18.85	25.13	63.69	54.23	948 (11)	29921 (11)	12011 (11)
41	100	74	18.85	25.13	68.60	56.04	1000 (11)	32091 (11)	12676 (11)
42	100	75	18.85	25.13	73.75	57.87	1054 (11)	34343 (11)	13358 (11)
43	100	76	18.85	25.13	79.15	59.73	1109 (11)	36675 (11)	14058 (11)
44	100	77	18.85	25.13	84.80	61.60	1165 (11)	39090 (11)	14774 (11)
45	100	78	18.85	25.13	90.72	63.50	1222 (11)	41586 (11)	15508 (11)
46	100	79	18.85	25.13	96.90	65.41	1281 (11)	44164 (11)	16258 (11)
47	100	79	18.85	25.13	103.36	67.35	1341 (11)	46825 (11)	17026 (11)
48	100	80	18.85	25.13	110.10	69.31	1402 (11)	49569 (11)	17810 (11)
49	100	81	18.85	28.27	117.12	71.29	1409 (11)	46933 (11)	18072 (11)
50	100	82	18.85	28.27	124.43	73.29	1470 (11)	49534 (11)	18862 (11)
51	100	83	18.85	28.27	132.03	75.31	1532 (11)	52210 (11)	19668 (11)
52	100	84	18.85	28.27	139.94	77.35	1595 (11)	54960 (11)	20490 (11)

n°	B	H	Afi	Afs	M	N	σc	σfi	σfs
	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kPa]	[kPa]	[kPa]
53	100	85	18.85	28.27	148.16	79.41	1660 (11)	57786 (11)	21327 (11)
54	100	85	18.85	28.27	156.69	81.50	1725 (11)	60686 (11)	22179 (11)
55	100	86	18.85	28.27	165.54	83.60	1792 (11)	63661 (11)	23047 (11)
56	100	87	18.85	28.27	174.72	85.73	1859 (11)	66712 (11)	23930 (11)
57	100	88	18.85	28.27	184.23	87.88	1928 (11)	69838 (11)	24828 (11)
58	100	89	18.85	28.27	194.07	90.04	1998 (11)	73040 (11)	25741 (11)
59	100	90	18.85	28.27	204.26	92.23	2068 (11)	76318 (11)	26669 (11)
60	100	91	18.85	28.27	214.80	94.44	2140 (11)	79671 (11)	27612 (11)
61	100	91	18.85	34.56	225.69	96.67	2072 (11)	68816 (11)	27101 (11)
62	100	92	18.85	34.56	236.94	98.93	2141 (11)	71710 (11)	28017 (11)
63	100	93	18.85	34.56	248.56	101.20	2210 (11)	74668 (11)	28946 (11)
64	100	94	18.85	34.56	260.55	103.49	2281 (11)	77689 (11)	29888 (11)
65	100	95	18.85	34.56	272.92	105.81	2353 (11)	80772 (11)	30844 (11)
66	100	96	18.85	34.56	285.68	108.15	2425 (11)	83919 (11)	31813 (11)
67	100	97	37.70	56.55	298.82	110.50	1941 (11)	53841 (11)	25992 (11)
68	100	97	18.85	34.56	312.36	112.88	2573 (11)	90401 (11)	33789 (11)
69	100	98	18.85	34.56	326.30	115.28	2648 (11)	93737 (11)	34797 (11)
70	100	99	18.85	34.56	340.65	117.70	2724 (11)	97137 (11)	35818 (11)
71	100	100	18.85	34.56	355.41	120.14	2802 (11)	100600 (11)	36851 (11)
72	100	101	18.85	34.56	370.59	122.61	2879 (11)	104126 (11)	37896 (11)
73	100	102	18.85	34.56	386.19	125.09	2958 (11)	107715 (11)	38955 (11)

Fondazione

Tensione massima di compressione nel calcestruzzo 29050 [kPa]

Tensione massima di trazione dell'acciaio 1569089 [kPa]

n°	B	H	Afi	Afs	M	N	σc	σfi	σfs
	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kPa]	[kPa]	[kPa]
1	100	120	26.55	26.55	0.00	0.00	0 (11)	0 (11)	0 (11)
2	100	120	26.55	26.55	0.84	0.00	5 (11)	290 (11)	64 (11)
3	100	120	26.55	26.55	3.36	0.00	20 (11)	1156 (11)	256 (11)
4	100	120	26.55	26.55	7.54	0.00	45 (11)	2595 (11)	574 (11)
5	100	120	26.55	26.55	13.38	0.00	79 (11)	4602 (11)	1017 (11)
6	100	120	26.55	26.55	20.85	0.00	124 (11)	7172 (11)	1586 (11)
7	100	120	26.55	26.55	29.94	0.00	178 (11)	10301 (11)	2277 (11)
8	100	120	26.55	26.55	40.65	0.00	241 (11)	13984 (11)	3092 (11)
9	100	120	26.55	26.55	52.96	0.00	314 (11)	18218 (11)	4028 (11)
10	100	120	26.55	26.55	66.85	0.00	397 (11)	22998 (11)	5084 (11)
11	100	120	26.55	26.55	82.32	0.00	489 (11)	28319 (11)	6261 (11)
12	100	120	26.55	26.55	-481.65	0.00	2860 (11)	36631 (11)	165689 (11)
13	100	120	26.55	26.55	-467.80	0.00	2778 (11)	35577 (11)	160922 (11)
14	100	120	26.55	26.55	-453.91	0.00	2695 (11)	34521 (11)	156145 (11)
15	100	120	26.55	26.55	-440.01	0.00	2613 (11)	33464 (11)	151362 (11)
16	100	120	26.55	26.55	-426.10	0.00	2530 (11)	32406 (11)	146577 (11)
17	100	120	26.55	26.55	-412.20	0.00	2447 (11)	31349 (11)	141796 (11)
18	100	120	26.55	26.55	-398.32	0.00	2365 (11)	30293 (11)	137021 (11)
19	100	120	26.55	26.55	-384.47	0.00	2283 (11)	29240 (11)	132258 (11)
20	100	120	26.55	26.55	-370.67	0.00	2201 (11)	28191 (11)	127511 (11)
21	100	120	26.55	26.55	-356.93	0.00	2119 (11)	27146 (11)	122785 (11)
22	100	120	26.55	26.55	-343.26	0.00	2038 (11)	26106 (11)	118082 (11)
23	100	120	26.55	26.55	-329.68	0.00	1957 (11)	25073 (11)	113409 (11)
24	100	120	26.55	26.55	-316.19	0.00	1877 (11)	24047 (11)	108769 (11)
25	100	120	26.55	26.55	-302.81	0.00	1798 (11)	23030 (11)	104166 (11)
26	100	120	26.55	26.55	-289.55	0.00	1719 (11)	22021 (11)	99606 (11)
27	100	120	26.55	26.55	-276.43	0.00	1641 (11)	21023 (11)	95091 (11)

n°	B [cm]	H [cm]	Afi [cmq]	Afs [cmq]	M [kNm]	N [kN]	σc [kPa]	σfi [kPa]	σfs [kPa]
28	100	120	26.55	26.55	-263.45	0.00	1564 (11)	20036 (11)	90627 (11)
29	100	120	26.55	26.55	-250.63	0.00	1488 (11)	19061 (11)	86218 (11)
30	100	120	26.55	26.55	-237.99	0.00	1413 (11)	18100 (11)	81868 (11)
31	100	120	26.55	26.55	-225.53	0.00	1339 (11)	17152 (11)	77581 (11)
32	100	120	26.55	26.55	-213.26	0.00	1266 (11)	16219 (11)	73362 (11)
33	100	120	26.55	26.55	-201.21	0.00	1195 (11)	15303 (11)	69216 (11)
34	100	120	26.55	26.55	-189.38	0.00	1124 (11)	14403 (11)	65146 (11)
35	100	120	26.55	26.55	-177.78	0.00	1056 (11)	13521 (11)	61157 (11)
36	100	120	26.55	26.55	-166.43	0.00	988 (11)	12658 (11)	57253 (11)
37	100	120	26.55	26.55	-155.34	0.00	922 (11)	11814 (11)	53438 (11)
38	100	120	26.55	26.55	-144.53	0.00	858 (11)	10992 (11)	49718 (11)
39	100	120	26.55	26.55	-134.00	0.00	796 (11)	10191 (11)	46095 (11)
40	100	120	26.55	26.55	-123.77	0.00	735 (11)	9413 (11)	42575 (11)
41	100	120	26.55	26.55	-113.84	0.00	676 (11)	8658 (11)	39162 (11)
42	100	120	26.55	26.55	-104.24	0.00	619 (11)	7928 (11)	35860 (11)
43	100	120	26.55	26.55	-94.98	0.00	564 (11)	7224 (11)	32673 (11)
44	100	120	26.55	26.55	-86.07	0.00	511 (11)	6546 (11)	29607 (11)
45	100	120	26.55	26.55	-77.51	0.00	460 (11)	5895 (11)	26664 (11)
46	100	120	26.55	26.55	-69.33	0.00	412 (11)	5273 (11)	23850 (11)
47	100	120	26.55	26.55	-61.54	0.00	365 (11)	4680 (11)	21169 (11)
48	100	120	26.55	26.55	-54.14	0.00	321 (11)	4118 (11)	18625 (11)
49	100	120	26.55	26.55	-47.16	0.00	280 (11)	3586 (11)	16222 (11)
50	100	120	26.55	26.55	-40.60	0.00	241 (11)	3087 (11)	13965 (11)
51	100	120	26.55	26.55	-34.47	0.00	205 (11)	2622 (11)	11858 (11)
52	100	120	26.55	26.55	-28.80	0.00	171 (11)	2190 (11)	9906 (11)
53	100	120	26.55	26.55	-23.58	0.00	140 (11)	1793 (11)	8112 (11)
54	100	120	26.55	26.55	-18.21	0.00	108 (11)	1385 (11)	6263 (11)
55	100	120	26.55	26.55	-13.45	0.00	80 (11)	1023 (11)	4627 (11)
56	100	120	26.55	26.55	-9.39	0.00	56 (11)	714 (11)	3231 (11)
57	100	120	26.55	26.55	-6.05	0.00	36 (11)	460 (11)	2080 (11)
58	100	120	26.55	26.55	-3.42	0.00	20 (11)	260 (11)	1176 (11)
59	100	120	26.55	26.55	-1.53	0.00	9 (11)	116 (11)	526 (11)
60	100	120	26.55	26.55	-0.38	0.00	2 (11)	29 (11)	132 (11)
61	100	120	0.00	0.00	0.00	0.00	0 (11)	0 (11)	0 (11)

Combinazioni SLEQ

Paramento

Tensione massima di compressione nel calcestruzzo 14940 [kPa]

Tensione massima di trazione dell'acciaio 450000 [kPa]

n°	B [cm]	H [cm]	Afi [cmq]	Afs [cmq]	M [kNm]	N [kN]	σc [kPa]	σfi [kPa]	σfs [kPa]
1	100	40	18.85	15.71	0.00	0.00	0 (12)	0 (12)	0 (12)
2	100	41	18.85	15.71	0.01	0.99	2 (13)	32 (12)	34 (13)
3	100	42	18.85	15.71	0.04	2.00	5 (13)	60 (12)	75 (13)
4	100	43	18.85	15.71	0.09	3.04	9 (13)	82 (12)	123 (13)
5	100	43	18.85	15.71	0.18	4.09	13 (13)	97 (12)	181 (13)
6	100	44	18.85	15.71	0.31	5.17	18 (13)	105 (12)	250 (13)
7	100	45	18.85	15.71	0.50	6.26	24 (13)	103 (12)	331 (13)
8	100	46	18.85	15.71	0.74	7.38	31 (13)	92 (12)	426 (13)
9	100	47	18.85	15.71	1.04	8.52	40 (13)	79 (13)	542 (13)

n°	B [cm]	H [cm]	Afi [cmq]	Afs [cmq]	M [kNm]	N [kN]	σc [kPa]	σfi [kPa]	σfs [kPa]
10	100	48	18.85	15.71	1.42	9.68	51 (13)	220 (13)	685 (13)
11	100	49	18.85	15.71	1.87	10.86	64 (13)	446 (13)	857 (13)
12	100	49	18.85	15.71	2.42	12.06	81 (13)	775 (13)	1058 (13)
13	100	50	18.85	15.71	3.06	13.28	99 (13)	1220 (13)	1287 (13)
14	100	51	18.85	18.85	3.80	14.52	117 (13)	1568 (13)	1505 (13)
15	100	52	18.85	18.85	4.65	15.79	139 (13)	2155 (13)	1774 (13)
16	100	53	18.85	18.85	5.62	17.07	163 (13)	2846 (13)	2066 (13)
17	100	54	18.85	18.85	6.71	18.38	189 (13)	3644 (13)	2383 (13)
18	100	55	18.85	18.85	7.93	19.71	217 (13)	4549 (13)	2723 (13)
19	100	55	18.85	18.85	9.30	21.06	248 (13)	5565 (13)	3088 (13)
20	100	56	18.85	18.85	10.81	22.43	280 (13)	6692 (13)	3477 (13)
21	100	57	18.85	18.85	12.47	23.82	314 (13)	7931 (13)	3890 (13)
22	100	58	18.85	18.85	14.30	25.23	351 (13)	9286 (13)	4328 (13)
23	100	59	18.85	18.85	16.29	26.66	389 (13)	10757 (13)	4790 (13)
24	100	60	18.85	18.85	18.47	28.12	430 (13)	12347 (13)	5277 (13)
25	100	61	18.85	18.85	20.82	29.59	472 (13)	14056 (13)	5788 (13)
26	100	61	18.85	21.99	23.37	31.09	494 (13)	13805 (13)	6122 (13)
27	100	62	18.85	21.99	26.11	32.60	538 (13)	15491 (13)	6663 (13)
28	100	63	18.85	21.99	29.06	34.14	584 (13)	17285 (13)	7227 (13)
29	100	64	18.85	21.99	32.23	35.70	632 (13)	19185 (13)	7816 (13)
30	100	65	18.85	21.99	35.61	37.28	681 (13)	21195 (13)	8428 (13)
31	100	66	18.85	21.99	39.22	38.88	733 (13)	23313 (13)	9064 (13)
32	100	67	18.85	21.99	43.07	40.50	786 (13)	25543 (13)	9723 (13)
33	100	67	18.85	21.99	47.16	42.14	842 (13)	27883 (13)	10407 (13)
34	100	68	18.85	21.99	51.50	43.81	899 (13)	30336 (13)	11113 (13)
35	100	69	18.85	21.99	56.09	45.49	958 (13)	32901 (13)	11844 (13)
36	100	70	18.85	21.99	60.95	47.20	1018 (13)	35579 (13)	12597 (13)
37	100	71	18.85	25.13	66.09	48.92	1035 (13)	33872 (13)	12963 (13)
38	100	72	18.85	25.13	71.50	50.67	1097 (13)	36432 (13)	13736 (13)
39	100	73	18.85	25.13	77.20	52.44	1159 (13)	39094 (13)	14530 (13)
40	100	73	18.85	25.13	83.19	54.23	1224 (13)	41857 (13)	15347 (13)
41	100	74	18.85	25.13	89.49	56.04	1290 (13)	44723 (13)	16185 (13)
42	100	75	18.85	25.13	96.09	57.87	1358 (13)	47692 (13)	17046 (13)
43	100	76	18.85	25.13	103.02	59.73	1427 (13)	50764 (13)	17928 (13)
44	100	77	18.85	25.13	110.26	61.60	1498 (13)	53940 (13)	18831 (13)
45	100	78	18.85	25.13	117.84	63.50	1571 (13)	57220 (13)	19756 (13)
46	100	79	18.85	25.13	125.75	65.41	1645 (13)	60605 (13)	20702 (13)
47	100	79	18.85	25.13	134.01	67.35	1721 (13)	64094 (13)	21669 (13)
48	100	80	18.85	25.13	142.62	69.31	1798 (13)	67689 (13)	22657 (13)
49	100	81	18.85	28.27	151.60	71.29	1805 (13)	63885 (13)	22976 (13)
50	100	82	18.85	28.27	160.94	73.29	1882 (13)	67286 (13)	23972 (13)
51	100	83	18.85	28.27	170.66	75.31	1960 (13)	70781 (13)	24988 (13)
52	100	84	18.85	28.27	180.76	77.35	2040 (13)	74371 (13)	26023 (13)
53	100	85	18.85	28.27	191.24	79.41	2121 (13)	78057 (13)	27078 (13)
54	100	85	18.85	28.27	202.13	81.50	2204 (13)	81837 (13)	28153 (13)
55	100	86	18.85	28.27	213.42	83.60	2288 (13)	85714 (13)	29246 (13)
56	100	87	18.85	28.27	225.13	85.73	2373 (13)	89686 (13)	30359 (13)
57	100	88	18.85	28.27	237.25	87.88	2460 (13)	93754 (13)	31491 (13)
58	100	89	18.85	28.27	249.80	90.04	2548 (13)	97919 (13)	32642 (13)
59	100	90	18.85	28.27	262.79	92.23	2638 (13)	102179 (13)	33811 (13)
60	100	91	18.85	28.27	276.21	94.44	2728 (13)	106537 (13)	34999 (13)
61	100	91	18.85	34.56	290.09	96.67	2637 (13)	91803 (13)	34331 (13)
62	100	92	18.85	34.56	304.42	98.93	2724 (13)	95559 (13)	35485 (13)
63	100	93	18.85	34.56	319.22	101.20	2812 (13)	99395 (13)	36655 (13)
64	100	94	18.85	34.56	334.48	103.49	2901 (13)	103311 (13)	37843 (13)
65	100	95	18.85	34.56	350.23	105.81	2992 (13)	107307 (13)	39047 (13)
66	100	96	18.85	34.56	366.46	108.15	3083 (13)	111383 (13)	40267 (13)
67	100	97	37.70	56.55	383.19	110.50	2459 (13)	71321 (13)	32816 (13)
68	100	97	18.85	34.56	400.41	112.88	3270 (13)	119776 (13)	42758 (13)
69	100	98	18.85	34.56	418.15	115.28	3365 (13)	124093 (13)	44027 (13)
70	100	99	18.85	34.56	436.39	117.70	3461 (13)	128491 (13)	45313 (13)
71	100	100	18.85	34.56	455.17	120.14	3558 (13)	132969 (13)	46614 (13)
72	100	101	18.85	34.56	474.47	122.61	3656 (13)	137529 (13)	47932 (13)
73	100	102	18.85	34.56	494.31	125.09	3756 (13)	142169 (13)	49265 (13)

Fondazione

Tensione massima di compressione nel calcestruzzo 13073 [kPa]

Tensione massima di trazione dell'acciaio 1569089 [kPa]

n°	B	H	Afi	Afs	M	N	σc	σfi	σfs
	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kPa]	[kPa]	[kPa]
1	100	120	26.55	26.55	0.00	0.00	0 (12)	0 (12)	0 (12)
2	100	120	26.55	26.55	1.17	0.00	7 (13)	402 (13)	89 (13)
3	100	120	26.55	26.55	4.65	0.00	28 (13)	1601 (13)	354 (13)
4	100	120	26.55	26.55	10.42	0.00	62 (13)	3586 (13)	793 (13)
5	100	120	26.55	26.55	18.45	0.00	110 (13)	6347 (13)	1403 (13)
6	100	120	26.55	26.55	28.70	0.00	170 (13)	9874 (13)	2183 (13)
7	100	120	26.55	26.55	41.15	0.00	244 (13)	14156 (13)	3130 (13)
8	100	120	26.55	26.55	55.76	0.00	331 (13)	19182 (13)	4241 (13)
9	100	120	26.55	26.55	72.51	0.00	431 (13)	24943 (13)	5515 (13)
10	100	120	26.55	26.55	91.36	0.00	542 (13)	31428 (13)	6948 (13)
11	100	120	26.55	26.55	112.28	0.00	667 (13)	38626 (13)	8540 (13)
12	100	120	26.55	26.55	-774.16	0.00	4597 (13)	58878 (13)	266312 (13)
13	100	120	26.55	26.55	-755.08	0.00	4483 (13)	57426 (13)	259747 (13)
14	100	120	26.55	26.55	-735.67	0.00	4368 (13)	55950 (13)	253068 (13)
15	100	120	26.55	26.55	-715.95	0.00	4251 (13)	54450 (13)	246287 (13)
16	100	120	26.55	26.55	-695.97	0.00	4132 (13)	52931 (13)	239413 (13)
17	100	120	26.55	26.55	-675.74	0.00	4012 (13)	51393 (13)	232456 (13)
18	100	120	26.55	26.55	-655.31	0.00	3891 (13)	49839 (13)	225427 (13)
19	100	120	26.55	26.55	-634.70	0.00	3769 (13)	48271 (13)	218336 (13)
20	100	120	26.55	26.55	-613.93	0.00	3645 (13)	46692 (13)	211192 (13)
21	100	120	26.55	26.55	-593.05	0.00	3521 (13)	45103 (13)	204008 (13)
22	100	120	26.55	26.55	-572.07	0.00	3397 (13)	43508 (13)	196792 (13)
23	100	120	26.55	26.55	-551.03	0.00	3272 (13)	41908 (13)	189555 (13)
24	100	120	26.55	26.55	-529.96	0.00	3147 (13)	40305 (13)	182307 (13)
25	100	120	26.55	26.55	-508.89	0.00	3022 (13)	38703 (13)	175058 (13)
26	100	120	26.55	26.55	-487.85	0.00	2897 (13)	37102 (13)	167819 (13)
27	100	120	26.55	26.55	-466.86	0.00	2772 (13)	35506 (13)	160599 (13)
28	100	120	26.55	26.55	-445.96	0.00	2648 (13)	33917 (13)	153410 (13)
29	100	120	26.55	26.55	-425.18	0.00	2525 (13)	32336 (13)	146261 (13)
30	100	120	26.55	26.55	-404.54	0.00	2402 (13)	30767 (13)	139163 (13)
31	100	120	26.55	26.55	-384.08	0.00	2281 (13)	29211 (13)	132125 (13)
32	100	120	26.55	26.55	-363.83	0.00	2160 (13)	27671 (13)	125158 (13)
33	100	120	26.55	26.55	-343.82	0.00	2041 (13)	26148 (13)	118273 (13)
34	100	120	26.55	26.55	-324.07	0.00	1924 (13)	24646 (13)	111478 (13)
35	100	120	26.55	26.55	-304.61	0.00	1809 (13)	23167 (13)	104786 (13)
36	100	120	26.55	26.55	-285.48	0.00	1695 (13)	21712 (13)	98205 (13)
37	100	120	26.55	26.55	-266.71	0.00	1584 (13)	20284 (13)	91747 (13)
38	100	120	26.55	26.55	-248.32	0.00	1474 (13)	18885 (13)	85421 (13)
39	100	120	26.55	26.55	-230.34	0.00	1368 (13)	17518 (13)	79238 (13)
40	100	120	26.55	26.55	-212.81	0.00	1264 (13)	16185 (13)	73207 (13)
41	100	120	26.55	26.55	-195.75	0.00	1162 (13)	14888 (13)	67340 (13)
42	100	120	26.55	26.55	-179.20	0.00	1064 (13)	13629 (13)	61645 (13)
43	100	120	26.55	26.55	-163.18	0.00	969 (13)	12411 (13)	56135 (13)
44	100	120	26.55	26.55	-147.73	0.00	877 (13)	11235 (13)	50818 (13)
45	100	120	26.55	26.55	-132.86	0.00	789 (13)	10105 (13)	45705 (13)
46	100	120	26.55	26.55	-118.62	0.00	704 (13)	9022 (13)	40807 (13)
47	100	120	26.55	26.55	-105.04	0.00	624 (13)	7988 (13)	36133 (13)
48	100	120	26.55	26.55	-92.13	0.00	547 (13)	7007 (13)	31694 (13)
49	100	120	26.55	26.55	-79.94	0.00	475 (13)	6080 (13)	27499 (13)
50	100	120	26.55	26.55	-68.49	0.00	407 (13)	5209 (13)	23560 (13)
51	100	120	26.55	26.55	-57.81	0.00	343 (13)	4397 (13)	19886 (13)
52	100	120	26.55	26.55	-47.93	0.00	285 (13)	3645 (13)	16488 (13)
53	100	120	26.55	26.55	-38.88	0.00	231 (13)	2957 (13)	13376 (13)
54	100	120	26.55	26.55	-30.06	0.00	178 (13)	2286 (13)	10341 (13)

Relazione di calcolo muro di sostegno sede stradale-NV34

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
NM25	03 D 26	CL	NV 34 05 001	A	127 di 135

n°	B	H	Afi	Afs	M	N	σ_c	σ_{fi}	σ_{fs}
	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kN]	[kPa]	[kPa]	[kPa]
55	100	120	26.55	26.55	-22.26	0.00	132 (13)	1693 (13)	7659 (13)
56	100	120	26.55	26.55	-15.59	0.00	93 (13)	1185 (13)	5361 (13)
57	100	120	26.55	26.55	-10.05	0.00	60 (13)	765 (13)	3459 (13)
58	100	120	26.55	26.55	-5.70	0.00	34 (13)	434 (13)	1961 (13)
59	100	120	26.55	26.55	-2.55	0.00	15 (13)	194 (13)	878 (13)
60	100	120	26.55	26.55	-0.64	0.00	4 (13)	49 (13)	221 (13)
61	100	120	0.00	0.00	0.00	0.00	0 (12)	0 (12)	0 (12)

Verifica a fessurazione

Simbologia adottata

n°	indice sezione
Y	ordinata sezione espressa in [m]
B	larghezza sezione espresso in [cm]
H	altezza sezione espressa in [cm]
Af	area ferri zona tesa espresso in [cmq]
Aeff	area efficace espressa in [cmq]
M	momento agente espressa in [kNm]
Mpf	momento di prima fessurazione espressa in [kNm]
ε	deformazione espresso in %
Sm	spaziatura tra le fessure espressa in [mm]
w	apertura delle fessure espressa in [mm]

Combinazioni SLER

Paramento

Apertura limite fessure $w_{lim}=0.40$

n°	B	H	Af	Aeff	M	Mpf	ε	Sm	w
	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kNm]	[%]	[mm]	[mm]
1	100	40	0.00	0.00	0.00	0.00	---	---	0.000 (10)
2	100	41	0.00	0.00	0.00	4.57	0.000000	0.00	0.000 (10)
3	100	42	0.00	0.00	0.02	13.00	0.000000	0.00	0.000 (10)
4	100	43	0.00	0.00	0.05	26.90	0.000000	0.00	0.000 (10)
5	100	43	0.00	0.00	0.10	49.25	0.000000	0.00	0.000 (10)
6	100	44	0.00	0.00	0.18	86.29	0.000000	0.00	0.000 (10)
7	100	45	0.00	0.00	0.29	152.89	0.000000	0.00	0.000 (10)
8	100	46	0.00	0.00	0.44	295.46	0.000000	0.00	0.000 (10)
9	100	47	0.00	0.00	0.64	770.29	0.000000	0.00	0.000 (10)
10	100	48	0.00	0.00	0.89	7543.67	0.000000	0.00	0.000 (10)
11	100	49	15.71	875.00	1.20	878.54	0.000000	0.00	0.000 (10)

n°	B [cm]	H [cm]	Af [cmq]	Aeff [cmq]	M [kNm]	Mpf [kNm]	ε [%]	Sm [mm]	w [mm]
12	100	49	15.71	875.00	1.58	538.78	0.000000	0.00	0.000 (10)
13	100	50	15.71	875.00	2.03	421.65	0.000000	0.00	0.000 (10)
14	100	51	18.85	875.00	2.56	371.79	0.000000	0.00	0.000 (10)
15	100	52	18.85	875.00	3.18	339.19	0.000000	0.00	0.000 (10)
16	100	53	18.85	875.00	3.89	319.31	0.000000	0.00	0.000 (10)
17	100	54	18.85	875.00	4.70	306.81	0.000000	0.00	0.000 (10)
18	100	55	18.85	875.00	5.61	298.97	0.000000	0.00	0.000 (10)
19	100	55	18.85	875.00	6.63	294.27	0.000000	0.00	0.000 (10)
20	100	56	18.85	875.00	7.77	291.79	0.000000	0.00	0.000 (10)
21	100	57	18.85	875.00	9.02	290.95	0.000000	0.00	0.000 (10)
22	100	58	18.85	875.00	10.41	291.36	0.000000	0.00	0.000 (10)
23	100	59	18.85	875.00	11.93	292.74	0.000000	0.00	0.000 (10)
24	100	60	18.85	875.00	13.58	294.90	0.000000	0.00	0.000 (10)
25	100	61	18.85	875.00	15.38	297.70	0.000000	0.00	0.000 (10)
26	100	61	21.99	875.00	17.33	307.15	0.000000	0.00	0.000 (10)
27	100	62	21.99	875.00	19.44	310.97	0.000000	0.00	0.000 (10)
28	100	63	21.99	875.00	21.71	315.18	0.000000	0.00	0.000 (10)
29	100	64	21.99	875.00	24.14	319.73	0.000000	0.00	0.000 (10)
30	100	65	21.99	875.00	26.75	324.59	0.000000	0.00	0.000 (10)
31	100	66	21.99	875.00	29.54	329.71	0.000000	0.00	0.000 (10)
32	100	67	21.99	875.00	32.52	335.08	0.000000	0.00	0.000 (10)
33	100	67	21.99	875.00	35.68	340.67	0.000000	0.00	0.000 (10)
34	100	68	21.99	875.00	39.05	346.46	0.000000	0.00	0.000 (10)
35	100	69	21.99	875.00	42.61	352.43	0.000000	0.00	0.000 (10)
36	100	70	21.99	875.00	46.39	358.58	0.000000	0.00	0.000 (10)
37	100	71	25.13	875.00	50.38	371.62	0.000000	0.00	0.000 (10)
38	100	72	25.13	875.00	54.59	378.16	0.000000	0.00	0.000 (10)
39	100	73	25.13	875.00	59.02	384.84	0.000000	0.00	0.000 (10)
40	100	73	25.13	875.00	63.69	391.66	0.000000	0.00	0.000 (10)
41	100	74	25.13	875.00	68.60	398.62	0.000000	0.00	0.000 (10)
42	100	75	25.13	875.00	73.75	405.71	0.000000	0.00	0.000 (10)
43	100	76	25.13	875.00	79.15	412.92	0.000000	0.00	0.000 (10)
44	100	77	25.13	875.00	84.80	420.25	0.000000	0.00	0.000 (10)
45	100	78	25.13	875.00	90.72	427.69	0.000000	0.00	0.000 (10)
46	100	79	25.13	875.00	96.90	435.25	0.000000	0.00	0.000 (10)
47	100	79	25.13	875.00	103.36	442.92	0.000000	0.00	0.000 (10)
48	100	80	25.13	875.00	110.10	450.70	0.000000	0.00	0.000 (10)
49	100	81	28.27	875.00	117.12	466.17	0.000000	0.00	0.000 (10)
50	100	82	28.27	875.00	124.43	474.23	0.000000	0.00	0.000 (10)
51	100	83	28.27	875.00	132.03	482.39	0.000000	0.00	0.000 (10)
52	100	84	28.27	875.00	139.94	490.65	0.000000	0.00	0.000 (10)
53	100	85	28.27	875.00	148.16	499.01	0.000000	0.00	0.000 (10)
54	100	85	28.27	875.00	156.69	507.47	0.000000	0.00	0.000 (10)
55	100	86	28.27	875.00	165.54	516.02	0.000000	0.00	0.000 (10)
56	100	87	28.27	875.00	174.72	524.67	0.000000	0.00	0.000 (10)
57	100	88	28.27	875.00	184.23	533.41	0.000000	0.00	0.000 (10)
58	100	89	28.27	875.00	194.07	542.24	0.000000	0.00	0.000 (10)
59	100	90	28.27	875.00	204.26	551.16	0.000000	0.00	0.000 (10)
60	100	91	28.27	875.00	214.80	560.17	0.000000	0.00	0.000 (10)
61	100	91	34.56	875.00	225.69	586.35	0.000000	0.00	0.000 (10)
62	100	92	34.56	875.00	236.94	595.70	0.000000	0.00	0.000 (10)
63	100	93	34.56	875.00	248.56	605.15	0.000000	0.00	0.000 (10)
64	100	94	34.56	875.00	260.55	614.68	0.000000	0.00	0.000 (10)
65	100	95	34.56	875.00	272.92	624.29	0.000000	0.00	0.000 (10)
66	100	96	34.56	875.00	285.68	634.00	0.000000	0.00	0.000 (10)
67	100	97	56.55	875.00	298.82	736.13	0.000000	0.00	0.000 (10)
68	100	97	34.56	875.00	312.36	653.67	0.000000	0.00	0.000 (10)
69	100	98	34.56	875.00	326.30	663.63	0.000000	0.00	0.000 (10)
70	100	99	34.56	875.00	340.65	673.68	0.000000	0.00	0.000 (10)
71	100	100	34.56	875.00	355.41	683.81	0.000000	0.00	0.000 (10)
72	100	101	34.56	875.00	370.59	694.03	0.000000	0.00	0.000 (10)
73	100	102	34.56	875.00	386.19	704.33	0.000000	0.00	0.000 (10)

Fondazione

Apertura limite fessure $w_{lim}=0.40$

n°	B	H	Af	Aeff	M	Mpf	ε	Sm	w
	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kNm]	[%]	[mm]	[mm]
1	100	120	0.00	0.00	0.00	0.00	---	---	0.000 (10)
2	100	120	26.55	875.00	0.84	808.11	0.000000	0.00	0.000 (10)
3	100	120	26.55	875.00	3.36	808.11	0.000000	0.00	0.000 (10)
4	100	120	26.55	875.00	7.54	808.11	0.000000	0.00	0.000 (10)
5	100	120	26.55	875.00	13.38	808.11	0.000000	0.00	0.000 (10)
6	100	120	26.55	875.00	20.85	808.11	0.000000	0.00	0.000 (10)
7	100	120	26.55	875.00	29.94	808.11	0.000000	0.00	0.000 (10)
8	100	120	26.55	875.00	40.65	808.11	0.000000	0.00	0.000 (10)
9	100	120	26.55	875.00	52.96	808.11	0.000000	0.00	0.000 (10)
10	100	120	26.55	875.00	66.85	808.11	0.000000	0.00	0.000 (10)
11	100	120	26.55	875.00	82.32	808.11	0.000000	0.00	0.000 (10)
12	100	120	26.55	875.00	-481.65	-808.11	0.000000	0.00	0.000 (10)
13	100	120	26.55	875.00	-467.80	-808.11	0.000000	0.00	0.000 (10)
14	100	120	26.55	875.00	-453.91	-808.11	0.000000	0.00	0.000 (10)
15	100	120	26.55	875.00	-440.01	-808.11	0.000000	0.00	0.000 (10)
16	100	120	26.55	875.00	-426.10	-808.11	0.000000	0.00	0.000 (10)
17	100	120	26.55	875.00	-412.20	-808.11	0.000000	0.00	0.000 (10)
18	100	120	26.55	875.00	-398.32	-808.11	0.000000	0.00	0.000 (10)
19	100	120	26.55	875.00	-384.47	-808.11	0.000000	0.00	0.000 (10)
20	100	120	26.55	875.00	-370.67	-808.11	0.000000	0.00	0.000 (10)
21	100	120	26.55	875.00	-356.93	-808.11	0.000000	0.00	0.000 (10)
22	100	120	26.55	875.00	-343.26	-808.11	0.000000	0.00	0.000 (10)
23	100	120	26.55	875.00	-329.68	-808.11	0.000000	0.00	0.000 (10)
24	100	120	26.55	875.00	-316.19	-808.11	0.000000	0.00	0.000 (10)
25	100	120	26.55	875.00	-302.81	-808.11	0.000000	0.00	0.000 (10)
26	100	120	26.55	875.00	-289.55	-808.11	0.000000	0.00	0.000 (10)
27	100	120	26.55	875.00	-276.43	-808.11	0.000000	0.00	0.000 (10)
28	100	120	26.55	875.00	-263.45	-808.11	0.000000	0.00	0.000 (10)
29	100	120	26.55	875.00	-250.63	-808.11	0.000000	0.00	0.000 (10)
30	100	120	26.55	875.00	-237.99	-808.11	0.000000	0.00	0.000 (10)
31	100	120	26.55	875.00	-225.53	-808.11	0.000000	0.00	0.000 (10)
32	100	120	26.55	875.00	-213.26	-808.11	0.000000	0.00	0.000 (10)
33	100	120	26.55	875.00	-201.21	-808.11	0.000000	0.00	0.000 (10)
34	100	120	26.55	875.00	-189.38	-808.11	0.000000	0.00	0.000 (10)
35	100	120	26.55	875.00	-177.78	-808.11	0.000000	0.00	0.000 (10)
36	100	120	26.55	875.00	-166.43	-808.11	0.000000	0.00	0.000 (10)
37	100	120	26.55	875.00	-155.34	-808.11	0.000000	0.00	0.000 (10)
38	100	120	26.55	875.00	-144.53	-808.11	0.000000	0.00	0.000 (10)
39	100	120	26.55	875.00	-134.00	-808.11	0.000000	0.00	0.000 (10)
40	100	120	26.55	875.00	-123.77	-808.11	0.000000	0.00	0.000 (10)
41	100	120	26.55	875.00	-113.84	-808.11	0.000000	0.00	0.000 (10)
42	100	120	26.55	875.00	-104.24	-808.11	0.000000	0.00	0.000 (10)
43	100	120	26.55	875.00	-94.98	-808.11	0.000000	0.00	0.000 (10)
44	100	120	26.55	875.00	-86.07	-808.11	0.000000	0.00	0.000 (10)
45	100	120	26.55	875.00	-77.51	-808.11	0.000000	0.00	0.000 (10)
46	100	120	26.55	875.00	-69.33	-808.11	0.000000	0.00	0.000 (10)
47	100	120	26.55	875.00	-61.54	-808.11	0.000000	0.00	0.000 (10)
48	100	120	26.55	875.00	-54.14	-808.11	0.000000	0.00	0.000 (10)
49	100	120	26.55	875.00	-47.16	-808.11	0.000000	0.00	0.000 (10)
50	100	120	26.55	875.00	-40.60	-808.11	0.000000	0.00	0.000 (10)
51	100	120	26.55	875.00	-34.47	-808.11	0.000000	0.00	0.000 (10)
52	100	120	26.55	875.00	-28.80	-808.11	0.000000	0.00	0.000 (10)
53	100	120	26.55	875.00	-23.58	-808.11	0.000000	0.00	0.000 (10)
54	100	120	26.55	875.00	-18.21	-808.11	0.000000	0.00	0.000 (10)
55	100	120	26.55	875.00	-13.45	-808.11	0.000000	0.00	0.000 (10)
56	100	120	26.55	875.00	-9.39	-808.11	0.000000	0.00	0.000 (10)
57	100	120	26.55	875.00	-6.05	-808.11	0.000000	0.00	0.000 (10)
58	100	120	26.55	875.00	-3.42	-808.11	0.000000	0.00	0.000 (10)
59	100	120	26.55	875.00	-1.53	-808.11	0.000000	0.00	0.000 (10)

Relazione di calcolo muro di sostegno sede stradale-NV34

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
NM25	03 D 26	CL	NV 34 05 001	A	130 di 135

n°	B	H	Af	Aeff	M	Mpf	ε	Sm	w
	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kNm]	[%]	[mm]	[mm]
60	100	120	26.55	875.00	-0.38	-808.11	0.000000	0.00	0.000 (10)
61	100	120	0.00	0.00	0.00	0.00	---	---	0.000 (10)

Combinazioni SLEF

Paramento

 Apertura limite fessure $w_{lim}=0.40$

n°	B	H	Af	Aeff	M	Mpf	ε	Sm	w
	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kNm]	[%]	[mm]	[mm]
1	100	40	0.00	0.00	0.00	0.00	---	---	0.000 (11)
2	100	41	0.00	0.00	0.00	4.57	0.000000	0.00	0.000 (11)
3	100	42	0.00	0.00	0.02	13.00	0.000000	0.00	0.000 (11)
4	100	43	0.00	0.00	0.05	26.90	0.000000	0.00	0.000 (11)
5	100	43	0.00	0.00	0.10	49.25	0.000000	0.00	0.000 (11)
6	100	44	0.00	0.00	0.18	86.29	0.000000	0.00	0.000 (11)
7	100	45	0.00	0.00	0.29	152.89	0.000000	0.00	0.000 (11)
8	100	46	0.00	0.00	0.44	295.46	0.000000	0.00	0.000 (11)
9	100	47	0.00	0.00	0.64	770.29	0.000000	0.00	0.000 (11)
10	100	48	0.00	0.00	0.89	7543.67	0.000000	0.00	0.000 (11)
11	100	49	15.71	875.00	1.20	878.54	0.000000	0.00	0.000 (11)
12	100	49	15.71	875.00	1.58	538.78	0.000000	0.00	0.000 (11)
13	100	50	15.71	875.00	2.03	421.65	0.000000	0.00	0.000 (11)
14	100	51	18.85	875.00	2.56	371.79	0.000000	0.00	0.000 (11)
15	100	52	18.85	875.00	3.18	339.19	0.000000	0.00	0.000 (11)
16	100	53	18.85	875.00	3.89	319.31	0.000000	0.00	0.000 (11)
17	100	54	18.85	875.00	4.70	306.81	0.000000	0.00	0.000 (11)
18	100	55	18.85	875.00	5.61	298.97	0.000000	0.00	0.000 (11)
19	100	55	18.85	875.00	6.63	294.27	0.000000	0.00	0.000 (11)
20	100	56	18.85	875.00	7.77	291.79	0.000000	0.00	0.000 (11)
21	100	57	18.85	875.00	9.02	290.95	0.000000	0.00	0.000 (11)
22	100	58	18.85	875.00	10.41	291.36	0.000000	0.00	0.000 (11)
23	100	59	18.85	875.00	11.93	292.74	0.000000	0.00	0.000 (11)
24	100	60	18.85	875.00	13.58	294.90	0.000000	0.00	0.000 (11)
25	100	61	18.85	875.00	15.38	297.70	0.000000	0.00	0.000 (11)
26	100	61	21.99	875.00	17.33	307.15	0.000000	0.00	0.000 (11)
27	100	62	21.99	875.00	19.44	310.97	0.000000	0.00	0.000 (11)
28	100	63	21.99	875.00	21.71	315.18	0.000000	0.00	0.000 (11)
29	100	64	21.99	875.00	24.14	319.73	0.000000	0.00	0.000 (11)
30	100	65	21.99	875.00	26.75	324.59	0.000000	0.00	0.000 (11)
31	100	66	21.99	875.00	29.54	329.71	0.000000	0.00	0.000 (11)
32	100	67	21.99	875.00	32.52	335.08	0.000000	0.00	0.000 (11)
33	100	67	21.99	875.00	35.68	340.67	0.000000	0.00	0.000 (11)
34	100	68	21.99	875.00	39.05	346.46	0.000000	0.00	0.000 (11)
35	100	69	21.99	875.00	42.61	352.43	0.000000	0.00	0.000 (11)
36	100	70	21.99	875.00	46.39	358.58	0.000000	0.00	0.000 (11)
37	100	71	25.13	875.00	50.38	371.62	0.000000	0.00	0.000 (11)
38	100	72	25.13	875.00	54.59	378.16	0.000000	0.00	0.000 (11)
39	100	73	25.13	875.00	59.02	384.84	0.000000	0.00	0.000 (11)
40	100	73	25.13	875.00	63.69	391.66	0.000000	0.00	0.000 (11)
41	100	74	25.13	875.00	68.60	398.62	0.000000	0.00	0.000 (11)
42	100	75	25.13	875.00	73.75	405.71	0.000000	0.00	0.000 (11)
43	100	76	25.13	875.00	79.15	412.92	0.000000	0.00	0.000 (11)
44	100	77	25.13	875.00	84.80	420.25	0.000000	0.00	0.000 (11)
45	100	78	25.13	875.00	90.72	427.69	0.000000	0.00	0.000 (11)

n°	B	H	Af	Aeff	M	Mpf	ε	Sm	w
	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kNm]	[%]	[mm]	[mm]
46	100	79	25.13	875.00	96.90	435.25	0.000000	0.00	0.000 (11)
47	100	79	25.13	875.00	103.36	442.92	0.000000	0.00	0.000 (11)
48	100	80	25.13	875.00	110.10	450.70	0.000000	0.00	0.000 (11)
49	100	81	28.27	875.00	117.12	466.17	0.000000	0.00	0.000 (11)
50	100	82	28.27	875.00	124.43	474.23	0.000000	0.00	0.000 (11)
51	100	83	28.27	875.00	132.03	482.39	0.000000	0.00	0.000 (11)
52	100	84	28.27	875.00	139.94	490.65	0.000000	0.00	0.000 (11)
53	100	85	28.27	875.00	148.16	499.01	0.000000	0.00	0.000 (11)
54	100	85	28.27	875.00	156.69	507.47	0.000000	0.00	0.000 (11)
55	100	86	28.27	875.00	165.54	516.02	0.000000	0.00	0.000 (11)
56	100	87	28.27	875.00	174.72	524.67	0.000000	0.00	0.000 (11)
57	100	88	28.27	875.00	184.23	533.41	0.000000	0.00	0.000 (11)
58	100	89	28.27	875.00	194.07	542.24	0.000000	0.00	0.000 (11)
59	100	90	28.27	875.00	204.26	551.16	0.000000	0.00	0.000 (11)
60	100	91	28.27	875.00	214.80	560.17	0.000000	0.00	0.000 (11)
61	100	91	34.56	875.00	225.69	586.35	0.000000	0.00	0.000 (11)
62	100	92	34.56	875.00	236.94	595.70	0.000000	0.00	0.000 (11)
63	100	93	34.56	875.00	248.56	605.15	0.000000	0.00	0.000 (11)
64	100	94	34.56	875.00	260.55	614.68	0.000000	0.00	0.000 (11)
65	100	95	34.56	875.00	272.92	624.29	0.000000	0.00	0.000 (11)
66	100	96	34.56	875.00	285.68	634.00	0.000000	0.00	0.000 (11)
67	100	97	56.55	875.00	298.82	736.13	0.000000	0.00	0.000 (11)
68	100	97	34.56	875.00	312.36	653.67	0.000000	0.00	0.000 (11)
69	100	98	34.56	875.00	326.30	663.63	0.000000	0.00	0.000 (11)
70	100	99	34.56	875.00	340.65	673.68	0.000000	0.00	0.000 (11)
71	100	100	34.56	875.00	355.41	683.81	0.000000	0.00	0.000 (11)
72	100	101	34.56	875.00	370.59	694.03	0.000000	0.00	0.000 (11)
73	100	102	34.56	875.00	386.19	704.33	0.000000	0.00	0.000 (11)

Fondazione

Apertura limite fessure $w_{lim}=0.40$

n°	B	H	Af	Aeff	M	Mpf	ε	Sm	w
	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kNm]	[%]	[mm]	[mm]
1	100	120	0.00	0.00	0.00	0.00	---	---	0.000 (11)
2	100	120	26.55	875.00	0.84	808.11	0.000000	0.00	0.000 (11)
3	100	120	26.55	875.00	3.36	808.11	0.000000	0.00	0.000 (11)
4	100	120	26.55	875.00	7.54	808.11	0.000000	0.00	0.000 (11)
5	100	120	26.55	875.00	13.38	808.11	0.000000	0.00	0.000 (11)
6	100	120	26.55	875.00	20.85	808.11	0.000000	0.00	0.000 (11)
7	100	120	26.55	875.00	29.94	808.11	0.000000	0.00	0.000 (11)
8	100	120	26.55	875.00	40.65	808.11	0.000000	0.00	0.000 (11)
9	100	120	26.55	875.00	52.96	808.11	0.000000	0.00	0.000 (11)
10	100	120	26.55	875.00	66.85	808.11	0.000000	0.00	0.000 (11)
11	100	120	26.55	875.00	82.32	808.11	0.000000	0.00	0.000 (11)
12	100	120	26.55	875.00	-481.65	-808.11	0.000000	0.00	0.000 (11)
13	100	120	26.55	875.00	-467.80	-808.11	0.000000	0.00	0.000 (11)
14	100	120	26.55	875.00	-453.91	-808.11	0.000000	0.00	0.000 (11)
15	100	120	26.55	875.00	-440.01	-808.11	0.000000	0.00	0.000 (11)
16	100	120	26.55	875.00	-426.10	-808.11	0.000000	0.00	0.000 (11)
17	100	120	26.55	875.00	-412.20	-808.11	0.000000	0.00	0.000 (11)
18	100	120	26.55	875.00	-398.32	-808.11	0.000000	0.00	0.000 (11)
19	100	120	26.55	875.00	-384.47	-808.11	0.000000	0.00	0.000 (11)
20	100	120	26.55	875.00	-370.67	-808.11	0.000000	0.00	0.000 (11)
21	100	120	26.55	875.00	-356.93	-808.11	0.000000	0.00	0.000 (11)
22	100	120	26.55	875.00	-343.26	-808.11	0.000000	0.00	0.000 (11)
23	100	120	26.55	875.00	-329.68	-808.11	0.000000	0.00	0.000 (11)
24	100	120	26.55	875.00	-316.19	-808.11	0.000000	0.00	0.000 (11)

n°	B	H	Af	Aeff	M	Mpf	ε	Sm	w
	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kNm]	[%]	[mm]	[mm]
25	100	120	26.55	875.00	-302.81	-808.11	0.000000	0.00	0.000 (11)
26	100	120	26.55	875.00	-289.55	-808.11	0.000000	0.00	0.000 (11)
27	100	120	26.55	875.00	-276.43	-808.11	0.000000	0.00	0.000 (11)
28	100	120	26.55	875.00	-263.45	-808.11	0.000000	0.00	0.000 (11)
29	100	120	26.55	875.00	-250.63	-808.11	0.000000	0.00	0.000 (11)
30	100	120	26.55	875.00	-237.99	-808.11	0.000000	0.00	0.000 (11)
31	100	120	26.55	875.00	-225.53	-808.11	0.000000	0.00	0.000 (11)
32	100	120	26.55	875.00	-213.26	-808.11	0.000000	0.00	0.000 (11)
33	100	120	26.55	875.00	-201.21	-808.11	0.000000	0.00	0.000 (11)
34	100	120	26.55	875.00	-189.38	-808.11	0.000000	0.00	0.000 (11)
35	100	120	26.55	875.00	-177.78	-808.11	0.000000	0.00	0.000 (11)
36	100	120	26.55	875.00	-166.43	-808.11	0.000000	0.00	0.000 (11)
37	100	120	26.55	875.00	-155.34	-808.11	0.000000	0.00	0.000 (11)
38	100	120	26.55	875.00	-144.53	-808.11	0.000000	0.00	0.000 (11)
39	100	120	26.55	875.00	-134.00	-808.11	0.000000	0.00	0.000 (11)
40	100	120	26.55	875.00	-123.77	-808.11	0.000000	0.00	0.000 (11)
41	100	120	26.55	875.00	-113.84	-808.11	0.000000	0.00	0.000 (11)
42	100	120	26.55	875.00	-104.24	-808.11	0.000000	0.00	0.000 (11)
43	100	120	26.55	875.00	-94.98	-808.11	0.000000	0.00	0.000 (11)
44	100	120	26.55	875.00	-86.07	-808.11	0.000000	0.00	0.000 (11)
45	100	120	26.55	875.00	-77.51	-808.11	0.000000	0.00	0.000 (11)
46	100	120	26.55	875.00	-69.33	-808.11	0.000000	0.00	0.000 (11)
47	100	120	26.55	875.00	-61.54	-808.11	0.000000	0.00	0.000 (11)
48	100	120	26.55	875.00	-54.14	-808.11	0.000000	0.00	0.000 (11)
49	100	120	26.55	875.00	-47.16	-808.11	0.000000	0.00	0.000 (11)
50	100	120	26.55	875.00	-40.60	-808.11	0.000000	0.00	0.000 (11)
51	100	120	26.55	875.00	-34.47	-808.11	0.000000	0.00	0.000 (11)
52	100	120	26.55	875.00	-28.80	-808.11	0.000000	0.00	0.000 (11)
53	100	120	26.55	875.00	-23.58	-808.11	0.000000	0.00	0.000 (11)
54	100	120	26.55	875.00	-18.21	-808.11	0.000000	0.00	0.000 (11)
55	100	120	26.55	875.00	-13.45	-808.11	0.000000	0.00	0.000 (11)
56	100	120	26.55	875.00	-9.39	-808.11	0.000000	0.00	0.000 (11)
57	100	120	26.55	875.00	-6.05	-808.11	0.000000	0.00	0.000 (11)
58	100	120	26.55	875.00	-3.42	-808.11	0.000000	0.00	0.000 (11)
59	100	120	26.55	875.00	-1.53	-808.11	0.000000	0.00	0.000 (11)
60	100	120	26.55	875.00	-0.38	-808.11	0.000000	0.00	0.000 (11)
61	100	120	0.00	0.00	0.00	0.00	---	---	0.000 (11)

Combinazioni SLEQ

Paramento

Apertura limite fessure $w_{lim}=0.30$

n°	B	H	Af	Aeff	M	Mpf	ε	Sm	w
	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kNm]	[%]	[mm]	[mm]
1	100	40	0.00	0.00	0.00	0.00	---	---	0.000 (12)
2	100	41	0.00	0.00	0.00	4.57	0.000000	0.00	0.000 (12)
3	100	42	0.00	0.00	0.02	13.00	0.000000	0.00	0.000 (12)
4	100	43	0.00	0.00	0.05	26.90	0.000000	0.00	0.000 (12)
5	100	43	0.00	0.00	0.10	49.25	0.000000	0.00	0.000 (12)
6	100	44	0.00	0.00	0.18	86.29	0.000000	0.00	0.000 (12)
7	100	45	0.00	0.00	0.29	152.89	0.000000	0.00	0.000 (12)
8	100	46	0.00	0.00	0.44	295.46	0.000000	0.00	0.000 (12)
9	100	47	0.00	0.00	0.64	770.29	0.000000	0.00	0.000 (12)
10	100	48	0.00	0.00	0.89	7543.67	0.000000	0.00	0.000 (12)

n°	B	H	Af	Aeff	M	Mpf	ε	Sm	w
	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kNm]	[%]	[mm]	[mm]
11	100	49	15.71	875.00	1.20	878.54	0.000000	0.00	0.000 (12)
12	100	49	15.71	875.00	1.58	538.78	0.000000	0.00	0.000 (12)
13	100	50	15.71	875.00	2.03	421.65	0.000000	0.00	0.000 (12)
14	100	51	18.85	875.00	2.56	371.79	0.000000	0.00	0.000 (12)
15	100	52	18.85	875.00	3.18	339.19	0.000000	0.00	0.000 (12)
16	100	53	18.85	875.00	3.89	319.31	0.000000	0.00	0.000 (12)
17	100	54	18.85	875.00	4.70	306.81	0.000000	0.00	0.000 (12)
18	100	55	18.85	875.00	5.61	298.97	0.000000	0.00	0.000 (12)
19	100	55	18.85	875.00	6.63	294.27	0.000000	0.00	0.000 (12)
20	100	56	18.85	875.00	7.77	291.79	0.000000	0.00	0.000 (12)
21	100	57	18.85	875.00	9.02	290.95	0.000000	0.00	0.000 (12)
22	100	58	18.85	875.00	10.41	291.36	0.000000	0.00	0.000 (12)
23	100	59	18.85	875.00	11.93	292.74	0.000000	0.00	0.000 (12)
24	100	60	18.85	875.00	13.58	294.90	0.000000	0.00	0.000 (12)
25	100	61	18.85	875.00	15.38	297.70	0.000000	0.00	0.000 (12)
26	100	61	21.99	875.00	17.33	307.15	0.000000	0.00	0.000 (12)
27	100	62	21.99	875.00	19.44	310.97	0.000000	0.00	0.000 (12)
28	100	63	21.99	875.00	21.71	315.18	0.000000	0.00	0.000 (12)
29	100	64	21.99	875.00	24.14	319.73	0.000000	0.00	0.000 (12)
30	100	65	21.99	875.00	26.75	324.59	0.000000	0.00	0.000 (12)
31	100	66	21.99	875.00	29.54	329.71	0.000000	0.00	0.000 (12)
32	100	67	21.99	875.00	32.52	335.08	0.000000	0.00	0.000 (12)
33	100	67	21.99	875.00	35.68	340.67	0.000000	0.00	0.000 (12)
34	100	68	21.99	875.00	39.05	346.46	0.000000	0.00	0.000 (12)
35	100	69	21.99	875.00	42.61	352.43	0.000000	0.00	0.000 (12)
36	100	70	21.99	875.00	46.39	358.58	0.000000	0.00	0.000 (12)
37	100	71	25.13	875.00	50.38	371.62	0.000000	0.00	0.000 (12)
38	100	72	25.13	875.00	54.59	378.16	0.000000	0.00	0.000 (12)
39	100	73	25.13	875.00	59.02	384.84	0.000000	0.00	0.000 (12)
40	100	73	25.13	875.00	63.69	391.66	0.000000	0.00	0.000 (12)
41	100	74	25.13	875.00	68.60	398.62	0.000000	0.00	0.000 (12)
42	100	75	25.13	875.00	73.75	405.71	0.000000	0.00	0.000 (12)
43	100	76	25.13	875.00	79.15	412.92	0.000000	0.00	0.000 (12)
44	100	77	25.13	875.00	84.80	420.25	0.000000	0.00	0.000 (12)
45	100	78	25.13	875.00	90.72	427.69	0.000000	0.00	0.000 (12)
46	100	79	25.13	875.00	96.90	435.25	0.000000	0.00	0.000 (12)
47	100	79	25.13	875.00	103.36	442.92	0.000000	0.00	0.000 (12)
48	100	80	25.13	875.00	110.10	450.70	0.000000	0.00	0.000 (12)
49	100	81	28.27	875.00	117.12	466.17	0.000000	0.00	0.000 (12)
50	100	82	28.27	875.00	124.43	474.23	0.000000	0.00	0.000 (12)
51	100	83	28.27	875.00	132.03	482.39	0.000000	0.00	0.000 (12)
52	100	84	28.27	875.00	139.94	490.65	0.000000	0.00	0.000 (12)
53	100	85	28.27	875.00	148.16	499.01	0.000000	0.00	0.000 (12)
54	100	85	28.27	875.00	156.69	507.47	0.000000	0.00	0.000 (12)
55	100	86	28.27	875.00	165.54	516.02	0.000000	0.00	0.000 (12)
56	100	87	28.27	875.00	174.72	524.67	0.000000	0.00	0.000 (12)
57	100	88	28.27	875.00	184.23	533.41	0.000000	0.00	0.000 (12)
58	100	89	28.27	875.00	194.07	542.24	0.000000	0.00	0.000 (12)
59	100	90	28.27	875.00	204.26	551.16	0.000000	0.00	0.000 (12)
60	100	91	28.27	875.00	214.80	560.17	0.000000	0.00	0.000 (12)
61	100	91	34.56	875.00	225.69	586.35	0.000000	0.00	0.000 (12)
62	100	92	34.56	875.00	236.94	595.70	0.000000	0.00	0.000 (12)
63	100	93	34.56	875.00	248.56	605.15	0.000000	0.00	0.000 (12)
64	100	94	34.56	875.00	260.55	614.68	0.000000	0.00	0.000 (12)
65	100	95	34.56	875.00	272.92	624.29	0.000000	0.00	0.000 (12)
66	100	96	34.56	875.00	285.68	634.00	0.000000	0.00	0.000 (12)
67	100	97	56.55	875.00	298.82	736.13	0.000000	0.00	0.000 (12)
68	100	97	34.56	875.00	312.36	653.67	0.000000	0.00	0.000 (12)
69	100	98	34.56	875.00	326.30	663.63	0.000000	0.00	0.000 (12)
70	100	99	34.56	875.00	340.65	673.68	0.000000	0.00	0.000 (12)
71	100	100	34.56	875.00	355.41	683.81	0.000000	0.00	0.000 (12)
72	100	101	34.56	875.00	370.59	694.03	0.000000	0.00	0.000 (12)
73	100	102	34.56	875.00	386.19	704.33	0.000000	0.00	0.000 (12)

Fondazione

Apertura limite fessure $w_{lim}=0.30$

n°	B	H	Af	Aeff	M	Mpf	ε	Sm	w
	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kNm]	[%]	[mm]	[mm]
1	100	120	0.00	0.00	0.00	0.00	---	---	0.000 (12)
2	100	120	26.55	875.00	0.84	808.11	0.000000	0.00	0.000 (12)
3	100	120	26.55	875.00	3.36	808.11	0.000000	0.00	0.000 (12)
4	100	120	26.55	875.00	7.54	808.11	0.000000	0.00	0.000 (12)
5	100	120	26.55	875.00	13.38	808.11	0.000000	0.00	0.000 (12)
6	100	120	26.55	875.00	20.85	808.11	0.000000	0.00	0.000 (12)
7	100	120	26.55	875.00	29.94	808.11	0.000000	0.00	0.000 (12)
8	100	120	26.55	875.00	40.65	808.11	0.000000	0.00	0.000 (12)
9	100	120	26.55	875.00	52.96	808.11	0.000000	0.00	0.000 (12)
10	100	120	26.55	875.00	66.85	808.11	0.000000	0.00	0.000 (12)
11	100	120	26.55	875.00	82.32	808.11	0.000000	0.00	0.000 (12)
12	100	120	26.55	875.00	-481.65	-808.11	0.000000	0.00	0.000 (12)
13	100	120	26.55	875.00	-467.80	-808.11	0.000000	0.00	0.000 (12)
14	100	120	26.55	875.00	-453.91	-808.11	0.000000	0.00	0.000 (12)
15	100	120	26.55	875.00	-440.01	-808.11	0.000000	0.00	0.000 (12)
16	100	120	26.55	875.00	-426.10	-808.11	0.000000	0.00	0.000 (12)
17	100	120	26.55	875.00	-412.20	-808.11	0.000000	0.00	0.000 (12)
18	100	120	26.55	875.00	-398.32	-808.11	0.000000	0.00	0.000 (12)
19	100	120	26.55	875.00	-384.47	-808.11	0.000000	0.00	0.000 (12)
20	100	120	26.55	875.00	-370.67	-808.11	0.000000	0.00	0.000 (12)
21	100	120	26.55	875.00	-356.93	-808.11	0.000000	0.00	0.000 (12)
22	100	120	26.55	875.00	-343.26	-808.11	0.000000	0.00	0.000 (12)
23	100	120	26.55	875.00	-329.68	-808.11	0.000000	0.00	0.000 (12)
24	100	120	26.55	875.00	-316.19	-808.11	0.000000	0.00	0.000 (12)
25	100	120	26.55	875.00	-302.81	-808.11	0.000000	0.00	0.000 (12)
26	100	120	26.55	875.00	-289.55	-808.11	0.000000	0.00	0.000 (12)
27	100	120	26.55	875.00	-276.43	-808.11	0.000000	0.00	0.000 (12)
28	100	120	26.55	875.00	-263.45	-808.11	0.000000	0.00	0.000 (12)
29	100	120	26.55	875.00	-250.63	-808.11	0.000000	0.00	0.000 (12)
30	100	120	26.55	875.00	-237.99	-808.11	0.000000	0.00	0.000 (12)
31	100	120	26.55	875.00	-225.53	-808.11	0.000000	0.00	0.000 (12)
32	100	120	26.55	875.00	-213.26	-808.11	0.000000	0.00	0.000 (12)
33	100	120	26.55	875.00	-201.21	-808.11	0.000000	0.00	0.000 (12)
34	100	120	26.55	875.00	-189.38	-808.11	0.000000	0.00	0.000 (12)
35	100	120	26.55	875.00	-177.78	-808.11	0.000000	0.00	0.000 (12)
36	100	120	26.55	875.00	-166.43	-808.11	0.000000	0.00	0.000 (12)
37	100	120	26.55	875.00	-155.34	-808.11	0.000000	0.00	0.000 (12)
38	100	120	26.55	875.00	-144.53	-808.11	0.000000	0.00	0.000 (12)
39	100	120	26.55	875.00	-134.00	-808.11	0.000000	0.00	0.000 (12)
40	100	120	26.55	875.00	-123.77	-808.11	0.000000	0.00	0.000 (12)
41	100	120	26.55	875.00	-113.84	-808.11	0.000000	0.00	0.000 (12)
42	100	120	26.55	875.00	-104.24	-808.11	0.000000	0.00	0.000 (12)
43	100	120	26.55	875.00	-94.98	-808.11	0.000000	0.00	0.000 (12)
44	100	120	26.55	875.00	-86.07	-808.11	0.000000	0.00	0.000 (12)
45	100	120	26.55	875.00	-77.51	-808.11	0.000000	0.00	0.000 (12)
46	100	120	26.55	875.00	-69.33	-808.11	0.000000	0.00	0.000 (12)
47	100	120	26.55	875.00	-61.54	-808.11	0.000000	0.00	0.000 (12)
48	100	120	26.55	875.00	-54.14	-808.11	0.000000	0.00	0.000 (12)
49	100	120	26.55	875.00	-47.16	-808.11	0.000000	0.00	0.000 (12)
50	100	120	26.55	875.00	-40.60	-808.11	0.000000	0.00	0.000 (12)
51	100	120	26.55	875.00	-34.47	-808.11	0.000000	0.00	0.000 (12)
52	100	120	26.55	875.00	-28.80	-808.11	0.000000	0.00	0.000 (12)
53	100	120	26.55	875.00	-23.58	-808.11	0.000000	0.00	0.000 (12)
54	100	120	26.55	875.00	-18.21	-808.11	0.000000	0.00	0.000 (12)
55	100	120	26.55	875.00	-13.45	-808.11	0.000000	0.00	0.000 (12)
56	100	120	26.55	875.00	-9.39	-808.11	0.000000	0.00	0.000 (12)
57	100	120	26.55	875.00	-6.05	-808.11	0.000000	0.00	0.000 (12)
58	100	120	26.55	875.00	-3.42	-808.11	0.000000	0.00	0.000 (12)

Relazione di calcolo muro di sostegno sede stradale-NV34

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
NM25	03 D 26	CL	NV 34 05 001	A	135 di 135

n°	B	H	Af	Aeff	M	Mpf	ε	Sm	w
	[cm]	[cm]	[cmq]	[cmq]	[kNm]	[kNm]	[%]	[mm]	[mm]
59	100	120	26.55	875.00	-1.53	-808.11	0.000000	0.00	0.000 (12)
60	100	120	26.55	875.00	-0.38	-808.11	0.000000	0.00	0.000 (12)
61	100	120	0.00	0.00	0.00	0.00	---	---	0.000 (12)