

COMMITTENTE:



PROGETTAZIONE:



**DIREZIONE TECNICA**  
**U.O. COORDINAMENTO NO CAPTIVE E INGEGNERIA DI SISTEMA**

**PROGETTO DEFINITIVO**

**POTENZIAMENTO DELLA LINEA FOLIGNO-TERONTOLA**

**INTERVENTI DI SEMPLIFICAZIONE E VELOCIZZAZIONE SUL PRG  
DELLA STAZIONE DI ASSISI**

**OPERE MINORI**

Canale Tescio - relazione di calcolo opere provvisionali

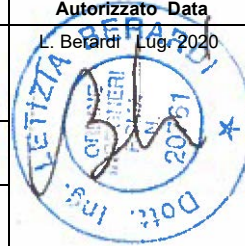
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COMMESSA LOTTO FASE ENTE TIPO DOC. OPERA/DISCIPLINA PROGR. REV.

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Rev.	Descrizione	Redatto	Data	Verificato	Data	Approvato	Data	Autorizzato - Data
A	Emissione	Giannini P. Quadring	Lug. 2020	S. Paoloni	Lug. 2020	T. Paolletti	Lug. 2020	L. Berardi - Lug. 2020



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n. Elab.:

**INTERFERENZE IDRAULICHE**

**CANALE TESCOIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
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## 1. PREMESSA

La presente relazione riporta i risultati delle verifiche di stabilità degli scavi provvisori e dei calcoli di dimensionamento e verifica delle opere provvisionali previste per la realizzazione del collettore IN03, incluse nel Progetto Definitivo del PRG della stazione di Assisi facente parte del potenziamento della linea Foligno – Terontola.

Le analisi svolte sono riferite a specifiche configurazioni di scavo e di opere provvisionali (sezioni di calcolo tipo), individuate come rappresentative delle condizioni maggiormente critiche, in funzione di altezza di scavo e condizioni di carico. Non ci sono variazioni legate al livello di falda (assente) e all’assetto stratigrafico che risulta omogeneo lungo tutto il tratto



**Figura 1-1: Tracciato di progetto con ubicazione opere principali**

Di seguito il tracciato del canale IN03, estrapolato da Google Earth:



**POTENZIAMENTO DELLA LINEA FOLIGNO-TERONTOLA  
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**Figura 1-2 Canale Tescio da google Earth**

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## 2. DOCUMENTI DI RIFERIMENTO, NORMATIVA, SOFTWARE

### 2.1. Documentazione di riferimento

- Rif. [1] IR0B 01 D 10 GE GE 0006 001 “Relazione Geotecnica Generale”
- Rif. [2] IR0B 01 D 10 F7 GE 0006 001 - “Profilo Geotecnico ”
- Rif. [3] IR0B 01 D 10 BZ IN 0300 001 - “Canale di recapito al Tescio: sezioni di carpenteria e dettagli”
- Rif. [4] IR0B 01 D 10 BZ IN 0300 002 - “Canale di recapito al Tescio: pianta e sezioni di scavo – tav. 1 di 3”
- Rif. [5] IR0B 01 D 10 BZ IN 0300 003 - “Canale di recapito al Tescio: pianta e sezioni di scavo – tav. 2 di 3”
- Rif. [6] IR0B 01 D 10 BZ IN 0300 004 - “Canale di recapito al Tescio: pianta e sezioni di scavo – tav. 3 di 3”
- Rif. [7] IR0B 01 D 10 L7 IN 0300 001 - “Canale di recapito al Tescio: planoprofilo dell’intervento”

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## 2.2. Normativa e Standard di Riferimento

- Rif. [8] Decreto Ministeriale del 17/01/2018: “Aggiornamento delle Norme tecniche per le costruzioni” (GU n.42 del 20-02-2018 - Suppl. Ordinario n. 8)
- Rif. [9] Circolare del Ministero delle infrastrutture e dei trasporti 21 gennaio 2019, n. 7 del Consiglio superiore dei Lavori Pubblici recante “Istruzioni per l’applicazione dell’«Aggiornamento delle “Norme tecniche per le costruzioni”» di cui al decreto ministeriale 17 gennaio 2018”
- Rif. [10] UNI EN 1992-1-1:2004: Eurocodice 2: Design of concrete structures - Part 1-1: General rules and rules for buildings.
- Rif. [11] UNI EN 1997-1: Eurocodice 7 - Progettazione Geotecnica - Parte 1: Regole generali.
- Rif. [12] RFI DTC SI CS MA IFS 001 C del 21.12.2018 - Manuale di progettazione delle opere civili – Parte II -Sezione 3 – Corpo Stradale.
- Rif. [13] RFI DTC SI SP IFS 001 C del 21.12.2018- Capitolato generale tecnico di appalto delle opere civili – Parte II – Sezione 5 – “Opere in terra e scavi”– RFI

## 2.3. Software

- Rif. [14] Paratie plus 19.1.2
- Rif. [15] Geostudio 2018, Slope/W, Geo-Slope, Canada

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### 3. MATERIALI

Il progetto prevede l'uso dei materiali con le caratteristiche meccaniche minime riportate nei paragrafi seguenti.

#### 3.1. Acciaio per travi di ripartizione e puntelli

Tipo S275:  $f_{yk} \geq 275$  MPa.

#### 3.2. Acciaio per palancole

Tipo S275:  $f_{yk} \geq 275$  MPa.

#### 3.3. Profilato palancole

Sono previste palancole del tipo PU22 con le caratteristiche meccaniche riportate nella tabella seguente.

**INTERFERENZE IDRAULICHE**

CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE DI SOSTEGNO

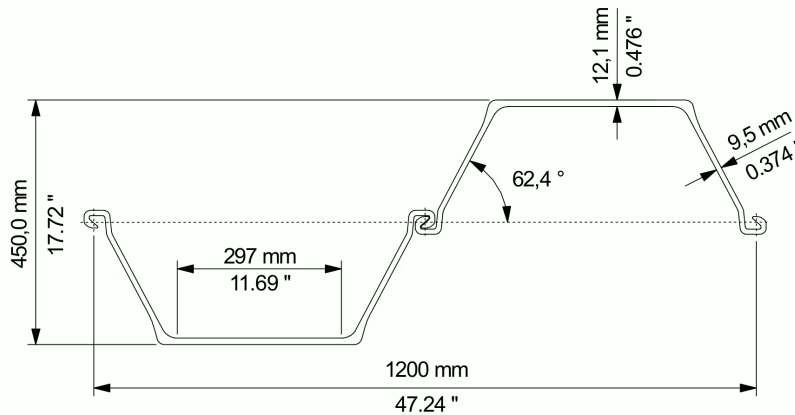
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**Tabella 1 Caratteristiche meccaniche delle palancole PU22**

Palplanche  
Sheet pile

**PU 22**

1.3.04 SP



Echelle : 1:10  
Scale :

\* un côté , intérieur des joints exclu  
\* one side , excluding inside of interlocks

	Section d'acier Sectional Area	Masse Mass	Moment d'inertie Moment of Inertia	Module de résistance Section Modulus	Rayon de giration Radius of Gyration	Surface * à traiter Coating * Area
Palpl. simple Single pile	109.7 cm <sup>2</sup>	86.1 kg /m	8740 cm <sup>4</sup>	546 cm <sup>3</sup>	8.93 cm	0.90 m <sup>2</sup> /m
Palpl. double Double pile	219.5 cm <sup>2</sup>	172.3 kg /m	59360 cm <sup>4</sup>	2640 cm <sup>3</sup>	16.45 cm	1.79 m <sup>2</sup> /m
Palpl. triple Triple pile	329.2 cm <sup>2</sup>	258.4 kg /m	82060 cm <sup>4</sup>	3025 cm <sup>3</sup>	15.79 cm	2.68 m <sup>2</sup> /m
Paroi Wall	182.9 cm <sup>2</sup> /m	143.6 kg /m <sup>2</sup>	49460 cm <sup>4</sup> /m	2200 cm <sup>3</sup> /m	16.45 cm	1.49 m <sup>2</sup> /m <sup>2</sup>
Palpl. simple Single pile	17.00 in <sup>2</sup>	57.86 lb /ft	210.0 in <sup>4</sup>	33.3 in <sup>3</sup>	3.52 in	2.95 ft <sup>2</sup> /ft
Palpl. double Double pile	34.02 in <sup>2</sup>	115.78 lb /ft	1426.1 in <sup>4</sup>	161.1 in <sup>3</sup>	6.48 in	5.87 ft <sup>2</sup> /ft
Palpl. triple Triple pile	51.03 in <sup>2</sup>	173.64 lb /ft	1971.5 in <sup>4</sup>	184.6 in <sup>3</sup>	6.22 in	8.79 ft <sup>2</sup> /ft
Paroi Wall	8.64 in <sup>2</sup> /ft	29.41 lb /ft <sup>2</sup>	362.2 in <sup>4</sup> /ft	40.9 in <sup>3</sup> /ft	6.48 in	1.49 ft <sup>2</sup> /ft <sup>2</sup>

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#### 4. SISMICITA'

Il 2.4.1 del DM18 (Doc.Rif. [8]) stabilisce, con riferimento alla Tab. 2.4.I, che le verifiche sismiche di opere di tipo 1 o in fase di costruzione possono omettersi quando il progetto preveda che tale condizione permanga per meno di 2 anni.

**Tab. 2.4.I – Valori minimi della Vita nominale  $V_N$  di progetto per i diversi tipi di costruzioni**

TIPI DI COSTRUZIONI		Valori minimi di $V_N$ (anni)
1	Costruzioni temporanee e provvisorie	10
2	Costruzioni con livelli di prestazioni ordinari	50
3	Costruzioni con livelli di prestazioni elevati	100

**Figura 4-1 Tab. 2.4.I DM18**

Le opere oggetto di tale relazione ricadono nel caso “Costruzioni temporanee e provvisorie”, pertanto le verifiche sismiche vengono omesse.

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## 5. DESCRIZIONE DEGLI INTERVENTI

Di seguito è riportata una sintetica descrizione delle modalità esecutive previste per le opere idrauliche cui fanno riferimento le opere provvisoriale e gli scavi oggetto di dimensionamento e verifica.

Per la realizzazione del collettore **IN03**, sono previste le modalità esecutive di seguito descritte (si fa riferimento alle progressive del collettore IN03):

- Da 0 a pk 75: scavi a cielo aperto con pendenza 2H:1V in destra, scavi a cielo aperto con pendenza 3H:2V in sinistra
- Da 75 a pk 285: scavi a cielo aperto con pendenza 3H:2V
- Da pk 285 a pk 325: scavi a cielo aperto con pendenza 2H:1V in destra; scavi a cielo aperto con pendenza 3H:2V in sinistra
- Da pk 325 a pk 400: scavi con palancole PU22 acciaio S275, Lunghezza L=9m, posizionate in destra; scavi a cielo aperto con pendenza 3H:2V in sinistra
- Da pk 400 a pk 550: scavi con palancole PU22 acciaio S275, Lunghezza L=10m; puntoni a -0.5m da sommità, D168mm s=8mm acciaio S275, a interasse i=4m
- Da pk 550 a pk 665: scavi con palancole PU22 acciaio S275, Lunghezza L=9m, posizionate in sinistra; scavi a cielo aperto con pendenza 2H:1V in destra
- Da pk 665 a pk 770: scavi con palancole PU22 acciaio S275, Lunghezza L=10m; puntoni a -0.5m da sommità, D168mm s=8mm acciaio S275, a interasse i=4m
- Da pk 770 a pk 850: scavi con palancole PU22 acciaio S275, Lunghezza L=12m, posizionate in sinistra; scavi a cielo aperto con pendenza 2H:1V in destra
- Da pk 850 a fine collettore: scavi con palancole PU22 acciaio S275, Lunghezza L=10m; puntoni a -0.5m da sommità, D168mm s=8mm acciaio S275, a interasse i=4m



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Lo scavo tra palancole è ipotizzato come rappresentato nel Doc. Rif. [3]

I modelli di calcolo riportati nel seguito della relazione prevedono pertanto le seguenti tipologie:

- Scavo con palancole Tipo 1 – palancole a sbalzo in assenza di carico in testa.

Tale configurazione è prevista quando il tracciato del canale si trova in adiacenza al marciapiede di via Tescio. I mezzi di cantiere in fase di posa del collettore sono dunque previsti dalla parte opposta e pertanto si ha assenza di carico in testa alla palanca. Essendo presenti sia palancole di lunghezza  $L=9m$  che  $L=12m$  a seconda dell'altezza di scavo, in questa relazione vengono presentati i risultati relativi alla configurazione peggiore, ovvero alla palanca da  $L=12m$  prevista per le altezze di scavo maggiori

- Scavo con palancole Tipo 2 – palancole a sbalzo con carico da mezzi di cantiere in testa.

Tale configurazione è prevista nella parte iniziale del tracciato del canale. La lunghezza delle palancole è pari a  $L=9m$ . E' previsto un carico da mezzi di cantiere pari a  $10kPa$

- Scavo con palancole Tipo 3 – palancole puntonate. Tale configurazione è prevista in vari punti del tracciato, talora senza carico in testa in adiacenza al marciapiede, talora con carico stradale in testa nelle porzioni in stretta adiacenza alla viabilità. Si riporta il calcolo relativo a quest'ultima configurazione, considerando un carico in testa pari a  $20kPa$ . La lunghezza delle palancole è pari a  $L=10m$
- Scavo a cielo aperto di pendenza  $3H/2V$
- Scavo a cielo aperto di pendenza  $2H/1V$

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## 6. MODELLO GEOTECNICO E IPOTESI DI CALCOLO

Per la definizione del modello geotecnico per le singole sezioni tipologiche da analizzare si è fatto riferimento a quanto definito dallo studio geotecnico generale (Profilo Geotecnico Rif. [2], Relazione Geotecnica Generale Rif. [1]).


Si osserva che gli scavi e le opere provvisionali ricadono nella formazione delle Argille ( $A_{Ls}$ ). Le analisi sono state condotte in condizioni drenate perché ritenute le condizioni dimensionanti. Le unità geotecniche utilizzate e i relativi parametri sono riportati nella tabella seguente.

Unità	$\gamma$	$\phi$	$c'$	$E$
	kN/mc	°	kPa	MPa
$A_{Ls}$	19.5	27	3	10

La falda, come riportato nel profilo geotecnico Rif. [2] e nella relazione geotecnica generale Rif. [1]), risulta assente e non interferisce con le opere oggetto di questa relazione

Nel calcolo delle paratie (palancole e paratie di micropali) i calcoli effettuati tengono conto della prescrizione contenuta al 6.5.2.2 del DM18 (Doc. Rif. [8]), per cui il modello geometrico deve considerare le possibili variazioni del profilo del terreno a monte e a valle del paramento rispetto ai valori nominali. Inoltre, nei casi in cui la funzione di sostegno è affidata esclusivamente alla resistenza del volume di terreno a valle dell'opera, la quota del terreno di valle (fondo scavo) è stata diminuita di una quantità pari al minore dei seguenti valori:

- 10% dell'altezza di terreno da sostenere nel caso di opere a sbalzo;
- 10% della differenza di quota fra il livello inferiore di vincolo e il fondo scavo nel caso di opere vincolate;
- 0.5 m.

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## 7. APPROCCI PROGETTUALI PER LE VERIFICHE DELLE OPERE

Ai fini del progetto delle opere oggetto della relazione, sono stati considerati gli stati limite ultimi (SLU). Nel caso delle paratie, sono stati considerati anche gli stati limite di esercizio (SLE).

In generale, le analisi degli stati limite di esercizio (SLE) sono utilizzate per ottenere informazioni circa gli spostamenti attesi sotto i carichi di esercizio e/o per verificarne l'ammissibilità nei confronti della funzionalità dell'opera.

Le analisi agli stati limite ultimi (SLU) sono impiegate per le verifiche di resistenza degli elementi strutturali e per le verifiche geotecniche.

### 7.1. Verifiche nei confronti degli stati limite ultimi (SLU)

Per ogni stato limite ultimo deve essere rispettata la condizione:

$$E_d \leq R_d$$

dove  $E_d$  è il valore di progetto dell'azione o dell'effetto dell'azione, ovvero:

$$E_d = E\left(\gamma_F F_k; \frac{X_k}{\gamma_M}; a_d\right)$$

$$E_d = \gamma_E E\left(F_k; \frac{X_k}{\gamma_M}; a_d\right)$$

con  $\gamma_E = \gamma_F$ , e dove  $R_d$  è il valore di progetto della resistenza del sistema geotecnico:

$$R_d = \frac{1}{\gamma_R} R\left(\gamma_F F_k; \frac{X_k}{\gamma_M}; a_d\right)$$

Effetto delle azioni e resistenza sono espresse in funzione delle azioni di progetto  $\gamma_F F_k$ , dei parametri di progetto  $X_k/\gamma_M$  e della geometria di progetto  $a_d$ .

L'effetto delle azioni può anche essere valutato direttamente come  $E_d = \gamma_E E_k$ . Nella formulazione delle resistenze  $R_d$ , compare esplicitamente un coefficiente  $\gamma_R$  che opera direttamente sulle resistenza del sistema.

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La verifica della suddetta condizione deve essere effettuata impiegando diverse combinazioni di gruppi di coefficienti parziali, rispettivamente definiti per le azioni (A1 e A2), per i parametri geotecnici (M1 e M2) e per le resistenze (R1, R2 e R3).

I diversi gruppi di coefficienti di sicurezza parziali sono scelti nell'ambito degli approcci previsti dalla normativa.

### 7.1.1. Azioni

I coefficienti parziali  $\gamma_F$  relativi alle azioni sono indicati nella Tabella 2.

**Tabella 2 Coefficienti parziali per le azioni o per l'effetto delle azioni, da MDP e NTC18**

	Effetto	Coefficiente Parziale $\gamma_F$ (o $\gamma_E$ )	EQU	(A1)	(A2)
Carichi permanenti $G_1$	Favorevole	$\gamma_{G1}$	0,9	1,0	1,0
	Sfavorevole		1,1	1,3	1,0
Carichi permanenti $G_2^{(1)}$	Favorevole	$\gamma_{G2}$	0,8	0,8	0,8
	Sfavorevole		1,5	1,5	1,3
Azioni variabili Q	Favorevole	$\gamma_Q$	0,0	0,0	0,0
	Sfavorevole		1,5	1,5	1,3

<sup>(1)</sup> Per i carichi permanenti  $G_2$  si applica quanto indicato alla Tabella 2.6.I. Per la spinta delle terre si fa riferimento ai coefficienti  $\gamma_{G1}$

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Tab. 5.2.V - Coefficienti parziali di sicurezza per le combinazioni di carico agli SLU

Coefficiente			EQU <sup>(1)</sup>	A1	A2
Azioni permanenti	favorevoli	YG1	0,90	1,00	1,00
	sfavorevoli		1,10	1,35	1,00
Azioni permanenti non strutturali <sup>(2)</sup>	favorevoli	YG2	0,00	0,00	0,00
	sfavorevoli		1,50	1,50	1,30
Ballast <sup>(3)</sup>	favorevoli	YB	0,90	1,00	1,00
	sfavorevoli		1,50	1,50	1,30
Azioni variabili da traffico <sup>(4)</sup>	favorevoli	YQ	0,00	0,00	0,00
	sfavorevoli		1,45	1,45	1,25
Azioni variabili	favorevoli	YQi	0,00	0,00	0,00
	sfavorevoli		1,50	1,50	1,30
Precompressione	favorevole	YP	0,90	1,00	1,00
	sfavorevole		1,00 <sup>(5)</sup>	1,00 <sup>(6)</sup>	1,00
Ritiro, viscosità e cedimenti non imposti appositamente	favorevole	YCe d	0,00	0,00	0,00
	sfavorevole		1,20	1,20	1,00

<sup>(1)</sup> Equilibrio che non coinvolga i parametri di deformabilità e resistenza del terreno; altrimenti si applicano i valori della colonna A2.

I coefficienti parziali per i parametri geotecnici del terreno sono indicati nella Tabella 3.

Tabella 3 Coefficienti parziali per i parametri geotecnici del terreno

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


La verifica allo stato limite ultimo richiesta dal DM2018 per la stabilità dei fronti di scavo in condizioni statiche, prevede l'utilizzo della combinazione di coefficienti:

- Approccio 1, combinazione 2: A2+M2+R2,

tenendo conto dei valori dei coefficienti parziali riportati nella Tabella 4.

Tabella 4 Coefficienti parziali per le verifiche di sicurezza di opere di materiali sciolti e di fronti di scavo

COEFFICIENTE	R2
$\gamma_R$	1,1

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### 7.1.2. *Approccio progettuale per le verifiche delle opere di sostegno del tipo paratie in condizioni statiche*

Le verifiche sono state sviluppate adottando per gli stati limite ultimi (SLU) di tipo strutturale (STR) e geotecnico (GEO):

- Approccio 1, combinazione 1: A1+M1+R1 (STR);
- Approccio 1, combinazione 2: A2+M2+R1 (GEO).

I coefficienti parziali per le azioni (A) e per i parametri geotecnici del terreno (M) sono in accordo alla Tabella 2 e Tabella 3 mentre quelli sulle resistenze sono posti pari a  $R1=1$ .

Le verifiche di stabilità del complesso opera di sostegno-terreno sono state condotte con:

- Approccio 1, combinazione 2: A2+M2+R2 (GEO).

tenendo conto dei coefficienti parziali riportati nella Tabella 2 e Tabella 3 per le azioni e i parametri geotecnici e nella Tabella 4 per le resistenze.

### 7.2. **Approccio progettuale per le verifiche degli stati limite idraulici - sifonamento**

La verifica a sifonamento si esegue controllando che il gradiente idraulico  $i$  risulti non superiore al gradiente idraulico critico  $i_c$  diviso per un coefficiente parziale  $\gamma_R = 3$ , se si assume come effetto delle azioni il gradiente idraulico medio, e per un coefficiente parziale  $\gamma_R = 2$  nel caso in cui si consideri il gradiente idraulico di efflusso.

Nel caso in esame verrà determinato il fattore di sicurezza al sifonamento con la relazione:

$$FS = \frac{i_c}{i_E} = \frac{\gamma'}{\gamma_w} \geq 3$$

Il gradiente idraulico medio è valutato cautelativamente come segue:

$$i_E = \frac{\Delta H_w}{h_{scavo} + 2 * infissione} \cong \frac{\Delta H_w}{2 * infissione}$$

In questo progetto, la verifica è omessa in assenza di moti di filtrazione per le opere oggetto di questa relazione

### 7.3. **Verifiche nei confronti degli stati limite di esercizio (SLE)**

Per ciascun stato limite di esercizio deve essere rispettata la condizione:



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$$E_d \leq C_d,$$

dove  $E_d$  è il valore di progetto dell'effetto delle azioni e  $C_d$  è il prescritto valore limite dell'effetto delle azioni.

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## 8. CARICHI E AZIONI

I carichi considerati in fase di calcolo e verifica sono i seguenti:

- carico accidentale;
- spinta del terreno.

### 8.1. Carico accidentale (Q1)

A monte dei palancolati (eccetto le palancole previste in adiacenza al marciapiede) e degli scavi a cielo aperto, è considerato un carico accidentale.

Tale carico è di entità pari a 10 kPa quando riferito ai mezzi di cantiere, e applicato ad una distanza di 50 cm dall'asse dell'opera di sostegno; in presenza di viabilità in esercizio durante i lavori, si considera un carico accidentale dovuto all'azione da traffico di 20 kPa.

### 8.2. Spinta del terreno

La spinta del terreno sulle opere di sostegno è valutata sulla base del modello di interazione terreno struttura descritto al § 9.

### 8.3. Combinazione delle azioni

Ai fini delle verifiche degli stati limite, si definiscono le seguenti combinazioni delle azioni:

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

$$\gamma_{G1} \cdot G_1 + \gamma_{G2} \cdot G_2 + \gamma_P \cdot P + \gamma_{Q1} \cdot Q_{k1} + \gamma_{Q2} \cdot \psi_{02} \cdot Q_{k2} + \gamma_{Q3} \cdot \psi_{03} \cdot Q_{k3} + \dots$$

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

$$G_1 + G_2 + P + Q_{k1} + \psi_{02} \cdot Q_{k2} + \psi_{03} \cdot Q_{k3} + \dots$$

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

$$G_1 + G_2 + P + \psi_{11} \cdot Q_{k1} + \psi_{22} \cdot Q_{k2} + \psi_{23} \cdot Q_{k3} + \dots$$

- Combinazione quasi permanente (SLE), generalmente impiegata per gli effetti a lungo termine:

$$G_1 + G_2 + P + \psi_{21} \cdot Q_{k1} + \psi_{22} \cdot Q_{k2} + \psi_{23} \cdot Q_{k3} + \dots$$



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


$$E + G_1 + G_2 + P + \psi_{21} \cdot Q_{k1} + \psi_{22} \cdot Q_{k2} + \dots$$

I coefficienti di combinazione  $\psi$  sono dati dalle NTC2018 a secondo del tipo di struttura (Tab. 2.5.I oppure nella Tab. 5.1.VI per i ponti stradali e nella Tab. 5.2.VII per i ponti ferroviari).

Nel caso in esame sono state considerate le seguenti combinazioni di carico.

**Tabella 5 Combinazioni di carico**

ID	Tipo di combinazione		E	G1-G2	$\gamma_G$	Q1	$\gamma_Q$	$\psi$
SLU	A1+M1+R1	Statica		x	1.3	x	1.5	1
SLU	A2+M2+R1	Statica		x	1.0	x	1.3	1
SLE		Statica	x	x	1.0	x	1.0	1

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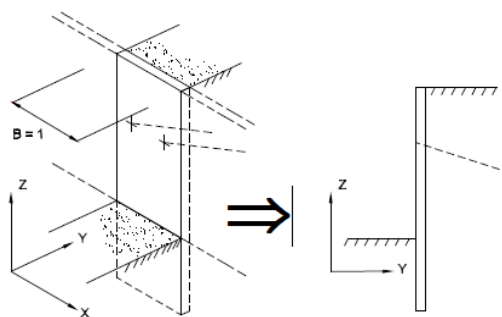
## 9. DESCRIZIONE DEI PROGRAMMI UTILIZZATI NELLE ANALISI

### 9.1. DESCRIZIONE DEL PROGRAMMA DI CALCOLO PARATIE PLUS PER L'ANALISI DELL'INTERAZIONE PARATIA-TERRENO

Al fine di rappresentare il comportamento dell'opera di sostegno durante le varie fasi di lavoro si è utilizzato un metodo di calcolo capace di simulare l'interazione terreno-paratia. L'analisi è stata sviluppata con il software Paratie Plus 2019 di Harpaceas.

PARATIE è un codice agli elementi finiti che simula il problema di uno scavo sostenuto da diaframmi flessibili e permette di valutare il comportamento della parete di sostegno durante tutte le fasi intermedie e nella configurazione finale.

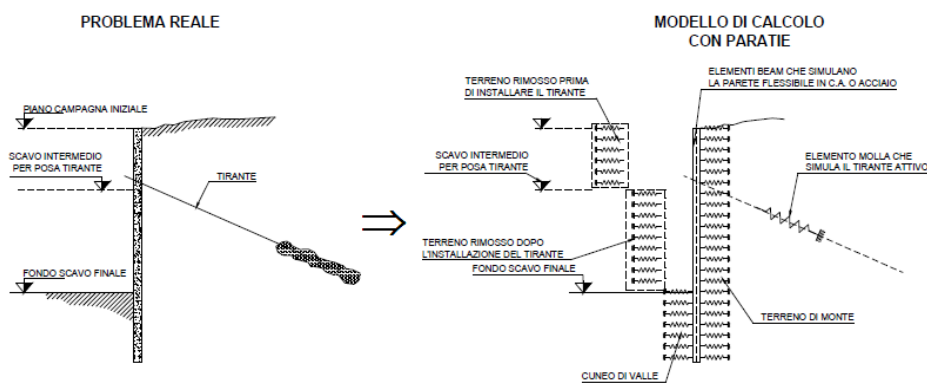
Il problema è visto come un problema piano in cui viene analizzata una "fetta" di parete di larghezza unitaria, come mostrato nella seguente figura.



**Figura 9-1 – Modellazione piana della paratia**

La modellazione numerica dell'interazione terreno-struttura è del tipo "trave su suolo elastico"; le pareti di sostegno vengono rappresentate con elementi finiti trave il cui comportamento è definito dalla rigidezza flessionale EJ, mentre il terreno viene simulato attraverso elementi elastoplastici monodimensionali (molle) connessi ai nodi delle paratie: ad ogni nodo convergono uno o al massimo due elementi terreno.

Il limite di questo schema sta nell'ammettere che ogni porzione di terreno, schematizzata da una "molla", abbia comportamento del tutto indipendente dalle porzioni adiacenti; l'interazione fra le varie regioni di terreno è affidata alla rigidezza flessionale della parete.




**Figura 9-2 Schematizzazione terreno e vincoli (ancoraggi, puntoni, elem. strutturali)**

La realizzazione dello scavo sostenuto da una o due paratie, eventualmente tirantate/puntellate, viene seguita in tutte le varie fasi attraverso un'analisi "statica incrementale": ogni passo di carico coincide con una ben precisa configurazione caratterizzata da una certa quota di scavo, da un certo insieme di tiranti/vincoli applicati, da una ben precisa disposizione di carichi applicati. Poiché il comportamento degli elementi finiti è di tipo elastoplastico, ogni configurazione dipende in generale dalle configurazioni precedenti e lo sviluppo di deformazioni plastiche ad un certo passo condiziona la risposta della struttura nei passi successivi. La soluzione ad ogni nuova configurazione (step) viene raggiunta attraverso un calcolo iterativo alla Newton-Raphson (Bathe, 1996).

L'analisi ha lo scopo di indagare la risposta strutturale in termini di deformazioni laterali subite dalla parete durante le varie fasi di scavo e di conseguenza la variazione delle pressioni orizzontali nel terreno. Per far questo, in corrispondenza di ogni nodo è necessario definire due gradi di libertà, cioè lo spostamento orizzontale e la rotazione attorno all'asse X ortogonale al piano della struttura (positiva se antioraria).

### **9.1.1. Coefficienti di spinta**

I coefficienti di spinta corrispondenti allo stato attivo e passivo sono valutati dal programma di calcolo a partire dai parametri geotecnici. In particolare i coefficienti di spinta attiva ( $k_a$ ) sono calcolati secondo la formulazione di Coulomb; i coefficienti di spinta passiva ( $k_p$ ) sono calcolati secondo la formulazione di Lancellotta (2007). In tutti i casi, spinta attiva e passiva, si considera un angolo di attrito terreno/calcestruzzo ( $\delta$ ) pari a  $1/2\phi'$ . Tale assunzione risulta cautelativa in relazione alle modalità realizzative delle opere quali le palancole infisse oggetto di questa relazione.

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### 9.1.2. Puntoni

Il puntone applicato è un elemento finito che diviene attivo a partire da un determinato step e che può eventualmente essere rimosso in seguito. La sua “nascita” provoca nel modello due effetti:

1. sorge una forza al nodo di applicazione del puntone, forza dovuta allo stato di eventuale coazione (la pretensione) con cui l'elemento nasce;
2. la rigidezza globale della struttura riceve un contributo dovuto alla rigidezza estensionale del puntone stesso. Quando, nelle fasi successive, il nodo ove il puntone è connesso, subirà ulteriori spostamenti, la forza nel puntone subirà mutamenti.

Il puntone viene caratterizzato da una rigidezza assiale data da un'espressione del tipo:

$$K=E \cdot (A/L)$$

ove E è il modulo elastico della barra, A l'area per unità di larghezza della barra nel tratto deformabile e L la lunghezza del puntone.

### 9.1.3. Verifiche delle palancole

Nel caso di palancole composte da elementi a U si può tenere conto cautelativamente della significativa riduzione della resistenza e della rigidezza a causa della presenza di una giunzione non rigida tra elementi adiacenti, sull'asse neutro della sezione complessiva.

Allo scopo, in accordo con quanto suggerito da EC3 Parte 5, è possibile ridurre la resistenza tramite due coefficienti  $\beta_B$  e  $\beta_D$ :

$$M_{c,Rd} = \beta_B W_{pl} f_y / \gamma_{M0}$$

sezioni in classe 1 e 2

$$M_{c,Rd} = \beta_B W_{el} f_y / \gamma_{M0}$$

sezioni in classe 3

$$(EI)_{eff} = \beta_D (EI)$$

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Tali coefficienti sono assunti in riferimento alla tabella seguente, nel caso di opere puntonate, pari a 0.7 e 0.45 rispettivamente; nel caso di opere a sbalzo, pari a 0.6 e 0.4 rispettivamente.

**Tabella 6 Coefficienti di riduzione resistenza e rigidezza palancolati**

Type of U-pile unit	No. of structural support levels (see note 1)	Reduction factors $\beta_B$ and $\beta_D$ referred to in clauses 5.2.2(2); 5.2.2(9); 5.2.3(2); 6.4(3) (see notes 2, 3, 4, and 5)					
		Highly unfavourable conditions (see note 6)		Unfavourable conditions (see note 7)		Favourable conditions (see note 8)	
		$\beta_B$	$\beta_D$	$\beta_B$	$\beta_D$	$\beta_B$	$\beta_D$
Singles or uncrimped doubles	0	0.40	0.30	0.50	0.35	0.60	0.40
	1	0.55	0.35	0.60	0.40	0.70	0.45
	>1	0.65	0.45	0.70	0.50	0.80	0.55
Crimped or welded doubles	0	0.70	0.60	0.75	0.65	0.80	0.70
	1	0.80	0.70	0.85	0.75	0.95	0.80
	>1	0.90	0.80	0.95	0.85	1.00	0.90

**9.1.4. Verifiche dei puntoni**

Per i puntoni, si verifica l'instabilità secondo quanto riportato al par. 4.2.4.1.3.1 - Aste compresse del DM18.

$$\frac{N_{Ed}}{N_{b,Rd}} \leq 1$$

Dove:


$N_{Ed}$  è l'azione di compressione di progetto

$N_{b,Rd}$  è la resistenza di progetto all'instabilità nell'asta compressa

La verifica è implementata nel software ParatiePlus, di cui si riportano i valori.

Le verifiche, comprendono:

- la resistenza della sezione, aggiungendo all'azione assiale, gli effetti flettenti dovuti al peso proprio (talora non trascurabile);
- le verifiche di stabilità dell'elemento compresso, assumendo come lunghezza di libera inflessione L l'interasse tra le pareti (assunzione conservativa).

	<b>POTENZIAMENTO DELLA LINEA FOLIGNO-TERONTOLA  INTERVENTI DI SEMPLIFICAZIONE E VELOCIZZAZIONE SUL  PRG DELLA STAZIONE DI ASSISI  PROGETTO DEFINITIVO</b>												
<b>INTERFERENZE IDRAULICHE</b>  <b>CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE  DI SOSTEGNO</b>	<table border="1"> <thead> <tr> <th>COMMESSA</th> <th>LOTTO</th> <th>CODIFICA</th> <th>DOCUMENTO</th> <th>REV.</th> <th>FOGLIO</th> </tr> </thead> <tbody> <tr> <td>IR0B</td> <td>00</td> <td>D10</td> <td>CL IN.03.0.9 001</td> <td>A</td> <td>26 di 68</td> </tr> </tbody> </table>	COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO	IR0B	00	D10	CL IN.03.0.9 001	A	26 di 68
COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO								
IR0B	00	D10	CL IN.03.0.9 001	A	26 di 68								

## 9.2. DESCRIZIONE DEL PROGRAMMA DI CALCOLO SLOPE/W

La valutazione dei fattori di sicurezza per la stabilità globale dell'opera è condotta mediante il modulo "Slope /W" del programma GeoStudio 2018 della GEO-SLOPE International.


Tale programma consente un'analisi di stabilità all'equilibrio limite tenendo conto di terreni variamente stratificati, dell'eventuale falda idrica, di sovraccarichi, della presenza di pressioni neutre diverse dalle pressioni idrostatiche, di sollecitazioni sismiche mediante un'analisi di tipo pseudostatico, di tiranti di ancoraggio e di eventuali altri elementi di rinforzo (ad esempio geogriglie).

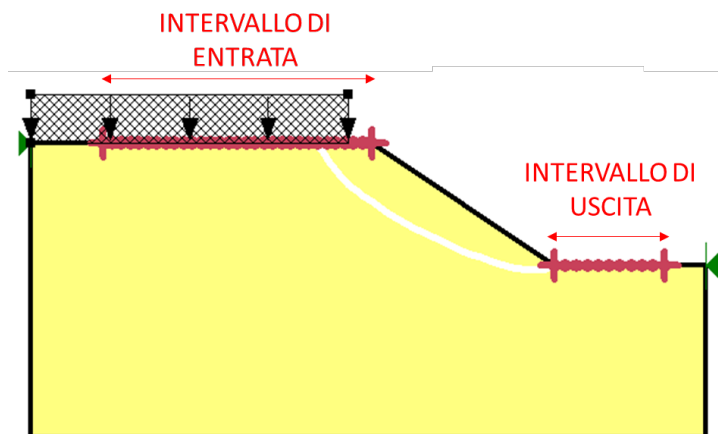
Il programma è in grado di fornire una soluzione generale al problema bidimensionale di stabilità ricavandone il coefficiente di sicurezza (FS) come rapporto tra la resistenza al taglio disponibile lungo la superficie di possibile scorrimento e quella effettivamente mobilitata dal volume di terreno coinvolto nel movimento; il criterio di rottura adottato è quello classico di Mohr - Coulomb.

La valutazione del coefficiente di sicurezza è effettuata per tentativi, generando un elevato numero di superfici mediante un algoritmo pseudo - casuale.

Il programma è in grado di compiere le verifiche di stabilità fornendo il coefficiente di sicurezza secondo differenti criteri; l'analisi è stata sviluppata utilizzando il metodo di Morgenstern-Price con superfici circolari ottimizzate.

Si precisa che la ricerca delle superfici critiche avviene definendo un intervallo di entrata (a monte) ed un intervallo di uscita (a valle); vengono quindi generati diversi archi di cerchio, contraddistinti ovviamente da diversi centri. Gli intervalli di entrata e uscita delle superfici sono individuati nelle figure estratte dal programma da una linea di colore rosso, mentre la linea verde identifica il profilo del terreno (vedasi figura seguente).

 <p><b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE</p>	<p><b>POTENZIAMENTO DELLA LINEA FOLIGNO-TERONTOLA INTERVENTI DI SEMPLIFICAZIONE E VELOCIZZAZIONE SUL PRG DELLA STAZIONE DI ASSISI PROGETTO DEFINITIVO</b></p>												
<p><b>INTERFERENZE IDRAULICHE</b></p> <p>CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE DI SOSTEGNO</p>	<table border="1"> <thead> <tr> <th>COMMESSA</th> <th>LOTTO</th> <th>CODIFICA</th> <th>DOCUMENTO</th> <th>REV.</th> <th>FOGLIO</th> </tr> </thead> <tbody> <tr> <td>IR0B</td> <td>00</td> <td>D10</td> <td>CL IN.03.0.9 001</td> <td>A</td> <td>27 di 68</td> </tr> </tbody> </table>	COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO	IR0B	00	D10	CL IN.03.0.9 001	A	27 di 68
COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO								
IR0B	00	D10	CL IN.03.0.9 001	A	27 di 68								



**Figura 9-3 Criteri di ricerca delle superfici di scivolamento**

Nella schermata di analisi, viene dunque riportata in verde chiaro la superficie di scorrimento critica (minimo FS tra tutte le superfici di scorrimento critiche) con relativo fattore di sicurezza FS.

### **9.2.1. Parametri caratteristici e fattorizzazione**

Nelle analisi di stabilità con il software Slope/W i parametri di resistenza delle unità geotecniche e i carichi variabili sono inseriti con i valori caratteristici; nelle analisi di stabilità in condizioni statiche vengono poi fattorizzati in accordo ai criteri illustrati nel 7.1 per il caso statico. Nelle figure seguenti si riportano i coefficienti parziali utilizzati all'interno del software per le analisi in condizioni statiche.

**INTERFERENZE IDRAULICHE**

CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE DI SOSTEGNO

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	28 di 68

Name:

Permanent Point Loads/Surcharge Loads		Material Parameters	
Favorable:	<input type="text" value="1"/>	Effective Cohesion:	<input type="text" value="1.25"/>
Unfavorable:	<input type="text" value="1"/>	Effective Coefficient of Friction:	<input type="text" value="1.25"/>
Variable Point Loads/Surcharge Loads		Undrained Strength:	<input type="text" value="1.4"/>
Favorable:	<input type="text" value="0"/>	Shear Strength (Other Models):	<input type="text" value="1.25"/>
Unfavorable:	<input type="text" value="1.3"/>	Reinforcement Parameters	
Soil Unit Weight		Pullout Resistance:	<input type="text" value="1"/>
Favorable:	<input type="text" value="1"/>	Shear Force:	<input type="text" value="1"/>
Unfavorable:	<input type="text" value="1"/>	Tensile Strength:	<input type="text" value="1"/>
Other Parameters			
Seismic Coefficients:	<input type="text" value="1"/>		
Earth Resistance:	<input type="text" value="1"/>		

Figura 9-4 Software Slope/W. Coefficienti parziali utilizzati nelle analisi di stabilità in condizioni statiche



**INTERFERENZE IDRAULICHE**

**CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
DI SOSTEGNO**

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	29 di 68

**10. IN03 - SCAVO CON PALANCOLE TIPO 1 – PALANCOLA A SBALZO IN ASSENZA DI CARICO**

Di seguito l'analisi per le palancole a sbalzo. Gli scavi sono previsti con palancole PU22 acciaio S275, Lunghezza L=12m

**10.1. Modello e stratigrafia**

La sezione critica per lo scavo tra palancole risulta quella ubicata alla pk 825.00. Qui l'altezza di scavo risulta pari a 3.33 m. Tenendo presente i criteri esposti al capitolo 6 si adotta un'altezza di calcolo pari a  $h_D=3.7m$ .

La falda è assente


La stratigrafia utilizzata è quella riportata al capitolo 6.

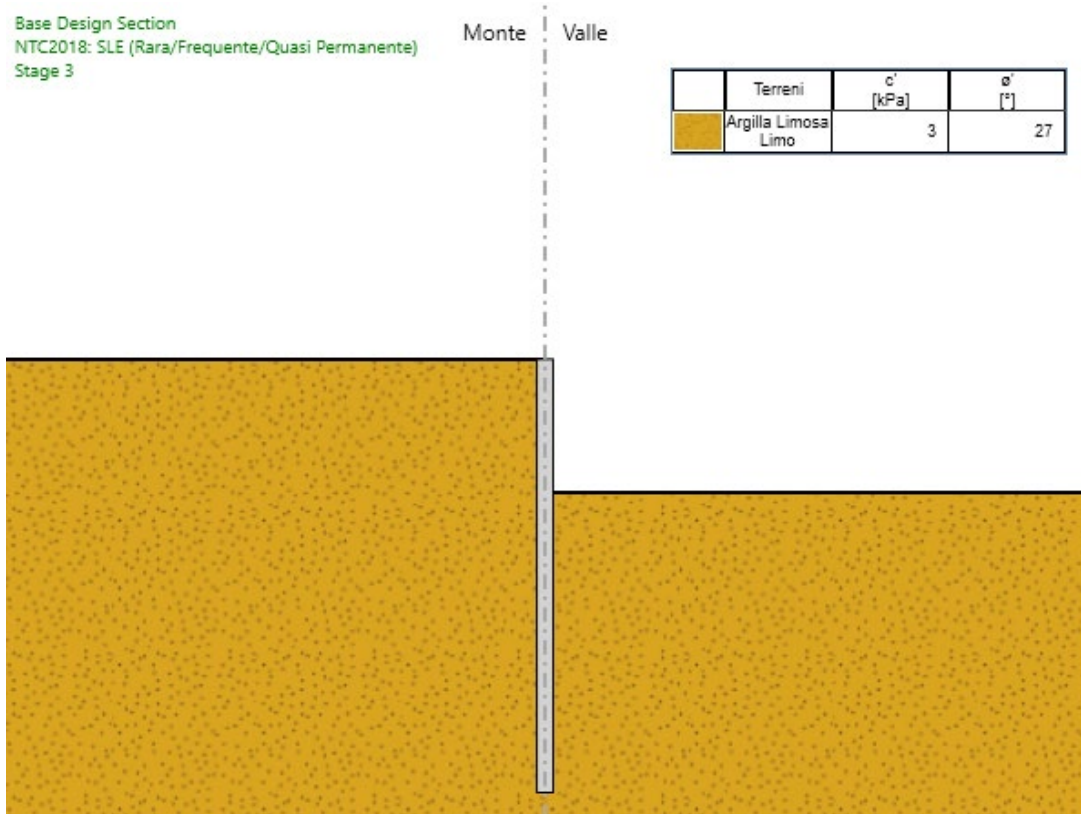
**10.2. Descrizione delle fasi di calcolo**

Il modello si basa sulle seguenti fasi di calcolo:

- Fase 1: condizione geostatica e costruzione opera provvisoria;
- Fase 2: scavo fino a quota fondo scavo


Di seguito si riporta il modello di calcolo con la stratigrafia di riferimento.

 <p><b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE</p>	<p><b>POTENZIAMENTO DELLA LINEA FOLIGNO-TERONTOLA</b> <b>INTERVENTI DI SEMPLIFICAZIONE E VELOCIZZAZIONE SUL</b> <b>PRG DELLA STAZIONE DI ASSISI</b> <b>PROGETTO DEFINITIVO</b></p>												
<p><b>INTERFERENZE IDRAULICHE</b></p> <p><b>CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE</b> <b>DI SOSTEGNO</b></p>	<table border="1"> <tr> <td>COMMESSA</td> <td>LOTTO</td> <td>CODIFICA</td> <td>DOCUMENTO</td> <td>REV.</td> <td>FOGLIO</td> </tr> <tr> <td>IR0B</td> <td>00</td> <td>D10</td> <td>CL IN.03.0.9 001</td> <td>A</td> <td>30 di 68</td> </tr> </table>	COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO	IR0B	00	D10	CL IN.03.0.9 001	A	30 di 68
COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO								
IR0B	00	D10	CL IN.03.0.9 001	A	30 di 68								



**Figura 10-1 Modello di calcolo**

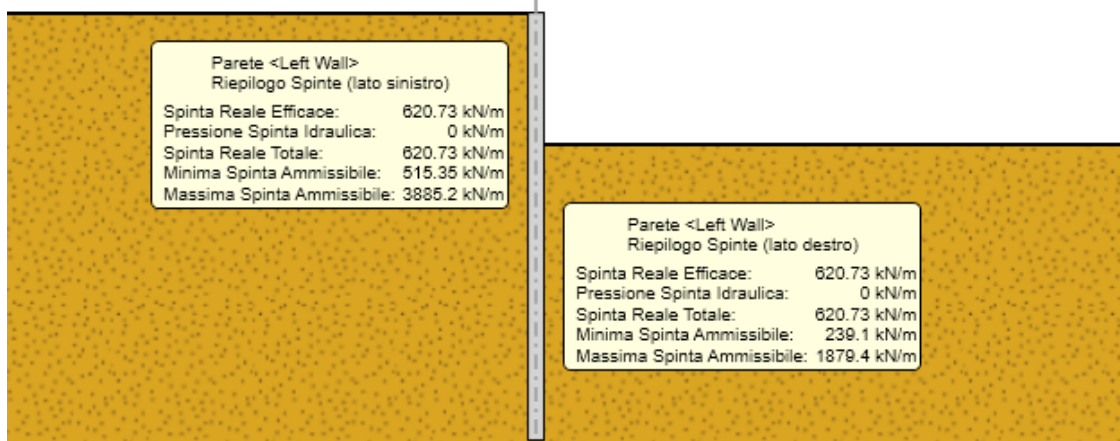
Di seguito si riportano le spinte calcolate dal programma per la combinazione GEO

 <p><b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE</p>	<p><b>POTENZIAMENTO DELLA LINEA FOLIGNO-TERONTOLA INTERVENTI DI SEMPLIFICAZIONE E VELOCIZZAZIONE SUL PRG DELLA STAZIONE DI ASSISI PROGETTO DEFINITIVO</b></p>												
<p><b>INTERFERENZE IDRAULICHE</b></p> <p>CANALE TESCOIO - RELAZIONE DI CALCOLO SCAVI E OPERE DI SOSTEGNO</p>	<table border="1"> <tr> <td>COMMESSA</td> <td>LOTTO</td> <td>CODIFICA</td> <td>DOCUMENTO</td> <td>REV.</td> <td>FOGLIO</td> </tr> <tr> <td>IR0B</td> <td>00</td> <td>D10</td> <td>CL IN.03.0.9 001</td> <td>A</td> <td>31 di 68</td> </tr> </table>	COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO	IR0B	00	D10	CL IN.03.0.9 001	A	31 di 68
COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO								
IR0B	00	D10	CL IN.03.0.9 001	A	31 di 68								

Base Design Section  
NTC2018: A2+M2+R1  
Stage 3

Monte    Valle

Terreni	c' [kPa]	φ' [°]
Argilla Limosa Limo	3	27



**Figura 10-2 Modello di calcolo e spinte**

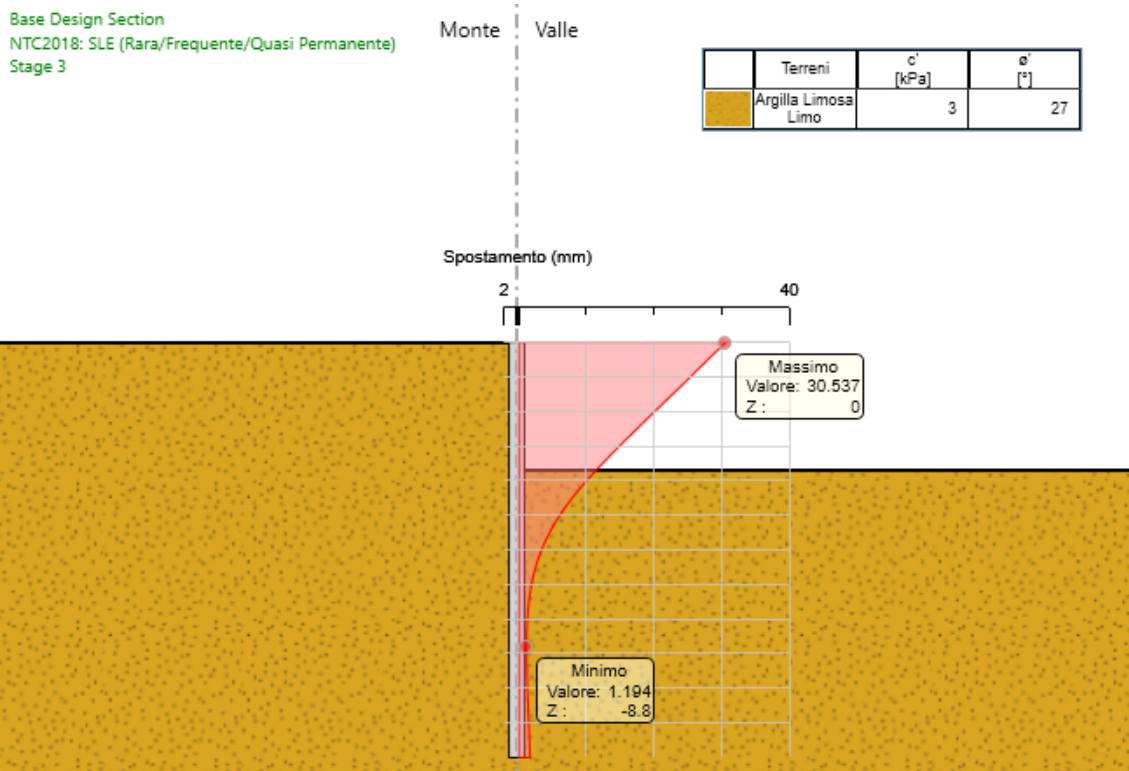
### 10.3. Sintesi dei risultati allo SLE

Nella figura seguente si riportano gli spostamenti nell'ultima fase di calcolo:

**INTERFERENZE IDRAULICHE**

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	32 di 68

**CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
DI SOSTEGNO**



**Figura 10-3 Spostamenti SLE**

Lo spostamento in testa risulta pari a 3 cm

#### 10.4. Sintesi dei risultati allo SLU

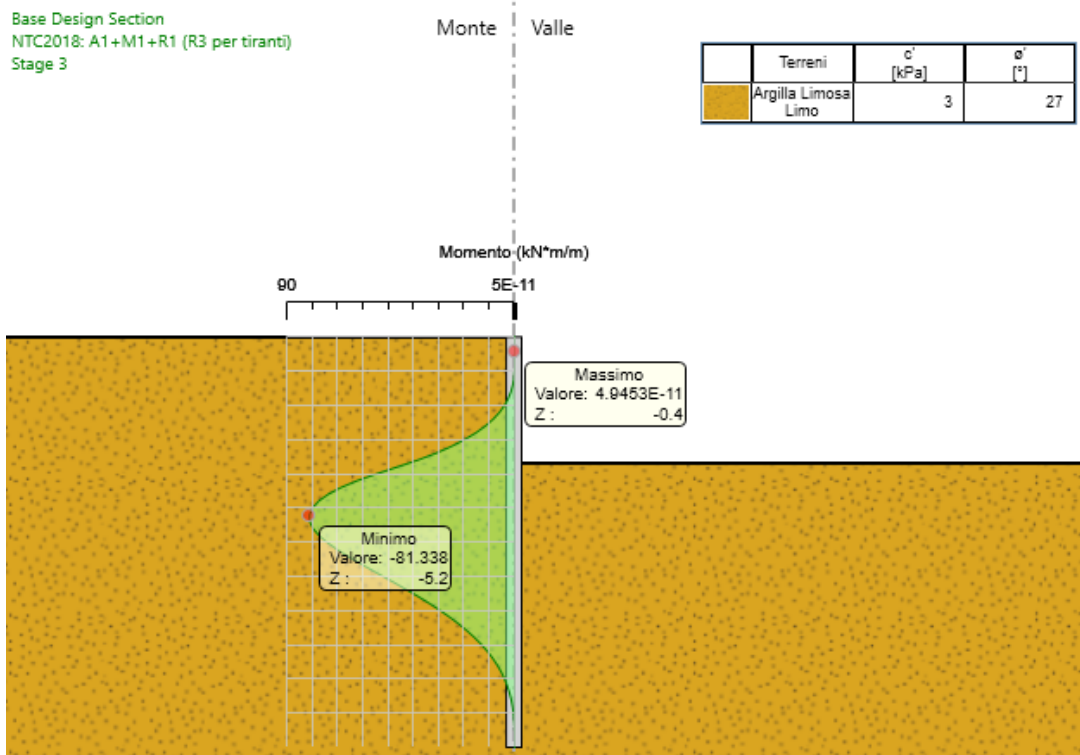
Nelle figure seguenti si riportano i diagrammi dei momenti e i diagrammi del taglio nell'ultima fase di calcolo, corrispondente alle condizioni A1+M1+R1 (STR) e A2-M2-R1 (GEO).

**INTERFERENZE IDRAULICHE**

CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE DI SOSTEGNO

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	33 di 68

**10.4.1. Sollecitazioni di momento flettente**



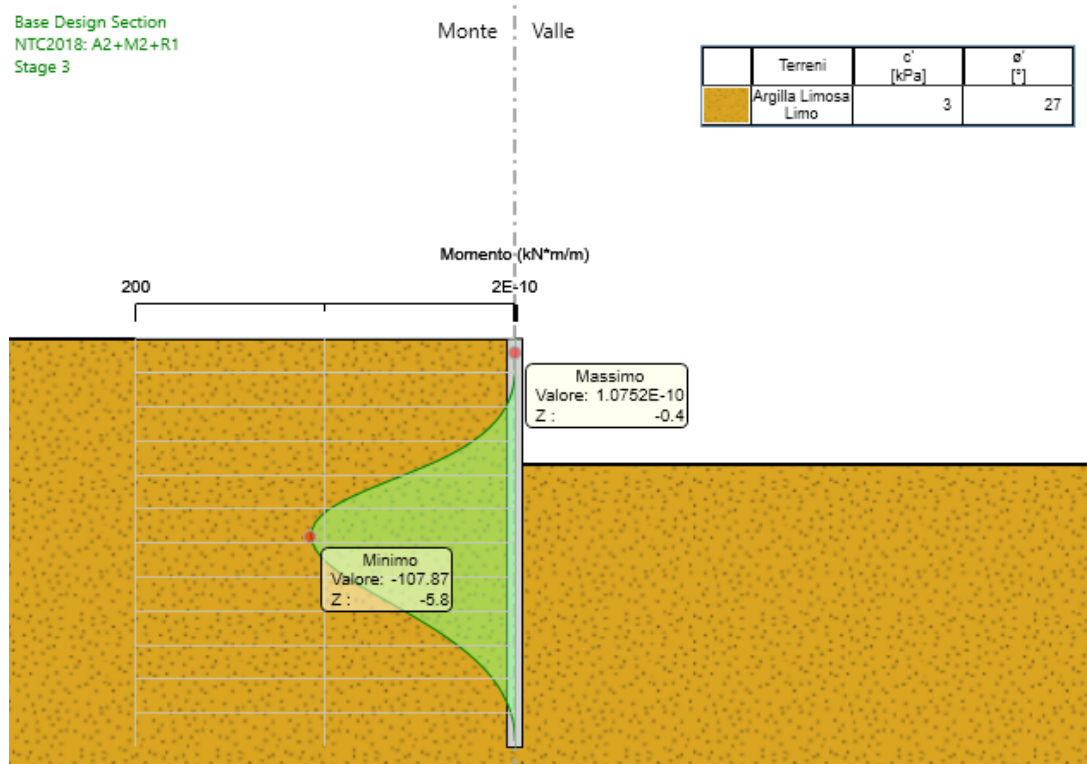
**Figura 10-4 Diagramma momenti flettenti (STR)**

**INTERFERENZE IDRAULICHE**

**CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
DI SOSTEGNO**

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	34 di 68

Base Design Section  
NTC2018: A2+M2+R1  
Stage 3



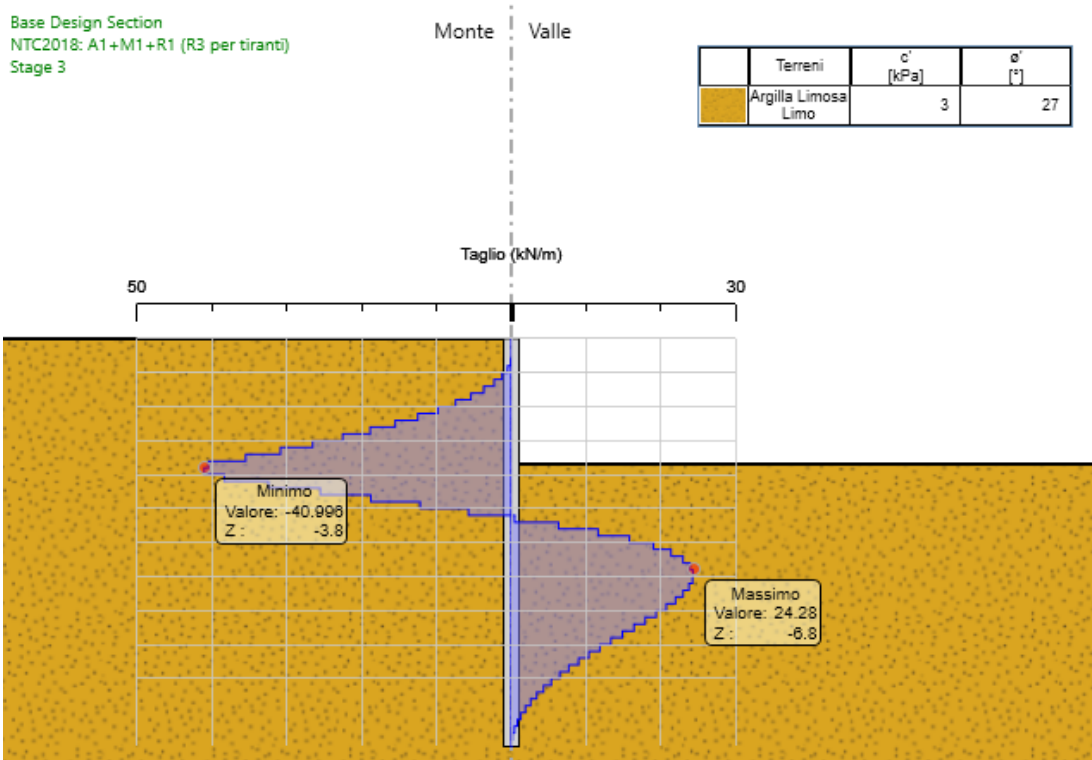
**Figura 10-5 Diagramma momenti flettenti (GEO)**

**INTERFERENZE IDRAULICHE**

CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE DI SOSTEGNO

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	35 di 68

**10.4.2. Sollecitazioni di taglio**

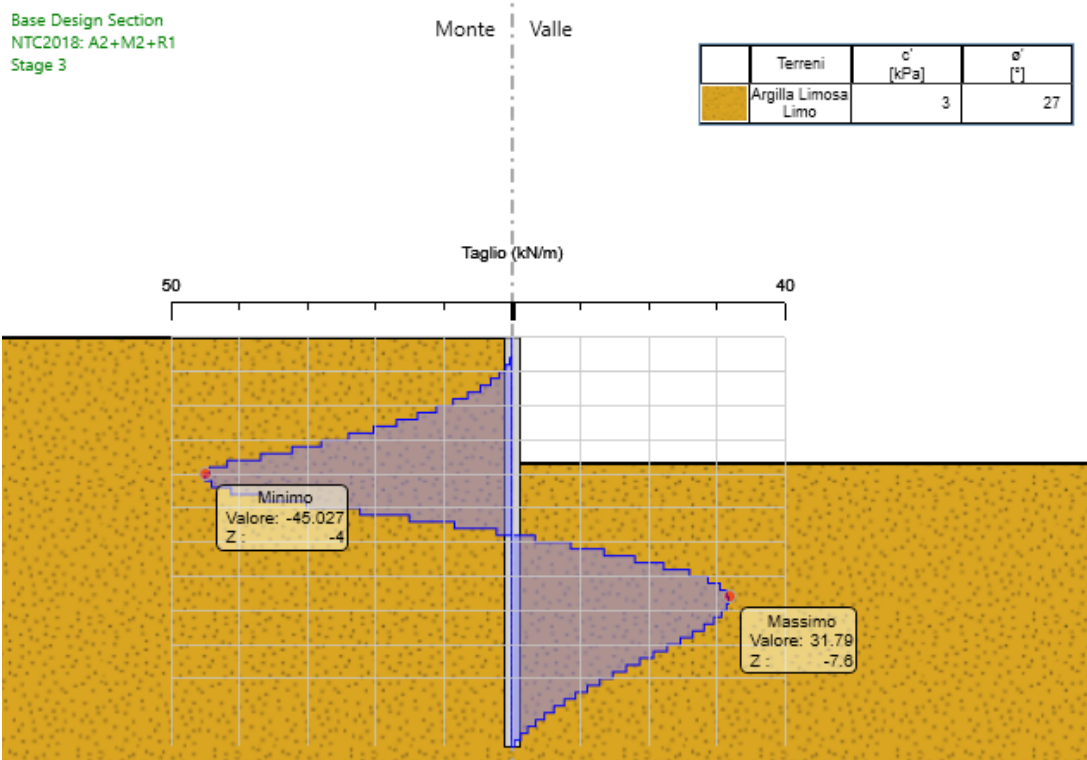


**Figura 10-6 Diagramma taglio (STR)**

**INTERFERENZE IDRAULICHE**

**CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
DI SOSTEGNO**

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	36 di 68




**Figura 10-7 Diagramma taglio (GEO)**

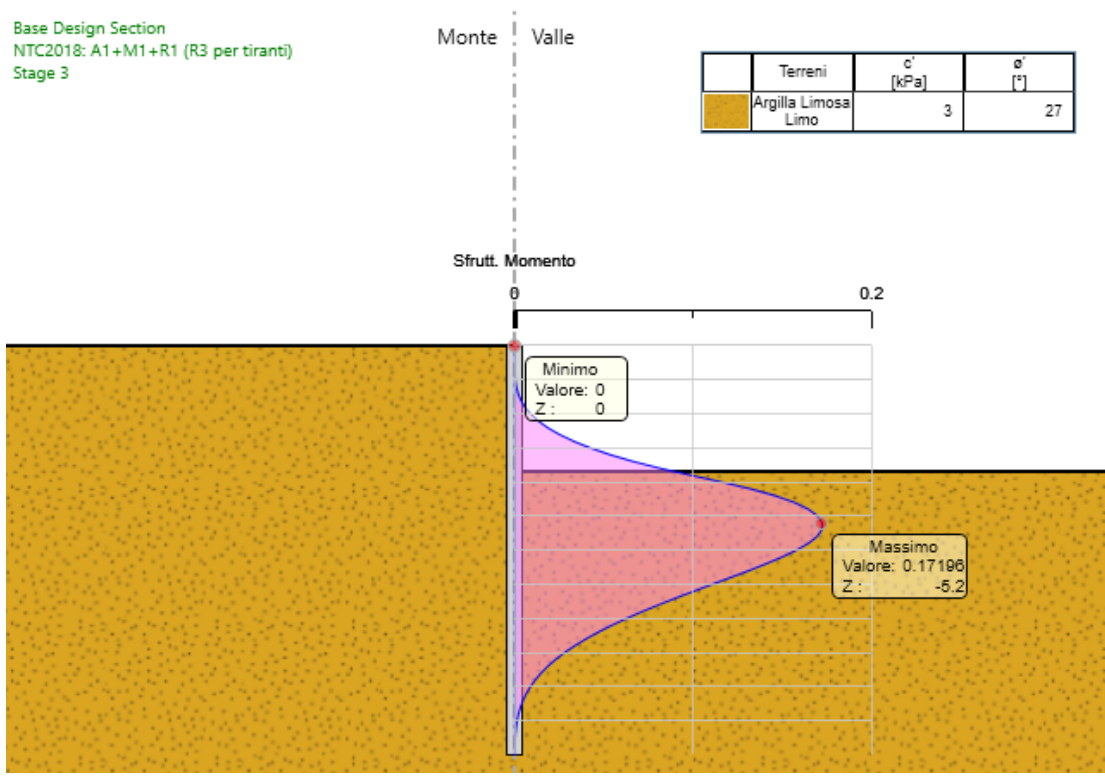
### 10.5. Verifiche elemento strutturale

Nelle figure seguenti si riportano i tassi di sfruttamento calcolati dal programma per la condizione A1+M1+R1 e A2-M2-R1. I tassi di sfruttamento risultano sempre inferiori a 1, pertanto le verifiche delle sezioni sono soddisfatte



 <p><b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE</p>	<p><b>POTENZIAMENTO DELLA LINEA FOLIGNO-TERONTOLA</b> <b>INTERVENTI DI SEMPLIFICAZIONE E VELOCIZZAZIONE SUL</b> <b>PRG DELLA STAZIONE DI ASSISI</b> <b>PROGETTO DEFINITIVO</b></p>												
<p><b>INTERFERENZE IDRAULICHE</b></p> <p>CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE DI SOSTEGNO</p>	<table border="1"> <tr> <td>COMMESSA</td> <td>LOTTO</td> <td>CODIFICA</td> <td>DOCUMENTO</td> <td>REV.</td> <td>FOGLIO</td> </tr> <tr> <td>IR0B</td> <td>00</td> <td>D10</td> <td>CL IN.03.0.9 001</td> <td>A</td> <td>37 di 68</td> </tr> </table>	COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO	IR0B	00	D10	CL IN.03.0.9 001	A	37 di 68
COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO								
IR0B	00	D10	CL IN.03.0.9 001	A	37 di 68								

**10.5.1. Tasso di sfruttamento momento**



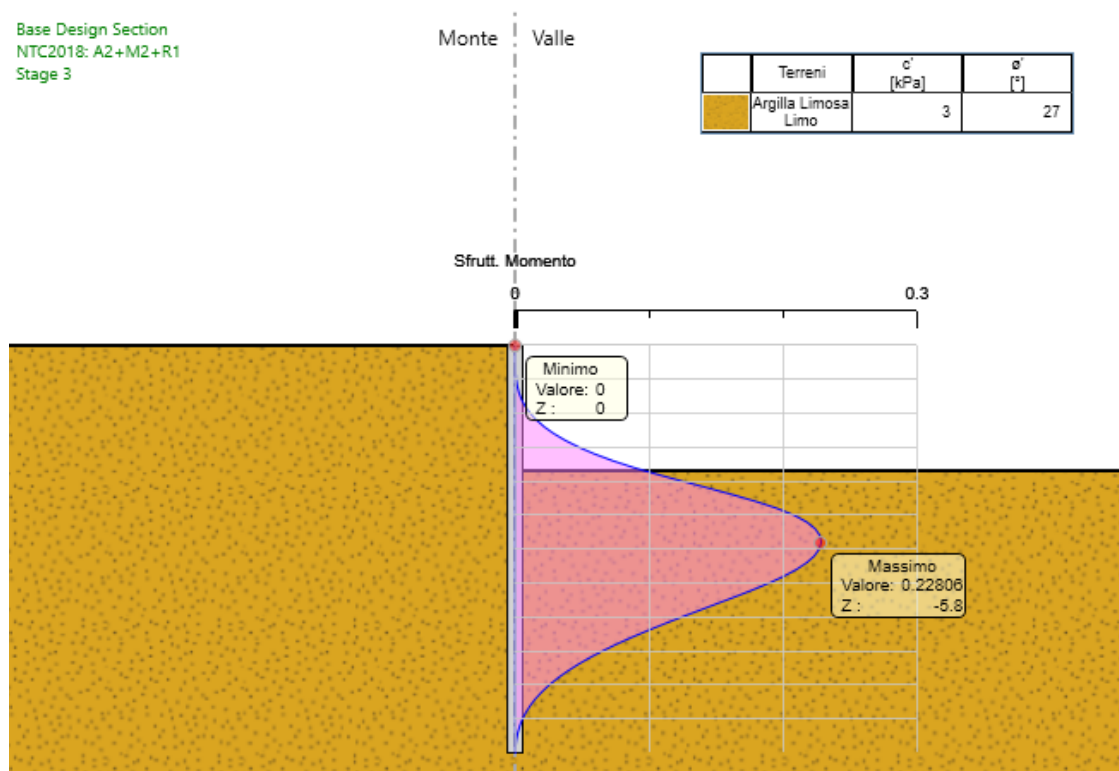
**Figura 10-8 Tasso sfruttamento Momento (STR)**

**INTERFERENZE IDRAULICHE**

**CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
DI SOSTEGNO**

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	38 di 68

Base Design Section  
NTC2018: A2+M2+R1  
Stage 3



**Figura 10-9 Tasso sfruttamento Momento (GEO)**

**INTERFERENZE IDRAULICHE**

CANALE TESCOIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
DI SOSTEGNO

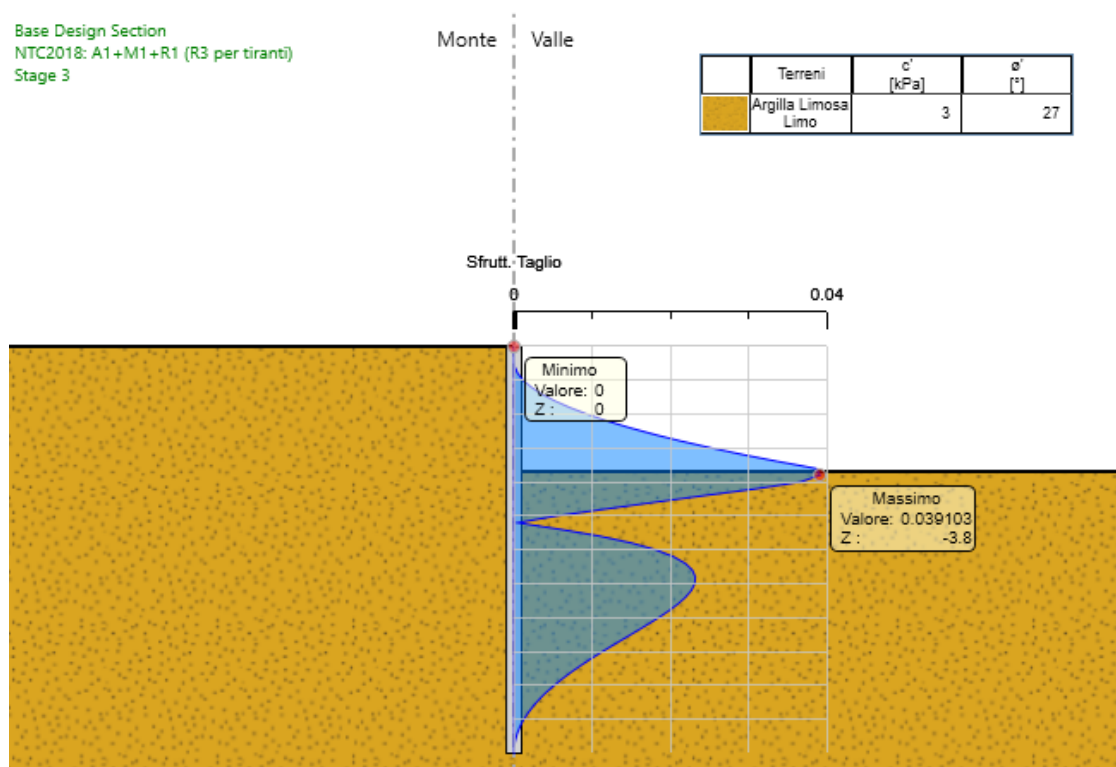
COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	39 di 68

**10.5.2. Tasso di sfruttamento taglio**

Base Design Section

NTC2018: A1+M1+R1 (R3 per tiranti)

Stage 3



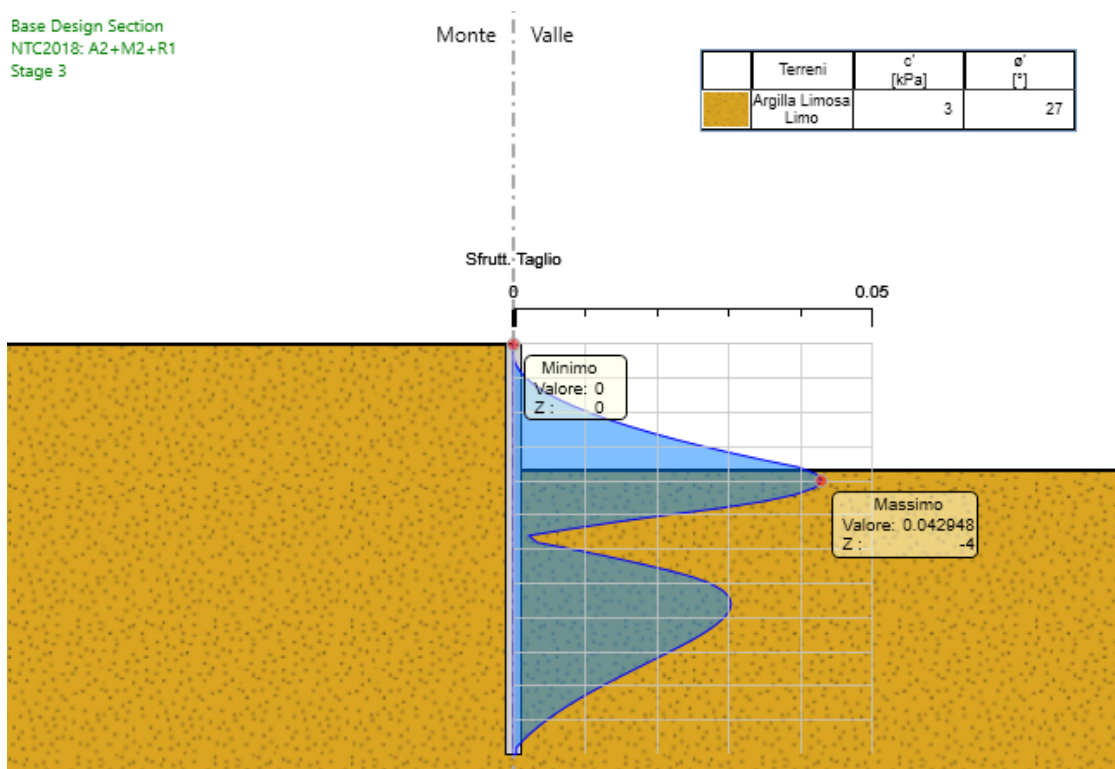
**Figura 10-10 Tasso sfruttamento Taglio (STR)**

**INTERFERENZE IDRAULICHE**

**CANALE TESCOIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
DI SOSTEGNO**

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	40 di 68

Base Design Section  
NTC2018: A2+M2+R1  
Stage 3



**Figura 10-11 Tasso sfruttamento Taglio (GEO)**

**11. IN03 - SCAVO CON PALANCOLE TIPO 2 – PALANCOLA A SBALZO IN PRESENZA DI CARICO IN TESTA**

Di seguito l'analisi per le palancole a sbalzo. Gli scavi sono previsti con palancole PU22 acciaio S275, Lunghezza L=9m

**11.1. Modello e stratigrafia**

La sezione critica per lo scavo tra palancole risulta quella ubicata alla pk 325. Qui l'altezza di scavo risulta pari a 2.96m. Si adotta un'altezza di calcolo pari a  $h_D=3.20m$  coerentemente con quanto esposto al capitolo 6.

La falda è assente

La stratigrafia utilizzata è quella riportata al capitolo 6.

Il carico in testa è pari a 10kPa

**11.2. Descrizione delle fasi di calcolo**

Il modello si basa sulle seguenti fasi di calcolo:


**INTERFERENZE IDRAULICHE**

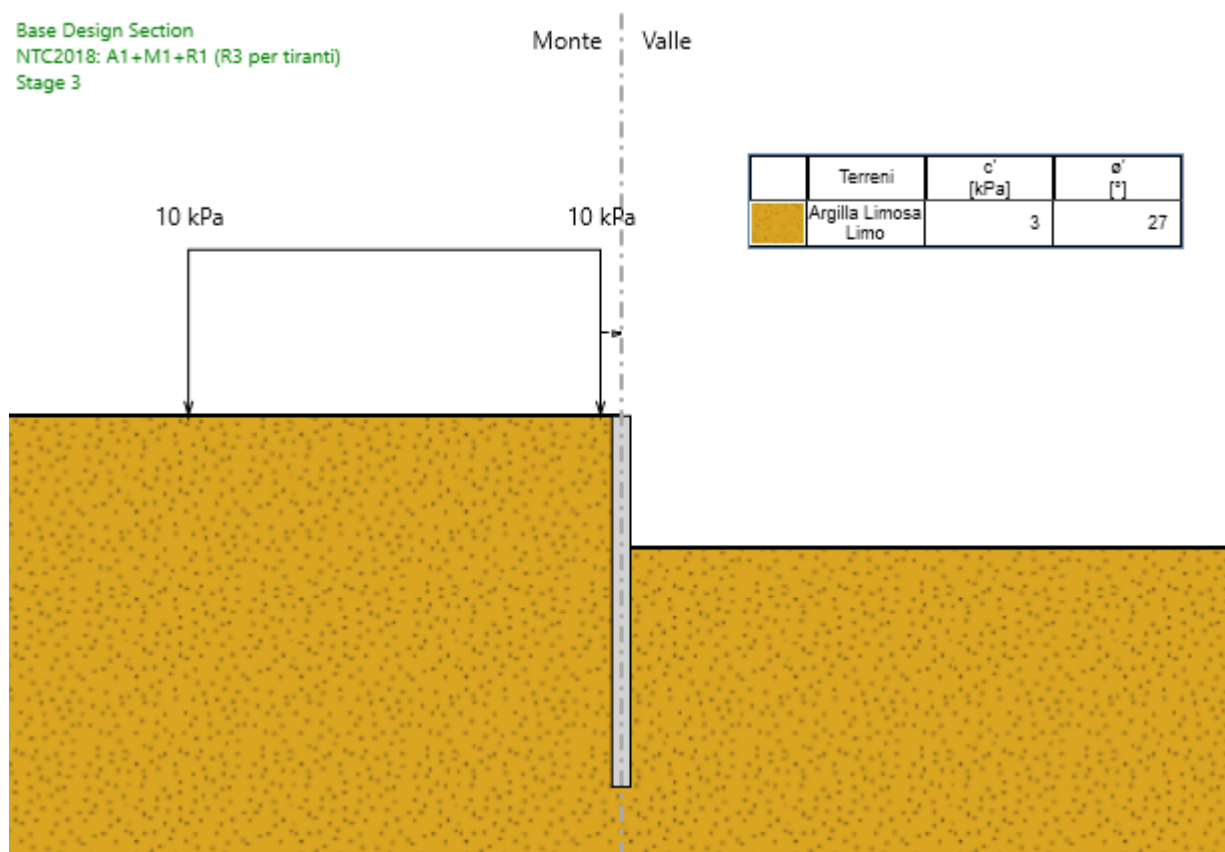
**CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
DI SOSTEGNO**

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	41 di 68

- Fase 1: condizione geostatica e costruzione opera provvisoria;
- Fase 2: applicazione sovraccarico da mezzi di cantiere pari a 10 kPa;
- Fase 3: scavo fino a quota fondo scavo


Di seguito si riporta il modello di calcolo con la stratigrafia di riferimento.

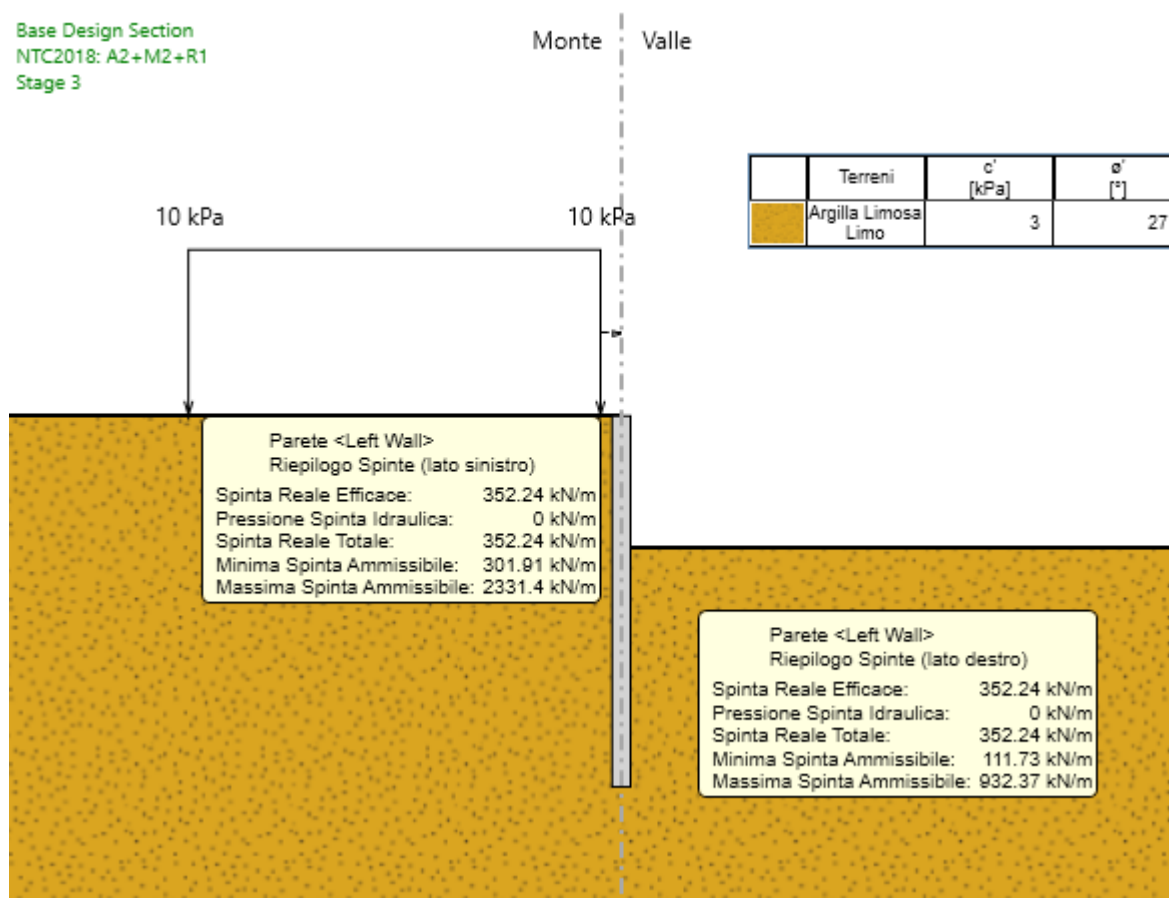
 <p><b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE</p>	<p><b>POTENZIAMENTO DELLA LINEA FOLIGNO-TERONTOLA</b> <b>INTERVENTI DI SEMPLIFICAZIONE E VELOCIZZAZIONE SUL</b> <b>PRG DELLA STAZIONE DI ASSISI</b> <b>PROGETTO DEFINITIVO</b></p>												
<p><b>INTERFERENZE IDRAULICHE</b></p> <p>CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE DI SOSTEGNO</p>	<table border="1"> <tr> <td>COMMESSA</td> <td>LOTTO</td> <td>CODIFICA</td> <td>DOCUMENTO</td> <td>REV.</td> <td>FOGLIO</td> </tr> <tr> <td>IR0B</td> <td>00</td> <td>D10</td> <td>CL IN.03.0.9 001</td> <td>A</td> <td>42 di 68</td> </tr> </table>	COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO	IR0B	00	D10	CL IN.03.0.9 001	A	42 di 68
COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO								
IR0B	00	D10	CL IN.03.0.9 001	A	42 di 68								



**Figura 11-1 Modello di calcolo**

Di seguito si riportano le spinte calcolate dal programma per la combinazione GEO


 <p><b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE</p>	<p><b>POTENZIAMENTO DELLA LINEA FOLIGNO-TERONTOLA INTERVENTI DI SEMPLIFICAZIONE E VELOCIZZAZIONE SUL PRG DELLA STAZIONE DI ASSISI PROGETTO DEFINITIVO</b></p>												
<p><b>INTERFERENZE IDRAULICHE</b></p> <p>CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE DI SOSTEGNO</p>	<table border="1"> <thead> <tr> <th>COMMESSA</th> <th>LOTTO</th> <th>CODIFICA</th> <th>DOCUMENTO</th> <th>REV.</th> <th>FOGLIO</th> </tr> </thead> <tbody> <tr> <td>IR0B</td> <td>00</td> <td>D10</td> <td>CL IN.03.0.9 001</td> <td>A</td> <td>43 di 68</td> </tr> </tbody> </table>	COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO	IR0B	00	D10	CL IN.03.0.9 001	A	43 di 68
COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO								
IR0B	00	D10	CL IN.03.0.9 001	A	43 di 68								

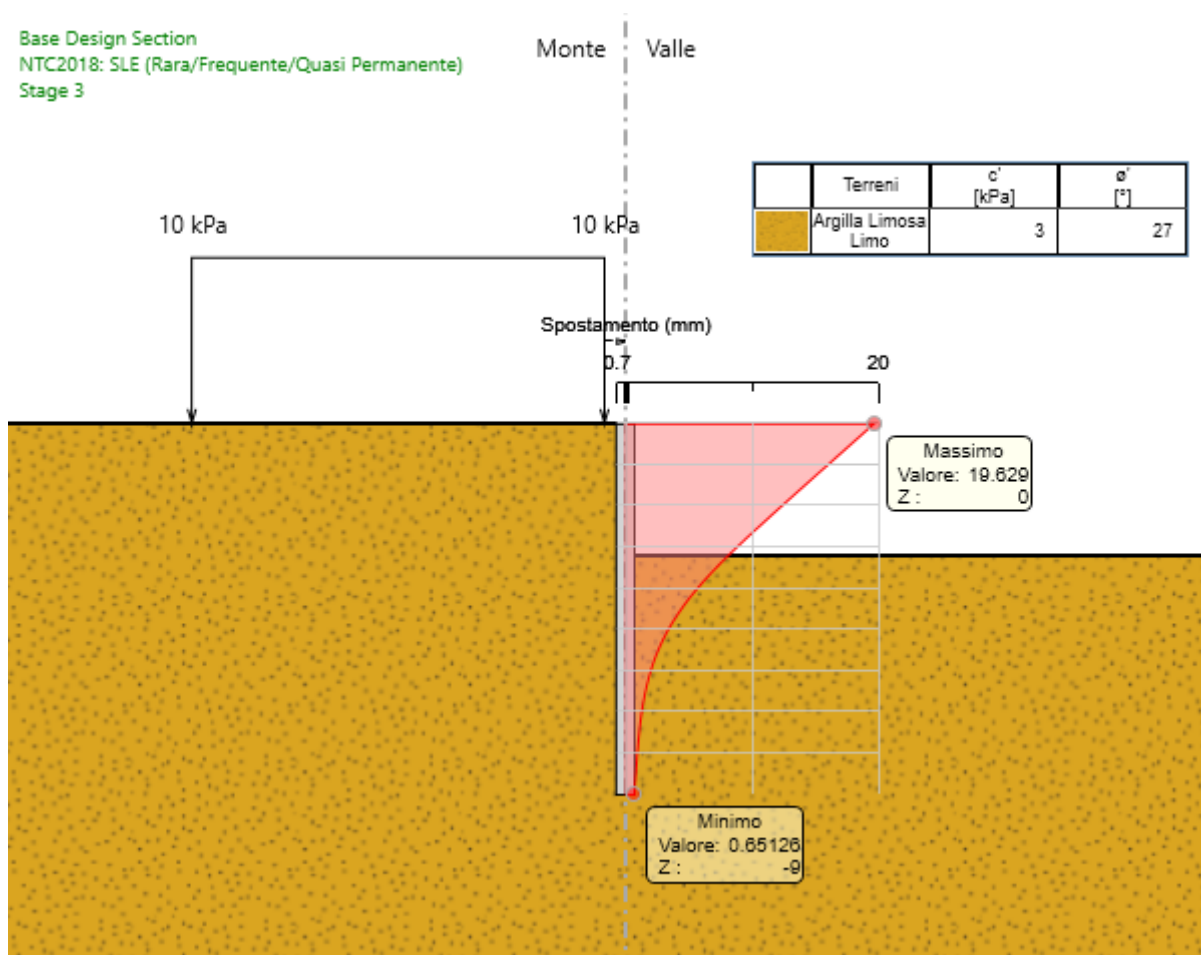


**Figura 11-2 Modello di calcolo e spinte**

### 11.3. Sintesi dei risultati allo SLE

Nella figura seguente si riportano gli spostamenti nell'ultima fase di calcolo:

 <p><b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE</p>	<p><b>POTENZIAMENTO DELLA LINEA FOLIGNO-TERONTOLA</b> <b>INTERVENTI DI SEMPLIFICAZIONE E VELOCIZZAZIONE SUL</b> <b>PRG DELLA STAZIONE DI ASSISI</b> <b>PROGETTO DEFINITIVO</b></p>												
<p><b>INTERFERENZE IDRAULICHE</b></p> <p>CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE DI SOSTEGNO</p>	<table border="1"> <thead> <tr> <th>COMMESSA</th> <th>LOTTO</th> <th>CODIFICA</th> <th>DOCUMENTO</th> <th>REV.</th> <th>FOGLIO</th> </tr> </thead> <tbody> <tr> <td>IR0B</td> <td>00</td> <td>D10</td> <td>CL IN.03.0.9 001</td> <td>A</td> <td>44 di 68</td> </tr> </tbody> </table>	COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO	IR0B	00	D10	CL IN.03.0.9 001	A	44 di 68
COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO								
IR0B	00	D10	CL IN.03.0.9 001	A	44 di 68								




**Figura 11-3 Spostamenti SLE**

Lo spostamento in testa risulta pari a 1.9 cm

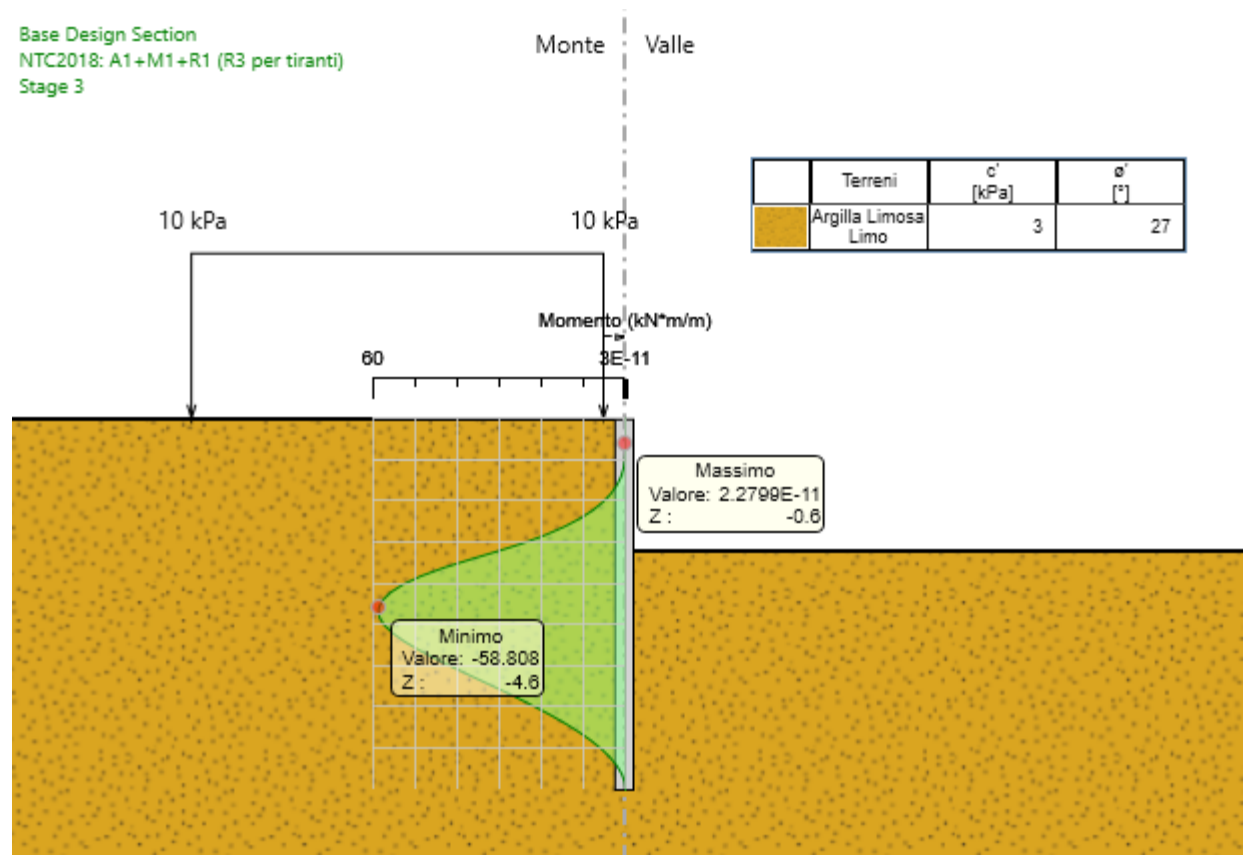
#### 11.4. Sintesi dei risultati allo SLU

Nelle figure seguenti si riportano i diagrammi dei momenti e i diagrammi del taglio nell'ultima fase di calcolo, corrispondente alle condizioni A1+M1+R1 (STR) e A2-M2-R1 (GEO).



 <p><b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE</p>	<p><b>POTENZIAMENTO DELLA LINEA FOLIGNO-TERONTOLA INTERVENTI DI SEMPLIFICAZIONE E VELOCIZZAZIONE SUL PRG DELLA STAZIONE DI ASSISI PROGETTO DEFINITIVO</b></p>												
<p><b>INTERFERENZE IDRAULICHE</b></p> <p>CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE DI SOSTEGNO</p>	<table border="1"> <tr> <td>COMMESSA</td> <td>LOTTO</td> <td>CODIFICA</td> <td>DOCUMENTO</td> <td>REV.</td> <td>FOGLIO</td> </tr> <tr> <td>IR0B</td> <td>00</td> <td>D10</td> <td>CL IN.03.0.9 001</td> <td>A</td> <td>45 di 68</td> </tr> </table>	COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO	IR0B	00	D10	CL IN.03.0.9 001	A	45 di 68
COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO								
IR0B	00	D10	CL IN.03.0.9 001	A	45 di 68								

**11.4.1. Sollecitazioni di momento flettente**



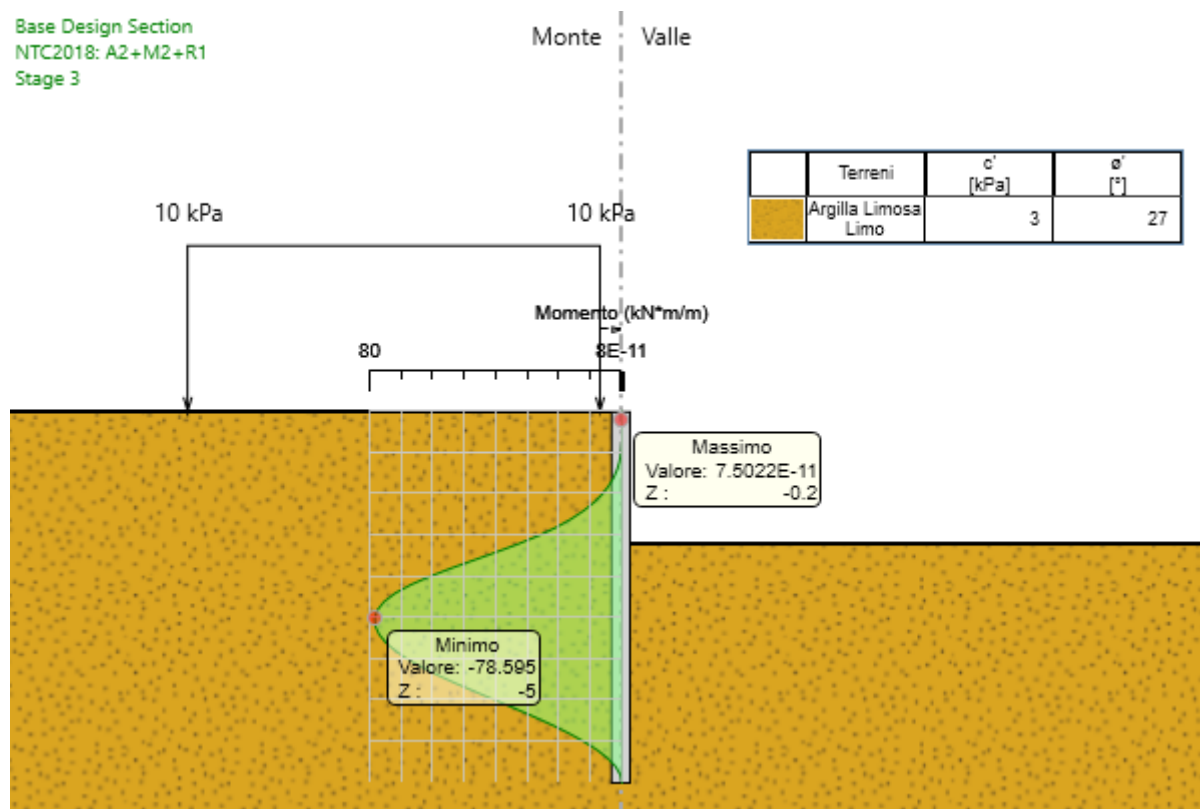
**Figura 11-4 Diagramma momenti flettenti (STR)**

**INTERFERENZE IDRAULICHE**


CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
DI SOSTEGNO

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
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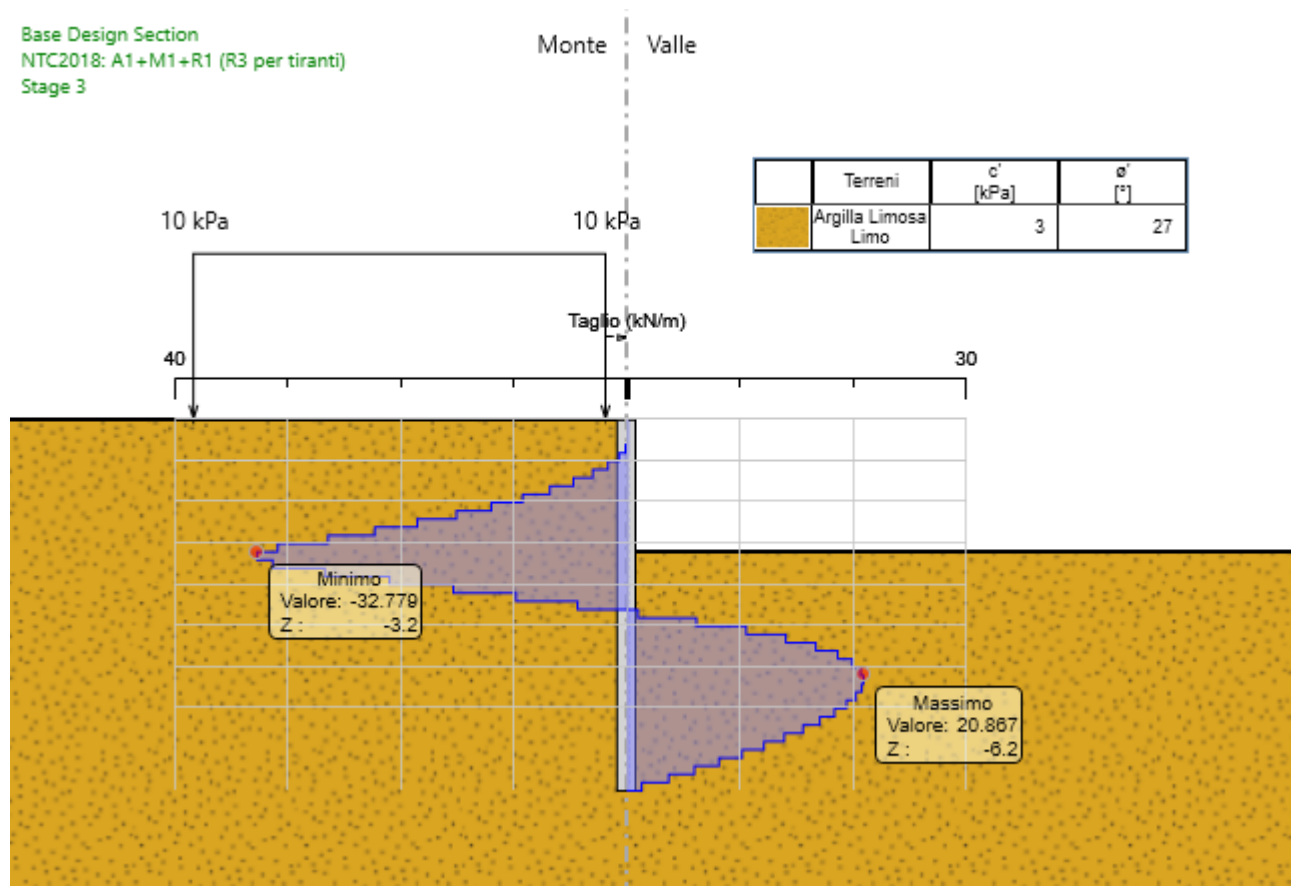
Base Design Section  
NTC2018: A2+M2+R1  
Stage 3




**Figura 11-5 Diagramma momenti flettenti (GEO)**

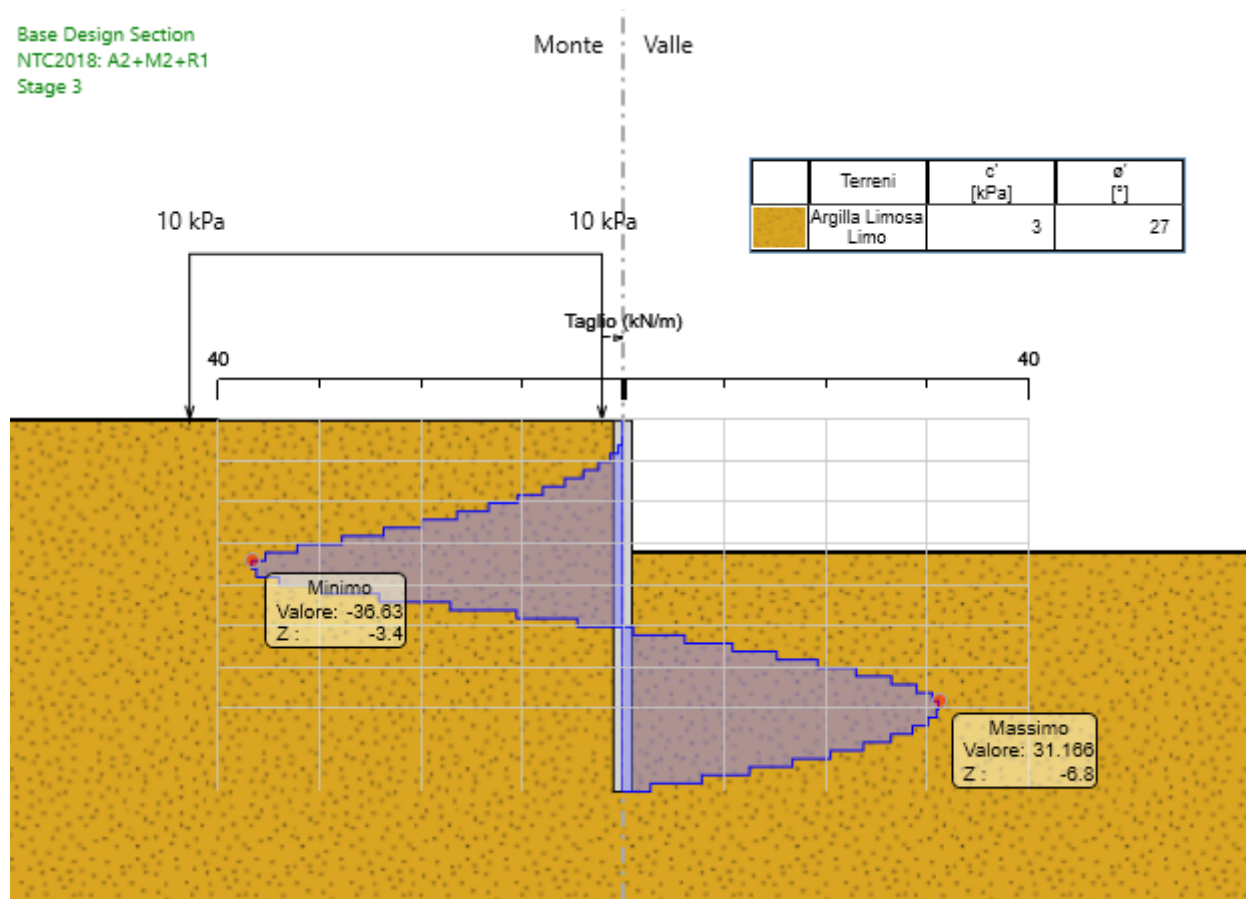
 <p><b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE</p>	<p><b>POTENZIAMENTO DELLA LINEA FOLIGNO-TERONTOLA</b> <b>INTERVENTI DI SEMPLIFICAZIONE E VELOCIZZAZIONE SUL</b> <b>PRG DELLA STAZIONE DI ASSISI</b> <b>PROGETTO DEFINITIVO</b></p>												
<p><b>INTERFERENZE IDRAULICHE</b></p> <p>CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE DI SOSTEGNO</p>	<table border="1"> <tr> <td>COMMESSA</td> <td>LOTTO</td> <td>CODIFICA</td> <td>DOCUMENTO</td> <td>REV.</td> <td>FOGLIO</td> </tr> <tr> <td>IR0B</td> <td>00</td> <td>D10</td> <td>CL IN.03.0.9 001</td> <td>A</td> <td>47 di 68</td> </tr> </table>	COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO	IR0B	00	D10	CL IN.03.0.9 001	A	47 di 68
COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO								
IR0B	00	D10	CL IN.03.0.9 001	A	47 di 68								

*11.4.2. Sollecitazioni di taglio*



**Figura 11-6 Diagramma taglio (STR)**


 <p><b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE</p>	<p><b>POTENZIAMENTO DELLA LINEA FOLIGNO-TERONTOLA</b> <b>INTERVENTI DI SEMPLIFICAZIONE E VELOCIZZAZIONE SUL</b> <b>PRG DELLA STAZIONE DI ASSISI</b> <b>PROGETTO DEFINITIVO</b></p>												
<p><b>INTERFERENZE IDRAULICHE</b></p> <p>CANALE TESCOIO - RELAZIONE DI CALCOLO SCAVI E OPERE DI SOSTEGNO</p>	<table border="1"> <tr> <td>COMMESSA</td> <td>LOTTO</td> <td>CODIFICA</td> <td>DOCUMENTO</td> <td>REV.</td> <td>FOGLIO</td> </tr> <tr> <td>IR0B</td> <td>00</td> <td>D10</td> <td>CL IN.03.0.9 001</td> <td>A</td> <td>48 di 68</td> </tr> </table>	COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO	IR0B	00	D10	CL IN.03.0.9 001	A	48 di 68
COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO								
IR0B	00	D10	CL IN.03.0.9 001	A	48 di 68								



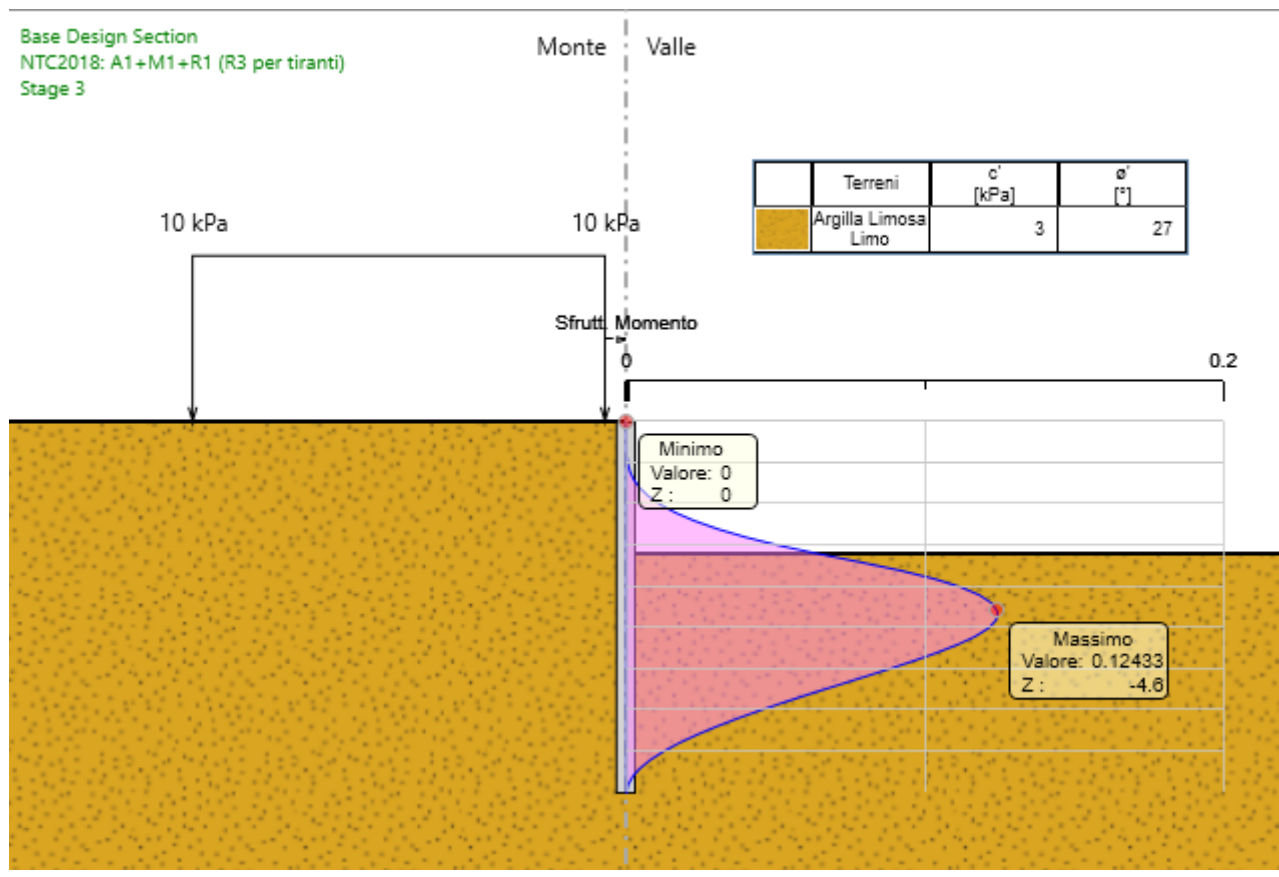
**Figura 11-7 Diagramma taglio (GEO)**

**11.5. Verifiche elemento strutturale**

Nelle figure seguenti si riportano i tassi di sfruttamento calcolati dal programma per la condizione A1+M1+R1 e A2-M2-R1. I tassi di sfruttamento risultano sempre inferiori a 1, pertanto le verifiche delle sezioni sono soddisfatte

 <p><b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE</p>	<p><b>POTENZIAMENTO DELLA LINEA FOLIGNO-TERONTOLA</b> <b>INTERVENTI DI SEMPLIFICAZIONE E VELOCIZZAZIONE SUL</b> <b>PRG DELLA STAZIONE DI ASSISI</b> <b>PROGETTO DEFINITIVO</b></p>												
<p><b>INTERFERENZE IDRAULICHE</b></p> <p>CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE DI SOSTEGNO</p>	<table border="1"> <tr> <td>COMMESSA</td> <td>LOTTO</td> <td>CODIFICA</td> <td>DOCUMENTO</td> <td>REV.</td> <td>FOGLIO</td> </tr> <tr> <td>IR0B</td> <td>00</td> <td>D10</td> <td>CL IN.03.0.9 001</td> <td>A</td> <td>49 di 68</td> </tr> </table>	COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO	IR0B	00	D10	CL IN.03.0.9 001	A	49 di 68
COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO								
IR0B	00	D10	CL IN.03.0.9 001	A	49 di 68								

**11.5.1. Tasso di sfruttamento momento**

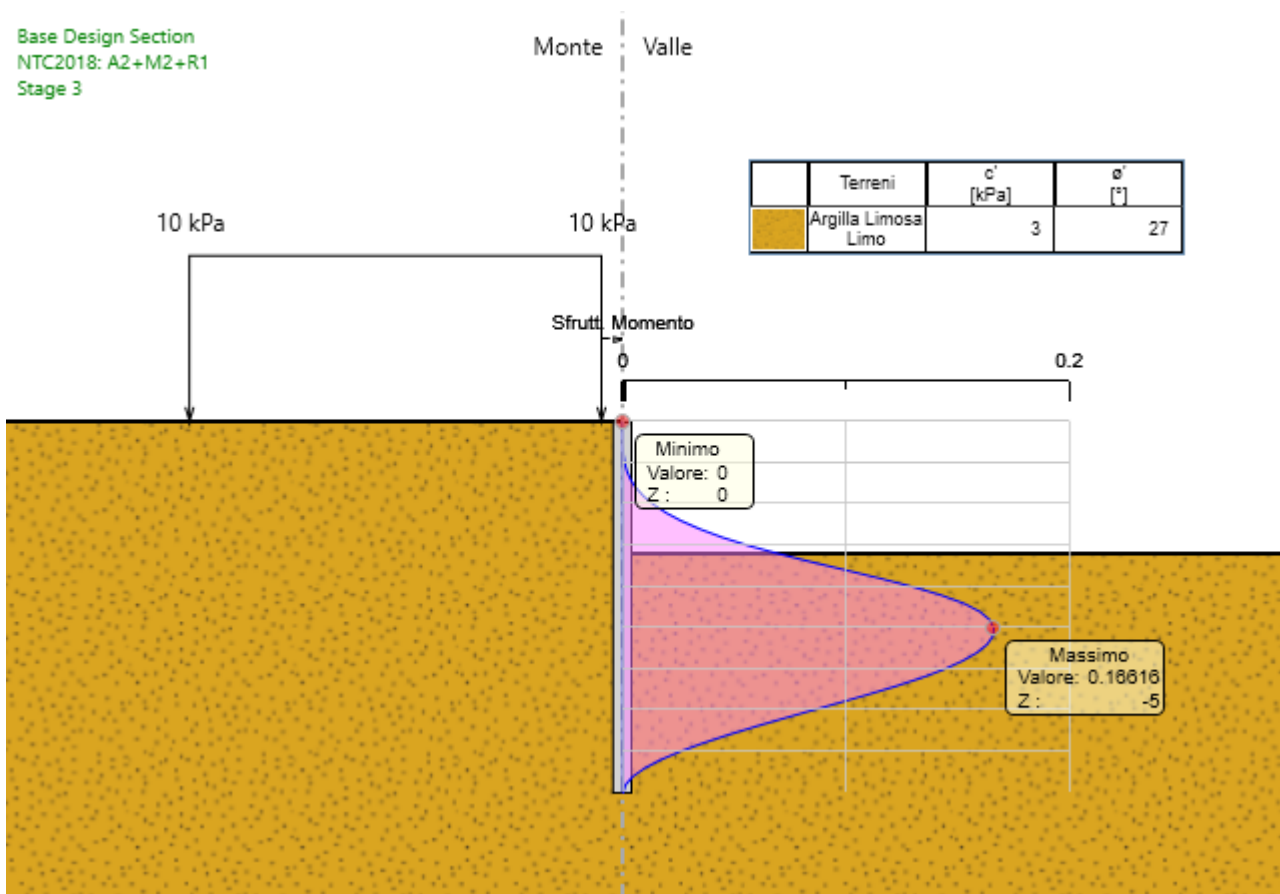


**Figura 11-8 Tasso sfruttamento Momento (STR)**

**INTERFERENZE IDRAULICHE**

CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
DI SOSTEGNO

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
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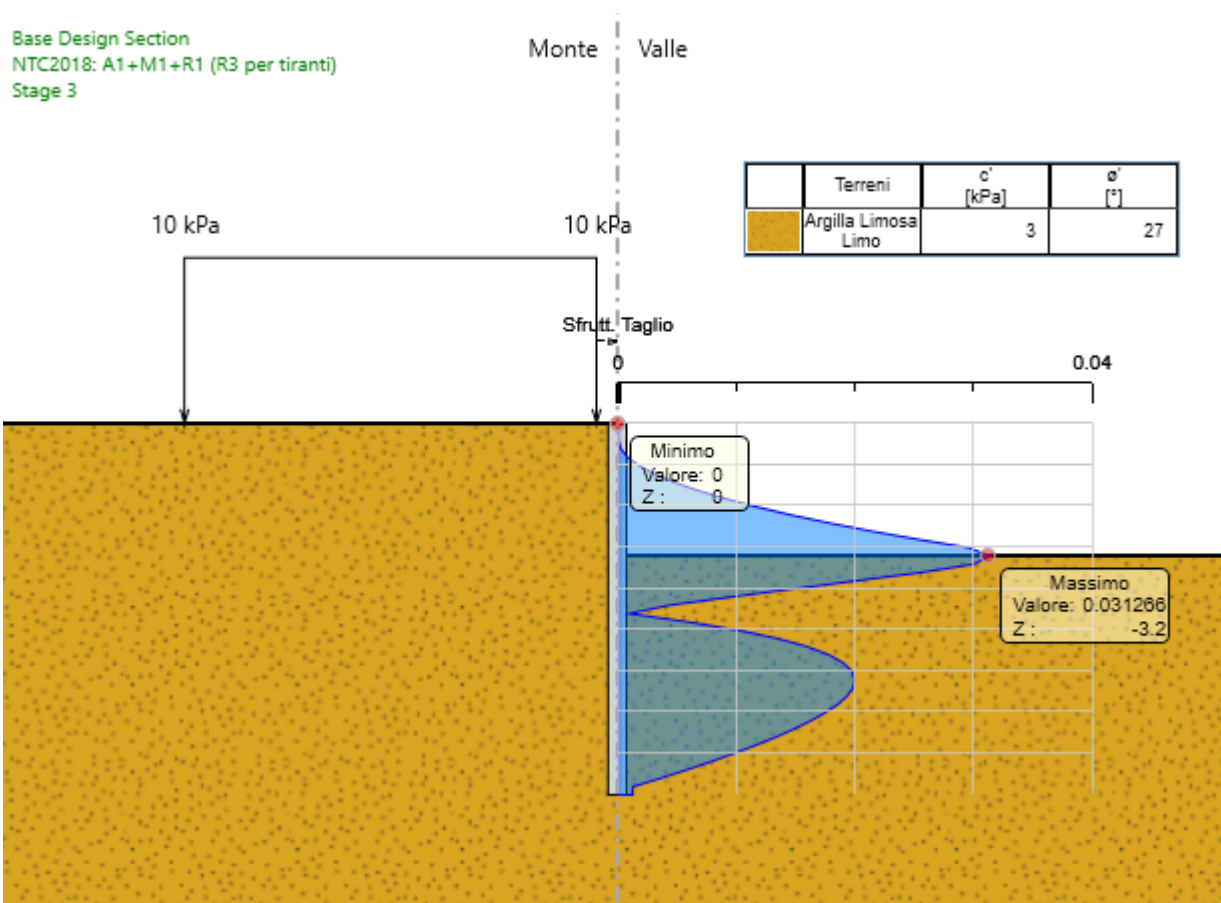
**Figura 11-9 Tasso sfruttamento Momento (GEO)**

**INTERFERENZE IDRAULICHE**

CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
DI SOSTEGNO

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	51 di 68

**11.5.2. Tasso di sfruttamento taglio**



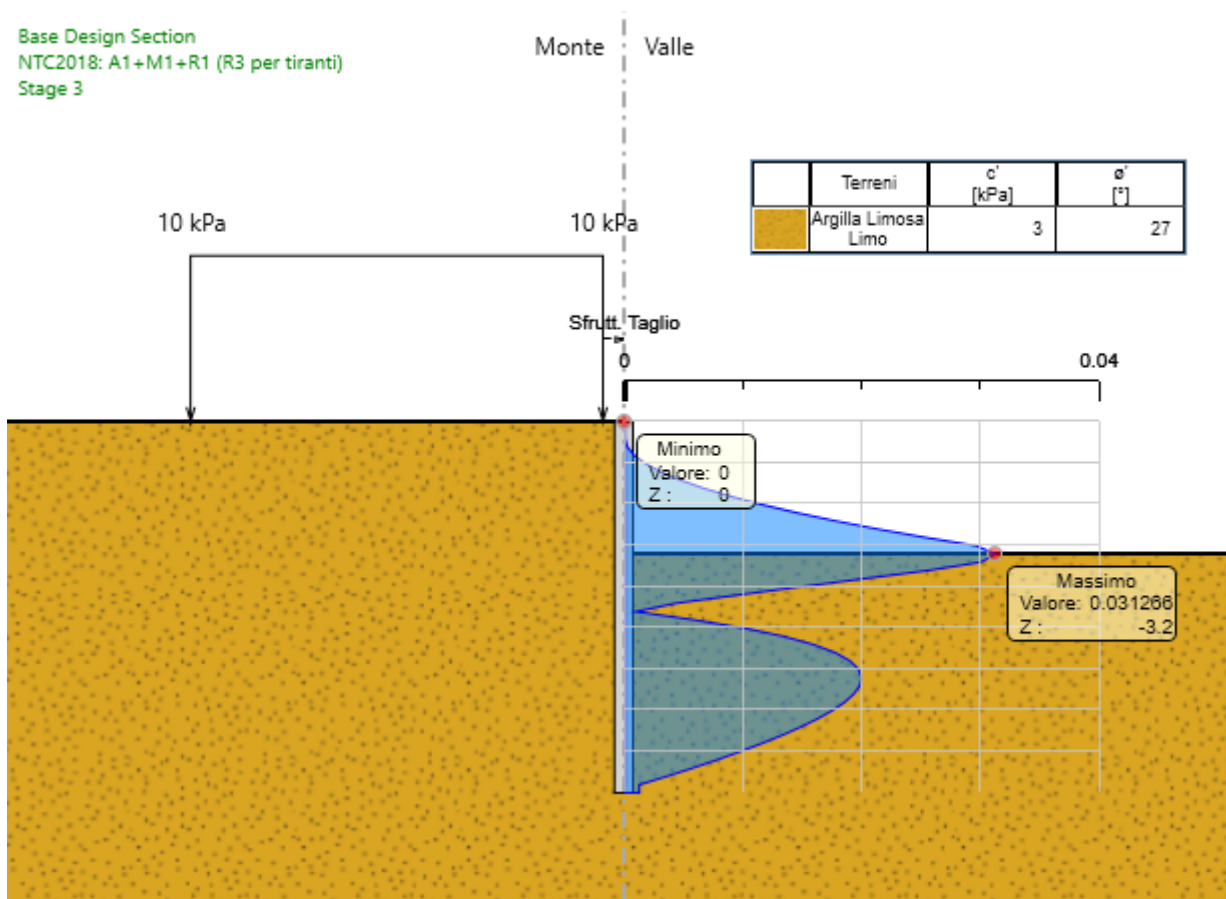
**Figura 11-10 Tasso sfruttamento Taglio (STR)**



**INTERFERENZE IDRAULICHE**

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	52 di 68

CANALE TESCOIO - RELAZIONE DI CALCOLO SCAVI E OPERE DI SOSTEGNO



**Figura 11-11 Tasso sfruttamento Taglio (GEO)**

## 12. IN03 - SCAVO CON PALANCOLE TIPO 3 – PALANCOLE PUNTONATE

Di seguito l'analisi per le palancole puntonate. Gli scavi sono previsti con palancole PU22 acciaio S275, Lunghezza L=10m; i puntone si trovano a -0.5m da sommità, e risultano essere D168mm s=8mm acciaio S275, a interasse i=4m

### 12.1. Modello e stratigrafia

La sezione critica per lo scavo tra palancole risulta quella ubicata alla pk 1075. Qui l'altezza di scavo risulta pari a 4.90m. Tenendo presente i criteri esposti al capitolo 6 riguardo l'altezza di calcolo, e considerata la presenza del vincolo puntone, si adotta un'altezza di calcolo pari a  $h_D=5.40m$ . La falda è assente

La stratigrafia utilizzata è quella riportata al capitolo 6.

Il carico in testa è pari a 20kPa



**INTERFERENZE IDRAULICHE**

**CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
DI SOSTEGNO**

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	53 di 68

## 12.2. Descrizione delle fasi di calcolo

Il modello si basa sulle seguenti fasi di calcolo:

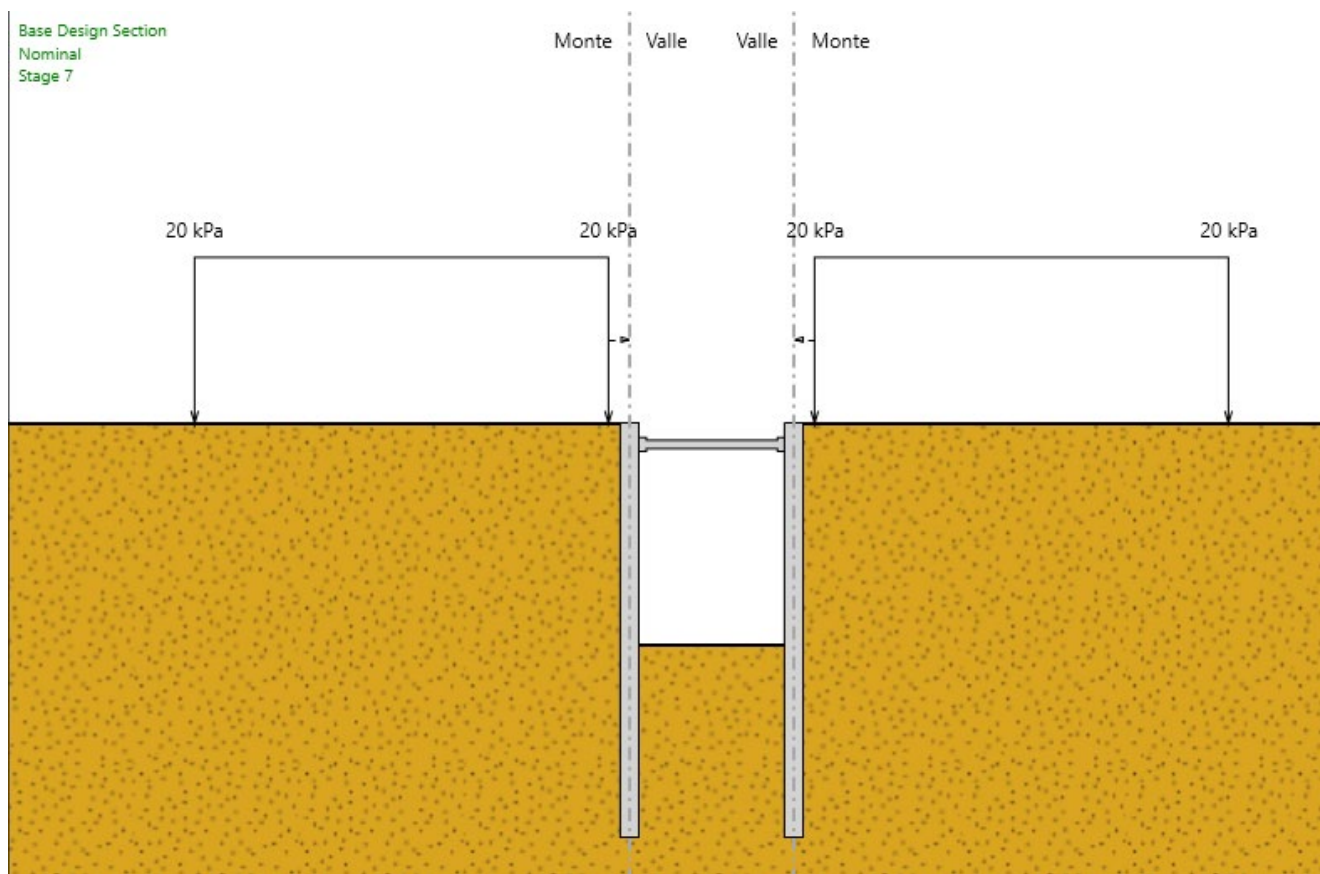
- Fase 1: condizione geostatica e costruzione opera provvisoria;
- Fase 2: applicazione sovraccarico da mezzi di cantiere pari a 20 kPa;
- Fase 3: scavo fino a quota -1m da p.c. per inserimento puntone;
- Fase 4: inserimento puntone;
- Fase 5: scavo fino a quota fondo scavo

Di seguito si riporta il modello di calcolo con la stratigrafia di riferimento.

**INTERFERENZE IDRAULICHE**

**CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
DI SOSTEGNO**

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	54 di 68



**Figura 12-1 Modello di calcolo**

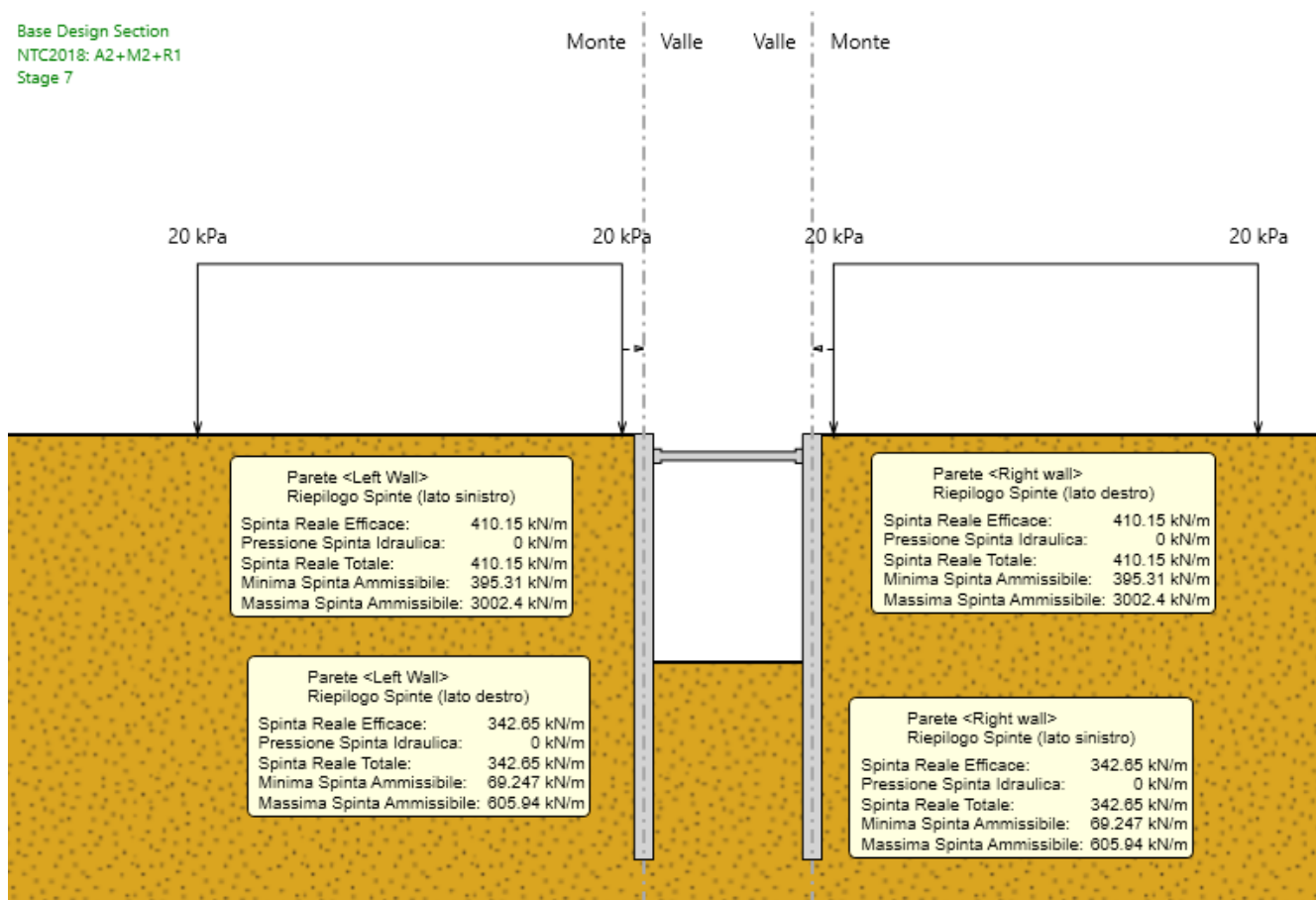
Di seguito si riportano le spinte calcolate dal programma per la combinazione GEO

**INTERFERENZE IDRAULICHE**

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	55 di 68

**CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
DI SOSTEGNO**


Base Design Section  
NTC2018: A2+M2+R1  
Stage 7

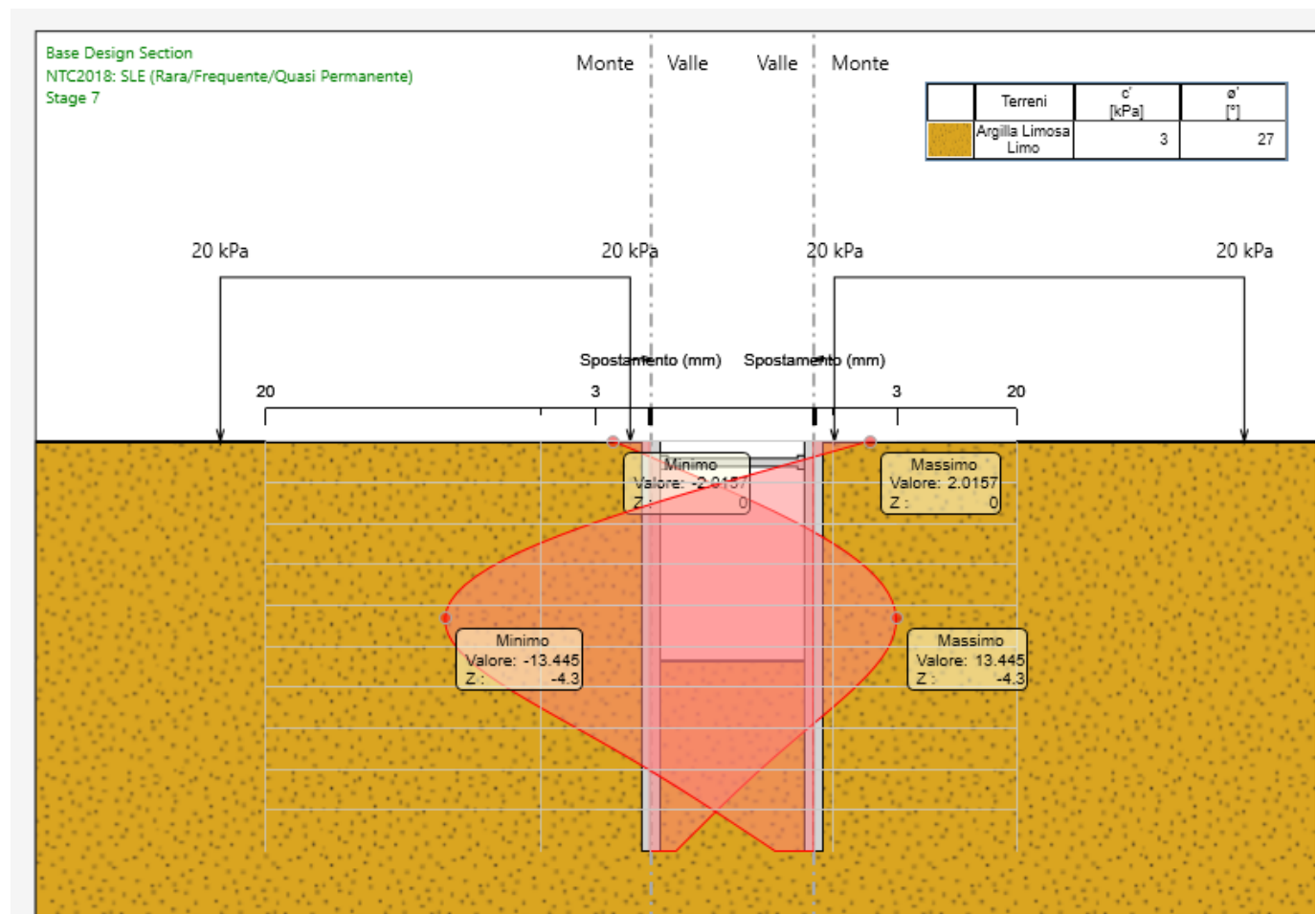


**Figura 12-2 Modello di calcolo e spinte**

### 12.3. Sintesi dei risultati allo SLE

Nella figura seguente si riportano gli spostamenti nell'ultima fase di calcolo:

 <p><b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE</p>	<p><b>POTENZIAMENTO DELLA LINEA FOLIGNO-TERONTOLA</b> <b>INTERVENTI DI SEMPLIFICAZIONE E VELOCIZZAZIONE SUL</b> <b>PRG DELLA STAZIONE DI ASSISI</b> <b>PROGETTO DEFINITIVO</b></p>												
<p><b>INTERFERENZE IDRAULICHE</b></p> <p>CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE DI SOSTEGNO</p>	<table border="1"> <tr> <td>COMMESSA</td> <td>LOTTO</td> <td>CODIFICA</td> <td>DOCUMENTO</td> <td>REV.</td> <td>FOGLIO</td> </tr> <tr> <td>IR0B</td> <td>00</td> <td>D10</td> <td>CL IN.03.0.9 001</td> <td>A</td> <td>56 di 68</td> </tr> </table>	COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO	IR0B	00	D10	CL IN.03.0.9 001	A	56 di 68
COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO								
IR0B	00	D10	CL IN.03.0.9 001	A	56 di 68								



**Figura 12-3 Spostamenti SLE**

Lo spostamento massimo risulta pari a 1.3 cm

#### 12.4. Sintesi dei risultati allo SLU

Nelle figure seguenti si riportano i diagrammi dei momenti e i diagrammi del taglio nell'ultima fase di calcolo, corrispondente alle condizioni A1+M1+R1 (STR) e A2-M2-R1 (GEO).

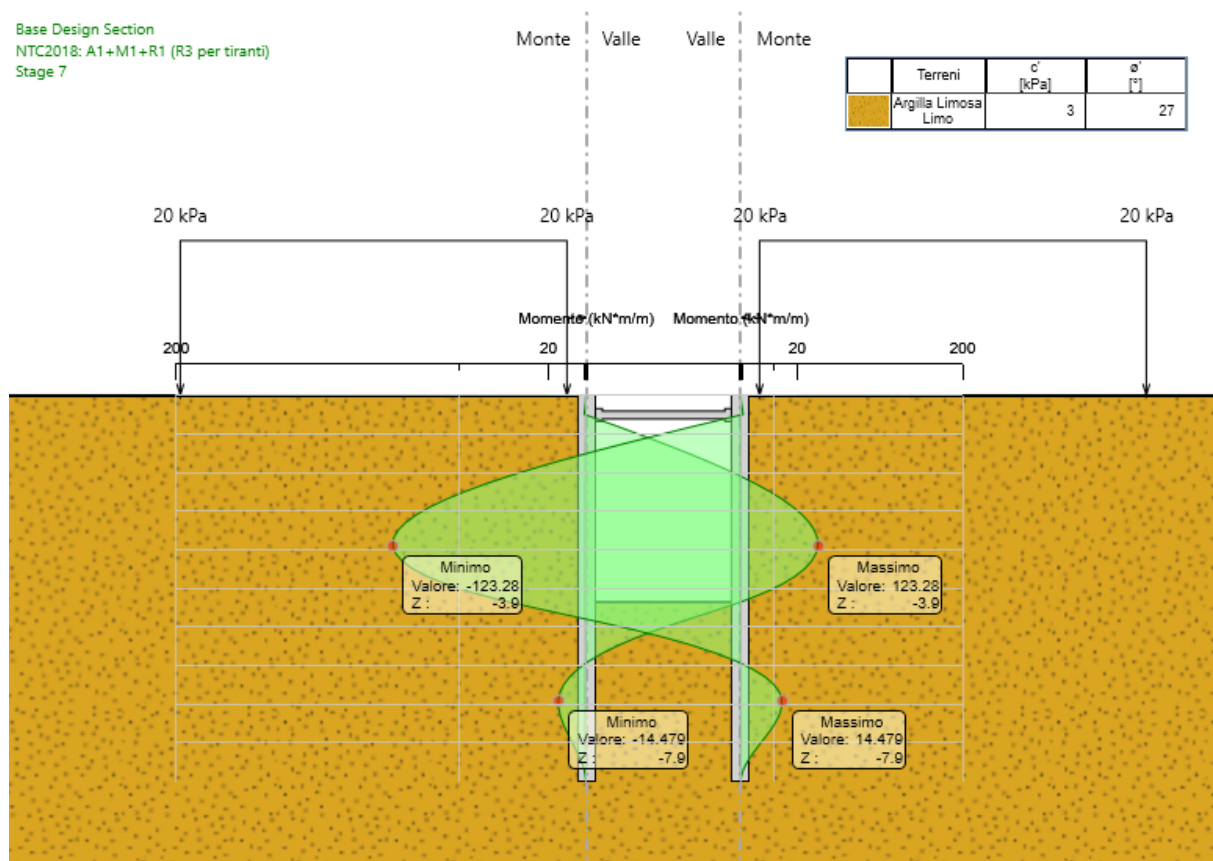
**INTERFERENZE IDRAULICHE**

CANALE TESCOIO - RELAZIONE DI CALCOLO SCAVI E OPERE DI SOSTEGNO

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	57 di 68

**12.4.1. Sollecitazioni di momento flettente**

Base Design Section  
NTC2018: A1+M1+R1 (R3 per tiranti)  
Stage 7

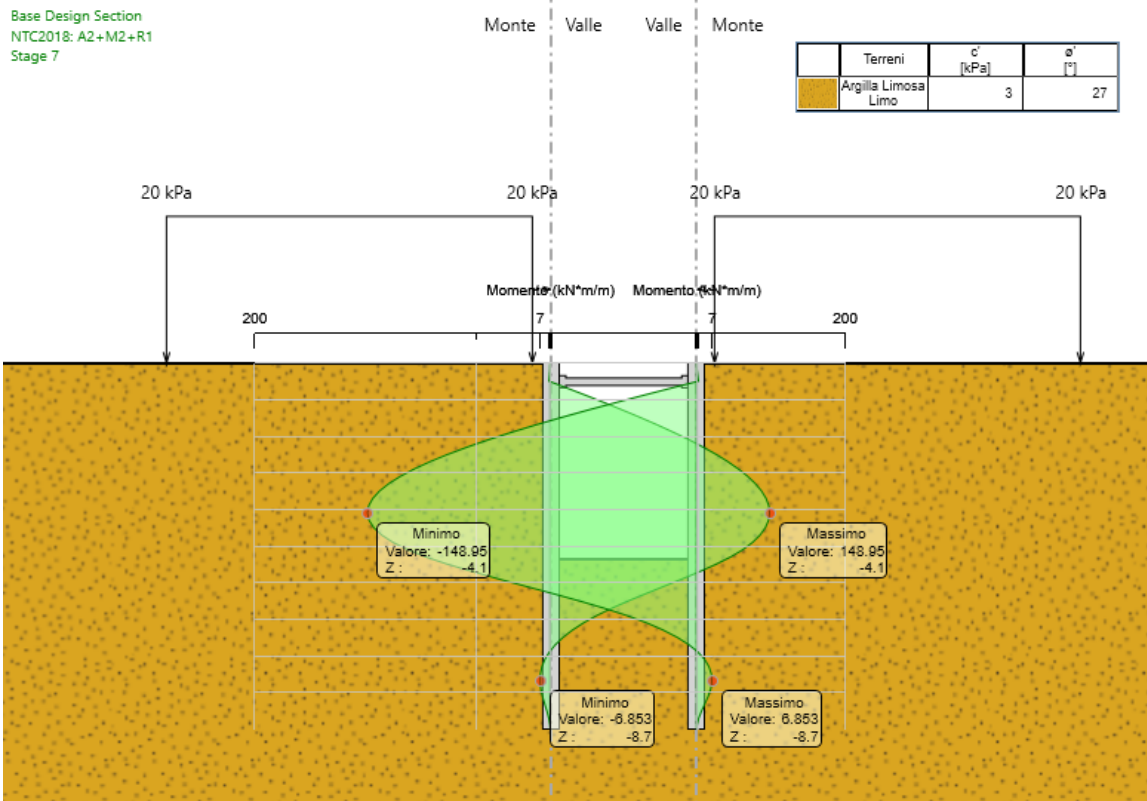


**Figura 12-4 Diagramma momenti flettenti (STR)**

**INTERFERENZE IDRAULICHE**

**CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
DI SOSTEGNO**

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	58 di 68



**Figura 12-5 Diagramma momenti flettenti (GEO)**

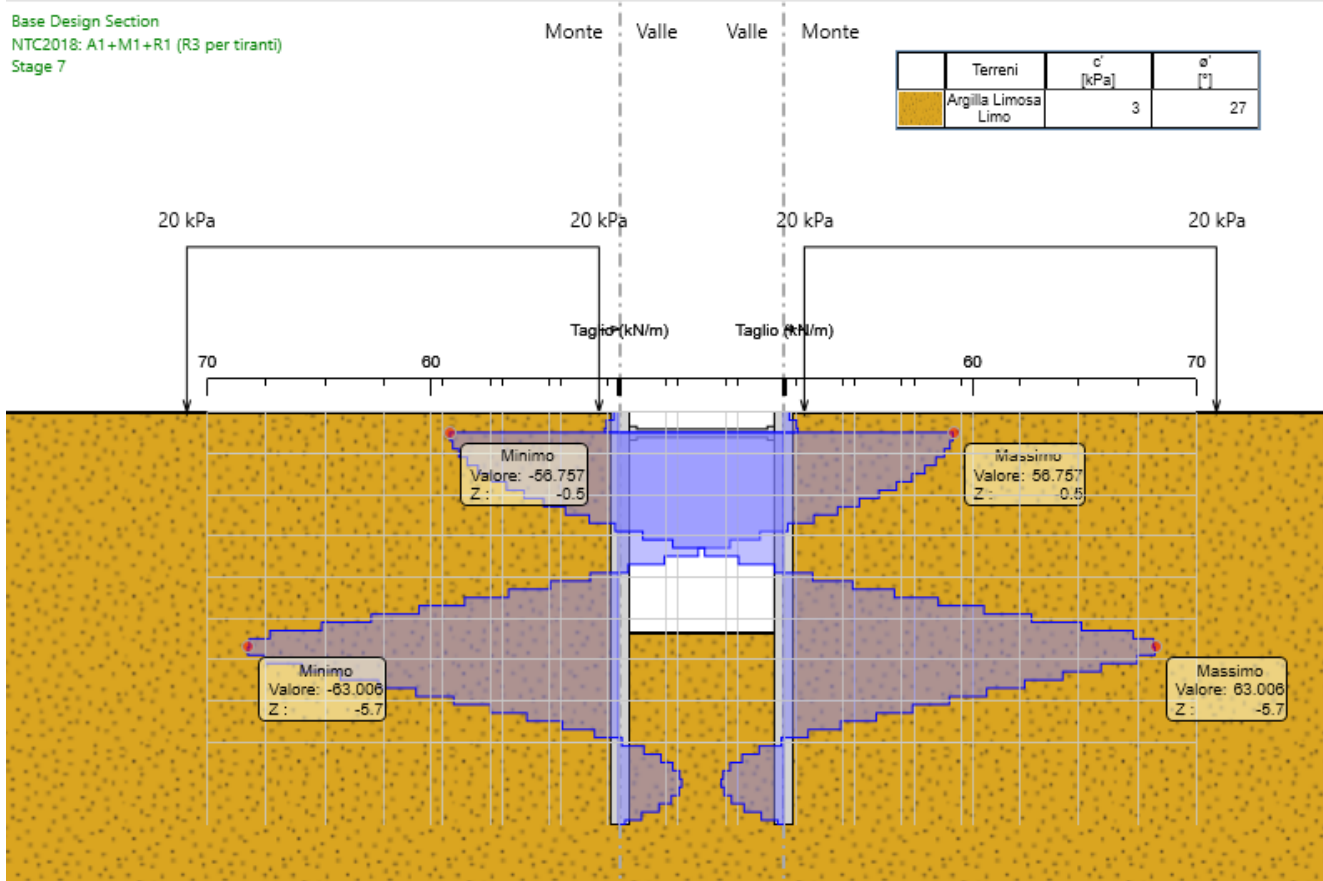


**INTERFERENZE IDRAULICHE**

CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE DI SOSTEGNO

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	59 di 68

**12.4.2. Sollecitazioni di taglio**



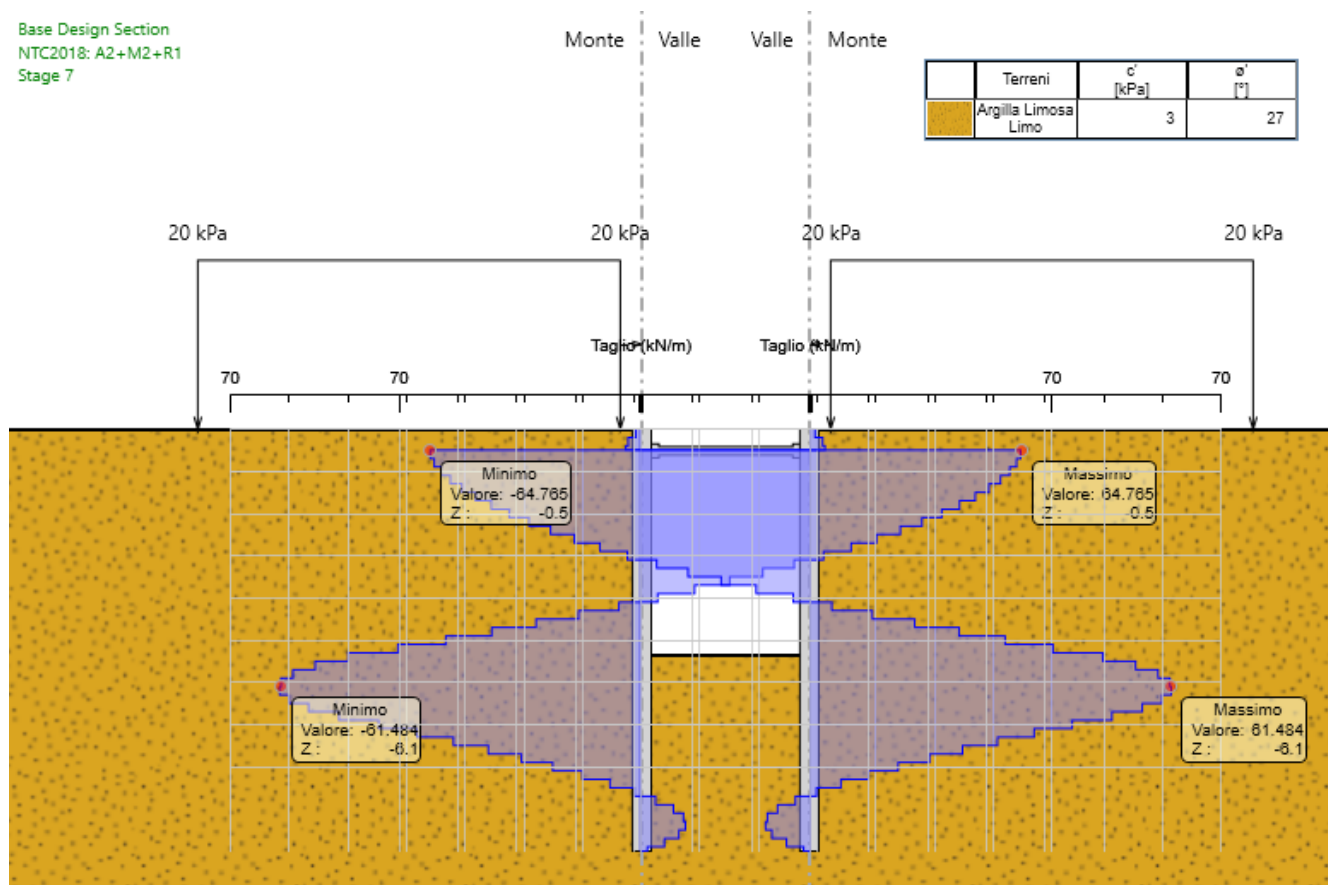
**Figura 12-6 Diagramma taglio (STR)**

**INTERFERENZE IDRAULICHE**

**CANALE TESCOIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
DI SOSTEGNO**

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	60 di 68

Base Design Section  
NTC2018: A2+M2+R1  
Stage 7




**Figura 12-7 Diagramma taglio (GEO)**

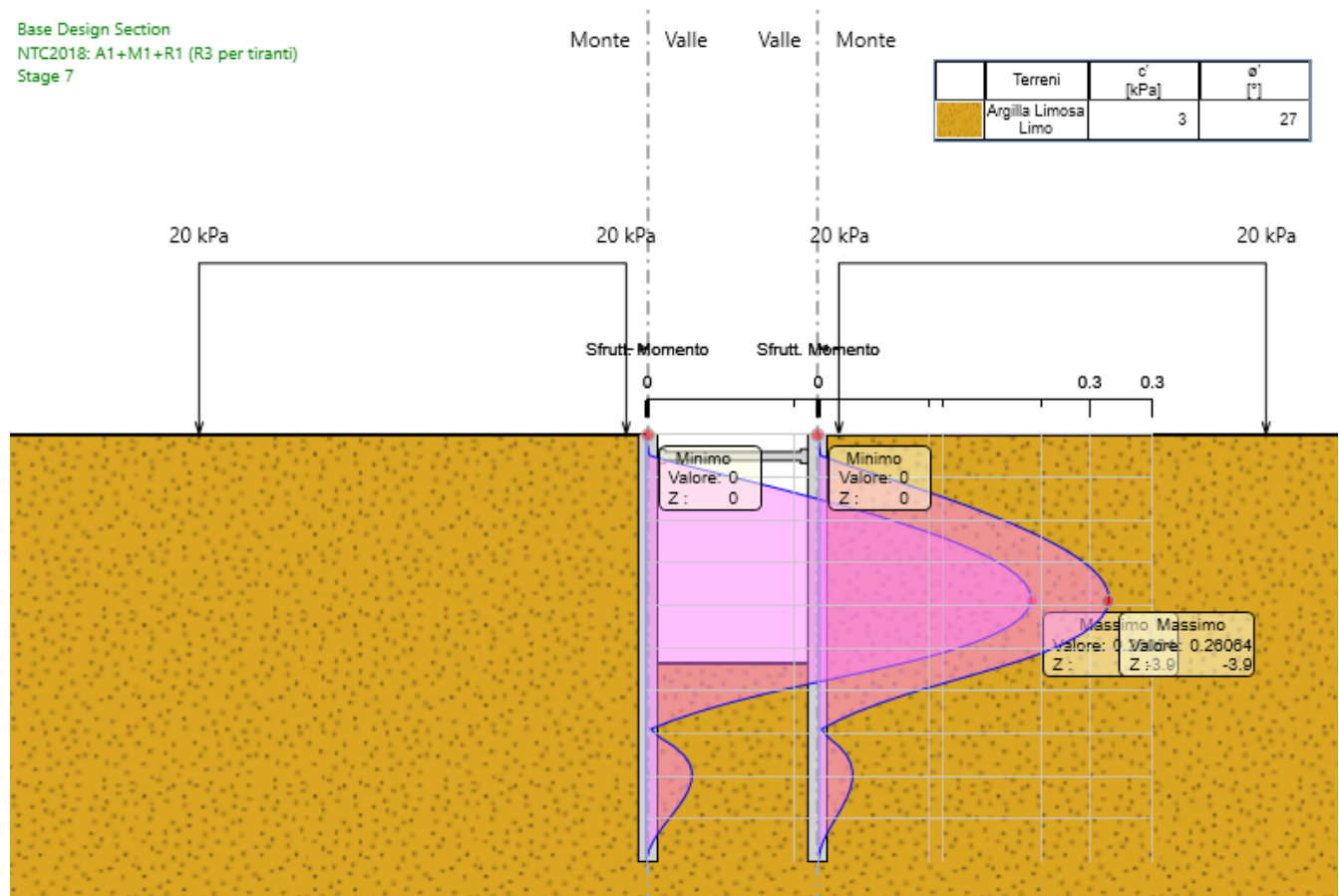
**12.5. Verifiche elemento strutturale**

Nelle figure seguenti si riportano i tassi di sfruttamento calcolati dal programma per la condizione A1+M1+R1 e A2-M2-R1. I tassi di sfruttamento risultano sempre inferiori a 1, pertanto le verifiche delle sezioni sono soddisfatte



 <p><b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE</p>	<p><b>POTENZIAMENTO DELLA LINEA FOLIGNO-TERONTOLA</b> <b>INTERVENTI DI SEMPLIFICAZIONE E VELOCIZZAZIONE SUL</b> <b>PRG DELLA STAZIONE DI ASSISI</b> <b>PROGETTO DEFINITIVO</b></p>												
<p><b>INTERFERENZE IDRAULICHE</b></p> <p>CANALE TESCOIO - RELAZIONE DI CALCOLO SCAVI E OPERE DI SOSTEGNO</p>	<table border="1"> <tr> <td>COMMESSA</td> <td>LOTTO</td> <td>CODIFICA</td> <td>DOCUMENTO</td> <td>REV.</td> <td>FOGLIO</td> </tr> <tr> <td>IR0B</td> <td>00</td> <td>D10</td> <td>CL IN.03.0.9 001</td> <td>A</td> <td>61 di 68</td> </tr> </table>	COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO	IR0B	00	D10	CL IN.03.0.9 001	A	61 di 68
COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO								
IR0B	00	D10	CL IN.03.0.9 001	A	61 di 68								

**12.5.1. Tasso di sfruttamento momento**

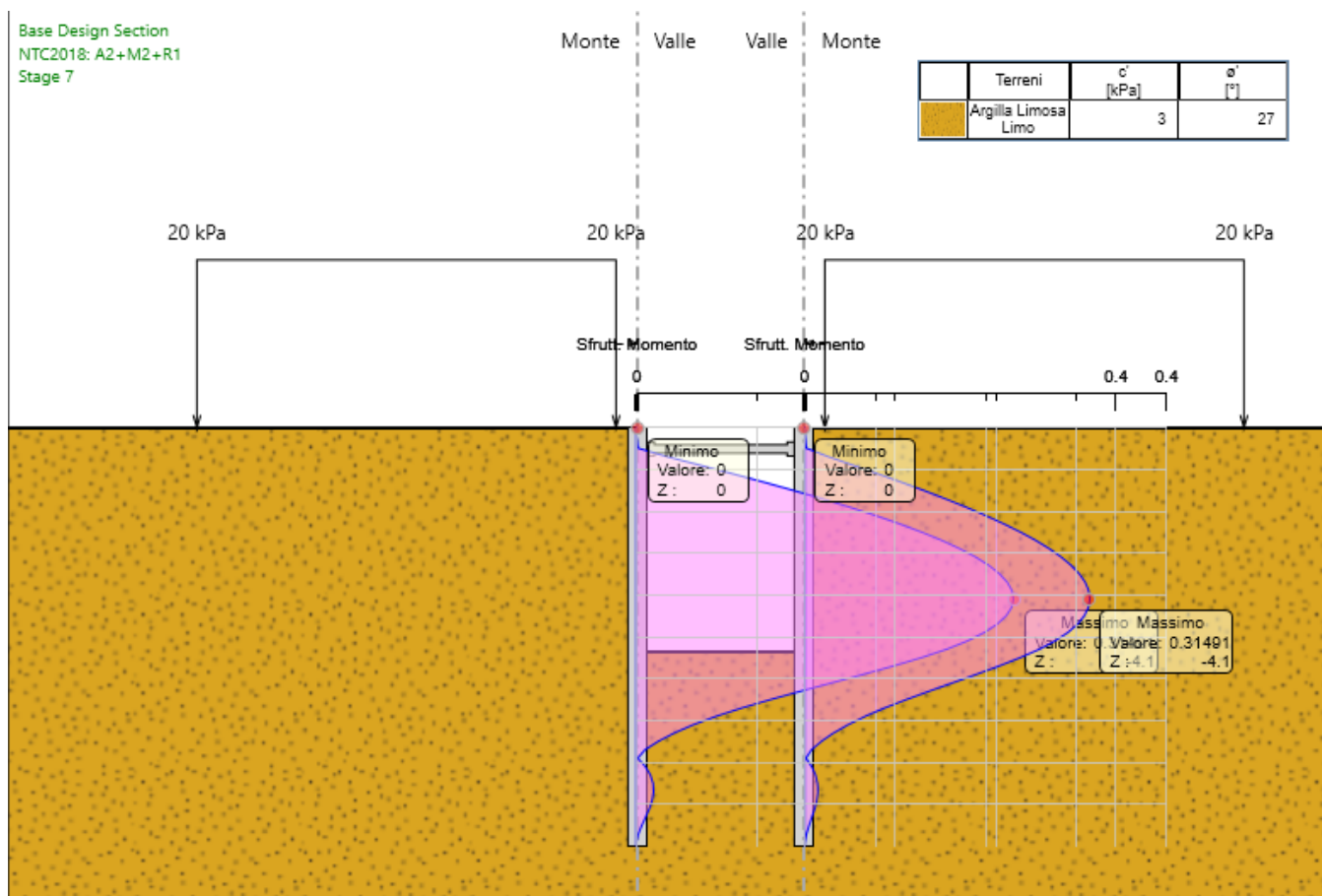


**Figura 12-8 Tasso sfruttamento Momento (STR)**


**INTERFERENZE IDRAULICHE**

CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
DI SOSTEGNO

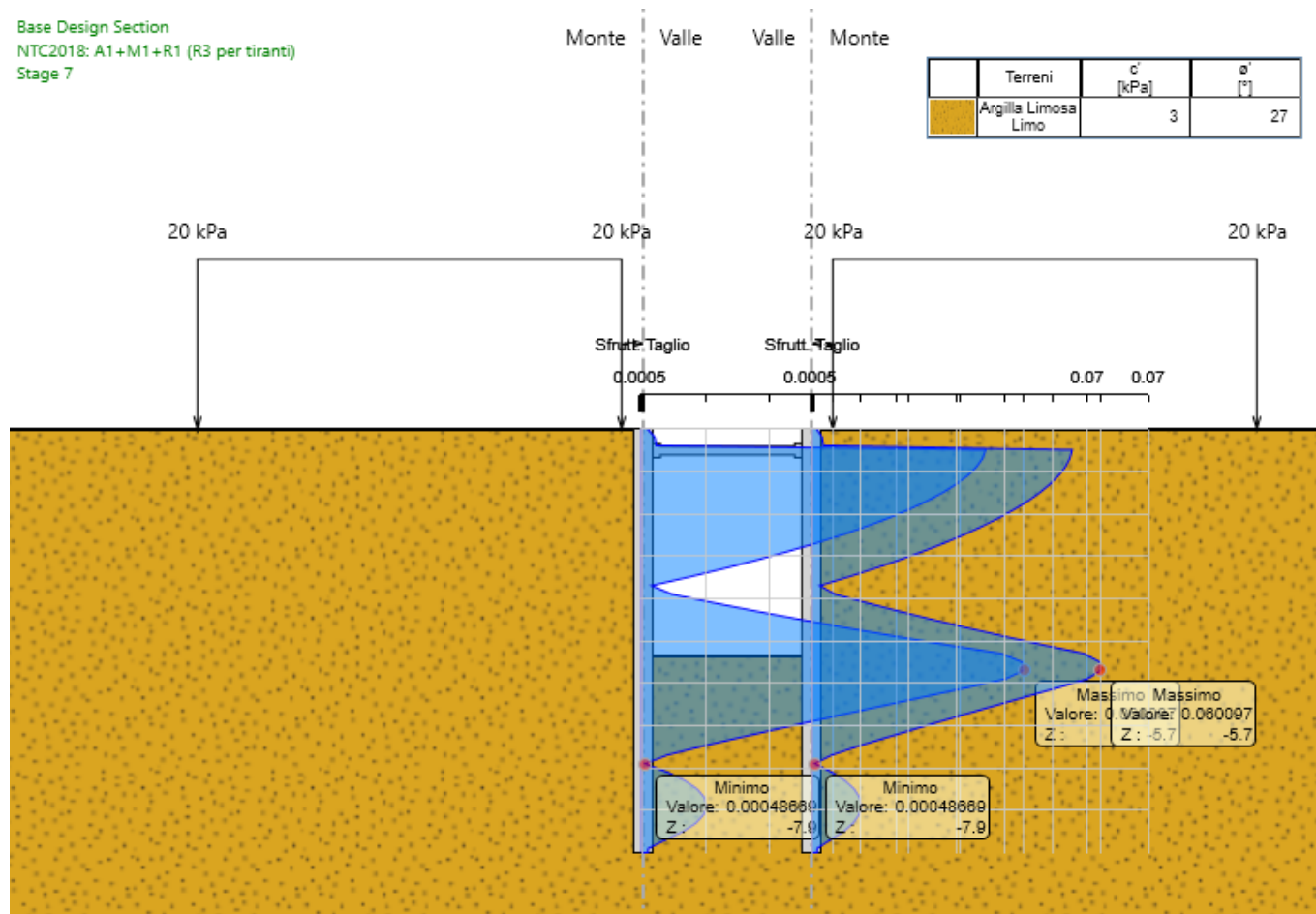
COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	62 di 68



**Figura 12-9 Tasso sfruttamento Momento (GEO)**

 <p><b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE</p>	<p><b>POTENZIAMENTO DELLA LINEA FOLIGNO-TERONTOLA</b> <b>INTERVENTI DI SEMPLIFICAZIONE E VELOCIZZAZIONE SUL</b> <b>PRG DELLA STAZIONE DI ASSISI</b> <b>PROGETTO DEFINITIVO</b></p>												
<p><b>INTERFERENZE IDRAULICHE</b></p> <p>CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE DI SOSTEGNO</p>	<table border="1"> <tr> <td>COMMESSA</td> <td>LOTTO</td> <td>CODIFICA</td> <td>DOCUMENTO</td> <td>REV.</td> <td>FOGLIO</td> </tr> <tr> <td>IR0B</td> <td>00</td> <td>D10</td> <td>CL IN.03.0.9 001</td> <td>A</td> <td>63 di 68</td> </tr> </table>	COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO	IR0B	00	D10	CL IN.03.0.9 001	A	63 di 68
COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO								
IR0B	00	D10	CL IN.03.0.9 001	A	63 di 68								

**12.5.2. Tasso di sfruttamento taglio**



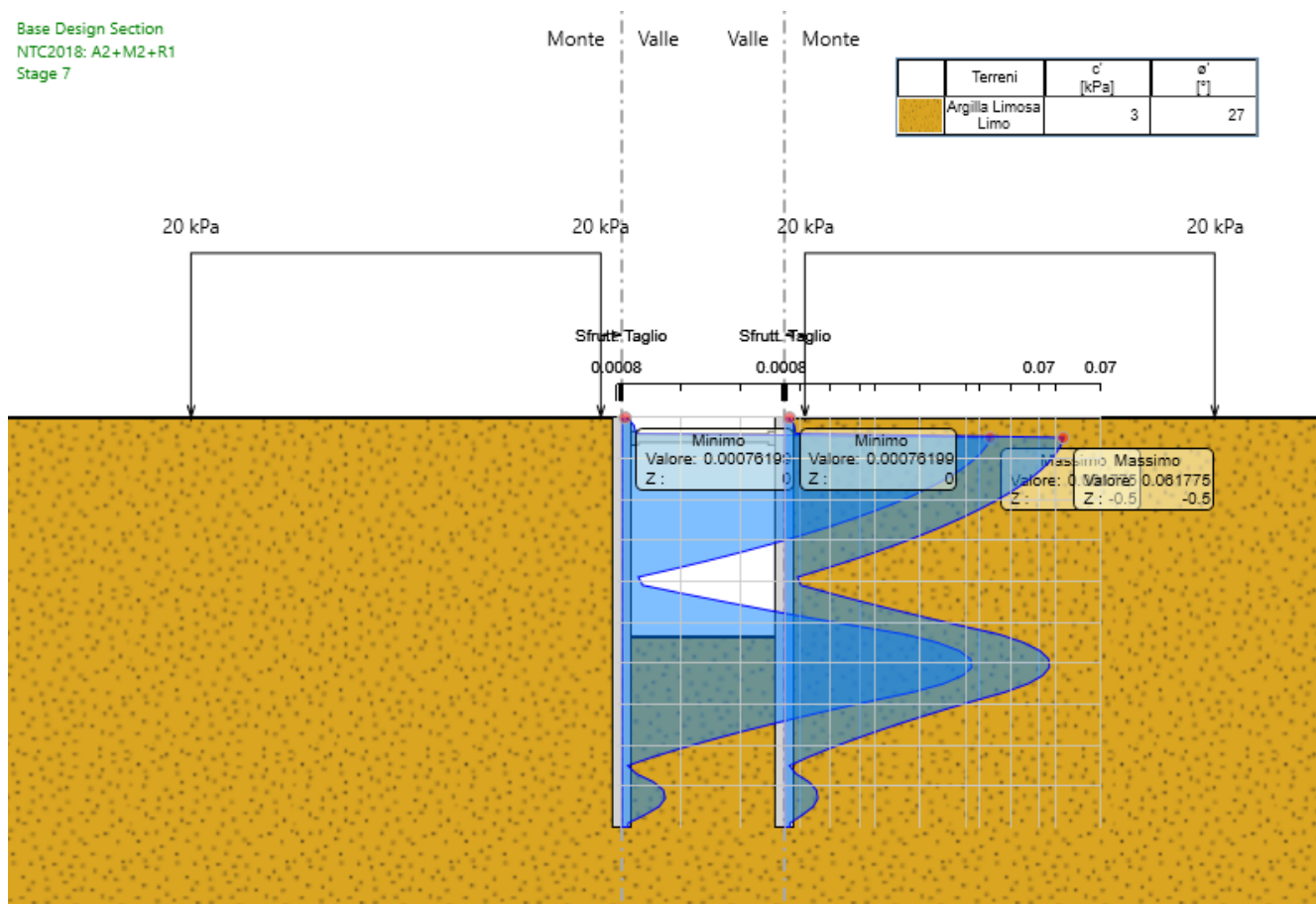
**Figura 12-10 Tasso sfruttamento Taglio (STR)**

**INTERFERENZE IDRAULICHE**

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	64 di 68

**CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
DI SOSTEGNO**

Base Design Section  
NTC2018: A2+M2+R1  
Stage 7



**Figura 12-11 Tasso sfruttamento Taglio (GEO)**

## 12.6. Instabilità puntone

La verifica del puntone è soddisfatta. I coefficienti di sfruttamento e l'instabilità risultano <1.

Sezione: D168 s=8mm S275	N [kN/m]	N [kN]	sfrut. Momento	sfrut. Taglio	Instabilità
STR	60	119	0,112	0,002	0,16
GEO	68	135	0,244	0,001	0,18

**INTERFERENZE IDRAULICHE**

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	65 di 68

**CANALE TESCOIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
DI SOSTEGNO**

### 13. ANALISI DI STABILITÀ SCAVI A CIELO APERTO

Nel seguito si riportano le analisi di stabilità condotte e i relativi fattori di sicurezza determinati per gli scavi a cielo aperto per l'installazione del collettore IN03 previsti tra le seguenti progressive:

- da pk 0 a pk 400
- da pk 550 a 665
- da pk 775 a 850

Sono state analizzate due configurazioni:

- scavo con pendenza 3H/2V
- scavo con pendenza 2H/1V

Per i parametri geotecnici, le condizioni di falda e la stratigrafia di riferimento si rimanda alla Relazione Geotecnica Generale di cui al Doc. Rif. [1] e al Profilo Geotecnico Doc. Rif. [2].

È stato considerato per entrambe le configurazioni un sovraccarico variabile a tergo dello scavo pari a 10 kPa.

La stratigrafia considerata è la seguente:


Unità	da	$\gamma$	$\phi$	$c'$
	m	kN/mc	°	kPa
Als	0	19,5	27	3

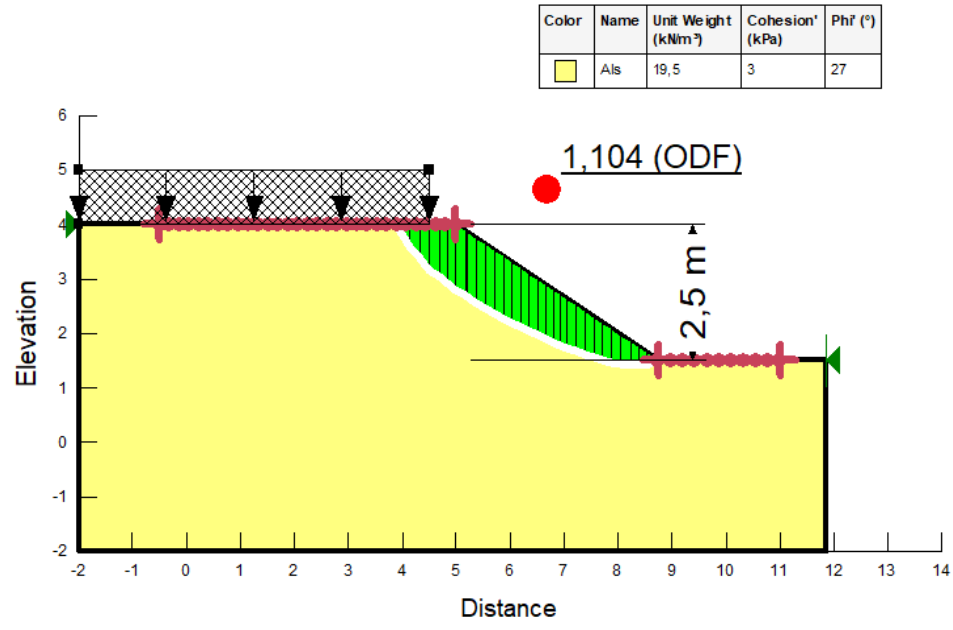
Le analisi sono state condotte in assenza di falda e considerando il terreno con comportamento drenato.

#### 13.1. Analisi di Stabilità scavo 3H/2V

Nel caso in esame l'altezza massima di scavo risulta pari a circa 2.5 m in sponda destra, alla progressiva pk 75.

Nella seguente figura si riporta il modello di calcolo implementato nel software GeoSlope, riportando i risultati nella combinazione A2+M2+R2.

 <p><b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE</p>	<p><b>POTENZIAMENTO DELLA LINEA FOLIGNO-TERONTOLA INTERVENTI DI SEMPLIFICAZIONE E VELOCIZZAZIONE SUL PRG DELLA STAZIONE DI ASSISI PROGETTO DEFINITIVO</b></p>												
<p><b>INTERFERENZE IDRAULICHE</b></p> <p>CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE DI SOSTEGNO</p>	<table border="1"> <tr> <td>COMMESSA</td> <td>LOTTO</td> <td>CODIFICA</td> <td>DOCUMENTO</td> <td>REV.</td> <td>FOGLIO</td> </tr> <tr> <td>IR0B</td> <td>00</td> <td>D10</td> <td>CL IN.03.0.9 001</td> <td>A</td> <td>66 di 68</td> </tr> </table>	COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO	IR0B	00	D10	CL IN.03.0.9 001	A	66 di 68
COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO								
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**Figura 13-1 Sezione di calcolo scavo a cielo aperto**

La verifica di stabilità risulta soddisfatta, essendo  $FS=1.104 \geq 1.1$

**13.2. Analisi di Stabilità scavo 2H/1V**

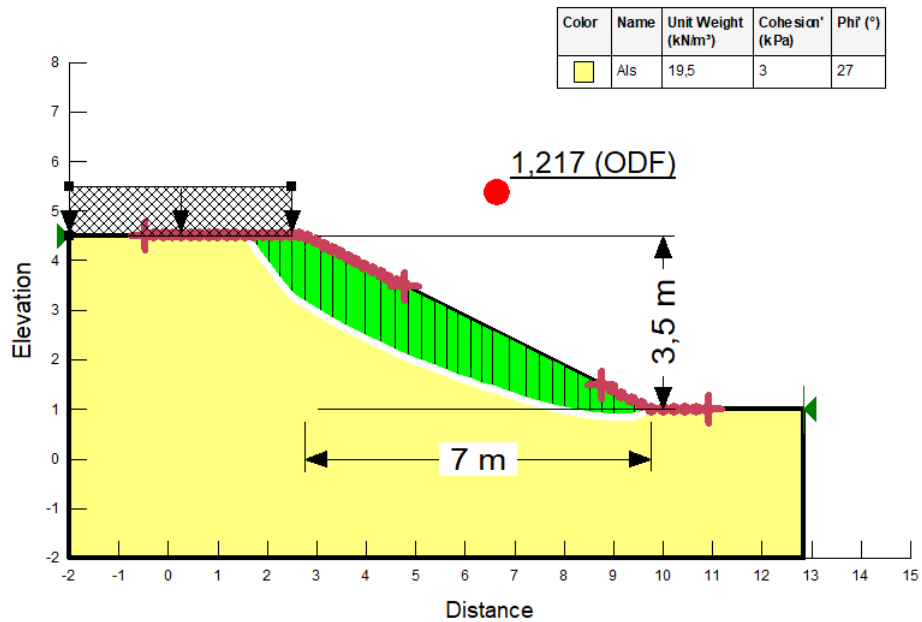
Nel caso degli scavi a cielo aperto caratterizzati da una pendenza 2H/1V, l'altezza massima di scavo è di 3.5 m in sponda destra alla progressiva pk 825.

Nella seguente figura si riporta il modello di calcolo implementato nel software GeoSlope, riportando i risultati nella combinazione A2+M2+R2.

**INTERFERENZE IDRAULICHE**

**CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
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COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
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**Figura 13-2 Sezione di calcolo scavo a cielo aperto sponda destra**

La verifica di stabilità risulta soddisfatta, essendo  $FS=1.2 \geq 1.1$



**POTENZIAMENTO DELLA LINEA FOLIGNO-TERONTOLA  
INTERVENTI DI SEMPLIFICAZIONE E VELOCIZZAZIONE SUL  
PRG DELLA STAZIONE DI ASSISI  
PROGETTO DEFINITIVO**

**INTERFERENZE IDRAULICHE**

**CANALE TESCIO - RELAZIONE DI CALCOLO SCAVI E OPERE  
DI SOSTEGNO**

COMMESSA	LOTTO	CODIFICA	DOCUMENTO	REV.	FOGLIO
IR0B	00	D10	CL IN.03.0.9 001	A	68 di 68

**14. ALLEGATI**



ALLEGATO 1:

IN03 - SCAVO CON PALANCOLE TIPO 1 – PALANCOLA A SBALZO  
IN ASSENZA DI CARICO

PARATIE plus™

***Report di Calcolo***

# Sommario

## Contenuto Sommario

## **1. Descrizione Progetto**

Palancola a sbalzo in assenza di carico in testa

## ***2. Descrizione del Software***

ParatiePlus è un codice agli elementi finiti che simula il problema di uno scavo sostenuto da diaframmi flessibili e permette di valutare il comportamento della parete di sostegno durante tutte le fasi intermedie e nella configurazione finale.

### 3. Descrizione della Stratigrafia e degli Strati di Terreno

Tipo : HORIZONTAL

Quota : 0 m

OCR : 1

Strato di Terreno	Terreno	$\gamma$ dry kN/m <sup>3</sup>	$\gamma$ sat kN/m <sup>3</sup>	$\phi'$ °	$\phi$ °	$c_v$ °	$\phi_p$ °	$c'$ kPa	Su kPa	Modulo Elastico Eu	Evc kPa	Eur kPa	Ah	Av	exp Pa	Rur/Rvc	Rvc	Ku kPa	Kvc kN/m <sup>3</sup>	Kur kN/m <sup>3</sup>
1	Argilla Limosa	19	19.5	27				3	Constant	10000	16000									

## 4. Descrizione Pareti

X : 0 m

Quota in alto : 0 m

Quota di fondo : -12 m

Muro di sinistra

Sezione : Default Section

Area equivalente : 0.01829 m

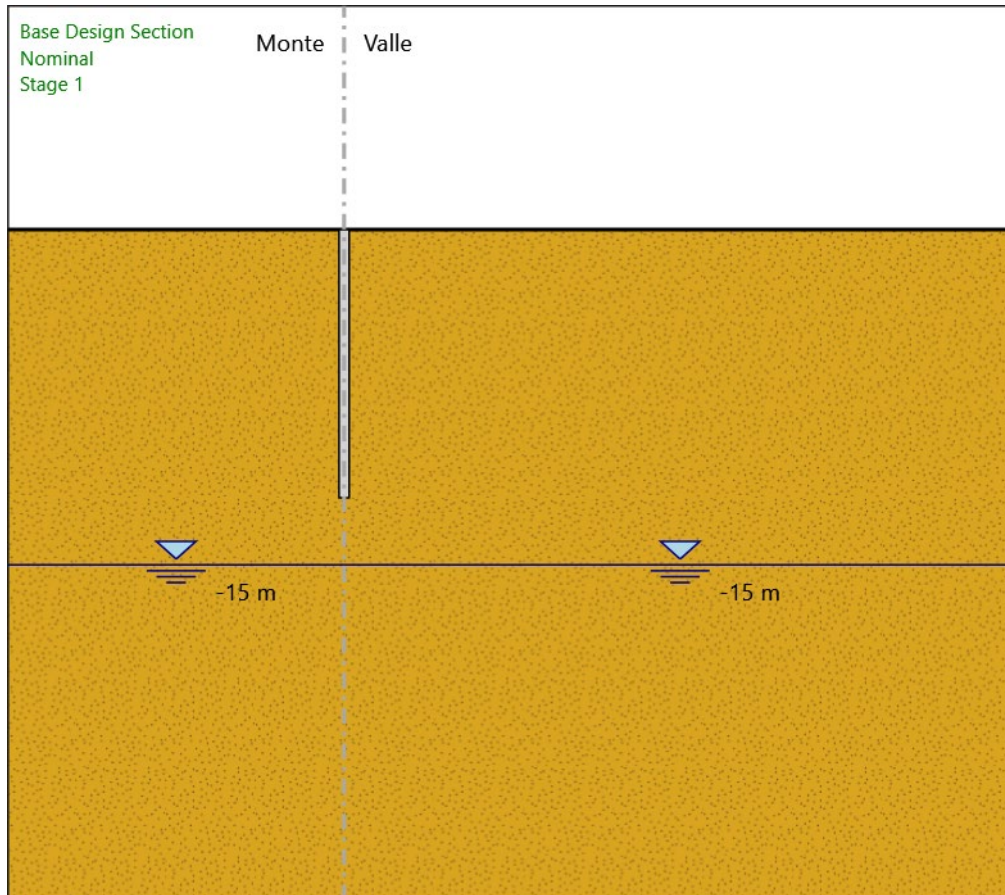
Inerzia equivalente : 0.0002 m<sup>4</sup>/m

Profilo palanca : PU\_22



## 5. Fasi di Calcolo

### 5.1. Stage 1



Stage 1

Scavo

Muro di sinistra

Lato monte : 0 m

Lato valle : 0 m

Linea di scavo di sinistra (Orizzontale)

0 m

Linea di scavo di destra (Orizzontale)

0 m

Falda acquifera

Falda di sinistra : -15 m

Falda di destra : -15 m

Elementi strutturali

Paratia : WallElement

X : 0 m

Quota in alto : 0 m

Quota di fondo : -12 m

Sezione : Default Section

Paratia : WallElement\_New

X : 3 m

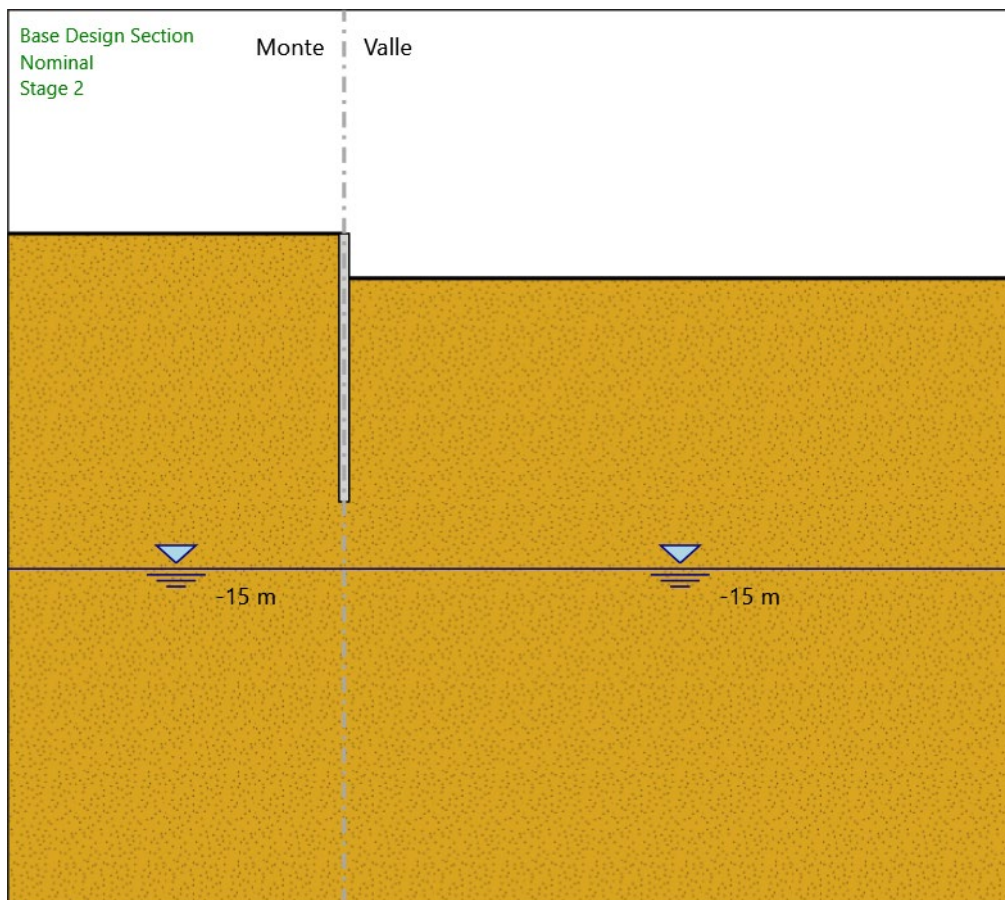
Quota in alto : 0 m

Quota di fondo : -9 m

Sezione : Default Section



## 5.2. Stage 2



Stage 2

Scavo

Muro di sinistra

Lato monte : 0 m

Lato valle : -2 m

Linea di scavo di sinistra (Orizzontale)

0 m

Linea di scavo di destra (Orizzontale)

-2 m

Falda acquifera

Falda di sinistra : -15 m

Falda di destra : -15 m

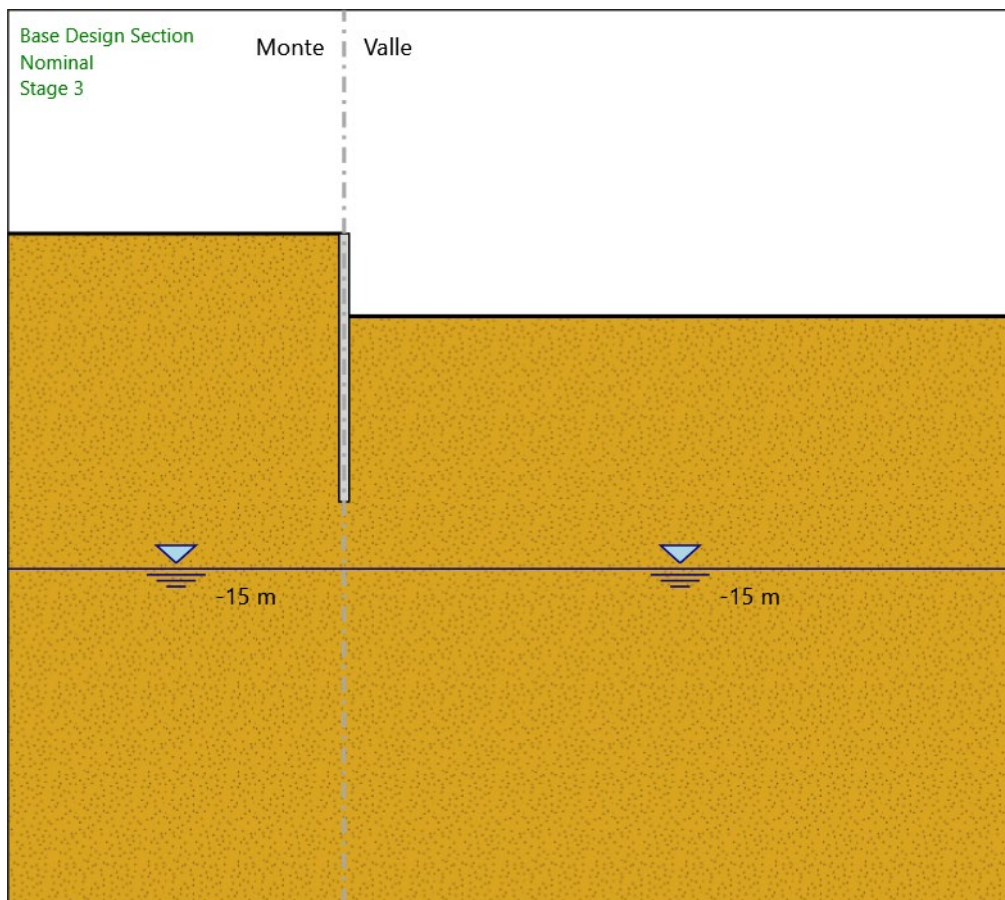
Elementi strutturali

Paratia : WallElement

X : 0 m

Quota in alto : 0 m  
Quota di fondo : -12 m  
Sezione : Default Section  
Paratia : WallElement\_New  
X : 3 m  
Quota in alto : 0 m  
Quota di fondo : -9 m  
Sezione : Default Section

### 5.3. Stage 3



Stage 3

Scavo

Muro di sinistra

Lato monte : 0 m

Lato valle : -3.7 m

Linea di scavo di sinistra (Orizzontale)

0 m

Linea di scavo di destra (Orizzontale)

-3.7 m

Falda acquifera

Falda di sinistra : -15 m

Falda di destra : -15 m

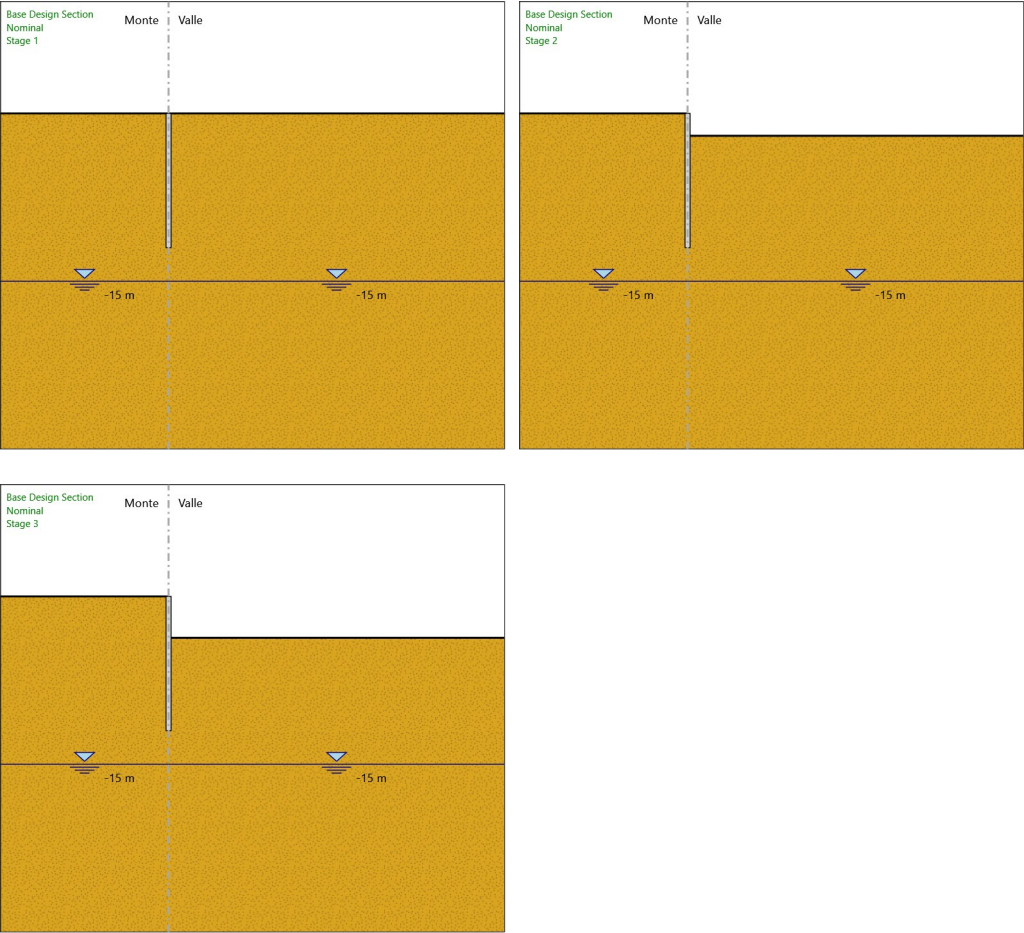
Elementi strutturali

Paratia : WallElement

X : 0 m

Quota in alto : 0 m  
Quota di fondo : -12 m  
Sezione : Default Section  
Paratia : WallElement\_New  
X : 3 m  
Quota in alto : 0 m  
Quota di fondo : -9 m  
Sezione : Default Section

### 5.4. Tabella Configurazione Stage (Nominal)



## 6. Grafici dei Risultati

### 6.1. Design Assumption : Nominal

#### 6.1.1. Tabella Spostamento Nominal - LEFT Stage: Stage 1

Design Assumption: Nominal	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento (mm)
Stage 1	0	0
Stage 1	-0.2	0
Stage 1	-0.4	0
Stage 1	-0.6	0
Stage 1	-0.8	0
Stage 1	-1	0
Stage 1	-1.2	0
Stage 1	-1.4	0
Stage 1	-1.6	0
Stage 1	-1.8	0
Stage 1	-2	0
Stage 1	-2.2	0
Stage 1	-2.4	0
Stage 1	-2.6	0
Stage 1	-2.8	0
Stage 1	-3	0
Stage 1	-3.2	0
Stage 1	-3.4	0
Stage 1	-3.6	0
Stage 1	-3.8	0
Stage 1	-4	0
Stage 1	-4.2	0
Stage 1	-4.4	0
Stage 1	-4.6	0
Stage 1	-4.8	0
Stage 1	-5	0
Stage 1	-5.2	0
Stage 1	-5.4	0
Stage 1	-5.6	0
Stage 1	-5.8	0
Stage 1	-6	0
Stage 1	-6.2	0
Stage 1	-6.4	0
Stage 1	-6.6	0
Stage 1	-6.8	0
Stage 1	-7	0
Stage 1	-7.2	0
Stage 1	-7.4	0
Stage 1	-7.6	0
Stage 1	-7.8	0
Stage 1	-8	0
Stage 1	-8.2	0
Stage 1	-8.4	0
Stage 1	-8.6	0
Stage 1	-8.8	0
Stage 1	-9	0
Stage 1	-9.2	0
Stage 1	-9.4	0
Stage 1	-9.6	0
Stage 1	-9.8	0
Stage 1	-10	0
Stage 1	-10.2	0
Stage 1	-10.4	0
Stage 1	-10.6	0
Stage 1	-10.8	0
Stage 1	-11	0
Stage 1	-11.2	0
Stage 1	-11.4	0
Stage 1	-11.6	0
Stage 1	-11.8	0
Stage 1	-12	0

## 6.1.2. Tabella Spostamento Nominal - LEFT Stage: Stage 2

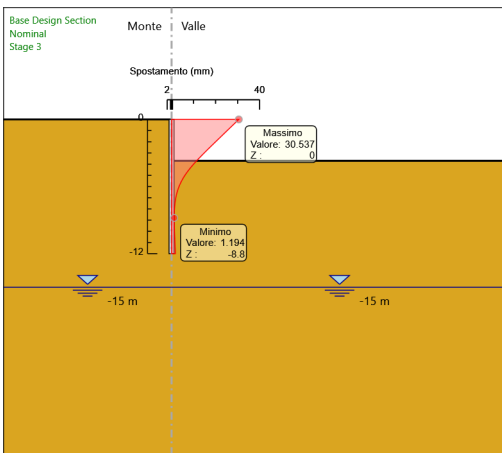
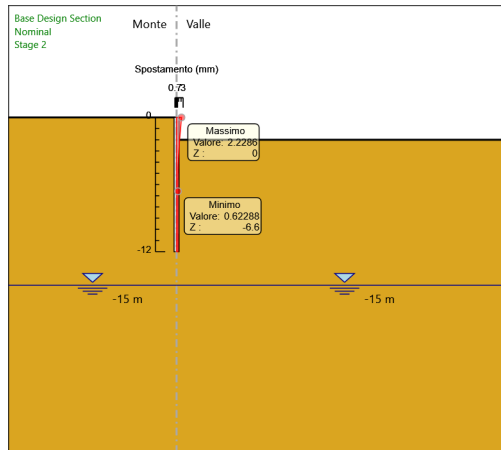
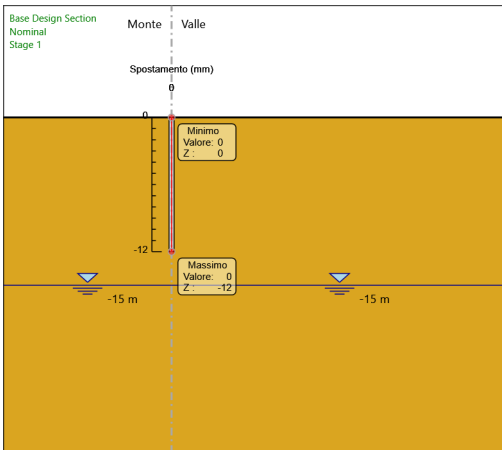
Design Assumption: Nominal	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento (mm)
Stage 2	0	2.23
Stage 2	-0.2	2.14
Stage 2	-0.4	2.06
Stage 2	-0.6	1.97
Stage 2	-0.8	1.88
Stage 2	-1	1.8
Stage 2	-1.2	1.71
Stage 2	-1.4	1.62
Stage 2	-1.6	1.54
Stage 2	-1.8	1.45
Stage 2	-2	1.37
Stage 2	-2.2	1.29
Stage 2	-2.4	1.21
Stage 2	-2.6	1.14
Stage 2	-2.8	1.07
Stage 2	-3	1.01
Stage 2	-3.2	0.95
Stage 2	-3.4	0.9
Stage 2	-3.6	0.86
Stage 2	-3.8	0.82
Stage 2	-4	0.78
Stage 2	-4.2	0.75
Stage 2	-4.4	0.72
Stage 2	-4.6	0.7
Stage 2	-4.8	0.68
Stage 2	-5	0.67
Stage 2	-5.2	0.65
Stage 2	-5.4	0.64
Stage 2	-5.6	0.64
Stage 2	-5.8	0.63
Stage 2	-6	0.63
Stage 2	-6.2	0.62
Stage 2	-6.4	0.62
Stage 2	-6.6	0.62
Stage 2	-6.8	0.62
Stage 2	-7	0.62
Stage 2	-7.2	0.62
Stage 2	-7.4	0.63
Stage 2	-7.6	0.63
Stage 2	-7.8	0.63
Stage 2	-8	0.63
Stage 2	-8.2	0.63
Stage 2	-8.4	0.63
Stage 2	-8.6	0.64
Stage 2	-8.8	0.64
Stage 2	-9	0.64
Stage 2	-9.2	0.64
Stage 2	-9.4	0.64
Stage 2	-9.6	0.64
Stage 2	-9.8	0.64
Stage 2	-10	0.64
Stage 2	-10.2	0.64
Stage 2	-10.4	0.64
Stage 2	-10.6	0.64
Stage 2	-10.8	0.64
Stage 2	-11	0.64
Stage 2	-11.2	0.64
Stage 2	-11.4	0.64
Stage 2	-11.6	0.64
Stage 2	-11.8	0.64
Stage 2	-12	0.64

### 6.1.3. Tabella Spostamento Nominal - LEFT Stage: Stage 3

Design Assumption: Nominal	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento (mm)
Stage 3	0	30.54
Stage 3	-0.2	29.48
Stage 3	-0.4	28.43
Stage 3	-0.6	27.37
Stage 3	-0.8	26.32
Stage 3	-1	25.26
Stage 3	-1.2	24.21
Stage 3	-1.4	23.15
Stage 3	-1.6	22.1
Stage 3	-1.8	21.05
Stage 3	-2	19.99
Stage 3	-2.2	18.95
Stage 3	-2.4	17.9
Stage 3	-2.6	16.86
Stage 3	-2.8	15.83
Stage 3	-3	14.81
Stage 3	-3.2	13.8
Stage 3	-3.4	12.81
Stage 3	-3.6	11.84
Stage 3	-3.8	10.9
Stage 3	-4	9.98
Stage 3	-4.2	9.11
Stage 3	-4.4	8.27
Stage 3	-4.6	7.48
Stage 3	-4.8	6.73
Stage 3	-5	6.04
Stage 3	-5.2	5.4
Stage 3	-5.4	4.82
Stage 3	-5.6	4.28
Stage 3	-5.8	3.8
Stage 3	-6	3.38
Stage 3	-6.2	3
Stage 3	-6.4	2.66
Stage 3	-6.6	2.37
Stage 3	-6.8	2.12
Stage 3	-7	1.91
Stage 3	-7.2	1.73
Stage 3	-7.4	1.59
Stage 3	-7.6	1.47
Stage 3	-7.8	1.38
Stage 3	-8	1.31
Stage 3	-8.2	1.26
Stage 3	-8.4	1.22
Stage 3	-8.6	1.2
Stage 3	-8.8	1.19
Stage 3	-9	1.2
Stage 3	-9.2	1.21
Stage 3	-9.4	1.23
Stage 3	-9.6	1.25
Stage 3	-9.8	1.28
Stage 3	-10	1.31
Stage 3	-10.2	1.35
Stage 3	-10.4	1.39
Stage 3	-10.6	1.43
Stage 3	-10.8	1.47
Stage 3	-11	1.51
Stage 3	-11.2	1.55
Stage 3	-11.4	1.59
Stage 3	-11.6	1.63
Stage 3	-11.8	1.67
Stage 3	-12	1.71



### 6.1.4. Grafici Spostamento in tabella



## 6.2. Inviluppi Spostamento Nominal

## 6.3. Risultati Paratia

### 6.3.1. Tabella Risultati Paratia Nominal - Stage: Stage 1

Design Assumption: Nominal Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	0	0	0
Stage 1	-0.2	0	0
Stage 1	-0.4	0	0
Stage 1	-0.6	0	0
Stage 1	-0.8	0	0
Stage 1	-1	0	0
Stage 1	-1.2	0	0
Stage 1	-1.4	0	0
Stage 1	-1.6	0	0
Stage 1	-1.8	0	0
Stage 1	-2	0	0
Stage 1	-2.2	0	0
Stage 1	-2.4	0	0
Stage 1	-2.6	0	0
Stage 1	-2.8	0	0
Stage 1	-3	0	0
Stage 1	-3.2	0	0
Stage 1	-3.4	0	0
Stage 1	-3.6	0	0
Stage 1	-3.8	0	0
Stage 1	-4	0	0
Stage 1	-4.2	0	0
Stage 1	-4.4	0	0
Stage 1	-4.6	0	0
Stage 1	-4.8	0	0
Stage 1	-5	0	0
Stage 1	-5.2	0	0
Stage 1	-5.4	0	0
Stage 1	-5.6	0	0
Stage 1	-5.8	0	0
Stage 1	-6	0	0
Stage 1	-6.2	0	0
Stage 1	-6.4	0	0
Stage 1	-6.6	0	0
Stage 1	-6.8	0	0
Stage 1	-7	0	0
Stage 1	-7.2	0	0
Stage 1	-7.4	0	0
Stage 1	-7.6	0	0
Stage 1	-7.8	0	0
Stage 1	-8	0	0
Stage 1	-8.2	0	0
Stage 1	-8.4	0	0
Stage 1	-8.6	0	0
Stage 1	-8.8	0	0
Stage 1	-9	0	0
Stage 1	-9.2	0	0
Stage 1	-9.4	0	0
Stage 1	-9.6	0	0
Stage 1	-9.8	0	0
Stage 1	-10	0	0
Stage 1	-10.2	0	0
Stage 1	-10.4	0	0
Stage 1	-10.6	0	0
Stage 1	-10.8	0	0
Stage 1	-11	0	0
Stage 1	-11.2	0	0
Stage 1	-11.4	0	0
Stage 1	-11.6	0	0
Stage 1	-11.8	0	0
Stage 1	-12	0	0

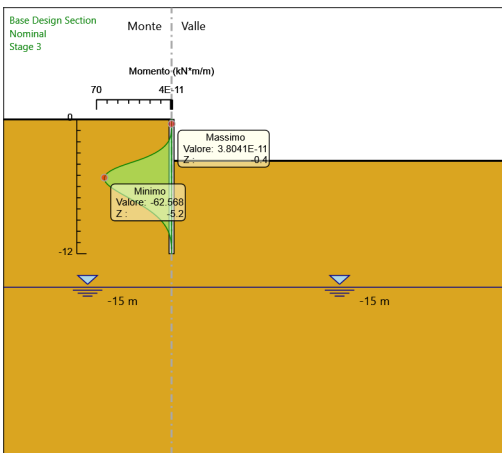
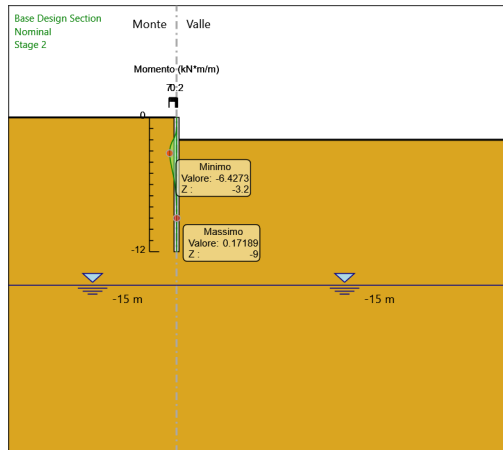
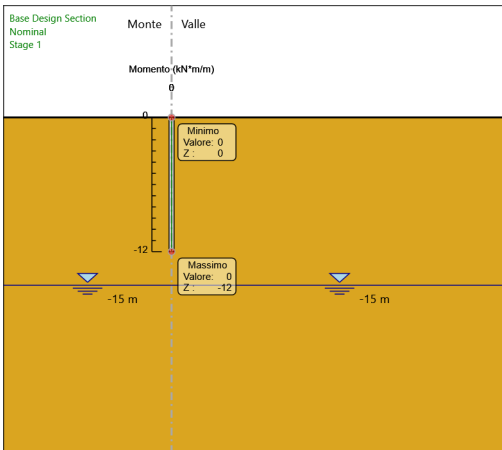
### 6.3.2. Tabella Risultati Paratia Nominal - Stage: Stage 2

Design Assumption: Nominal Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	0	0	0
Stage 2	-0.2	0	0
Stage 2	-0.2	0	0
Stage 2	-0.4	0	0
Stage 2	-0.4	0	0
Stage 2	-0.6	0	0
Stage 2	-0.6	0	0
Stage 2	-0.8	-0.01	-0.06
Stage 2	-1	-0.09	-0.38
Stage 2	-1.2	-0.28	-0.94
Stage 2	-1.4	-0.63	-1.76
Stage 2	-1.6	-1.19	-2.82
Stage 2	-1.8	-2.02	-4.14
Stage 2	-2	-3.16	-5.71
Stage 2	-2.2	-4.26	-5.51
Stage 2	-2.4	-5.13	-4.31
Stage 2	-2.6	-5.75	-3.12
Stage 2	-2.8	-6.16	-2.04
Stage 2	-3	-6.37	-1.08
Stage 2	-3.2	-6.43	-0.27
Stage 2	-3.4	-6.35	0.41
Stage 2	-3.6	-6.15	0.96
Stage 2	-3.8	-5.88	1.39
Stage 2	-4	-5.54	1.71
Stage 2	-4.2	-5.15	1.93
Stage 2	-4.4	-4.73	2.08
Stage 2	-4.6	-4.3	2.16
Stage 2	-4.8	-3.87	2.17
Stage 2	-5	-3.44	2.14
Stage 2	-5.2	-3.02	2.07
Stage 2	-5.4	-2.63	1.98
Stage 2	-5.6	-2.26	1.86
Stage 2	-5.8	-1.91	1.72
Stage 2	-6	-1.6	1.58
Stage 2	-6.2	-1.31	1.43
Stage 2	-6.4	-1.06	1.28
Stage 2	-6.6	-0.83	1.13
Stage 2	-6.8	-0.63	0.99
Stage 2	-7	-0.46	0.85
Stage 2	-7.2	-0.32	0.72
Stage 2	-7.4	-0.2	0.61
Stage 2	-7.6	-0.1	0.5
Stage 2	-7.8	-0.02	0.4
Stage 2	-8	0.05	0.32
Stage 2	-8.2	0.09	0.24
Stage 2	-8.4	0.13	0.17
Stage 2	-8.6	0.15	0.12
Stage 2	-8.8	0.17	0.07
Stage 2	-9	0.17	0.03
Stage 2	-9.2	0.17	-0.01
Stage 2	-9.4	0.16	-0.03
Stage 2	-9.6	0.15	-0.05
Stage 2	-9.8	0.14	-0.07
Stage 2	-10	0.12	-0.08
Stage 2	-10.2	0.11	-0.09
Stage 2	-10.4	0.09	-0.09
Stage 2	-10.6	0.07	-0.09
Stage 2	-10.8	0.06	-0.08
Stage 2	-11	0.04	-0.08
Stage 2	-11.2	0.03	-0.07
Stage 2	-11.4	0.02	-0.06
Stage 2	-11.6	0.01	-0.04
Stage 2	-11.8	0	-0.03
Stage 2	-12	0	-0.01

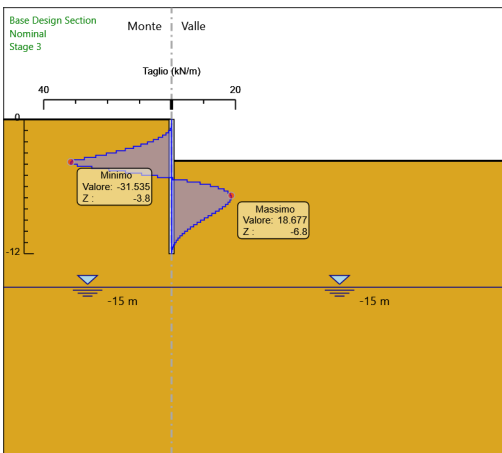
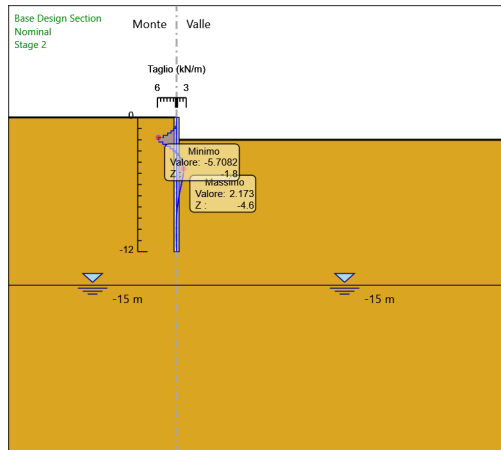
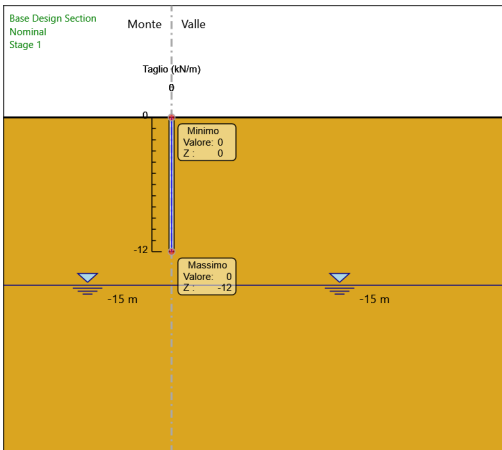
### 6.3.3. Tabella Risultati Paratia Nominal - Stage: Stage 3

Design Assumption: Nominal Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	0	0	0
Stage 3	-0.2	0	0
Stage 3	-0.2	0	0
Stage 3	-0.4	0	0
Stage 3	-0.4	0	0
Stage 3	-0.6	0	0
Stage 3	-0.6	0	0
Stage 3	-0.8	-0.01	-0.06
Stage 3	-1	-0.09	-0.38
Stage 3	-1.2	-0.28	-0.94
Stage 3	-1.4	-0.63	-1.76
Stage 3	-1.6	-1.19	-2.82
Stage 3	-1.8	-2.02	-4.14
Stage 3	-2	-3.16	-5.71
Stage 3	-2.2	-4.67	-7.53
Stage 3	-2.4	-6.59	-9.6
Stage 3	-2.6	-8.97	-11.92
Stage 3	-2.8	-11.87	-14.49
Stage 3	-3	-15.33	-17.31
Stage 3	-3.2	-19.41	-20.38
Stage 3	-3.4	-24.15	-23.71
Stage 3	-3.6	-29.6	-27.28
Stage 3	-3.8	-35.82	-31.1
Stage 3	-4	-42.13	-31.54
Stage 3	-4.2	-48.03	-29.48
Stage 3	-4.4	-53.01	-24.94
Stage 3	-4.6	-56.94	-19.61
Stage 3	-4.8	-59.82	-14.42
Stage 3	-5	-61.69	-9.35
Stage 3	-5.2	-62.57	-4.39
Stage 3	-5.4	-62.5	0.35
Stage 3	-5.6	-61.52	4.86
Stage 3	-5.8	-59.74	8.92
Stage 3	-6	-57.31	12.14
Stage 3	-6.2	-54.39	14.61
Stage 3	-6.4	-51.1	16.42
Stage 3	-6.6	-47.58	17.65
Stage 3	-6.8	-43.9	18.38
Stage 3	-7	-40.16	18.68
Stage 3	-7.2	-36.44	18.62
Stage 3	-7.4	-32.79	18.26
Stage 3	-7.6	-29.26	17.66
Stage 3	-7.8	-25.88	16.87
Stage 3	-8	-22.7	15.93
Stage 3	-8.2	-19.72	14.88
Stage 3	-8.4	-16.97	13.77
Stage 3	-8.6	-14.45	12.6
Stage 3	-8.8	-12.16	11.43
Stage 3	-9	-10.11	10.25
Stage 3	-9.2	-8.29	9.1
Stage 3	-9.4	-6.69	7.99
Stage 3	-9.6	-5.31	6.92
Stage 3	-9.8	-4.13	5.92
Stage 3	-10	-3.13	4.98
Stage 3	-10.2	-2.31	4.12
Stage 3	-10.4	-1.64	3.33
Stage 3	-10.6	-1.12	2.62
Stage 3	-10.8	-0.72	2
Stage 3	-11	-0.43	1.46
Stage 3	-11.2	-0.23	1
Stage 3	-11.4	-0.1	0.63
Stage 3	-11.6	-0.03	0.34
Stage 3	-11.8	0	0.14
Stage 3	-12	0	0.02

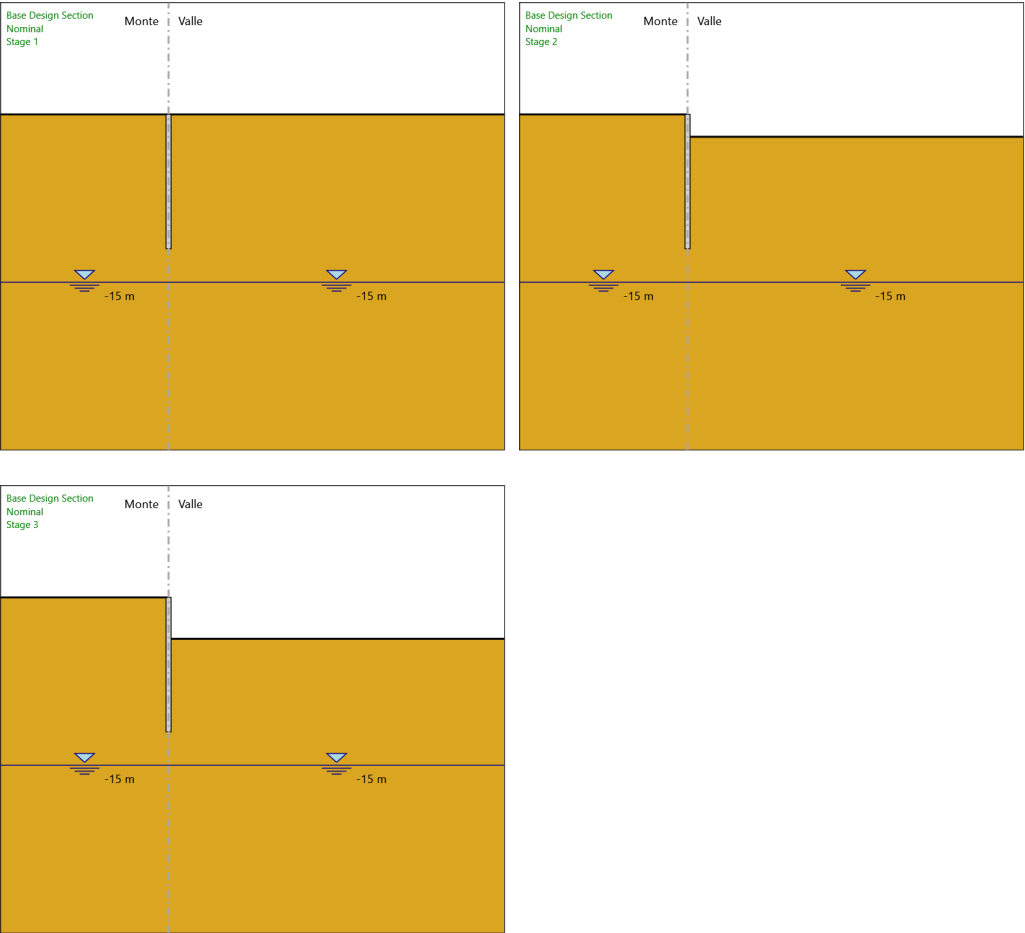
### 6.3.4. Grafico Momento Nominal



### 6.3.5. Grafico Taglio Nominal

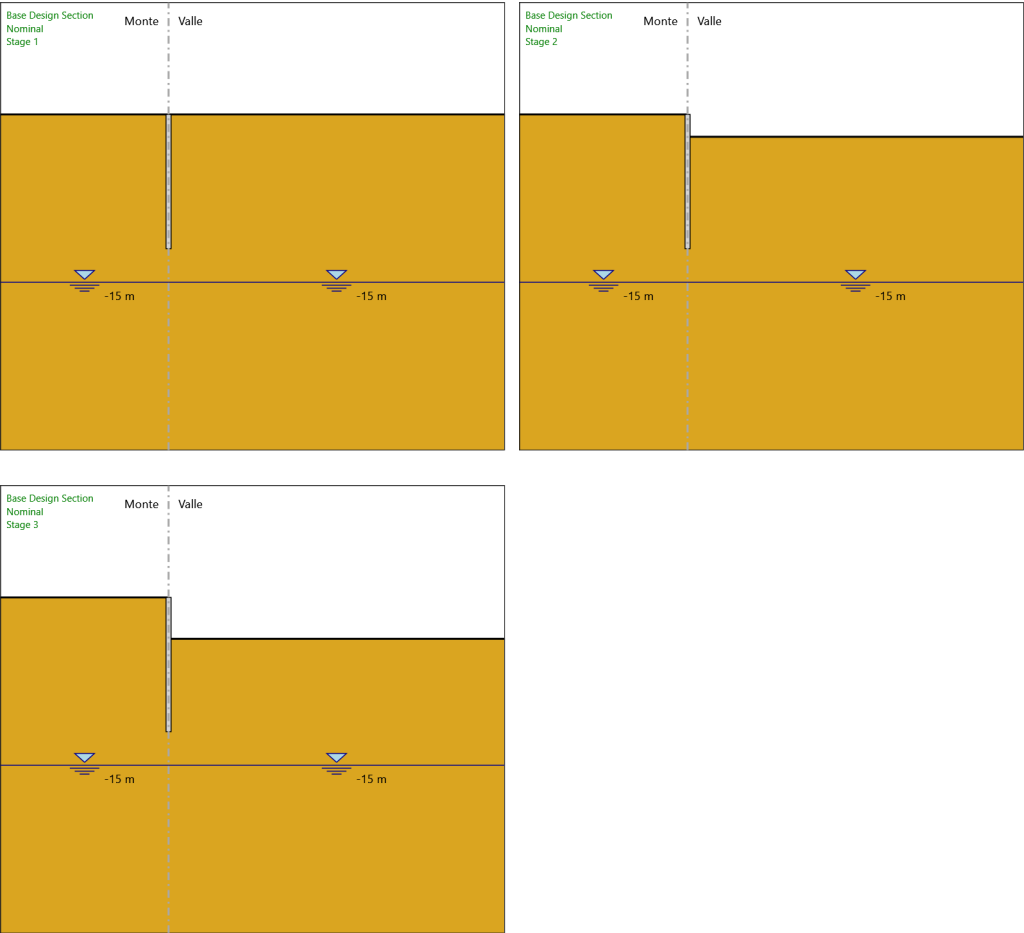


### 6.3.6. Grafico Momento Nominal





### 6.3.7. Grafico Taglio Nominal



## 6.4. Involuppi Risultati Paratia Nominal

## 6.4. Riepilogo spinte

Design Assump- tion: Nominal	Tipo Risultato: Riepi- logo spinte	Muro:	LEFT	Lato	LEFT		
Stage	Vera effettiva (kN/m)	Pressione neutra (kN/m)	Vera Totale (kN/m)	Min ammissibile (kN/m)	Max ammissibile (kN/m)	Percentuale di resi- stenza massima	Vera / Attiva
Stage 1	752.4	0	752.4	411	5062.8	14.86%	1.83
Stage 2	667.4	0	667.4	411	5062.8	13.18%	1.62
Stage 3	591.5	0	591.5	411	5062.8	11.68%	1.44

Design Assump- tion: Nominal	Tipo Risultato: Riepi- logo spinte	Muro:	LEFT	Lato	RIGHT		
Stage	Vera effettiva (kN/m)	Pressione neutra (kN/m)	Vera Totale (kN/m)	Min ammissibile (kN/m)	Max ammissibile (kN/m)	Percentuale di resi- stenza massima	Vera / Attiva
Stage 1	752.4	0	752.4	411	5062.8	14.86%	1.83
Stage 2	667.4	0	667.4	280	3535.9	18.87%	2.38
Stage 3	591.5	0	591.5	188.3	2451.5	24.13%	3.14

## 7. Descrizione Coefficienti Design Assumption

### Coefficienti A

Nome	Carichi Per- manenti Sfavorevoli (F_dead_lo ad_unfa- vour)	Carichi Per- manenti Favorevoli (F_dead_lo ad_favour)	Carichi Va- riabili Sfa- vorevoli (F_live_loa d_unfa- vour)	Carichi Va- riabili Fa- vorevoli (F_live_loa d_favour)	Carico Si- smico (F_seism_ load)	Pres sioni Lato Mon te (F_ Wa- terD R)	Pres sioni Lato Vall e (F_ Wa- ter Res)	Carichi Perma- nenti De- stabiliz- zanti (F_UPL_G DStab)	Carichi Perma- nenti Sta- bilizzanti (F_UPL_G Stab)	Carichi Va- riabili De- stabiliz- zanti (F_UPL_Q DStab)	Carichi Perma- nenti De- stabiliz- zanti (F_HYD_G DStab)	Carichi Perma- nenti Sta- bilizzanti (F_HYD_G Stab)	Carichi Va- riabili De- stabiliz- zanti (F_HYD_Q DStab)
Simbolo	$\gamma_G$	$\gamma_G$	$\gamma_Q$	$\gamma_Q$	$\gamma_{QE}$	$\gamma_G$	$\gamma_G$	$\gamma_{Gdst}$	$\gamma_{Gstb}$	$\gamma_{Qdst}$	$\gamma_{Gdst}$	$\gamma_{Gstb}$	$\gamma_{Qdst}$
Nominal	1	1	1	1	1	1	1	1	1	1	1	1	1
NTC2018 : SLE (Rara/Fr equente /Quasi Perma- nente)	1	1	1	1	0	1	1	1	1	1	1	1	1
NTC2018 : A1+M1+ R1 (R3 per ti- ranti)	1.3	1	1.5	1	0	1.3	1	1	1	1	1.3	0.9	1
NTC2018 : A2+M2+ R1	1	1	1.3	1	0	1	1	1	1	1	1.3	0.9	1

### Coefficienti M

Nome	Parziale su $\tan(\phi')$ (F_Fr)	Parziale su $c'$ (F_eff_cohe)	Parziale su Su (F_Su)	Parziale su $q_u$ (F_qu)	Parziale su peso specifico (F_gamma)
Simbolo	$\gamma_\phi$	$\gamma_c$	$\gamma_{cu}$	$\gamma_{qu}$	$\gamma_\gamma$
Nominal	1	1	1	1	1
NTC2018: SLE (Rara/Frequente/Quasi Permanente)	1	1	1	1	1
NTC2018: A1+M1+R1 (R3 per tiranti)	1	1	1	1	1
NTC2018: A2+M2+R1	1.25	1.25	1.4	1	1

### Coefficienti R

Nome	Parziale resistenza terreno (es. Kp) (F_Soil_Res_walls)	Parziale resistenza Tiranti permanenti (F_Anch_P)	Parziale resistenza Tiranti temporanei (F_Anch_T)	Parziale elementi strutturali (F_wall)
Simbolo	$\gamma_{Re}$	$\gamma_{ap}$	$\gamma_{at}$	
Nominal	1	1	1	1
NTC2018: SLE (Rara/Fre- quente/Quasi Permanente)	1	1	1	1
NTC2018: A1+M1+R1 (R3 per tiranti)	1	1.2	1.1	1
NTC2018: A2+M2+R1	1	1.2	1.1	1

## 7.1. Risultati NTC2018: SLE (Rara/Frequente/Quasi Permanente)

### 7.1.1. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 1

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Tipo Risultato: Spostamento			Muro: LEFT
Stage	Z (m)	Spostamento (mm)	
Stage 1	0	0	
Stage 1	-0.2	0	
Stage 1	-0.4	0	
Stage 1	-0.6	0	
Stage 1	-0.8	0	
Stage 1	-1	0	
Stage 1	-1.2	0	
Stage 1	-1.4	0	
Stage 1	-1.6	0	
Stage 1	-1.8	0	
Stage 1	-2	0	
Stage 1	-2.2	0	
Stage 1	-2.4	0	
Stage 1	-2.6	0	
Stage 1	-2.8	0	
Stage 1	-3	0	
Stage 1	-3.2	0	
Stage 1	-3.4	0	
Stage 1	-3.6	0	
Stage 1	-3.8	0	
Stage 1	-4	0	
Stage 1	-4.2	0	
Stage 1	-4.4	0	
Stage 1	-4.6	0	
Stage 1	-4.8	0	
Stage 1	-5	0	
Stage 1	-5.2	0	
Stage 1	-5.4	0	
Stage 1	-5.6	0	
Stage 1	-5.8	0	
Stage 1	-6	0	
Stage 1	-6.2	0	
Stage 1	-6.4	0	
Stage 1	-6.6	0	
Stage 1	-6.8	0	
Stage 1	-7	0	
Stage 1	-7.2	0	
Stage 1	-7.4	0	
Stage 1	-7.6	0	
Stage 1	-7.8	0	
Stage 1	-8	0	
Stage 1	-8.2	0	
Stage 1	-8.4	0	
Stage 1	-8.6	0	
Stage 1	-8.8	0	
Stage 1	-9	0	
Stage 1	-9.2	0	
Stage 1	-9.4	0	
Stage 1	-9.6	0	
Stage 1	-9.8	0	
Stage 1	-10	0	
Stage 1	-10.2	0	
Stage 1	-10.4	0	
Stage 1	-10.6	0	
Stage 1	-10.8	0	
Stage 1	-11	0	
Stage 1	-11.2	0	
Stage 1	-11.4	0	
Stage 1	-11.6	0	
Stage 1	-11.8	0	
Stage 1	-12	0	

**7.1.2. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 1**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	0	0	0
Stage 1	-0.2	0	0
Stage 1	-0.4	0	0
Stage 1	-0.6	0	0
Stage 1	-0.8	0	0
Stage 1	-1	0	0
Stage 1	-1.2	0	0
Stage 1	-1.4	0	0
Stage 1	-1.6	0	0
Stage 1	-1.8	0	0
Stage 1	-2	0	0
Stage 1	-2.2	0	0
Stage 1	-2.4	0	0
Stage 1	-2.6	0	0
Stage 1	-2.8	0	0
Stage 1	-3	0	0
Stage 1	-3.2	0	0
Stage 1	-3.4	0	0
Stage 1	-3.6	0	0
Stage 1	-3.8	0	0
Stage 1	-4	0	0
Stage 1	-4.2	0	0
Stage 1	-4.4	0	0
Stage 1	-4.6	0	0
Stage 1	-4.8	0	0
Stage 1	-5	0	0
Stage 1	-5.2	0	0
Stage 1	-5.4	0	0
Stage 1	-5.6	0	0
Stage 1	-5.8	0	0
Stage 1	-6	0	0
Stage 1	-6.2	0	0
Stage 1	-6.4	0	0
Stage 1	-6.6	0	0
Stage 1	-6.8	0	0
Stage 1	-7	0	0
Stage 1	-7.2	0	0
Stage 1	-7.4	0	0
Stage 1	-7.6	0	0
Stage 1	-7.8	0	0
Stage 1	-8	0	0
Stage 1	-8.2	0	0
Stage 1	-8.4	0	0
Stage 1	-8.6	0	0
Stage 1	-8.8	0	0
Stage 1	-9	0	0
Stage 1	-9.2	0	0
Stage 1	-9.4	0	0
Stage 1	-9.6	0	0
Stage 1	-9.8	0	0
Stage 1	-10	0	0
Stage 1	-10.2	0	0
Stage 1	-10.4	0	0
Stage 1	-10.6	0	0
Stage 1	-10.8	0	0
Stage 1	-11	0	0
Stage 1	-11.2	0	0
Stage 1	-11.4	0	0
Stage 1	-11.6	0	0
Stage 1	-11.8	0	0
Stage 1	-12	0	0

### 7.1.3. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 2

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Tipo Risultato: Spostamento Muro: LEFT		
Stage	Z (m)	Spostamento (mm)
Stage 2	0	2.23
Stage 2	-0.2	2.14
Stage 2	-0.4	2.06
Stage 2	-0.6	1.97
Stage 2	-0.8	1.88
Stage 2	-1	1.8
Stage 2	-1.2	1.71
Stage 2	-1.4	1.62
Stage 2	-1.6	1.54
Stage 2	-1.8	1.45
Stage 2	-2	1.37
Stage 2	-2.2	1.29
Stage 2	-2.4	1.21
Stage 2	-2.6	1.14
Stage 2	-2.8	1.07
Stage 2	-3	1.01
Stage 2	-3.2	0.95
Stage 2	-3.4	0.9
Stage 2	-3.6	0.86
Stage 2	-3.8	0.82
Stage 2	-4	0.78
Stage 2	-4.2	0.75
Stage 2	-4.4	0.72
Stage 2	-4.6	0.7
Stage 2	-4.8	0.68
Stage 2	-5	0.67
Stage 2	-5.2	0.65
Stage 2	-5.4	0.64
Stage 2	-5.6	0.64
Stage 2	-5.8	0.63
Stage 2	-6	0.63
Stage 2	-6.2	0.62
Stage 2	-6.4	0.62
Stage 2	-6.6	0.62
Stage 2	-6.8	0.62
Stage 2	-7	0.62
Stage 2	-7.2	0.62
Stage 2	-7.4	0.63
Stage 2	-7.6	0.63
Stage 2	-7.8	0.63
Stage 2	-8	0.63
Stage 2	-8.2	0.63
Stage 2	-8.4	0.63
Stage 2	-8.6	0.64
Stage 2	-8.8	0.64
Stage 2	-9	0.64
Stage 2	-9.2	0.64
Stage 2	-9.4	0.64
Stage 2	-9.6	0.64
Stage 2	-9.8	0.64
Stage 2	-10	0.64
Stage 2	-10.2	0.64
Stage 2	-10.4	0.64
Stage 2	-10.6	0.64
Stage 2	-10.8	0.64
Stage 2	-11	0.64
Stage 2	-11.2	0.64
Stage 2	-11.4	0.64
Stage 2	-11.6	0.64
Stage 2	-11.8	0.64
Stage 2	-12	0.64

**7.1.4. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 2**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	0	0	0
Stage 2	-0.2	0	0
Stage 2	-0.2	0	0
Stage 2	-0.4	0	0
Stage 2	-0.4	0	0
Stage 2	-0.6	0	0
Stage 2	-0.6	0	0
Stage 2	-0.8	-0.01	-0.06
Stage 2	-1	-0.09	-0.38
Stage 2	-1.2	-0.28	-0.94
Stage 2	-1.4	-0.63	-1.76
Stage 2	-1.6	-1.19	-2.82
Stage 2	-1.8	-2.02	-4.14
Stage 2	-2	-3.16	-5.71
Stage 2	-2.2	-4.26	-5.51
Stage 2	-2.4	-5.13	-4.31
Stage 2	-2.6	-5.75	-3.12
Stage 2	-2.8	-6.16	-2.04
Stage 2	-3	-6.37	-1.08
Stage 2	-3.2	-6.43	-0.27
Stage 2	-3.4	-6.35	0.41
Stage 2	-3.6	-6.15	0.96
Stage 2	-3.8	-5.88	1.39
Stage 2	-4	-5.54	1.71
Stage 2	-4.2	-5.15	1.93
Stage 2	-4.4	-4.73	2.08
Stage 2	-4.6	-4.3	2.16
Stage 2	-4.8	-3.87	2.17
Stage 2	-5	-3.44	2.14
Stage 2	-5.2	-3.02	2.07
Stage 2	-5.4	-2.63	1.98
Stage 2	-5.6	-2.26	1.86
Stage 2	-5.8	-1.91	1.72
Stage 2	-6	-1.6	1.58
Stage 2	-6.2	-1.31	1.43
Stage 2	-6.4	-1.06	1.28
Stage 2	-6.6	-0.83	1.13
Stage 2	-6.8	-0.63	0.99
Stage 2	-7	-0.46	0.85
Stage 2	-7.2	-0.32	0.72
Stage 2	-7.4	-0.2	0.61
Stage 2	-7.6	-0.1	0.5
Stage 2	-7.8	-0.02	0.4
Stage 2	-8	0.05	0.32
Stage 2	-8.2	0.09	0.24
Stage 2	-8.4	0.13	0.17
Stage 2	-8.6	0.15	0.12
Stage 2	-8.8	0.17	0.07
Stage 2	-9	0.17	0.03
Stage 2	-9.2	0.17	-0.01
Stage 2	-9.4	0.16	-0.03
Stage 2	-9.6	0.15	-0.05
Stage 2	-9.8	0.14	-0.07
Stage 2	-10	0.12	-0.08
Stage 2	-10.2	0.11	-0.09
Stage 2	-10.4	0.09	-0.09
Stage 2	-10.6	0.07	-0.09
Stage 2	-10.8	0.06	-0.08
Stage 2	-11	0.04	-0.08
Stage 2	-11.2	0.03	-0.07
Stage 2	-11.4	0.02	-0.06
Stage 2	-11.6	0.01	-0.04
Stage 2	-11.8	0	-0.03
Stage 2	-12	0	-0.01



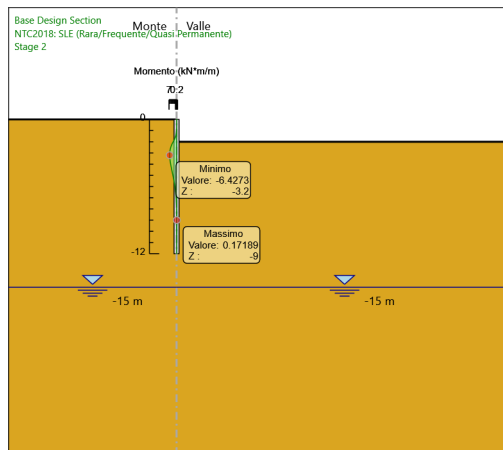
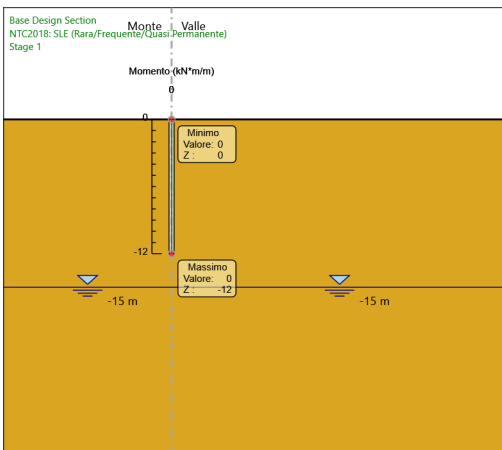
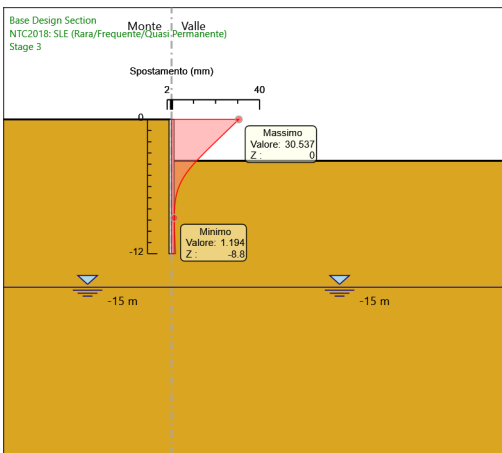
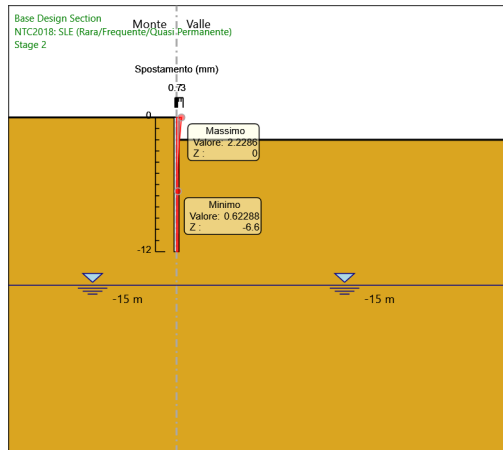
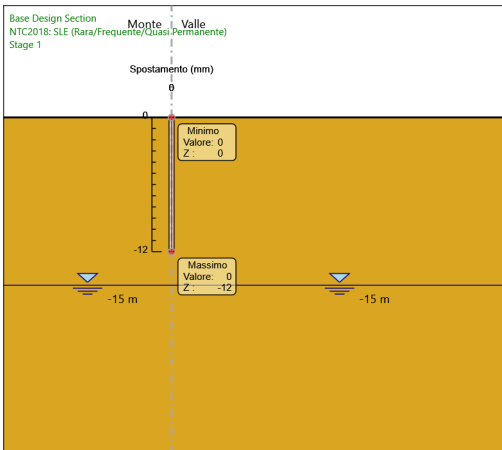
### 7.1.5. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 3

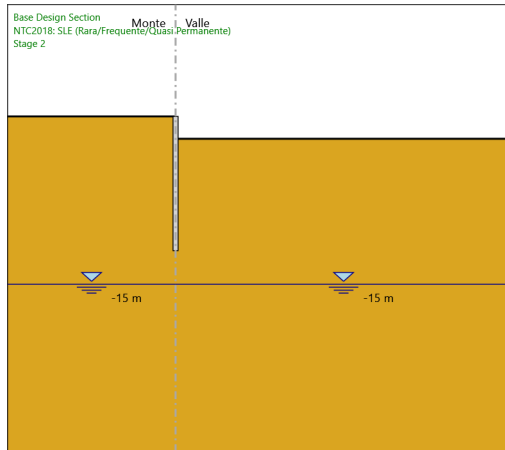
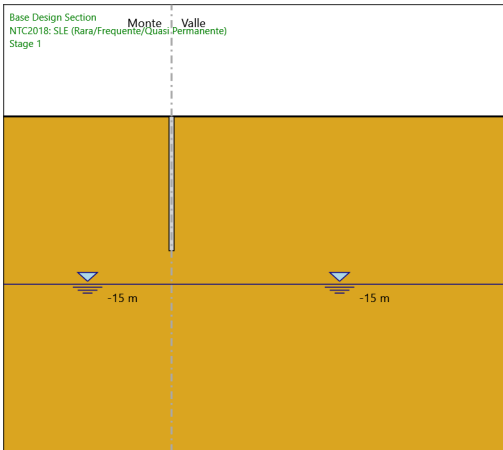
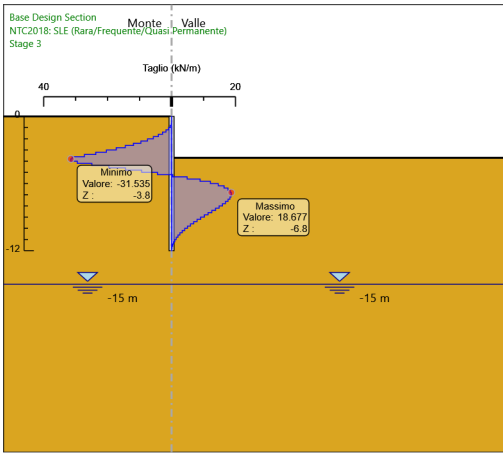
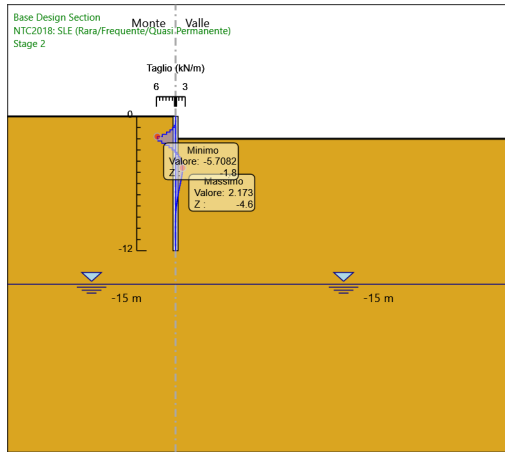
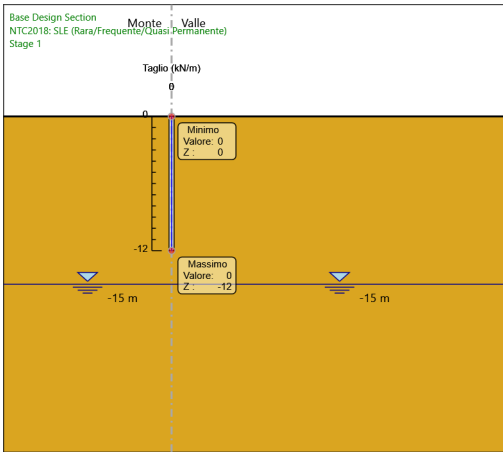
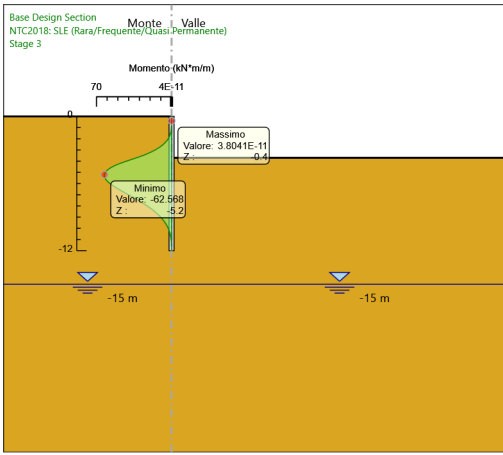
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Tipo Risultato: Spostamento			Muro: LEFT
Stage	Z (m)	Spostamento (mm)	
Stage 3	0	30.54	
Stage 3	-0.2	29.48	
Stage 3	-0.4	28.43	
Stage 3	-0.6	27.37	
Stage 3	-0.8	26.32	
Stage 3	-1	25.26	
Stage 3	-1.2	24.21	
Stage 3	-1.4	23.15	
Stage 3	-1.6	22.1	
Stage 3	-1.8	21.05	
Stage 3	-2	19.99	
Stage 3	-2.2	18.95	
Stage 3	-2.4	17.9	
Stage 3	-2.6	16.86	
Stage 3	-2.8	15.83	
Stage 3	-3	14.81	
Stage 3	-3.2	13.8	
Stage 3	-3.4	12.81	
Stage 3	-3.6	11.84	
Stage 3	-3.8	10.9	
Stage 3	-4	9.98	
Stage 3	-4.2	9.11	
Stage 3	-4.4	8.27	
Stage 3	-4.6	7.48	
Stage 3	-4.8	6.73	
Stage 3	-5	6.04	
Stage 3	-5.2	5.4	
Stage 3	-5.4	4.82	
Stage 3	-5.6	4.28	
Stage 3	-5.8	3.8	
Stage 3	-6	3.38	
Stage 3	-6.2	3	
Stage 3	-6.4	2.66	
Stage 3	-6.6	2.37	
Stage 3	-6.8	2.12	
Stage 3	-7	1.91	
Stage 3	-7.2	1.73	
Stage 3	-7.4	1.59	
Stage 3	-7.6	1.47	
Stage 3	-7.8	1.38	
Stage 3	-8	1.31	
Stage 3	-8.2	1.26	
Stage 3	-8.4	1.22	
Stage 3	-8.6	1.2	
Stage 3	-8.8	1.19	
Stage 3	-9	1.2	
Stage 3	-9.2	1.21	
Stage 3	-9.4	1.23	
Stage 3	-9.6	1.25	
Stage 3	-9.8	1.28	
Stage 3	-10	1.31	
Stage 3	-10.2	1.35	
Stage 3	-10.4	1.39	
Stage 3	-10.6	1.43	
Stage 3	-10.8	1.47	
Stage 3	-11	1.51	
Stage 3	-11.2	1.55	
Stage 3	-11.4	1.59	
Stage 3	-11.6	1.63	
Stage 3	-11.8	1.67	
Stage 3	-12	1.71	

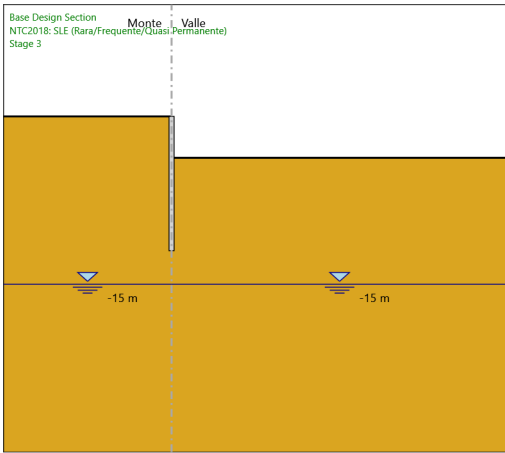
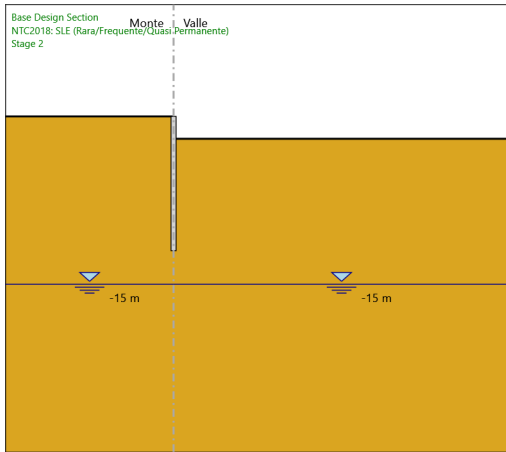
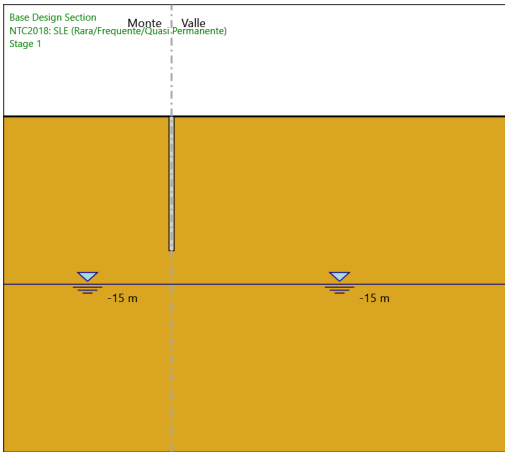
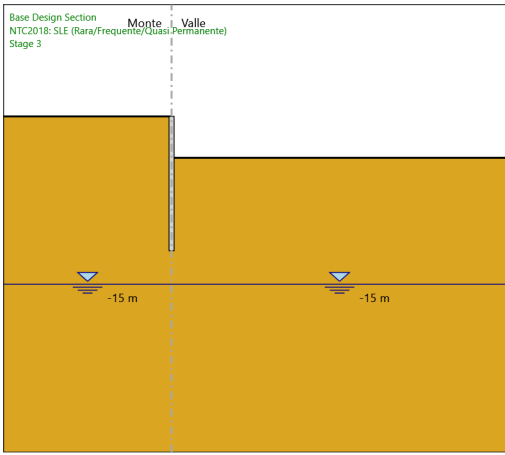
**7.1.6. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall -  
Stage: Stage 3**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	0	0	0
Stage 3	-0.2	0	0
Stage 3	-0.2	0	0
Stage 3	-0.4	0	0
Stage 3	-0.4	0	0
Stage 3	-0.6	0	0
Stage 3	-0.6	0	0
Stage 3	-0.8	-0.01	-0.06
Stage 3	-1	-0.09	-0.38
Stage 3	-1.2	-0.28	-0.94
Stage 3	-1.4	-0.63	-1.76
Stage 3	-1.6	-1.19	-2.82
Stage 3	-1.8	-2.02	-4.14
Stage 3	-2	-3.16	-5.71
Stage 3	-2.2	-4.67	-7.53
Stage 3	-2.4	-6.59	-9.6
Stage 3	-2.6	-8.97	-11.92
Stage 3	-2.8	-11.87	-14.49
Stage 3	-3	-15.33	-17.31
Stage 3	-3.2	-19.41	-20.38
Stage 3	-3.4	-24.15	-23.71
Stage 3	-3.6	-29.6	-27.28
Stage 3	-3.8	-35.82	-31.1
Stage 3	-4	-42.13	-31.54
Stage 3	-4.2	-48.03	-29.48
Stage 3	-4.4	-53.01	-24.94
Stage 3	-4.6	-56.94	-19.61
Stage 3	-4.8	-59.82	-14.42
Stage 3	-5	-61.69	-9.35
Stage 3	-5.2	-62.57	-4.39
Stage 3	-5.4	-62.5	0.35
Stage 3	-5.6	-61.52	4.86
Stage 3	-5.8	-59.74	8.92
Stage 3	-6	-57.31	12.14
Stage 3	-6.2	-54.39	14.61
Stage 3	-6.4	-51.1	16.42
Stage 3	-6.6	-47.58	17.65
Stage 3	-6.8	-43.9	18.38
Stage 3	-7	-40.16	18.68
Stage 3	-7.2	-36.44	18.62
Stage 3	-7.4	-32.79	18.26
Stage 3	-7.6	-29.26	17.66
Stage 3	-7.8	-25.88	16.87
Stage 3	-8	-22.7	15.93
Stage 3	-8.2	-19.72	14.88
Stage 3	-8.4	-16.97	13.77
Stage 3	-8.6	-14.45	12.6
Stage 3	-8.8	-12.16	11.43
Stage 3	-9	-10.11	10.25
Stage 3	-9.2	-8.29	9.1
Stage 3	-9.4	-6.69	7.99
Stage 3	-9.6	-5.31	6.92
Stage 3	-9.8	-4.13	5.92
Stage 3	-10	-3.13	4.98
Stage 3	-10.2	-2.31	4.12
Stage 3	-10.4	-1.64	3.33
Stage 3	-10.6	-1.12	2.62
Stage 3	-10.8	-0.72	2
Stage 3	-11	-0.43	1.46
Stage 3	-11.2	-0.23	1
Stage 3	-11.4	-0.1	0.63
Stage 3	-11.6	-0.03	0.34
Stage 3	-11.8	0	0.14
Stage 3	-12	0	0.02

### 7.1.7. Tabella Grafici dei Risultati







## 7.2. Risultati NTC2018: A1+M1+R1 (R3 per tiranti)

### 7.2.1. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 1

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	0	0	0
Stage 1	-0.2	0	0
Stage 1	-0.4	0	0
Stage 1	-0.6	0	0
Stage 1	-0.8	0	0
Stage 1	-1	0	0
Stage 1	-1.2	0	0
Stage 1	-1.4	0	0
Stage 1	-1.6	0	0
Stage 1	-1.8	0	0
Stage 1	-2	0	0
Stage 1	-2.2	0	0
Stage 1	-2.4	0	0
Stage 1	-2.6	0	0
Stage 1	-2.8	0	0
Stage 1	-3	0	0
Stage 1	-3.2	0	0
Stage 1	-3.4	0	0
Stage 1	-3.6	0	0
Stage 1	-3.8	0	0
Stage 1	-4	0	0
Stage 1	-4.2	0	0
Stage 1	-4.4	0	0
Stage 1	-4.6	0	0
Stage 1	-4.8	0	0
Stage 1	-5	0	0
Stage 1	-5.2	0	0
Stage 1	-5.4	0	0
Stage 1	-5.6	0	0
Stage 1	-5.8	0	0
Stage 1	-6	0	0
Stage 1	-6.2	0	0
Stage 1	-6.4	0	0
Stage 1	-6.6	0	0
Stage 1	-6.8	0	0
Stage 1	-7	0	0
Stage 1	-7.2	0	0
Stage 1	-7.4	0	0
Stage 1	-7.6	0	0
Stage 1	-7.8	0	0
Stage 1	-8	0	0
Stage 1	-8.2	0	0
Stage 1	-8.4	0	0
Stage 1	-8.6	0	0
Stage 1	-8.8	0	0
Stage 1	-9	0	0
Stage 1	-9.2	0	0
Stage 1	-9.4	0	0
Stage 1	-9.6	0	0
Stage 1	-9.8	0	0
Stage 1	-10	0	0
Stage 1	-10.2	0	0
Stage 1	-10.4	0	0
Stage 1	-10.6	0	0
Stage 1	-10.8	0	0
Stage 1	-11	0	0
Stage 1	-11.2	0	0
Stage 1	-11.4	0	0
Stage 1	-11.6	0	0
Stage 1	-11.8	0	0
Stage 1	-12	0	0

## 7.2.2. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 2

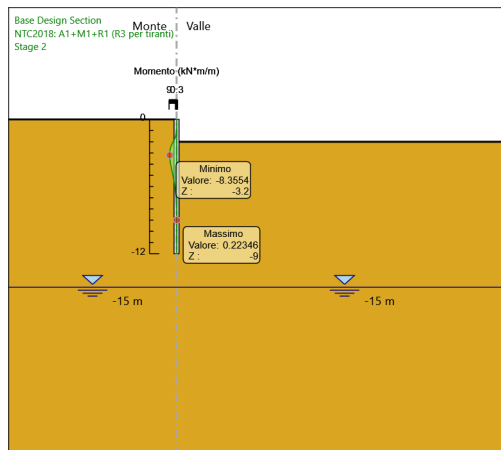
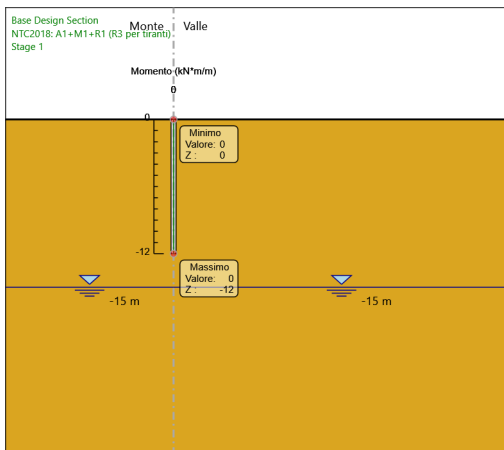
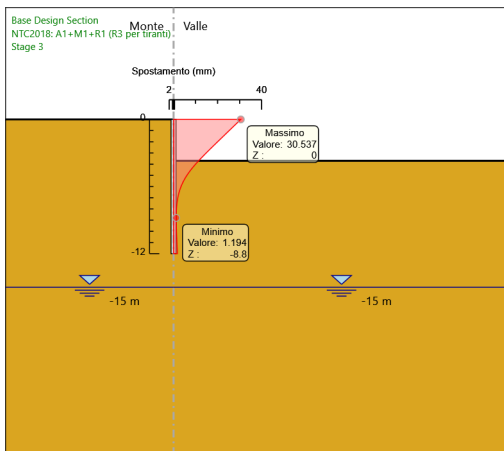
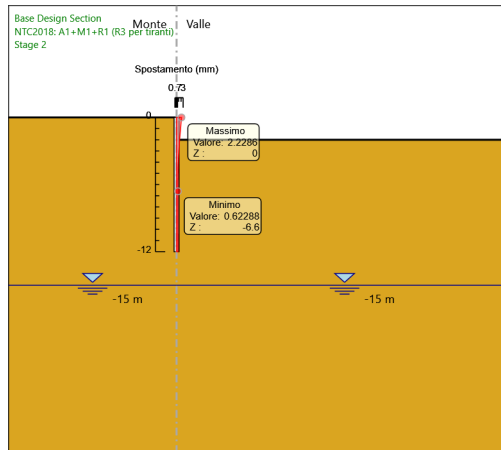
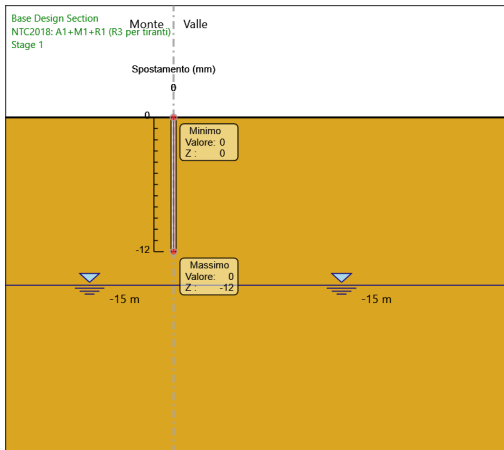
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	0	0	0
Stage 2	-0.2	0	0
Stage 2	-0.2	0	0
Stage 2	-0.4	0	0
Stage 2	-0.4	0	0
Stage 2	-0.6	0	0
Stage 2	-0.6	0	0
Stage 2	-0.8	-0.02	-0.08
Stage 2	-1	-0.11	-0.49
Stage 2	-1.2	-0.36	-1.22
Stage 2	-1.4	-0.82	-2.28
Stage 2	-1.6	-1.55	-3.67
Stage 2	-1.8	-2.63	-5.38
Stage 2	-2	-4.11	-7.42
Stage 2	-2.2	-5.54	-7.17
Stage 2	-2.4	-6.66	-5.6
Stage 2	-2.6	-7.48	-4.06
Stage 2	-2.8	-8	-2.65
Stage 2	-3	-8.29	-1.41
Stage 2	-3.2	-8.36	-0.35
Stage 2	-3.4	-8.25	0.53
Stage 2	-3.6	-8	1.24
Stage 2	-3.8	-7.64	1.8
Stage 2	-4	-7.2	2.22
Stage 2	-4.2	-6.69	2.51
Stage 2	-4.4	-6.15	2.7
Stage 2	-4.6	-5.59	2.8
Stage 2	-4.8	-5.03	2.82
Stage 2	-5	-4.47	2.79
Stage 2	-5.2	-3.93	2.7
Stage 2	-5.4	-3.42	2.57
Stage 2	-5.6	-2.93	2.41
Stage 2	-5.8	-2.49	2.24
Stage 2	-6	-2.08	2.05
Stage 2	-6.2	-1.71	1.85
Stage 2	-6.4	-1.38	1.66
Stage 2	-6.6	-1.08	1.47
Stage 2	-6.8	-0.83	1.28
Stage 2	-7	-0.6	1.11
Stage 2	-7.2	-0.42	0.94
Stage 2	-7.4	-0.26	0.79
Stage 2	-7.6	-0.13	0.65
Stage 2	-7.8	-0.02	0.52
Stage 2	-8	0.06	0.41
Stage 2	-8.2	0.12	0.31
Stage 2	-8.4	0.17	0.23
Stage 2	-8.6	0.2	0.15
Stage 2	-8.8	0.22	0.09
Stage 2	-9	0.22	0.04
Stage 2	-9.2	0.22	-0.01
Stage 2	-9.4	0.21	-0.04
Stage 2	-9.6	0.2	-0.07
Stage 2	-9.8	0.18	-0.09
Stage 2	-10	0.16	-0.1
Stage 2	-10.2	0.14	-0.11
Stage 2	-10.4	0.12	-0.11
Stage 2	-10.6	0.09	-0.11
Stage 2	-10.8	0.07	-0.11
Stage 2	-11	0.05	-0.1
Stage 2	-11.2	0.03	-0.09
Stage 2	-11.4	0.02	-0.07
Stage 2	-11.6	0.01	-0.05
Stage 2	-11.8	0	-0.03
Stage 2	-12	0	-0.01

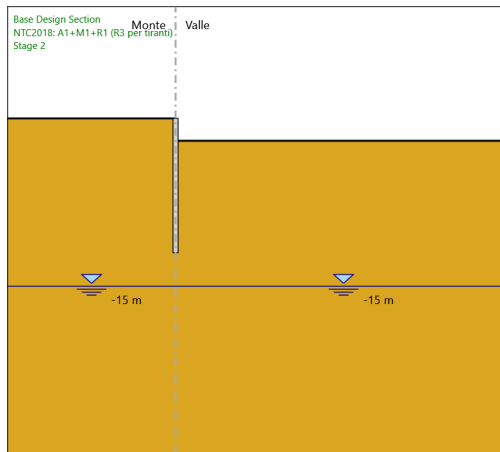
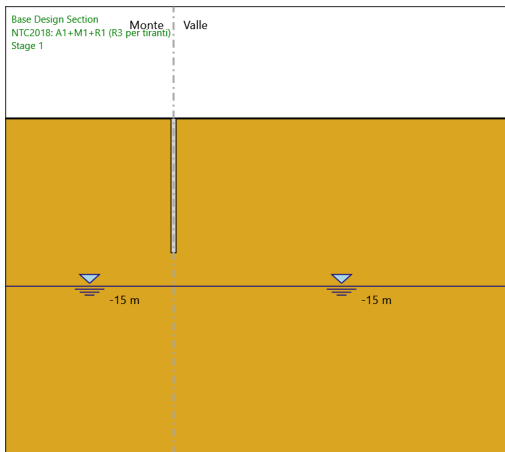
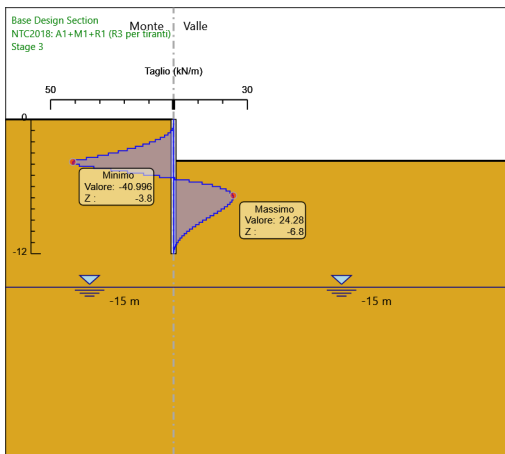
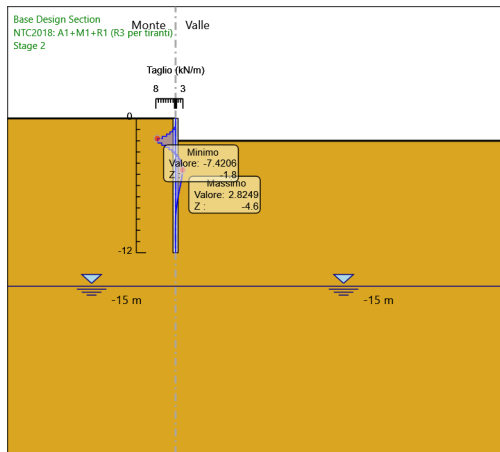
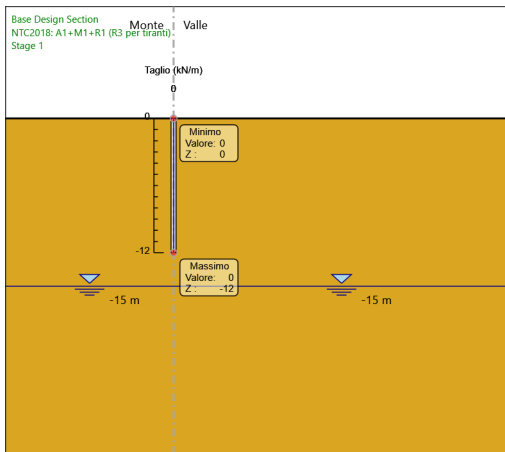
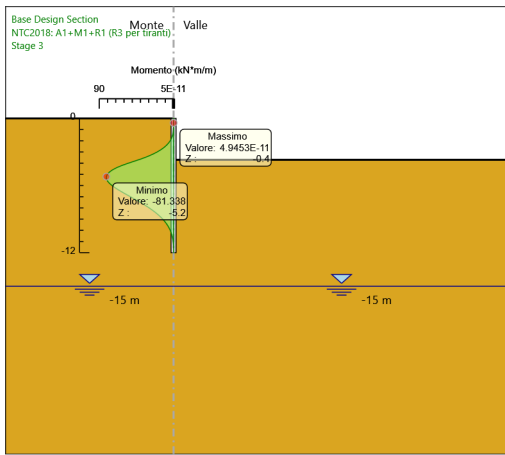
### 7.2.3. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 3

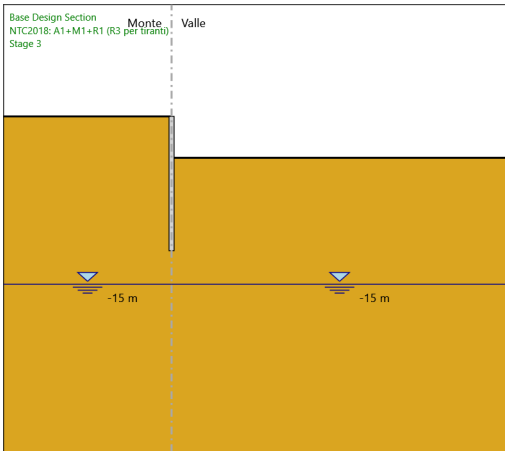
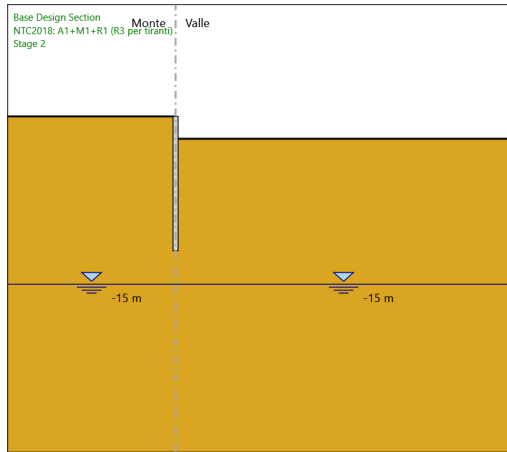
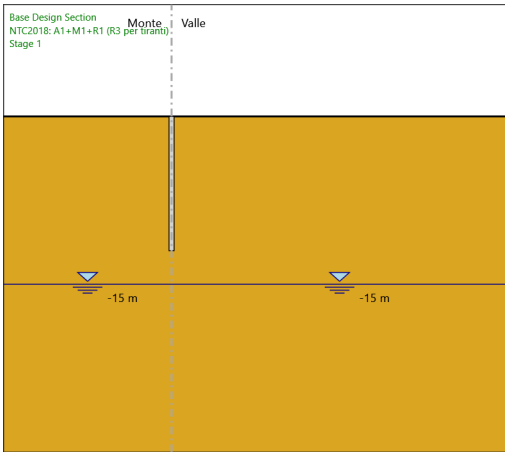
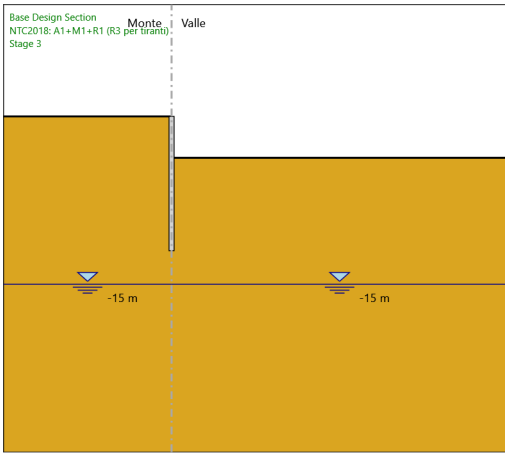
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	0	0	0
Stage 3	-0.2	0	0
Stage 3	-0.2	0	0
Stage 3	-0.4	0	0
Stage 3	-0.4	0	0
Stage 3	-0.6	0	0
Stage 3	-0.6	0	0
Stage 3	-0.8	-0.02	-0.08
Stage 3	-1	-0.11	-0.49
Stage 3	-1.2	-0.36	-1.22
Stage 3	-1.4	-0.82	-2.28
Stage 3	-1.6	-1.55	-3.67
Stage 3	-1.8	-2.63	-5.38
Stage 3	-2	-4.11	-7.42
Stage 3	-2.2	-6.07	-9.78
Stage 3	-2.4	-8.56	-12.48
Stage 3	-2.6	-11.66	-15.49
Stage 3	-2.8	-15.43	-18.83
Stage 3	-3	-19.93	-22.5
Stage 3	-3.2	-25.23	-26.5
Stage 3	-3.4	-31.39	-30.82
Stage 3	-3.6	-38.48	-35.46
Stage 3	-3.8	-46.57	-40.44
Stage 3	-4	-54.77	-41
Stage 3	-4.2	-62.43	-38.32
Stage 3	-4.4	-68.92	-32.42
Stage 3	-4.6	-74.02	-25.49
Stage 3	-4.8	-77.77	-18.74
Stage 3	-5	-80.2	-12.15
Stage 3	-5.2	-81.34	-5.71
Stage 3	-5.4	-81.25	0.45
Stage 3	-5.6	-79.98	6.32
Stage 3	-5.8	-77.66	11.6
Stage 3	-6	-74.5	15.79
Stage 3	-6.2	-70.71	19
Stage 3	-6.4	-66.44	21.35
Stage 3	-6.6	-61.85	22.94
Stage 3	-6.8	-57.07	23.89
Stage 3	-7	-52.21	24.28
Stage 3	-7.2	-47.37	24.2
Stage 3	-7.4	-42.63	23.74
Stage 3	-7.6	-38.03	22.96
Stage 3	-7.8	-33.65	21.93
Stage 3	-8	-29.51	20.71
Stage 3	-8.2	-25.64	19.35
Stage 3	-8.4	-22.06	17.9
Stage 3	-8.6	-18.78	16.39
Stage 3	-8.8	-15.81	14.85
Stage 3	-9	-13.14	13.33
Stage 3	-9.2	-10.78	11.83
Stage 3	-9.4	-8.7	10.38
Stage 3	-9.6	-6.9	9
Stage 3	-9.8	-5.36	7.69
Stage 3	-10	-4.07	6.47
Stage 3	-10.2	-3	5.35
Stage 3	-10.4	-2.13	4.33
Stage 3	-10.6	-1.45	3.41
Stage 3	-10.8	-0.93	2.6
Stage 3	-11	-0.55	1.89
Stage 3	-11.2	-0.29	1.3
Stage 3	-11.4	-0.13	0.82
Stage 3	-11.6	-0.04	0.44
Stage 3	-11.8	0	0.18
Stage 3	-12	0	0.02



## 7.2.4. Tabella Grafici dei Risultati







## 7.3. Risultati NTC2018: A2+M2+R1

### 7.3.1. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 1

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	0	0	0
Stage 1	-0.2	0	0
Stage 1	-0.4	0	0
Stage 1	-0.6	0	0
Stage 1	-0.8	0	0
Stage 1	-1	0	0
Stage 1	-1.2	0	0
Stage 1	-1.4	0	0
Stage 1	-1.6	0	0
Stage 1	-1.8	0	0
Stage 1	-2	0	0
Stage 1	-2.2	0	0
Stage 1	-2.4	0	0
Stage 1	-2.6	0	0
Stage 1	-2.8	0	0
Stage 1	-3	0	0
Stage 1	-3.2	0	0
Stage 1	-3.4	0	0
Stage 1	-3.6	0	0
Stage 1	-3.8	0	0
Stage 1	-4	0	0
Stage 1	-4.2	0	0
Stage 1	-4.4	0	0
Stage 1	-4.6	0	0
Stage 1	-4.8	0	0
Stage 1	-5	0	0
Stage 1	-5.2	0	0
Stage 1	-5.4	0	0
Stage 1	-5.6	0	0
Stage 1	-5.8	0	0
Stage 1	-6	0	0
Stage 1	-6.2	0	0
Stage 1	-6.4	0	0
Stage 1	-6.6	0	0
Stage 1	-6.8	0	0
Stage 1	-7	0	0
Stage 1	-7.2	0	0
Stage 1	-7.4	0	0
Stage 1	-7.6	0	0
Stage 1	-7.8	0	0
Stage 1	-8	0	0
Stage 1	-8.2	0	0
Stage 1	-8.4	0	0
Stage 1	-8.6	0	0
Stage 1	-8.8	0	0
Stage 1	-9	0	0
Stage 1	-9.2	0	0
Stage 1	-9.4	0	0
Stage 1	-9.6	0	0
Stage 1	-9.8	0	0
Stage 1	-10	0	0
Stage 1	-10.2	0	0
Stage 1	-10.4	0	0
Stage 1	-10.6	0	0
Stage 1	-10.8	0	0
Stage 1	-11	0	0
Stage 1	-11.2	0	0
Stage 1	-11.4	0	0
Stage 1	-11.6	0	0
Stage 1	-11.8	0	0
Stage 1	-12	0	0

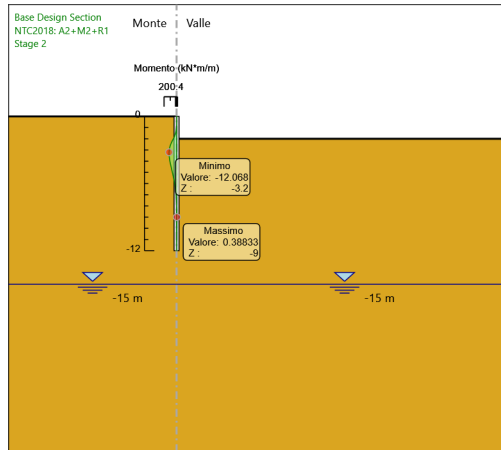
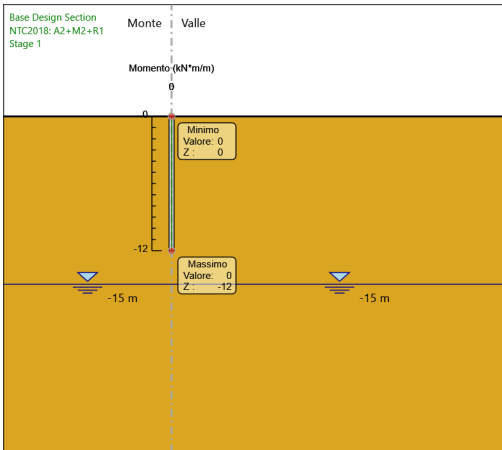
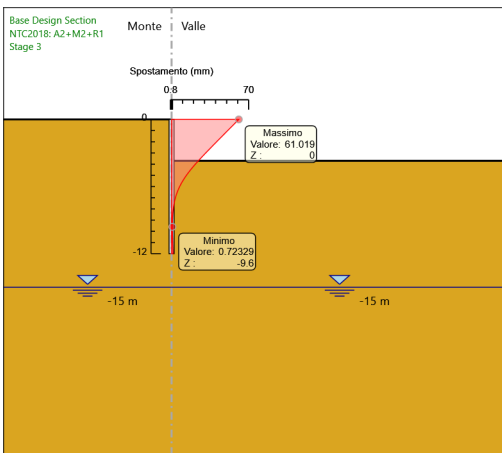
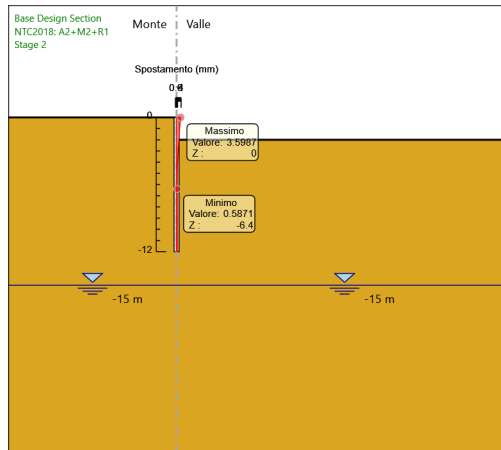
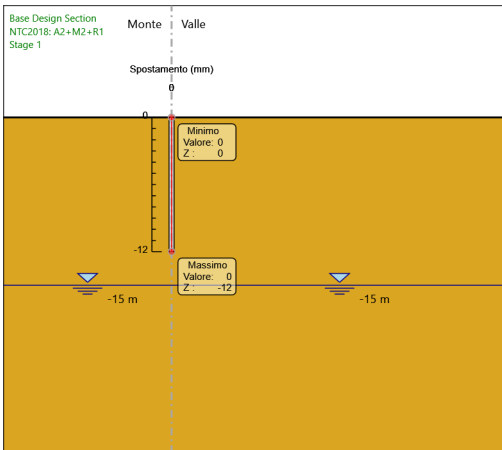
### 7.3.2. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 2

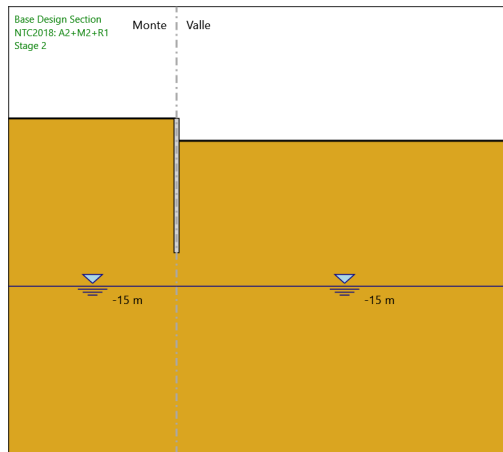
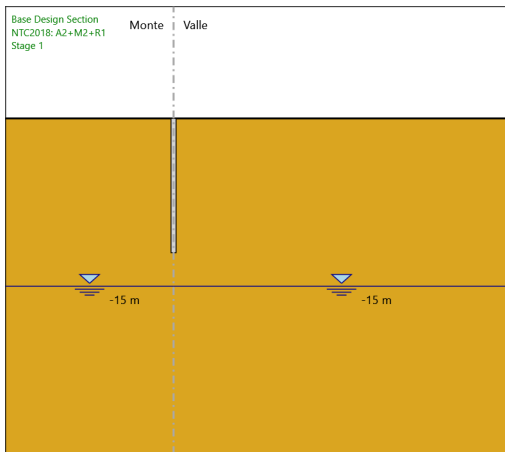
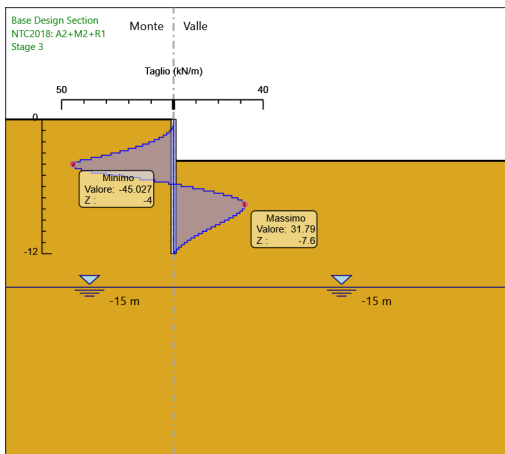
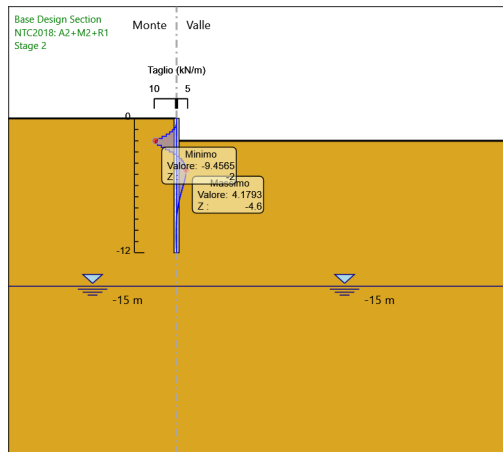
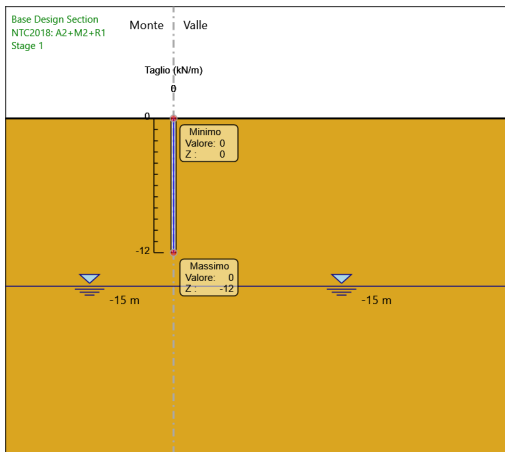
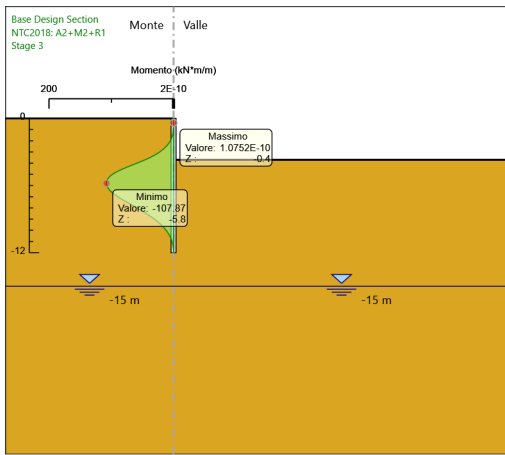
Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	0	0	0
Stage 2	-0.2	0	0
Stage 2	-0.2	0	0
Stage 2	-0.4	0	0
Stage 2	-0.4	0	0
Stage 2	-0.6	0	0
Stage 2	-0.8	-0.06	-0.31
Stage 2	-1	-0.25	-0.93
Stage 2	-1.2	-0.62	-1.85
Stage 2	-1.4	-1.23	-3.08
Stage 2	-1.6	-2.16	-4.61
Stage 2	-1.8	-3.45	-6.45
Stage 2	-2	-5.17	-8.6
Stage 2	-2.2	-7.06	-9.46
Stage 2	-2.4	-8.76	-8.51
Stage 2	-2.6	-10.12	-6.78
Stage 2	-2.8	-11.12	-5.02
Stage 2	-3	-11.77	-3.25
Stage 2	-3.2	-12.07	-1.48
Stage 2	-3.4	-12.06	0.04
Stage 2	-3.6	-11.81	1.28
Stage 2	-3.8	-11.36	2.25
Stage 2	-4	-10.76	2.99
Stage 2	-4.2	-10.05	3.53
Stage 2	-4.4	-9.27	3.89
Stage 2	-4.6	-8.45	4.1
Stage 2	-4.8	-7.62	4.18
Stage 2	-5	-6.79	4.16
Stage 2	-5.2	-5.98	4.05
Stage 2	-5.4	-5.2	3.88
Stage 2	-5.6	-4.47	3.66
Stage 2	-5.8	-3.78	3.41
Stage 2	-6	-3.16	3.13
Stage 2	-6.2	-2.59	2.85
Stage 2	-6.4	-2.08	2.55
Stage 2	-6.6	-1.63	2.26
Stage 2	-6.8	-1.23	1.98
Stage 2	-7	-0.89	1.71
Stage 2	-7.2	-0.6	1.46
Stage 2	-7.4	-0.35	1.22
Stage 2	-7.6	-0.15	1.01
Stage 2	-7.8	0.01	0.81
Stage 2	-8	0.14	0.64
Stage 2	-8.2	0.24	0.48
Stage 2	-8.4	0.31	0.35
Stage 2	-8.6	0.35	0.23
Stage 2	-8.8	0.38	0.13
Stage 2	-9	0.39	0.05
Stage 2	-9.2	0.38	-0.02
Stage 2	-9.4	0.37	-0.08
Stage 2	-9.6	0.34	-0.12
Stage 2	-9.8	0.31	-0.15
Stage 2	-10	0.28	-0.18
Stage 2	-10.2	0.24	-0.19
Stage 2	-10.4	0.2	-0.19
Stage 2	-10.6	0.16	-0.19
Stage 2	-10.8	0.12	-0.18
Stage 2	-11	0.09	-0.17
Stage 2	-11.2	0.06	-0.15
Stage 2	-11.4	0.04	-0.13
Stage 2	-11.6	0.02	-0.1
Stage 2	-11.8	0	-0.06
Stage 2	-12	0	-0.02

### 7.3.3. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 3

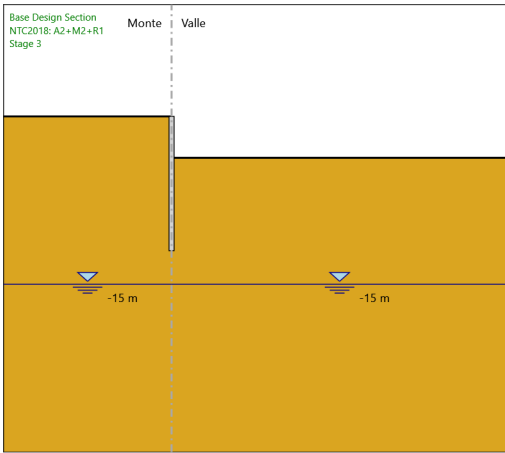
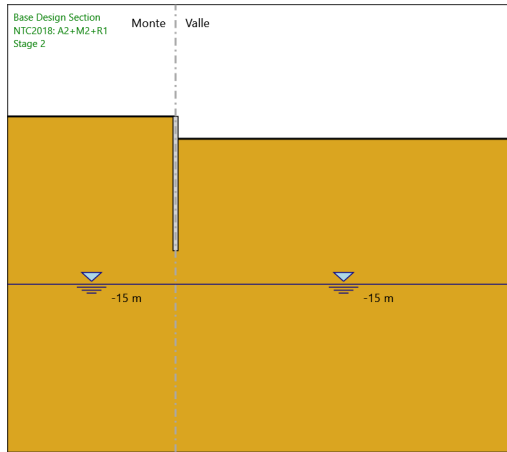
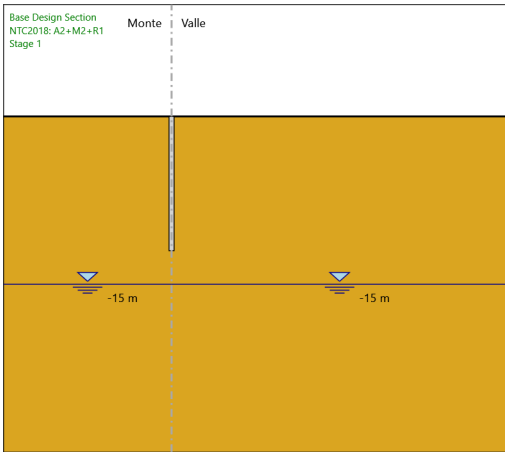
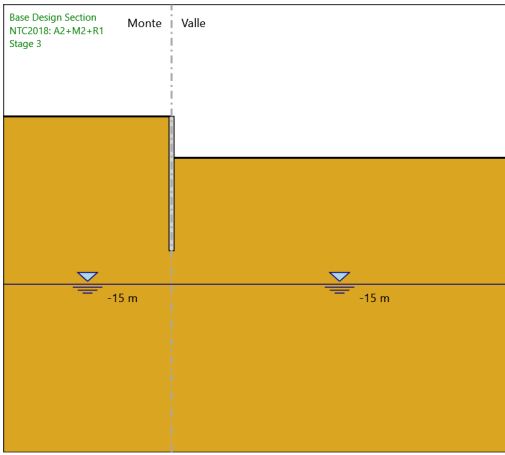
Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	0	0	0
Stage 3	-0.2	0	0
Stage 3	-0.2	0	0
Stage 3	-0.4	0	0
Stage 3	-0.4	0	0
Stage 3	-0.6	0	0
Stage 3	-0.8	-0.06	-0.31
Stage 3	-1	-0.25	-0.93
Stage 3	-1.2	-0.62	-1.85
Stage 3	-1.4	-1.23	-3.08
Stage 3	-1.6	-2.16	-4.61
Stage 3	-1.8	-3.45	-6.45
Stage 3	-2	-5.17	-8.6
Stage 3	-2.2	-7.38	-11.05
Stage 3	-2.4	-10.14	-13.81
Stage 3	-2.6	-13.52	-16.88
Stage 3	-2.8	-17.57	-20.25
Stage 3	-3	-22.35	-23.93
Stage 3	-3.2	-27.94	-27.92
Stage 3	-3.4	-34.38	-32.21
Stage 3	-3.6	-41.74	-36.8
Stage 3	-3.8	-50.08	-41.71
Stage 3	-4	-58.93	-44.27
Stage 3	-4.2	-67.94	-45.03
Stage 3	-4.4	-76.74	-43.99
Stage 3	-4.6	-84.97	-41.15
Stage 3	-4.8	-92.27	-36.52
Stage 3	-5	-98.29	-30.08
Stage 3	-5.2	-102.74	-22.26
Stage 3	-5.4	-105.75	-15.04
Stage 3	-5.6	-107.42	-8.38
Stage 3	-5.8	-107.87	-2.25
Stage 3	-6	-107.19	3.42
Stage 3	-6.2	-105.46	8.66
Stage 3	-6.4	-102.75	13.52
Stage 3	-6.6	-99.14	18.06
Stage 3	-6.8	-94.68	22.28
Stage 3	-7	-89.47	26.06
Stage 3	-7.2	-83.72	28.76
Stage 3	-7.4	-77.61	30.53
Stage 3	-7.6	-71.31	31.5
Stage 3	-7.8	-64.96	31.79
Stage 3	-8	-58.65	31.51
Stage 3	-8.2	-52.5	30.75
Stage 3	-8.4	-46.58	29.62
Stage 3	-8.6	-40.94	28.19
Stage 3	-8.8	-35.63	26.53
Stage 3	-9	-30.69	24.71
Stage 3	-9.2	-26.14	22.78
Stage 3	-9.4	-21.98	20.79
Stage 3	-9.6	-18.22	18.77
Stage 3	-9.8	-14.87	16.77
Stage 3	-10	-11.91	14.8
Stage 3	-10.2	-9.33	12.9
Stage 3	-10.4	-7.12	11.07
Stage 3	-10.6	-5.25	9.34
Stage 3	-10.8	-3.71	7.71
Stage 3	-11	-2.47	6.19
Stage 3	-11.2	-1.51	4.79
Stage 3	-11.4	-0.81	3.51
Stage 3	-11.6	-0.34	2.35
Stage 3	-11.8	-0.08	1.31
Stage 3	-12	0	0.4

### 7.3.4. Tabella Grafici dei Risultati









## **8. Normative adottate per le verifiche degli Elementi Strutturali**

### **Normative Verifiche**

Calcestruzzo	NTC
Acciaio	EC3
Tirante	NTC

### **Coefficienti per Verifica Tiranti**

GEO FS	1
$\xi_{a3}$	1.8
$\gamma_s$	1.15

## 8.1. Riepilogo Stage / Design Assumption per Involuppo

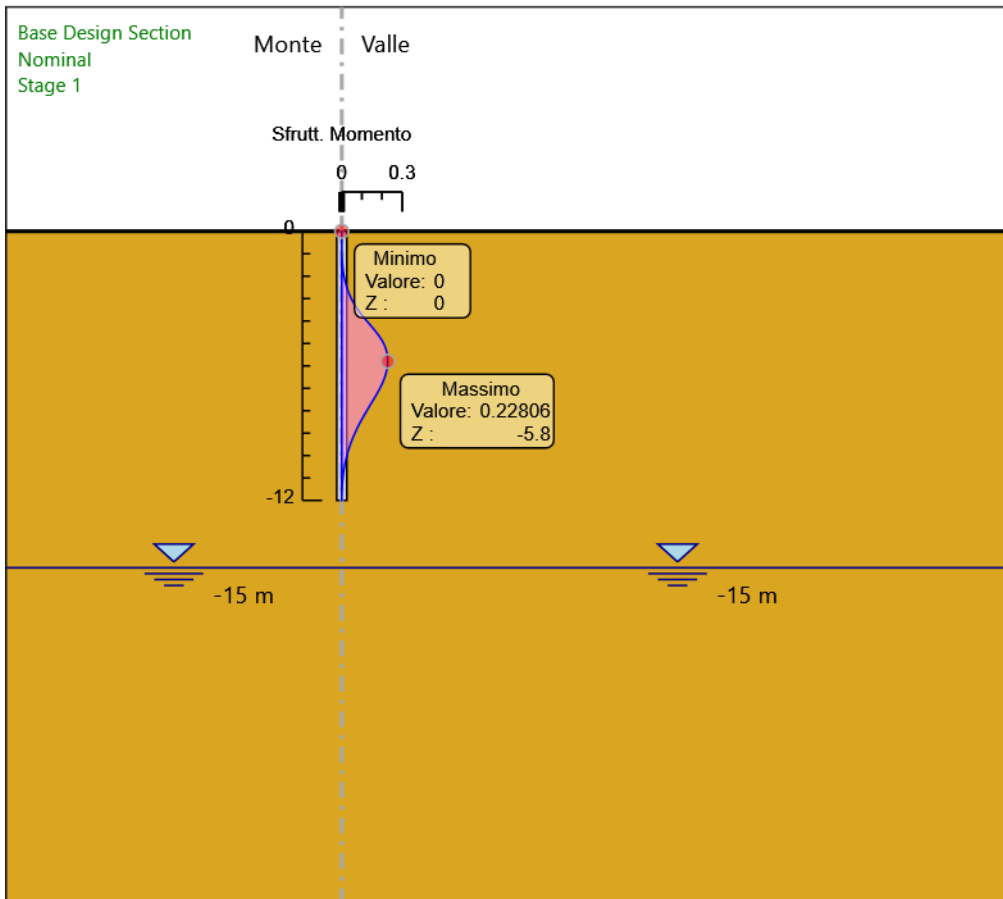
Design Assumption	Stage 1	Stage 2	Stage 3
NTC2018: SLE (Rara/Frequente/Quasi Permanente)	V	V	V
NTC2018: A1+M1+R1 (R3 per tiranti)	V	V	V
NTC2018: A2+M2+R1	V	V	V

## 8.2. Risultati SteelWorld

### 8.2.1. Tabella Involuppi Tasso di Sfruttamento a Momento - SteelWorld : LEFT

Involuppi Tasso di Sfruttamento a Momento - SteelWorld	LEFT
Z (m)	Tasso di Sfruttamento a Momento - SteelWorld
0	0
-0.2	0
-0.4	0
-0.6	0
-0.8	0
-1	0.001
-1.2	0.001
-1.4	0.003
-1.6	0.005
-1.8	0.007
-2	0.011
-2.2	0.016
-2.4	0.021
-2.6	0.029
-2.8	0.037
-3	0.047
-3.2	0.059
-3.4	0.073
-3.6	0.088
-3.8	0.106
-4	0.125
-4.2	0.144
-4.4	0.162
-4.6	0.18
-4.8	0.195
-5	0.208
-5.2	0.217
-5.4	0.224
-5.6	0.227
-5.8	0.228
-6	0.227
-6.2	0.223
-6.4	0.217
-6.6	0.21
-6.8	0.2
-7	0.189
-7.2	0.177
-7.4	0.164
-7.6	0.151
-7.8	0.137
-8	0.124
-8.2	0.111
-8.4	0.098
-8.6	0.087
-8.8	0.075
-9	0.065
-9.2	0.055
-9.4	0.046
-9.6	0.039
-9.8	0.031
-10	0.025
-10.2	0.02
-10.4	0.015
-10.6	0.011
-10.8	0.008
-11	0.005
-11.2	0.003
-11.4	0.002
-11.6	0.001
-11.8	0
-12	0

## 8.2.2. Grafico Involuppi Tasso di Sfruttamento a Momento - SteelWorld

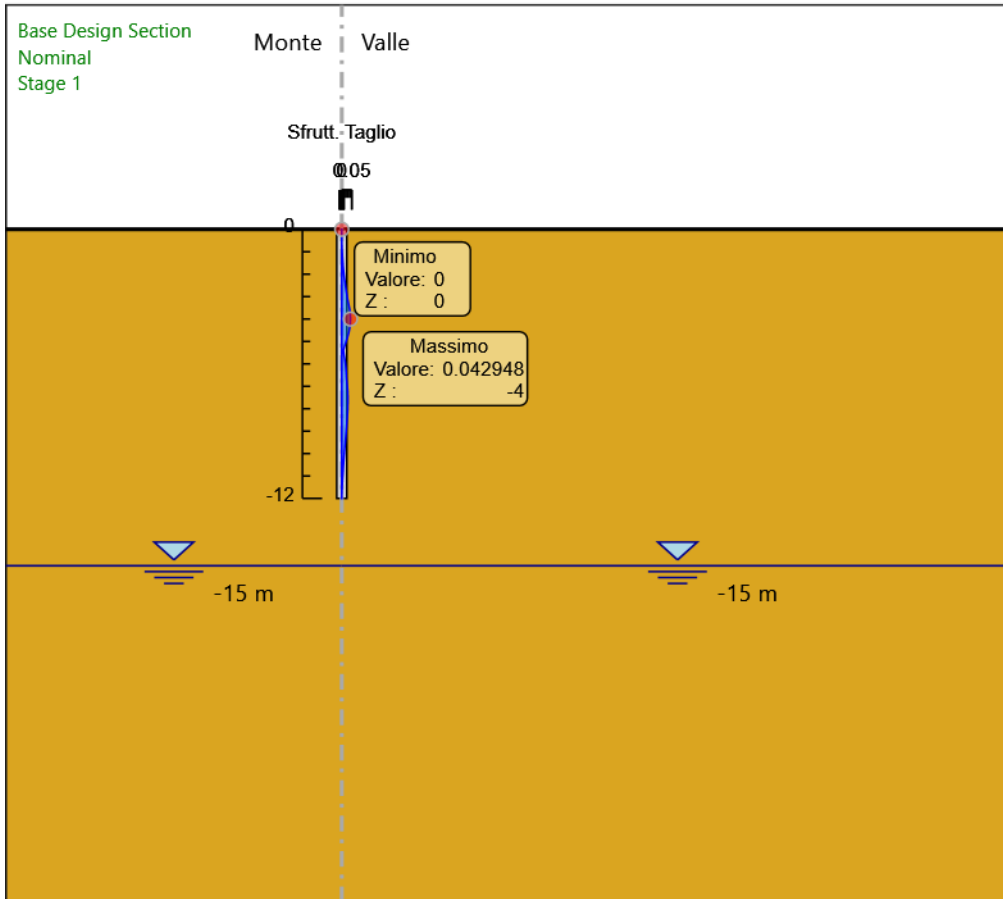


Involuppi  
Tasso di Sfruttamento a Momento - SteelWorld

### 8.2.1. Tabella Involuppi Tasso di Sfruttamento a Taglio - SteelWorld : LEFT

Involuppi Tasso di Sfruttamento a Taglio - SteelWorld	LEFT
Z (m)	Tasso di Sfruttamento a Taglio - SteelWorld
0	0
-0.2	0
-0.4	0
-0.6	0
-0.8	0.001
-1	0.002
-1.2	0.003
-1.4	0.004
-1.6	0.006
-1.8	0.008
-2	0.011
-2.2	0.013
-2.4	0.016
-2.6	0.019
-2.8	0.023
-3	0.027
-3.2	0.031
-3.4	0.035
-3.6	0.04
-3.8	0.042
-4	0.043
-4.2	0.042
-4.4	0.039
-4.6	0.035
-4.8	0.029
-5	0.021
-5.2	0.014
-5.4	0.008
-5.6	0.011
-5.8	0.015
-6	0.018
-6.2	0.02
-6.4	0.022
-6.6	0.023
-6.8	0.025
-7	0.027
-7.2	0.029
-7.4	0.03
-7.6	0.03
-7.8	0.03
-8	0.029
-8.2	0.028
-8.4	0.027
-8.6	0.025
-8.8	0.024
-9	0.022
-9.2	0.02
-9.4	0.018
-9.6	0.016
-9.8	0.014
-10	0.012
-10.2	0.011
-10.4	0.009
-10.6	0.007
-10.8	0.006
-11	0.005
-11.2	0.003
-11.4	0.002
-11.6	0.001
-11.8	0
-12	0

## 8.2.2. Grafico Involuppi Tasso di Sfruttamento a Taglio - SteelWorld



Inviluppi  
Tasso di Sfruttamento a Taglio - SteelWorld





ALLEGATO 2:

IN03 - SCAVO CON PALANCOLE TIPO 2 – PALANCOLA A SBALZO  
IN PRESENZA DI CARICO IN TESTA

PARATIE plus™

***Report di Calcolo***

# Sommario

## Contenuto Sommario

## **1. Descrizione Progetto**

Palancola a sbalzo in presenza di carico in testa

## ***2. Descrizione del Software***

ParatiePlus è un codice agli elementi finiti che simula il problema di uno scavo sostenuto da diaframmi flessibili e permette di valutare il comportamento della parete di sostegno durante tutte le fasi intermedie e nella configurazione finale.

### 3. Descrizione della Stratigrafia e degli Strati di Terreno

Tipo : HORIZONTAL

Quota : 0 m

OCR : 1

Strato di Terreno	Terreno	$\gamma$ dry kN/m <sup>3</sup>	$\gamma$ sat kN/m <sup>3</sup>	$\phi'$ °	$\phi$ °	$c_v$ °	$\phi_p$ °	$c'$ kPa	Su kPa	Modulo Elastico Eu	Evc kPa	Eur kPa	Ah	Av	exp Pa	Rur/Rvc	Rvc	Ku kPa	Kvc kN/m <sup>3</sup>	Kur kN/m <sup>3</sup>
1	Argilla Limosa	19	19.5	27				3	Constant	10000	16000									

## 4. Descrizione Pareti

X : 0 m

Quota in alto : 0 m

Quota di fondo : -9 m

Muro di sinistra

Sezione : Default Section

Area equivalente : 0.01829 m

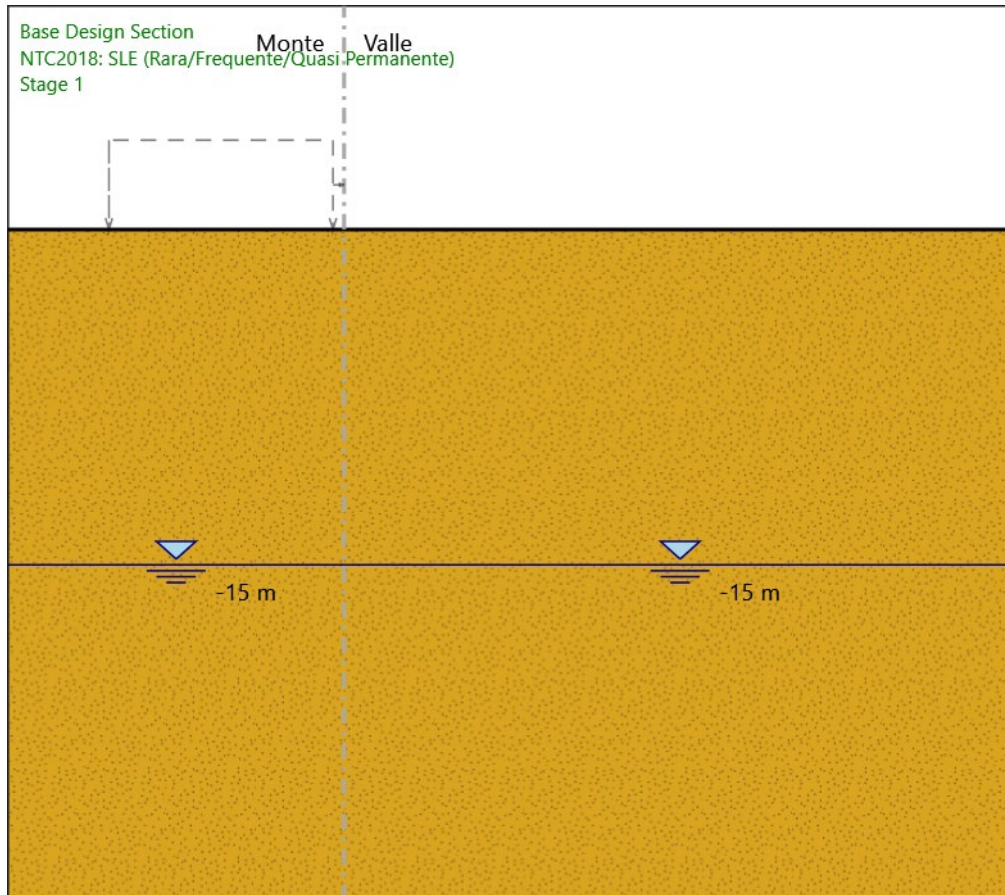
Inerzia equivalente : 0.0002 m<sup>4</sup>/m

Profilo palanca : PU\_22



## 5. Fasi di Calcolo

### 5.1. Stage 1



Stage 1

Scavo

Muro di sinistra

Lato monte : 0 m

Lato valle : 0 m

Linea di scavo di sinistra (Orizzontale)

0 m

Linea di scavo di destra (Orizzontale)

0 m

Falda acquifera

Falda di sinistra : -15 m

Falda di destra : -15 m

Elementi strutturali

Paratia : WallElement

X : 0 m

Quota in alto : 0 m

Quota di fondo : -9 m

Sezione : Default Section

Paratia : WallElement\_New

X : 3 m

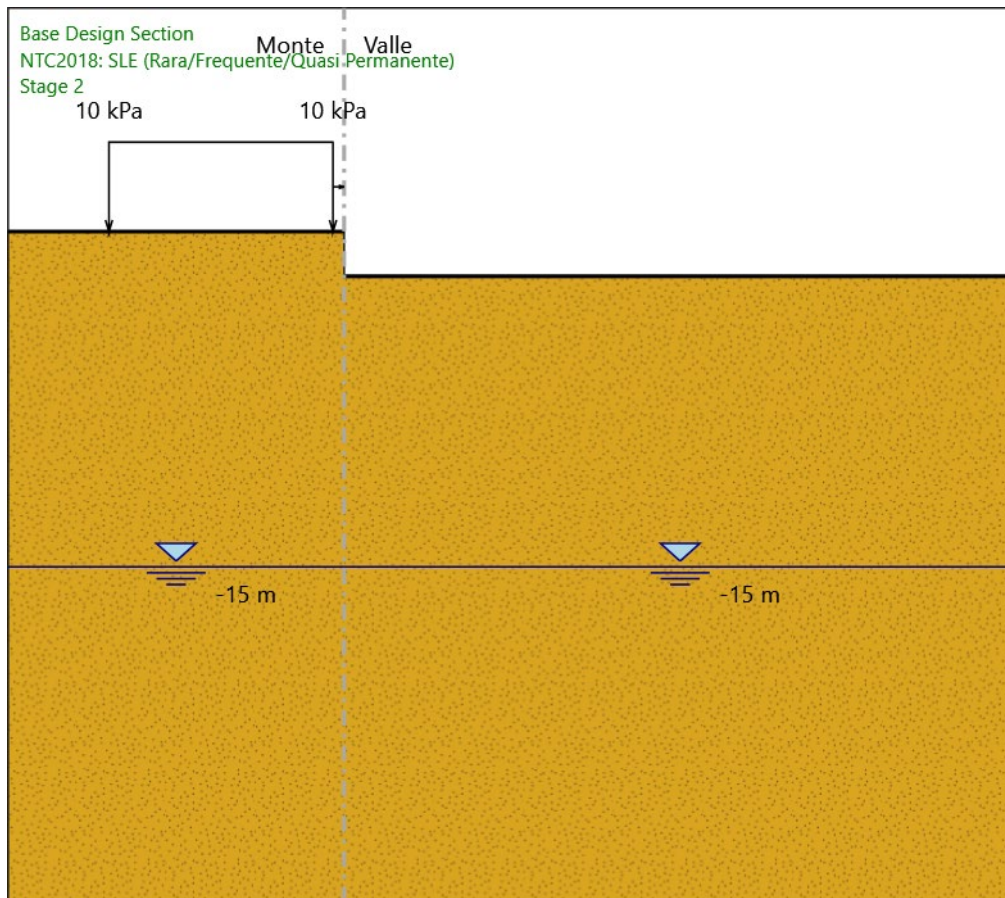
Quota in alto : 0 m

Quota di fondo : -9 m

Sezione : Default Section



## 5.2. Stage 2



Stage 2

Scavo

Muro di sinistra

Lato monte : 0 m

Lato valle : -2 m

Linea di scavo di sinistra (Orizzontale)

0 m

Linea di scavo di destra (Orizzontale)

-2 m

Falda acquifera

Falda di sinistra : -15 m

Falda di destra : -15 m

Carichi

Carico lineare in superficie : SurfaceSurcharge

X iniziale : -10.5 m

X finale : -0.5 m  
Pressione iniziale : 10 kPa  
Pressione finale : 10 kPa

#### Elementi strutturali

Paratia : WallElement

X : 0 m

Quota in alto : 0 m

Quota di fondo : -9 m

Sezione : Default Section

Paratia : WallElement\_New

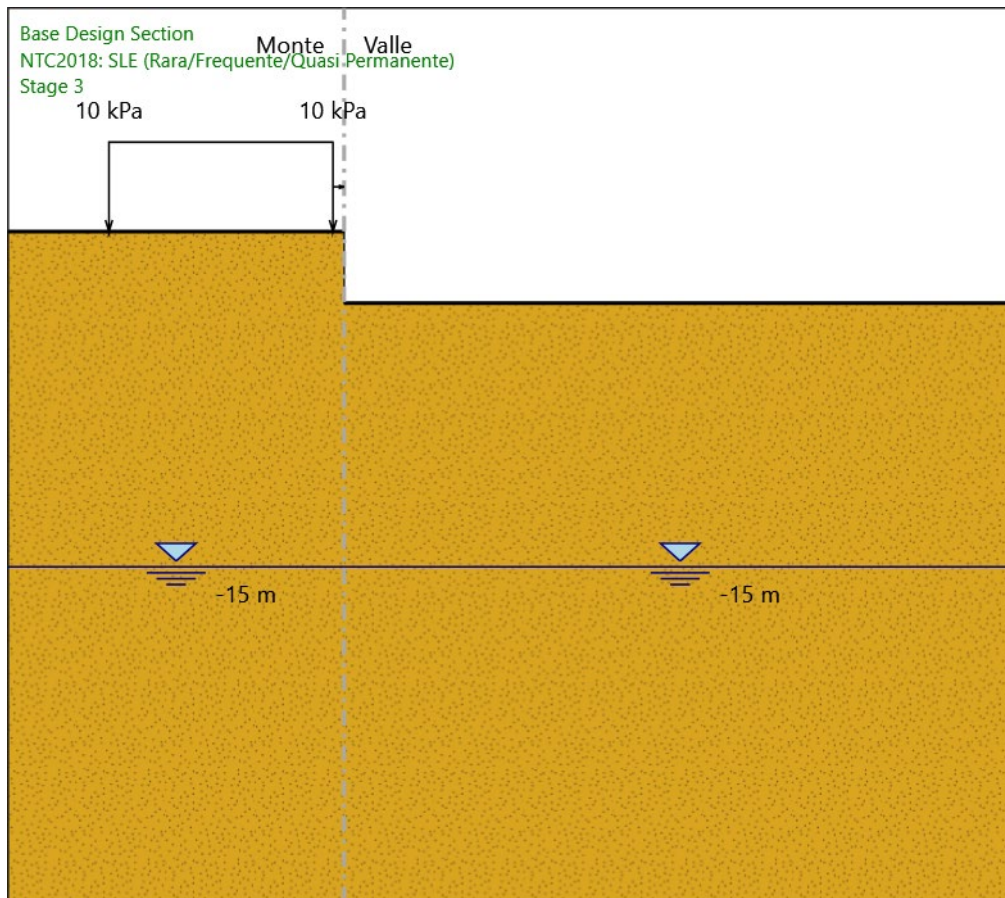
X : 3 m

Quota in alto : 0 m

Quota di fondo : -9 m

Sezione : Default Section

### 5.3. Stage 3



Stage 3

Scavo

Muro di sinistra

Lato monte : 0 m

Lato valle : -3.2 m

Linea di scavo di sinistra (Orizzontale)

0 m

Linea di scavo di destra (Orizzontale)

-3.2 m

Falda acquifera

Falda di sinistra : -15 m

Falda di destra : -15 m

Carichi

Carico lineare in superficie : SurfaceSurcharge

X iniziale : -10.5 m

X finale : -0.5 m  
Pressione iniziale : 10 kPa  
Pressione finale : 10 kPa

#### Elementi strutturali

Paratia : WallElement

X : 0 m

Quota in alto : 0 m

Quota di fondo : -9 m

Sezione : Default Section

Paratia : WallElement\_New

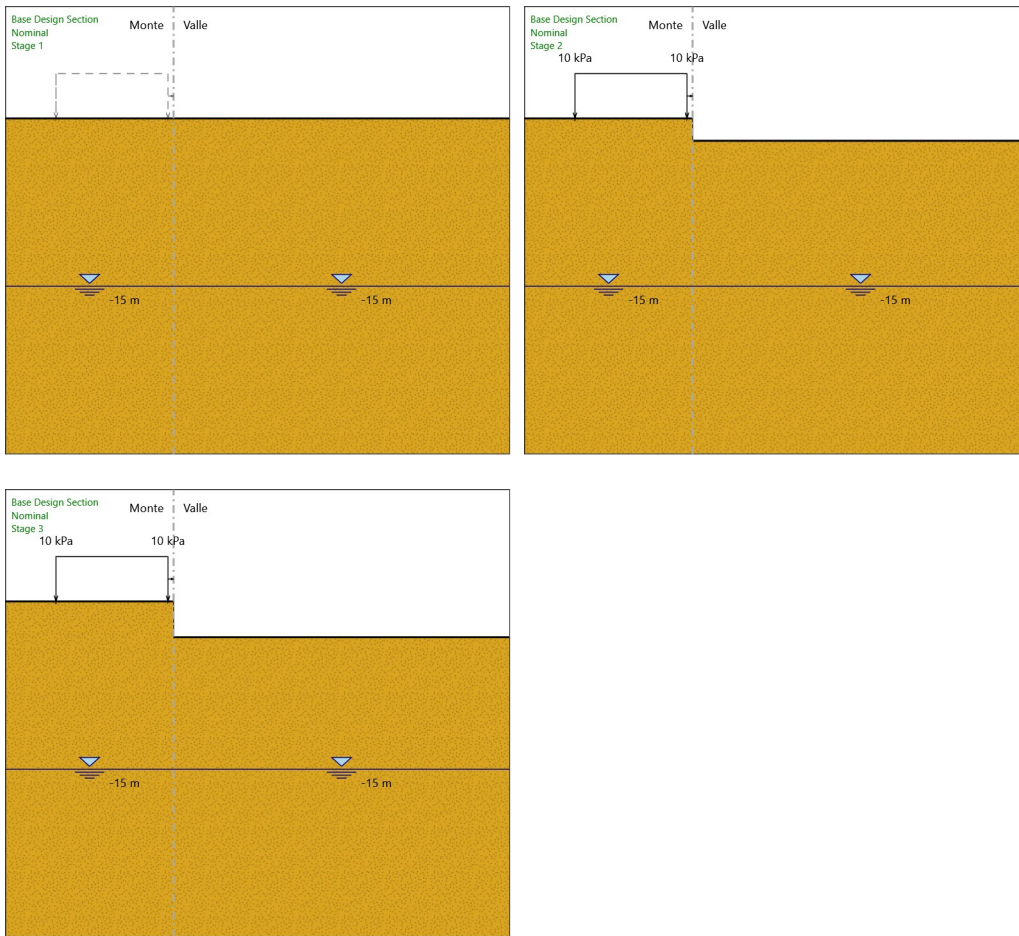
X : 3 m

Quota in alto : 0 m

Quota di fondo : -9 m

Sezione : Default Section

## 5.4. Tabella Configurazione Stage (Nominal)



## 6. Grafici dei Risultati

### 6.1. Design Assumption : Nominal

#### 6.1.1. Tabella Spostamento Nominal - LEFT Stage: Stage 1

Design Assumption: Nominal	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento (mm)
Stage 1	0	0
Stage 1	-0.2	0
Stage 1	-0.4	0
Stage 1	-0.6	0
Stage 1	-0.8	0
Stage 1	-1	0
Stage 1	-1.2	0
Stage 1	-1.4	0
Stage 1	-1.6	0
Stage 1	-1.8	0
Stage 1	-2	0
Stage 1	-2.2	0
Stage 1	-2.4	0
Stage 1	-2.6	0
Stage 1	-2.8	0
Stage 1	-3	0
Stage 1	-3.2	0
Stage 1	-3.4	0
Stage 1	-3.6	0
Stage 1	-3.8	0
Stage 1	-4	0
Stage 1	-4.2	0
Stage 1	-4.4	0
Stage 1	-4.6	0
Stage 1	-4.8	0
Stage 1	-5	0
Stage 1	-5.2	0
Stage 1	-5.4	0
Stage 1	-5.6	0
Stage 1	-5.8	0
Stage 1	-6	0
Stage 1	-6.2	0
Stage 1	-6.4	0
Stage 1	-6.6	0
Stage 1	-6.8	0
Stage 1	-7	0
Stage 1	-7.2	0
Stage 1	-7.4	0
Stage 1	-7.6	0
Stage 1	-7.8	0
Stage 1	-8	0
Stage 1	-8.2	0
Stage 1	-8.4	0
Stage 1	-8.6	0
Stage 1	-8.8	0
Stage 1	-9	0

## 6.1.2. Tabella Spostamento Nominal - LEFT Stage: Stage 2

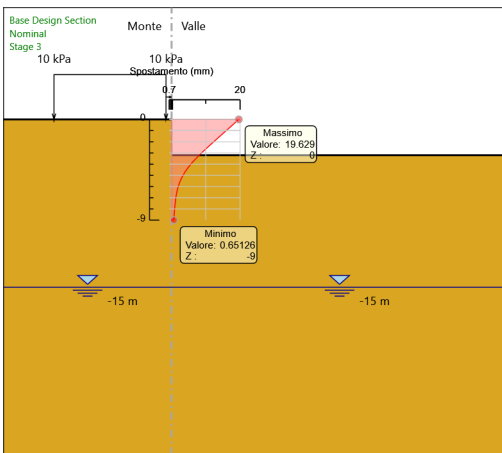
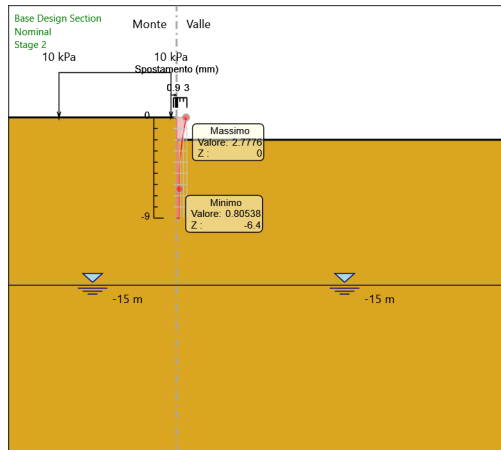
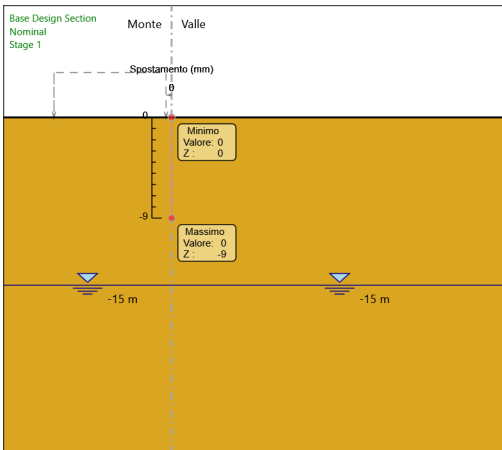
Design Assumption: Nominal	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento (mm)
Stage 2	0	2.78
Stage 2	-0.2	2.67
Stage 2	-0.4	2.56
Stage 2	-0.6	2.45
Stage 2	-0.8	2.34
Stage 2	-1	2.23
Stage 2	-1.2	2.13
Stage 2	-1.4	2.02
Stage 2	-1.6	1.91
Stage 2	-1.8	1.81
Stage 2	-2	1.7
Stage 2	-2.2	1.6
Stage 2	-2.4	1.51
Stage 2	-2.6	1.42
Stage 2	-2.8	1.33
Stage 2	-3	1.26
Stage 2	-3.2	1.19
Stage 2	-3.4	1.13
Stage 2	-3.6	1.07
Stage 2	-3.8	1.02
Stage 2	-4	0.98
Stage 2	-4.2	0.94
Stage 2	-4.4	0.91
Stage 2	-4.6	0.88
Stage 2	-4.8	0.86
Stage 2	-5	0.85
Stage 2	-5.2	0.83
Stage 2	-5.4	0.82
Stage 2	-5.6	0.82
Stage 2	-5.8	0.81
Stage 2	-6	0.81
Stage 2	-6.2	0.81
Stage 2	-6.4	0.81
Stage 2	-6.6	0.81
Stage 2	-6.8	0.81
Stage 2	-7	0.81
Stage 2	-7.2	0.81
Stage 2	-7.4	0.82
Stage 2	-7.6	0.82
Stage 2	-7.8	0.83
Stage 2	-8	0.83
Stage 2	-8.2	0.83
Stage 2	-8.4	0.84
Stage 2	-8.6	0.84
Stage 2	-8.8	0.85
Stage 2	-9	0.85

### 6.1.3. Tabella Spostamento Nominal - LEFT Stage: Stage 3

Design Assumption: Nominal	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento (mm)
Stage 3	0	19.63
Stage 3	-0.2	18.9
Stage 3	-0.4	18.16
Stage 3	-0.6	17.43
Stage 3	-0.8	16.7
Stage 3	-1	15.96
Stage 3	-1.2	15.23
Stage 3	-1.4	14.5
Stage 3	-1.6	13.76
Stage 3	-1.8	13.03
Stage 3	-2	12.3
Stage 3	-2.2	11.58
Stage 3	-2.4	10.86
Stage 3	-2.6	10.15
Stage 3	-2.8	9.45
Stage 3	-3	8.75
Stage 3	-3.2	8.08
Stage 3	-3.4	7.43
Stage 3	-3.6	6.8
Stage 3	-3.8	6.2
Stage 3	-4	5.63
Stage 3	-4.2	5.09
Stage 3	-4.4	4.59
Stage 3	-4.6	4.13
Stage 3	-4.8	3.71
Stage 3	-5	3.33
Stage 3	-5.2	2.98
Stage 3	-5.4	2.68
Stage 3	-5.6	2.4
Stage 3	-5.8	2.16
Stage 3	-6	1.95
Stage 3	-6.2	1.76
Stage 3	-6.4	1.6
Stage 3	-6.6	1.46
Stage 3	-6.8	1.34
Stage 3	-7	1.24
Stage 3	-7.2	1.15
Stage 3	-7.4	1.08
Stage 3	-7.6	1.01
Stage 3	-7.8	0.95
Stage 3	-8	0.89
Stage 3	-8.2	0.84
Stage 3	-8.4	0.79
Stage 3	-8.6	0.74
Stage 3	-8.8	0.7
Stage 3	-9	0.65



### 6.1.4. Grafici Spostamento in tabella



## 6.2. Involuppi Spostamento Nominal

## 6.3. Risultati Paratia

### 6.3.1. Tabella Risultati Paratia Nominal - Stage: Stage 1

Design Assumption: Nominal Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	0	0	0
Stage 1	-0.2	0	0
Stage 1	-0.4	0	0
Stage 1	-0.6	0	0
Stage 1	-0.8	0	0
Stage 1	-1	0	0
Stage 1	-1.2	0	0
Stage 1	-1.4	0	0
Stage 1	-1.6	0	0
Stage 1	-1.8	0	0
Stage 1	-2	0	0
Stage 1	-2.2	0	0
Stage 1	-2.4	0	0
Stage 1	-2.6	0	0
Stage 1	-2.8	0	0
Stage 1	-3	0	0
Stage 1	-3.2	0	0
Stage 1	-3.4	0	0
Stage 1	-3.6	0	0
Stage 1	-3.8	0	0
Stage 1	-4	0	0
Stage 1	-4.2	0	0
Stage 1	-4.4	0	0
Stage 1	-4.6	0	0
Stage 1	-4.8	0	0
Stage 1	-5	0	0
Stage 1	-5.2	0	0
Stage 1	-5.4	0	0
Stage 1	-5.6	0	0
Stage 1	-5.8	0	0
Stage 1	-6	0	0
Stage 1	-6.2	0	0
Stage 1	-6.4	0	0
Stage 1	-6.6	0	0
Stage 1	-6.8	0	0
Stage 1	-7	0	0
Stage 1	-7.2	0	0
Stage 1	-7.4	0	0
Stage 1	-7.6	0	0
Stage 1	-7.8	0	0
Stage 1	-8	0	0
Stage 1	-8.2	0	0
Stage 1	-8.4	0	0
Stage 1	-8.6	0	0
Stage 1	-8.8	0	0
Stage 1	-9	0	0

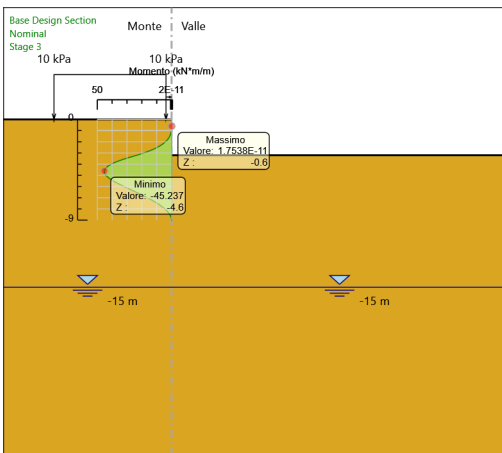
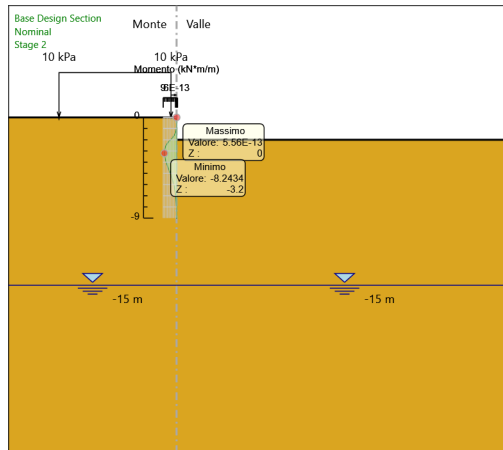
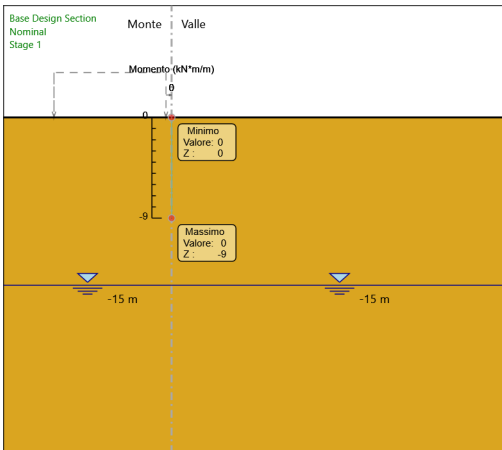
### 6.3.2. Tabella Risultati Paratia Nominal - Stage: Stage 2

Design Assumption: Nominal Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	0	0	0
Stage 2	-0.2	0	0
Stage 2	-0.2	0	0
Stage 2	-0.4	0	0
Stage 2	-0.4	0	0
Stage 2	-0.6	0	0
Stage 2	-0.6	0	0
Stage 2	-0.8	-0.03	-0.14
Stage 2	-1	-0.15	-0.59
Stage 2	-1.2	-0.41	-1.34
Stage 2	-1.4	-0.89	-2.38
Stage 2	-1.6	-1.63	-3.69
Stage 2	-1.8	-2.69	-5.28
Stage 2	-2	-4.11	-7.14
Stage 2	-2.2	-5.51	-6.99
Stage 2	-2.4	-6.64	-5.63
Stage 2	-2.6	-7.44	-4.02
Stage 2	-2.8	-7.95	-2.54
Stage 2	-3	-8.2	-1.27
Stage 2	-3.2	-8.24	-0.2
Stage 2	-3.4	-8.11	0.67
Stage 2	-3.6	-7.84	1.36
Stage 2	-3.8	-7.46	1.89
Stage 2	-4	-7	2.28
Stage 2	-4.2	-6.49	2.56
Stage 2	-4.4	-5.94	2.73
Stage 2	-4.6	-5.38	2.81
Stage 2	-4.8	-4.82	2.81
Stage 2	-5	-4.27	2.76
Stage 2	-5.2	-3.74	2.65
Stage 2	-5.4	-3.24	2.51
Stage 2	-5.6	-2.77	2.34
Stage 2	-5.8	-2.34	2.15
Stage 2	-6	-1.95	1.95
Stage 2	-6.2	-1.6	1.74
Stage 2	-6.4	-1.29	1.54
Stage 2	-6.6	-1.03	1.34
Stage 2	-6.8	-0.8	1.15
Stage 2	-7	-0.6	0.97
Stage 2	-7.2	-0.44	0.8
Stage 2	-7.4	-0.31	0.65
Stage 2	-7.6	-0.21	0.51
Stage 2	-7.8	-0.14	0.38
Stage 2	-8	-0.08	0.28
Stage 2	-8.2	-0.04	0.19
Stage 2	-8.4	-0.02	0.12
Stage 2	-8.6	-0.01	0.06
Stage 2	-8.8	0	0.02
Stage 2	-9	0	0

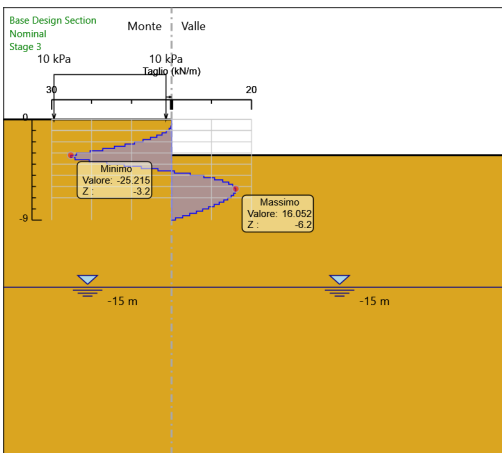
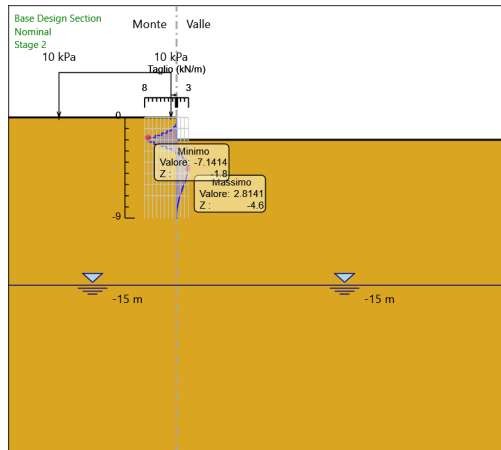
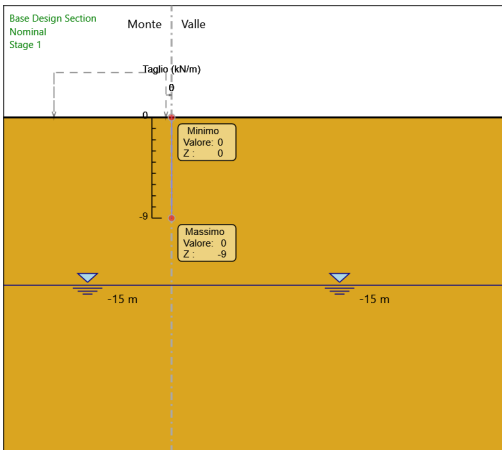
### 6.3.3. Tabella Risultati Paratia Nominal - Stage: Stage 3

Design Assumption: Nominal Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	0	0	0
Stage 3	-0.2	0	0
Stage 3	-0.2	0	0
Stage 3	-0.4	0	0
Stage 3	-0.4	0	0
Stage 3	-0.6	0	0
Stage 3	-0.6	0	0
Stage 3	-0.8	-0.03	-0.14
Stage 3	-1	-0.15	-0.59
Stage 3	-1.2	-0.41	-1.34
Stage 3	-1.4	-0.89	-2.38
Stage 3	-1.6	-1.63	-3.69
Stage 3	-1.8	-2.69	-5.28
Stage 3	-2	-4.11	-7.14
Stage 3	-2.2	-5.97	-9.27
Stage 3	-2.4	-8.3	-11.65
Stage 3	-2.6	-11.16	-14.3
Stage 3	-2.8	-14.6	-17.21
Stage 3	-3	-18.67	-20.38
Stage 3	-3.2	-23.43	-23.8
Stage 3	-3.4	-28.48	-25.21
Stage 3	-3.6	-33.31	-24.15
Stage 3	-3.8	-37.43	-20.6
Stage 3	-4	-40.67	-16.19
Stage 3	-4.2	-43.04	-11.86
Stage 3	-4.4	-44.56	-7.6
Stage 3	-4.6	-45.24	-3.4
Stage 3	-4.8	-45.09	0.72
Stage 3	-5	-44.16	4.68
Stage 3	-5.2	-42.54	8.07
Stage 3	-5.4	-40.39	10.76
Stage 3	-5.6	-37.83	12.81
Stage 3	-5.8	-34.97	14.29
Stage 3	-6	-31.91	15.29
Stage 3	-6.2	-28.74	15.86
Stage 3	-6.4	-25.53	16.05
Stage 3	-6.6	-22.34	15.93
Stage 3	-6.8	-19.24	15.53
Stage 3	-7	-16.26	14.9
Stage 3	-7.2	-13.44	14.07
Stage 3	-7.4	-10.83	13.07
Stage 3	-7.6	-8.45	11.93
Stage 3	-7.8	-6.32	10.65
Stage 3	-8	-4.46	9.27
Stage 3	-8.2	-2.9	7.79
Stage 3	-8.4	-1.66	6.21
Stage 3	-8.6	-0.75	4.55
Stage 3	-8.8	-0.19	2.8
Stage 3	-9	0	0.96

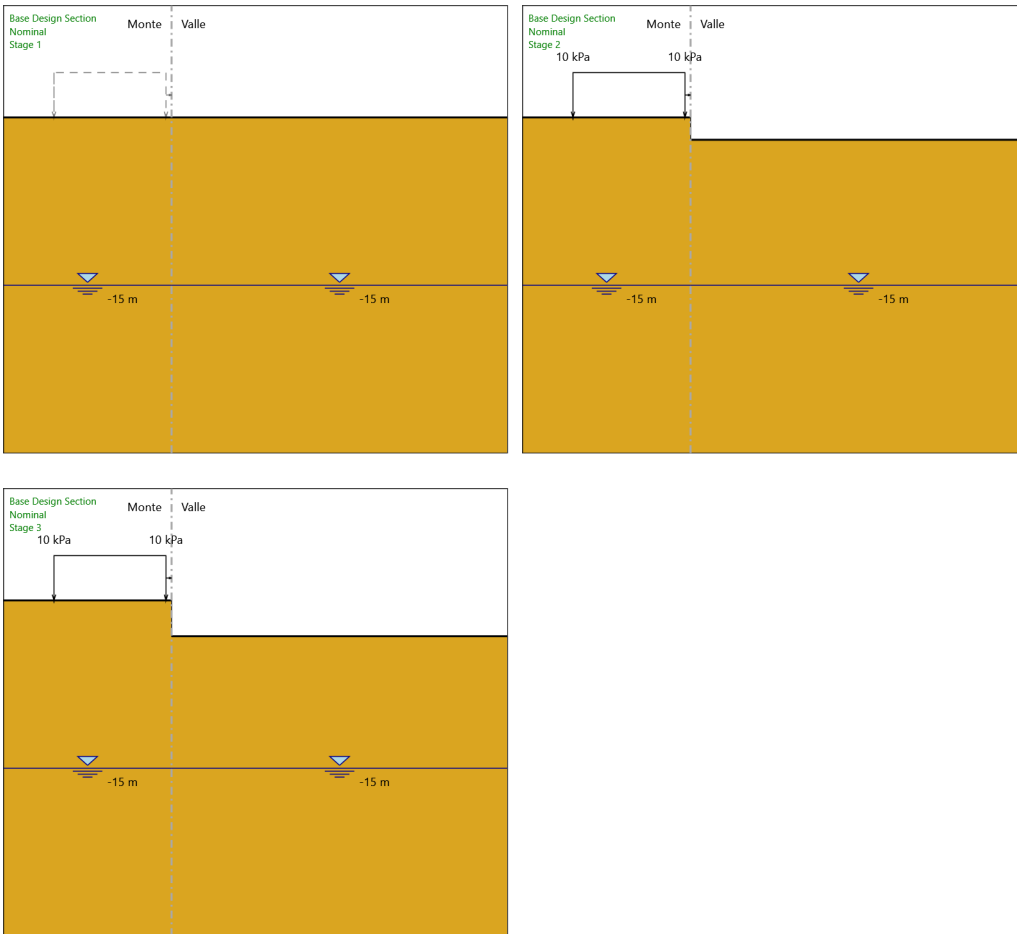
### 6.3.4. Grafico Momento Nominal



### 6.3.5. Grafico Taglio Nominal

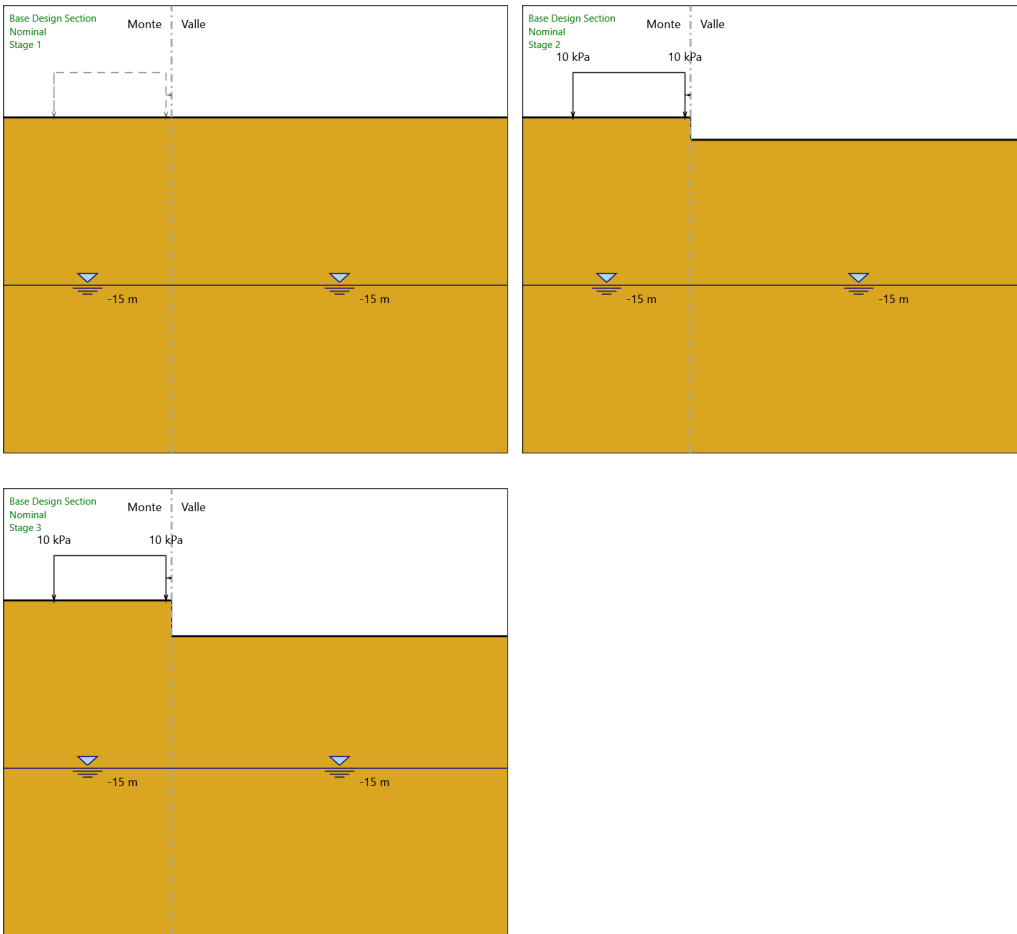


### 6.3.6. Grafico Momento Nominal





### 6.3.7. Grafico Taglio Nominal



## 6.4. Inviluppi Risultati Paratia Nominal

## 6.4. Riepilogo spinte

Design Assump- tion: Nominal	Tipo Risultato: Riepi- logo spinte	Muro: LEFT Lato LEFT							
		Stage	Vera effettiva (kN/m)	Pressione neutra (kN/m)	Vera Totale (kN/m)	Min ammissibile (kN/m)	Max ammissibile (kN/m)	Percentuale di resi- stenza massima	Vera / Attiva
		Stage 1	423.2	0	423.2	223.9	2873.4	14.73%	1.89
		Stage 2	367.8	0	367.8	239.1	3039.8	12.1%	1.54
		Stage 3	327.1	0	327.1	239.1	3039.8	10.76%	1.37

Design Assump- tion: Nominal	Tipo Risultato: Riepi- logo spinte	Muro: LEFT Lato RIGHT							
		Stage	Vera effettiva (kN/m)	Pressione neutra (kN/m)	Vera Totale (kN/m)	Min ammissibile (kN/m)	Max ammissibile (kN/m)	Percentuale di resi- stenza massima	Vera / Attiva
		Stage 1	423.2	0	423.2	223.9	2873.4	14.73%	1.89
		Stage 2	367.8	0	367.8	130.5	1757.1	20.93%	2.82
		Stage 3	327.1	0	327.1	86.4	1218	26.86%	3.79

## 7. Descrizione Coefficienti Design Assumption

### Coefficienti A

Nome	Carichi Per- manenti (F_dead_lo ad_unfa- vour)	Carichi Per- manenti (F_dead_lo ad_favour)	Carichi Va- riabili Sfa- vorevoli (F_live_loa d_unfa- vour)	Carichi Va- riabili Fa- vorevoli (F_live_loa d_favour)	Carico Si- smico (F_seism_ load)	Pres sioni Lato Mon te (F_ Wa- terD R)	Pres sioni Lato Vall e (F_ Wa- ter Res)	Carichi Perma- nenti De- stabiliz- zanti (F_UPL_G DStab)	Carichi Perma- nenti Sta- bilizzanti (F_UPL_G Stab)	Carichi Va- riabili De- stabiliz- zanti (F_UPL_Q DStab)	Carichi Perma- nenti De- stabiliz- zanti (F_HYD_G DStab)	Carichi Perma- nenti Sta- bilizzanti (F_HYD_G Stab)	Carichi Va- riabili De- stabiliz- zanti (F_HYD_Q DStab)
Simbolo	$\gamma_G$	$\gamma_G$	$\gamma_Q$	$\gamma_Q$	$\gamma_{QE}$	$\gamma_G$	$\gamma_G$	$\gamma_{Gdst}$	$\gamma_{Gstb}$	$\gamma_{Qdst}$	$\gamma_{Gdst}$	$\gamma_{Gstb}$	$\gamma_{Qdst}$
Nominal	1	1	1	1	1	1	1	1	1	1	1	1	1
NTC2018 : SLE (Rara/Fr equente /Quasi Perma- nente)	1	1	1	1	0	1	1	1	1	1	1	1	1
NTC2018 : A1+M1+ R1 (R3 per ti- ranti)	1.3	1	1.5	1	0	1.3	1	1	1	1	1.3	0.9	1
NTC2018 : A2+M2+ R1	1	1	1.3	1	0	1	1	1	1	1	1.3	0.9	1

### Coefficienti M

Nome	Parziale su $\tan(\phi')$ (F_Fr)	Parziale su $c'$ (F_eff_cohe)	Parziale su Su (F_Su)	Parziale su $q_u$ (F_qu)	Parziale su peso specifico (F_gamma)
Simbolo	$\gamma_\phi$	$\gamma_c$	$\gamma_{cu}$	$\gamma_{qu}$	$\gamma_\gamma$
Nominal	1	1	1	1	1
NTC2018: SLE (Rara/Frequente/Quasi Permanente)	1	1	1	1	1
NTC2018: A1+M1+R1 (R3 per tiranti)	1	1	1	1	1
NTC2018: A2+M2+R1	1.25	1.25	1.4	1	1

### Coefficienti R

Nome	Parziale resistenza terreno (es. Kp) (F_Soil_Res_walls)	Parziale resistenza Tiranti permanenti (F_Anch_P)	Parziale resistenza Tiranti temporanei (F_Anch_T)	Parziale elementi strutturali (F_wall)
Simbolo	$\gamma_{Re}$	$\gamma_{ap}$	$\gamma_{at}$	
Nominal	1	1	1	1
NTC2018: SLE (Rara/Fre- quente/Quasi Permanente)	1	1	1	1
NTC2018: A1+M1+R1 (R3 per tiranti)	1	1.2	1.1	1
NTC2018: A2+M2+R1	1	1.2	1.1	1

## 7.1. Risultati NTC2018: SLE (Rara/Frequente/Quasi Permanente)

### 7.1.1. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 1

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Tipo Risultato: Spostamento			Muro: LEFT
Stage	Z (m)	Spostamento (mm)	
Stage 1	0	0	
Stage 1	-0.2	0	
Stage 1	-0.4	0	
Stage 1	-0.6	0	
Stage 1	-0.8	0	
Stage 1	-1	0	
Stage 1	-1.2	0	
Stage 1	-1.4	0	
Stage 1	-1.6	0	
Stage 1	-1.8	0	
Stage 1	-2	0	
Stage 1	-2.2	0	
Stage 1	-2.4	0	
Stage 1	-2.6	0	
Stage 1	-2.8	0	
Stage 1	-3	0	
Stage 1	-3.2	0	
Stage 1	-3.4	0	
Stage 1	-3.6	0	
Stage 1	-3.8	0	
Stage 1	-4	0	
Stage 1	-4.2	0	
Stage 1	-4.4	0	
Stage 1	-4.6	0	
Stage 1	-4.8	0	
Stage 1	-5	0	
Stage 1	-5.2	0	
Stage 1	-5.4	0	
Stage 1	-5.6	0	
Stage 1	-5.8	0	
Stage 1	-6	0	
Stage 1	-6.2	0	
Stage 1	-6.4	0	
Stage 1	-6.6	0	
Stage 1	-6.8	0	
Stage 1	-7	0	
Stage 1	-7.2	0	
Stage 1	-7.4	0	
Stage 1	-7.6	0	
Stage 1	-7.8	0	
Stage 1	-8	0	
Stage 1	-8.2	0	
Stage 1	-8.4	0	
Stage 1	-8.6	0	
Stage 1	-8.8	0	
Stage 1	-9	0	

**7.1.2. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 1**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	0	0	0
Stage 1	-0.2	0	0
Stage 1	-0.4	0	0
Stage 1	-0.6	0	0
Stage 1	-0.8	0	0
Stage 1	-1	0	0
Stage 1	-1.2	0	0
Stage 1	-1.4	0	0
Stage 1	-1.6	0	0
Stage 1	-1.8	0	0
Stage 1	-2	0	0
Stage 1	-2.2	0	0
Stage 1	-2.4	0	0
Stage 1	-2.6	0	0
Stage 1	-2.8	0	0
Stage 1	-3	0	0
Stage 1	-3.2	0	0
Stage 1	-3.4	0	0
Stage 1	-3.6	0	0
Stage 1	-3.8	0	0
Stage 1	-4	0	0
Stage 1	-4.2	0	0
Stage 1	-4.4	0	0
Stage 1	-4.6	0	0
Stage 1	-4.8	0	0
Stage 1	-5	0	0
Stage 1	-5.2	0	0
Stage 1	-5.4	0	0
Stage 1	-5.6	0	0
Stage 1	-5.8	0	0
Stage 1	-6	0	0
Stage 1	-6.2	0	0
Stage 1	-6.4	0	0
Stage 1	-6.6	0	0
Stage 1	-6.8	0	0
Stage 1	-7	0	0
Stage 1	-7.2	0	0
Stage 1	-7.4	0	0
Stage 1	-7.6	0	0
Stage 1	-7.8	0	0
Stage 1	-8	0	0
Stage 1	-8.2	0	0
Stage 1	-8.4	0	0
Stage 1	-8.6	0	0
Stage 1	-8.8	0	0
Stage 1	-9	0	0

### 7.1.3. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 2

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Tipo Risultato: Spostamento			Muro: LEFT
Stage	Z (m)	Spostamento (mm)	
Stage 2	0	2.78	
Stage 2	-0.2	2.67	
Stage 2	-0.4	2.56	
Stage 2	-0.6	2.45	
Stage 2	-0.8	2.34	
Stage 2	-1	2.23	
Stage 2	-1.2	2.13	
Stage 2	-1.4	2.02	
Stage 2	-1.6	1.91	
Stage 2	-1.8	1.81	
Stage 2	-2	1.7	
Stage 2	-2.2	1.6	
Stage 2	-2.4	1.51	
Stage 2	-2.6	1.42	
Stage 2	-2.8	1.33	
Stage 2	-3	1.26	
Stage 2	-3.2	1.19	
Stage 2	-3.4	1.13	
Stage 2	-3.6	1.07	
Stage 2	-3.8	1.02	
Stage 2	-4	0.98	
Stage 2	-4.2	0.94	
Stage 2	-4.4	0.91	
Stage 2	-4.6	0.88	
Stage 2	-4.8	0.86	
Stage 2	-5	0.85	
Stage 2	-5.2	0.83	
Stage 2	-5.4	0.82	
Stage 2	-5.6	0.82	
Stage 2	-5.8	0.81	
Stage 2	-6	0.81	
Stage 2	-6.2	0.81	
Stage 2	-6.4	0.81	
Stage 2	-6.6	0.81	
Stage 2	-6.8	0.81	
Stage 2	-7	0.81	
Stage 2	-7.2	0.81	
Stage 2	-7.4	0.82	
Stage 2	-7.6	0.82	
Stage 2	-7.8	0.83	
Stage 2	-8	0.83	
Stage 2	-8.2	0.83	
Stage 2	-8.4	0.84	
Stage 2	-8.6	0.84	
Stage 2	-8.8	0.85	
Stage 2	-9	0.85	

**7.1.4. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 2**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	0	0	0
Stage 2	-0.2	0	0
Stage 2	-0.2	0	0
Stage 2	-0.4	0	0
Stage 2	-0.4	0	0
Stage 2	-0.6	0	0
Stage 2	-0.6	0	0
Stage 2	-0.8	-0.03	-0.14
Stage 2	-1	-0.15	-0.59
Stage 2	-1.2	-0.41	-1.34
Stage 2	-1.4	-0.89	-2.38
Stage 2	-1.6	-1.63	-3.69
Stage 2	-1.8	-2.69	-5.28
Stage 2	-2	-4.11	-7.14
Stage 2	-2.2	-5.51	-6.99
Stage 2	-2.4	-6.64	-5.63
Stage 2	-2.6	-7.44	-4.02
Stage 2	-2.8	-7.95	-2.54
Stage 2	-3	-8.2	-1.27
Stage 2	-3.2	-8.24	-0.2
Stage 2	-3.4	-8.11	0.67
Stage 2	-3.6	-7.84	1.36
Stage 2	-3.8	-7.46	1.89
Stage 2	-4	-7	2.28
Stage 2	-4.2	-6.49	2.56
Stage 2	-4.4	-5.94	2.73
Stage 2	-4.6	-5.38	2.81
Stage 2	-4.8	-4.82	2.81
Stage 2	-5	-4.27	2.76
Stage 2	-5.2	-3.74	2.65
Stage 2	-5.4	-3.24	2.51
Stage 2	-5.6	-2.77	2.34
Stage 2	-5.8	-2.34	2.15
Stage 2	-6	-1.95	1.95
Stage 2	-6.2	-1.6	1.74
Stage 2	-6.4	-1.29	1.54
Stage 2	-6.6	-1.03	1.34
Stage 2	-6.8	-0.8	1.15
Stage 2	-7	-0.6	0.97
Stage 2	-7.2	-0.44	0.8
Stage 2	-7.4	-0.31	0.65
Stage 2	-7.6	-0.21	0.51
Stage 2	-7.8	-0.14	0.38
Stage 2	-8	-0.08	0.28
Stage 2	-8.2	-0.04	0.19
Stage 2	-8.4	-0.02	0.12
Stage 2	-8.6	-0.01	0.06
Stage 2	-8.8	0	0.02
Stage 2	-9	0	0



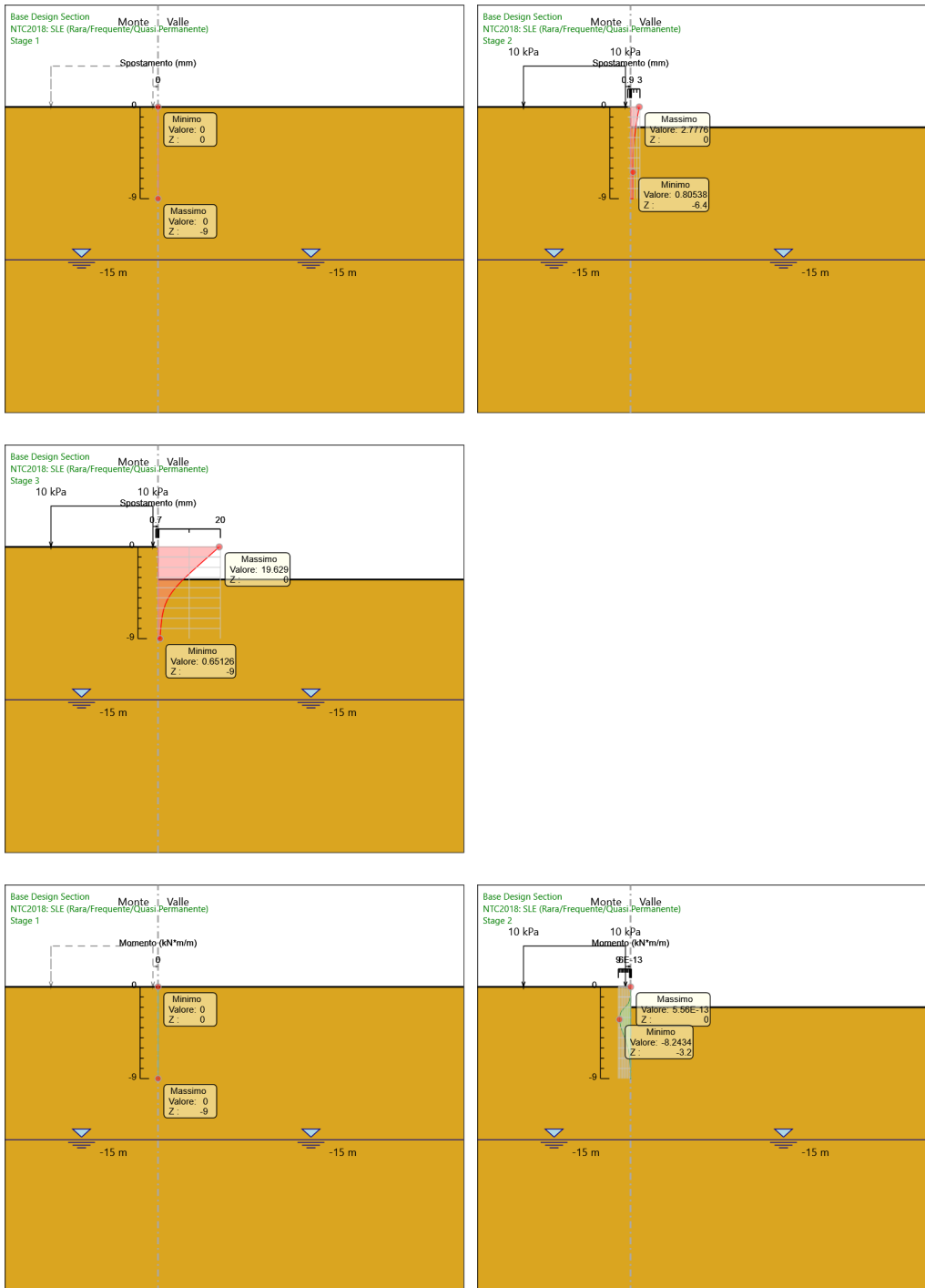
### 7.1.5. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 3

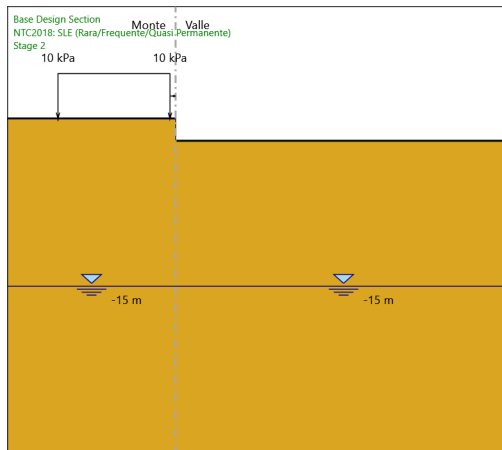
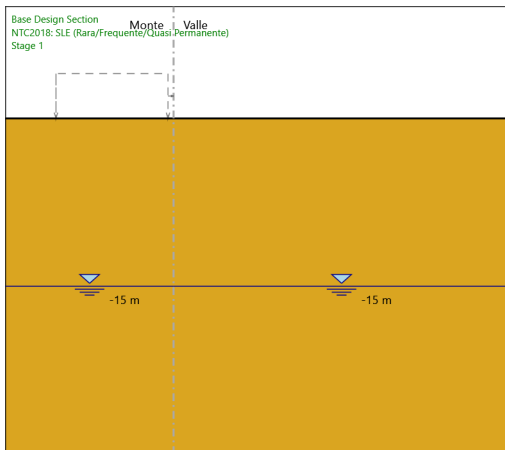
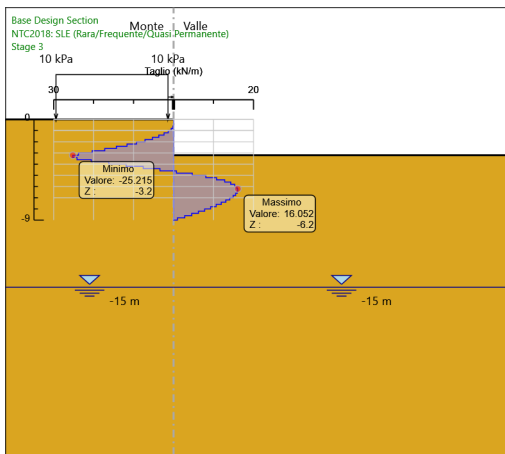
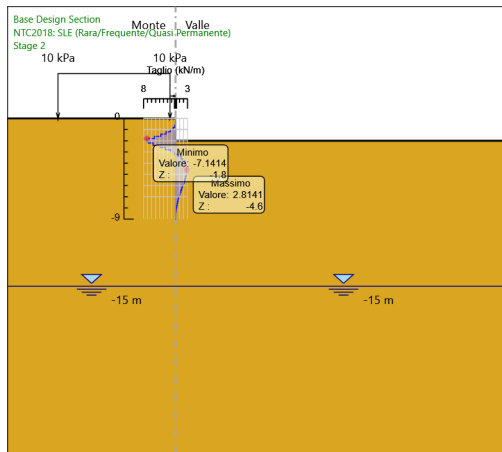
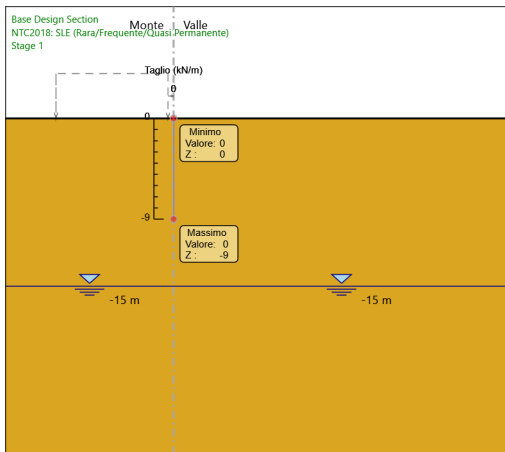
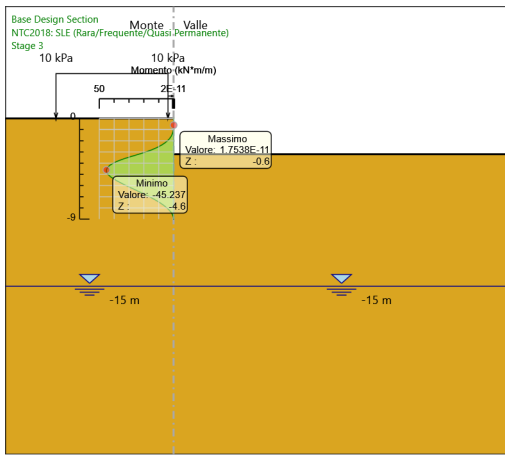
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Tipo Risultato: Spostamento			Muro: LEFT
Stage	Z (m)	Spostamento (mm)	
Stage 3	0	19.63	
Stage 3	-0.2	18.9	
Stage 3	-0.4	18.16	
Stage 3	-0.6	17.43	
Stage 3	-0.8	16.7	
Stage 3	-1	15.96	
Stage 3	-1.2	15.23	
Stage 3	-1.4	14.5	
Stage 3	-1.6	13.76	
Stage 3	-1.8	13.03	
Stage 3	-2	12.3	
Stage 3	-2.2	11.58	
Stage 3	-2.4	10.86	
Stage 3	-2.6	10.15	
Stage 3	-2.8	9.45	
Stage 3	-3	8.75	
Stage 3	-3.2	8.08	
Stage 3	-3.4	7.43	
Stage 3	-3.6	6.8	
Stage 3	-3.8	6.2	
Stage 3	-4	5.63	
Stage 3	-4.2	5.09	
Stage 3	-4.4	4.59	
Stage 3	-4.6	4.13	
Stage 3	-4.8	3.71	
Stage 3	-5	3.33	
Stage 3	-5.2	2.98	
Stage 3	-5.4	2.68	
Stage 3	-5.6	2.4	
Stage 3	-5.8	2.16	
Stage 3	-6	1.95	
Stage 3	-6.2	1.76	
Stage 3	-6.4	1.6	
Stage 3	-6.6	1.46	
Stage 3	-6.8	1.34	
Stage 3	-7	1.24	
Stage 3	-7.2	1.15	
Stage 3	-7.4	1.08	
Stage 3	-7.6	1.01	
Stage 3	-7.8	0.95	
Stage 3	-8	0.89	
Stage 3	-8.2	0.84	
Stage 3	-8.4	0.79	
Stage 3	-8.6	0.74	
Stage 3	-8.8	0.7	
Stage 3	-9	0.65	

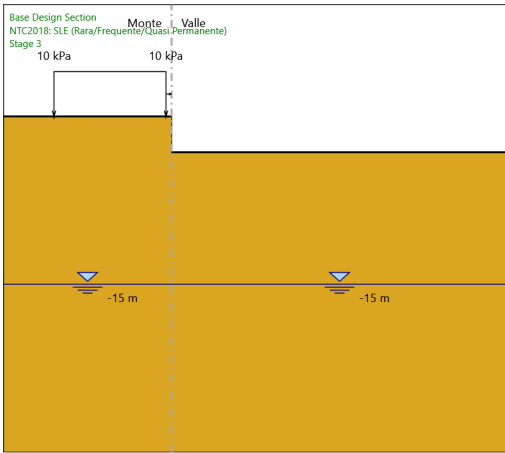
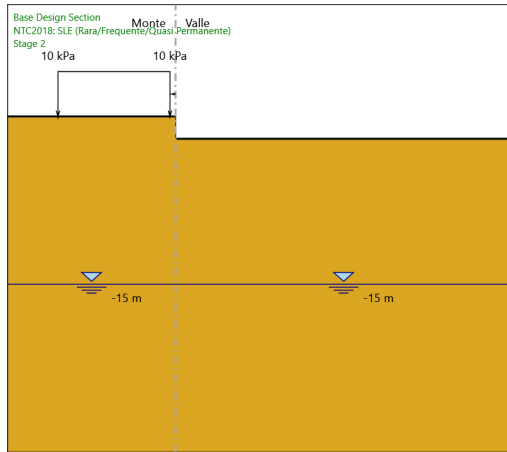
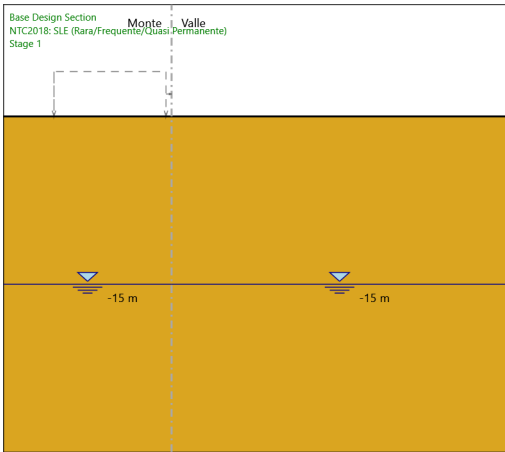
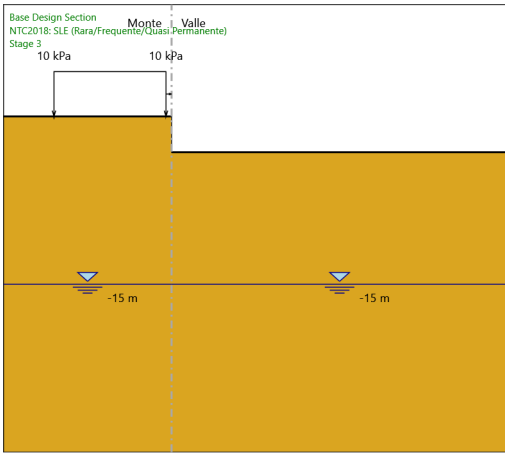
**7.1.6. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 3**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	0	0	0
Stage 3	-0.2	0	0
Stage 3	-0.2	0	0
Stage 3	-0.4	0	0
Stage 3	-0.4	0	0
Stage 3	-0.6	0	0
Stage 3	-0.6	0	0
Stage 3	-0.8	-0.03	-0.14
Stage 3	-1	-0.15	-0.59
Stage 3	-1.2	-0.41	-1.34
Stage 3	-1.4	-0.89	-2.38
Stage 3	-1.6	-1.63	-3.69
Stage 3	-1.8	-2.69	-5.28
Stage 3	-2	-4.11	-7.14
Stage 3	-2.2	-5.97	-9.27
Stage 3	-2.4	-8.3	-11.65
Stage 3	-2.6	-11.16	-14.3
Stage 3	-2.8	-14.6	-17.21
Stage 3	-3	-18.67	-20.38
Stage 3	-3.2	-23.43	-23.8
Stage 3	-3.4	-28.48	-25.21
Stage 3	-3.6	-33.31	-24.15
Stage 3	-3.8	-37.43	-20.6
Stage 3	-4	-40.67	-16.19
Stage 3	-4.2	-43.04	-11.86
Stage 3	-4.4	-44.56	-7.6
Stage 3	-4.6	-45.24	-3.4
Stage 3	-4.8	-45.09	0.72
Stage 3	-5	-44.16	4.68
Stage 3	-5.2	-42.54	8.07
Stage 3	-5.4	-40.39	10.76
Stage 3	-5.6	-37.83	12.81
Stage 3	-5.8	-34.97	14.29
Stage 3	-6	-31.91	15.29
Stage 3	-6.2	-28.74	15.86
Stage 3	-6.4	-25.53	16.05
Stage 3	-6.6	-22.34	15.93
Stage 3	-6.8	-19.24	15.53
Stage 3	-7	-16.26	14.9
Stage 3	-7.2	-13.44	14.07
Stage 3	-7.4	-10.83	13.07
Stage 3	-7.6	-8.45	11.93
Stage 3	-7.8	-6.32	10.65
Stage 3	-8	-4.46	9.27
Stage 3	-8.2	-2.9	7.79
Stage 3	-8.4	-1.66	6.21
Stage 3	-8.6	-0.75	4.55
Stage 3	-8.8	-0.19	2.8
Stage 3	-9	0	0.96

## 7.1.7. Tabella Grafici dei Risultati







## 7.2. Risultati NTC2018: A1+M1+R1 (R3 per tiranti)

### 7.2.1. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 1

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	0	0	0
Stage 1	-0.2	0	0
Stage 1	-0.4	0	0
Stage 1	-0.6	0	0
Stage 1	-0.8	0	0
Stage 1	-1	0	0
Stage 1	-1.2	0	0
Stage 1	-1.4	0	0
Stage 1	-1.6	0	0
Stage 1	-1.8	0	0
Stage 1	-2	0	0
Stage 1	-2.2	0	0
Stage 1	-2.4	0	0
Stage 1	-2.6	0	0
Stage 1	-2.8	0	0
Stage 1	-3	0	0
Stage 1	-3.2	0	0
Stage 1	-3.4	0	0
Stage 1	-3.6	0	0
Stage 1	-3.8	0	0
Stage 1	-4	0	0
Stage 1	-4.2	0	0
Stage 1	-4.4	0	0
Stage 1	-4.6	0	0
Stage 1	-4.8	0	0
Stage 1	-5	0	0
Stage 1	-5.2	0	0
Stage 1	-5.4	0	0
Stage 1	-5.6	0	0
Stage 1	-5.8	0	0
Stage 1	-6	0	0
Stage 1	-6.2	0	0
Stage 1	-6.4	0	0
Stage 1	-6.6	0	0
Stage 1	-6.8	0	0
Stage 1	-7	0	0
Stage 1	-7.2	0	0
Stage 1	-7.4	0	0
Stage 1	-7.6	0	0
Stage 1	-7.8	0	0
Stage 1	-8	0	0
Stage 1	-8.2	0	0
Stage 1	-8.4	0	0
Stage 1	-8.6	0	0
Stage 1	-8.8	0	0
Stage 1	-9	0	0

## 7.2.2. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 2

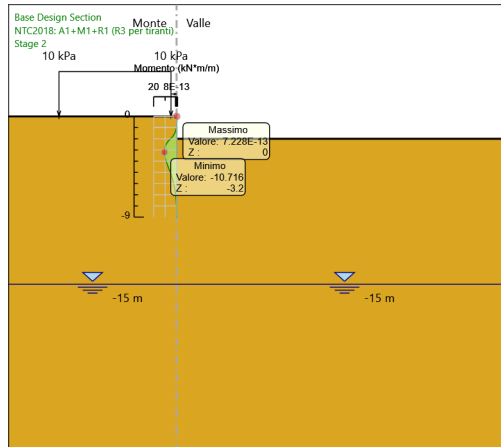
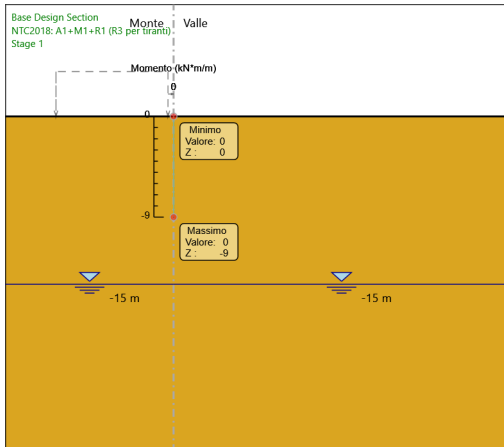
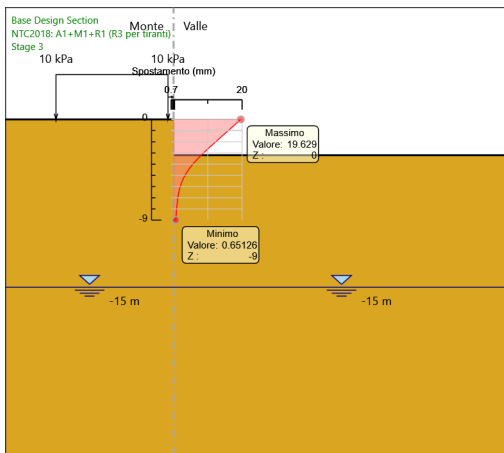
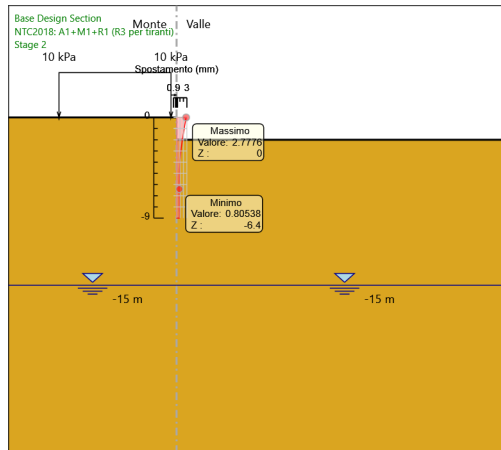
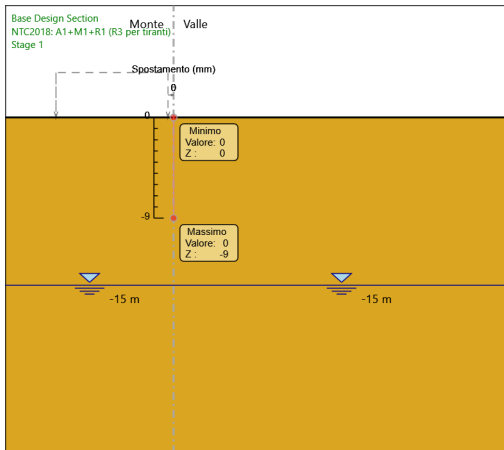
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	0	0	0
Stage 2	-0.2	0	0
Stage 2	-0.2	0	0
Stage 2	-0.4	0	0
Stage 2	-0.4	0	0
Stage 2	-0.6	0	0
Stage 2	-0.6	0	0
Stage 2	-0.8	-0.04	-0.19
Stage 2	-1	-0.19	-0.77
Stage 2	-1.2	-0.54	-1.74
Stage 2	-1.4	-1.16	-3.09
Stage 2	-1.6	-2.12	-4.8
Stage 2	-1.8	-3.49	-6.87
Stage 2	-2	-5.35	-9.28
Stage 2	-2.2	-7.16	-9.08
Stage 2	-2.4	-8.63	-7.32
Stage 2	-2.6	-9.67	-5.22
Stage 2	-2.8	-10.34	-3.31
Stage 2	-3	-10.67	-1.65
Stage 2	-3.2	-10.72	-0.25
Stage 2	-3.4	-10.54	0.87
Stage 2	-3.6	-10.19	1.77
Stage 2	-3.8	-9.7	2.46
Stage 2	-4	-9.1	2.97
Stage 2	-4.2	-8.44	3.33
Stage 2	-4.4	-7.73	3.55
Stage 2	-4.6	-7	3.65
Stage 2	-4.8	-6.27	3.66
Stage 2	-5	-5.55	3.58
Stage 2	-5.2	-4.86	3.45
Stage 2	-5.4	-4.21	3.26
Stage 2	-5.6	-3.6	3.04
Stage 2	-5.8	-3.04	2.79
Stage 2	-6	-2.53	2.53
Stage 2	-6.2	-2.08	2.27
Stage 2	-6.4	-1.68	2
Stage 2	-6.6	-1.33	1.74
Stage 2	-6.8	-1.04	1.49
Stage 2	-7	-0.78	1.26
Stage 2	-7.2	-0.58	1.04
Stage 2	-7.4	-0.41	0.84
Stage 2	-7.6	-0.28	0.66
Stage 2	-7.8	-0.18	0.5
Stage 2	-8	-0.1	0.36
Stage 2	-8.2	-0.05	0.25
Stage 2	-8.4	-0.02	0.15
Stage 2	-8.6	-0.01	0.08
Stage 2	-8.8	0	0.03
Stage 2	-9	0	0

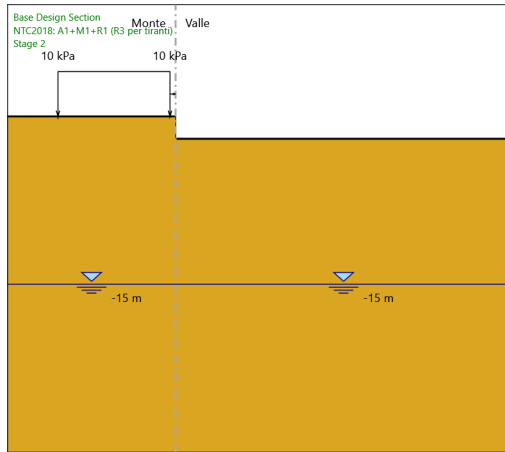
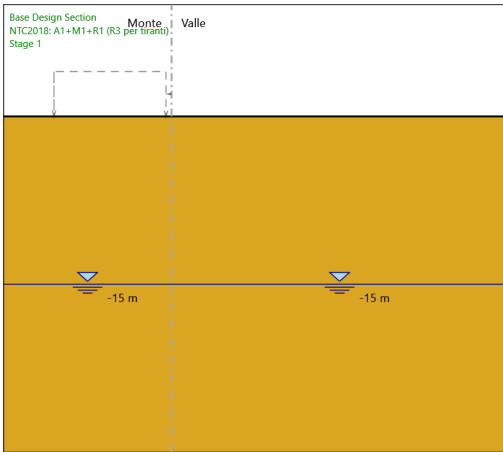
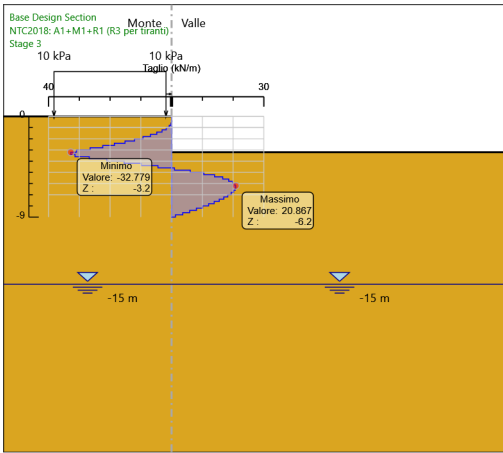
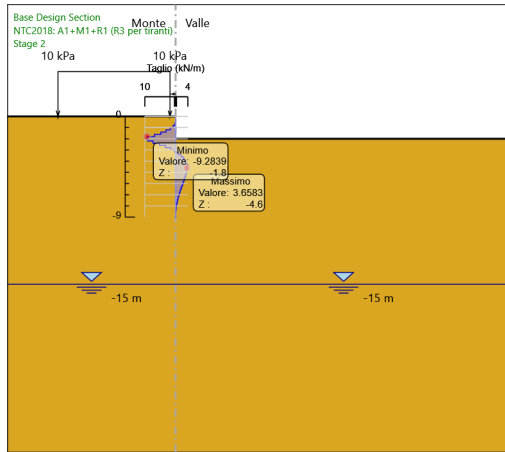
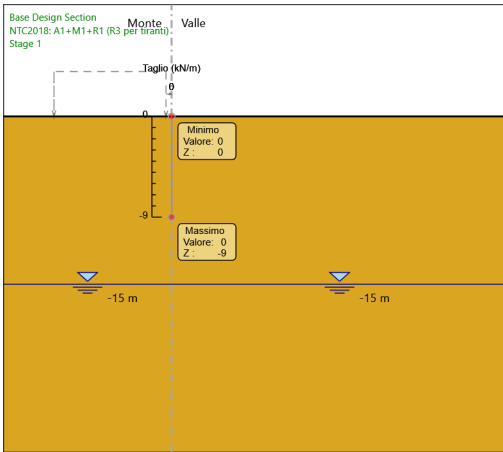
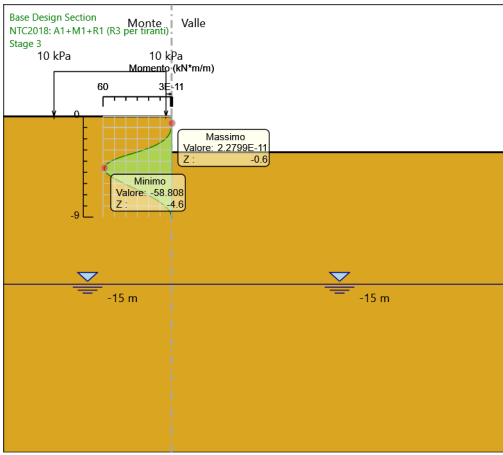
### 7.2.3. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 3

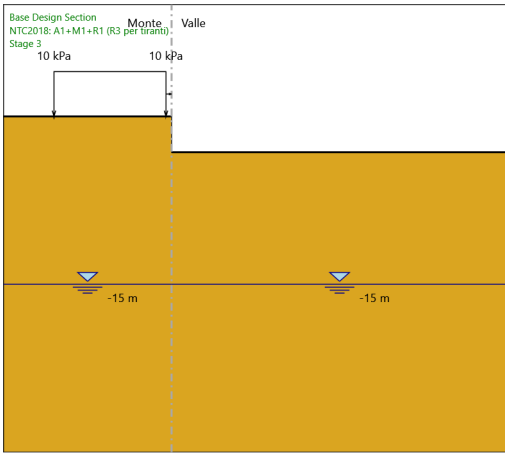
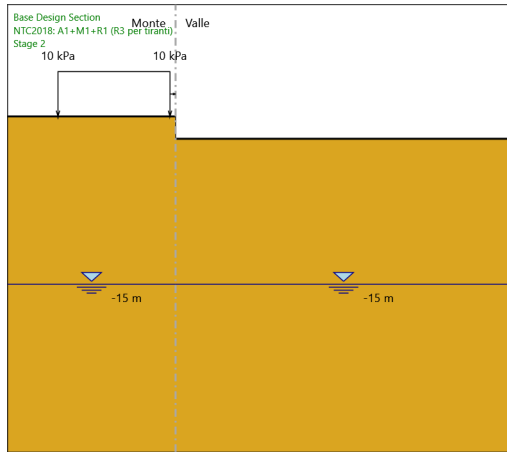
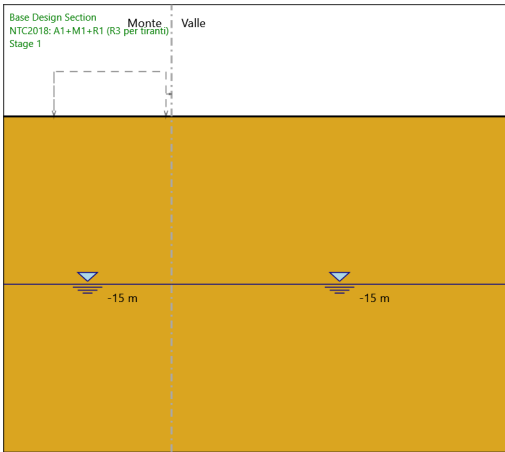
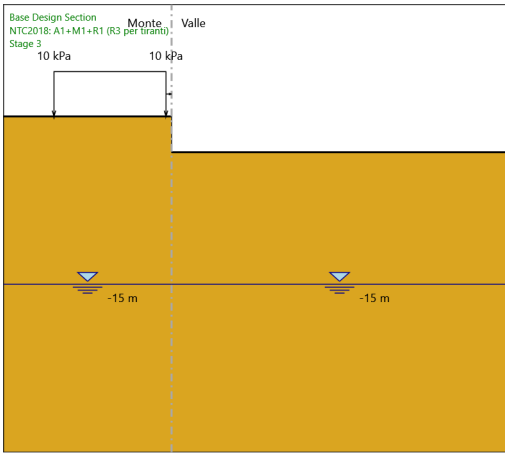
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	0	0	0
Stage 3	-0.2	0	0
Stage 3	-0.2	0	0
Stage 3	-0.4	0	0
Stage 3	-0.4	0	0
Stage 3	-0.6	0	0
Stage 3	-0.6	0	0
Stage 3	-0.8	-0.04	-0.19
Stage 3	-1	-0.19	-0.77
Stage 3	-1.2	-0.54	-1.74
Stage 3	-1.4	-1.16	-3.09
Stage 3	-1.6	-2.12	-4.8
Stage 3	-1.8	-3.49	-6.87
Stage 3	-2	-5.35	-9.28
Stage 3	-2.2	-7.76	-12.05
Stage 3	-2.4	-10.79	-15.15
Stage 3	-2.6	-14.5	-18.59
Stage 3	-2.8	-18.98	-22.37
Stage 3	-3	-24.28	-26.49
Stage 3	-3.2	-30.46	-30.94
Stage 3	-3.4	-37.02	-32.78
Stage 3	-3.6	-43.3	-31.39
Stage 3	-3.8	-48.65	-26.78
Stage 3	-4	-52.87	-21.05
Stage 3	-4.2	-55.95	-15.41
Stage 3	-4.4	-57.92	-9.87
Stage 3	-4.6	-58.81	-4.43
Stage 3	-4.8	-58.62	0.94
Stage 3	-5	-57.4	6.09
Stage 3	-5.2	-55.3	10.5
Stage 3	-5.4	-52.51	13.98
Stage 3	-5.6	-49.18	16.65
Stage 3	-5.8	-45.46	18.58
Stage 3	-6	-41.48	19.88
Stage 3	-6.2	-37.36	20.61
Stage 3	-6.4	-33.19	20.87
Stage 3	-6.6	-29.05	20.71
Stage 3	-6.8	-25.01	20.19
Stage 3	-7	-21.14	19.37
Stage 3	-7.2	-17.48	18.29
Stage 3	-7.4	-14.08	16.99
Stage 3	-7.6	-10.98	15.5
Stage 3	-7.8	-8.21	13.85
Stage 3	-8	-5.8	12.05
Stage 3	-8.2	-3.77	10.12
Stage 3	-8.4	-2.16	8.08
Stage 3	-8.6	-0.98	5.91
Stage 3	-8.8	-0.25	3.64
Stage 3	-9	0	1.25



## 7.2.4. Tabella Grafici dei Risultati







## 7.3. Risultati NTC2018: A2+M2+R1

### 7.3.1. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 1

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	0	0	0
Stage 1	-0.2	0	0
Stage 1	-0.4	0	0
Stage 1	-0.6	0	0
Stage 1	-0.8	0	0
Stage 1	-1	0	0
Stage 1	-1.2	0	0
Stage 1	-1.4	0	0
Stage 1	-1.6	0	0
Stage 1	-1.8	0	0
Stage 1	-2	0	0
Stage 1	-2.2	0	0
Stage 1	-2.4	0	0
Stage 1	-2.6	0	0
Stage 1	-2.8	0	0
Stage 1	-3	0	0
Stage 1	-3.2	0	0
Stage 1	-3.4	0	0
Stage 1	-3.6	0	0
Stage 1	-3.8	0	0
Stage 1	-4	0	0
Stage 1	-4.2	0	0
Stage 1	-4.4	0	0
Stage 1	-4.6	0	0
Stage 1	-4.8	0	0
Stage 1	-5	0	0
Stage 1	-5.2	0	0
Stage 1	-5.4	0	0
Stage 1	-5.6	0	0
Stage 1	-5.8	0	0
Stage 1	-6	0	0
Stage 1	-6.2	0	0
Stage 1	-6.4	0	0
Stage 1	-6.6	0	0
Stage 1	-6.8	0	0
Stage 1	-7	0	0
Stage 1	-7.2	0	0
Stage 1	-7.4	0	0
Stage 1	-7.6	0	0
Stage 1	-7.8	0	0
Stage 1	-8	0	0
Stage 1	-8.2	0	0
Stage 1	-8.4	0	0
Stage 1	-8.6	0	0
Stage 1	-8.8	0	0
Stage 1	-9	0	0

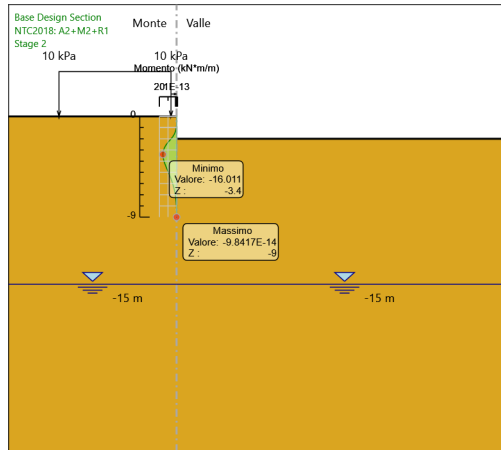
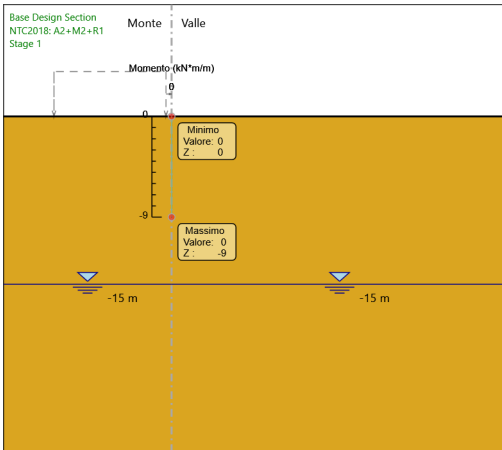
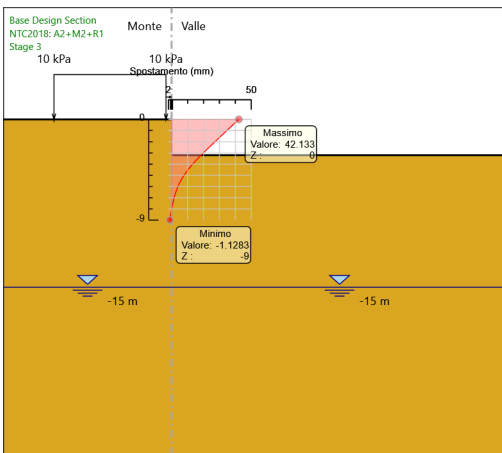
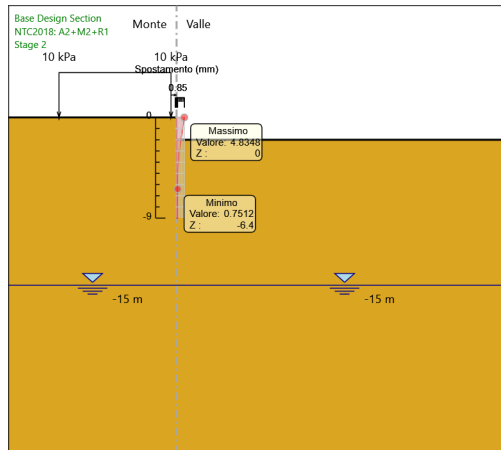
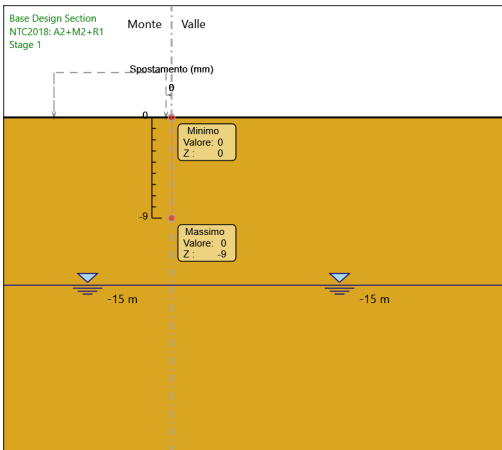
### 7.3.2. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 2

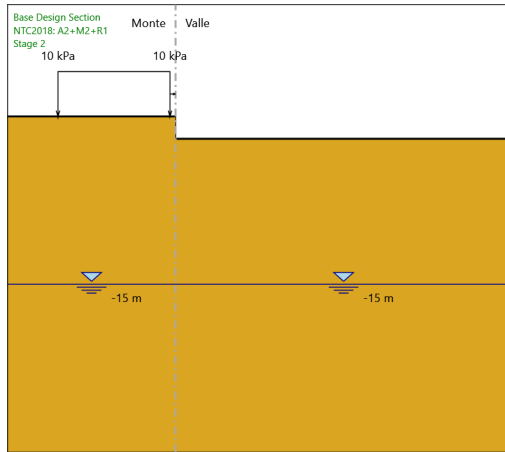
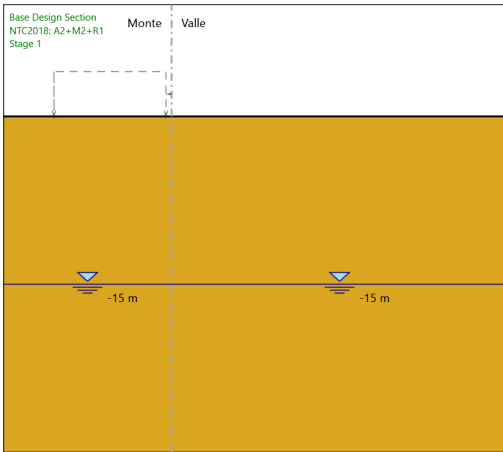
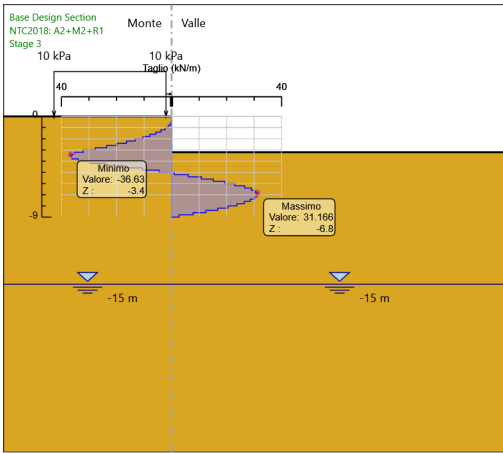
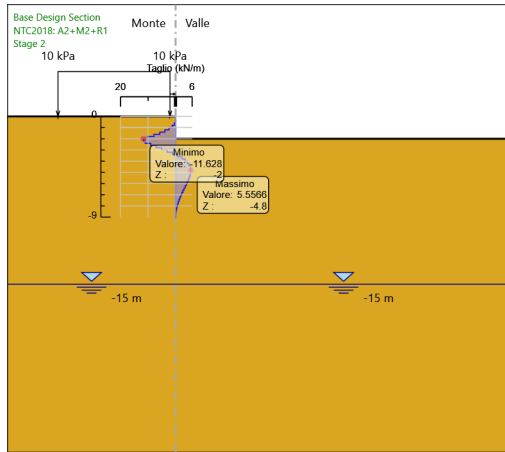
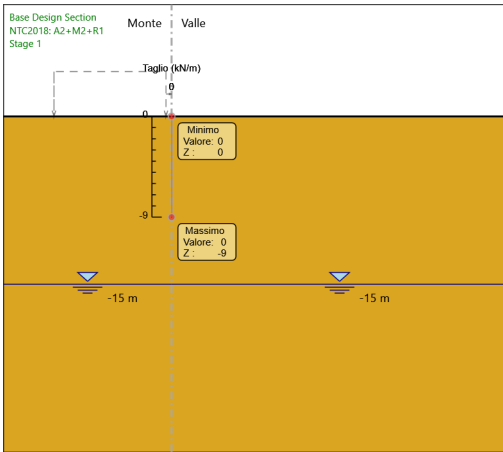
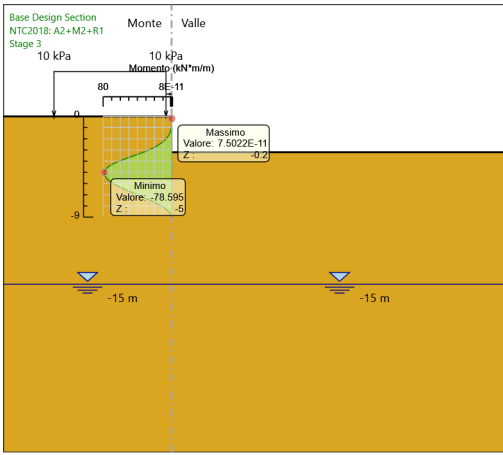
Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	0	0	0
Stage 2	-0.2	0	0
Stage 2	-0.2	0	0
Stage 2	-0.4	0	0
Stage 2	-0.4	0	0
Stage 2	-0.6	-0.01	-0.05
Stage 2	-0.8	-0.1	-0.46
Stage 2	-1	-0.35	-1.24
Stage 2	-1.2	-0.83	-2.38
Stage 2	-1.4	-1.6	-3.88
Stage 2	-1.6	-2.75	-5.72
Stage 2	-1.8	-4.33	-7.9
Stage 2	-2	-6.41	-10.4
Stage 2	-2.2	-8.73	-11.63
Stage 2	-2.4	-10.95	-11.07
Stage 2	-2.6	-12.76	-9.06
Stage 2	-2.8	-14.17	-7.05
Stage 2	-3	-15.18	-5.05
Stage 2	-3.2	-15.79	-3.06
Stage 2	-3.4	-16.01	-1.1
Stage 2	-3.6	-15.85	0.79
Stage 2	-3.8	-15.39	2.3
Stage 2	-4	-14.7	3.46
Stage 2	-4.2	-13.83	4.34
Stage 2	-4.4	-12.84	4.95
Stage 2	-4.6	-11.78	5.33
Stage 2	-4.8	-10.67	5.52
Stage 2	-5	-9.56	5.56
Stage 2	-5.2	-8.47	5.46
Stage 2	-5.4	-7.42	5.26
Stage 2	-5.6	-6.42	4.99
Stage 2	-5.8	-5.49	4.66
Stage 2	-6	-4.63	4.28
Stage 2	-6.2	-3.85	3.89
Stage 2	-6.4	-3.16	3.48
Stage 2	-6.6	-2.54	3.07
Stage 2	-6.8	-2.01	2.67
Stage 2	-7	-1.55	2.29
Stage 2	-7.2	-1.17	1.92
Stage 2	-7.4	-0.85	1.58
Stage 2	-7.6	-0.59	1.28
Stage 2	-7.8	-0.39	1
Stage 2	-8	-0.24	0.75
Stage 2	-8.2	-0.14	0.54
Stage 2	-8.4	-0.07	0.36
Stage 2	-8.6	-0.02	0.21
Stage 2	-8.8	0	0.1
Stage 2	-9	0	0.02

### 7.3.3. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 3

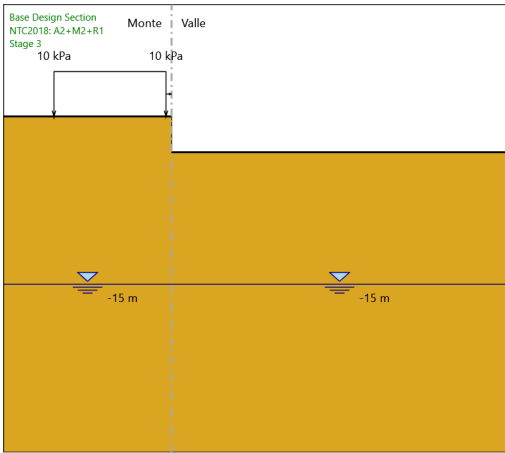
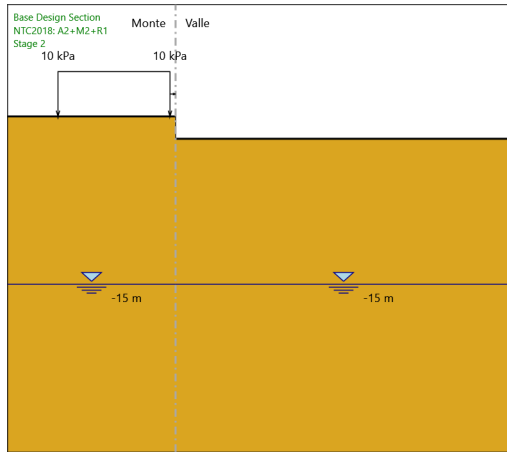
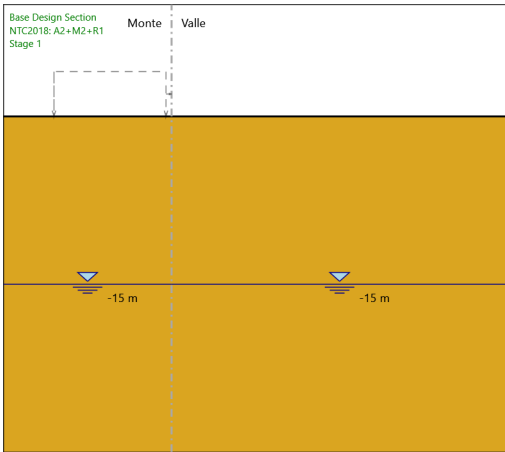
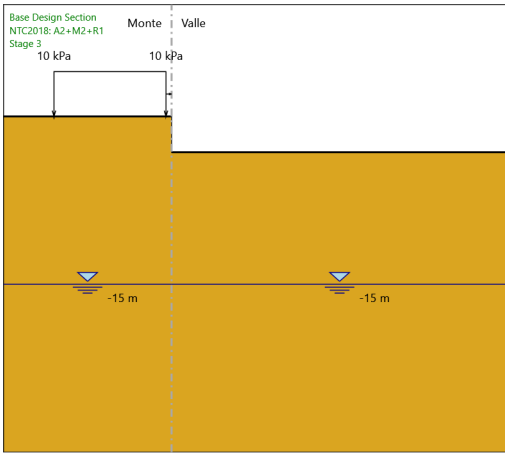
Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	0	0	0
Stage 3	-0.2	0	0
Stage 3	-0.2	0	0
Stage 3	-0.4	0	0
Stage 3	-0.4	0	0
Stage 3	-0.6	-0.01	-0.05
Stage 3	-0.8	-0.1	-0.46
Stage 3	-1	-0.35	-1.24
Stage 3	-1.2	-0.83	-2.38
Stage 3	-1.4	-1.6	-3.88
Stage 3	-1.6	-2.75	-5.72
Stage 3	-1.8	-4.33	-7.9
Stage 3	-2	-6.41	-10.4
Stage 3	-2.2	-9.05	-13.23
Stage 3	-2.4	-12.33	-16.37
Stage 3	-2.6	-16.29	-19.84
Stage 3	-2.8	-21.02	-23.62
Stage 3	-3	-26.56	-27.72
Stage 3	-3.2	-32.99	-32.14
Stage 3	-3.4	-40.05	-35.28
Stage 3	-3.6	-47.37	-36.63
Stage 3	-3.8	-54.61	-36.19
Stage 3	-4	-61.4	-33.95
Stage 3	-4.2	-67.38	-29.91
Stage 3	-4.4	-72.2	-24.07
Stage 3	-4.6	-75.6	-17.01
Stage 3	-4.8	-77.7	-10.5
Stage 3	-5	-78.6	-4.5
Stage 3	-5.2	-78.39	1.03
Stage 3	-5.4	-77.16	6.13
Stage 3	-5.6	-75	10.84
Stage 3	-5.8	-71.96	15.19
Stage 3	-6	-68.11	19.24
Stage 3	-6.2	-63.5	23.02
Stage 3	-6.4	-58.2	26.54
Stage 3	-6.6	-52.39	29.02
Stage 3	-6.8	-46.29	30.53
Stage 3	-7	-40.05	31.17
Stage 3	-7.2	-33.85	31.01
Stage 3	-7.4	-27.83	30.13
Stage 3	-7.6	-22.11	28.6
Stage 3	-7.8	-16.81	26.46
Stage 3	-8	-12.06	23.75
Stage 3	-8.2	-7.96	20.51
Stage 3	-8.4	-4.61	16.76
Stage 3	-8.6	-2.11	12.5
Stage 3	-8.8	-0.55	7.81
Stage 3	-9	0	2.73

### 7.3.4. Tabella Grafici dei Risultati









## **8. Normative adottate per le verifiche degli Elementi Strutturali**

### **Normative Verifiche**

Calcestruzzo	NTC
Acciaio	EC3
Tirante	NTC

### **Coefficienti per Verifica Tiranti**

GEO FS	1
$\xi_{a3}$	1.8
$\gamma_s$	1.15

## 8.1. Riepilogo Stage / Design Assumption per Involuppo

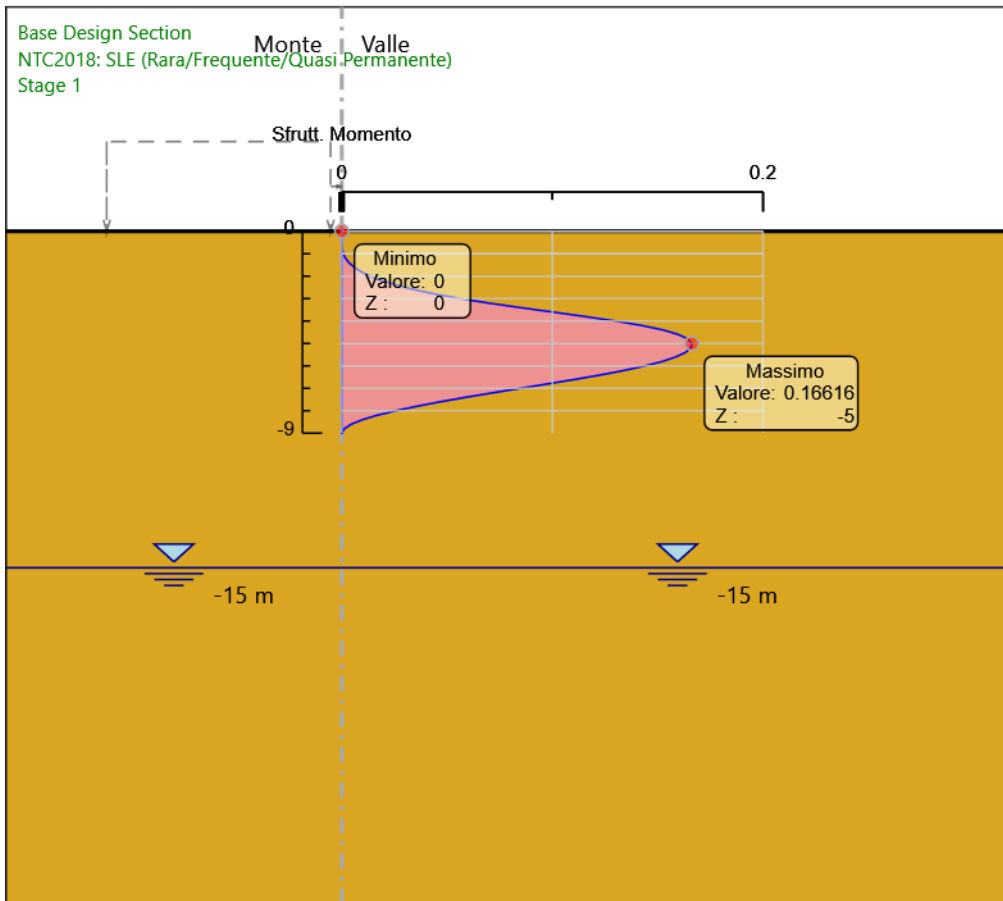
Design Assumption	Stage 1	Stage 2	Stage 3
NTC2018: SLE (Rara/Frequente/Quasi Permanente)	V	V	V
NTC2018: A1+M1+R1 (R3 per tiranti)	V	V	V
NTC2018: A2+M2+R1	V	V	V

## 8.2. Risultati SteelWorld

### 8.2.1. Tabella Involuppi Tasso di Sfruttamento a Momento - SteelWorld : LEFT

Involuppi Tasso di Sfruttamento a Momento - SteelWorld	LEFT
Z (m)	Tasso di Sfruttamento a Momento - SteelWorld
0	0
-0.2	0
-0.4	0
-0.6	0
-0.8	0
-1	0.001
-1.2	0.002
-1.4	0.003
-1.6	0.006
-1.8	0.009
-2	0.014
-2.2	0.019
-2.4	0.026
-2.6	0.034
-2.8	0.044
-3	0.056
-3.2	0.07
-3.4	0.085
-3.6	0.1
-3.8	0.115
-4	0.13
-4.2	0.142
-4.4	0.153
-4.6	0.16
-4.8	0.164
-5	0.166
-5.2	0.166
-5.4	0.163
-5.6	0.159
-5.8	0.152
-6	0.144
-6.2	0.134
-6.4	0.123
-6.6	0.111
-6.8	0.098
-7	0.085
-7.2	0.072
-7.4	0.059
-7.6	0.047
-7.8	0.036
-8	0.026
-8.2	0.017
-8.4	0.01
-8.6	0.004
-8.8	0.001
-9	0

## 8.2.2. Grafico Involuppi Tasso di Sfruttamento a Momento - SteelWorld

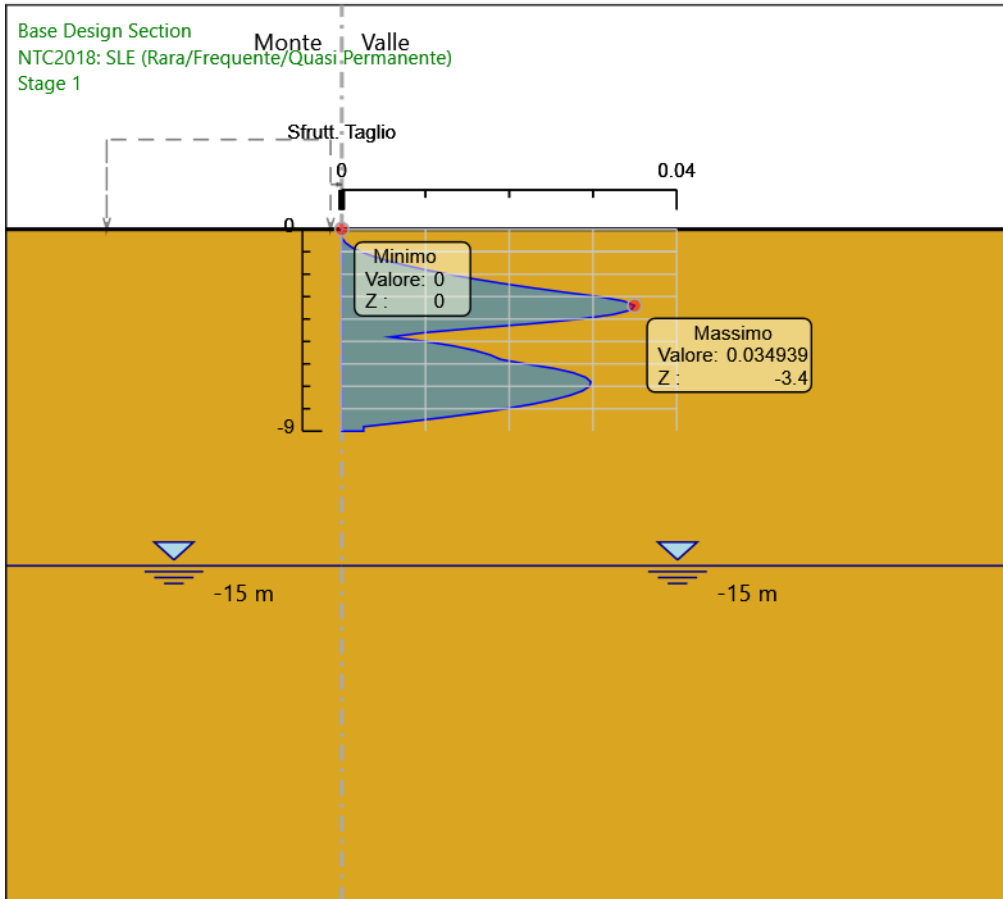


Involuppi  
Tasso di Sfruttamento a Momento - SteelWorld

### 8.2.1. Tabella Involuppi Tasso di Sfruttamento a Taglio - SteelWorld : LEFT

Involuppi Tasso di Sfruttamento a Taglio - SteelWorld	LEFT
Z (m)	Tasso di Sfruttamento a Taglio - SteelWorld
0	0
-0.2	0
-0.4	0
-0.6	0
-0.8	0.001
-1	0.002
-1.2	0.004
-1.4	0.005
-1.6	0.008
-1.8	0.01
-2	0.013
-2.2	0.016
-2.4	0.019
-2.6	0.023
-2.8	0.026
-3	0.031
-3.2	0.034
-3.4	0.035
-3.6	0.035
-3.8	0.032
-4	0.029
-4.2	0.023
-4.4	0.016
-4.6	0.01
-4.8	0.006
-5	0.01
-5.2	0.013
-5.4	0.016
-5.6	0.018
-5.8	0.019
-6	0.022
-6.2	0.025
-6.4	0.028
-6.6	0.029
-6.8	0.03
-7	0.03
-7.2	0.029
-7.4	0.027
-7.6	0.025
-7.8	0.023
-8	0.02
-8.2	0.016
-8.4	0.012
-8.6	0.007
-8.8	0.003
-9	0.003

## 8.2.2. Grafico Involuppi Tasso di Sfruttamento a Taglio - SteelWorld



Inviluppi  
Tasso di Sfruttamento a Taglio - SteelWorld





ALLEGATO 3:

IN03 - SCAVO CON PALANCOLE TIPO 3 –

PALANCOLE PUNTONATE



## ***Report di Calcolo***

# Sommario

## Contenuto Sommario

# **1. Descrizione Progetto**

Plancole Puntonate

## ***2. Descrizione del Software***

ParatiePlus è un codice agli elementi finiti che simula il problema di uno scavo sostenuto da diaframmi flessibili e permette di valutare il comportamento della parete di sostegno durante tutte le fasi intermedie e nella configurazione finale.

### 3. Descrizione della Stratigrafia e degli Strati di Terreno

Tipo : HORIZONTAL

Quota : 0 m

OCR : 1

Strato di Terreno	Terreno	$\gamma$ dry kN/m <sup>3</sup>	$\gamma$ sat kN/m <sup>3</sup>	$\phi'$ °	$\phi$ °	$c_v$ °	$\phi_p$ °	$c'$ kPa	Su kPa	Modulo Elastico Eu	Evc kPa	Eur kPa	Ah	Av	exp Pa	Rur/Rvc	Rvc	Ku kPa	Kvc kN/m <sup>3</sup>	Kur kN/m <sup>3</sup>
1	Argilla Limosa	19	19.5	27				3	Constant	10000	16000									

## 4. Descrizione Pareti

X : 0 m

Quota in alto : 0 m

Quota di fondo : -10 m

Muro di sinistra

Sezione : Default Section

Area equivalente : 0.01829 m

Inerzia equivalente : 0.0002 m<sup>4</sup>/m

Profilo palanca : PU\_22



X : 4 m

Quota in alto : 0 m

Quota di fondo : -10 m

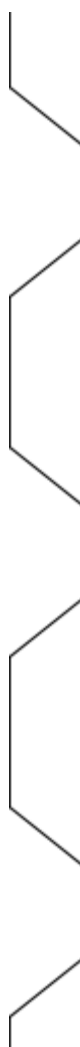
Muro di destra

Sezione : Default Section

Area equivalente : 0.01829 m

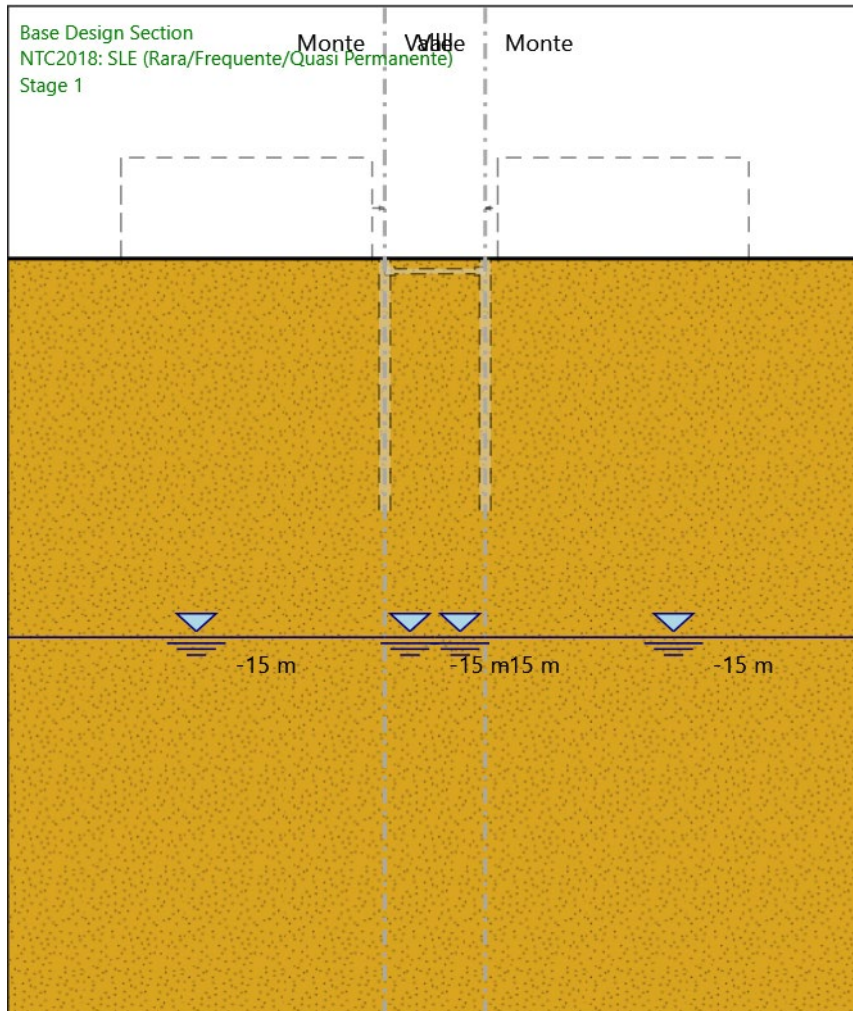
Inerzia equivalente : 0.0002 m<sup>4</sup>/m

Profilo palanca : PU\_22



## 5. Fasi di Calcolo

### 5.1. Stage 1



Stage 1

Scavo

Muro di sinistra

Lato monte : 0 m

Lato valle : 0 m

Muro di destra

Lato monte : 0 m

Lato valle : 0 m

Linea di scavo di sinistra (Orizzontale)

0 m



Linea di scavo centrale (Orizzontale)

0 m

Linea di scavo di destra (Orizzontale)

0 m

Falda acquifera

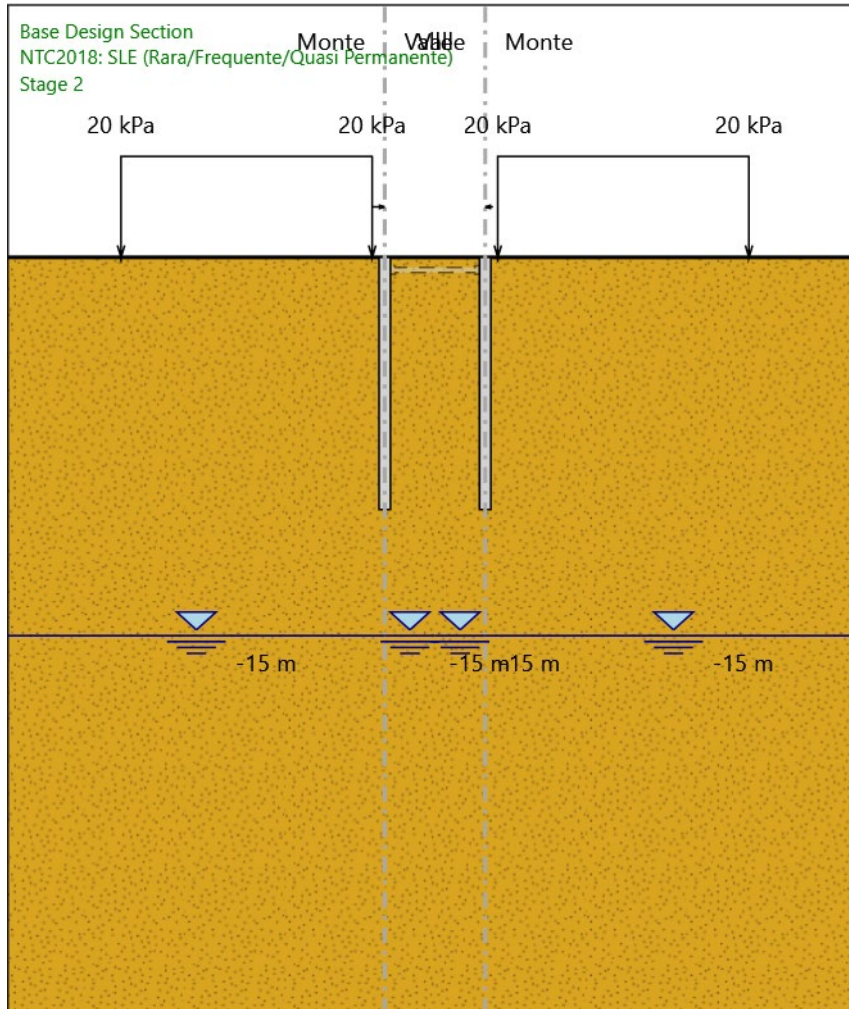
Falda di sinistra : -15 m

Falda di destra : -15 m

Falda centrale-sinistra : -15 m

Falda centrale-destra : -15 m

## 5.2. Stage 2



Stage 2

Scavo

Muro di sinistra

Lato monte : 0 m

Lato valle : 0 m

Muro di destra

Lato monte : 0 m

Lato valle : 0 m

Linea di scavo di sinistra (Orizzontale)

0 m

Linea di scavo centrale (Orizzontale)

0 m

Linea di scavo di destra (Orizzontale)

0 m

#### Falda acquifera

Falda di sinistra : -15 m

Falda di destra : -15 m

Falda centrale-sinistra : -15 m

Falda centrale-destra : -15 m

#### Carichi

Carico lineare in superficie : SurfaceSurcharge

X iniziale : -10.5 m

X finale : -0.5 m

Pressione iniziale : 20 kPa

Pressione finale : 20 kPa

Carico lineare in superficie : SurfaceSurcharge

X iniziale : 4.5 m

X finale : 14.5 m

Pressione iniziale : 20 kPa

Pressione finale : 20 kPa

#### Elementi strutturali

Paratia : WallElement

X : 0 m

Quota in alto : 0 m

Quota di fondo : -10 m

Sezione : Default Section

Paratia : WallElement\_New

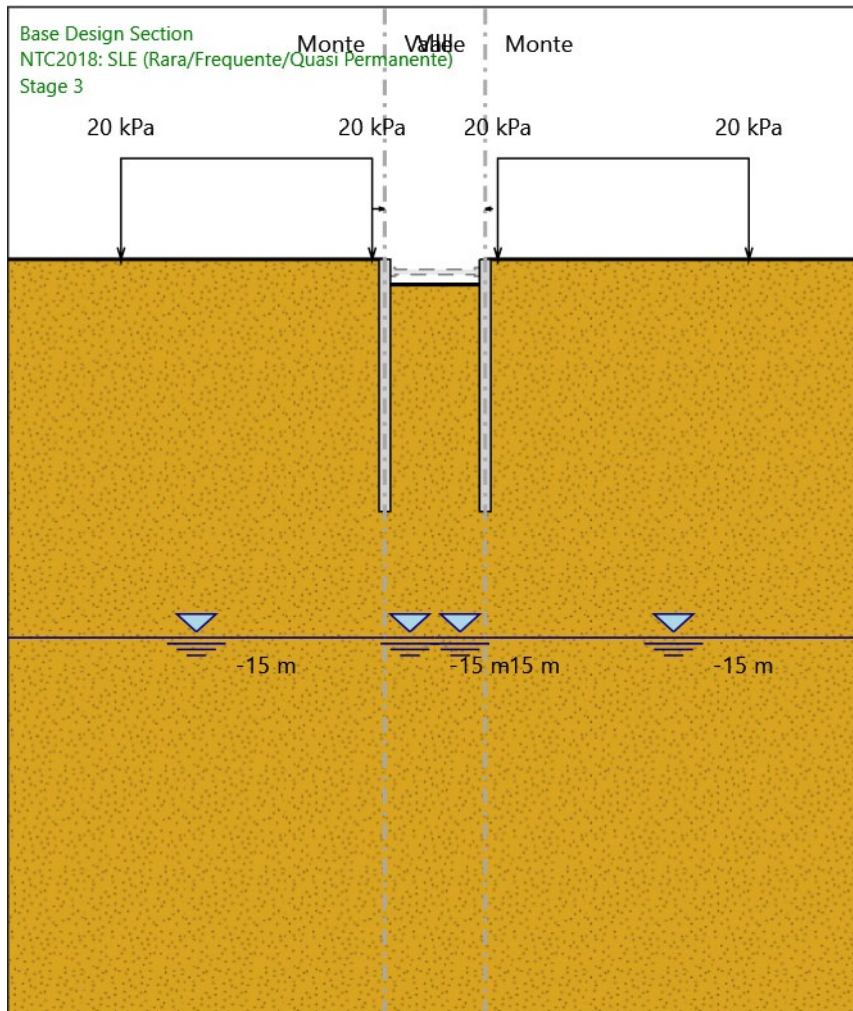
X : 4 m

Quota in alto : 0 m

Quota di fondo : -10 m

Sezione : Default Section

### 5.3. Stage 3



Stage 3

Scavo

Muro di sinistra

Lato monte : 0 m

Lato valle : -1 m

Muro di destra

Lato monte : 0 m

Lato valle : -1 m

Linea di scavo di sinistra (Orizzontale)

0 m

Linea di scavo centrale (Orizzontale)

-1 m

Linea di scavo di destra (Orizzontale)

0 m

#### Falda acquifera

Falda di sinistra : -15 m

Falda di destra : -15 m

Falda centrale-sinistra : -15 m

Falda centrale-destra : -15 m

#### Carichi

Carico lineare in superficie : SurfaceSurcharge

X iniziale : -10.5 m

X finale : -0.5 m

Pressione iniziale : 20 kPa

Pressione finale : 20 kPa

Carico lineare in superficie : SurfaceSurcharge

X iniziale : 4.5 m

X finale : 14.5 m

Pressione iniziale : 20 kPa

Pressione finale : 20 kPa

#### Elementi strutturali

Paratia : WallElement

X : 0 m

Quota in alto : 0 m

Quota di fondo : -10 m

Sezione : Default Section

Paratia : WallElement\_New

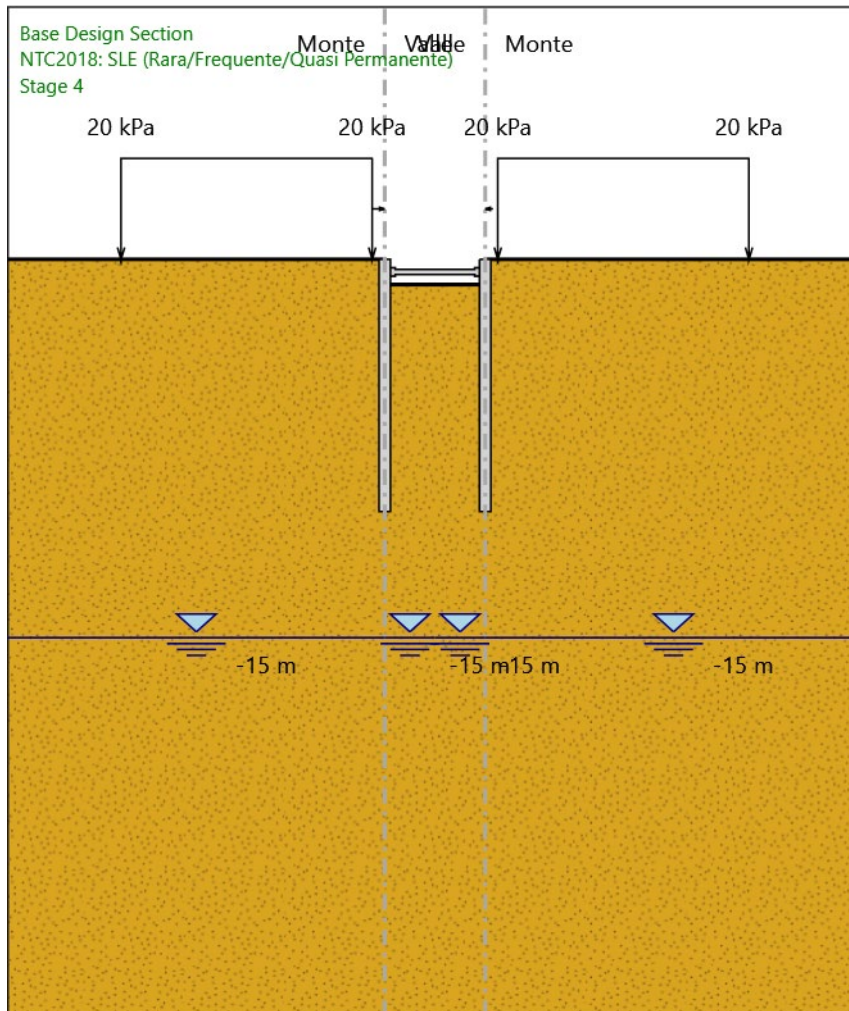
X : 4 m

Quota in alto : 0 m

Quota di fondo : -10 m

Sezione : Default Section

## 5.4. Stage 4



Stage 4

Scavo

Muro di sinistra

Lato monte : 0 m

Lato valle : -1 m

Muro di destra

Lato monte : 0 m

Lato valle : -1 m

Linea di scavo di sinistra (Orizzontale)

0 m

Linea di scavo centrale (Orizzontale)

-1 m

Linea di scavo di destra (Orizzontale)

0 m

#### Falda acquifera

Falda di sinistra : -15 m

Falda di destra : -15 m

Falda centrale-sinistra : -15 m

Falda centrale-destra : -15 m

#### Carichi

Carico lineare in superficie : SurfaceSurcharge

X iniziale : -10.5 m

X finale : -0.5 m

Pressione iniziale : 20 kPa

Pressione finale : 20 kPa

Carico lineare in superficie : SurfaceSurcharge

X iniziale : 4.5 m

X finale : 14.5 m

Pressione iniziale : 20 kPa

Pressione finale : 20 kPa

#### Elementi strutturali

Paratia : WallElement

X : 0 m

Quota in alto : 0 m

Quota di fondo : -10 m

Sezione : Default Section

Paratia : WallElement\_New

X : 4 m

Quota in alto : 0 m

Quota di fondo : -10 m

Sezione : Default Section

Puntone : Strut

X del primo muro : 0 m

X del secondo muro : 4 m

Z : -0.5 m

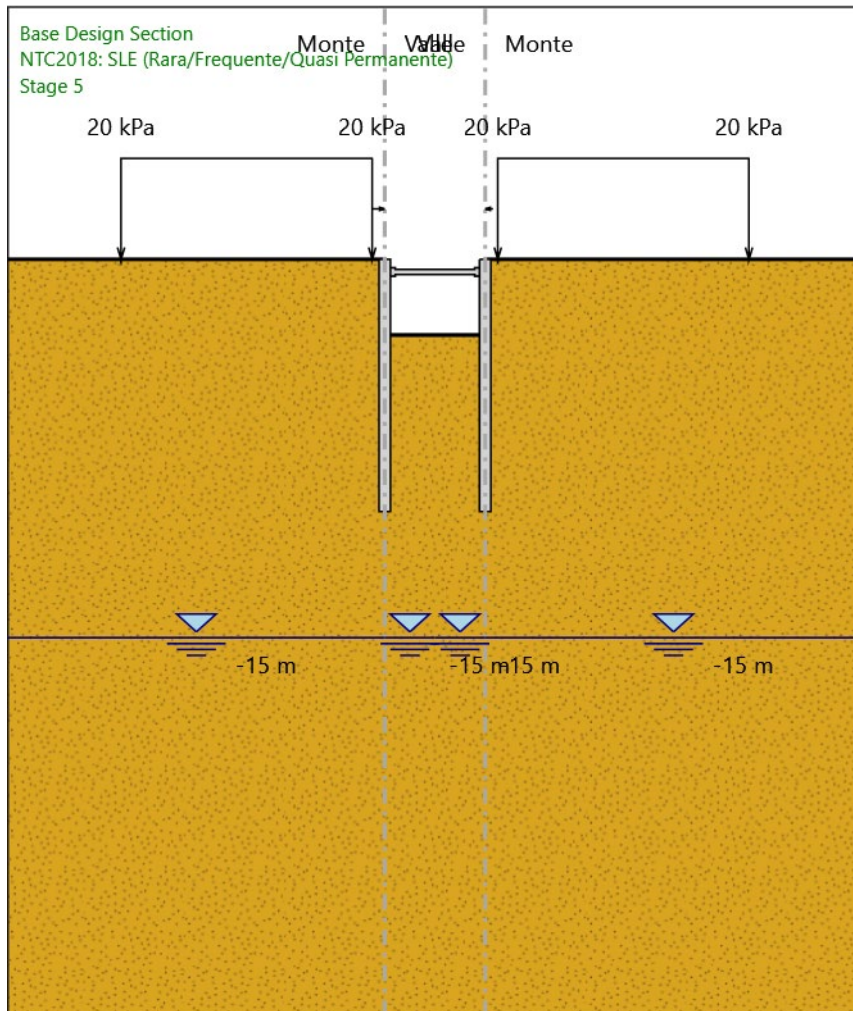
Lunghezza : 4 m

Angolo : 0 °

Sezione : Strut Section 1



## 5.5. Stage 5



Stage 5

Scavo

Muro di sinistra

Lato monte : 0 m

Lato valle : -3 m

Muro di destra

Lato monte : 0 m

Lato valle : -3 m

Linea di scavo di sinistra (Orizzontale)

0 m

Linea di scavo centrale (Orizzontale)

-3 m



Linea di scavo di destra (Orizzontale)

0 m

#### Falda acquifera

Falda di sinistra : -15 m

Falda di destra : -15 m

Falda centrale-sinistra : -15 m

Falda centrale-destra : -15 m

#### Carichi

Carico lineare in superficie : SurfaceSurcharge

X iniziale : -10.5 m

X finale : -0.5 m

Pressione iniziale : 20 kPa

Pressione finale : 20 kPa

Carico lineare in superficie : SurfaceSurcharge

X iniziale : 4.5 m

X finale : 14.5 m

Pressione iniziale : 20 kPa

Pressione finale : 20 kPa

#### Elementi strutturali

Paratia : WallElement

X : 0 m

Quota in alto : 0 m

Quota di fondo : -10 m

Sezione : Default Section

Paratia : WallElement\_New

X : 4 m

Quota in alto : 0 m

Quota di fondo : -10 m

Sezione : Default Section

Puntone : Strut

X del primo muro : 0 m

X del secondo muro : 4 m

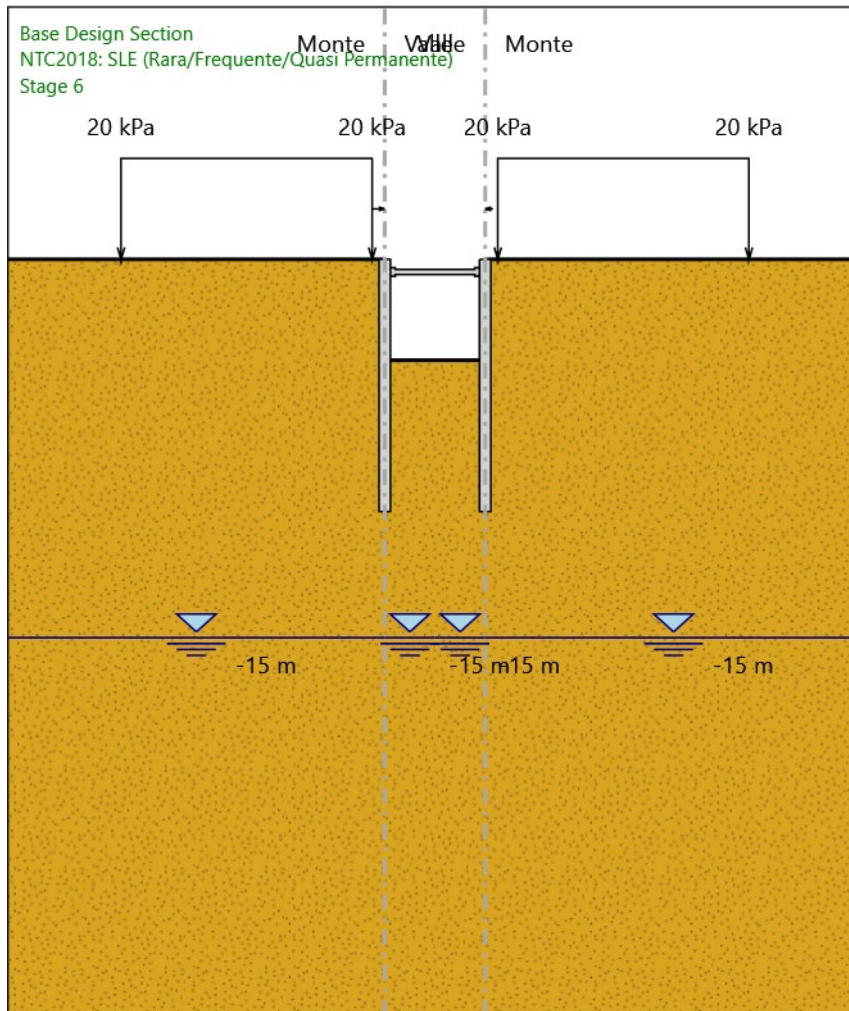
Z : -0.5 m

Lunghezza : 4 m

Angolo : 0 °

Sezione : Strut Section 1

## 5.6. Stage 6



Stage 6

Scavo

Muro di sinistra

Lato monte : 0 m

Lato valle : -4 m

Muro di destra

Lato monte : 0 m

Lato valle : -4 m

Linea di scavo di sinistra (Orizzontale)

0 m

Linea di scavo centrale (Orizzontale)

-4 m

Linea di scavo di destra (Orizzontale)

0 m

#### Falda acquifera

Falda di sinistra : -15 m

Falda di destra : -15 m

Falda centrale-sinistra : -15 m

Falda centrale-destra : -15 m

#### Carichi

Carico lineare in superficie : SurfaceSurcharge

X iniziale : -10.5 m

X finale : -0.5 m

Pressione iniziale : 20 kPa

Pressione finale : 20 kPa

Carico lineare in superficie : SurfaceSurcharge

X iniziale : 4.5 m

X finale : 14.5 m

Pressione iniziale : 20 kPa

Pressione finale : 20 kPa

#### Elementi strutturali

Paratia : WallElement

X : 0 m

Quota in alto : 0 m

Quota di fondo : -10 m

Sezione : Default Section

Paratia : WallElement\_New

X : 4 m

Quota in alto : 0 m

Quota di fondo : -10 m

Sezione : Default Section

Puntone : Strut

X del primo muro : 0 m

X del secondo muro : 4 m

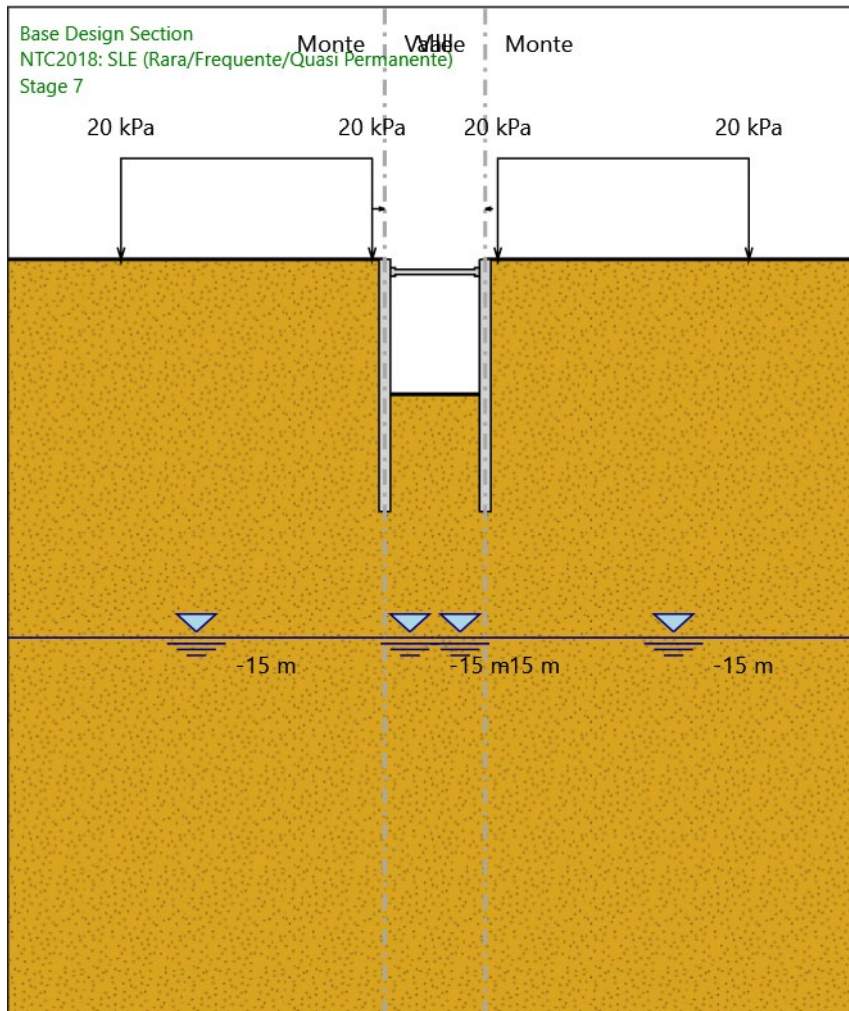
Z : -0.5 m

Lunghezza : 4 m

Angolo : 0 °

Sezione : Strut Section 1

## 5.7. Stage 7



Stage 7

Scavo

Muro di sinistra

Lato monte : 0 m

Lato valle : -5.35 m

Muro di destra

Lato monte : 0 m

Lato valle : -5.35 m

Linea di scavo di sinistra (Orizzontale)

0 m

Linea di scavo centrale (Orizzontale)

-5.35 m

Linea di scavo di destra (Orizzontale)

0 m

#### Falda acquifera

Falda di sinistra : -15 m

Falda di destra : -15 m

Falda centrale-sinistra : -15 m

Falda centrale-destra : -15 m

#### Carichi

Carico lineare in superficie : SurfaceSurcharge

X iniziale : -10.5 m

X finale : -0.5 m

Pressione iniziale : 20 kPa

Pressione finale : 20 kPa

Carico lineare in superficie : SurfaceSurcharge

X iniziale : 4.5 m

X finale : 14.5 m

Pressione iniziale : 20 kPa

Pressione finale : 20 kPa

#### Elementi strutturali

Paratia : WallElement

X : 0 m

Quota in alto : 0 m

Quota di fondo : -10 m

Sezione : Default Section

Paratia : WallElement\_New

X : 4 m

Quota in alto : 0 m

Quota di fondo : -10 m

Sezione : Default Section

Puntone : Strut

X del primo muro : 0 m

X del secondo muro : 4 m

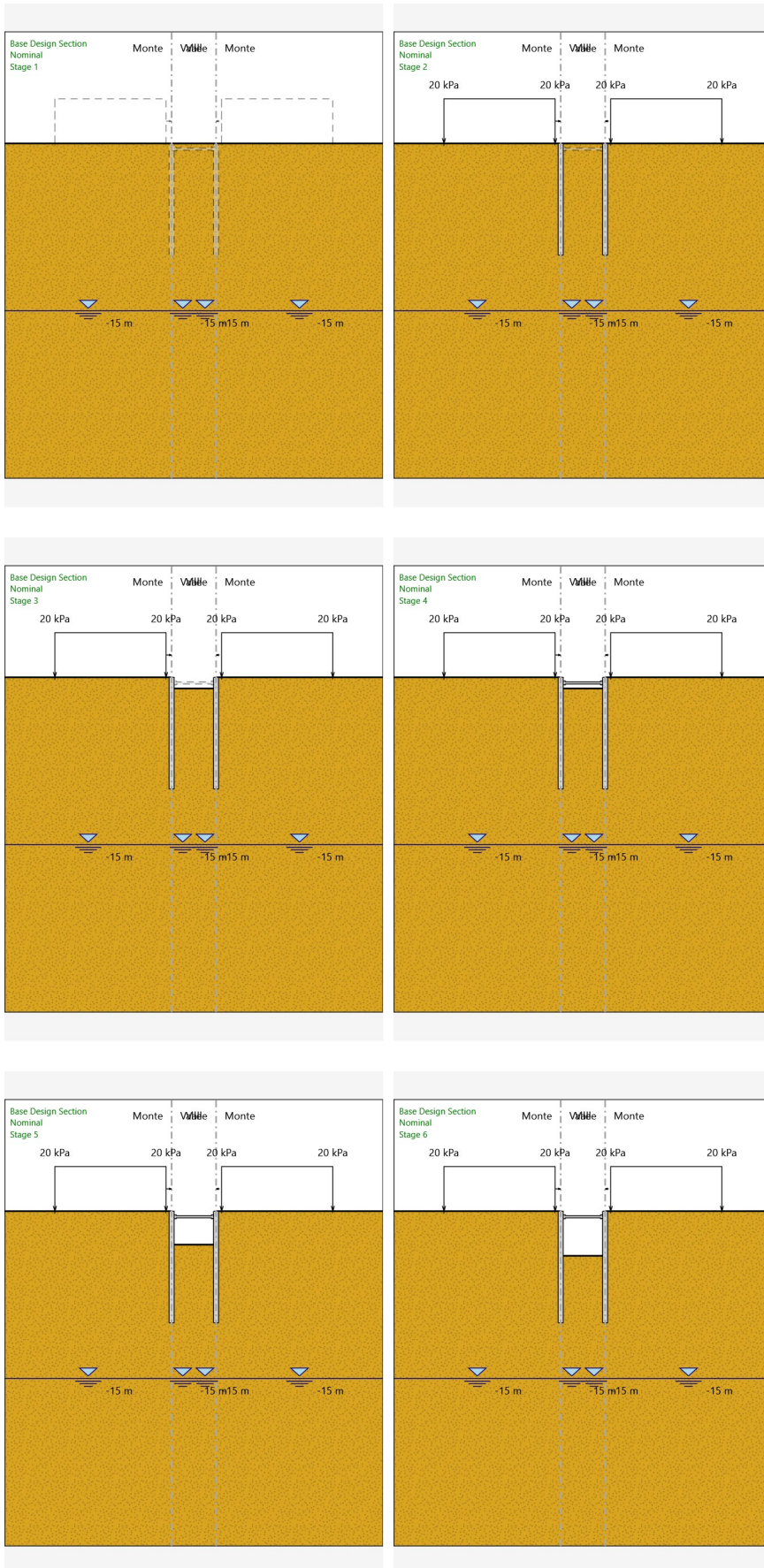
Z : -0.5 m

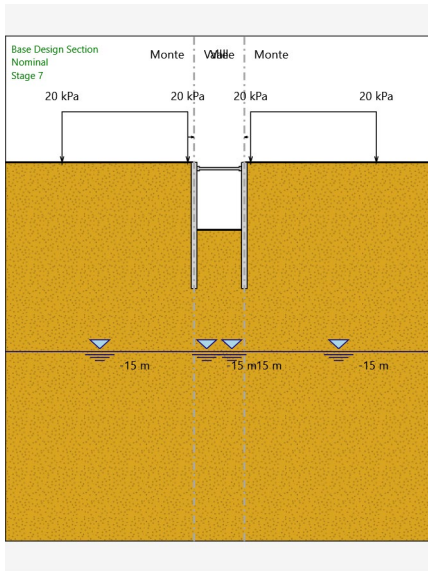
Lunghezza : 4 m

Angolo : 0 °

Sezione : Strut Section 1

## 5.8. Tabella Configurazione Stage (Nominal)





## 6. Grafici dei Risultati

### 6.1. Design Assumption : Nominal

#### 6.1.1. Tabella Spostamento Nominal - LEFT Stage: Stage 1

Design Assumption: Nominal	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento (mm)
Stage 1	0	0
Stage 1	-0.2	0
Stage 1	-0.4	0
Stage 1	-0.5	0
Stage 1	-0.7	0
Stage 1	-0.9	0
Stage 1	-1.1	0
Stage 1	-1.3	0
Stage 1	-1.5	0
Stage 1	-1.7	0
Stage 1	-1.9	0
Stage 1	-2.1	0
Stage 1	-2.3	0
Stage 1	-2.5	0
Stage 1	-2.7	0
Stage 1	-2.9	0
Stage 1	-3.1	0
Stage 1	-3.3	0
Stage 1	-3.5	0
Stage 1	-3.7	0
Stage 1	-3.9	0
Stage 1	-4.1	0
Stage 1	-4.3	0
Stage 1	-4.5	0
Stage 1	-4.7	0
Stage 1	-4.9	0
Stage 1	-5.1	0
Stage 1	-5.3	0
Stage 1	-5.5	0
Stage 1	-5.7	0
Stage 1	-5.9	0
Stage 1	-6.1	0
Stage 1	-6.3	0
Stage 1	-6.5	0
Stage 1	-6.7	0
Stage 1	-6.9	0
Stage 1	-7.1	0
Stage 1	-7.3	0
Stage 1	-7.5	0
Stage 1	-7.7	0
Stage 1	-7.9	0
Stage 1	-8.1	0
Stage 1	-8.3	0
Stage 1	-8.5	0
Stage 1	-8.7	0
Stage 1	-8.9	0
Stage 1	-9.1	0
Stage 1	-9.3	0
Stage 1	-9.5	0
Stage 1	-9.7	0
Stage 1	-9.9	0
Stage 1	-10	0



### 6.1.2. Tabella Spostamento Nominal - RIGHT Stage: Stage 1

Design Assumption: Nominal	Tipo Risultato: Spostamento	Muro: RIGHT
Stage	Z (m)	Spostamento (mm)
Stage 1	0	0
Stage 1	-0.2	0
Stage 1	-0.4	0
Stage 1	-0.5	0
Stage 1	-0.7	0
Stage 1	-0.9	0
Stage 1	-1.1	0
Stage 1	-1.3	0
Stage 1	-1.5	0
Stage 1	-1.7	0
Stage 1	-1.9	0
Stage 1	-2.1	0
Stage 1	-2.3	0
Stage 1	-2.5	0
Stage 1	-2.7	0
Stage 1	-2.9	0
Stage 1	-3.1	0
Stage 1	-3.3	0
Stage 1	-3.5	0
Stage 1	-3.7	0
Stage 1	-3.9	0
Stage 1	-4.1	0
Stage 1	-4.3	0
Stage 1	-4.5	0
Stage 1	-4.7	0
Stage 1	-4.9	0
Stage 1	-5.1	0
Stage 1	-5.3	0
Stage 1	-5.5	0
Stage 1	-5.7	0
Stage 1	-5.9	0
Stage 1	-6.1	0
Stage 1	-6.3	0
Stage 1	-6.5	0
Stage 1	-6.7	0
Stage 1	-6.9	0
Stage 1	-7.1	0
Stage 1	-7.3	0
Stage 1	-7.5	0
Stage 1	-7.7	0
Stage 1	-7.9	0
Stage 1	-8.1	0
Stage 1	-8.3	0
Stage 1	-8.5	0
Stage 1	-8.7	0
Stage 1	-8.9	0
Stage 1	-9.1	0
Stage 1	-9.3	0
Stage 1	-9.5	0
Stage 1	-9.7	0
Stage 1	-9.9	0
Stage 1	-10	0

### 6.1.3. Tabella Spostamento Nominal - LEFT Stage: Stage 2

Design Assumption: Nominal	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento (mm)
Stage 2	0	0.03
Stage 2	-0.2	0.05
Stage 2	-0.4	0.06
Stage 2	-0.5	0.07
Stage 2	-0.7	0.08
Stage 2	-0.9	0.09
Stage 2	-1.1	0.11
Stage 2	-1.3	0.12
Stage 2	-1.5	0.13
Stage 2	-1.7	0.14
Stage 2	-1.9	0.15
Stage 2	-2.1	0.16
Stage 2	-2.3	0.17
Stage 2	-2.5	0.18
Stage 2	-2.7	0.19
Stage 2	-2.9	0.19
Stage 2	-3.1	0.2
Stage 2	-3.3	0.21
Stage 2	-3.5	0.21
Stage 2	-3.7	0.21
Stage 2	-3.9	0.22
Stage 2	-4.1	0.22
Stage 2	-4.3	0.22
Stage 2	-4.5	0.23
Stage 2	-4.7	0.23
Stage 2	-4.9	0.23
Stage 2	-5.1	0.23
Stage 2	-5.3	0.23
Stage 2	-5.5	0.23
Stage 2	-5.7	0.24
Stage 2	-5.9	0.24
Stage 2	-6.1	0.24
Stage 2	-6.3	0.24
Stage 2	-6.5	0.24
Stage 2	-6.7	0.24
Stage 2	-6.9	0.24
Stage 2	-7.1	0.24
Stage 2	-7.3	0.24
Stage 2	-7.5	0.24
Stage 2	-7.7	0.24
Stage 2	-7.9	0.24
Stage 2	-8.1	0.24
Stage 2	-8.3	0.24
Stage 2	-8.5	0.24
Stage 2	-8.7	0.24
Stage 2	-8.9	0.24
Stage 2	-9.1	0.24
Stage 2	-9.3	0.24
Stage 2	-9.5	0.24
Stage 2	-9.7	0.24
Stage 2	-9.9	0.25
Stage 2	-10	0.25

### 6.1.4. Tabella Spostamento Nominal - RIGHT Stage: Stage 2

Design Assumption: Nominal		
Tipo Risultato: Spostamento	Muro: RIGHT	
Stage	Z (m)	Spostamento (mm)
Stage 2	0	-0.03
Stage 2	-0.2	-0.05
Stage 2	-0.4	-0.06
Stage 2	-0.5	-0.07
Stage 2	-0.7	-0.08
Stage 2	-0.9	-0.09
Stage 2	-1.1	-0.11
Stage 2	-1.3	-0.12
Stage 2	-1.5	-0.13
Stage 2	-1.7	-0.14
Stage 2	-1.9	-0.15
Stage 2	-2.1	-0.16
Stage 2	-2.3	-0.17
Stage 2	-2.5	-0.18
Stage 2	-2.7	-0.19
Stage 2	-2.9	-0.19
Stage 2	-3.1	-0.2
Stage 2	-3.3	-0.21
Stage 2	-3.5	-0.21
Stage 2	-3.7	-0.21
Stage 2	-3.9	-0.22
Stage 2	-4.1	-0.22
Stage 2	-4.3	-0.22
Stage 2	-4.5	-0.23
Stage 2	-4.7	-0.23
Stage 2	-4.9	-0.23
Stage 2	-5.1	-0.23
Stage 2	-5.3	-0.23
Stage 2	-5.5	-0.23
Stage 2	-5.7	-0.24
Stage 2	-5.9	-0.24
Stage 2	-6.1	-0.24
Stage 2	-6.3	-0.24
Stage 2	-6.5	-0.24
Stage 2	-6.7	-0.24
Stage 2	-6.9	-0.24
Stage 2	-7.1	-0.24
Stage 2	-7.3	-0.24
Stage 2	-7.5	-0.24
Stage 2	-7.7	-0.24
Stage 2	-7.9	-0.24
Stage 2	-8.1	-0.24
Stage 2	-8.3	-0.24
Stage 2	-8.5	-0.24
Stage 2	-8.7	-0.24
Stage 2	-8.9	-0.24
Stage 2	-9.1	-0.24
Stage 2	-9.3	-0.24
Stage 2	-9.5	-0.24
Stage 2	-9.7	-0.24
Stage 2	-9.9	-0.25
Stage 2	-10	-0.25

### 6.1.5. Tabella Spostamento Nominal - LEFT Stage: Stage 3

Design Assumption: Nominal	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento (mm)
Stage 3	0	0.42
Stage 3	-0.2	0.42
Stage 3	-0.4	0.41
Stage 3	-0.5	0.41
Stage 3	-0.7	0.4
Stage 3	-0.9	0.4
Stage 3	-1.1	0.39
Stage 3	-1.3	0.39
Stage 3	-1.5	0.38
Stage 3	-1.7	0.38
Stage 3	-1.9	0.38
Stage 3	-2.1	0.37
Stage 3	-2.3	0.37
Stage 3	-2.5	0.37
Stage 3	-2.7	0.37
Stage 3	-2.9	0.37
Stage 3	-3.1	0.37
Stage 3	-3.3	0.37
Stage 3	-3.5	0.37
Stage 3	-3.7	0.37
Stage 3	-3.9	0.38
Stage 3	-4.1	0.38
Stage 3	-4.3	0.38
Stage 3	-4.5	0.38
Stage 3	-4.7	0.38
Stage 3	-4.9	0.38
Stage 3	-5.1	0.39
Stage 3	-5.3	0.39
Stage 3	-5.5	0.39
Stage 3	-5.7	0.39
Stage 3	-5.9	0.39
Stage 3	-6.1	0.39
Stage 3	-6.3	0.39
Stage 3	-6.5	0.39
Stage 3	-6.7	0.39
Stage 3	-6.9	0.4
Stage 3	-7.1	0.4
Stage 3	-7.3	0.4
Stage 3	-7.5	0.4
Stage 3	-7.7	0.4
Stage 3	-7.9	0.4
Stage 3	-8.1	0.4
Stage 3	-8.3	0.4
Stage 3	-8.5	0.4
Stage 3	-8.7	0.4
Stage 3	-8.9	0.4
Stage 3	-9.1	0.4
Stage 3	-9.3	0.4
Stage 3	-9.5	0.4
Stage 3	-9.7	0.4
Stage 3	-9.9	0.4
Stage 3	-10	0.4

### 6.1.6. Tabella Spostamento Nominal - RIGHT Stage: Stage 3

Design Assumption: Nominal	Tipo Risultato: Spostamento	Muro: RIGHT
Stage	Z (m)	Spostamento (mm)
Stage 3	0	-0.42
Stage 3	-0.2	-0.42
Stage 3	-0.4	-0.41
Stage 3	-0.5	-0.41
Stage 3	-0.7	-0.4
Stage 3	-0.9	-0.4
Stage 3	-1.1	-0.39
Stage 3	-1.3	-0.39
Stage 3	-1.5	-0.38
Stage 3	-1.7	-0.38
Stage 3	-1.9	-0.38
Stage 3	-2.1	-0.37
Stage 3	-2.3	-0.37
Stage 3	-2.5	-0.37
Stage 3	-2.7	-0.37
Stage 3	-2.9	-0.37
Stage 3	-3.1	-0.37
Stage 3	-3.3	-0.37
Stage 3	-3.5	-0.37
Stage 3	-3.7	-0.37
Stage 3	-3.9	-0.38
Stage 3	-4.1	-0.38
Stage 3	-4.3	-0.38
Stage 3	-4.5	-0.38
Stage 3	-4.7	-0.38
Stage 3	-4.9	-0.38
Stage 3	-5.1	-0.39
Stage 3	-5.3	-0.39
Stage 3	-5.5	-0.39
Stage 3	-5.7	-0.39
Stage 3	-5.9	-0.39
Stage 3	-6.1	-0.39
Stage 3	-6.3	-0.39
Stage 3	-6.5	-0.39
Stage 3	-6.7	-0.39
Stage 3	-6.9	-0.4
Stage 3	-7.1	-0.4
Stage 3	-7.3	-0.4
Stage 3	-7.5	-0.4
Stage 3	-7.7	-0.4
Stage 3	-7.9	-0.4
Stage 3	-8.1	-0.4
Stage 3	-8.3	-0.4
Stage 3	-8.5	-0.4
Stage 3	-8.7	-0.4
Stage 3	-8.9	-0.4
Stage 3	-9.1	-0.4
Stage 3	-9.3	-0.4
Stage 3	-9.5	-0.4
Stage 3	-9.7	-0.4
Stage 3	-9.9	-0.4
Stage 3	-10	-0.4

### 6.1.7. Tabella Spostamento Nominal - LEFT Stage: Stage 4

Design Assumption: Nominal	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento (mm)
Stage 4	0	0.42
Stage 4	-0.2	0.42
Stage 4	-0.4	0.41
Stage 4	-0.5	0.41
Stage 4	-0.7	0.4
Stage 4	-0.9	0.4
Stage 4	-1.1	0.39
Stage 4	-1.3	0.39
Stage 4	-1.5	0.38
Stage 4	-1.7	0.38
Stage 4	-1.9	0.38
Stage 4	-2.1	0.37
Stage 4	-2.3	0.37
Stage 4	-2.5	0.37
Stage 4	-2.7	0.37
Stage 4	-2.9	0.37
Stage 4	-3.1	0.37
Stage 4	-3.3	0.37
Stage 4	-3.5	0.37
Stage 4	-3.7	0.37
Stage 4	-3.9	0.38
Stage 4	-4.1	0.38
Stage 4	-4.3	0.38
Stage 4	-4.5	0.38
Stage 4	-4.7	0.38
Stage 4	-4.9	0.38
Stage 4	-5.1	0.39
Stage 4	-5.3	0.39
Stage 4	-5.5	0.39
Stage 4	-5.7	0.39
Stage 4	-5.9	0.39
Stage 4	-6.1	0.39
Stage 4	-6.3	0.39
Stage 4	-6.5	0.39
Stage 4	-6.7	0.39
Stage 4	-6.9	0.4
Stage 4	-7.1	0.4
Stage 4	-7.3	0.4
Stage 4	-7.5	0.4
Stage 4	-7.7	0.4
Stage 4	-7.9	0.4
Stage 4	-8.1	0.4
Stage 4	-8.3	0.4
Stage 4	-8.5	0.4
Stage 4	-8.7	0.4
Stage 4	-8.9	0.4
Stage 4	-9.1	0.4
Stage 4	-9.3	0.4
Stage 4	-9.5	0.4
Stage 4	-9.7	0.4
Stage 4	-9.9	0.4
Stage 4	-10	0.4

### 6.1.8. Tabella Spostamento Nominal - RIGHT Stage: Stage 4

Design Assumption: Nominal	Tipo Risultato: Spostamento	Muro: RIGHT
Stage	Z (m)	Spostamento (mm)
Stage 4	0	-0.42
Stage 4	-0.2	-0.42
Stage 4	-0.4	-0.41
Stage 4	-0.5	-0.41
Stage 4	-0.7	-0.4
Stage 4	-0.9	-0.4
Stage 4	-1.1	-0.39
Stage 4	-1.3	-0.39
Stage 4	-1.5	-0.38
Stage 4	-1.7	-0.38
Stage 4	-1.9	-0.38
Stage 4	-2.1	-0.37
Stage 4	-2.3	-0.37
Stage 4	-2.5	-0.37
Stage 4	-2.7	-0.37
Stage 4	-2.9	-0.37
Stage 4	-3.1	-0.37
Stage 4	-3.3	-0.37
Stage 4	-3.5	-0.37
Stage 4	-3.7	-0.37
Stage 4	-3.9	-0.38
Stage 4	-4.1	-0.38
Stage 4	-4.3	-0.38
Stage 4	-4.5	-0.38
Stage 4	-4.7	-0.38
Stage 4	-4.9	-0.38
Stage 4	-5.1	-0.39
Stage 4	-5.3	-0.39
Stage 4	-5.5	-0.39
Stage 4	-5.7	-0.39
Stage 4	-5.9	-0.39
Stage 4	-6.1	-0.39
Stage 4	-6.3	-0.39
Stage 4	-6.5	-0.39
Stage 4	-6.7	-0.39
Stage 4	-6.9	-0.4
Stage 4	-7.1	-0.4
Stage 4	-7.3	-0.4
Stage 4	-7.5	-0.4
Stage 4	-7.7	-0.4
Stage 4	-7.9	-0.4
Stage 4	-8.1	-0.4
Stage 4	-8.3	-0.4
Stage 4	-8.5	-0.4
Stage 4	-8.7	-0.4
Stage 4	-8.9	-0.4
Stage 4	-9.1	-0.4
Stage 4	-9.3	-0.4
Stage 4	-9.5	-0.4
Stage 4	-9.7	-0.4
Stage 4	-9.9	-0.4
Stage 4	-10	-0.4

### 6.1.9. Tabella Spostamento Nominal - LEFT Stage: Stage 5

Design Assumption: Nominal	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento (mm)
Stage 5	0	0.04
Stage 5	-0.2	0.22
Stage 5	-0.4	0.4
Stage 5	-0.5	0.49
Stage 5	-0.7	0.66
Stage 5	-0.9	0.84
Stage 5	-1.1	1.01
Stage 5	-1.3	1.18
Stage 5	-1.5	1.33
Stage 5	-1.7	1.47
Stage 5	-1.9	1.6
Stage 5	-2.1	1.72
Stage 5	-2.3	1.82
Stage 5	-2.5	1.9
Stage 5	-2.7	1.96
Stage 5	-2.9	2.01
Stage 5	-3.1	2.04
Stage 5	-3.3	2.06
Stage 5	-3.5	2.07
Stage 5	-3.7	2.07
Stage 5	-3.9	2.06
Stage 5	-4.1	2.04
Stage 5	-4.3	2.02
Stage 5	-4.5	1.99
Stage 5	-4.7	1.96
Stage 5	-4.9	1.92
Stage 5	-5.1	1.89
Stage 5	-5.3	1.85
Stage 5	-5.5	1.82
Stage 5	-5.7	1.78
Stage 5	-5.9	1.75
Stage 5	-6.1	1.71
Stage 5	-6.3	1.68
Stage 5	-6.5	1.65
Stage 5	-6.7	1.62
Stage 5	-6.9	1.59
Stage 5	-7.1	1.57
Stage 5	-7.3	1.55
Stage 5	-7.5	1.52
Stage 5	-7.7	1.5
Stage 5	-7.9	1.48
Stage 5	-8.1	1.47
Stage 5	-8.3	1.45
Stage 5	-8.5	1.43
Stage 5	-8.7	1.42
Stage 5	-8.9	1.4
Stage 5	-9.1	1.39
Stage 5	-9.3	1.38
Stage 5	-9.5	1.36
Stage 5	-9.7	1.35
Stage 5	-9.9	1.34
Stage 5	-10	1.33



### 6.1.10. Tabella Spostamento Nominal - RIGHT Stage: Stage 5

Design Assumption: Nominal		
Tipo Risultato: Spostamento	Muro: RIGHT	
Stage	Z (m)	Spostamento (mm)
Stage 5	0	-0.04
Stage 5	-0.2	-0.22
Stage 5	-0.4	-0.4
Stage 5	-0.5	-0.49
Stage 5	-0.7	-0.66
Stage 5	-0.9	-0.84
Stage 5	-1.1	-1.01
Stage 5	-1.3	-1.18
Stage 5	-1.5	-1.33
Stage 5	-1.7	-1.47
Stage 5	-1.9	-1.6
Stage 5	-2.1	-1.72
Stage 5	-2.3	-1.82
Stage 5	-2.5	-1.9
Stage 5	-2.7	-1.96
Stage 5	-2.9	-2.01
Stage 5	-3.1	-2.04
Stage 5	-3.3	-2.06
Stage 5	-3.5	-2.07
Stage 5	-3.7	-2.07
Stage 5	-3.9	-2.06
Stage 5	-4.1	-2.04
Stage 5	-4.3	-2.02
Stage 5	-4.5	-1.99
Stage 5	-4.7	-1.96
Stage 5	-4.9	-1.92
Stage 5	-5.1	-1.89
Stage 5	-5.3	-1.85
Stage 5	-5.5	-1.82
Stage 5	-5.7	-1.78
Stage 5	-5.9	-1.75
Stage 5	-6.1	-1.71
Stage 5	-6.3	-1.68
Stage 5	-6.5	-1.65
Stage 5	-6.7	-1.62
Stage 5	-6.9	-1.59
Stage 5	-7.1	-1.57
Stage 5	-7.3	-1.55
Stage 5	-7.5	-1.52
Stage 5	-7.7	-1.5
Stage 5	-7.9	-1.48
Stage 5	-8.1	-1.47
Stage 5	-8.3	-1.45
Stage 5	-8.5	-1.43
Stage 5	-8.7	-1.42
Stage 5	-8.9	-1.4
Stage 5	-9.1	-1.39
Stage 5	-9.3	-1.38
Stage 5	-9.5	-1.36
Stage 5	-9.7	-1.35
Stage 5	-9.9	-1.34
Stage 5	-10	-1.33

### 6.1.11. Tabella Spostamento Nominal - LEFT Stage: Stage 6

Design Assumption: Nominal	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento (mm)
Stage 6	0	-0.46
Stage 6	-0.2	-0.06
Stage 6	-0.4	0.33
Stage 6	-0.5	0.53
Stage 6	-0.7	0.93
Stage 6	-0.9	1.32
Stage 6	-1.1	1.7
Stage 6	-1.3	2.08
Stage 6	-1.5	2.43
Stage 6	-1.7	2.77
Stage 6	-1.9	3.08
Stage 6	-2.1	3.36
Stage 6	-2.3	3.62
Stage 6	-2.5	3.85
Stage 6	-2.7	4.04
Stage 6	-2.9	4.2
Stage 6	-3.1	4.32
Stage 6	-3.3	4.41
Stage 6	-3.5	4.46
Stage 6	-3.7	4.49
Stage 6	-3.9	4.48
Stage 6	-4.1	4.44
Stage 6	-4.3	4.38
Stage 6	-4.5	4.3
Stage 6	-4.7	4.21
Stage 6	-4.9	4.1
Stage 6	-5.1	3.99
Stage 6	-5.3	3.86
Stage 6	-5.5	3.74
Stage 6	-5.7	3.61
Stage 6	-5.9	3.49
Stage 6	-6.1	3.36
Stage 6	-6.3	3.24
Stage 6	-6.5	3.13
Stage 6	-6.7	3.01
Stage 6	-6.9	2.91
Stage 6	-7.1	2.81
Stage 6	-7.3	2.71
Stage 6	-7.5	2.62
Stage 6	-7.7	2.53
Stage 6	-7.9	2.45
Stage 6	-8.1	2.38
Stage 6	-8.3	2.3
Stage 6	-8.5	2.23
Stage 6	-8.7	2.16
Stage 6	-8.9	2.1
Stage 6	-9.1	2.03
Stage 6	-9.3	1.97
Stage 6	-9.5	1.91
Stage 6	-9.7	1.85
Stage 6	-9.9	1.78
Stage 6	-10	1.75

### 6.1.12. Tabella Spostamento Nominal - RIGHT Stage: Stage 6

Design Assumption: Nominal	Tipo Risultato: Spostamento	Muro: RIGHT
Stage	Z (m)	Spostamento (mm)
Stage 6	0	0.46
Stage 6	-0.2	0.06
Stage 6	-0.4	-0.33
Stage 6	-0.5	-0.53
Stage 6	-0.7	-0.93
Stage 6	-0.9	-1.32
Stage 6	-1.1	-1.7
Stage 6	-1.3	-2.08
Stage 6	-1.5	-2.43
Stage 6	-1.7	-2.77
Stage 6	-1.9	-3.08
Stage 6	-2.1	-3.36
Stage 6	-2.3	-3.62
Stage 6	-2.5	-3.85
Stage 6	-2.7	-4.04
Stage 6	-2.9	-4.2
Stage 6	-3.1	-4.32
Stage 6	-3.3	-4.41
Stage 6	-3.5	-4.46
Stage 6	-3.7	-4.49
Stage 6	-3.9	-4.48
Stage 6	-4.1	-4.44
Stage 6	-4.3	-4.38
Stage 6	-4.5	-4.3
Stage 6	-4.7	-4.21
Stage 6	-4.9	-4.1
Stage 6	-5.1	-3.99
Stage 6	-5.3	-3.86
Stage 6	-5.5	-3.74
Stage 6	-5.7	-3.61
Stage 6	-5.9	-3.49
Stage 6	-6.1	-3.36
Stage 6	-6.3	-3.24
Stage 6	-6.5	-3.13
Stage 6	-6.7	-3.01
Stage 6	-6.9	-2.91
Stage 6	-7.1	-2.81
Stage 6	-7.3	-2.71
Stage 6	-7.5	-2.62
Stage 6	-7.7	-2.53
Stage 6	-7.9	-2.45
Stage 6	-8.1	-2.38
Stage 6	-8.3	-2.3
Stage 6	-8.5	-2.23
Stage 6	-8.7	-2.16
Stage 6	-8.9	-2.1
Stage 6	-9.1	-2.03
Stage 6	-9.3	-1.97
Stage 6	-9.5	-1.91
Stage 6	-9.7	-1.85
Stage 6	-9.9	-1.78
Stage 6	-10	-1.75

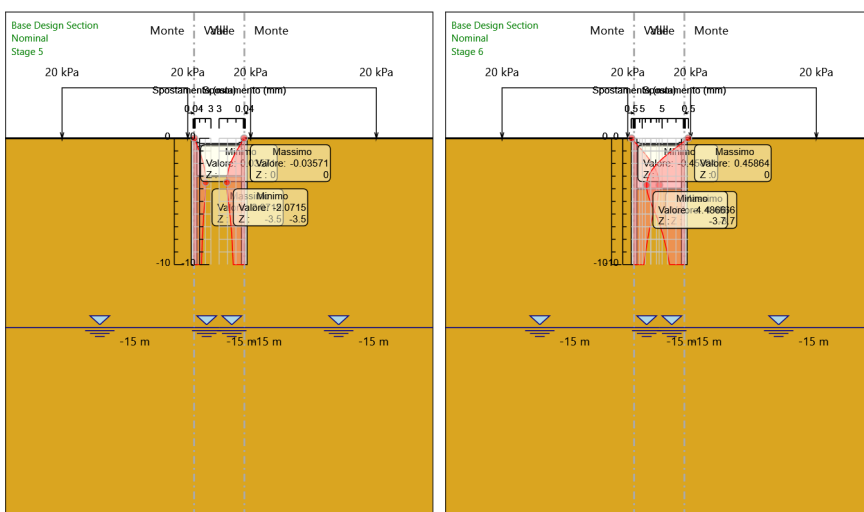
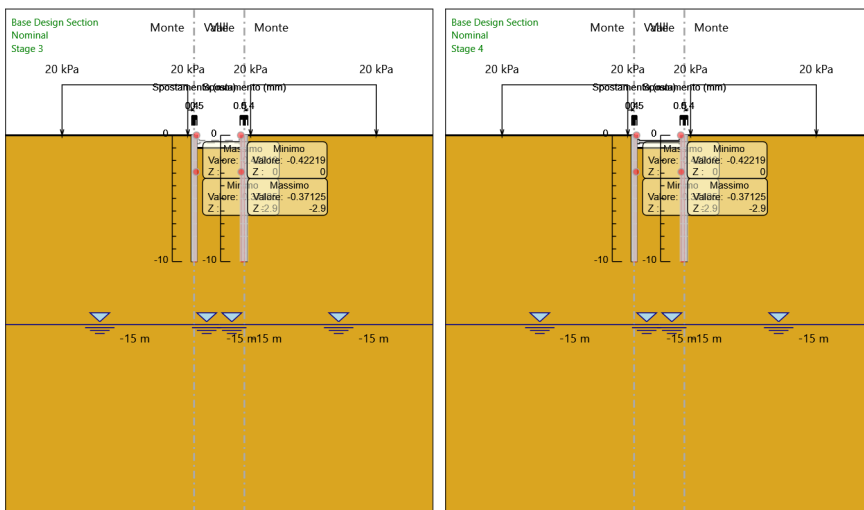
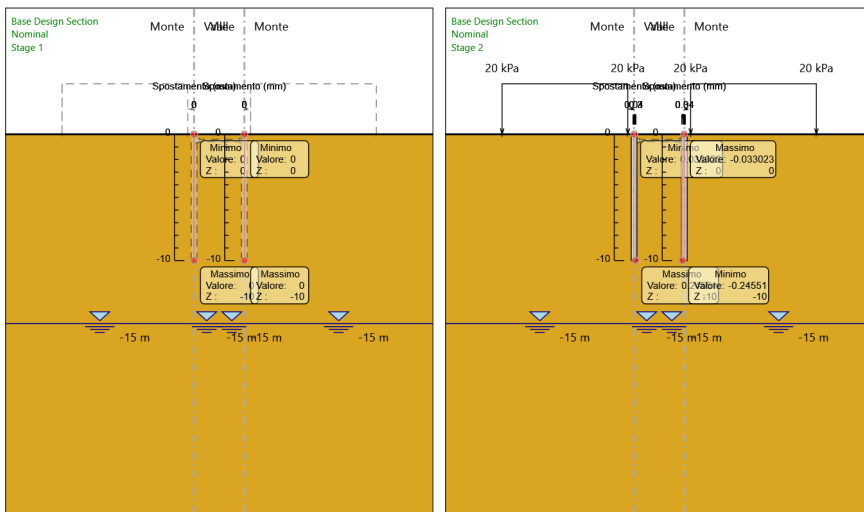
### 6.1.13. Tabella Spostamento Nominal - LEFT Stage: Stage 7

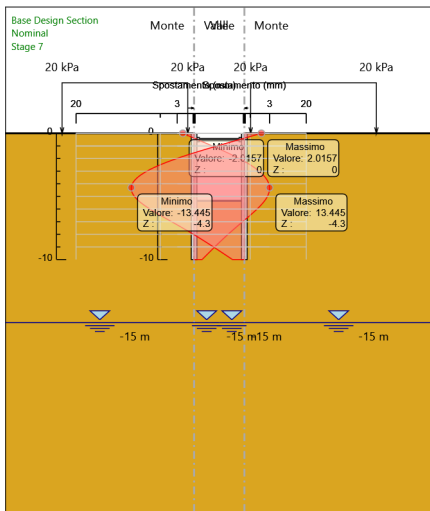
Design Assumption: Nominal	Tipo Risultato: Spostamento	Muro: LEFT
Stage	Z (m)	Spostamento (mm)
Stage 7	0	-2.02
Stage 7	-0.2	-0.96
Stage 7	-0.4	0.1
Stage 7	-0.5	0.62
Stage 7	-0.7	1.68
Stage 7	-0.9	2.73
Stage 7	-1.1	3.76
Stage 7	-1.3	4.78
Stage 7	-1.5	5.76
Stage 7	-1.7	6.71
Stage 7	-1.9	7.62
Stage 7	-2.1	8.47
Stage 7	-2.3	9.28
Stage 7	-2.5	10.02
Stage 7	-2.7	10.7
Stage 7	-2.9	11.32
Stage 7	-3.1	11.86
Stage 7	-3.3	12.32
Stage 7	-3.5	12.71
Stage 7	-3.7	13.01
Stage 7	-3.9	13.24
Stage 7	-4.1	13.38
Stage 7	-4.3	13.45
Stage 7	-4.5	13.43
Stage 7	-4.7	13.34
Stage 7	-4.9	13.18
Stage 7	-5.1	12.94
Stage 7	-5.3	12.65
Stage 7	-5.5	12.3
Stage 7	-5.7	11.9
Stage 7	-5.9	11.45
Stage 7	-6.1	10.98
Stage 7	-6.3	10.48
Stage 7	-6.5	9.97
Stage 7	-6.7	9.45
Stage 7	-6.9	8.92
Stage 7	-7.1	8.38
Stage 7	-7.3	7.85
Stage 7	-7.5	7.33
Stage 7	-7.7	6.81
Stage 7	-7.9	6.31
Stage 7	-8.1	5.81
Stage 7	-8.3	5.32
Stage 7	-8.5	4.84
Stage 7	-8.7	4.37
Stage 7	-8.9	3.91
Stage 7	-9.1	3.45
Stage 7	-9.3	2.99
Stage 7	-9.5	2.54
Stage 7	-9.7	2.09
Stage 7	-9.9	1.64
Stage 7	-10	1.41

### 6.1.14. Tabella Spostamento Nominal - RIGHT Stage: Stage 7

Design Assumption: Nominal	Tipo Risultato: Spostamento	Muro: RIGHT
Stage	Z (m)	Spostamento (mm)
Stage 7	0	2.02
Stage 7	-0.2	0.96
Stage 7	-0.4	-0.1
Stage 7	-0.5	-0.62
Stage 7	-0.7	-1.68
Stage 7	-0.9	-2.73
Stage 7	-1.1	-3.76
Stage 7	-1.3	-4.78
Stage 7	-1.5	-5.76
Stage 7	-1.7	-6.71
Stage 7	-1.9	-7.62
Stage 7	-2.1	-8.47
Stage 7	-2.3	-9.28
Stage 7	-2.5	-10.02
Stage 7	-2.7	-10.7
Stage 7	-2.9	-11.32
Stage 7	-3.1	-11.86
Stage 7	-3.3	-12.32
Stage 7	-3.5	-12.71
Stage 7	-3.7	-13.01
Stage 7	-3.9	-13.24
Stage 7	-4.1	-13.38
Stage 7	-4.3	-13.45
Stage 7	-4.5	-13.43
Stage 7	-4.7	-13.34
Stage 7	-4.9	-13.18
Stage 7	-5.1	-12.94
Stage 7	-5.3	-12.65
Stage 7	-5.5	-12.3
Stage 7	-5.7	-11.9
Stage 7	-5.9	-11.45
Stage 7	-6.1	-10.98
Stage 7	-6.3	-10.48
Stage 7	-6.5	-9.97
Stage 7	-6.7	-9.45
Stage 7	-6.9	-8.92
Stage 7	-7.1	-8.38
Stage 7	-7.3	-7.85
Stage 7	-7.5	-7.33
Stage 7	-7.7	-6.81
Stage 7	-7.9	-6.31
Stage 7	-8.1	-5.81
Stage 7	-8.3	-5.32
Stage 7	-8.5	-4.84
Stage 7	-8.7	-4.37
Stage 7	-8.9	-3.91
Stage 7	-9.1	-3.45
Stage 7	-9.3	-2.99
Stage 7	-9.5	-2.54
Stage 7	-9.7	-2.09
Stage 7	-9.9	-1.64
Stage 7	-10	-1.41

### 6.1.15. Grafici Spostamento in tabella





## 6.2. Involuppi Spostamento Nominal



## 6.3. Risultati Paratia

### 6.3.1. Tabella Risultati Paratia Nominal - Stage: Stage 1

Design Assumption: Nominal Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	0	0	0
Stage 1	-0.2	0	0
Stage 1	-0.4	0	0
Stage 1	-0.5	0	0
Stage 1	-0.7	0	0
Stage 1	-0.9	0	0
Stage 1	-1.1	0	0
Stage 1	-1.3	0	0
Stage 1	-1.5	0	0
Stage 1	-1.7	0	0
Stage 1	-1.9	0	0
Stage 1	-2.1	0	0
Stage 1	-2.3	0	0
Stage 1	-2.5	0	0
Stage 1	-2.7	0	0
Stage 1	-2.9	0	0
Stage 1	-3.1	0	0
Stage 1	-3.3	0	0
Stage 1	-3.5	0	0
Stage 1	-3.7	0	0
Stage 1	-3.9	0	0
Stage 1	-4.1	0	0
Stage 1	-4.3	0	0
Stage 1	-4.5	0	0
Stage 1	-4.7	0	0
Stage 1	-4.9	0	0
Stage 1	-5.1	0	0
Stage 1	-5.3	0	0
Stage 1	-5.5	0	0
Stage 1	-5.7	0	0
Stage 1	-5.9	0	0
Stage 1	-6.1	0	0
Stage 1	-6.3	0	0
Stage 1	-6.5	0	0
Stage 1	-6.7	0	0
Stage 1	-6.9	0	0
Stage 1	-7.1	0	0
Stage 1	-7.3	0	0
Stage 1	-7.5	0	0
Stage 1	-7.7	0	0
Stage 1	-7.9	0	0
Stage 1	-8.1	0	0
Stage 1	-8.3	0	0
Stage 1	-8.5	0	0
Stage 1	-8.7	0	0
Stage 1	-8.9	0	0
Stage 1	-9.1	0	0
Stage 1	-9.3	0	0
Stage 1	-9.5	0	0
Stage 1	-9.7	0	0
Stage 1	-9.9	0	0
Stage 1	-10	0	0

### 6.3.2. Tabella Risultati Paratia Nominal - Stage: Stage 1

Design Assumption: Nominal Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	0	0	0
Stage 1	-0.2	0	0
Stage 1	-0.4	0	0
Stage 1	-0.5	0	0
Stage 1	-0.7	0	0
Stage 1	-0.9	0	0
Stage 1	-1.1	0	0
Stage 1	-1.3	0	0
Stage 1	-1.5	0	0
Stage 1	-1.7	0	0
Stage 1	-1.9	0	0
Stage 1	-2.1	0	0
Stage 1	-2.3	0	0
Stage 1	-2.5	0	0
Stage 1	-2.7	0	0
Stage 1	-2.9	0	0
Stage 1	-3.1	0	0
Stage 1	-3.3	0	0
Stage 1	-3.5	0	0
Stage 1	-3.7	0	0
Stage 1	-3.9	0	0
Stage 1	-4.1	0	0
Stage 1	-4.3	0	0
Stage 1	-4.5	0	0
Stage 1	-4.7	0	0
Stage 1	-4.9	0	0
Stage 1	-5.1	0	0
Stage 1	-5.3	0	0
Stage 1	-5.5	0	0
Stage 1	-5.7	0	0
Stage 1	-5.9	0	0
Stage 1	-6.1	0	0
Stage 1	-6.3	0	0
Stage 1	-6.5	0	0
Stage 1	-6.7	0	0
Stage 1	-6.9	0	0
Stage 1	-7.1	0	0
Stage 1	-7.3	0	0
Stage 1	-7.5	0	0
Stage 1	-7.7	0	0
Stage 1	-7.9	0	0
Stage 1	-8.1	0	0
Stage 1	-8.3	0	0
Stage 1	-8.5	0	0
Stage 1	-8.7	0	0
Stage 1	-8.9	0	0
Stage 1	-9.1	0	0
Stage 1	-9.3	0	0
Stage 1	-9.5	0	0
Stage 1	-9.7	0	0
Stage 1	-9.9	0	0
Stage 1	-10	0	0

### 6.3.3. Tabella Risultati Paratia Nominal - Stage: Stage 2

Design Assumption: Nominal Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	0	0	0.03
Stage 2	-0.2	0.01	0.03
Stage 2	-0.4	0.06	0.27
Stage 2	-0.5	0.1	0.43
Stage 2	-0.7	0.22	0.57
Stage 2	-0.9	0.36	0.7
Stage 2	-1.1	0.5	0.7
Stage 2	-1.3	0.62	0.63
Stage 2	-1.5	0.73	0.52
Stage 2	-1.7	0.81	0.4
Stage 2	-1.9	0.86	0.27
Stage 2	-2.1	0.89	0.16
Stage 2	-2.3	0.9	0.05
Stage 2	-2.5	0.9	-0.04
Stage 2	-2.7	0.87	-0.11
Stage 2	-2.9	0.84	-0.17
Stage 2	-3.1	0.8	-0.22
Stage 2	-3.3	0.75	-0.25
Stage 2	-3.5	0.69	-0.27
Stage 2	-3.7	0.64	-0.27
Stage 2	-3.9	0.58	-0.3
Stage 2	-4.1	0.51	-0.32
Stage 2	-4.3	0.45	-0.31
Stage 2	-4.5	0.39	-0.29
Stage 2	-4.7	0.34	-0.27
Stage 2	-4.9	0.29	-0.25
Stage 2	-5.1	0.24	-0.22
Stage 2	-5.3	0.2	-0.2
Stage 2	-5.5	0.17	-0.18
Stage 2	-5.7	0.14	-0.15
Stage 2	-5.9	0.11	-0.13
Stage 2	-6.1	0.09	-0.11
Stage 2	-6.3	0.07	-0.1
Stage 2	-6.5	0.05	-0.08
Stage 2	-6.7	0.04	-0.06
Stage 2	-6.9	0.03	-0.05
Stage 2	-7.1	0.02	-0.04
Stage 2	-7.3	0.02	-0.03
Stage 2	-7.5	0.01	-0.02
Stage 2	-7.7	0.01	-0.02
Stage 2	-7.9	0	-0.01
Stage 2	-8.1	0	-0.01
Stage 2	-8.3	0	-0.01
Stage 2	-8.5	0	0
Stage 2	-8.7	0	0
Stage 2	-8.9	0	0
Stage 2	-9.1	0	0
Stage 2	-9.3	0	0
Stage 2	-9.5	0	0
Stage 2	-9.7	0	0
Stage 2	-9.9	0	0
Stage 2	-9.9	0	0
Stage 2	-10	0	0

### 6.3.4. Tabella Risultati Paratia Nominal - Stage: Stage 2

Design Assumption: Nominal Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	0	0	-0.03
Stage 2	-0.2	-0.01	-0.03
Stage 2	-0.4	-0.06	-0.27
Stage 2	-0.5	-0.1	-0.43
Stage 2	-0.7	-0.22	-0.57
Stage 2	-0.9	-0.36	-0.7
Stage 2	-1.1	-0.5	-0.7
Stage 2	-1.3	-0.62	-0.63
Stage 2	-1.5	-0.73	-0.52
Stage 2	-1.7	-0.81	-0.4
Stage 2	-1.9	-0.86	-0.27
Stage 2	-2.1	-0.89	-0.16
Stage 2	-2.3	-0.9	-0.05
Stage 2	-2.5	-0.9	0.04
Stage 2	-2.7	-0.87	0.11
Stage 2	-2.9	-0.84	0.17
Stage 2	-3.1	-0.8	0.22
Stage 2	-3.3	-0.75	0.25
Stage 2	-3.5	-0.69	0.27
Stage 2	-3.7	-0.64	0.27
Stage 2	-3.9	-0.58	0.3
Stage 2	-4.1	-0.51	0.32
Stage 2	-4.3	-0.45	0.31
Stage 2	-4.5	-0.39	0.29
Stage 2	-4.7	-0.34	0.27
Stage 2	-4.9	-0.29	0.25
Stage 2	-5.1	-0.24	0.22
Stage 2	-5.3	-0.2	0.2
Stage 2	-5.5	-0.17	0.18
Stage 2	-5.7	-0.14	0.15
Stage 2	-5.9	-0.11	0.13
Stage 2	-6.1	-0.09	0.11
Stage 2	-6.3	-0.07	0.1
Stage 2	-6.5	-0.05	0.08
Stage 2	-6.7	-0.04	0.06
Stage 2	-6.9	-0.03	0.05
Stage 2	-7.1	-0.02	0.04
Stage 2	-7.3	-0.02	0.03
Stage 2	-7.5	-0.01	0.02
Stage 2	-7.7	-0.01	0.02
Stage 2	-7.9	0	0.01
Stage 2	-8.1	0	0.01
Stage 2	-8.3	0	0.01
Stage 2	-8.5	0	0
Stage 2	-8.7	0	0
Stage 2	-8.9	0	0
Stage 2	-9.1	0	0
Stage 2	-9.3	0	0
Stage 2	-9.5	0	0
Stage 2	-9.7	0	0
Stage 2	-9.9	0	0
Stage 2	-9.9	0	0
Stage 2	-10	0	0

### 6.3.5. Tabella Risultati Paratia Nominal - Stage: Stage 3

Design Assumption: Nominal Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	0	0	0
Stage 3	-0.2	0	0
Stage 3	-0.2	0	0
Stage 3	-0.4	0	0
Stage 3	-0.4	0	0
Stage 3	-0.5	0	0
Stage 3	-0.5	0	0
Stage 3	-0.7	-0.01	-0.04
Stage 3	-0.9	-0.1	-0.43
Stage 3	-1.1	-0.35	-1.29
Stage 3	-1.3	-0.55	-0.99
Stage 3	-1.5	-0.68	-0.66
Stage 3	-1.7	-0.76	-0.37
Stage 3	-1.9	-0.78	-0.13
Stage 3	-2.1	-0.77	0.06
Stage 3	-2.3	-0.73	0.2
Stage 3	-2.5	-0.67	0.3
Stage 3	-2.7	-0.6	0.37
Stage 3	-2.9	-0.52	0.41
Stage 3	-3.1	-0.43	0.42
Stage 3	-3.3	-0.35	0.42
Stage 3	-3.5	-0.27	0.4
Stage 3	-3.7	-0.19	0.38
Stage 3	-3.9	-0.13	0.32
Stage 3	-4.1	-0.08	0.26
Stage 3	-4.3	-0.03	0.22
Stage 3	-4.5	0	0.19
Stage 3	-4.7	0.03	0.15
Stage 3	-4.9	0.06	0.12
Stage 3	-5.1	0.08	0.09
Stage 3	-5.3	0.09	0.06
Stage 3	-5.5	0.1	0.04
Stage 3	-5.7	0.1	0.02
Stage 3	-5.9	0.1	0.01
Stage 3	-6.1	0.1	-0.01
Stage 3	-6.3	0.1	-0.02
Stage 3	-6.5	0.09	-0.03
Stage 3	-6.7	0.09	-0.03
Stage 3	-6.9	0.08	-0.04
Stage 3	-7.1	0.07	-0.04
Stage 3	-7.3	0.06	-0.04
Stage 3	-7.5	0.06	-0.04
Stage 3	-7.7	0.05	-0.04
Stage 3	-7.9	0.04	-0.04
Stage 3	-8.1	0.04	-0.03
Stage 3	-8.3	0.03	-0.03
Stage 3	-8.5	0.02	-0.03
Stage 3	-8.7	0.02	-0.03
Stage 3	-8.9	0.01	-0.02
Stage 3	-9.1	0.01	-0.02
Stage 3	-9.3	0.01	-0.02
Stage 3	-9.5	0	-0.01
Stage 3	-9.7	0	-0.01
Stage 3	-9.9	0	0
Stage 3	-10	0	0

### 6.3.6. Tabella Risultati Paratia Nominal - Stage: Stage 3

Design Assumption: Nominal Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	0	0	0
Stage 3	-0.2	0	0
Stage 3	-0.2	0	0
Stage 3	-0.4	0	0
Stage 3	-0.4	0	0
Stage 3	-0.5	0	0
Stage 3	-0.5	0	0
Stage 3	-0.7	0.01	0.04
Stage 3	-0.9	0.1	0.43
Stage 3	-1.1	0.35	1.29
Stage 3	-1.3	0.55	0.99
Stage 3	-1.5	0.68	0.66
Stage 3	-1.7	0.76	0.37
Stage 3	-1.9	0.78	0.13
Stage 3	-2.1	0.77	-0.06
Stage 3	-2.3	0.73	-0.2
Stage 3	-2.5	0.67	-0.3
Stage 3	-2.7	0.6	-0.37
Stage 3	-2.9	0.52	-0.41
Stage 3	-3.1	0.43	-0.42
Stage 3	-3.3	0.35	-0.42
Stage 3	-3.5	0.27	-0.4
Stage 3	-3.7	0.19	-0.38
Stage 3	-3.9	0.13	-0.32
Stage 3	-4.1	0.08	-0.26
Stage 3	-4.3	0.03	-0.22
Stage 3	-4.5	0	-0.19
Stage 3	-4.7	-0.03	-0.15
Stage 3	-4.9	-0.06	-0.12
Stage 3	-5.1	-0.08	-0.09
Stage 3	-5.3	-0.09	-0.06
Stage 3	-5.5	-0.1	-0.04
Stage 3	-5.7	-0.1	-0.02
Stage 3	-5.9	-0.1	-0.01
Stage 3	-6.1	-0.1	0.01
Stage 3	-6.3	-0.1	0.02
Stage 3	-6.5	-0.09	0.03
Stage 3	-6.7	-0.09	0.03
Stage 3	-6.9	-0.08	0.04
Stage 3	-7.1	-0.07	0.04
Stage 3	-7.3	-0.06	0.04
Stage 3	-7.5	-0.06	0.04
Stage 3	-7.7	-0.05	0.04
Stage 3	-7.9	-0.04	0.04
Stage 3	-8.1	-0.04	0.03
Stage 3	-8.3	-0.03	0.03
Stage 3	-8.5	-0.02	0.03
Stage 3	-8.7	-0.02	0.03
Stage 3	-8.9	-0.01	0.02
Stage 3	-9.1	-0.01	0.02
Stage 3	-9.3	-0.01	0.02
Stage 3	-9.5	0	0.01
Stage 3	-9.7	0	0.01
Stage 3	-9.9	0	0
Stage 3	-10	0	0

### 6.3.7. Tabella Risultati Paratia Nominal - Stage: Stage 4

Design Assumption: Nominal Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 4	0	0	0
Stage 4	-0.2	0	0
Stage 4	-0.2	0	0
Stage 4	-0.4	0	0
Stage 4	-0.4	0	0
Stage 4	-0.5	0	0
Stage 4	-0.5	0	0
Stage 4	-0.7	-0.01	-0.04
Stage 4	-0.9	-0.1	-0.43
Stage 4	-1.1	-0.35	-1.29
Stage 4	-1.3	-0.55	-0.99
Stage 4	-1.5	-0.68	-0.66
Stage 4	-1.7	-0.76	-0.37
Stage 4	-1.9	-0.78	-0.13
Stage 4	-2.1	-0.77	0.06
Stage 4	-2.3	-0.73	0.2
Stage 4	-2.5	-0.67	0.3
Stage 4	-2.7	-0.6	0.37
Stage 4	-2.9	-0.52	0.41
Stage 4	-3.1	-0.43	0.42
Stage 4	-3.3	-0.35	0.42
Stage 4	-3.5	-0.27	0.4
Stage 4	-3.7	-0.19	0.38
Stage 4	-3.9	-0.13	0.32
Stage 4	-4.1	-0.08	0.26
Stage 4	-4.3	-0.03	0.22
Stage 4	-4.5	0	0.19
Stage 4	-4.7	0.03	0.15
Stage 4	-4.9	0.06	0.12
Stage 4	-5.1	0.08	0.09
Stage 4	-5.3	0.09	0.06
Stage 4	-5.5	0.1	0.04
Stage 4	-5.7	0.1	0.02
Stage 4	-5.9	0.1	0.01
Stage 4	-6.1	0.1	-0.01
Stage 4	-6.3	0.1	-0.02
Stage 4	-6.5	0.09	-0.03
Stage 4	-6.7	0.09	-0.03
Stage 4	-6.9	0.08	-0.04
Stage 4	-7.1	0.07	-0.04
Stage 4	-7.3	0.06	-0.04
Stage 4	-7.5	0.06	-0.04
Stage 4	-7.7	0.05	-0.04
Stage 4	-7.9	0.04	-0.04
Stage 4	-8.1	0.04	-0.03
Stage 4	-8.3	0.03	-0.03
Stage 4	-8.5	0.02	-0.03
Stage 4	-8.7	0.02	-0.03
Stage 4	-8.9	0.01	-0.02
Stage 4	-9.1	0.01	-0.02
Stage 4	-9.3	0.01	-0.02
Stage 4	-9.5	0	-0.01
Stage 4	-9.7	0	-0.01
Stage 4	-9.9	0	0
Stage 4	-10	0	0

### 6.3.8. Tabella Risultati Paratia Nominal - Stage: Stage 4

Design Assumption: Nominal Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 4	0	0	0
Stage 4	-0.2	0	0
Stage 4	-0.2	0	0
Stage 4	-0.4	0	0
Stage 4	-0.4	0	0
Stage 4	-0.5	0	0
Stage 4	-0.5	0	0
Stage 4	-0.7	0.01	0.04
Stage 4	-0.9	0.1	0.43
Stage 4	-1.1	0.35	1.29
Stage 4	-1.3	0.55	0.99
Stage 4	-1.5	0.68	0.66
Stage 4	-1.7	0.76	0.37
Stage 4	-1.9	0.78	0.13
Stage 4	-2.1	0.77	-0.06
Stage 4	-2.3	0.73	-0.2
Stage 4	-2.5	0.67	-0.3
Stage 4	-2.7	0.6	-0.37
Stage 4	-2.9	0.52	-0.41
Stage 4	-3.1	0.43	-0.42
Stage 4	-3.3	0.35	-0.42
Stage 4	-3.5	0.27	-0.4
Stage 4	-3.7	0.19	-0.38
Stage 4	-3.9	0.13	-0.32
Stage 4	-4.1	0.08	-0.26
Stage 4	-4.3	0.03	-0.22
Stage 4	-4.5	0	-0.19
Stage 4	-4.7	-0.03	-0.15
Stage 4	-4.9	-0.06	-0.12
Stage 4	-5.1	-0.08	-0.09
Stage 4	-5.3	-0.09	-0.06
Stage 4	-5.5	-0.1	-0.04
Stage 4	-5.7	-0.1	-0.02
Stage 4	-5.9	-0.1	-0.01
Stage 4	-6.1	-0.1	0.01
Stage 4	-6.3	-0.1	0.02
Stage 4	-6.5	-0.09	0.03
Stage 4	-6.7	-0.09	0.03
Stage 4	-6.9	-0.08	0.04
Stage 4	-7.1	-0.07	0.04
Stage 4	-7.3	-0.06	0.04
Stage 4	-7.5	-0.06	0.04
Stage 4	-7.7	-0.05	0.04
Stage 4	-7.9	-0.04	0.04
Stage 4	-8.1	-0.04	0.03
Stage 4	-8.3	-0.03	0.03
Stage 4	-8.5	-0.02	0.03
Stage 4	-8.7	-0.02	0.03
Stage 4	-8.9	-0.01	0.02
Stage 4	-9.1	-0.01	0.02
Stage 4	-9.3	-0.01	0.02
Stage 4	-9.5	0	0.01
Stage 4	-9.7	0	0.01
Stage 4	-9.9	0	0
Stage 4	-10	0	0



### 6.3.9. Tabella Risultati Paratia Nominal - Stage: Stage 5

Design Assumption: Nominal Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 5	0	0	-0.16
Stage 5	-0.2	-0.03	-0.16
Stage 5	-0.4	-0.12	-0.42
Stage 5	-0.5	-0.16	-0.44
Stage 5	-0.7	2.96	15.58
Stage 5	-0.9	5.99	15.19
Stage 5	-1.1	8.88	14.43
Stage 5	-1.3	11.55	13.33
Stage 5	-1.5	13.93	11.92
Stage 5	-1.7	15.97	10.2
Stage 5	-1.9	17.61	8.19
Stage 5	-2.1	18.79	5.9
Stage 5	-2.3	19.46	3.34
Stage 5	-2.5	19.56	0.49
Stage 5	-2.7	19.03	-2.62
Stage 5	-2.9	17.83	-6
Stage 5	-3.1	15.9	-9.64
Stage 5	-3.3	13.9	-10.02
Stage 5	-3.5	11.93	-9.85
Stage 5	-3.7	10.05	-9.41
Stage 5	-3.9	8.28	-8.83
Stage 5	-4.1	6.65	-8.16
Stage 5	-4.3	5.17	-7.41
Stage 5	-4.5	3.84	-6.63
Stage 5	-4.7	2.67	-5.86
Stage 5	-4.9	1.65	-5.1
Stage 5	-5.1	0.78	-4.37
Stage 5	-5.3	0.04	-3.68
Stage 5	-5.5	-0.56	-3.03
Stage 5	-5.7	-1.05	-2.44
Stage 5	-5.9	-1.43	-1.89
Stage 5	-6.1	-1.71	-1.4
Stage 5	-6.3	-1.9	-0.96
Stage 5	-6.5	-2.02	-0.58
Stage 5	-6.7	-2.07	-0.24
Stage 5	-6.9	-2.06	0.05
Stage 5	-7.1	-2	0.29
Stage 5	-7.3	-1.9	0.49
Stage 5	-7.5	-1.77	0.65
Stage 5	-7.7	-1.61	0.78
Stage 5	-7.9	-1.44	0.87
Stage 5	-8.1	-1.26	0.92
Stage 5	-8.3	-1.07	0.95
Stage 5	-8.5	-0.88	0.95
Stage 5	-8.7	-0.69	0.92
Stage 5	-8.9	-0.52	0.86
Stage 5	-9.1	-0.37	0.78
Stage 5	-9.3	-0.23	0.67
Stage 5	-9.5	-0.12	0.54
Stage 5	-9.7	-0.05	0.39
Stage 5	-9.9	-0.01	0.21
Stage 5	-10	0	0.05

### 6.3.10. Tabella Risultati Paratia Nominal - Stage: Stage 5

Design Assumption: Nominal Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 5	0	0	0.16
Stage 5	-0.2	0.03	0.16
Stage 5	-0.4	0.12	0.42
Stage 5	-0.5	0.16	0.44
Stage 5	-0.7	-2.96	-15.58
Stage 5	-0.9	-5.99	-15.19
Stage 5	-1.1	-8.88	-14.43
Stage 5	-1.3	-11.55	-13.33
Stage 5	-1.5	-13.93	-11.92
Stage 5	-1.7	-15.97	-10.2
Stage 5	-1.9	-17.61	-8.19
Stage 5	-2.1	-18.79	-5.9
Stage 5	-2.3	-19.46	-3.34
Stage 5	-2.5	-19.56	-0.49
Stage 5	-2.7	-19.03	2.62
Stage 5	-2.9	-17.83	6
Stage 5	-3.1	-15.9	9.64
Stage 5	-3.3	-13.9	10.02
Stage 5	-3.5	-11.93	9.85
Stage 5	-3.7	-10.05	9.41
Stage 5	-3.9	-8.28	8.83
Stage 5	-4.1	-6.65	8.16
Stage 5	-4.3	-5.17	7.41
Stage 5	-4.5	-3.84	6.63
Stage 5	-4.7	-2.67	5.86
Stage 5	-4.9	-1.65	5.1
Stage 5	-5.1	-0.78	4.37
Stage 5	-5.3	-0.04	3.68
Stage 5	-5.5	0.56	3.03
Stage 5	-5.7	1.05	2.44
Stage 5	-5.9	1.43	1.89
Stage 5	-6.1	1.71	1.4
Stage 5	-6.3	1.9	0.96
Stage 5	-6.5	2.02	0.58
Stage 5	-6.7	2.07	0.24
Stage 5	-6.9	2.06	-0.05
Stage 5	-7.1	2	-0.29
Stage 5	-7.3	1.9	-0.49
Stage 5	-7.5	1.77	-0.65
Stage 5	-7.7	1.61	-0.78
Stage 5	-7.9	1.44	-0.87
Stage 5	-8.1	1.26	-0.92
Stage 5	-8.3	1.07	-0.95
Stage 5	-8.5	0.88	-0.95
Stage 5	-8.7	0.69	-0.92
Stage 5	-8.9	0.52	-0.86
Stage 5	-9.1	0.37	-0.78
Stage 5	-9.3	0.23	-0.67
Stage 5	-9.5	0.12	-0.54
Stage 5	-9.7	0.05	-0.39
Stage 5	-9.9	0.01	-0.21
Stage 5	-10	0	-0.05

### 6.3.11. Tabella Risultati Paratia Nominal - Stage: Stage 6

Design Assumption: Nominal Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 6	0	0	-0.31
Stage 6	-0.2	-0.06	-0.31
Stage 6	-0.4	-0.22	-0.81
Stage 6	-0.5	-0.31	-0.87
Stage 6	-0.7	4.72	25.16
Stage 6	-0.9	9.67	24.77
Stage 6	-1.1	14.48	24.01
Stage 6	-1.3	19.06	22.91
Stage 6	-1.5	23.36	21.49
Stage 6	-1.7	27.31	19.78
Stage 6	-1.9	30.87	17.77
Stage 6	-2.1	33.96	15.48
Stage 6	-2.3	36.54	12.91
Stage 6	-2.5	38.56	10.07
Stage 6	-2.7	39.95	6.96
Stage 6	-2.9	40.67	3.58
Stage 6	-3.1	40.65	-0.06
Stage 6	-3.3	39.86	-3.97
Stage 6	-3.5	38.23	-8.14
Stage 6	-3.7	35.72	-12.57
Stage 6	-3.9	32.26	-17.28
Stage 6	-4.1	27.81	-22.25
Stage 6	-4.3	23.05	-23.81
Stage 6	-4.5	18.47	-22.9
Stage 6	-4.7	14.2	-21.34
Stage 6	-4.9	10.31	-19.45
Stage 6	-5.1	6.85	-17.31
Stage 6	-5.3	3.86	-14.96
Stage 6	-5.5	1.32	-12.68
Stage 6	-5.7	-0.78	-10.53
Stage 6	-5.9	-2.49	-8.53
Stage 6	-6.1	-3.83	-6.7
Stage 6	-6.3	-4.84	-5.04
Stage 6	-6.5	-5.55	-3.55
Stage 6	-6.7	-5.99	-2.22
Stage 6	-6.9	-6.21	-1.06
Stage 6	-7.1	-6.22	-0.06
Stage 6	-7.3	-6.06	0.8
Stage 6	-7.5	-5.76	1.5
Stage 6	-7.7	-5.34	2.07
Stage 6	-7.9	-4.84	2.51
Stage 6	-8.1	-4.27	2.83
Stage 6	-8.3	-3.67	3.02
Stage 6	-8.5	-3.05	3.1
Stage 6	-8.7	-2.43	3.07
Stage 6	-8.9	-1.85	2.94
Stage 6	-9.1	-1.31	2.7
Stage 6	-9.3	-0.83	2.37
Stage 6	-9.5	-0.45	1.93
Stage 6	-9.7	-0.17	1.39
Stage 6	-9.9	-0.02	0.75
Stage 6	-10	0	0.2

### 6.3.12. Tabella Risultati Paratia Nominal - Stage: Stage 6

Design Assumption: Nominal Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 6	0	0	0.31
Stage 6	-0.2	0.06	0.31
Stage 6	-0.4	0.22	0.81
Stage 6	-0.5	0.31	0.87
Stage 6	-0.7	-4.72	-25.16
Stage 6	-0.9	-9.67	-24.77
Stage 6	-1.1	-14.48	-24.01
Stage 6	-1.3	-19.06	-22.91
Stage 6	-1.5	-23.36	-21.49
Stage 6	-1.7	-27.31	-19.78
Stage 6	-1.9	-30.87	-17.77
Stage 6	-2.1	-33.96	-15.48
Stage 6	-2.3	-36.54	-12.91
Stage 6	-2.5	-38.56	-10.07
Stage 6	-2.7	-39.95	-6.96
Stage 6	-2.9	-40.67	-3.58
Stage 6	-3.1	-40.65	0.06
Stage 6	-3.3	-39.86	3.97
Stage 6	-3.5	-38.23	8.14
Stage 6	-3.7	-35.72	12.57
Stage 6	-3.9	-32.26	17.28
Stage 6	-4.1	-27.81	22.25
Stage 6	-4.3	-23.05	23.81
Stage 6	-4.5	-18.47	22.9
Stage 6	-4.7	-14.2	21.34
Stage 6	-4.9	-10.31	19.45
Stage 6	-5.1	-6.85	17.31
Stage 6	-5.3	-3.86	14.96
Stage 6	-5.5	-1.32	12.68
Stage 6	-5.7	0.78	10.53
Stage 6	-5.9	2.49	8.53
Stage 6	-6.1	3.83	6.7
Stage 6	-6.3	4.84	5.04
Stage 6	-6.5	5.55	3.55
Stage 6	-6.7	5.99	2.22
Stage 6	-6.9	6.21	1.06
Stage 6	-7.1	6.22	0.06
Stage 6	-7.3	6.06	-0.8
Stage 6	-7.5	5.76	-1.5
Stage 6	-7.7	5.34	-2.07
Stage 6	-7.9	4.84	-2.51
Stage 6	-8.1	4.27	-2.83
Stage 6	-8.3	3.67	-3.02
Stage 6	-8.5	3.05	-3.1
Stage 6	-8.7	2.43	-3.07
Stage 6	-8.9	1.85	-2.94
Stage 6	-9.1	1.31	-2.7
Stage 6	-9.3	0.83	-2.37
Stage 6	-9.5	0.45	-1.93
Stage 6	-9.7	0.17	-1.39
Stage 6	-9.9	0.02	-0.75
Stage 6	-10	0	-0.2

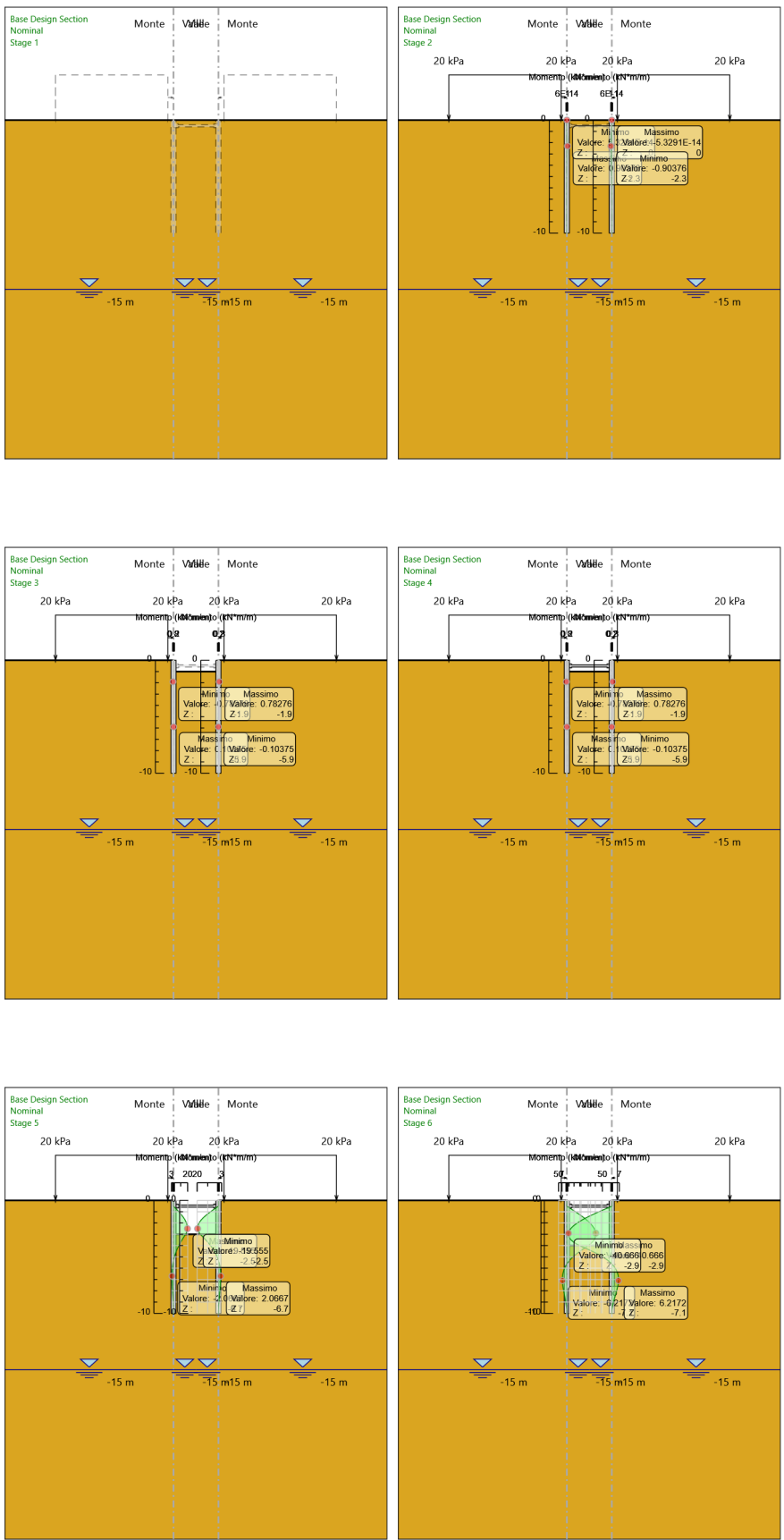
### 6.3.13. Tabella Risultati Paratia Nominal - Stage: Stage 7

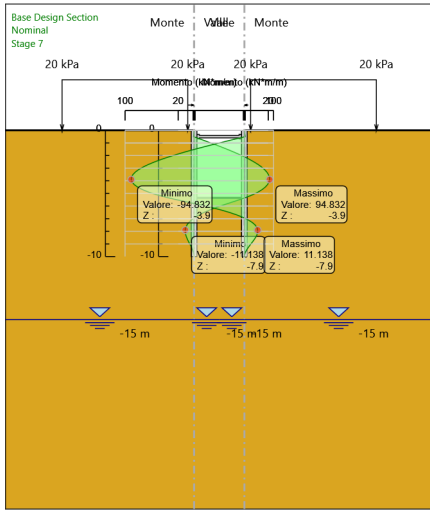
Design Assumption: Nominal Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 7	0	0	-0.69
Stage 7	-0.2	-0.14	-0.69
Stage 7	-0.4	-0.46	-1.63
Stage 7	-0.5	-0.65	-1.83
Stage 7	-0.7	8.08	43.66
Stage 7	-0.9	16.74	43.27
Stage 7	-1.1	25.24	42.51
Stage 7	-1.3	33.52	41.41
Stage 7	-1.5	41.52	39.99
Stage 7	-1.7	49.18	38.28
Stage 7	-1.9	56.43	36.27
Stage 7	-2.1	63.23	33.98
Stage 7	-2.3	69.51	31.41
Stage 7	-2.5	75.23	28.57
Stage 7	-2.7	80.32	25.46
Stage 7	-2.9	84.74	22.08
Stage 7	-3.1	88.42	18.44
Stage 7	-3.3	91.33	14.53
Stage 7	-3.5	93.4	10.36
Stage 7	-3.7	94.59	5.93
Stage 7	-3.9	94.83	1.22
Stage 7	-4.1	94.08	-3.75
Stage 7	-4.3	92.29	-8.95
Stage 7	-4.5	89.41	-14.42
Stage 7	-4.7	85.38	-20.15
Stage 7	-4.9	80.15	-26.13
Stage 7	-5.1	73.68	-32.36
Stage 7	-5.3	65.91	-38.85
Stage 7	-5.5	56.79	-45.6
Stage 7	-5.7	47.14	-48.27
Stage 7	-5.9	37.44	-48.47
Stage 7	-6.1	28.21	-46.17
Stage 7	-6.3	19.93	-41.4
Stage 7	-6.5	12.64	-36.42
Stage 7	-6.7	6.35	-31.44
Stage 7	-6.9	1.06	-26.49
Stage 7	-7.1	-3.26	-21.6
Stage 7	-7.3	-6.62	-16.78
Stage 7	-7.5	-9.03	-12.04
Stage 7	-7.7	-10.51	-7.39
Stage 7	-7.9	-11.14	-3.16
Stage 7	-8.1	-11.06	0.39
Stage 7	-8.3	-10.4	3.27
Stage 7	-8.5	-9.31	5.48
Stage 7	-8.7	-7.9	7.04
Stage 7	-8.9	-6.31	7.95
Stage 7	-9.1	-4.66	8.22
Stage 7	-9.3	-3.09	7.86
Stage 7	-9.5	-1.72	6.86
Stage 7	-9.7	-0.67	5.23
Stage 7	-9.9	-0.08	2.97
Stage 7	-10	0	0.8

### 6.3.14. Tabella Risultati Paratia Nominal - Stage: Stage 7

Design Assumption: Nominal Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 7	0	0	0.69
Stage 7	-0.2	0.14	0.69
Stage 7	-0.4	0.46	1.63
Stage 7	-0.5	0.65	1.83
Stage 7	-0.7	-8.08	-43.66
Stage 7	-0.9	-16.74	-43.27
Stage 7	-1.1	-25.24	-42.51
Stage 7	-1.3	-33.52	-41.41
Stage 7	-1.5	-41.52	-39.99
Stage 7	-1.7	-49.18	-38.28
Stage 7	-1.9	-56.43	-36.27
Stage 7	-2.1	-63.23	-33.98
Stage 7	-2.3	-69.51	-31.41
Stage 7	-2.5	-75.23	-28.57
Stage 7	-2.7	-80.32	-25.46
Stage 7	-2.9	-84.74	-22.08
Stage 7	-3.1	-88.42	-18.44
Stage 7	-3.3	-91.33	-14.53
Stage 7	-3.5	-93.4	-10.36
Stage 7	-3.7	-94.59	-5.93
Stage 7	-3.9	-94.83	-1.22
Stage 7	-4.1	-94.08	3.75
Stage 7	-4.3	-92.29	8.95
Stage 7	-4.5	-89.41	14.42
Stage 7	-4.7	-85.38	20.15
Stage 7	-4.9	-80.15	26.13
Stage 7	-5.1	-73.68	32.36
Stage 7	-5.3	-65.91	38.85
Stage 7	-5.5	-56.79	45.6
Stage 7	-5.7	-47.14	48.27
Stage 7	-5.9	-37.44	48.47
Stage 7	-6.1	-28.21	46.17
Stage 7	-6.3	-19.93	41.4
Stage 7	-6.5	-12.64	36.42
Stage 7	-6.7	-6.35	31.44
Stage 7	-6.9	-1.06	26.49
Stage 7	-7.1	3.26	21.6
Stage 7	-7.3	6.62	16.78
Stage 7	-7.5	9.03	12.04
Stage 7	-7.7	10.51	7.39
Stage 7	-7.9	11.14	3.16
Stage 7	-8.1	11.06	-0.39
Stage 7	-8.3	10.4	-3.27
Stage 7	-8.5	9.31	-5.48
Stage 7	-8.7	7.9	-7.04
Stage 7	-8.9	6.31	-7.95
Stage 7	-9.1	4.66	-8.22
Stage 7	-9.3	3.09	-7.86
Stage 7	-9.5	1.72	-6.86
Stage 7	-9.7	0.67	-5.23
Stage 7	-9.9	0.08	-2.97
Stage 7	-10	0	-0.8

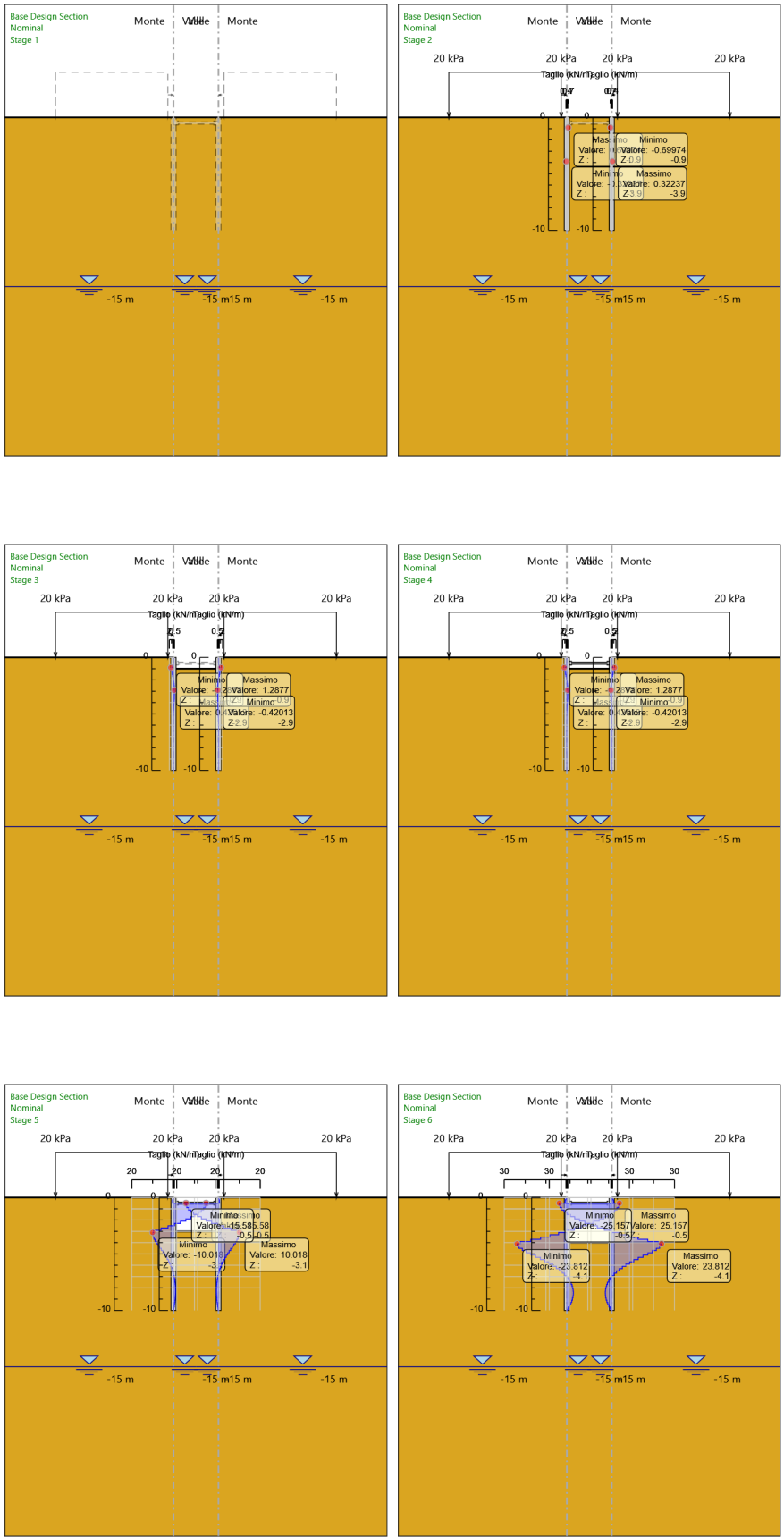
### 6.3.15. Grafico Momento Nominal

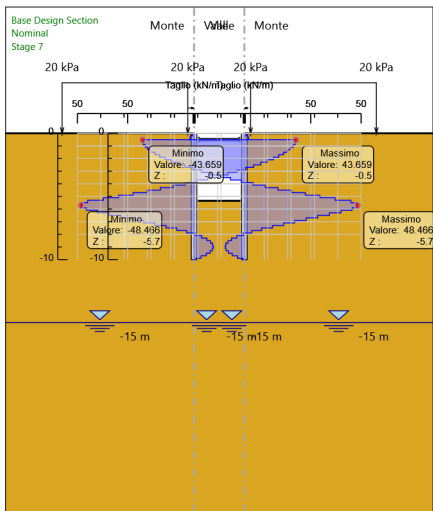




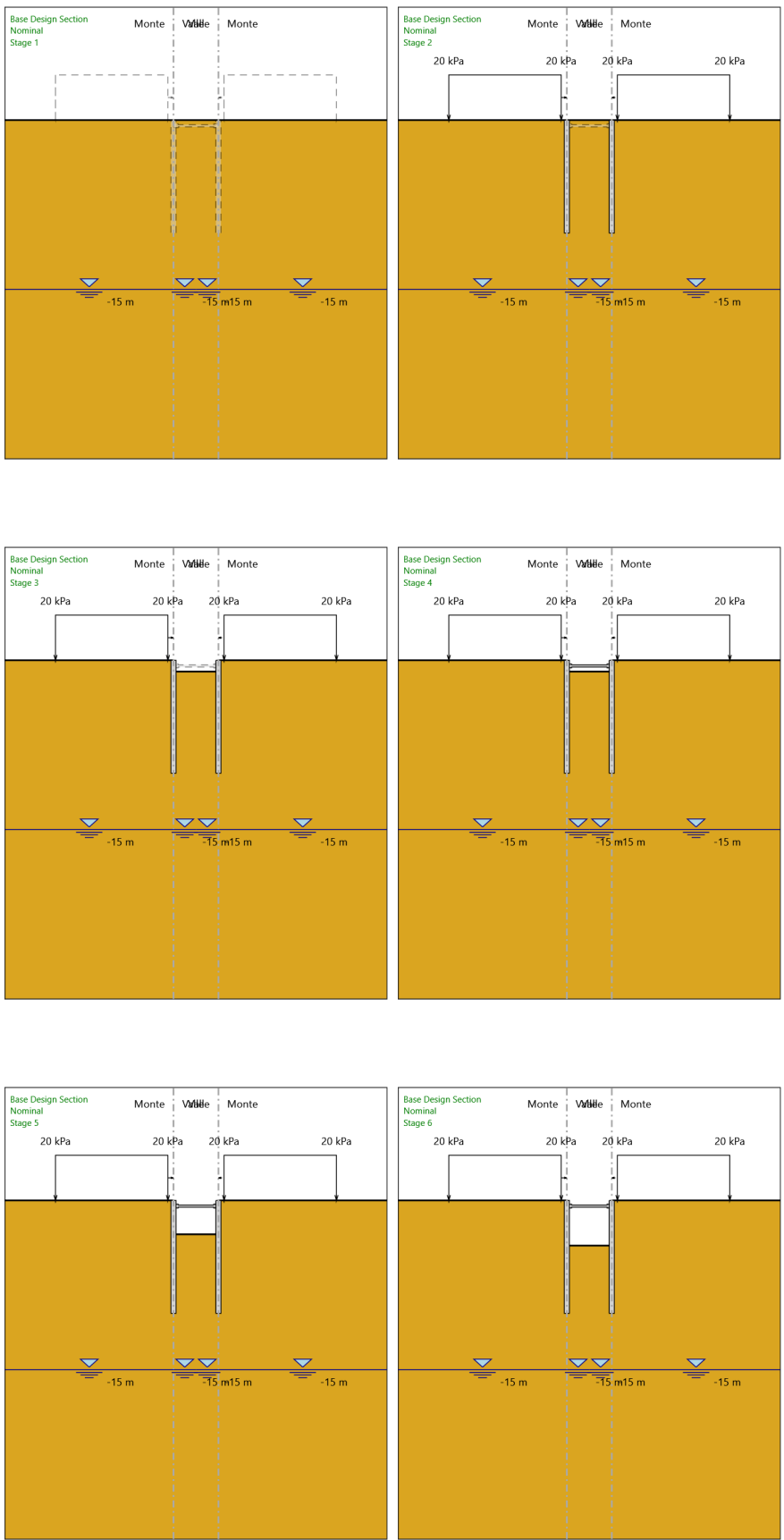


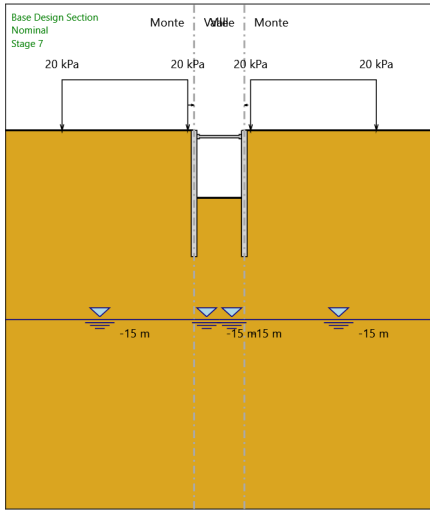
### 6.3.16. Grafico Taglio Nominal



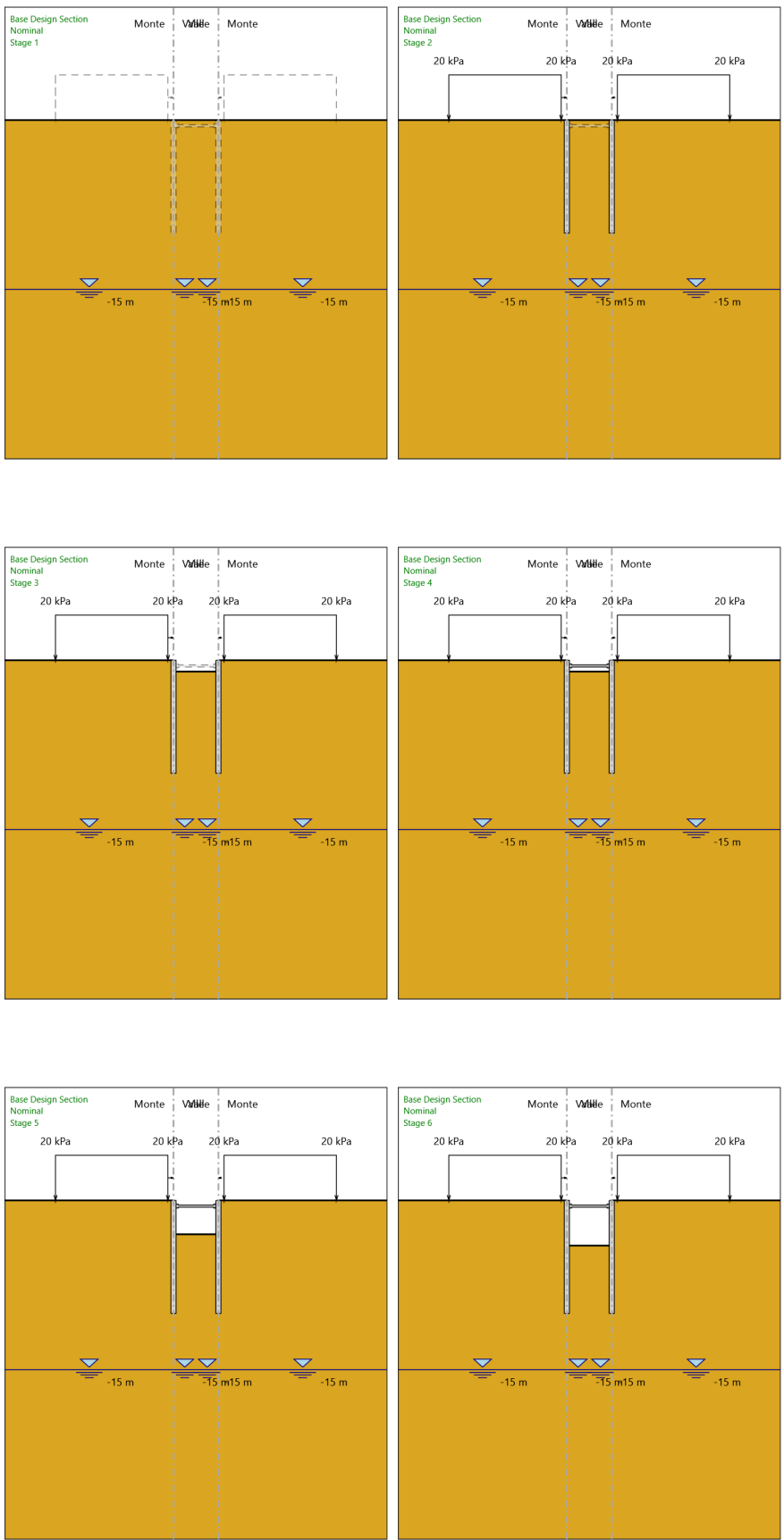


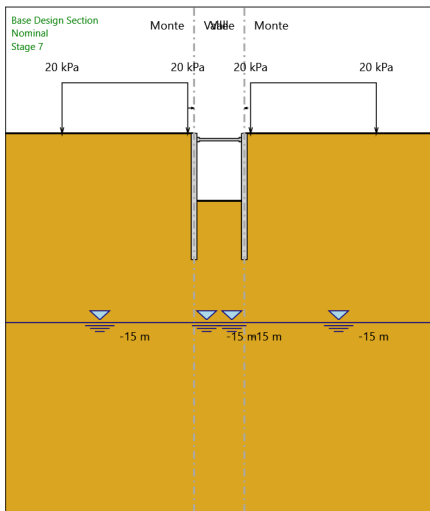
### 6.3.17. Grafico Momento Nominal





### 6.3.18. Grafico Taglio Nominal





## 6.4. Inviluppi Risultati Paratia Nominal

## 6.5. Risultati Elementi strutturali

Design Assumption: Nominal Sollecitazione Strut

Stage	Forza (kN/m)
Stage 4	2.7472165E-13
Stage 5	-16.05992
Stage 6	-26.07038
Stage 7	-45.53279



## 6.5. Riepilogo spinte

Design Assump- tion: Nominal	Tipo Risultato: Riepi- logo spinte	Muro: LEFT Lato LEFT							
		Stage	Vera effettiva (kN/m)	Pressione neutra (kN/m)	Vera Totale (kN/m)	Min ammissibile (kN/m)	Max ammissibile (kN/m)	Percentuale di resi- stenza massima	Vera / Attiva
		Stage 1	522.5	0	522.5	280	3534.8	14.78%	1.87
		Stage 2	541	0	541	314.6	3913.1	13.83%	1.72
		Stage 3	506.9	0	506.9	314.6	3913.1	12.95%	1.61
		Stage 4	506.9	0	506.9	314.6	3913.1	12.95%	1.61
		Stage 5	435.1	0	435.1	314.6	3913.1	11.12%	1.38
		Stage 6	397.9	0	397.9	314.6	3913.1	10.17%	1.26
		Stage 7	357.4	0	357.4	314.6	3913.1	9.13%	1.14

Design Assump- tion: Nominal	Tipo Risultato: Riepi- logo spinte	Muro: LEFT Lato RIGHT							
		Stage	Vera effettiva (kN/m)	Pressione neutra (kN/m)	Vera Totale (kN/m)	Min ammissibile (kN/m)	Max ammissibile (kN/m)	Percentuale di resi- stenza massima	Vera / Attiva
		Stage 1	522.5	0	522.5	280	3534.8	14.78%	1.87
		Stage 2	541	0	541	280	3534.8	15.3%	1.93
		Stage 3	506.9	0	506.9	223.9	2873.8	17.64%	2.26
		Stage 4	506.9	0	506.9	223.9	2873.8	17.64%	2.26
		Stage 5	419.1	0	419.1	130.5	1756.3	23.86%	3.21
		Stage 6	371.8	0	371.8	93.2	1300.2	28.6%	3.99
		Stage 7	311.8	0	311.8	52.7	792.3	39.35%	5.92

Design Assump- tion: Nominal Stage	Tipo Risultato: Riepi- logo spinte Vera effettiva (kN/m)	Muro:	RIGHT	Lato	LEFT	Percentuale di resi- stenza massima	Vera / Attiva
		Pressione neutra (kN/m)	Vera Totale (kN/m)	Min ammissibile (kN/m)	Max ammissibile (kN/m)		
Stage 1	522.5	0	522.5	280	3534.8	14.78%	1.87
Stage 2	541	0	541	280	3534.8	15.3%	1.93
Stage 3	506.9	0	506.9	223.9	2873.8	17.64%	2.26
Stage 4	506.9	0	506.9	223.9	2873.8	17.64%	2.26
Stage 5	419.1	0	419.1	130.5	1756.3	23.86%	3.21
Stage 6	371.8	0	371.8	93.2	1300.2	28.6%	3.99
Stage 7	311.8	0	311.8	52.7	792.3	39.35%	5.92

Design Assump- tion: Nominal Stage	Tipo Risultato: Riepi- logo spinte Vera effettiva (kN/m)	Muro:	RIGHT	Lato	RIGHT	Percentuale di resi- stenza massima	Vera / Attiva
		Pressione neutra (kN/m)	Vera Totale (kN/m)	Min ammissibile (kN/m)	Max ammissibile (kN/m)		
Stage 1	522.5	0	522.5	280	3534.8	14.78%	1.87
Stage 2	541	0	541	314.6	3913.1	13.83%	1.72
Stage 3	506.9	0	506.9	314.6	3913.1	12.95%	1.61
Stage 4	506.9	0	506.9	314.6	3913.1	12.95%	1.61
Stage 5	435.1	0	435.1	314.6	3913.1	11.12%	1.38
Stage 6	397.9	0	397.9	314.6	3913.1	10.17%	1.26
Stage 7	357.4	0	357.4	314.6	3913.1	9.13%	1.14

## 7. Descrizione Coefficienti Design Assumption

### Coefficienti A

Nome	Carichi Per- manenti (F_dead_lo ad_unfa- vour)	Carichi Per- manenti (F_dead_lo ad_favour)	Carichi Va- riabili Sfa- vorevoli (F_live_loa d_unfa- vour)	Carichi Va- riabili Fa- vorevoli (F_live_loa d_favour)	Carico Si- smico (F_seism_ load)	Pres sioni Lato Mon te (F_ Wa- terD R)	Pres sioni Lato Vall e (F_ Wa- ter Res)	Carichi Perma- nenti De- stabiliz- zanti (F_UPL_G DStab)	Carichi Perma- nenti Sta- bilizzanti (F_UPL_G Stab)	Carichi Va- riabili De- stabiliz- zanti (F_UPL_Q DStab)	Carichi Perma- nenti De- stabiliz- zanti (F_HYD_G DStab)	Carichi Perma- nenti Sta- bilizzanti (F_HYD_G Stab)	Carichi Va- riabili De- stabiliz- zanti (F_HYD_Q DStab)
Simbolo	$\gamma_G$	$\gamma_G$	$\gamma_Q$	$\gamma_Q$	$\gamma_{QE}$	$\gamma_G$	$\gamma_G$	$\gamma_{Gdst}$	$\gamma_{Gstb}$	$\gamma_{Qdst}$	$\gamma_{Gdst}$	$\gamma_{Gstb}$	$\gamma_{Qdst}$
Nominal	1	1	1	1	1	1	1	1	1	1	1	1	1
NTC2018 : SLE (Rara/Fr equente /Quasi Perma- nente)	1	1	1	1	0	1	1	1	1	1	1	1	1
NTC2018 : A1+M1+ R1 (R3 per ti- ranti)	1.3	1	1.5	1	0	1.3	1	1	1	1	1.3	0.9	1
NTC2018 : A2+M2+ R1	1	1	1.3	1	0	1	1	1	1	1	1.3	0.9	1

### Coefficienti M

Nome	Parziale su $\tan(\phi')$ (F_Fr)	Parziale su $c'$ (F_eff_cohe)	Parziale su Su (F_Su)	Parziale su qu (F_qu)	Parziale su peso specifico (F_gamma)
Simbolo	$\gamma_\phi$	$\gamma_c$	$\gamma_{cu}$	$\gamma_{qu}$	$\gamma_\gamma$
Nominal	1	1	1	1	1
NTC2018: SLE (Rara/Frequente/Quasi Permanente)	1	1	1	1	1
NTC2018: A1+M1+R1 (R3 per tiranti)	1	1	1	1	1
NTC2018: A2+M2+R1	1.25	1.25	1.4	1	1

### Coefficienti R

Nome	Parziale resistenza terreno (es. Kp) (F_Soil_Res_walls)	Parziale resistenza Tiranti permanenti (F_Anch_P)	Parziale resistenza Tiranti temporanei (F_Anch_T)	Parziale elementi strutturali (F_wall)
Simbolo	$\gamma_{Re}$	$\gamma_{ap}$	$\gamma_{at}$	
Nominal	1	1	1	1
NTC2018: SLE (Rara/Fre- quente/Quasi Permanente)	1	1	1	1
NTC2018: A1+M1+R1 (R3 per tiranti)	1	1.2	1.1	1
NTC2018: A2+M2+R1	1	1.2	1.1	1

## 7.1. Risultati NTC2018: SLE (Rara/Frequente/Quasi Permanente)

### 7.1.1. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 1

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Tipo Risultato: Spostamento			Muro: LEFT
Stage	Z (m)	Spostamento (mm)	
Stage 1	0	0	
Stage 1	-0.2	0	
Stage 1	-0.4	0	
Stage 1	-0.5	0	
Stage 1	-0.7	0	
Stage 1	-0.9	0	
Stage 1	-1.1	0	
Stage 1	-1.3	0	
Stage 1	-1.5	0	
Stage 1	-1.7	0	
Stage 1	-1.9	0	
Stage 1	-2.1	0	
Stage 1	-2.3	0	
Stage 1	-2.5	0	
Stage 1	-2.7	0	
Stage 1	-2.9	0	
Stage 1	-3.1	0	
Stage 1	-3.3	0	
Stage 1	-3.5	0	
Stage 1	-3.7	0	
Stage 1	-3.9	0	
Stage 1	-4.1	0	
Stage 1	-4.3	0	
Stage 1	-4.5	0	
Stage 1	-4.7	0	
Stage 1	-4.9	0	
Stage 1	-5.1	0	
Stage 1	-5.3	0	
Stage 1	-5.5	0	
Stage 1	-5.7	0	
Stage 1	-5.9	0	
Stage 1	-6.1	0	
Stage 1	-6.3	0	
Stage 1	-6.5	0	
Stage 1	-6.7	0	
Stage 1	-6.9	0	
Stage 1	-7.1	0	
Stage 1	-7.3	0	
Stage 1	-7.5	0	
Stage 1	-7.7	0	
Stage 1	-7.9	0	
Stage 1	-8.1	0	
Stage 1	-8.3	0	
Stage 1	-8.5	0	
Stage 1	-8.7	0	
Stage 1	-8.9	0	
Stage 1	-9.1	0	
Stage 1	-9.3	0	
Stage 1	-9.5	0	
Stage 1	-9.7	0	
Stage 1	-9.9	0	
Stage 1	-10	0	

**7.1.2. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - RIGHT Stage: Stage 1**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Tipo Risultato: Spostamento Muro: RIGHT		
Stage	Z (m)	Spostamento (mm)
Stage 1	0	0
Stage 1	-0.2	0
Stage 1	-0.4	0
Stage 1	-0.5	0
Stage 1	-0.7	0
Stage 1	-0.9	0
Stage 1	-1.1	0
Stage 1	-1.3	0
Stage 1	-1.5	0
Stage 1	-1.7	0
Stage 1	-1.9	0
Stage 1	-2.1	0
Stage 1	-2.3	0
Stage 1	-2.5	0
Stage 1	-2.7	0
Stage 1	-2.9	0
Stage 1	-3.1	0
Stage 1	-3.3	0
Stage 1	-3.5	0
Stage 1	-3.7	0
Stage 1	-3.9	0
Stage 1	-4.1	0
Stage 1	-4.3	0
Stage 1	-4.5	0
Stage 1	-4.7	0
Stage 1	-4.9	0
Stage 1	-5.1	0
Stage 1	-5.3	0
Stage 1	-5.5	0
Stage 1	-5.7	0
Stage 1	-5.9	0
Stage 1	-6.1	0
Stage 1	-6.3	0
Stage 1	-6.5	0
Stage 1	-6.7	0
Stage 1	-6.9	0
Stage 1	-7.1	0
Stage 1	-7.3	0
Stage 1	-7.5	0
Stage 1	-7.7	0
Stage 1	-7.9	0
Stage 1	-8.1	0
Stage 1	-8.3	0
Stage 1	-8.5	0
Stage 1	-8.7	0
Stage 1	-8.9	0
Stage 1	-9.1	0
Stage 1	-9.3	0
Stage 1	-9.5	0
Stage 1	-9.7	0
Stage 1	-9.9	0
Stage 1	-10	0

**7.1.3. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 1**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	0	0	0
Stage 1	-0.2	0	0
Stage 1	-0.4	0	0
Stage 1	-0.5	0	0
Stage 1	-0.7	0	0
Stage 1	-0.9	0	0
Stage 1	-1.1	0	0
Stage 1	-1.3	0	0
Stage 1	-1.5	0	0
Stage 1	-1.7	0	0
Stage 1	-1.9	0	0
Stage 1	-2.1	0	0
Stage 1	-2.3	0	0
Stage 1	-2.5	0	0
Stage 1	-2.7	0	0
Stage 1	-2.9	0	0
Stage 1	-3.1	0	0
Stage 1	-3.3	0	0
Stage 1	-3.5	0	0
Stage 1	-3.7	0	0
Stage 1	-3.9	0	0
Stage 1	-4.1	0	0
Stage 1	-4.3	0	0
Stage 1	-4.5	0	0
Stage 1	-4.7	0	0
Stage 1	-4.9	0	0
Stage 1	-5.1	0	0
Stage 1	-5.3	0	0
Stage 1	-5.5	0	0
Stage 1	-5.7	0	0
Stage 1	-5.9	0	0
Stage 1	-6.1	0	0
Stage 1	-6.3	0	0
Stage 1	-6.5	0	0
Stage 1	-6.7	0	0
Stage 1	-6.9	0	0
Stage 1	-7.1	0	0
Stage 1	-7.3	0	0
Stage 1	-7.5	0	0
Stage 1	-7.7	0	0
Stage 1	-7.9	0	0
Stage 1	-8.1	0	0
Stage 1	-8.3	0	0
Stage 1	-8.5	0	0
Stage 1	-8.7	0	0
Stage 1	-8.9	0	0
Stage 1	-9.1	0	0
Stage 1	-9.3	0	0
Stage 1	-9.5	0	0
Stage 1	-9.7	0	0
Stage 1	-9.9	0	0
Stage 1	-10	0	0

**7.1.4. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Right wall - Stage: Stage 1**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	0	0	0
Stage 1	-0.2	0	0
Stage 1	-0.4	0	0
Stage 1	-0.5	0	0
Stage 1	-0.7	0	0
Stage 1	-0.9	0	0
Stage 1	-1.1	0	0
Stage 1	-1.3	0	0
Stage 1	-1.5	0	0
Stage 1	-1.7	0	0
Stage 1	-1.9	0	0
Stage 1	-2.1	0	0
Stage 1	-2.3	0	0
Stage 1	-2.5	0	0
Stage 1	-2.7	0	0
Stage 1	-2.9	0	0
Stage 1	-3.1	0	0
Stage 1	-3.3	0	0
Stage 1	-3.5	0	0
Stage 1	-3.7	0	0
Stage 1	-3.9	0	0
Stage 1	-4.1	0	0
Stage 1	-4.3	0	0
Stage 1	-4.5	0	0
Stage 1	-4.7	0	0
Stage 1	-4.9	0	0
Stage 1	-5.1	0	0
Stage 1	-5.3	0	0
Stage 1	-5.5	0	0
Stage 1	-5.7	0	0
Stage 1	-5.9	0	0
Stage 1	-6.1	0	0
Stage 1	-6.3	0	0
Stage 1	-6.5	0	0
Stage 1	-6.7	0	0
Stage 1	-6.9	0	0
Stage 1	-7.1	0	0
Stage 1	-7.3	0	0
Stage 1	-7.5	0	0
Stage 1	-7.7	0	0
Stage 1	-7.9	0	0
Stage 1	-8.1	0	0
Stage 1	-8.3	0	0
Stage 1	-8.5	0	0
Stage 1	-8.7	0	0
Stage 1	-8.9	0	0
Stage 1	-9.1	0	0
Stage 1	-9.3	0	0
Stage 1	-9.5	0	0
Stage 1	-9.7	0	0
Stage 1	-9.9	0	0
Stage 1	-10	0	0

### 7.1.5. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 2

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Tipo Risultato: Spostamento Muro: LEFT		
Stage	Z (m)	Spostamento (mm)
Stage 2	0	0.03
Stage 2	-0.2	0.05
Stage 2	-0.4	0.06
Stage 2	-0.5	0.07
Stage 2	-0.7	0.08
Stage 2	-0.9	0.09
Stage 2	-1.1	0.11
Stage 2	-1.3	0.12
Stage 2	-1.5	0.13
Stage 2	-1.7	0.14
Stage 2	-1.9	0.15
Stage 2	-2.1	0.16
Stage 2	-2.3	0.17
Stage 2	-2.5	0.18
Stage 2	-2.7	0.19
Stage 2	-2.9	0.19
Stage 2	-3.1	0.2
Stage 2	-3.3	0.21
Stage 2	-3.5	0.21
Stage 2	-3.7	0.21
Stage 2	-3.9	0.22
Stage 2	-4.1	0.22
Stage 2	-4.3	0.22
Stage 2	-4.5	0.23
Stage 2	-4.7	0.23
Stage 2	-4.9	0.23
Stage 2	-5.1	0.23
Stage 2	-5.3	0.23
Stage 2	-5.5	0.23
Stage 2	-5.7	0.24
Stage 2	-5.9	0.24
Stage 2	-6.1	0.24
Stage 2	-6.3	0.24
Stage 2	-6.5	0.24
Stage 2	-6.7	0.24
Stage 2	-6.9	0.24
Stage 2	-7.1	0.24
Stage 2	-7.3	0.24
Stage 2	-7.5	0.24
Stage 2	-7.7	0.24
Stage 2	-7.9	0.24
Stage 2	-8.1	0.24
Stage 2	-8.3	0.24
Stage 2	-8.5	0.24
Stage 2	-8.7	0.24
Stage 2	-8.9	0.24
Stage 2	-9.1	0.24
Stage 2	-9.3	0.24
Stage 2	-9.5	0.24
Stage 2	-9.7	0.24
Stage 2	-9.9	0.25
Stage 2	-10	0.25



**7.1.6. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - RIGHT Stage: Stage 2**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Tipo Risultato: Spostamento Muro: RIGHT		
Stage	Z (m)	Spostamento (mm)
Stage 2	0	-0.03
Stage 2	-0.2	-0.05
Stage 2	-0.4	-0.06
Stage 2	-0.5	-0.07
Stage 2	-0.7	-0.08
Stage 2	-0.9	-0.09
Stage 2	-1.1	-0.11
Stage 2	-1.3	-0.12
Stage 2	-1.5	-0.13
Stage 2	-1.7	-0.14
Stage 2	-1.9	-0.15
Stage 2	-2.1	-0.16
Stage 2	-2.3	-0.17
Stage 2	-2.5	-0.18
Stage 2	-2.7	-0.19
Stage 2	-2.9	-0.19
Stage 2	-3.1	-0.2
Stage 2	-3.3	-0.21
Stage 2	-3.5	-0.21
Stage 2	-3.7	-0.21
Stage 2	-3.9	-0.22
Stage 2	-4.1	-0.22
Stage 2	-4.3	-0.22
Stage 2	-4.5	-0.23
Stage 2	-4.7	-0.23
Stage 2	-4.9	-0.23
Stage 2	-5.1	-0.23
Stage 2	-5.3	-0.23
Stage 2	-5.5	-0.23
Stage 2	-5.7	-0.24
Stage 2	-5.9	-0.24
Stage 2	-6.1	-0.24
Stage 2	-6.3	-0.24
Stage 2	-6.5	-0.24
Stage 2	-6.7	-0.24
Stage 2	-6.9	-0.24
Stage 2	-7.1	-0.24
Stage 2	-7.3	-0.24
Stage 2	-7.5	-0.24
Stage 2	-7.7	-0.24
Stage 2	-7.9	-0.24
Stage 2	-8.1	-0.24
Stage 2	-8.3	-0.24
Stage 2	-8.5	-0.24
Stage 2	-8.7	-0.24
Stage 2	-8.9	-0.24
Stage 2	-9.1	-0.24
Stage 2	-9.3	-0.24
Stage 2	-9.5	-0.24
Stage 2	-9.7	-0.24
Stage 2	-9.9	-0.25
Stage 2	-10	-0.25

**7.1.7. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 2**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	0	0	0.03
Stage 2	-0.2	0.01	0.03
Stage 2	-0.4	0.06	0.27
Stage 2	-0.5	0.1	0.43
Stage 2	-0.7	0.22	0.57
Stage 2	-0.9	0.36	0.7
Stage 2	-1.1	0.5	0.7
Stage 2	-1.3	0.62	0.63
Stage 2	-1.5	0.73	0.52
Stage 2	-1.7	0.81	0.4
Stage 2	-1.9	0.86	0.27
Stage 2	-2.1	0.89	0.16
Stage 2	-2.3	0.9	0.05
Stage 2	-2.5	0.9	-0.04
Stage 2	-2.7	0.87	-0.11
Stage 2	-2.9	0.84	-0.17
Stage 2	-3.1	0.8	-0.22
Stage 2	-3.3	0.75	-0.25
Stage 2	-3.5	0.69	-0.27
Stage 2	-3.7	0.64	-0.27
Stage 2	-3.9	0.58	-0.3
Stage 2	-4.1	0.51	-0.32
Stage 2	-4.3	0.45	-0.31
Stage 2	-4.5	0.39	-0.29
Stage 2	-4.7	0.34	-0.27
Stage 2	-4.9	0.29	-0.25
Stage 2	-5.1	0.24	-0.22
Stage 2	-5.3	0.2	-0.2
Stage 2	-5.5	0.17	-0.18
Stage 2	-5.7	0.14	-0.15
Stage 2	-5.9	0.11	-0.13
Stage 2	-6.1	0.09	-0.11
Stage 2	-6.3	0.07	-0.1
Stage 2	-6.5	0.05	-0.08
Stage 2	-6.7	0.04	-0.06
Stage 2	-6.9	0.03	-0.05
Stage 2	-7.1	0.02	-0.04
Stage 2	-7.3	0.02	-0.03
Stage 2	-7.5	0.01	-0.02
Stage 2	-7.7	0.01	-0.02
Stage 2	-7.9	0	-0.01
Stage 2	-8.1	0	-0.01
Stage 2	-8.3	0	-0.01
Stage 2	-8.5	0	0
Stage 2	-8.7	0	0
Stage 2	-8.9	0	0
Stage 2	-9.1	0	0
Stage 2	-9.3	0	0
Stage 2	-9.5	0	0
Stage 2	-9.7	0	0
Stage 2	-9.9	0	0
Stage 2	-9.9	0	0
Stage 2	-10	0	0

**7.1.8. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Right wall - Stage: Stage 2**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	0	0	-0.03
Stage 2	-0.2	-0.01	-0.03
Stage 2	-0.4	-0.06	-0.27
Stage 2	-0.5	-0.1	-0.43
Stage 2	-0.7	-0.22	-0.57
Stage 2	-0.9	-0.36	-0.7
Stage 2	-1.1	-0.5	-0.7
Stage 2	-1.3	-0.62	-0.63
Stage 2	-1.5	-0.73	-0.52
Stage 2	-1.7	-0.81	-0.4
Stage 2	-1.9	-0.86	-0.27
Stage 2	-2.1	-0.89	-0.16
Stage 2	-2.3	-0.9	-0.05
Stage 2	-2.5	-0.9	0.04
Stage 2	-2.7	-0.87	0.11
Stage 2	-2.9	-0.84	0.17
Stage 2	-3.1	-0.8	0.22
Stage 2	-3.3	-0.75	0.25
Stage 2	-3.5	-0.69	0.27
Stage 2	-3.7	-0.64	0.27
Stage 2	-3.9	-0.58	0.3
Stage 2	-4.1	-0.51	0.32
Stage 2	-4.3	-0.45	0.31
Stage 2	-4.5	-0.39	0.29
Stage 2	-4.7	-0.34	0.27
Stage 2	-4.9	-0.29	0.25
Stage 2	-5.1	-0.24	0.22
Stage 2	-5.3	-0.2	0.2
Stage 2	-5.5	-0.17	0.18
Stage 2	-5.7	-0.14	0.15
Stage 2	-5.9	-0.11	0.13
Stage 2	-6.1	-0.09	0.11
Stage 2	-6.3	-0.07	0.1
Stage 2	-6.5	-0.05	0.08
Stage 2	-6.7	-0.04	0.06
Stage 2	-6.9	-0.03	0.05
Stage 2	-7.1	-0.02	0.04
Stage 2	-7.3	-0.02	0.03
Stage 2	-7.5	-0.01	0.02
Stage 2	-7.7	-0.01	0.02
Stage 2	-7.9	0	0.01
Stage 2	-8.1	0	0.01
Stage 2	-8.3	0	0.01
Stage 2	-8.5	0	0
Stage 2	-8.7	0	0
Stage 2	-8.9	0	0
Stage 2	-9.1	0	0
Stage 2	-9.3	0	0
Stage 2	-9.5	0	0
Stage 2	-9.7	0	0
Stage 2	-9.9	0	0
Stage 2	-9.9	0	0
Stage 2	-10	0	0

**7.1.9. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 3**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Tipo Risultato: Spostamento Muro: LEFT		
Stage	Z (m)	Spostamento (mm)
Stage 3	0	0.42
Stage 3	-0.2	0.42
Stage 3	-0.4	0.41
Stage 3	-0.5	0.41
Stage 3	-0.7	0.4
Stage 3	-0.9	0.4
Stage 3	-1.1	0.39
Stage 3	-1.3	0.39
Stage 3	-1.5	0.38
Stage 3	-1.7	0.38
Stage 3	-1.9	0.38
Stage 3	-2.1	0.37
Stage 3	-2.3	0.37
Stage 3	-2.5	0.37
Stage 3	-2.7	0.37
Stage 3	-2.9	0.37
Stage 3	-3.1	0.37
Stage 3	-3.3	0.37
Stage 3	-3.5	0.37
Stage 3	-3.7	0.37
Stage 3	-3.9	0.38
Stage 3	-4.1	0.38
Stage 3	-4.3	0.38
Stage 3	-4.5	0.38
Stage 3	-4.7	0.38
Stage 3	-4.9	0.38
Stage 3	-5.1	0.39
Stage 3	-5.3	0.39
Stage 3	-5.5	0.39
Stage 3	-5.7	0.39
Stage 3	-5.9	0.39
Stage 3	-6.1	0.39
Stage 3	-6.3	0.39
Stage 3	-6.5	0.39
Stage 3	-6.7	0.39
Stage 3	-6.9	0.4
Stage 3	-7.1	0.4
Stage 3	-7.3	0.4
Stage 3	-7.5	0.4
Stage 3	-7.7	0.4
Stage 3	-7.9	0.4
Stage 3	-8.1	0.4
Stage 3	-8.3	0.4
Stage 3	-8.5	0.4
Stage 3	-8.7	0.4
Stage 3	-8.9	0.4
Stage 3	-9.1	0.4
Stage 3	-9.3	0.4
Stage 3	-9.5	0.4
Stage 3	-9.7	0.4
Stage 3	-9.9	0.4
Stage 3	-10	0.4

**7.1.10. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - RIGHT Stage: Stage 3**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Tipo Risultato: Spostamento Muro: RIGHT		
Stage	Z (m)	Spostamento (mm)
Stage 3	0	-0.42
Stage 3	-0.2	-0.42
Stage 3	-0.4	-0.41
Stage 3	-0.5	-0.41
Stage 3	-0.7	-0.4
Stage 3	-0.9	-0.4
Stage 3	-1.1	-0.39
Stage 3	-1.3	-0.39
Stage 3	-1.5	-0.38
Stage 3	-1.7	-0.38
Stage 3	-1.9	-0.38
Stage 3	-2.1	-0.37
Stage 3	-2.3	-0.37
Stage 3	-2.5	-0.37
Stage 3	-2.7	-0.37
Stage 3	-2.9	-0.37
Stage 3	-3.1	-0.37
Stage 3	-3.3	-0.37
Stage 3	-3.5	-0.37
Stage 3	-3.7	-0.37
Stage 3	-3.9	-0.38
Stage 3	-4.1	-0.38
Stage 3	-4.3	-0.38
Stage 3	-4.5	-0.38
Stage 3	-4.7	-0.38
Stage 3	-4.9	-0.38
Stage 3	-5.1	-0.39
Stage 3	-5.3	-0.39
Stage 3	-5.5	-0.39
Stage 3	-5.7	-0.39
Stage 3	-5.9	-0.39
Stage 3	-6.1	-0.39
Stage 3	-6.3	-0.39
Stage 3	-6.5	-0.39
Stage 3	-6.7	-0.39
Stage 3	-6.9	-0.4
Stage 3	-7.1	-0.4
Stage 3	-7.3	-0.4
Stage 3	-7.5	-0.4
Stage 3	-7.7	-0.4
Stage 3	-7.9	-0.4
Stage 3	-8.1	-0.4
Stage 3	-8.3	-0.4
Stage 3	-8.5	-0.4
Stage 3	-8.7	-0.4
Stage 3	-8.9	-0.4
Stage 3	-9.1	-0.4
Stage 3	-9.3	-0.4
Stage 3	-9.5	-0.4
Stage 3	-9.7	-0.4
Stage 3	-9.9	-0.4
Stage 3	-10	-0.4

**7.1.11. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 3**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	0	0	0
Stage 3	-0.2	0	0
Stage 3	-0.2	0	0
Stage 3	-0.4	0	0
Stage 3	-0.4	0	0
Stage 3	-0.5	0	0
Stage 3	-0.5	0	0
Stage 3	-0.7	-0.01	-0.04
Stage 3	-0.9	-0.1	-0.43
Stage 3	-1.1	-0.35	-1.29
Stage 3	-1.3	-0.55	-0.99
Stage 3	-1.5	-0.68	-0.66
Stage 3	-1.7	-0.76	-0.37
Stage 3	-1.9	-0.78	-0.13
Stage 3	-2.1	-0.77	0.06
Stage 3	-2.3	-0.73	0.2
Stage 3	-2.5	-0.67	0.3
Stage 3	-2.7	-0.6	0.37
Stage 3	-2.9	-0.52	0.41
Stage 3	-3.1	-0.43	0.42
Stage 3	-3.3	-0.35	0.42
Stage 3	-3.5	-0.27	0.4
Stage 3	-3.7	-0.19	0.38
Stage 3	-3.9	-0.13	0.32
Stage 3	-4.1	-0.08	0.26
Stage 3	-4.3	-0.03	0.22
Stage 3	-4.5	0	0.19
Stage 3	-4.7	0.03	0.15
Stage 3	-4.9	0.06	0.12
Stage 3	-5.1	0.08	0.09
Stage 3	-5.3	0.09	0.06
Stage 3	-5.5	0.1	0.04
Stage 3	-5.7	0.1	0.02
Stage 3	-5.9	0.1	0.01
Stage 3	-6.1	0.1	-0.01
Stage 3	-6.3	0.1	-0.02
Stage 3	-6.5	0.09	-0.03
Stage 3	-6.7	0.09	-0.03
Stage 3	-6.9	0.08	-0.04
Stage 3	-7.1	0.07	-0.04
Stage 3	-7.3	0.06	-0.04
Stage 3	-7.5	0.06	-0.04
Stage 3	-7.7	0.05	-0.04
Stage 3	-7.9	0.04	-0.04
Stage 3	-8.1	0.04	-0.03
Stage 3	-8.3	0.03	-0.03
Stage 3	-8.5	0.02	-0.03
Stage 3	-8.7	0.02	-0.03
Stage 3	-8.9	0.01	-0.02
Stage 3	-9.1	0.01	-0.02
Stage 3	-9.3	0.01	-0.02
Stage 3	-9.5	0	-0.01
Stage 3	-9.7	0	-0.01
Stage 3	-9.9	0	0
Stage 3	-10	0	0

**7.1.12. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Right wall - Stage: Stage 3**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	0	0	0
Stage 3	-0.2	0	0
Stage 3	-0.2	0	0
Stage 3	-0.4	0	0
Stage 3	-0.4	0	0
Stage 3	-0.5	0	0
Stage 3	-0.5	0	0
Stage 3	-0.7	0.01	0.04
Stage 3	-0.9	0.1	0.43
Stage 3	-1.1	0.35	1.29
Stage 3	-1.3	0.55	0.99
Stage 3	-1.5	0.68	0.66
Stage 3	-1.7	0.76	0.37
Stage 3	-1.9	0.78	0.13
Stage 3	-2.1	0.77	-0.06
Stage 3	-2.3	0.73	-0.2
Stage 3	-2.5	0.67	-0.3
Stage 3	-2.7	0.6	-0.37
Stage 3	-2.9	0.52	-0.41
Stage 3	-3.1	0.43	-0.42
Stage 3	-3.3	0.35	-0.42
Stage 3	-3.5	0.27	-0.4
Stage 3	-3.7	0.19	-0.38
Stage 3	-3.9	0.13	-0.32
Stage 3	-4.1	0.08	-0.26
Stage 3	-4.3	0.03	-0.22
Stage 3	-4.5	0	-0.19
Stage 3	-4.7	-0.03	-0.15
Stage 3	-4.9	-0.06	-0.12
Stage 3	-5.1	-0.08	-0.09
Stage 3	-5.3	-0.09	-0.06
Stage 3	-5.5	-0.1	-0.04
Stage 3	-5.7	-0.1	-0.02
Stage 3	-5.9	-0.1	-0.01
Stage 3	-6.1	-0.1	0.01
Stage 3	-6.3	-0.1	0.02
Stage 3	-6.5	-0.09	0.03
Stage 3	-6.7	-0.09	0.03
Stage 3	-6.9	-0.08	0.04
Stage 3	-7.1	-0.07	0.04
Stage 3	-7.3	-0.06	0.04
Stage 3	-7.5	-0.06	0.04
Stage 3	-7.7	-0.05	0.04
Stage 3	-7.9	-0.04	0.04
Stage 3	-8.1	-0.04	0.03
Stage 3	-8.3	-0.03	0.03
Stage 3	-8.5	-0.02	0.03
Stage 3	-8.7	-0.02	0.03
Stage 3	-8.9	-0.01	0.02
Stage 3	-9.1	-0.01	0.02
Stage 3	-9.3	-0.01	0.02
Stage 3	-9.5	0	0.01
Stage 3	-9.7	0	0.01
Stage 3	-9.9	0	0
Stage 3	-10	0	0

### 7.1.13. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 4

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Tipo Risultato: Spostamento Muro: LEFT		
Stage	Z (m)	Spostamento (mm)
Stage 4	0	0.42
Stage 4	-0.2	0.42
Stage 4	-0.4	0.41
Stage 4	-0.5	0.41
Stage 4	-0.7	0.4
Stage 4	-0.9	0.4
Stage 4	-1.1	0.39
Stage 4	-1.3	0.39
Stage 4	-1.5	0.38
Stage 4	-1.7	0.38
Stage 4	-1.9	0.38
Stage 4	-2.1	0.37
Stage 4	-2.3	0.37
Stage 4	-2.5	0.37
Stage 4	-2.7	0.37
Stage 4	-2.9	0.37
Stage 4	-3.1	0.37
Stage 4	-3.3	0.37
Stage 4	-3.5	0.37
Stage 4	-3.7	0.37
Stage 4	-3.9	0.38
Stage 4	-4.1	0.38
Stage 4	-4.3	0.38
Stage 4	-4.5	0.38
Stage 4	-4.7	0.38
Stage 4	-4.9	0.38
Stage 4	-5.1	0.39
Stage 4	-5.3	0.39
Stage 4	-5.5	0.39
Stage 4	-5.7	0.39
Stage 4	-5.9	0.39
Stage 4	-6.1	0.39
Stage 4	-6.3	0.39
Stage 4	-6.5	0.39
Stage 4	-6.7	0.39
Stage 4	-6.9	0.4
Stage 4	-7.1	0.4
Stage 4	-7.3	0.4
Stage 4	-7.5	0.4
Stage 4	-7.7	0.4
Stage 4	-7.9	0.4
Stage 4	-8.1	0.4
Stage 4	-8.3	0.4
Stage 4	-8.5	0.4
Stage 4	-8.7	0.4
Stage 4	-8.9	0.4
Stage 4	-9.1	0.4
Stage 4	-9.3	0.4
Stage 4	-9.5	0.4
Stage 4	-9.7	0.4
Stage 4	-9.9	0.4
Stage 4	-10	0.4



**7.1.14. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - RIGHT Stage: Stage 4**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Tipo Risultato: Spostamento Muro: RIGHT		
Stage	Z (m)	Spostamento (mm)
Stage 4	0	-0.42
Stage 4	-0.2	-0.42
Stage 4	-0.4	-0.41
Stage 4	-0.5	-0.41
Stage 4	-0.7	-0.4
Stage 4	-0.9	-0.4
Stage 4	-1.1	-0.39
Stage 4	-1.3	-0.39
Stage 4	-1.5	-0.38
Stage 4	-1.7	-0.38
Stage 4	-1.9	-0.38
Stage 4	-2.1	-0.37
Stage 4	-2.3	-0.37
Stage 4	-2.5	-0.37
Stage 4	-2.7	-0.37
Stage 4	-2.9	-0.37
Stage 4	-3.1	-0.37
Stage 4	-3.3	-0.37
Stage 4	-3.5	-0.37
Stage 4	-3.7	-0.37
Stage 4	-3.9	-0.38
Stage 4	-4.1	-0.38
Stage 4	-4.3	-0.38
Stage 4	-4.5	-0.38
Stage 4	-4.7	-0.38
Stage 4	-4.9	-0.38
Stage 4	-5.1	-0.39
Stage 4	-5.3	-0.39
Stage 4	-5.5	-0.39
Stage 4	-5.7	-0.39
Stage 4	-5.9	-0.39
Stage 4	-6.1	-0.39
Stage 4	-6.3	-0.39
Stage 4	-6.5	-0.39
Stage 4	-6.7	-0.39
Stage 4	-6.9	-0.4
Stage 4	-7.1	-0.4
Stage 4	-7.3	-0.4
Stage 4	-7.5	-0.4
Stage 4	-7.7	-0.4
Stage 4	-7.9	-0.4
Stage 4	-8.1	-0.4
Stage 4	-8.3	-0.4
Stage 4	-8.5	-0.4
Stage 4	-8.7	-0.4
Stage 4	-8.9	-0.4
Stage 4	-9.1	-0.4
Stage 4	-9.3	-0.4
Stage 4	-9.5	-0.4
Stage 4	-9.7	-0.4
Stage 4	-9.9	-0.4
Stage 4	-10	-0.4

**7.1.15. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 4**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 4	0	0	0
Stage 4	-0.2	0	0
Stage 4	-0.2	0	0
Stage 4	-0.4	0	0
Stage 4	-0.4	0	0
Stage 4	-0.5	0	0
Stage 4	-0.5	0	0
Stage 4	-0.7	-0.01	-0.04
Stage 4	-0.9	-0.1	-0.43
Stage 4	-1.1	-0.35	-1.29
Stage 4	-1.3	-0.55	-0.99
Stage 4	-1.5	-0.68	-0.66
Stage 4	-1.7	-0.76	-0.37
Stage 4	-1.9	-0.78	-0.13
Stage 4	-2.1	-0.77	0.06
Stage 4	-2.3	-0.73	0.2
Stage 4	-2.5	-0.67	0.3
Stage 4	-2.7	-0.6	0.37
Stage 4	-2.9	-0.52	0.41
Stage 4	-3.1	-0.43	0.42
Stage 4	-3.3	-0.35	0.42
Stage 4	-3.5	-0.27	0.4
Stage 4	-3.7	-0.19	0.38
Stage 4	-3.9	-0.13	0.32
Stage 4	-4.1	-0.08	0.26
Stage 4	-4.3	-0.03	0.22
Stage 4	-4.5	0	0.19
Stage 4	-4.7	0.03	0.15
Stage 4	-4.9	0.06	0.12
Stage 4	-5.1	0.08	0.09
Stage 4	-5.3	0.09	0.06
Stage 4	-5.5	0.1	0.04
Stage 4	-5.7	0.1	0.02
Stage 4	-5.9	0.1	0.01
Stage 4	-6.1	0.1	-0.01
Stage 4	-6.3	0.1	-0.02
Stage 4	-6.5	0.09	-0.03
Stage 4	-6.7	0.09	-0.03
Stage 4	-6.9	0.08	-0.04
Stage 4	-7.1	0.07	-0.04
Stage 4	-7.3	0.06	-0.04
Stage 4	-7.5	0.06	-0.04
Stage 4	-7.7	0.05	-0.04
Stage 4	-7.9	0.04	-0.04
Stage 4	-8.1	0.04	-0.03
Stage 4	-8.3	0.03	-0.03
Stage 4	-8.5	0.02	-0.03
Stage 4	-8.7	0.02	-0.03
Stage 4	-8.9	0.01	-0.02
Stage 4	-9.1	0.01	-0.02
Stage 4	-9.3	0.01	-0.02
Stage 4	-9.5	0	-0.01
Stage 4	-9.7	0	-0.01
Stage 4	-9.9	0	0
Stage 4	-10	0	0

**7.1.16. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Right wall - Stage: Stage 4**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 4	0	0	0
Stage 4	-0.2	0	0
Stage 4	-0.2	0	0
Stage 4	-0.4	0	0
Stage 4	-0.4	0	0
Stage 4	-0.5	0	0
Stage 4	-0.5	0	0
Stage 4	-0.7	0.01	0.04
Stage 4	-0.9	0.1	0.43
Stage 4	-1.1	0.35	1.29
Stage 4	-1.3	0.55	0.99
Stage 4	-1.5	0.68	0.66
Stage 4	-1.7	0.76	0.37
Stage 4	-1.9	0.78	0.13
Stage 4	-2.1	0.77	-0.06
Stage 4	-2.3	0.73	-0.2
Stage 4	-2.5	0.67	-0.3
Stage 4	-2.7	0.6	-0.37
Stage 4	-2.9	0.52	-0.41
Stage 4	-3.1	0.43	-0.42
Stage 4	-3.3	0.35	-0.42
Stage 4	-3.5	0.27	-0.4
Stage 4	-3.7	0.19	-0.38
Stage 4	-3.9	0.13	-0.32
Stage 4	-4.1	0.08	-0.26
Stage 4	-4.3	0.03	-0.22
Stage 4	-4.5	0	-0.19
Stage 4	-4.7	-0.03	-0.15
Stage 4	-4.9	-0.06	-0.12
Stage 4	-5.1	-0.08	-0.09
Stage 4	-5.3	-0.09	-0.06
Stage 4	-5.5	-0.1	-0.04
Stage 4	-5.7	-0.1	-0.02
Stage 4	-5.9	-0.1	-0.01
Stage 4	-6.1	-0.1	0.01
Stage 4	-6.3	-0.1	0.02
Stage 4	-6.5	-0.09	0.03
Stage 4	-6.7	-0.09	0.03
Stage 4	-6.9	-0.08	0.04
Stage 4	-7.1	-0.07	0.04
Stage 4	-7.3	-0.06	0.04
Stage 4	-7.5	-0.06	0.04
Stage 4	-7.7	-0.05	0.04
Stage 4	-7.9	-0.04	0.04
Stage 4	-8.1	-0.04	0.03
Stage 4	-8.3	-0.03	0.03
Stage 4	-8.5	-0.02	0.03
Stage 4	-8.7	-0.02	0.03
Stage 4	-8.9	-0.01	0.02
Stage 4	-9.1	-0.01	0.02
Stage 4	-9.3	-0.01	0.02
Stage 4	-9.5	0	0.01
Stage 4	-9.7	0	0.01
Stage 4	-9.9	0	0
Stage 4	-10	0	0

**7.1.17. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 5**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Tipo Risultato: Spostamento			Muro: LEFT
Stage	Z (m)	Spostamento (mm)	
Stage 5	0	0.04	
Stage 5	-0.2	0.22	
Stage 5	-0.4	0.4	
Stage 5	-0.5	0.49	
Stage 5	-0.7	0.66	
Stage 5	-0.9	0.84	
Stage 5	-1.1	1.01	
Stage 5	-1.3	1.18	
Stage 5	-1.5	1.33	
Stage 5	-1.7	1.47	
Stage 5	-1.9	1.6	
Stage 5	-2.1	1.72	
Stage 5	-2.3	1.82	
Stage 5	-2.5	1.9	
Stage 5	-2.7	1.96	
Stage 5	-2.9	2.01	
Stage 5	-3.1	2.04	
Stage 5	-3.3	2.06	
Stage 5	-3.5	2.07	
Stage 5	-3.7	2.07	
Stage 5	-3.9	2.06	
Stage 5	-4.1	2.04	
Stage 5	-4.3	2.02	
Stage 5	-4.5	1.99	
Stage 5	-4.7	1.96	
Stage 5	-4.9	1.92	
Stage 5	-5.1	1.89	
Stage 5	-5.3	1.85	
Stage 5	-5.5	1.82	
Stage 5	-5.7	1.78	
Stage 5	-5.9	1.75	
Stage 5	-6.1	1.71	
Stage 5	-6.3	1.68	
Stage 5	-6.5	1.65	
Stage 5	-6.7	1.62	
Stage 5	-6.9	1.59	
Stage 5	-7.1	1.57	
Stage 5	-7.3	1.55	
Stage 5	-7.5	1.52	
Stage 5	-7.7	1.5	
Stage 5	-7.9	1.48	
Stage 5	-8.1	1.47	
Stage 5	-8.3	1.45	
Stage 5	-8.5	1.43	
Stage 5	-8.7	1.42	
Stage 5	-8.9	1.4	
Stage 5	-9.1	1.39	
Stage 5	-9.3	1.38	
Stage 5	-9.5	1.36	
Stage 5	-9.7	1.35	
Stage 5	-9.9	1.34	
Stage 5	-10	1.33	

**7.1.18. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - RIGHT Stage: Stage 5**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Tipo Risultato: Spostamento Muro: RIGHT		
Stage	Z (m)	Spostamento (mm)
Stage 5	0	-0.04
Stage 5	-0.2	-0.22
Stage 5	-0.4	-0.4
Stage 5	-0.5	-0.49
Stage 5	-0.7	-0.66
Stage 5	-0.9	-0.84
Stage 5	-1.1	-1.01
Stage 5	-1.3	-1.18
Stage 5	-1.5	-1.33
Stage 5	-1.7	-1.47
Stage 5	-1.9	-1.6
Stage 5	-2.1	-1.72
Stage 5	-2.3	-1.82
Stage 5	-2.5	-1.9
Stage 5	-2.7	-1.96
Stage 5	-2.9	-2.01
Stage 5	-3.1	-2.04
Stage 5	-3.3	-2.06
Stage 5	-3.5	-2.07
Stage 5	-3.7	-2.07
Stage 5	-3.9	-2.06
Stage 5	-4.1	-2.04
Stage 5	-4.3	-2.02
Stage 5	-4.5	-1.99
Stage 5	-4.7	-1.96
Stage 5	-4.9	-1.92
Stage 5	-5.1	-1.89
Stage 5	-5.3	-1.85
Stage 5	-5.5	-1.82
Stage 5	-5.7	-1.78
Stage 5	-5.9	-1.75
Stage 5	-6.1	-1.71
Stage 5	-6.3	-1.68
Stage 5	-6.5	-1.65
Stage 5	-6.7	-1.62
Stage 5	-6.9	-1.59
Stage 5	-7.1	-1.57
Stage 5	-7.3	-1.55
Stage 5	-7.5	-1.52
Stage 5	-7.7	-1.5
Stage 5	-7.9	-1.48
Stage 5	-8.1	-1.47
Stage 5	-8.3	-1.45
Stage 5	-8.5	-1.43
Stage 5	-8.7	-1.42
Stage 5	-8.9	-1.4
Stage 5	-9.1	-1.39
Stage 5	-9.3	-1.38
Stage 5	-9.5	-1.36
Stage 5	-9.7	-1.35
Stage 5	-9.9	-1.34
Stage 5	-10	-1.33

**7.1.19. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 5**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 5	0	0	-0.16
Stage 5	-0.2	-0.03	-0.16
Stage 5	-0.4	-0.12	-0.42
Stage 5	-0.5	-0.16	-0.44
Stage 5	-0.7	2.96	15.58
Stage 5	-0.9	5.99	15.19
Stage 5	-1.1	8.88	14.43
Stage 5	-1.3	11.55	13.33
Stage 5	-1.5	13.93	11.92
Stage 5	-1.7	15.97	10.2
Stage 5	-1.9	17.61	8.19
Stage 5	-2.1	18.79	5.9
Stage 5	-2.3	19.46	3.34
Stage 5	-2.5	19.56	0.49
Stage 5	-2.7	19.03	-2.62
Stage 5	-2.9	17.83	-6
Stage 5	-3.1	15.9	-9.64
Stage 5	-3.3	13.9	-10.02
Stage 5	-3.5	11.93	-9.85
Stage 5	-3.7	10.05	-9.41
Stage 5	-3.9	8.28	-8.83
Stage 5	-4.1	6.65	-8.16
Stage 5	-4.3	5.17	-7.41
Stage 5	-4.5	3.84	-6.63
Stage 5	-4.7	2.67	-5.86
Stage 5	-4.9	1.65	-5.1
Stage 5	-5.1	0.78	-4.37
Stage 5	-5.3	0.04	-3.68
Stage 5	-5.5	-0.56	-3.03
Stage 5	-5.7	-1.05	-2.44
Stage 5	-5.9	-1.43	-1.89
Stage 5	-6.1	-1.71	-1.4
Stage 5	-6.3	-1.9	-0.96
Stage 5	-6.5	-2.02	-0.58
Stage 5	-6.7	-2.07	-0.24
Stage 5	-6.9	-2.06	0.05
Stage 5	-7.1	-2	0.29
Stage 5	-7.3	-1.9	0.49
Stage 5	-7.5	-1.77	0.65
Stage 5	-7.7	-1.61	0.78
Stage 5	-7.9	-1.44	0.87
Stage 5	-8.1	-1.26	0.92
Stage 5	-8.3	-1.07	0.95
Stage 5	-8.5	-0.88	0.95
Stage 5	-8.7	-0.69	0.92
Stage 5	-8.9	-0.52	0.86
Stage 5	-9.1	-0.37	0.78
Stage 5	-9.3	-0.23	0.67
Stage 5	-9.5	-0.12	0.54
Stage 5	-9.7	-0.05	0.39
Stage 5	-9.9	-0.01	0.21
Stage 5	-10	0	0.05

**7.1.20. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Right wall - Stage: Stage 5**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 5	0	0	0.16
Stage 5	-0.2	0.03	0.16
Stage 5	-0.4	0.12	0.42
Stage 5	-0.5	0.16	0.44
Stage 5	-0.7	-2.96	-15.58
Stage 5	-0.9	-5.99	-15.19
Stage 5	-1.1	-8.88	-14.43
Stage 5	-1.3	-11.55	-13.33
Stage 5	-1.5	-13.93	-11.92
Stage 5	-1.7	-15.97	-10.2
Stage 5	-1.9	-17.61	-8.19
Stage 5	-2.1	-18.79	-5.9
Stage 5	-2.3	-19.46	-3.34
Stage 5	-2.5	-19.56	-0.49
Stage 5	-2.7	-19.03	2.62
Stage 5	-2.9	-17.83	6
Stage 5	-3.1	-15.9	9.64
Stage 5	-3.3	-13.9	10.02
Stage 5	-3.5	-11.93	9.85
Stage 5	-3.7	-10.05	9.41
Stage 5	-3.9	-8.28	8.83
Stage 5	-4.1	-6.65	8.16
Stage 5	-4.3	-5.17	7.41
Stage 5	-4.5	-3.84	6.63
Stage 5	-4.7	-2.67	5.86
Stage 5	-4.9	-1.65	5.1
Stage 5	-5.1	-0.78	4.37
Stage 5	-5.3	-0.04	3.68
Stage 5	-5.5	0.56	3.03
Stage 5	-5.7	1.05	2.44
Stage 5	-5.9	1.43	1.89
Stage 5	-6.1	1.71	1.4
Stage 5	-6.3	1.9	0.96
Stage 5	-6.5	2.02	0.58
Stage 5	-6.7	2.07	0.24
Stage 5	-6.9	2.06	-0.05
Stage 5	-7.1	2	-0.29
Stage 5	-7.3	1.9	-0.49
Stage 5	-7.5	1.77	-0.65
Stage 5	-7.7	1.61	-0.78
Stage 5	-7.9	1.44	-0.87
Stage 5	-8.1	1.26	-0.92
Stage 5	-8.3	1.07	-0.95
Stage 5	-8.5	0.88	-0.95
Stage 5	-8.7	0.69	-0.92
Stage 5	-8.9	0.52	-0.86
Stage 5	-9.1	0.37	-0.78
Stage 5	-9.3	0.23	-0.67
Stage 5	-9.5	0.12	-0.54
Stage 5	-9.7	0.05	-0.39
Stage 5	-9.9	0.01	-0.21
Stage 5	-10	0	-0.05

**7.1.21. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage: Stage 6**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Tipo Risultato: Spostamento			Muro: LEFT
Stage	Z (m)	Spostamento (mm)	
Stage 6	0	-0.46	
Stage 6	-0.2	-0.06	
Stage 6	-0.4	0.33	
Stage 6	-0.5	0.53	
Stage 6	-0.7	0.93	
Stage 6	-0.9	1.32	
Stage 6	-1.1	1.7	
Stage 6	-1.3	2.08	
Stage 6	-1.5	2.43	
Stage 6	-1.7	2.77	
Stage 6	-1.9	3.08	
Stage 6	-2.1	3.36	
Stage 6	-2.3	3.62	
Stage 6	-2.5	3.85	
Stage 6	-2.7	4.04	
Stage 6	-2.9	4.2	
Stage 6	-3.1	4.32	
Stage 6	-3.3	4.41	
Stage 6	-3.5	4.46	
Stage 6	-3.7	4.49	
Stage 6	-3.9	4.48	
Stage 6	-4.1	4.44	
Stage 6	-4.3	4.38	
Stage 6	-4.5	4.3	
Stage 6	-4.7	4.21	
Stage 6	-4.9	4.1	
Stage 6	-5.1	3.99	
Stage 6	-5.3	3.86	
Stage 6	-5.5	3.74	
Stage 6	-5.7	3.61	
Stage 6	-5.9	3.49	
Stage 6	-6.1	3.36	
Stage 6	-6.3	3.24	
Stage 6	-6.5	3.13	
Stage 6	-6.7	3.01	
Stage 6	-6.9	2.91	
Stage 6	-7.1	2.81	
Stage 6	-7.3	2.71	
Stage 6	-7.5	2.62	
Stage 6	-7.7	2.53	
Stage 6	-7.9	2.45	
Stage 6	-8.1	2.38	
Stage 6	-8.3	2.3	
Stage 6	-8.5	2.23	
Stage 6	-8.7	2.16	
Stage 6	-8.9	2.1	
Stage 6	-9.1	2.03	
Stage 6	-9.3	1.97	
Stage 6	-9.5	1.91	
Stage 6	-9.7	1.85	
Stage 6	-9.9	1.78	
Stage 6	-10	1.75	



**7.1.22. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - RIGHT Stage: Stage 6**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Tipo Risultato: Spostamento Muro: RIGHT		
Stage	Z (m)	Spostamento (mm)
Stage 6	0	0.46
Stage 6	-0.2	0.06
Stage 6	-0.4	-0.33
Stage 6	-0.5	-0.53
Stage 6	-0.7	-0.93
Stage 6	-0.9	-1.32
Stage 6	-1.1	-1.7
Stage 6	-1.3	-2.08
Stage 6	-1.5	-2.43
Stage 6	-1.7	-2.77
Stage 6	-1.9	-3.08
Stage 6	-2.1	-3.36
Stage 6	-2.3	-3.62
Stage 6	-2.5	-3.85
Stage 6	-2.7	-4.04
Stage 6	-2.9	-4.2
Stage 6	-3.1	-4.32
Stage 6	-3.3	-4.41
Stage 6	-3.5	-4.46
Stage 6	-3.7	-4.49
Stage 6	-3.9	-4.48
Stage 6	-4.1	-4.44
Stage 6	-4.3	-4.38
Stage 6	-4.5	-4.3
Stage 6	-4.7	-4.21
Stage 6	-4.9	-4.1
Stage 6	-5.1	-3.99
Stage 6	-5.3	-3.86
Stage 6	-5.5	-3.74
Stage 6	-5.7	-3.61
Stage 6	-5.9	-3.49
Stage 6	-6.1	-3.36
Stage 6	-6.3	-3.24
Stage 6	-6.5	-3.13
Stage 6	-6.7	-3.01
Stage 6	-6.9	-2.91
Stage 6	-7.1	-2.81
Stage 6	-7.3	-2.71
Stage 6	-7.5	-2.62
Stage 6	-7.7	-2.53
Stage 6	-7.9	-2.45
Stage 6	-8.1	-2.38
Stage 6	-8.3	-2.3
Stage 6	-8.5	-2.23
Stage 6	-8.7	-2.16
Stage 6	-8.9	-2.1
Stage 6	-9.1	-2.03
Stage 6	-9.3	-1.97
Stage 6	-9.5	-1.91
Stage 6	-9.7	-1.85
Stage 6	-9.9	-1.78
Stage 6	-10	-1.75

**7.1.23. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 6**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 6	0	0	-0.31
Stage 6	-0.2	-0.06	-0.31
Stage 6	-0.4	-0.22	-0.81
Stage 6	-0.5	-0.31	-0.87
Stage 6	-0.7	4.72	25.16
Stage 6	-0.9	9.67	24.77
Stage 6	-1.1	14.48	24.01
Stage 6	-1.3	19.06	22.91
Stage 6	-1.5	23.36	21.49
Stage 6	-1.7	27.31	19.78
Stage 6	-1.9	30.87	17.77
Stage 6	-2.1	33.96	15.48
Stage 6	-2.3	36.54	12.91
Stage 6	-2.5	38.56	10.07
Stage 6	-2.7	39.95	6.96
Stage 6	-2.9	40.67	3.58
Stage 6	-3.1	40.65	-0.06
Stage 6	-3.3	39.86	-3.97
Stage 6	-3.5	38.23	-8.14
Stage 6	-3.7	35.72	-12.57
Stage 6	-3.9	32.26	-17.28
Stage 6	-4.1	27.81	-22.25
Stage 6	-4.3	23.05	-23.81
Stage 6	-4.5	18.47	-22.9
Stage 6	-4.7	14.2	-21.34
Stage 6	-4.9	10.31	-19.45
Stage 6	-5.1	6.85	-17.31
Stage 6	-5.3	3.86	-14.96
Stage 6	-5.5	1.32	-12.68
Stage 6	-5.7	-0.78	-10.53
Stage 6	-5.9	-2.49	-8.53
Stage 6	-6.1	-3.83	-6.7
Stage 6	-6.3	-4.84	-5.04
Stage 6	-6.5	-5.55	-3.55
Stage 6	-6.7	-5.99	-2.22
Stage 6	-6.9	-6.21	-1.06
Stage 6	-7.1	-6.22	-0.06
Stage 6	-7.3	-6.06	0.8
Stage 6	-7.5	-5.76	1.5
Stage 6	-7.7	-5.34	2.07
Stage 6	-7.9	-4.84	2.51
Stage 6	-8.1	-4.27	2.83
Stage 6	-8.3	-3.67	3.02
Stage 6	-8.5	-3.05	3.1
Stage 6	-8.7	-2.43	3.07
Stage 6	-8.9	-1.85	2.94
Stage 6	-9.1	-1.31	2.7
Stage 6	-9.3	-0.83	2.37
Stage 6	-9.5	-0.45	1.93
Stage 6	-9.7	-0.17	1.39
Stage 6	-9.9	-0.02	0.75
Stage 6	-10	0	0.2

**7.1.24. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Right wall - Stage: Stage 6**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 6	0	0	0.31
Stage 6	-0.2	0.06	0.31
Stage 6	-0.4	0.22	0.81
Stage 6	-0.5	0.31	0.87
Stage 6	-0.7	-4.72	-25.16
Stage 6	-0.9	-9.67	-24.77
Stage 6	-1.1	-14.48	-24.01
Stage 6	-1.3	-19.06	-22.91
Stage 6	-1.5	-23.36	-21.49
Stage 6	-1.7	-27.31	-19.78
Stage 6	-1.9	-30.87	-17.77
Stage 6	-2.1	-33.96	-15.48
Stage 6	-2.3	-36.54	-12.91
Stage 6	-2.5	-38.56	-10.07
Stage 6	-2.7	-39.95	-6.96
Stage 6	-2.9	-40.67	-3.58
Stage 6	-3.1	-40.65	0.06
Stage 6	-3.3	-39.86	3.97
Stage 6	-3.5	-38.23	8.14
Stage 6	-3.7	-35.72	12.57
Stage 6	-3.9	-32.26	17.28
Stage 6	-4.1	-27.81	22.25
Stage 6	-4.3	-23.05	23.81
Stage 6	-4.5	-18.47	22.9
Stage 6	-4.7	-14.2	21.34
Stage 6	-4.9	-10.31	19.45
Stage 6	-5.1	-6.85	17.31
Stage 6	-5.3	-3.86	14.96
Stage 6	-5.5	-1.32	12.68
Stage 6	-5.7	0.78	10.53
Stage 6	-5.9	2.49	8.53
Stage 6	-6.1	3.83	6.7
Stage 6	-6.3	4.84	5.04
Stage 6	-6.5	5.55	3.55
Stage 6	-6.7	5.99	2.22
Stage 6	-6.9	6.21	1.06
Stage 6	-7.1	6.22	0.06
Stage 6	-7.3	6.06	-0.8
Stage 6	-7.5	5.76	-1.5
Stage 6	-7.7	5.34	-2.07
Stage 6	-7.9	4.84	-2.51
Stage 6	-8.1	4.27	-2.83
Stage 6	-8.3	3.67	-3.02
Stage 6	-8.5	3.05	-3.1
Stage 6	-8.7	2.43	-3.07
Stage 6	-8.9	1.85	-2.94
Stage 6	-9.1	1.31	-2.7
Stage 6	-9.3	0.83	-2.37
Stage 6	-9.5	0.45	-1.93
Stage 6	-9.7	0.17	-1.39
Stage 6	-9.9	0.02	-0.75
Stage 6	-10	0	-0.2

**7.1.25. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - LEFT Stage:  
Stage 7**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Tipo Risultato: Spostamento			Muro: LEFT
Stage	Z (m)	Spostamento (mm)	
Stage 7	0	-2.02	
Stage 7	-0.2	-0.96	
Stage 7	-0.4	0.1	
Stage 7	-0.5	0.62	
Stage 7	-0.7	1.68	
Stage 7	-0.9	2.73	
Stage 7	-1.1	3.76	
Stage 7	-1.3	4.78	
Stage 7	-1.5	5.76	
Stage 7	-1.7	6.71	
Stage 7	-1.9	7.62	
Stage 7	-2.1	8.47	
Stage 7	-2.3	9.28	
Stage 7	-2.5	10.02	
Stage 7	-2.7	10.7	
Stage 7	-2.9	11.32	
Stage 7	-3.1	11.86	
Stage 7	-3.3	12.32	
Stage 7	-3.5	12.71	
Stage 7	-3.7	13.01	
Stage 7	-3.9	13.24	
Stage 7	-4.1	13.38	
Stage 7	-4.3	13.45	
Stage 7	-4.5	13.43	
Stage 7	-4.7	13.34	
Stage 7	-4.9	13.18	
Stage 7	-5.1	12.94	
Stage 7	-5.3	12.65	
Stage 7	-5.5	12.3	
Stage 7	-5.7	11.9	
Stage 7	-5.9	11.45	
Stage 7	-6.1	10.98	
Stage 7	-6.3	10.48	
Stage 7	-6.5	9.97	
Stage 7	-6.7	9.45	
Stage 7	-6.9	8.92	
Stage 7	-7.1	8.38	
Stage 7	-7.3	7.85	
Stage 7	-7.5	7.33	
Stage 7	-7.7	6.81	
Stage 7	-7.9	6.31	
Stage 7	-8.1	5.81	
Stage 7	-8.3	5.32	
Stage 7	-8.5	4.84	
Stage 7	-8.7	4.37	
Stage 7	-8.9	3.91	
Stage 7	-9.1	3.45	
Stage 7	-9.3	2.99	
Stage 7	-9.5	2.54	
Stage 7	-9.7	2.09	
Stage 7	-9.9	1.64	
Stage 7	-10	1.41	

**7.1.26. Tabella Spostamento NTC2018: SLE (Rara/Frequente/Quasi Permanente) - RIGHT Stage: Stage 7**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Tipo Risultato: Spostamento Muro: RIGHT		
Stage	Z (m)	Spostamento (mm)
Stage 7	0	2.02
Stage 7	-0.2	0.96
Stage 7	-0.4	-0.1
Stage 7	-0.5	-0.62
Stage 7	-0.7	-1.68
Stage 7	-0.9	-2.73
Stage 7	-1.1	-3.76
Stage 7	-1.3	-4.78
Stage 7	-1.5	-5.76
Stage 7	-1.7	-6.71
Stage 7	-1.9	-7.62
Stage 7	-2.1	-8.47
Stage 7	-2.3	-9.28
Stage 7	-2.5	-10.02
Stage 7	-2.7	-10.7
Stage 7	-2.9	-11.32
Stage 7	-3.1	-11.86
Stage 7	-3.3	-12.32
Stage 7	-3.5	-12.71
Stage 7	-3.7	-13.01
Stage 7	-3.9	-13.24
Stage 7	-4.1	-13.38
Stage 7	-4.3	-13.45
Stage 7	-4.5	-13.43
Stage 7	-4.7	-13.34
Stage 7	-4.9	-13.18
Stage 7	-5.1	-12.94
Stage 7	-5.3	-12.65
Stage 7	-5.5	-12.3
Stage 7	-5.7	-11.9
Stage 7	-5.9	-11.45
Stage 7	-6.1	-10.98
Stage 7	-6.3	-10.48
Stage 7	-6.5	-9.97
Stage 7	-6.7	-9.45
Stage 7	-6.9	-8.92
Stage 7	-7.1	-8.38
Stage 7	-7.3	-7.85
Stage 7	-7.5	-7.33
Stage 7	-7.7	-6.81
Stage 7	-7.9	-6.31
Stage 7	-8.1	-5.81
Stage 7	-8.3	-5.32
Stage 7	-8.5	-4.84
Stage 7	-8.7	-4.37
Stage 7	-8.9	-3.91
Stage 7	-9.1	-3.45
Stage 7	-9.3	-2.99
Stage 7	-9.5	-2.54
Stage 7	-9.7	-2.09
Stage 7	-9.9	-1.64
Stage 7	-10	-1.41

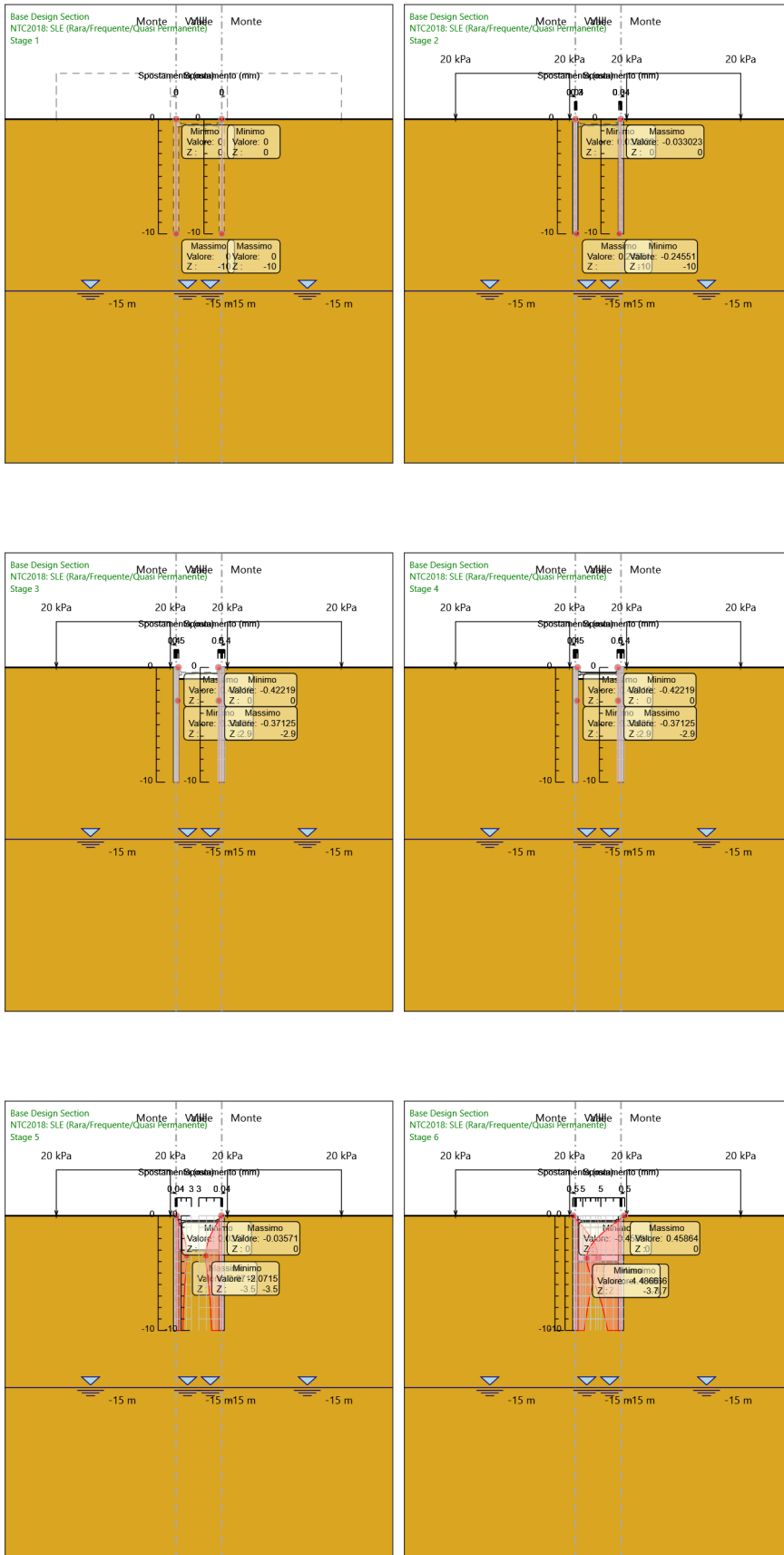
**7.1.27. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Left Wall - Stage: Stage 7**

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 7	0	0	-0.69
Stage 7	-0.2	-0.14	-0.69
Stage 7	-0.4	-0.46	-1.63
Stage 7	-0.5	-0.65	-1.83
Stage 7	-0.7	8.08	43.66
Stage 7	-0.9	16.74	43.27
Stage 7	-1.1	25.24	42.51
Stage 7	-1.3	33.52	41.41
Stage 7	-1.5	41.52	39.99
Stage 7	-1.7	49.18	38.28
Stage 7	-1.9	56.43	36.27
Stage 7	-2.1	63.23	33.98
Stage 7	-2.3	69.51	31.41
Stage 7	-2.5	75.23	28.57
Stage 7	-2.7	80.32	25.46
Stage 7	-2.9	84.74	22.08
Stage 7	-3.1	88.42	18.44
Stage 7	-3.3	91.33	14.53
Stage 7	-3.5	93.4	10.36
Stage 7	-3.7	94.59	5.93
Stage 7	-3.9	94.83	1.22
Stage 7	-4.1	94.08	-3.75
Stage 7	-4.3	92.29	-8.95
Stage 7	-4.5	89.41	-14.42
Stage 7	-4.7	85.38	-20.15
Stage 7	-4.9	80.15	-26.13
Stage 7	-5.1	73.68	-32.36
Stage 7	-5.3	65.91	-38.85
Stage 7	-5.5	56.79	-45.6
Stage 7	-5.7	47.14	-48.27
Stage 7	-5.9	37.44	-48.47
Stage 7	-6.1	28.21	-46.17
Stage 7	-6.3	19.93	-41.4
Stage 7	-6.5	12.64	-36.42
Stage 7	-6.7	6.35	-31.44
Stage 7	-6.9	1.06	-26.49
Stage 7	-7.1	-3.26	-21.6
Stage 7	-7.3	-6.62	-16.78
Stage 7	-7.5	-9.03	-12.04
Stage 7	-7.7	-10.51	-7.39
Stage 7	-7.9	-11.14	-3.16
Stage 7	-8.1	-11.06	0.39
Stage 7	-8.3	-10.4	3.27
Stage 7	-8.5	-9.31	5.48
Stage 7	-8.7	-7.9	7.04
Stage 7	-8.9	-6.31	7.95
Stage 7	-9.1	-4.66	8.22
Stage 7	-9.3	-3.09	7.86
Stage 7	-9.5	-1.72	6.86
Stage 7	-9.7	-0.67	5.23
Stage 7	-9.9	-0.08	2.97
Stage 7	-10	0	0.8

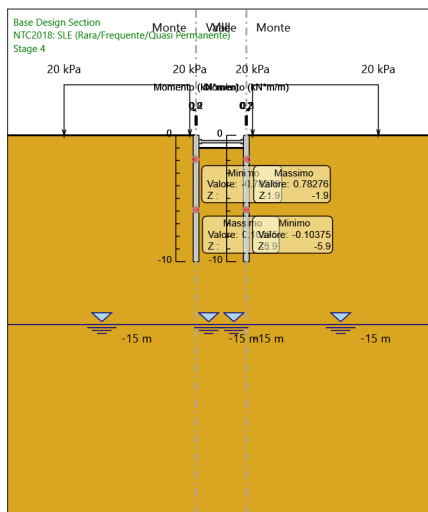
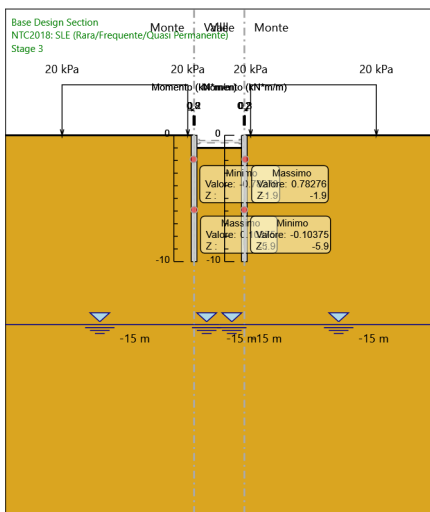
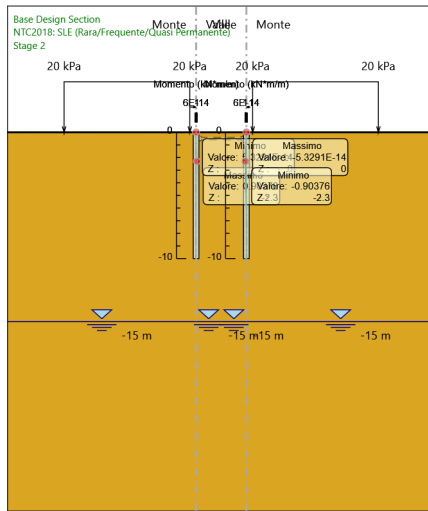
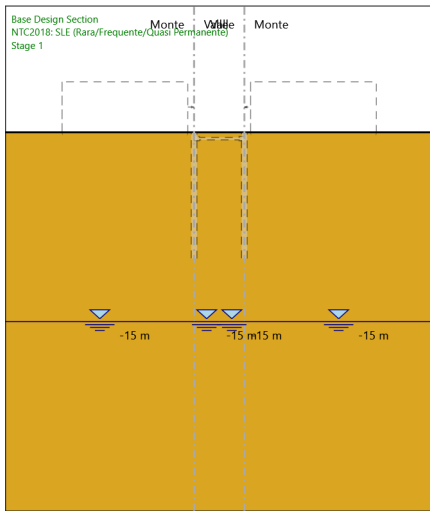
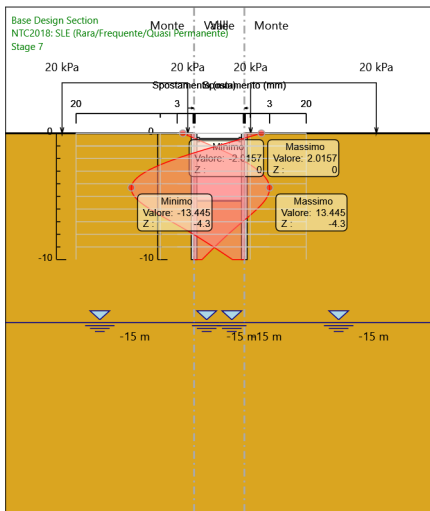
**7.1.28. Tabella Risultati Paratia NTC2018: SLE (Rara/Frequente/Quasi Permanente) - Right wall - Stage: Stage 7**

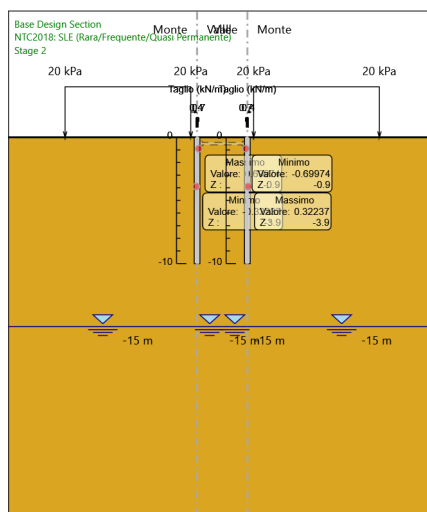
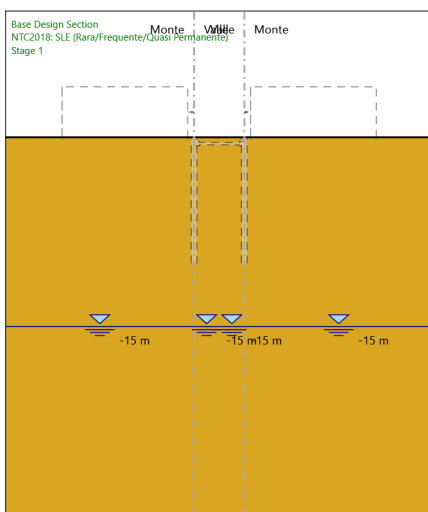
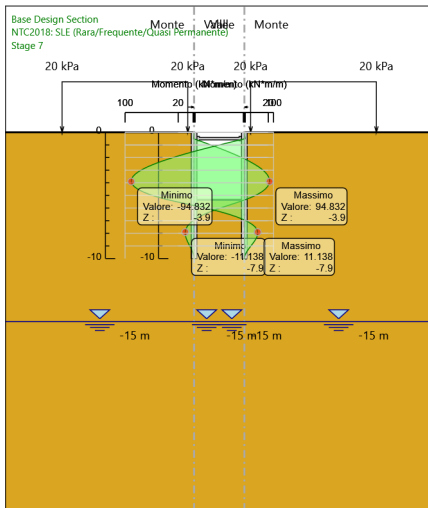
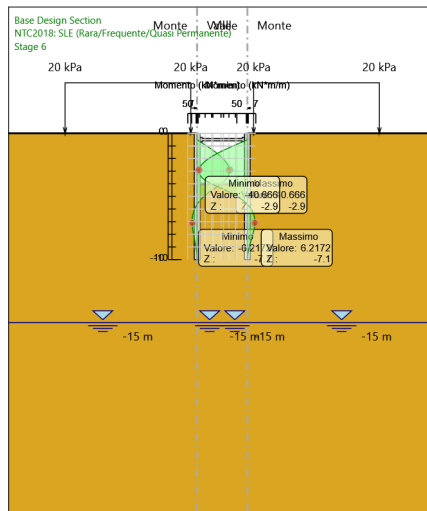
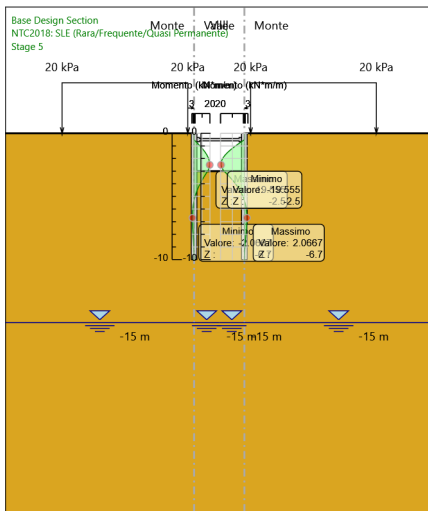
Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 7	0	0	0.69
Stage 7	-0.2	0.14	0.69
Stage 7	-0.4	0.46	1.63
Stage 7	-0.5	0.65	1.83
Stage 7	-0.7	-8.08	-43.66
Stage 7	-0.9	-16.74	-43.27
Stage 7	-1.1	-25.24	-42.51
Stage 7	-1.3	-33.52	-41.41
Stage 7	-1.5	-41.52	-39.99
Stage 7	-1.7	-49.18	-38.28
Stage 7	-1.9	-56.43	-36.27
Stage 7	-2.1	-63.23	-33.98
Stage 7	-2.3	-69.51	-31.41
Stage 7	-2.5	-75.23	-28.57
Stage 7	-2.7	-80.32	-25.46
Stage 7	-2.9	-84.74	-22.08
Stage 7	-3.1	-88.42	-18.44
Stage 7	-3.3	-91.33	-14.53
Stage 7	-3.5	-93.4	-10.36
Stage 7	-3.7	-94.59	-5.93
Stage 7	-3.9	-94.83	-1.22
Stage 7	-4.1	-94.08	3.75
Stage 7	-4.3	-92.29	8.95
Stage 7	-4.5	-89.41	14.42
Stage 7	-4.7	-85.38	20.15
Stage 7	-4.9	-80.15	26.13
Stage 7	-5.1	-73.68	32.36
Stage 7	-5.3	-65.91	38.85
Stage 7	-5.5	-56.79	45.6
Stage 7	-5.7	-47.14	48.27
Stage 7	-5.9	-37.44	48.47
Stage 7	-6.1	-28.21	46.17
Stage 7	-6.3	-19.93	41.4
Stage 7	-6.5	-12.64	36.42
Stage 7	-6.7	-6.35	31.44
Stage 7	-6.9	-1.06	26.49
Stage 7	-7.1	3.26	21.6
Stage 7	-7.3	6.62	16.78
Stage 7	-7.5	9.03	12.04
Stage 7	-7.7	10.51	7.39
Stage 7	-7.9	11.14	3.16
Stage 7	-8.1	11.06	-0.39
Stage 7	-8.3	10.4	-3.27
Stage 7	-8.5	9.31	-5.48
Stage 7	-8.7	7.9	-7.04
Stage 7	-8.9	6.31	-7.95
Stage 7	-9.1	4.66	-8.22
Stage 7	-9.3	3.09	-7.86
Stage 7	-9.5	1.72	-6.86
Stage 7	-9.7	0.67	-5.23
Stage 7	-9.9	0.08	-2.97
Stage 7	-10	0	-0.8

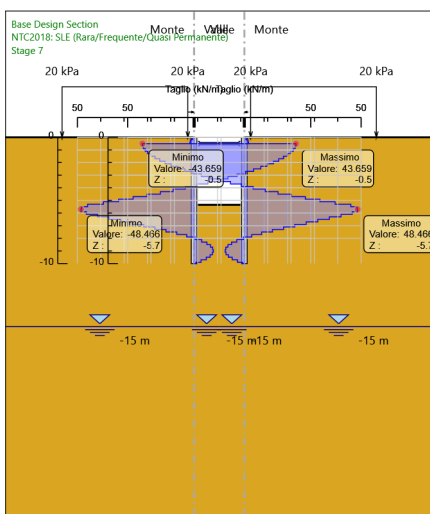
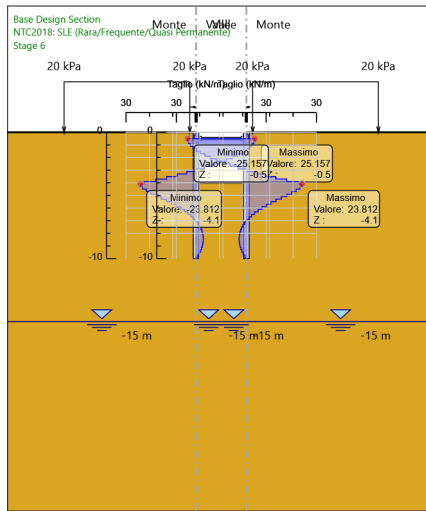
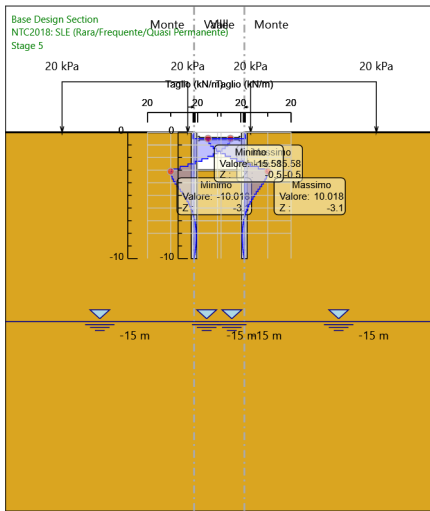
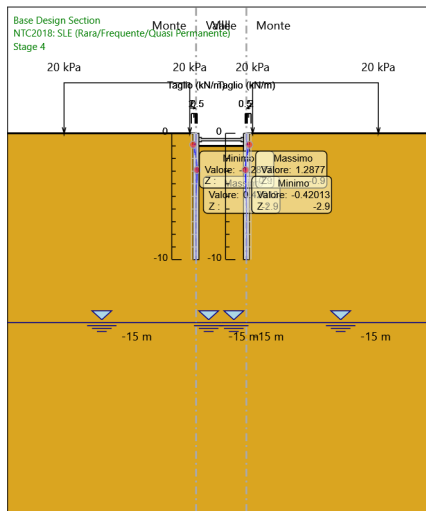
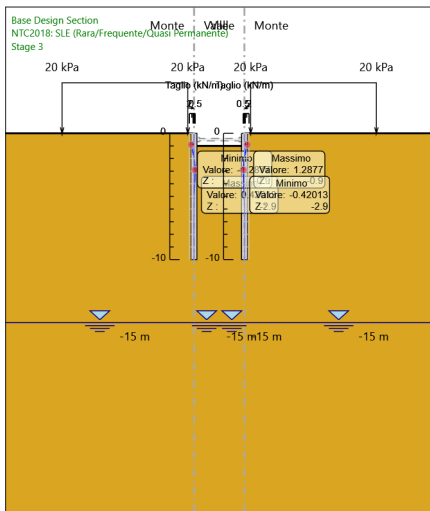
## 7.1.29. Tabella Grafici dei Risultati

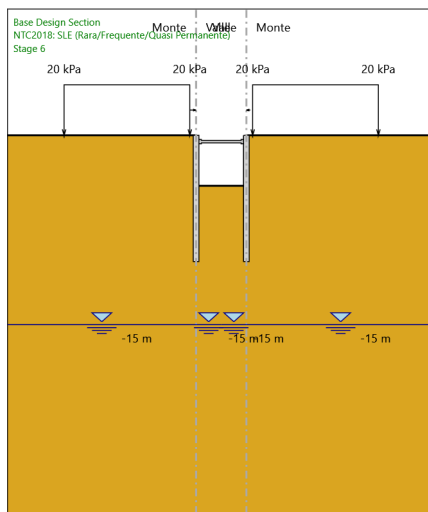
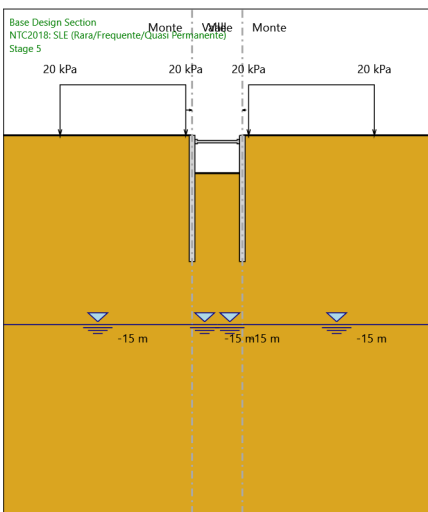
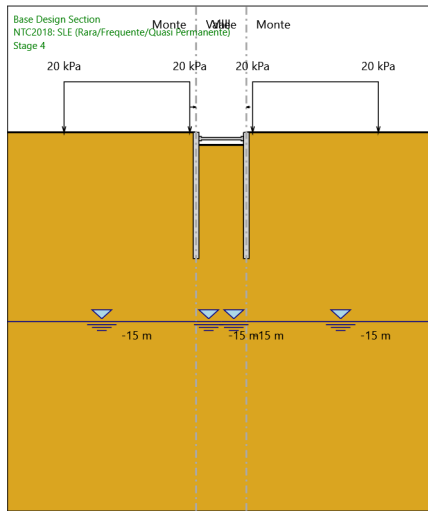
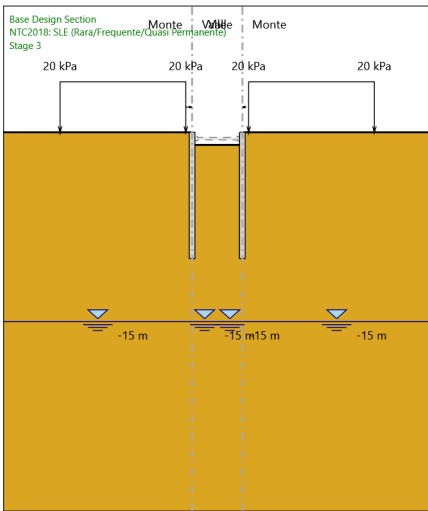
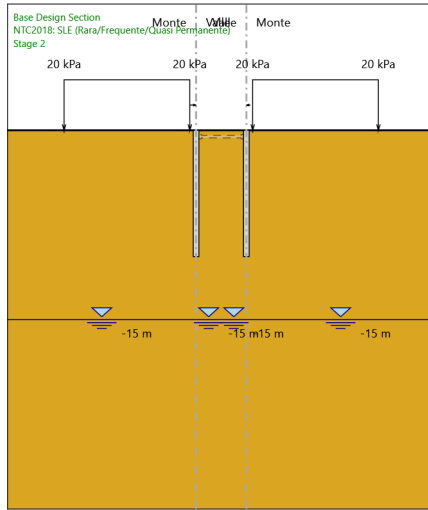
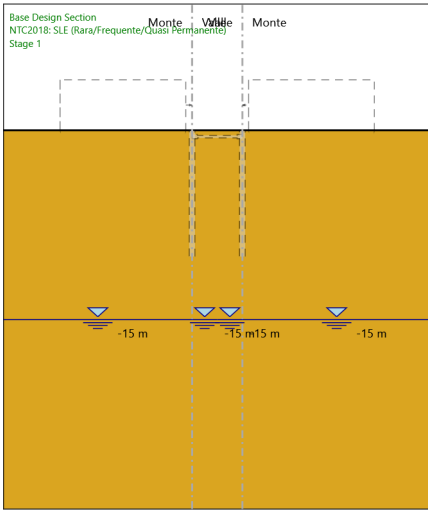


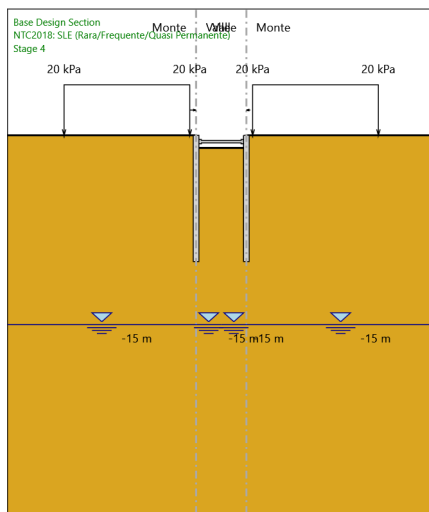
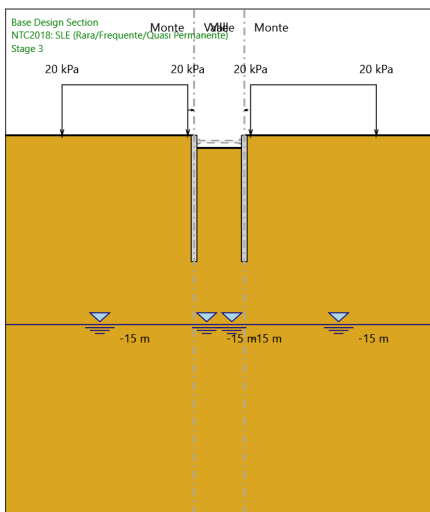
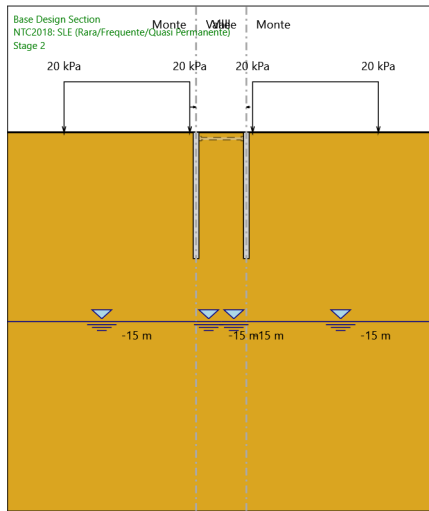
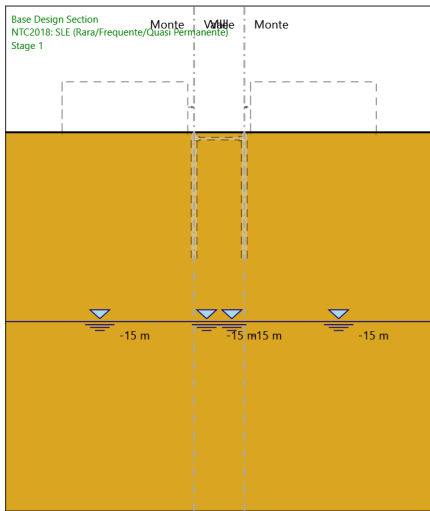
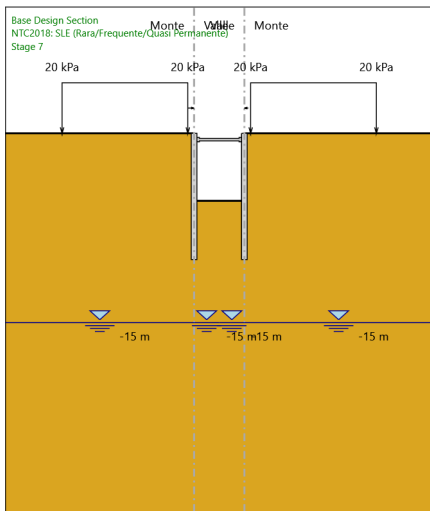


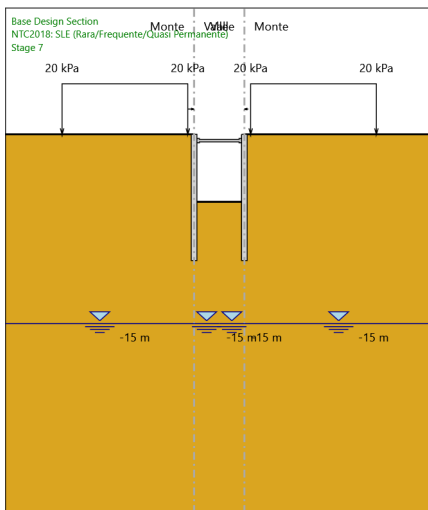
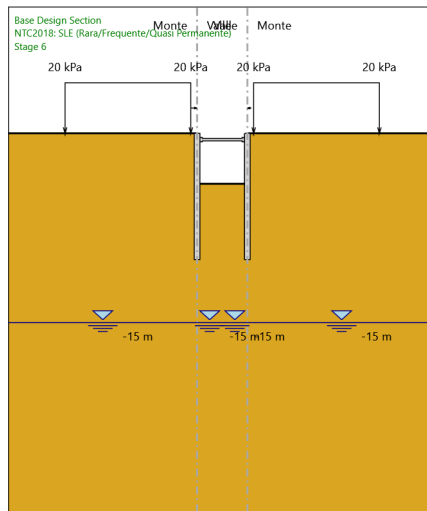
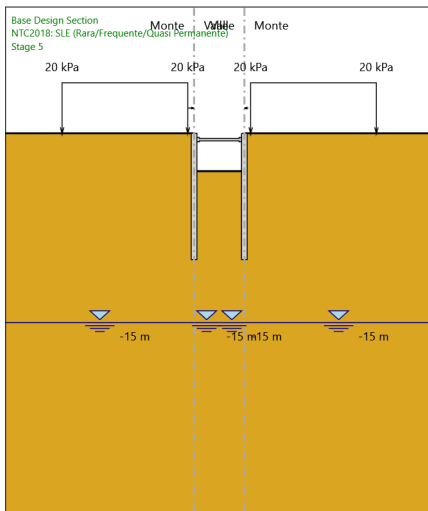












### 7.1.30. Risultati Elementi strutturali - NTC2018: SLE (Rara/Frequente/Quasi Permanente)

Design Assumption: NTC2018: SLE (Rara/Frequente/Quasi Permanente) Sollecitazione Strut

Stage	Forza (kN/m)
Stage 4	2.7472165E-13
Stage 5	-16.05992
Stage 6	-26.07038
Stage 7	-45.53279

## 7.2. Risultati NTC2018: A1+M1+R1 (R3 per tiranti)

### 7.2.1. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 1

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	0	0	0
Stage 1	-0.2	0	0
Stage 1	-0.4	0	0
Stage 1	-0.5	0	0
Stage 1	-0.7	0	0
Stage 1	-0.9	0	0
Stage 1	-1.1	0	0
Stage 1	-1.3	0	0
Stage 1	-1.5	0	0
Stage 1	-1.7	0	0
Stage 1	-1.9	0	0
Stage 1	-2.1	0	0
Stage 1	-2.3	0	0
Stage 1	-2.5	0	0
Stage 1	-2.7	0	0
Stage 1	-2.9	0	0
Stage 1	-3.1	0	0
Stage 1	-3.3	0	0
Stage 1	-3.5	0	0
Stage 1	-3.7	0	0
Stage 1	-3.9	0	0
Stage 1	-4.1	0	0
Stage 1	-4.3	0	0
Stage 1	-4.5	0	0
Stage 1	-4.7	0	0
Stage 1	-4.9	0	0
Stage 1	-5.1	0	0
Stage 1	-5.3	0	0
Stage 1	-5.5	0	0
Stage 1	-5.7	0	0
Stage 1	-5.9	0	0
Stage 1	-6.1	0	0
Stage 1	-6.3	0	0
Stage 1	-6.5	0	0
Stage 1	-6.7	0	0
Stage 1	-6.9	0	0
Stage 1	-7.1	0	0
Stage 1	-7.3	0	0
Stage 1	-7.5	0	0
Stage 1	-7.7	0	0
Stage 1	-7.9	0	0
Stage 1	-8.1	0	0
Stage 1	-8.3	0	0
Stage 1	-8.5	0	0
Stage 1	-8.7	0	0
Stage 1	-8.9	0	0
Stage 1	-9.1	0	0
Stage 1	-9.3	0	0
Stage 1	-9.5	0	0
Stage 1	-9.7	0	0
Stage 1	-9.9	0	0
Stage 1	-10	0	0

## 7.2.2. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Right wall - Stage: Stage 1

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti) Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	0	0	0
Stage 1	-0.2	0	0
Stage 1	-0.4	0	0
Stage 1	-0.5	0	0
Stage 1	-0.7	0	0
Stage 1	-0.9	0	0
Stage 1	-1.1	0	0
Stage 1	-1.3	0	0
Stage 1	-1.5	0	0
Stage 1	-1.7	0	0
Stage 1	-1.9	0	0
Stage 1	-2.1	0	0
Stage 1	-2.3	0	0
Stage 1	-2.5	0	0
Stage 1	-2.7	0	0
Stage 1	-2.9	0	0
Stage 1	-3.1	0	0
Stage 1	-3.3	0	0
Stage 1	-3.5	0	0
Stage 1	-3.7	0	0
Stage 1	-3.9	0	0
Stage 1	-4.1	0	0
Stage 1	-4.3	0	0
Stage 1	-4.5	0	0
Stage 1	-4.7	0	0
Stage 1	-4.9	0	0
Stage 1	-5.1	0	0
Stage 1	-5.3	0	0
Stage 1	-5.5	0	0
Stage 1	-5.7	0	0
Stage 1	-5.9	0	0
Stage 1	-6.1	0	0
Stage 1	-6.3	0	0
Stage 1	-6.5	0	0
Stage 1	-6.7	0	0
Stage 1	-6.9	0	0
Stage 1	-7.1	0	0
Stage 1	-7.3	0	0
Stage 1	-7.5	0	0
Stage 1	-7.7	0	0
Stage 1	-7.9	0	0
Stage 1	-8.1	0	0
Stage 1	-8.3	0	0
Stage 1	-8.5	0	0
Stage 1	-8.7	0	0
Stage 1	-8.9	0	0
Stage 1	-9.1	0	0
Stage 1	-9.3	0	0
Stage 1	-9.5	0	0
Stage 1	-9.7	0	0
Stage 1	-9.9	0	0
Stage 1	-10	0	0



### 7.2.3. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 2

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	0	0	0.04
Stage 2	-0.2	0.01	0.04
Stage 2	-0.4	0.08	0.36
Stage 2	-0.5	0.14	0.56
Stage 2	-0.7	0.28	0.74
Stage 2	-0.9	0.47	0.91
Stage 2	-1.1	0.65	0.91
Stage 2	-1.3	0.81	0.82
Stage 2	-1.5	0.95	0.68
Stage 2	-1.7	1.05	0.52
Stage 2	-1.9	1.12	0.36
Stage 2	-2.1	1.16	0.2
Stage 2	-2.3	1.17	0.07
Stage 2	-2.5	1.16	-0.05
Stage 2	-2.7	1.14	-0.15
Stage 2	-2.9	1.09	-0.22
Stage 2	-3.1	1.03	-0.28
Stage 2	-3.3	0.97	-0.32
Stage 2	-3.5	0.9	-0.35
Stage 2	-3.7	0.83	-0.36
Stage 2	-3.9	0.75	-0.39
Stage 2	-4.1	0.67	-0.42
Stage 2	-4.3	0.59	-0.4
Stage 2	-4.5	0.51	-0.38
Stage 2	-4.7	0.44	-0.35
Stage 2	-4.9	0.38	-0.32
Stage 2	-5.1	0.32	-0.29
Stage 2	-5.3	0.27	-0.26
Stage 2	-5.5	0.22	-0.23
Stage 2	-5.7	0.18	-0.2
Stage 2	-5.9	0.15	-0.17
Stage 2	-6.1	0.12	-0.15
Stage 2	-6.3	0.09	-0.12
Stage 2	-6.5	0.07	-0.1
Stage 2	-6.7	0.05	-0.08
Stage 2	-6.9	0.04	-0.07
Stage 2	-7.1	0.03	-0.05
Stage 2	-7.3	0.02	-0.04
Stage 2	-7.5	0.01	-0.03
Stage 2	-7.7	0.01	-0.02
Stage 2	-7.9	0.01	-0.02
Stage 2	-8.1	0	-0.01
Stage 2	-8.3	0	-0.01
Stage 2	-8.5	0	-0.01
Stage 2	-8.7	0	0
Stage 2	-8.9	0	0
Stage 2	-9.1	0	0
Stage 2	-9.3	0	0
Stage 2	-9.5	0	0
Stage 2	-9.7	0	0
Stage 2	-9.9	0	0
Stage 2	-9.9	0	0
Stage 2	-10	0	0

### 7.2.4. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Right wall - Stage: Stage 2

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti) Risultati Paratia		Muro: RIGHT		
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)	
Stage 2	0	0	-0.04	
Stage 2	-0.2	-0.01	-0.04	
Stage 2	-0.4	-0.08	-0.36	
Stage 2	-0.5	-0.14	-0.56	
Stage 2	-0.7	-0.28	-0.74	
Stage 2	-0.9	-0.47	-0.91	
Stage 2	-1.1	-0.65	-0.91	
Stage 2	-1.3	-0.81	-0.82	
Stage 2	-1.5	-0.95	-0.68	
Stage 2	-1.7	-1.05	-0.52	
Stage 2	-1.9	-1.12	-0.36	
Stage 2	-2.1	-1.16	-0.2	
Stage 2	-2.3	-1.17	-0.07	
Stage 2	-2.5	-1.16	0.05	
Stage 2	-2.7	-1.14	0.15	
Stage 2	-2.9	-1.09	0.22	
Stage 2	-3.1	-1.03	0.28	
Stage 2	-3.3	-0.97	0.32	
Stage 2	-3.5	-0.9	0.35	
Stage 2	-3.7	-0.83	0.36	
Stage 2	-3.9	-0.75	0.39	
Stage 2	-4.1	-0.67	0.42	
Stage 2	-4.3	-0.59	0.4	
Stage 2	-4.5	-0.51	0.38	
Stage 2	-4.7	-0.44	0.35	
Stage 2	-4.9	-0.38	0.32	
Stage 2	-5.1	-0.32	0.29	
Stage 2	-5.3	-0.27	0.26	
Stage 2	-5.5	-0.22	0.23	
Stage 2	-5.7	-0.18	0.2	
Stage 2	-5.9	-0.15	0.17	
Stage 2	-6.1	-0.12	0.15	
Stage 2	-6.3	-0.09	0.12	
Stage 2	-6.5	-0.07	0.1	
Stage 2	-6.7	-0.05	0.08	
Stage 2	-6.9	-0.04	0.07	
Stage 2	-7.1	-0.03	0.05	
Stage 2	-7.3	-0.02	0.04	
Stage 2	-7.5	-0.01	0.03	
Stage 2	-7.7	-0.01	0.02	
Stage 2	-7.9	-0.01	0.02	
Stage 2	-8.1	0	0.01	
Stage 2	-8.3	0	0.01	
Stage 2	-8.5	0	0.01	
Stage 2	-8.7	0	0	
Stage 2	-8.9	0	0	
Stage 2	-9.1	0	0	
Stage 2	-9.3	0	0	
Stage 2	-9.5	0	0	
Stage 2	-9.7	0	0	
Stage 2	-9.9	0	0	
Stage 2	-9.9	0	0	
Stage 2	-10	0	0	

### 7.2.5. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 3

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	0	0	0
Stage 3	-0.2	0	0
Stage 3	-0.2	0	0
Stage 3	-0.4	0	0
Stage 3	-0.4	0	0
Stage 3	-0.5	0	0
Stage 3	-0.5	0	0
Stage 3	-0.7	-0.01	-0.06
Stage 3	-0.9	-0.12	-0.56
Stage 3	-1.1	-0.46	-1.67
Stage 3	-1.3	-0.72	-1.29
Stage 3	-1.5	-0.89	-0.86
Stage 3	-1.7	-0.98	-0.48
Stage 3	-1.9	-1.02	-0.17
Stage 3	-2.1	-1	0.08
Stage 3	-2.3	-0.95	0.26
Stage 3	-2.5	-0.87	0.39
Stage 3	-2.7	-0.78	0.48
Stage 3	-2.9	-0.67	0.53
Stage 3	-3.1	-0.56	0.55
Stage 3	-3.3	-0.45	0.54
Stage 3	-3.5	-0.35	0.52
Stage 3	-3.7	-0.25	0.49
Stage 3	-3.9	-0.17	0.41
Stage 3	-4.1	-0.1	0.33
Stage 3	-4.3	-0.04	0.29
Stage 3	-4.5	0.01	0.24
Stage 3	-4.7	0.05	0.2
Stage 3	-4.9	0.08	0.16
Stage 3	-5.1	0.1	0.12
Stage 3	-5.3	0.12	0.08
Stage 3	-5.5	0.13	0.05
Stage 3	-5.7	0.13	0.03
Stage 3	-5.9	0.13	0.01
Stage 3	-6.1	0.13	-0.01
Stage 3	-6.3	0.13	-0.02
Stage 3	-6.5	0.12	-0.03
Stage 3	-6.7	0.11	-0.04
Stage 3	-6.9	0.1	-0.05
Stage 3	-7.1	0.09	-0.05
Stage 3	-7.3	0.08	-0.05
Stage 3	-7.5	0.07	-0.05
Stage 3	-7.7	0.06	-0.05
Stage 3	-7.9	0.05	-0.05
Stage 3	-8.1	0.05	-0.04
Stage 3	-8.3	0.04	-0.04
Stage 3	-8.5	0.03	-0.04
Stage 3	-8.7	0.02	-0.03
Stage 3	-8.9	0.02	-0.03
Stage 3	-9.1	0.01	-0.03
Stage 3	-9.3	0.01	-0.02
Stage 3	-9.5	0	-0.02
Stage 3	-9.7	0	-0.01
Stage 3	-9.9	0	-0.01
Stage 3	-10	0	0

### 7.2.6. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Right wall - Stage: Stage 3

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti) Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	0	0	0
Stage 3	-0.2	0	0
Stage 3	-0.2	0	0
Stage 3	-0.4	0	0
Stage 3	-0.4	0	0
Stage 3	-0.5	0	0
Stage 3	-0.5	0	0
Stage 3	-0.7	0.01	0.06
Stage 3	-0.9	0.12	0.56
Stage 3	-1.1	0.46	1.67
Stage 3	-1.3	0.72	1.29
Stage 3	-1.5	0.89	0.86
Stage 3	-1.7	0.98	0.48
Stage 3	-1.9	1.02	0.17
Stage 3	-2.1	1	-0.08
Stage 3	-2.3	0.95	-0.26
Stage 3	-2.5	0.87	-0.39
Stage 3	-2.7	0.78	-0.48
Stage 3	-2.9	0.67	-0.53
Stage 3	-3.1	0.56	-0.55
Stage 3	-3.3	0.45	-0.54
Stage 3	-3.5	0.35	-0.52
Stage 3	-3.7	0.25	-0.49
Stage 3	-3.9	0.17	-0.41
Stage 3	-4.1	0.1	-0.33
Stage 3	-4.3	0.04	-0.29
Stage 3	-4.5	-0.01	-0.24
Stage 3	-4.7	-0.05	-0.2
Stage 3	-4.9	-0.08	-0.16
Stage 3	-5.1	-0.1	-0.12
Stage 3	-5.3	-0.12	-0.08
Stage 3	-5.5	-0.13	-0.05
Stage 3	-5.7	-0.13	-0.03
Stage 3	-5.9	-0.13	-0.01
Stage 3	-6.1	-0.13	0.01
Stage 3	-6.3	-0.13	0.02
Stage 3	-6.5	-0.12	0.03
Stage 3	-6.7	-0.11	0.04
Stage 3	-6.9	-0.1	0.05
Stage 3	-7.1	-0.09	0.05
Stage 3	-7.3	-0.08	0.05
Stage 3	-7.5	-0.07	0.05
Stage 3	-7.7	-0.06	0.05
Stage 3	-7.9	-0.05	0.05
Stage 3	-8.1	-0.05	0.04
Stage 3	-8.3	-0.04	0.04
Stage 3	-8.5	-0.03	0.04
Stage 3	-8.7	-0.02	0.03
Stage 3	-8.9	-0.02	0.03
Stage 3	-9.1	-0.01	0.03
Stage 3	-9.3	-0.01	0.02
Stage 3	-9.5	0	0.02
Stage 3	-9.7	0	0.01
Stage 3	-9.9	0	0.01
Stage 3	-10	0	0

### 7.2.7. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 4

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 4	0	0	0
Stage 4	-0.2	0	0
Stage 4	-0.2	0	0
Stage 4	-0.4	0	0
Stage 4	-0.4	0	0
Stage 4	-0.5	0	0
Stage 4	-0.5	0	0
Stage 4	-0.7	-0.01	-0.06
Stage 4	-0.9	-0.12	-0.56
Stage 4	-1.1	-0.46	-1.67
Stage 4	-1.3	-0.72	-1.29
Stage 4	-1.5	-0.89	-0.86
Stage 4	-1.7	-0.98	-0.48
Stage 4	-1.9	-1.02	-0.17
Stage 4	-2.1	-1	0.08
Stage 4	-2.3	-0.95	0.26
Stage 4	-2.5	-0.87	0.39
Stage 4	-2.7	-0.78	0.48
Stage 4	-2.9	-0.67	0.53
Stage 4	-3.1	-0.56	0.55
Stage 4	-3.3	-0.45	0.54
Stage 4	-3.5	-0.35	0.52
Stage 4	-3.7	-0.25	0.49
Stage 4	-3.9	-0.17	0.41
Stage 4	-4.1	-0.1	0.33
Stage 4	-4.3	-0.04	0.29
Stage 4	-4.5	0.01	0.24
Stage 4	-4.7	0.05	0.2
Stage 4	-4.9	0.08	0.16
Stage 4	-5.1	0.1	0.12
Stage 4	-5.3	0.12	0.08
Stage 4	-5.5	0.13	0.05
Stage 4	-5.7	0.13	0.03
Stage 4	-5.9	0.13	0.01
Stage 4	-6.1	0.13	-0.01
Stage 4	-6.3	0.13	-0.02
Stage 4	-6.5	0.12	-0.03
Stage 4	-6.7	0.11	-0.04
Stage 4	-6.9	0.1	-0.05
Stage 4	-7.1	0.09	-0.05
Stage 4	-7.3	0.08	-0.05
Stage 4	-7.5	0.07	-0.05
Stage 4	-7.7	0.06	-0.05
Stage 4	-7.9	0.05	-0.05
Stage 4	-8.1	0.05	-0.04
Stage 4	-8.3	0.04	-0.04
Stage 4	-8.5	0.03	-0.04
Stage 4	-8.7	0.02	-0.03
Stage 4	-8.9	0.02	-0.03
Stage 4	-9.1	0.01	-0.03
Stage 4	-9.3	0.01	-0.02
Stage 4	-9.5	0	-0.02
Stage 4	-9.7	0	-0.01
Stage 4	-9.9	0	-0.01
Stage 4	-10	0	0

### 7.2.8. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Right wall - Stage: Stage 4

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti) Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 4	0	0	0
Stage 4	-0.2	0	0
Stage 4	-0.2	0	0
Stage 4	-0.4	0	0
Stage 4	-0.4	0	0
Stage 4	-0.5	0	0
Stage 4	-0.5	0	0
Stage 4	-0.7	0.01	0.06
Stage 4	-0.9	0.12	0.56
Stage 4	-1.1	0.46	1.67
Stage 4	-1.3	0.72	1.29
Stage 4	-1.5	0.89	0.86
Stage 4	-1.7	0.98	0.48
Stage 4	-1.9	1.02	0.17
Stage 4	-2.1	1	-0.08
Stage 4	-2.3	0.95	-0.26
Stage 4	-2.5	0.87	-0.39
Stage 4	-2.7	0.78	-0.48
Stage 4	-2.9	0.67	-0.53
Stage 4	-3.1	0.56	-0.55
Stage 4	-3.3	0.45	-0.54
Stage 4	-3.5	0.35	-0.52
Stage 4	-3.7	0.25	-0.49
Stage 4	-3.9	0.17	-0.41
Stage 4	-4.1	0.1	-0.33
Stage 4	-4.3	0.04	-0.29
Stage 4	-4.5	-0.01	-0.24
Stage 4	-4.7	-0.05	-0.2
Stage 4	-4.9	-0.08	-0.16
Stage 4	-5.1	-0.1	-0.12
Stage 4	-5.3	-0.12	-0.08
Stage 4	-5.5	-0.13	-0.05
Stage 4	-5.7	-0.13	-0.03
Stage 4	-5.9	-0.13	-0.01
Stage 4	-6.1	-0.13	0.01
Stage 4	-6.3	-0.13	0.02
Stage 4	-6.5	-0.12	0.03
Stage 4	-6.7	-0.11	0.04
Stage 4	-6.9	-0.1	0.05
Stage 4	-7.1	-0.09	0.05
Stage 4	-7.3	-0.08	0.05
Stage 4	-7.5	-0.07	0.05
Stage 4	-7.7	-0.06	0.05
Stage 4	-7.9	-0.05	0.05
Stage 4	-8.1	-0.05	0.04
Stage 4	-8.3	-0.04	0.04
Stage 4	-8.5	-0.03	0.04
Stage 4	-8.7	-0.02	0.03
Stage 4	-8.9	-0.02	0.03
Stage 4	-9.1	-0.01	0.03
Stage 4	-9.3	-0.01	0.02
Stage 4	-9.5	0	0.02
Stage 4	-9.7	0	0.01
Stage 4	-9.9	0	0.01
Stage 4	-10	0	0

### 7.2.9. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 5

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 5	0	0	-0.2
Stage 5	-0.2	-0.04	-0.2
Stage 5	-0.4	-0.15	-0.55
Stage 5	-0.5	-0.21	-0.57
Stage 5	-0.7	3.84	20.25
Stage 5	-0.9	7.79	19.75
Stage 5	-1.1	11.55	18.76
Stage 5	-1.3	15.01	17.33
Stage 5	-1.5	18.11	15.49
Stage 5	-1.7	20.76	13.26
Stage 5	-1.9	22.89	10.65
Stage 5	-2.1	24.43	7.67
Stage 5	-2.3	25.29	4.34
Stage 5	-2.5	25.42	0.64
Stage 5	-2.7	24.74	-3.4
Stage 5	-2.9	23.18	-7.79
Stage 5	-3.1	20.68	-12.53
Stage 5	-3.3	18.07	-13.02
Stage 5	-3.5	15.51	-12.8
Stage 5	-3.7	13.07	-12.23
Stage 5	-3.9	10.77	-11.48
Stage 5	-4.1	8.65	-10.61
Stage 5	-4.3	6.72	-9.63
Stage 5	-4.5	5	-8.62
Stage 5	-4.7	3.47	-7.61
Stage 5	-4.9	2.15	-6.63
Stage 5	-5.1	1.01	-5.68
Stage 5	-5.3	0.06	-4.78
Stage 5	-5.5	-0.73	-3.94
Stage 5	-5.7	-1.37	-3.17
Stage 5	-5.9	-1.86	-2.46
Stage 5	-6.1	-2.22	-1.82
Stage 5	-6.3	-2.47	-1.25
Stage 5	-6.5	-2.62	-0.75
Stage 5	-6.7	-2.69	-0.31
Stage 5	-6.9	-2.67	0.06
Stage 5	-7.1	-2.6	0.38
Stage 5	-7.3	-2.47	0.64
Stage 5	-7.5	-2.3	0.85
Stage 5	-7.7	-2.1	1.01
Stage 5	-7.9	-1.87	1.13
Stage 5	-8.1	-1.63	1.2
Stage 5	-8.3	-1.39	1.23
Stage 5	-8.5	-1.14	1.23
Stage 5	-8.7	-0.9	1.19
Stage 5	-8.9	-0.68	1.12
Stage 5	-9.1	-0.48	1.01
Stage 5	-9.3	-0.3	0.87
Stage 5	-9.5	-0.16	0.7
Stage 5	-9.7	-0.06	0.5
Stage 5	-9.9	-0.01	0.27
Stage 5	-10	0	0.07

## 7.2.10. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Right wall - Stage: Stage 5

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti) Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 5	0	0	0.2
Stage 5	-0.2	0.04	0.2
Stage 5	-0.4	0.15	0.55
Stage 5	-0.5	0.21	0.57
Stage 5	-0.7	-3.84	-20.25
Stage 5	-0.9	-7.79	-19.75
Stage 5	-1.1	-11.55	-18.76
Stage 5	-1.3	-15.01	-17.33
Stage 5	-1.5	-18.11	-15.49
Stage 5	-1.7	-20.76	-13.26
Stage 5	-1.9	-22.89	-10.65
Stage 5	-2.1	-24.43	-7.67
Stage 5	-2.3	-25.29	-4.34
Stage 5	-2.5	-25.42	-0.64
Stage 5	-2.7	-24.74	3.4
Stage 5	-2.9	-23.18	7.79
Stage 5	-3.1	-20.68	12.53
Stage 5	-3.3	-18.07	13.02
Stage 5	-3.5	-15.51	12.8
Stage 5	-3.7	-13.07	12.23
Stage 5	-3.9	-10.77	11.48
Stage 5	-4.1	-8.65	10.61
Stage 5	-4.3	-6.72	9.63
Stage 5	-4.5	-5	8.62
Stage 5	-4.7	-3.47	7.61
Stage 5	-4.9	-2.15	6.63
Stage 5	-5.1	-1.01	5.68
Stage 5	-5.3	-0.06	4.78
Stage 5	-5.5	0.73	3.94
Stage 5	-5.7	1.37	3.17
Stage 5	-5.9	1.86	2.46
Stage 5	-6.1	2.22	1.82
Stage 5	-6.3	2.47	1.25
Stage 5	-6.5	2.62	0.75
Stage 5	-6.7	2.69	0.31
Stage 5	-6.9	2.67	-0.06
Stage 5	-7.1	2.6	-0.38
Stage 5	-7.3	2.47	-0.64
Stage 5	-7.5	2.3	-0.85
Stage 5	-7.7	2.1	-1.01
Stage 5	-7.9	1.87	-1.13
Stage 5	-8.1	1.63	-1.2
Stage 5	-8.3	1.39	-1.23
Stage 5	-8.5	1.14	-1.23
Stage 5	-8.7	0.9	-1.19
Stage 5	-8.9	0.68	-1.12
Stage 5	-9.1	0.48	-1.01
Stage 5	-9.3	0.3	-0.87
Stage 5	-9.5	0.16	-0.7
Stage 5	-9.7	0.06	-0.5
Stage 5	-9.9	0.01	-0.27
Stage 5	-10	0	-0.07



### 7.2.11. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 6

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti) Risultati Paratia		Muro: LEFT		
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)	
Stage 6	0	0	-0.4	
Stage 6	-0.2	-0.08	-0.4	
Stage 6	-0.4	-0.29	-1.05	
Stage 6	-0.5	-0.4	-1.13	
Stage 6	-0.7	6.14	32.7	
Stage 6	-0.9	12.58	32.2	
Stage 6	-1.1	18.82	31.21	
Stage 6	-1.3	24.77	29.78	
Stage 6	-1.5	30.36	27.94	
Stage 6	-1.7	35.5	25.71	
Stage 6	-1.9	40.12	23.1	
Stage 6	-2.1	44.15	20.12	
Stage 6	-2.3	47.51	16.79	
Stage 6	-2.5	50.13	13.09	
Stage 6	-2.7	51.94	9.05	
Stage 6	-2.9	52.87	4.66	
Stage 6	-3.1	52.85	-0.08	
Stage 6	-3.3	51.82	-5.16	
Stage 6	-3.5	49.7	-10.58	
Stage 6	-3.7	46.43	-16.34	
Stage 6	-3.9	41.94	-22.47	
Stage 6	-4.1	36.15	-28.92	
Stage 6	-4.3	29.96	-30.96	
Stage 6	-4.5	24.01	-29.76	
Stage 6	-4.7	18.46	-27.74	
Stage 6	-4.9	13.41	-25.29	
Stage 6	-5.1	8.9	-22.51	
Stage 6	-5.3	5.01	-19.45	
Stage 6	-5.5	1.72	-16.48	
Stage 6	-5.7	-1.02	-13.69	
Stage 6	-5.9	-3.24	-11.09	
Stage 6	-6.1	-4.98	-8.71	
Stage 6	-6.3	-6.29	-6.55	
Stage 6	-6.5	-7.21	-4.61	
Stage 6	-6.7	-7.79	-2.89	
Stage 6	-6.9	-8.07	-1.38	
Stage 6	-7.1	-8.08	-0.07	
Stage 6	-7.3	-7.88	1.03	
Stage 6	-7.5	-7.48	1.95	
Stage 6	-7.7	-6.95	2.7	
Stage 6	-7.9	-6.29	3.27	
Stage 6	-8.1	-5.56	3.67	
Stage 6	-8.3	-4.77	3.93	
Stage 6	-8.5	-3.96	4.03	
Stage 6	-8.7	-3.17	4	
Stage 6	-8.9	-2.4	3.82	
Stage 6	-9.1	-1.7	3.51	
Stage 6	-9.3	-1.08	3.07	
Stage 6	-9.5	-0.58	2.5	
Stage 6	-9.7	-0.22	1.81	
Stage 6	-9.9	-0.03	0.98	
Stage 6	-10	0	0.26	

## 7.2.12. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Right wall - Stage: Stage 6

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti) Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 6	0	0	0.4
Stage 6	-0.2	0.08	0.4
Stage 6	-0.4	0.29	1.05
Stage 6	-0.5	0.4	1.13
Stage 6	-0.7	-6.14	-32.7
Stage 6	-0.9	-12.58	-32.2
Stage 6	-1.1	-18.82	-31.21
Stage 6	-1.3	-24.77	-29.78
Stage 6	-1.5	-30.36	-27.94
Stage 6	-1.7	-35.5	-25.71
Stage 6	-1.9	-40.12	-23.1
Stage 6	-2.1	-44.15	-20.12
Stage 6	-2.3	-47.51	-16.79
Stage 6	-2.5	-50.13	-13.09
Stage 6	-2.7	-51.94	-9.05
Stage 6	-2.9	-52.87	-4.66
Stage 6	-3.1	-52.85	0.08
Stage 6	-3.3	-51.82	5.16
Stage 6	-3.5	-49.7	10.58
Stage 6	-3.7	-46.43	16.34
Stage 6	-3.9	-41.94	22.47
Stage 6	-4.1	-36.15	28.92
Stage 6	-4.3	-29.96	30.96
Stage 6	-4.5	-24.01	29.76
Stage 6	-4.7	-18.46	27.74
Stage 6	-4.9	-13.41	25.29
Stage 6	-5.1	-8.9	22.51
Stage 6	-5.3	-5.01	19.45
Stage 6	-5.5	-1.72	16.48
Stage 6	-5.7	1.02	13.69
Stage 6	-5.9	3.24	11.09
Stage 6	-6.1	4.98	8.71
Stage 6	-6.3	6.29	6.55
Stage 6	-6.5	7.21	4.61
Stage 6	-6.7	7.79	2.89
Stage 6	-6.9	8.07	1.38
Stage 6	-7.1	8.08	0.07
Stage 6	-7.3	7.88	-1.03
Stage 6	-7.5	7.48	-1.95
Stage 6	-7.7	6.95	-2.7
Stage 6	-7.9	6.29	-3.27
Stage 6	-8.1	5.56	-3.67
Stage 6	-8.3	4.77	-3.93
Stage 6	-8.5	3.96	-4.03
Stage 6	-8.7	3.17	-4
Stage 6	-8.9	2.4	-3.82
Stage 6	-9.1	1.7	-3.51
Stage 6	-9.3	1.08	-3.07
Stage 6	-9.5	0.58	-2.5
Stage 6	-9.7	0.22	-1.81
Stage 6	-9.9	0.03	-0.98
Stage 6	-10	0	-0.26

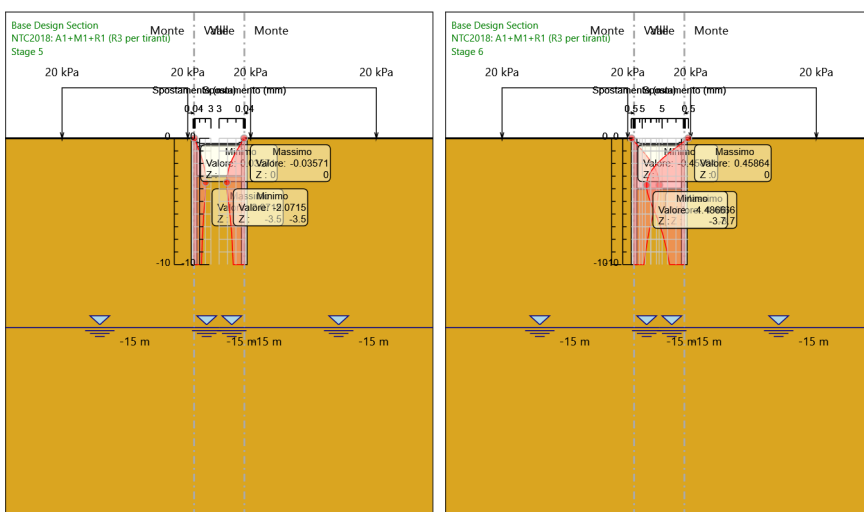
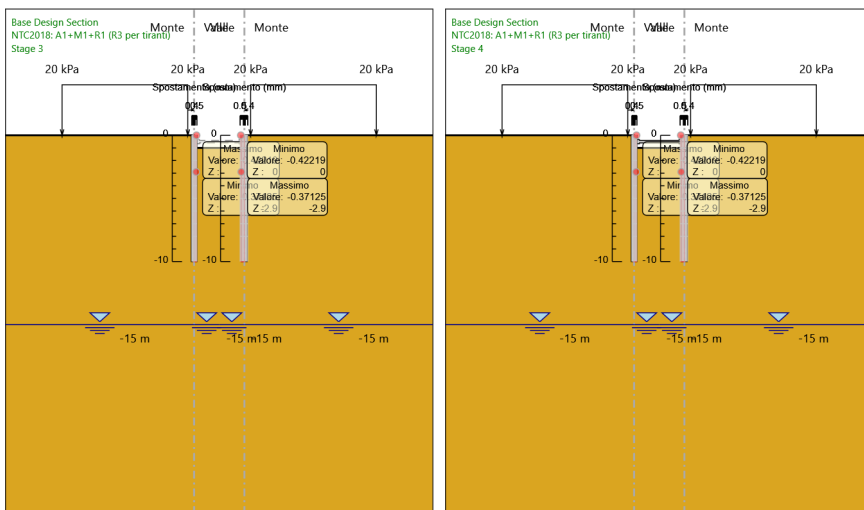
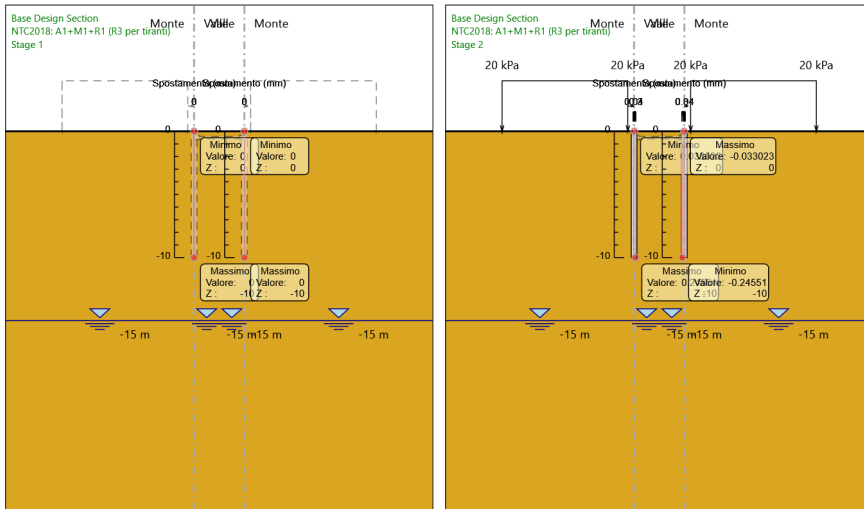
### 7.2.13. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Left Wall - Stage: Stage 7

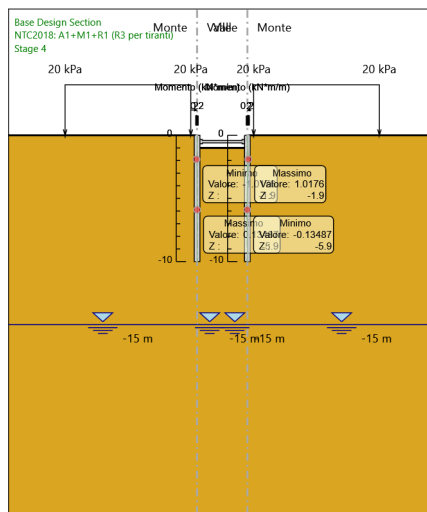
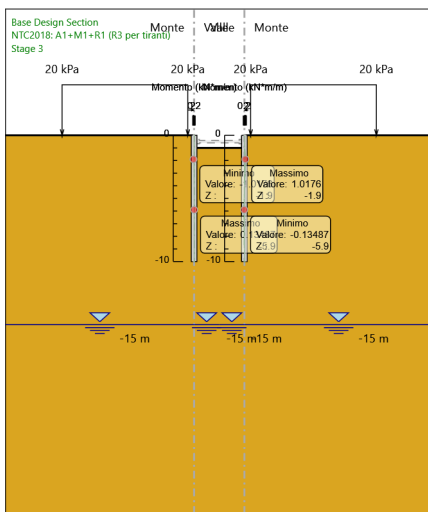
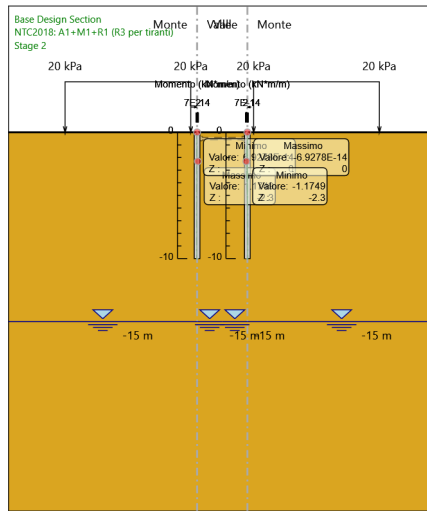
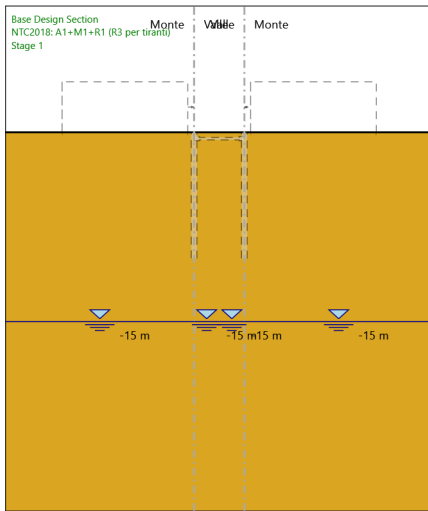
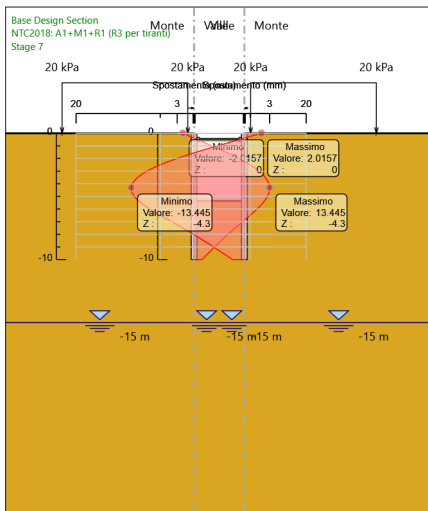
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti) Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 7	0	0	-0.9
Stage 7	-0.2	-0.18	-0.9
Stage 7	-0.4	-0.6	-2.12
Stage 7	-0.5	-0.84	-2.38
Stage 7	-0.7	10.51	56.76
Stage 7	-0.9	21.76	56.25
Stage 7	-1.1	32.81	55.26
Stage 7	-1.3	43.58	53.83
Stage 7	-1.5	53.98	51.99
Stage 7	-1.7	63.93	49.76
Stage 7	-1.9	73.36	47.15
Stage 7	-2.1	82.2	44.18
Stage 7	-2.3	90.36	40.84
Stage 7	-2.5	97.79	37.15
Stage 7	-2.7	104.41	33.1
Stage 7	-2.9	110.16	28.71
Stage 7	-3.1	114.95	23.97
Stage 7	-3.3	118.73	18.89
Stage 7	-3.5	121.42	13.47
Stage 7	-3.7	122.96	7.71
Stage 7	-3.9	123.28	1.59
Stage 7	-4.1	122.31	-4.87
Stage 7	-4.3	119.98	-11.64
Stage 7	-4.5	116.23	-18.75
Stage 7	-4.7	110.99	-26.19
Stage 7	-4.9	104.2	-33.96
Stage 7	-5.1	95.79	-42.07
Stage 7	-5.3	85.68	-50.51
Stage 7	-5.5	73.83	-59.28
Stage 7	-5.7	61.28	-62.76
Stage 7	-5.9	48.67	-63.01
Stage 7	-6.1	36.67	-60.03
Stage 7	-6.3	25.9	-53.82
Stage 7	-6.5	16.43	-47.35
Stage 7	-6.7	8.26	-40.87
Stage 7	-6.9	1.37	-34.44
Stage 7	-7.1	-4.24	-28.08
Stage 7	-7.3	-8.6	-21.81
Stage 7	-7.5	-11.73	-15.65
Stage 7	-7.7	-13.66	-9.61
Stage 7	-7.9	-14.48	-4.11
Stage 7	-8.1	-14.38	0.51
Stage 7	-8.3	-13.53	4.25
Stage 7	-8.5	-12.1	7.13
Stage 7	-8.7	-10.27	9.16
Stage 7	-8.9	-8.2	10.34
Stage 7	-9.1	-6.06	10.69
Stage 7	-9.3	-4.02	10.22
Stage 7	-9.5	-2.24	8.92
Stage 7	-9.7	-0.88	6.8
Stage 7	-9.9	-0.1	3.86
Stage 7	-10	0	1.04

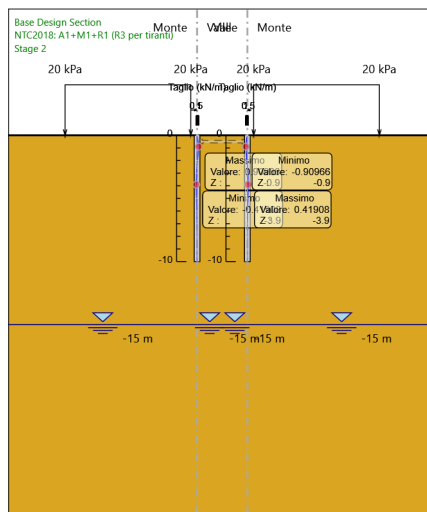
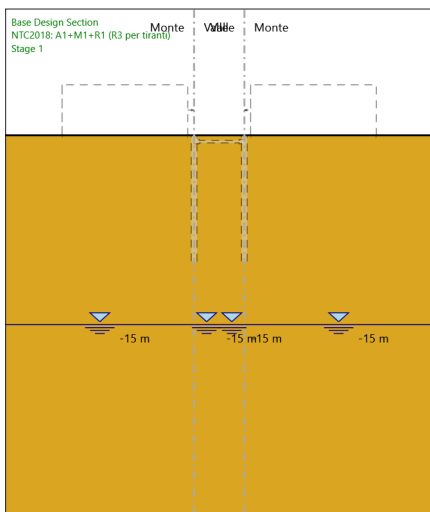
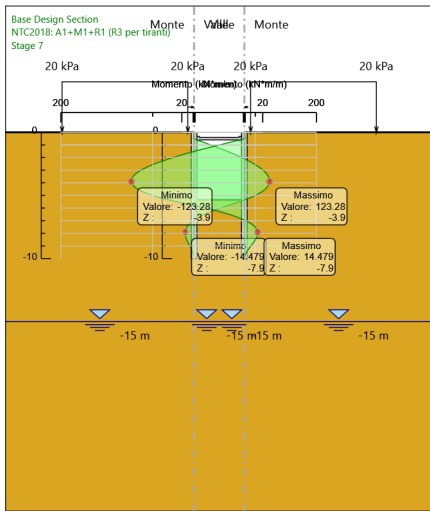
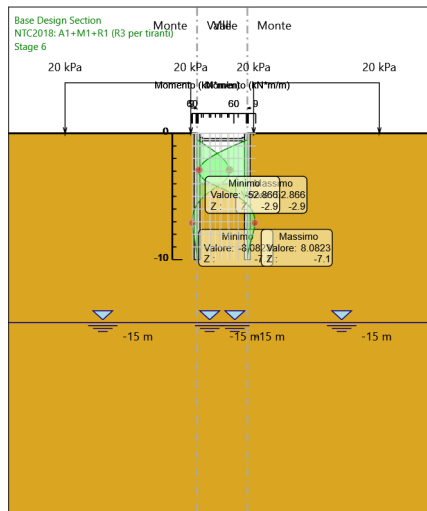
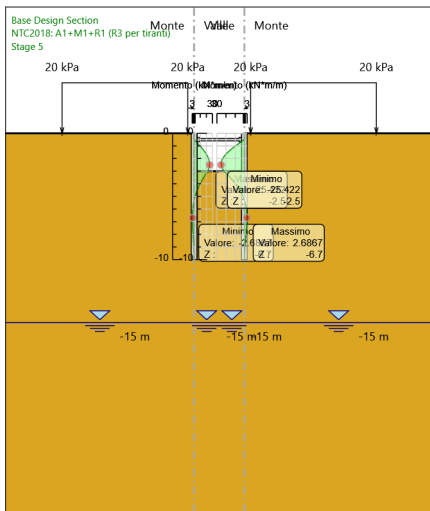
### 7.2.14. Tabella Risultati Paratia NTC2018: A1+M1+R1 (R3 per tiranti) - Right wall - Stage: Stage 7

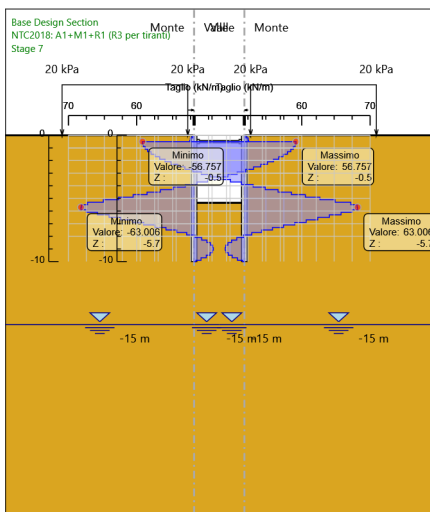
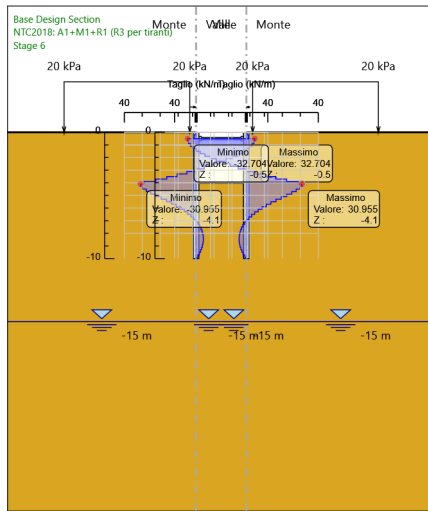
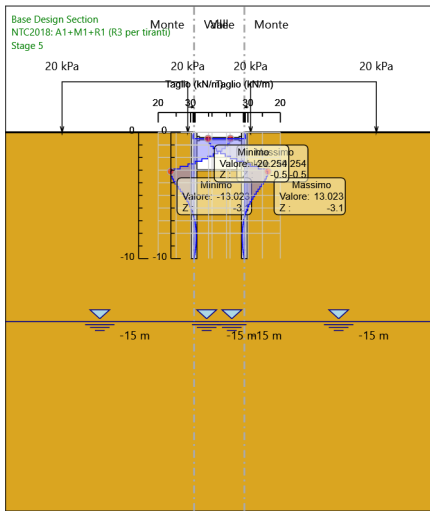
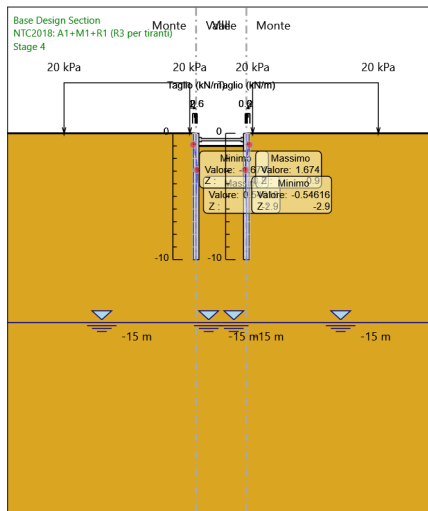
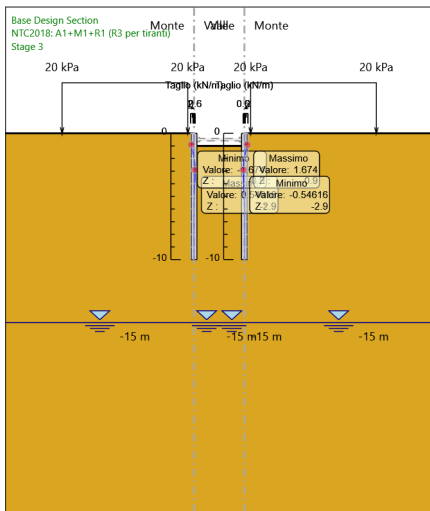
Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti) Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 7	0	0	0.9
Stage 7	-0.2	0.18	0.9
Stage 7	-0.4	0.6	2.12
Stage 7	-0.5	0.84	2.38
Stage 7	-0.7	-10.51	-56.76
Stage 7	-0.9	-21.76	-56.25
Stage 7	-1.1	-32.81	-55.26
Stage 7	-1.3	-43.58	-53.83
Stage 7	-1.5	-53.98	-51.99
Stage 7	-1.7	-63.93	-49.76
Stage 7	-1.9	-73.36	-47.15
Stage 7	-2.1	-82.2	-44.18
Stage 7	-2.3	-90.36	-40.84
Stage 7	-2.5	-97.79	-37.15
Stage 7	-2.7	-104.41	-33.1
Stage 7	-2.9	-110.16	-28.71
Stage 7	-3.1	-114.95	-23.97
Stage 7	-3.3	-118.73	-18.89
Stage 7	-3.5	-121.42	-13.47
Stage 7	-3.7	-122.96	-7.71
Stage 7	-3.9	-123.28	-1.59
Stage 7	-4.1	-122.31	4.87
Stage 7	-4.3	-119.98	11.64
Stage 7	-4.5	-116.23	18.75
Stage 7	-4.7	-110.99	26.19
Stage 7	-4.9	-104.2	33.96
Stage 7	-5.1	-95.79	42.07
Stage 7	-5.3	-85.68	50.51
Stage 7	-5.5	-73.83	59.28
Stage 7	-5.7	-61.28	62.76
Stage 7	-5.9	-48.67	63.01
Stage 7	-6.1	-36.67	60.03
Stage 7	-6.3	-25.9	53.82
Stage 7	-6.5	-16.43	47.35
Stage 7	-6.7	-8.26	40.87
Stage 7	-6.9	-1.37	34.44
Stage 7	-7.1	4.24	28.08
Stage 7	-7.3	8.6	21.81
Stage 7	-7.5	11.73	15.65
Stage 7	-7.7	13.66	9.61
Stage 7	-7.9	14.48	4.11
Stage 7	-8.1	14.38	-0.51
Stage 7	-8.3	13.53	-4.25
Stage 7	-8.5	12.1	-7.13
Stage 7	-8.7	10.27	-9.16
Stage 7	-8.9	8.2	-10.34
Stage 7	-9.1	6.06	-10.69
Stage 7	-9.3	4.02	-10.22
Stage 7	-9.5	2.24	-8.92
Stage 7	-9.7	0.88	-6.8
Stage 7	-9.9	0.1	-3.86
Stage 7	-10	0	-1.04

## 7.2.15. Tabella Grafici dei Risultati

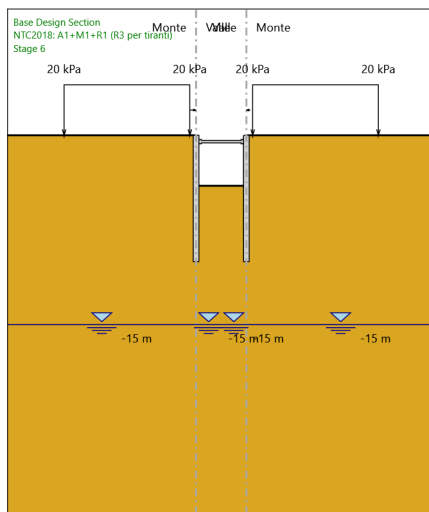
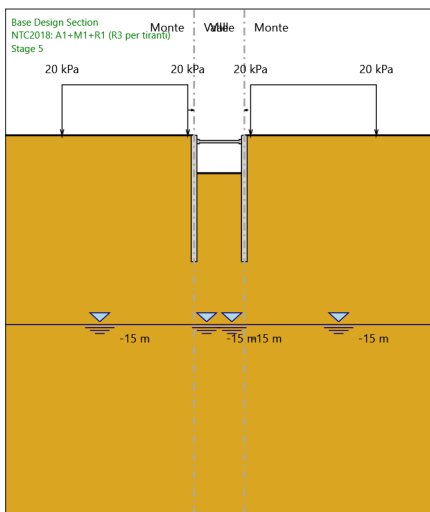
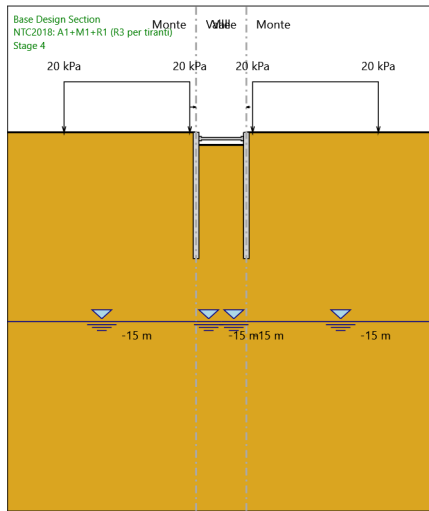
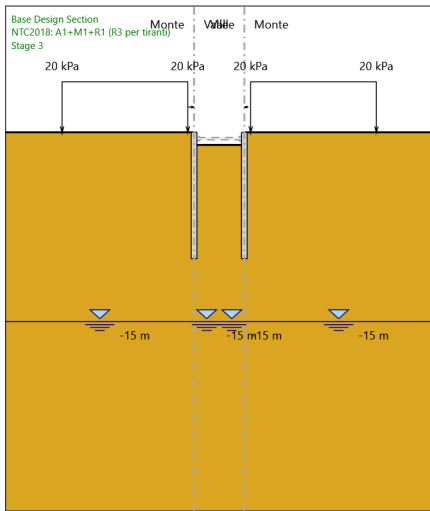
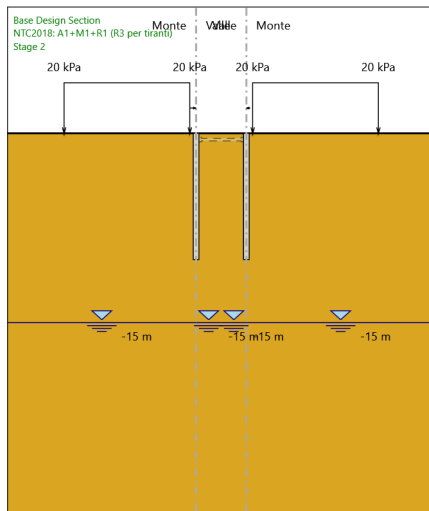
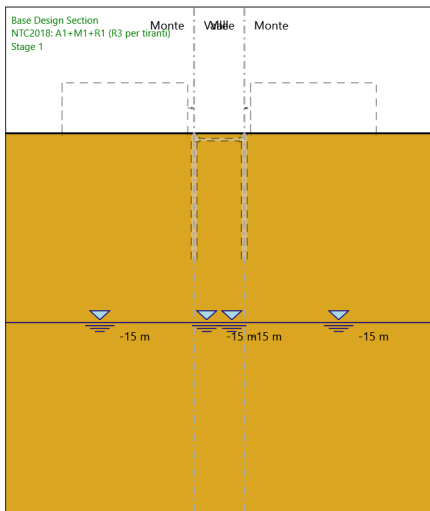


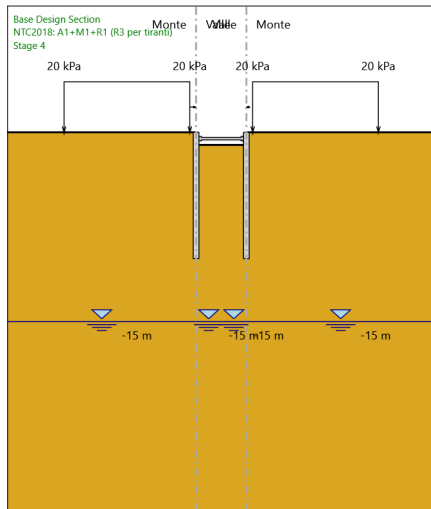
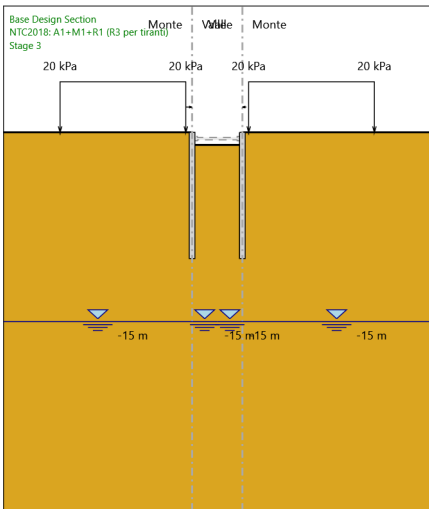
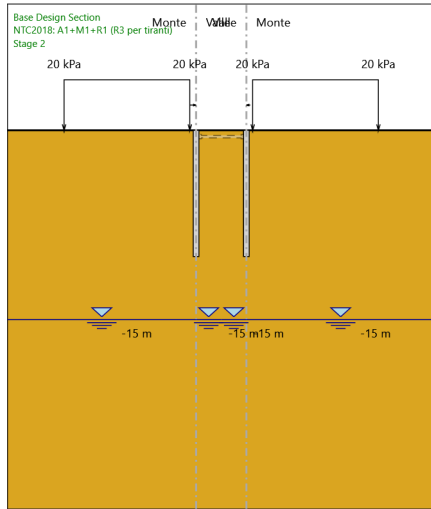
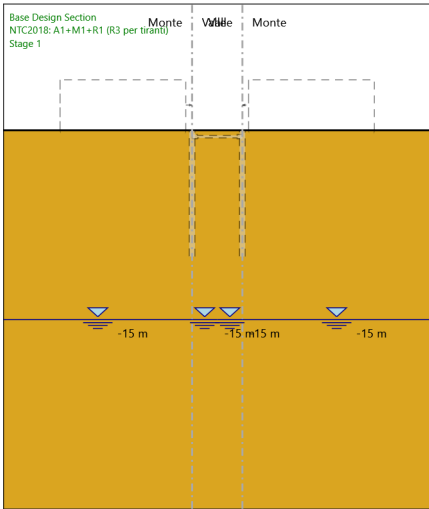
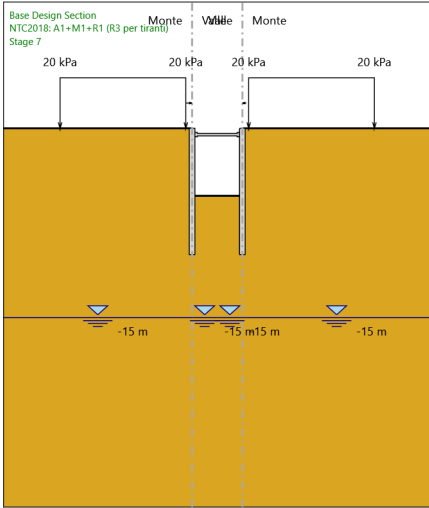


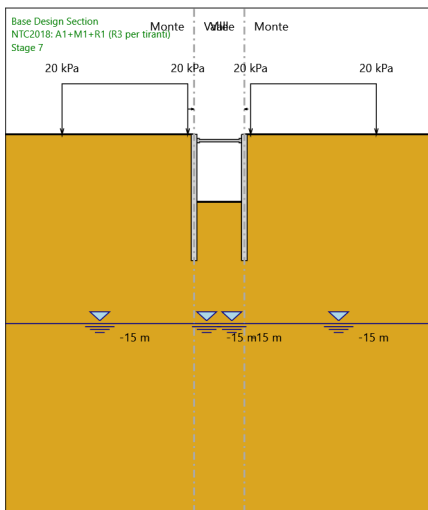
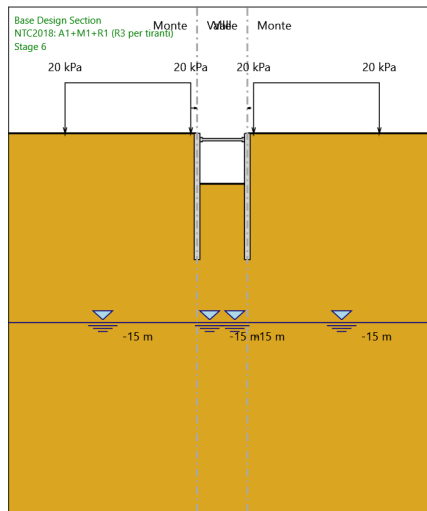
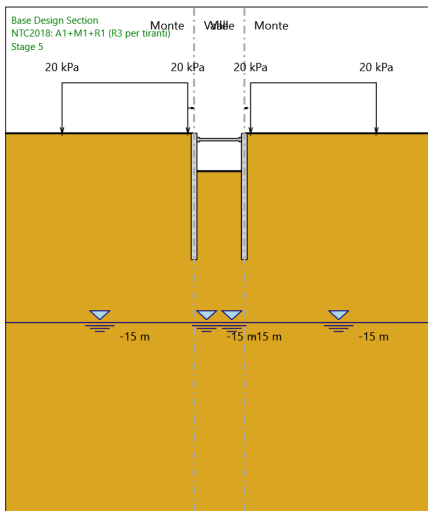












## 7.2.16. Risultati Elementi strutturali - NTC2018: A1+M1+R1 (R3 per tiranti)

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti) Sollecitazione Strut

Stage	Forza (kN/m)
Stage 4	3.57138145E-13
Stage 5	-20.877896
Stage 6	-33.891494
Stage 7	-59.192627

## 7.3. Risultati NTC2018: A2+M2+R1

### 7.3.1. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 1

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	0	0	0
Stage 1	-0.2	0	0
Stage 1	-0.4	0	0
Stage 1	-0.5	0	0
Stage 1	-0.7	0	0
Stage 1	-0.9	0	0
Stage 1	-1.1	0	0
Stage 1	-1.3	0	0
Stage 1	-1.5	0	0
Stage 1	-1.7	0	0
Stage 1	-1.9	0	0
Stage 1	-2.1	0	0
Stage 1	-2.3	0	0
Stage 1	-2.5	0	0
Stage 1	-2.7	0	0
Stage 1	-2.9	0	0
Stage 1	-3.1	0	0
Stage 1	-3.3	0	0
Stage 1	-3.5	0	0
Stage 1	-3.7	0	0
Stage 1	-3.9	0	0
Stage 1	-4.1	0	0
Stage 1	-4.3	0	0
Stage 1	-4.5	0	0
Stage 1	-4.7	0	0
Stage 1	-4.9	0	0
Stage 1	-5.1	0	0
Stage 1	-5.3	0	0
Stage 1	-5.5	0	0
Stage 1	-5.7	0	0
Stage 1	-5.9	0	0
Stage 1	-6.1	0	0
Stage 1	-6.3	0	0
Stage 1	-6.5	0	0
Stage 1	-6.7	0	0
Stage 1	-6.9	0	0
Stage 1	-7.1	0	0
Stage 1	-7.3	0	0
Stage 1	-7.5	0	0
Stage 1	-7.7	0	0
Stage 1	-7.9	0	0
Stage 1	-8.1	0	0
Stage 1	-8.3	0	0
Stage 1	-8.5	0	0
Stage 1	-8.7	0	0
Stage 1	-8.9	0	0
Stage 1	-9.1	0	0
Stage 1	-9.3	0	0
Stage 1	-9.5	0	0
Stage 1	-9.7	0	0
Stage 1	-9.9	0	0
Stage 1	-10	0	0

### 7.3.2. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Right wall - Stage: Stage 1

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	0	0	0
Stage 1	-0.2	0	0
Stage 1	-0.4	0	0
Stage 1	-0.5	0	0
Stage 1	-0.7	0	0
Stage 1	-0.9	0	0
Stage 1	-1.1	0	0
Stage 1	-1.3	0	0
Stage 1	-1.5	0	0
Stage 1	-1.7	0	0
Stage 1	-1.9	0	0
Stage 1	-2.1	0	0
Stage 1	-2.3	0	0
Stage 1	-2.5	0	0
Stage 1	-2.7	0	0
Stage 1	-2.9	0	0
Stage 1	-3.1	0	0
Stage 1	-3.3	0	0
Stage 1	-3.5	0	0
Stage 1	-3.7	0	0
Stage 1	-3.9	0	0
Stage 1	-4.1	0	0
Stage 1	-4.3	0	0
Stage 1	-4.5	0	0
Stage 1	-4.7	0	0
Stage 1	-4.9	0	0
Stage 1	-5.1	0	0
Stage 1	-5.3	0	0
Stage 1	-5.5	0	0
Stage 1	-5.7	0	0
Stage 1	-5.9	0	0
Stage 1	-6.1	0	0
Stage 1	-6.3	0	0
Stage 1	-6.5	0	0
Stage 1	-6.7	0	0
Stage 1	-6.9	0	0
Stage 1	-7.1	0	0
Stage 1	-7.3	0	0
Stage 1	-7.5	0	0
Stage 1	-7.7	0	0
Stage 1	-7.9	0	0
Stage 1	-8.1	0	0
Stage 1	-8.3	0	0
Stage 1	-8.5	0	0
Stage 1	-8.7	0	0
Stage 1	-8.9	0	0
Stage 1	-9.1	0	0
Stage 1	-9.3	0	0
Stage 1	-9.5	0	0
Stage 1	-9.7	0	0
Stage 1	-9.9	0	0
Stage 1	-10	0	0

### 7.3.3. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 2

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	0	0	0.03
Stage 2	-0.2	0.01	0.03
Stage 2	-0.4	0.06	0.28
Stage 2	-0.5	0.11	0.44
Stage 2	-0.7	0.22	0.58
Stage 2	-0.9	0.36	0.71
Stage 2	-1.1	0.51	0.71
Stage 2	-1.3	0.63	0.64
Stage 2	-1.5	0.74	0.53
Stage 2	-1.7	0.82	0.41
Stage 2	-1.9	0.88	0.28
Stage 2	-2.1	0.91	0.16
Stage 2	-2.3	0.92	0.06
Stage 2	-2.5	0.91	-0.04
Stage 2	-2.7	0.89	-0.11
Stage 2	-2.9	0.86	-0.17
Stage 2	-3.1	0.81	-0.22
Stage 2	-3.3	0.76	-0.25
Stage 2	-3.5	0.71	-0.27
Stage 2	-3.7	0.65	-0.28
Stage 2	-3.9	0.59	-0.31
Stage 2	-4.1	0.53	-0.33
Stage 2	-4.3	0.47	-0.31
Stage 2	-4.5	0.41	-0.3
Stage 2	-4.7	0.35	-0.28
Stage 2	-4.9	0.3	-0.25
Stage 2	-5.1	0.25	-0.23
Stage 2	-5.3	0.21	-0.21
Stage 2	-5.5	0.18	-0.18
Stage 2	-5.7	0.15	-0.16
Stage 2	-5.9	0.12	-0.14
Stage 2	-6.1	0.09	-0.12
Stage 2	-6.3	0.07	-0.1
Stage 2	-6.5	0.06	-0.08
Stage 2	-6.7	0.04	-0.07
Stage 2	-6.9	0.03	-0.06
Stage 2	-7.1	0.02	-0.04
Stage 2	-7.3	0.02	-0.03
Stage 2	-7.5	0.01	-0.03
Stage 2	-7.7	0.01	-0.02
Stage 2	-7.9	0.01	-0.01
Stage 2	-8.1	0	-0.01
Stage 2	-8.3	0	-0.01
Stage 2	-8.5	0	0
Stage 2	-8.7	0	0
Stage 2	-8.9	0	0
Stage 2	-9.1	0	0
Stage 2	-9.3	0	0
Stage 2	-9.5	0	0
Stage 2	-9.7	0	0
Stage 2	-9.9	0	0
Stage 2	-9.9	0	0
Stage 2	-10	0	0

### 7.3.4. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Right wall - Stage: Stage 2

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	0	0	-0.03
Stage 2	-0.2	-0.01	-0.03
Stage 2	-0.4	-0.06	-0.28
Stage 2	-0.5	-0.11	-0.44
Stage 2	-0.7	-0.22	-0.58
Stage 2	-0.9	-0.36	-0.71
Stage 2	-1.1	-0.51	-0.71
Stage 2	-1.3	-0.63	-0.64
Stage 2	-1.5	-0.74	-0.53
Stage 2	-1.7	-0.82	-0.41
Stage 2	-1.9	-0.88	-0.28
Stage 2	-2.1	-0.91	-0.16
Stage 2	-2.3	-0.92	-0.06
Stage 2	-2.5	-0.91	0.04
Stage 2	-2.7	-0.89	0.11
Stage 2	-2.9	-0.86	0.17
Stage 2	-3.1	-0.81	0.22
Stage 2	-3.3	-0.76	0.25
Stage 2	-3.5	-0.71	0.27
Stage 2	-3.7	-0.65	0.28
Stage 2	-3.9	-0.59	0.31
Stage 2	-4.1	-0.53	0.33
Stage 2	-4.3	-0.47	0.31
Stage 2	-4.5	-0.41	0.3
Stage 2	-4.7	-0.35	0.28
Stage 2	-4.9	-0.3	0.25
Stage 2	-5.1	-0.25	0.23
Stage 2	-5.3	-0.21	0.21
Stage 2	-5.5	-0.18	0.18
Stage 2	-5.7	-0.15	0.16
Stage 2	-5.9	-0.12	0.14
Stage 2	-6.1	-0.09	0.12
Stage 2	-6.3	-0.07	0.1
Stage 2	-6.5	-0.06	0.08
Stage 2	-6.7	-0.04	0.07
Stage 2	-6.9	-0.03	0.06
Stage 2	-7.1	-0.02	0.04
Stage 2	-7.3	-0.02	0.03
Stage 2	-7.5	-0.01	0.03
Stage 2	-7.7	-0.01	0.02
Stage 2	-7.9	-0.01	0.01
Stage 2	-8.1	0	0.01
Stage 2	-8.3	0	0.01
Stage 2	-8.5	0	0
Stage 2	-8.7	0	0
Stage 2	-8.9	0	0
Stage 2	-9.1	0	0
Stage 2	-9.3	0	0
Stage 2	-9.5	0	0
Stage 2	-9.7	0	0
Stage 2	-9.9	0	0
Stage 2	-9.9	0	0
Stage 2	-10	0	0

### 7.3.5. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 3

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	0	0	0
Stage 3	-0.2	0	0
Stage 3	-0.2	0	0
Stage 3	-0.4	0	0
Stage 3	-0.4	0	0
Stage 3	-0.5	-0.01	-0.07
Stage 3	-0.7	-0.07	-0.3
Stage 3	-0.9	-0.27	-1.01
Stage 3	-1.1	-0.7	-2.17
Stage 3	-1.3	-1.05	-1.75
Stage 3	-1.5	-1.29	-1.17
Stage 3	-1.7	-1.42	-0.67
Stage 3	-1.9	-1.47	-0.26
Stage 3	-2.1	-1.46	0.07
Stage 3	-2.3	-1.4	0.31
Stage 3	-2.5	-1.3	0.49
Stage 3	-2.7	-1.18	0.61
Stage 3	-2.9	-1.04	0.68
Stage 3	-3.1	-0.9	0.71
Stage 3	-3.3	-0.76	0.71
Stage 3	-3.5	-0.62	0.69
Stage 3	-3.7	-0.49	0.66
Stage 3	-3.9	-0.37	0.58
Stage 3	-4.1	-0.28	0.49
Stage 3	-4.3	-0.19	0.43
Stage 3	-4.5	-0.11	0.37
Stage 3	-4.7	-0.05	0.31
Stage 3	-4.9	0	0.26
Stage 3	-5.1	0.04	0.21
Stage 3	-5.3	0.07	0.16
Stage 3	-5.5	0.1	0.12
Stage 3	-5.7	0.11	0.08
Stage 3	-5.9	0.12	0.05
Stage 3	-6.1	0.13	0.02
Stage 3	-6.3	0.13	0
Stage 3	-6.5	0.13	-0.02
Stage 3	-6.7	0.12	-0.03
Stage 3	-6.9	0.11	-0.04
Stage 3	-7.1	0.1	-0.05
Stage 3	-7.3	0.09	-0.05
Stage 3	-7.5	0.08	-0.05
Stage 3	-7.7	0.07	-0.05
Stage 3	-7.9	0.06	-0.05
Stage 3	-8.1	0.05	-0.05
Stage 3	-8.3	0.04	-0.05
Stage 3	-8.5	0.03	-0.04
Stage 3	-8.7	0.03	-0.04
Stage 3	-8.9	0.02	-0.03
Stage 3	-9.1	0.01	-0.03
Stage 3	-9.3	0.01	-0.02
Stage 3	-9.5	0	-0.02
Stage 3	-9.7	0	-0.01
Stage 3	-9.9	0	-0.01
Stage 3	-10	0	0



### 7.3.6. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Right wall - Stage: Stage 3

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	0	0	0
Stage 3	-0.2	0	0
Stage 3	-0.2	0	0
Stage 3	-0.4	0	0
Stage 3	-0.4	0	0
Stage 3	-0.5	0.01	0.07
Stage 3	-0.7	0.07	0.3
Stage 3	-0.9	0.27	1.01
Stage 3	-1.1	0.7	2.17
Stage 3	-1.3	1.05	1.75
Stage 3	-1.5	1.29	1.17
Stage 3	-1.7	1.42	0.67
Stage 3	-1.9	1.47	0.26
Stage 3	-2.1	1.46	-0.07
Stage 3	-2.3	1.4	-0.31
Stage 3	-2.5	1.3	-0.49
Stage 3	-2.7	1.18	-0.61
Stage 3	-2.9	1.04	-0.68
Stage 3	-3.1	0.9	-0.71
Stage 3	-3.3	0.76	-0.71
Stage 3	-3.5	0.62	-0.69
Stage 3	-3.7	0.49	-0.66
Stage 3	-3.9	0.37	-0.58
Stage 3	-4.1	0.28	-0.49
Stage 3	-4.3	0.19	-0.43
Stage 3	-4.5	0.11	-0.37
Stage 3	-4.7	0.05	-0.31
Stage 3	-4.9	0	-0.26
Stage 3	-5.1	-0.04	-0.21
Stage 3	-5.3	-0.07	-0.16
Stage 3	-5.5	-0.1	-0.12
Stage 3	-5.7	-0.11	-0.08
Stage 3	-5.9	-0.12	-0.05
Stage 3	-6.1	-0.13	-0.02
Stage 3	-6.3	-0.13	0
Stage 3	-6.5	-0.13	0.02
Stage 3	-6.7	-0.12	0.03
Stage 3	-6.9	-0.11	0.04
Stage 3	-7.1	-0.1	0.05
Stage 3	-7.3	-0.09	0.05
Stage 3	-7.5	-0.08	0.05
Stage 3	-7.7	-0.07	0.05
Stage 3	-7.9	-0.06	0.05
Stage 3	-8.1	-0.05	0.05
Stage 3	-8.3	-0.04	0.05
Stage 3	-8.5	-0.03	0.04
Stage 3	-8.7	-0.03	0.04
Stage 3	-8.9	-0.02	0.03
Stage 3	-9.1	-0.01	0.03
Stage 3	-9.3	-0.01	0.02
Stage 3	-9.5	0	0.02
Stage 3	-9.7	0	0.01
Stage 3	-9.9	0	0.01
Stage 3	-10	0	0

### 7.3.7. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 4

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 4	0	0	0
Stage 4	-0.2	0	0
Stage 4	-0.2	0	0
Stage 4	-0.4	0	0
Stage 4	-0.4	0	0
Stage 4	-0.5	-0.01	-0.07
Stage 4	-0.7	-0.07	-0.3
Stage 4	-0.9	-0.27	-1.01
Stage 4	-1.1	-0.7	-2.17
Stage 4	-1.3	-1.05	-1.75
Stage 4	-1.5	-1.29	-1.17
Stage 4	-1.7	-1.42	-0.67
Stage 4	-1.9	-1.47	-0.26
Stage 4	-2.1	-1.46	0.07
Stage 4	-2.3	-1.4	0.31
Stage 4	-2.5	-1.3	0.49
Stage 4	-2.7	-1.18	0.61
Stage 4	-2.9	-1.04	0.68
Stage 4	-3.1	-0.9	0.71
Stage 4	-3.3	-0.76	0.71
Stage 4	-3.5	-0.62	0.69
Stage 4	-3.7	-0.49	0.66
Stage 4	-3.9	-0.37	0.58
Stage 4	-4.1	-0.28	0.49
Stage 4	-4.3	-0.19	0.43
Stage 4	-4.5	-0.11	0.37
Stage 4	-4.7	-0.05	0.31
Stage 4	-4.9	0	0.26
Stage 4	-5.1	0.04	0.21
Stage 4	-5.3	0.07	0.16
Stage 4	-5.5	0.1	0.12
Stage 4	-5.7	0.11	0.08
Stage 4	-5.9	0.12	0.05
Stage 4	-6.1	0.13	0.02
Stage 4	-6.3	0.13	0
Stage 4	-6.5	0.13	-0.02
Stage 4	-6.7	0.12	-0.03
Stage 4	-6.9	0.11	-0.04
Stage 4	-7.1	0.1	-0.05
Stage 4	-7.3	0.09	-0.05
Stage 4	-7.5	0.08	-0.05
Stage 4	-7.7	0.07	-0.05
Stage 4	-7.9	0.06	-0.05
Stage 4	-8.1	0.05	-0.05
Stage 4	-8.3	0.04	-0.05
Stage 4	-8.5	0.03	-0.04
Stage 4	-8.7	0.03	-0.04
Stage 4	-8.9	0.02	-0.03
Stage 4	-9.1	0.01	-0.03
Stage 4	-9.3	0.01	-0.02
Stage 4	-9.5	0	-0.02
Stage 4	-9.7	0	-0.01
Stage 4	-9.9	0	-0.01
Stage 4	-10	0	0

### 7.3.8. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Right wall - Stage: Stage 4

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 4	0	0	0
Stage 4	-0.2	0	0
Stage 4	-0.2	0	0
Stage 4	-0.4	0	0
Stage 4	-0.4	0	0
Stage 4	-0.5	0.01	0.07
Stage 4	-0.7	0.07	0.3
Stage 4	-0.9	0.27	1.01
Stage 4	-1.1	0.7	2.17
Stage 4	-1.3	1.05	1.75
Stage 4	-1.5	1.29	1.17
Stage 4	-1.7	1.42	0.67
Stage 4	-1.9	1.47	0.26
Stage 4	-2.1	1.46	-0.07
Stage 4	-2.3	1.4	-0.31
Stage 4	-2.5	1.3	-0.49
Stage 4	-2.7	1.18	-0.61
Stage 4	-2.9	1.04	-0.68
Stage 4	-3.1	0.9	-0.71
Stage 4	-3.3	0.76	-0.71
Stage 4	-3.5	0.62	-0.69
Stage 4	-3.7	0.49	-0.66
Stage 4	-3.9	0.37	-0.58
Stage 4	-4.1	0.28	-0.49
Stage 4	-4.3	0.19	-0.43
Stage 4	-4.5	0.11	-0.37
Stage 4	-4.7	0.05	-0.31
Stage 4	-4.9	0	-0.26
Stage 4	-5.1	-0.04	-0.21
Stage 4	-5.3	-0.07	-0.16
Stage 4	-5.5	-0.1	-0.12
Stage 4	-5.7	-0.11	-0.08
Stage 4	-5.9	-0.12	-0.05
Stage 4	-6.1	-0.13	-0.02
Stage 4	-6.3	-0.13	0
Stage 4	-6.5	-0.13	0.02
Stage 4	-6.7	-0.12	0.03
Stage 4	-6.9	-0.11	0.04
Stage 4	-7.1	-0.1	0.05
Stage 4	-7.3	-0.09	0.05
Stage 4	-7.5	-0.08	0.05
Stage 4	-7.7	-0.07	0.05
Stage 4	-7.9	-0.06	0.05
Stage 4	-8.1	-0.05	0.05
Stage 4	-8.3	-0.04	0.05
Stage 4	-8.5	-0.03	0.04
Stage 4	-8.7	-0.03	0.04
Stage 4	-8.9	-0.02	0.03
Stage 4	-9.1	-0.01	0.03
Stage 4	-9.3	-0.01	0.02
Stage 4	-9.5	0	0.02
Stage 4	-9.7	0	0.01
Stage 4	-9.9	0	0.01
Stage 4	-10	0	0

### 7.3.9. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 5

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 5	0	0	-0.19
Stage 5	-0.2	-0.04	-0.19
Stage 5	-0.4	-0.14	-0.5
Stage 5	-0.5	-0.2	-0.59
Stage 5	-0.7	4.16	21.77
Stage 5	-0.9	8.37	21.06
Stage 5	-1.1	12.35	19.9
Stage 5	-1.3	16.02	18.33
Stage 5	-1.5	19.29	16.37
Stage 5	-1.7	22.1	14.04
Stage 5	-1.9	24.37	11.35
Stage 5	-2.1	26.03	8.33
Stage 5	-2.3	27.02	4.96
Stage 5	-2.5	27.27	1.26
Stage 5	-2.7	26.72	-2.78
Stage 5	-2.9	25.29	-7.13
Stage 5	-3.1	22.93	-11.82
Stage 5	-3.3	20.09	-14.17
Stage 5	-3.5	17.15	-14.74
Stage 5	-3.7	14.28	-14.33
Stage 5	-3.9	11.54	-13.68
Stage 5	-4.1	8.98	-12.84
Stage 5	-4.3	6.61	-11.81
Stage 5	-4.5	4.48	-10.66
Stage 5	-4.7	2.61	-9.39
Stage 5	-4.9	1	-8.02
Stage 5	-5.1	-0.34	-6.69
Stage 5	-5.3	-1.43	-5.47
Stage 5	-5.5	-2.3	-4.35
Stage 5	-5.7	-2.97	-3.34
Stage 5	-5.9	-3.46	-2.44
Stage 5	-6.1	-3.78	-1.64
Stage 5	-6.3	-3.97	-0.95
Stage 5	-6.5	-4.04	-0.34
Stage 5	-6.7	-4.01	0.17
Stage 5	-6.9	-3.89	0.6
Stage 5	-7.1	-3.7	0.95
Stage 5	-7.3	-3.46	1.22
Stage 5	-7.5	-3.17	1.44
Stage 5	-7.7	-2.85	1.59
Stage 5	-7.9	-2.51	1.68
Stage 5	-8.1	-2.17	1.73
Stage 5	-8.3	-1.82	1.73
Stage 5	-8.5	-1.48	1.69
Stage 5	-8.7	-1.16	1.6
Stage 5	-8.9	-0.87	1.48
Stage 5	-9.1	-0.61	1.32
Stage 5	-9.3	-0.38	1.12
Stage 5	-9.5	-0.2	0.89
Stage 5	-9.7	-0.08	0.63
Stage 5	-9.9	-0.01	0.33
Stage 5	-10	0	0.09

### 7.3.10. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Right wall - Stage: Stage 5

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 5	0	0	0.19
Stage 5	-0.2	0.04	0.19
Stage 5	-0.4	0.14	0.5
Stage 5	-0.5	0.2	0.59
Stage 5	-0.7	-4.16	-21.77
Stage 5	-0.9	-8.37	-21.06
Stage 5	-1.1	-12.35	-19.9
Stage 5	-1.3	-16.02	-18.33
Stage 5	-1.5	-19.29	-16.37
Stage 5	-1.7	-22.1	-14.04
Stage 5	-1.9	-24.37	-11.35
Stage 5	-2.1	-26.03	-8.33
Stage 5	-2.3	-27.02	-4.96
Stage 5	-2.5	-27.27	-1.26
Stage 5	-2.7	-26.72	2.78
Stage 5	-2.9	-25.29	7.13
Stage 5	-3.1	-22.93	11.82
Stage 5	-3.3	-20.09	14.17
Stage 5	-3.5	-17.15	14.74
Stage 5	-3.7	-14.28	14.33
Stage 5	-3.9	-11.54	13.68
Stage 5	-4.1	-8.98	12.84
Stage 5	-4.3	-6.61	11.81
Stage 5	-4.5	-4.48	10.66
Stage 5	-4.7	-2.61	9.39
Stage 5	-4.9	-1	8.02
Stage 5	-5.1	0.34	6.69
Stage 5	-5.3	1.43	5.47
Stage 5	-5.5	2.3	4.35
Stage 5	-5.7	2.97	3.34
Stage 5	-5.9	3.46	2.44
Stage 5	-6.1	3.78	1.64
Stage 5	-6.3	3.97	0.95
Stage 5	-6.5	4.04	0.34
Stage 5	-6.7	4.01	-0.17
Stage 5	-6.9	3.89	-0.6
Stage 5	-7.1	3.7	-0.95
Stage 5	-7.3	3.46	-1.22
Stage 5	-7.5	3.17	-1.44
Stage 5	-7.7	2.85	-1.59
Stage 5	-7.9	2.51	-1.68
Stage 5	-8.1	2.17	-1.73
Stage 5	-8.3	1.82	-1.73
Stage 5	-8.5	1.48	-1.69
Stage 5	-8.7	1.16	-1.6
Stage 5	-8.9	0.87	-1.48
Stage 5	-9.1	0.61	-1.32
Stage 5	-9.3	0.38	-1.12
Stage 5	-9.5	0.2	-0.89
Stage 5	-9.7	0.08	-0.63
Stage 5	-9.9	0.01	-0.33
Stage 5	-10	0	-0.09

### 7.3.11. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 6

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 6	0	0	-0.42
Stage 6	-0.2	-0.08	-0.42
Stage 6	-0.4	-0.29	-1.04
Stage 6	-0.5	-0.41	-1.2
Stage 6	-0.7	6.87	36.38
Stage 6	-0.9	14	35.67
Stage 6	-1.1	20.9	34.51
Stage 6	-1.3	27.49	32.93
Stage 6	-1.5	33.68	30.97
Stage 6	-1.7	39.41	28.64
Stage 6	-1.9	44.6	25.96
Stage 6	-2.1	49.19	22.93
Stage 6	-2.3	53.1	19.56
Stage 6	-2.5	56.27	15.86
Stage 6	-2.7	58.64	11.83
Stage 6	-2.9	60.13	7.47
Stage 6	-3.1	60.69	2.79
Stage 6	-3.3	60.25	-2.22
Stage 6	-3.5	58.74	-7.54
Stage 6	-3.7	56.1	-13.19
Stage 6	-3.9	52.27	-19.17
Stage 6	-4.1	47.18	-25.47
Stage 6	-4.3	41.29	-29.41
Stage 6	-4.5	34.98	-31.56
Stage 6	-4.7	28.6	-31.92
Stage 6	-4.9	22.5	-30.49
Stage 6	-5.1	16.9	-27.98
Stage 6	-5.3	11.83	-25.39
Stage 6	-5.5	7.27	-22.76
Stage 6	-5.7	3.25	-20.13
Stage 6	-5.9	-0.26	-17.51
Stage 6	-6.1	-3.24	-14.92
Stage 6	-6.3	-5.71	-12.35
Stage 6	-6.5	-7.67	-9.82
Stage 6	-6.7	-9.14	-7.32
Stage 6	-6.9	-10.11	-4.87
Stage 6	-7.1	-10.61	-2.47
Stage 6	-7.3	-10.69	-0.42
Stage 6	-7.5	-10.43	1.32
Stage 6	-7.7	-9.87	2.75
Stage 6	-7.9	-9.1	3.89
Stage 6	-8.1	-8.15	4.75
Stage 6	-8.3	-7.08	5.35
Stage 6	-8.5	-5.94	5.69
Stage 6	-8.7	-4.78	5.78
Stage 6	-8.9	-3.65	5.64
Stage 6	-9.1	-2.6	5.26
Stage 6	-9.3	-1.67	4.66
Stage 6	-9.5	-0.9	3.84
Stage 6	-9.7	-0.34	2.79
Stage 6	-9.9	-0.04	1.52
Stage 6	-10	0	0.4

### 7.3.12. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Right wall - Stage: Stage 6

Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 6	0	0	0.42
Stage 6	-0.2	0.08	0.42
Stage 6	-0.4	0.29	1.04
Stage 6	-0.5	0.41	1.2
Stage 6	-0.7	-6.87	-36.38
Stage 6	-0.9	-14	-35.67
Stage 6	-1.1	-20.9	-34.51
Stage 6	-1.3	-27.49	-32.93
Stage 6	-1.5	-33.68	-30.97
Stage 6	-1.7	-39.41	-28.64
Stage 6	-1.9	-44.6	-25.96
Stage 6	-2.1	-49.19	-22.93
Stage 6	-2.3	-53.1	-19.56
Stage 6	-2.5	-56.27	-15.86
Stage 6	-2.7	-58.64	-11.83
Stage 6	-2.9	-60.13	-7.47
Stage 6	-3.1	-60.69	-2.79
Stage 6	-3.3	-60.25	2.22
Stage 6	-3.5	-58.74	7.54
Stage 6	-3.7	-56.1	13.19
Stage 6	-3.9	-52.27	19.17
Stage 6	-4.1	-47.18	25.47
Stage 6	-4.3	-41.29	29.41
Stage 6	-4.5	-34.98	31.56
Stage 6	-4.7	-28.6	31.92
Stage 6	-4.9	-22.5	30.49
Stage 6	-5.1	-16.9	27.98
Stage 6	-5.3	-11.83	25.39
Stage 6	-5.5	-7.27	22.76
Stage 6	-5.7	-3.25	20.13
Stage 6	-5.9	0.26	17.51
Stage 6	-6.1	3.24	14.92
Stage 6	-6.3	5.71	12.35
Stage 6	-6.5	7.67	9.82
Stage 6	-6.7	9.14	7.32
Stage 6	-6.9	10.11	4.87
Stage 6	-7.1	10.61	2.47
Stage 6	-7.3	10.69	0.42
Stage 6	-7.5	10.43	-1.32
Stage 6	-7.7	9.87	-2.75
Stage 6	-7.9	9.1	-3.89
Stage 6	-8.1	8.15	-4.75
Stage 6	-8.3	7.08	-5.35
Stage 6	-8.5	5.94	-5.69
Stage 6	-8.7	4.78	-5.78
Stage 6	-8.9	3.65	-5.64
Stage 6	-9.1	2.6	-5.26
Stage 6	-9.3	1.67	-4.66
Stage 6	-9.5	0.9	-3.84
Stage 6	-9.7	0.34	-2.79
Stage 6	-9.9	0.04	-1.52
Stage 6	-10	0	-0.4

### 7.3.13. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Left Wall - Stage: Stage 7

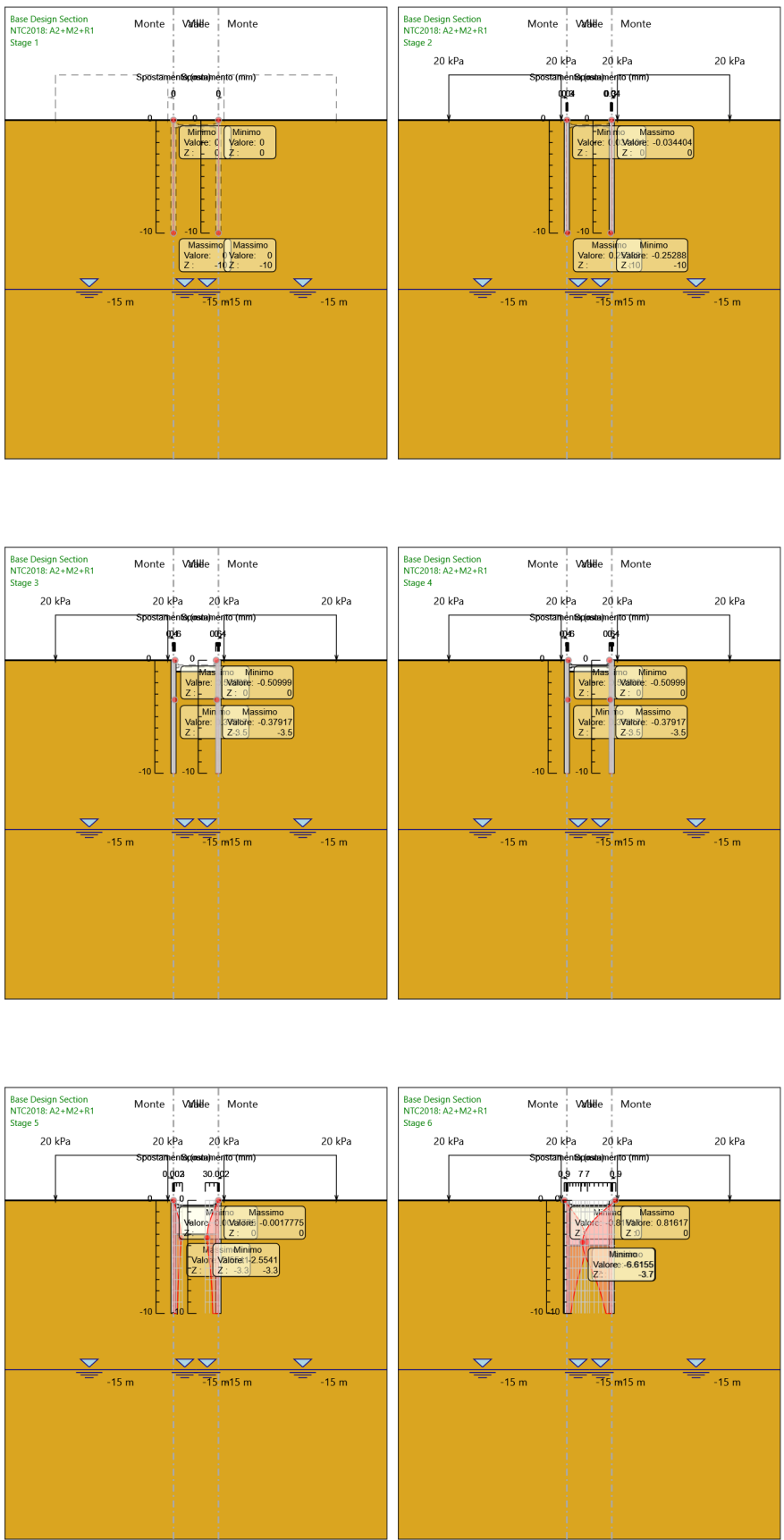
Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 7	0	0	-0.8
Stage 7	-0.2	-0.16	-0.8
Stage 7	-0.4	-0.58	-2.12
Stage 7	-0.5	-0.83	-2.51
Stage 7	-0.7	12.12	64.77
Stage 7	-0.9	24.93	64.06
Stage 7	-1.1	37.51	62.9
Stage 7	-1.3	49.77	61.32
Stage 7	-1.5	61.65	59.36
Stage 7	-1.7	73.05	57.03
Stage 7	-1.9	83.92	54.35
Stage 7	-2.1	94.19	51.32
Stage 7	-2.3	103.78	47.95
Stage 7	-2.5	112.63	44.25
Stage 7	-2.7	120.67	40.22
Stage 7	-2.9	127.84	35.86
Stage 7	-3.1	134.08	31.18
Stage 7	-3.3	139.31	26.17
Stage 7	-3.5	143.48	20.85
Stage 7	-3.7	146.52	15.2
Stage 7	-3.9	148.37	9.22
Stage 7	-4.1	148.95	2.92
Stage 7	-4.3	148.22	-3.67
Stage 7	-4.5	146.1	-10.58
Stage 7	-4.7	142.54	-17.8
Stage 7	-4.9	137.48	-25.34
Stage 7	-5.1	130.84	-33.19
Stage 7	-5.3	122.57	-41.35
Stage 7	-5.5	112.61	-49.82
Stage 7	-5.7	101.52	-55.43
Stage 7	-5.9	89.67	-59.24
Stage 7	-6.1	77.42	-61.26
Stage 7	-6.3	65.12	-61.48
Stage 7	-6.5	53.14	-59.91
Stage 7	-6.7	41.83	-56.55
Stage 7	-6.9	31.55	-51.39
Stage 7	-7.1	22.63	-44.62
Stage 7	-7.3	15.01	-38.11
Stage 7	-7.5	8.63	-31.88
Stage 7	-7.7	3.44	-25.94
Stage 7	-7.9	-0.62	-20.3
Stage 7	-8.1	-3.61	-14.97
Stage 7	-8.3	-5.6	-9.94
Stage 7	-8.5	-6.64	-5.22
Stage 7	-8.7	-6.85	-1.05
Stage 7	-8.9	-6.34	2.55
Stage 7	-9.1	-5.22	5.6
Stage 7	-9.3	-3.76	7.31
Stage 7	-9.5	-2.24	7.63
Stage 7	-9.7	-0.93	6.54
Stage 7	-9.9	-0.11	4.06
Stage 7	-10	0	1.15

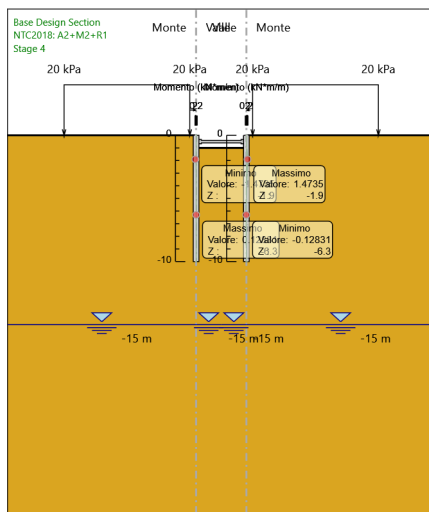
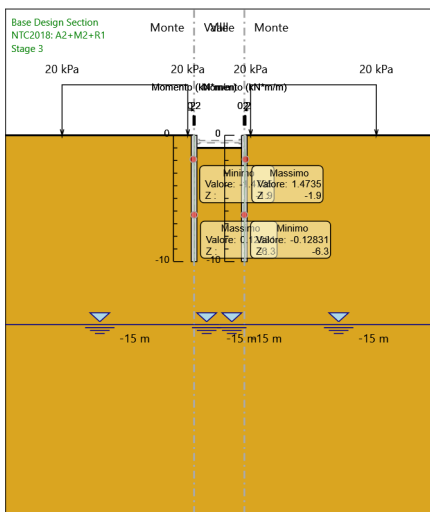
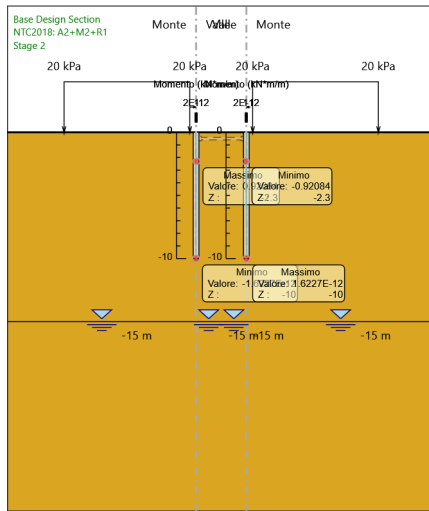
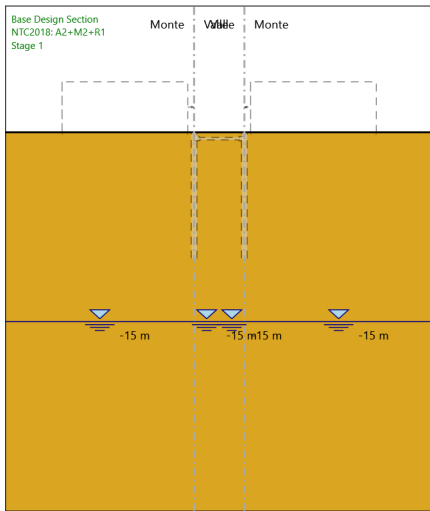
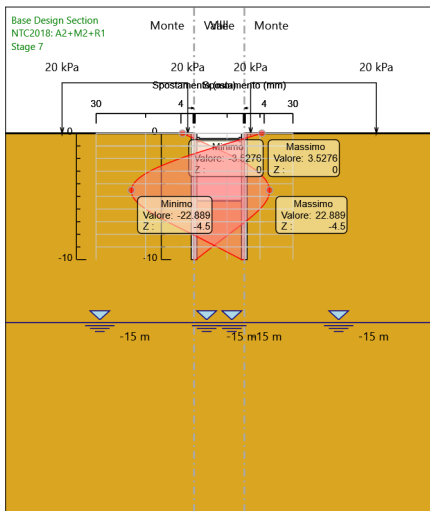


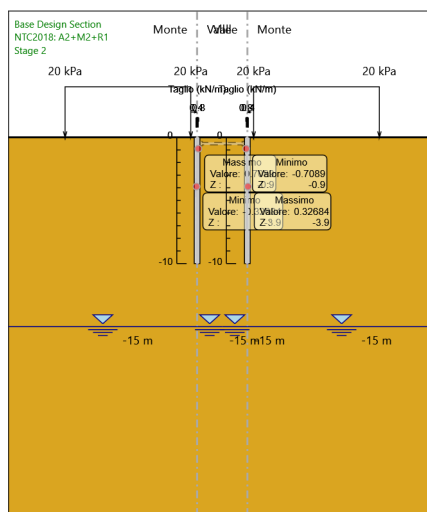
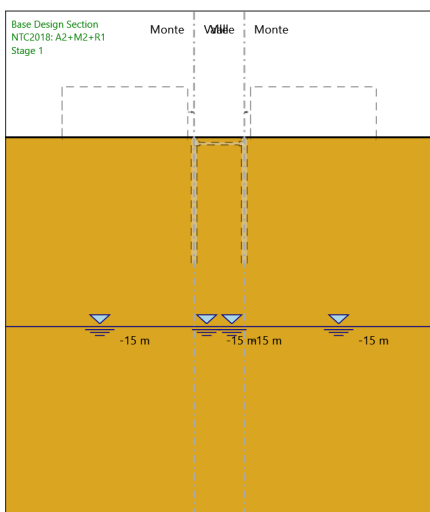
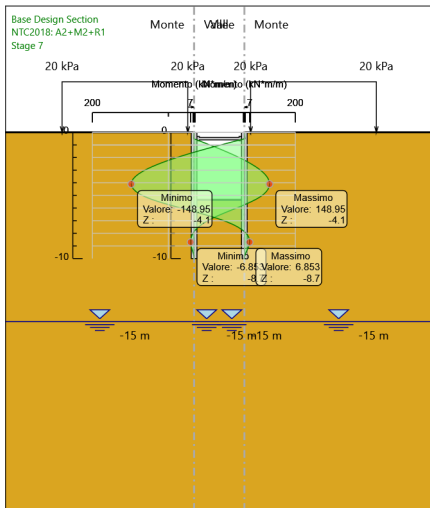
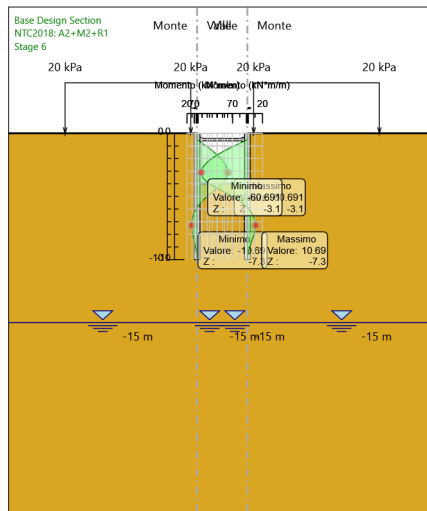
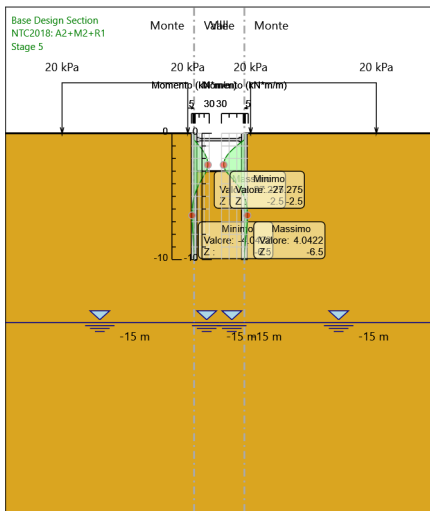
### 7.3.14. Tabella Risultati Paratia NTC2018: A2+M2+R1 - Right wall - Stage: Stage 7

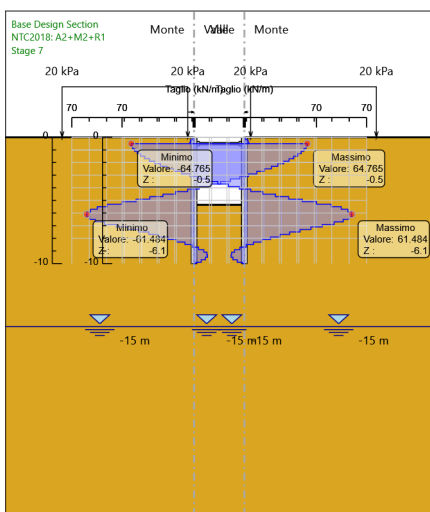
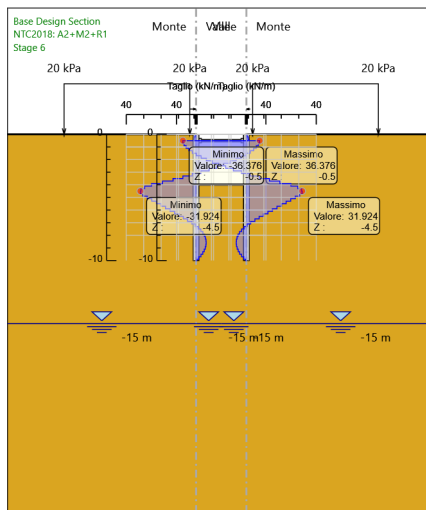
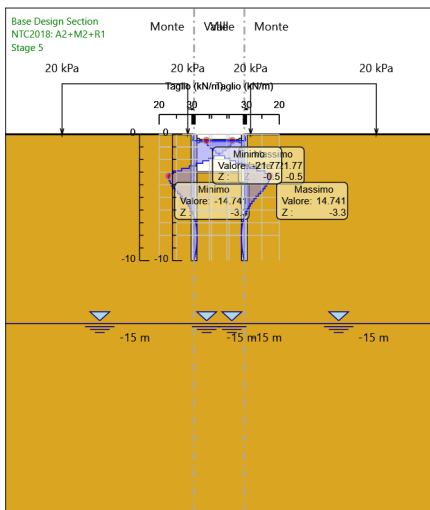
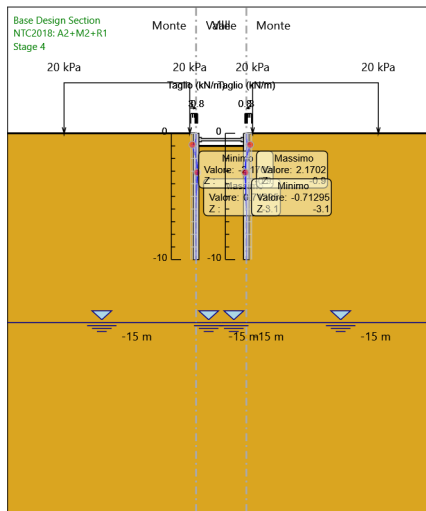
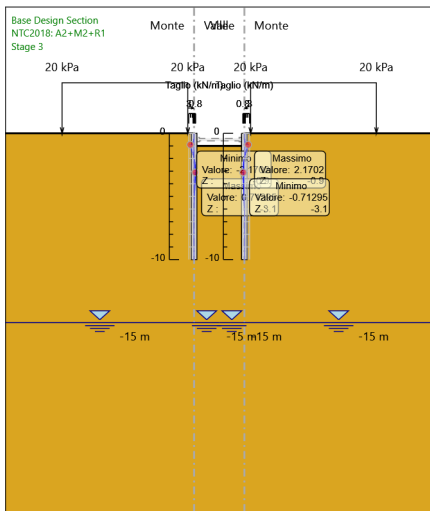
Design Assumption: NTC2018: A2+M2+R1 Risultati Paratia		Muro: RIGHT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 7	0	0	0.8
Stage 7	-0.2	0.16	0.8
Stage 7	-0.4	0.58	2.12
Stage 7	-0.5	0.83	2.51
Stage 7	-0.7	-12.12	-64.77
Stage 7	-0.9	-24.93	-64.06
Stage 7	-1.1	-37.51	-62.9
Stage 7	-1.3	-49.77	-61.32
Stage 7	-1.5	-61.65	-59.36
Stage 7	-1.7	-73.05	-57.03
Stage 7	-1.9	-83.92	-54.35
Stage 7	-2.1	-94.19	-51.32
Stage 7	-2.3	-103.78	-47.95
Stage 7	-2.5	-112.63	-44.25
Stage 7	-2.7	-120.67	-40.22
Stage 7	-2.9	-127.84	-35.86
Stage 7	-3.1	-134.08	-31.18
Stage 7	-3.3	-139.31	-26.17
Stage 7	-3.5	-143.48	-20.85
Stage 7	-3.7	-146.52	-15.2
Stage 7	-3.9	-148.37	-9.22
Stage 7	-4.1	-148.95	-2.92
Stage 7	-4.3	-148.22	3.67
Stage 7	-4.5	-146.1	10.58
Stage 7	-4.7	-142.54	17.8
Stage 7	-4.9	-137.48	25.34
Stage 7	-5.1	-130.84	33.19
Stage 7	-5.3	-122.57	41.35
Stage 7	-5.5	-112.61	49.82
Stage 7	-5.7	-101.52	55.43
Stage 7	-5.9	-89.67	59.24
Stage 7	-6.1	-77.42	61.26
Stage 7	-6.3	-65.12	61.48
Stage 7	-6.5	-53.14	59.91
Stage 7	-6.7	-41.83	56.55
Stage 7	-6.9	-31.55	51.39
Stage 7	-7.1	-22.63	44.62
Stage 7	-7.3	-15.01	38.11
Stage 7	-7.5	-8.63	31.88
Stage 7	-7.7	-3.44	25.94
Stage 7	-7.9	0.62	20.3
Stage 7	-8.1	3.61	14.97
Stage 7	-8.3	5.6	9.94
Stage 7	-8.5	6.64	5.22
Stage 7	-8.7	6.85	1.05
Stage 7	-8.9	6.34	-2.55
Stage 7	-9.1	5.22	-5.6
Stage 7	-9.3	3.76	-7.31
Stage 7	-9.5	2.24	-7.63
Stage 7	-9.7	0.93	-6.54
Stage 7	-9.9	0.11	-4.06
Stage 7	-10	0	-1.15

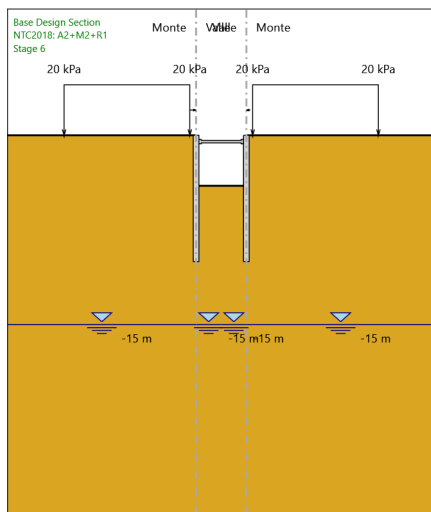
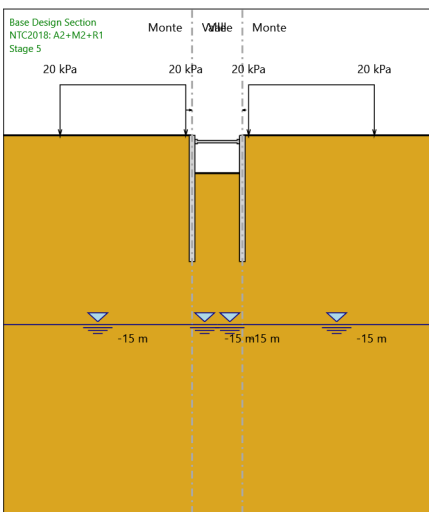
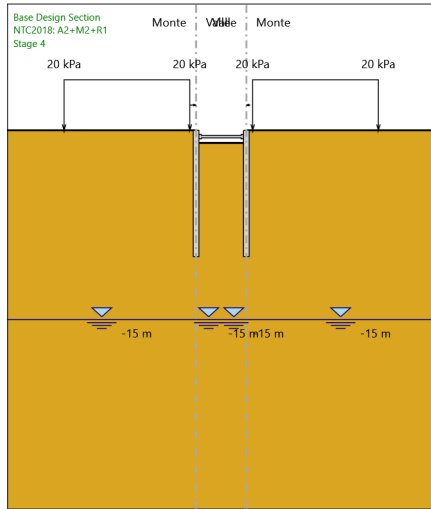
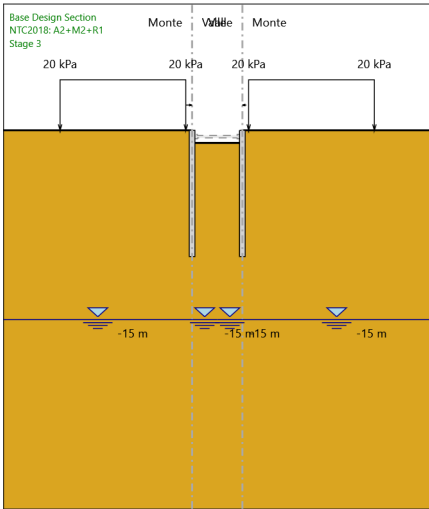
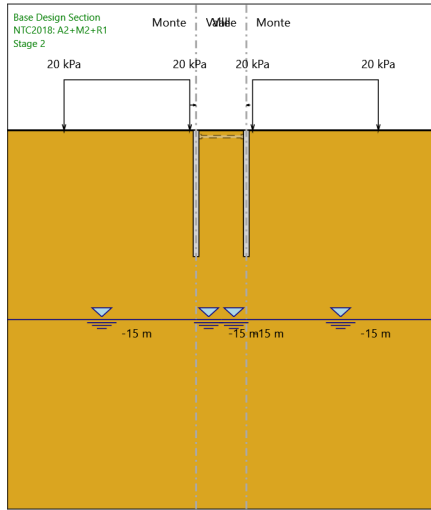
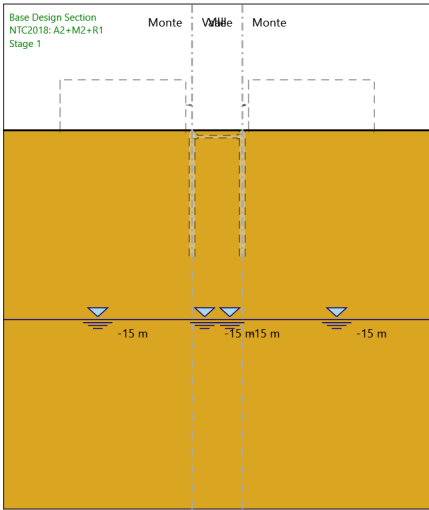
### 7.3.15. Tabella Grafici dei Risultati

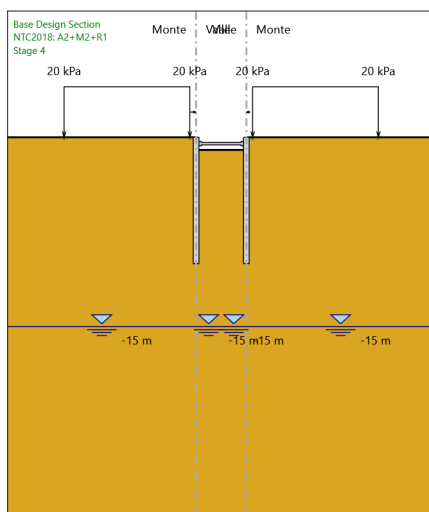
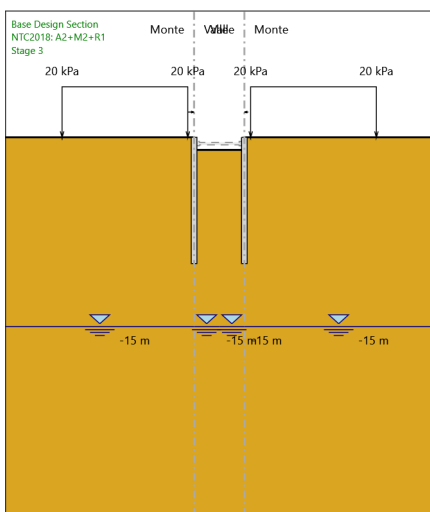
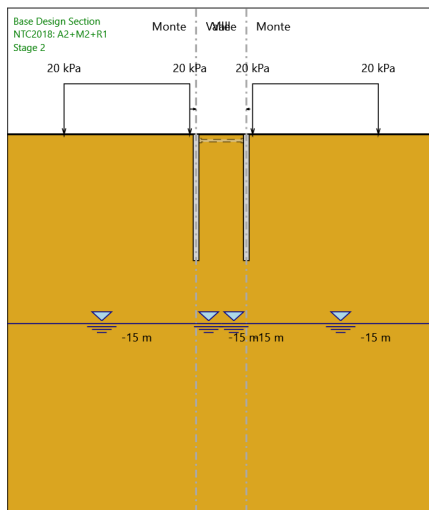
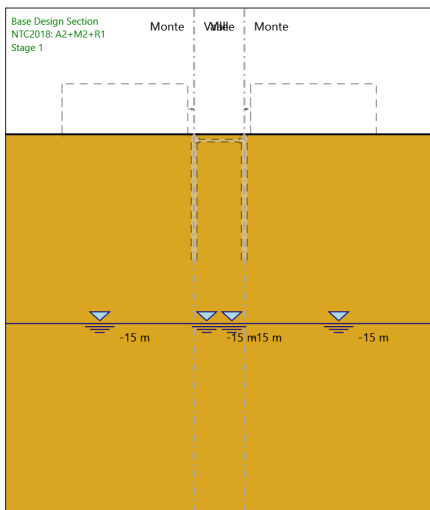
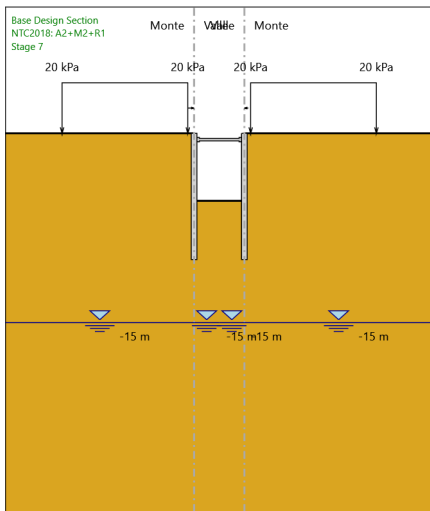


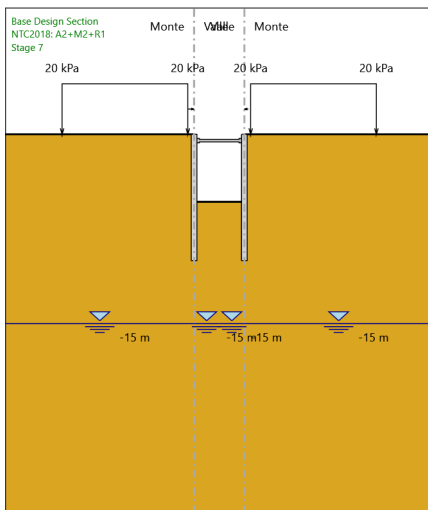
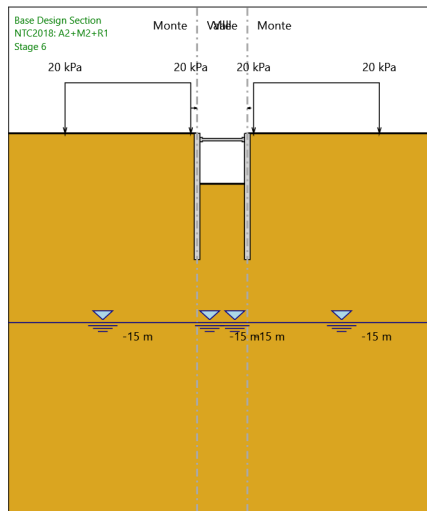
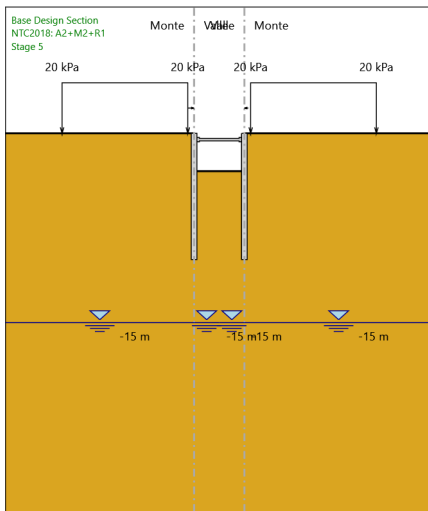












### 7.3.16. Risultati Elementi strutturali - NTC2018: A2+M2+R1

Design Assumption: NTC2018: A2+M2+R1 Sollecitazione Strut

Stage	Forza (kN/m)
Stage 4	-4.5786942E-14
Stage 5	-22.58679
Stage 6	-37.79859
Stage 7	-67.50089



## **8. Normative adottate per le verifiche degli Elementi Strutturali**

### **Normative Verifiche**

Calcestruzzo	NTC
Acciaio	EC3
Tirante	NTC

### **Coefficienti per Verifica Tiranti**

GEO FS	1
$\xi_{a3}$	1.8
$\gamma_s$	1.15

# 8.1. Riepilogo Stage / Design Assumption per Inviluppo

Design Assumption	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7
NTC2018: SLE (Rara/Frequente/Quasi Permanente)	V	V	V	V	V	V	V
NTC2018: A1+M1+R1 (R3 per tiranti)	V	V	V	V	V	V	V
NTC2018: A2+M2+R1	V	V	V	V	V	V	V

## 8.2. Risultati SteelWorld

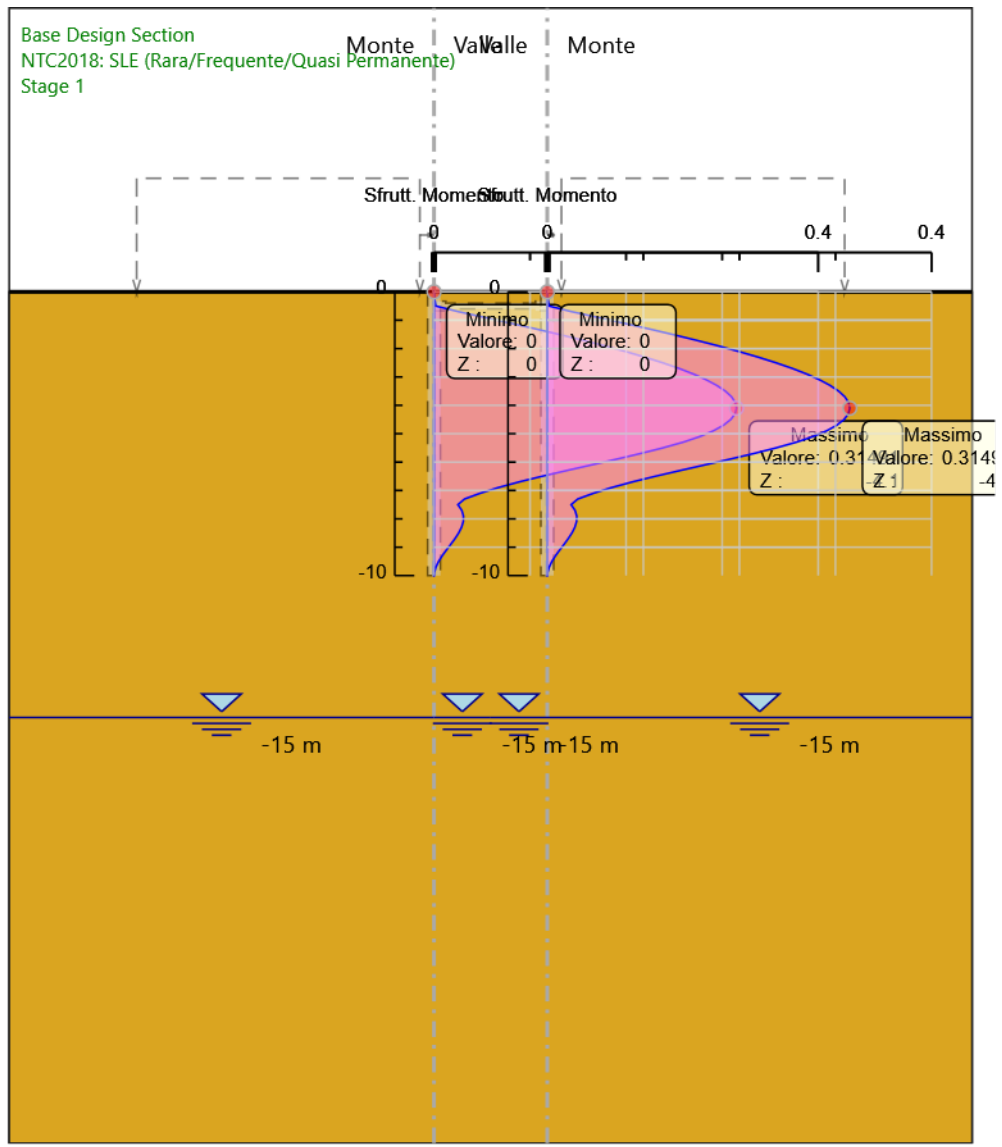
### 8.2.1. Tabella Involuppi Tasso di Sfruttamento a Momento - SteelWorld : LEFT

Involuppi Tasso di Sfruttamento a Momento - SteelWorld	LEFT
Z (m)	Tasso di Sfruttamento a Momento - SteelWorld
0	0
-0.2	0
-0.4	0.001
-0.5	0.002
-0.7	0.026
-0.9	0.053
-1.1	0.079
-1.3	0.105
-1.5	0.13
-1.7	0.154
-1.9	0.177
-2.1	0.199
-2.3	0.219
-2.5	0.238
-2.7	0.255
-2.9	0.27
-3.1	0.283
-3.3	0.295
-3.5	0.303
-3.7	0.31
-3.9	0.314
-4.1	0.315
-4.3	0.313
-4.5	0.309
-4.7	0.301
-4.9	0.291
-5.1	0.277
-5.3	0.259
-5.5	0.238
-5.7	0.215
-5.9	0.19
-6.1	0.164
-6.3	0.138
-6.5	0.112
-6.7	0.088
-6.9	0.067
-7.1	0.048
-7.3	0.032
-7.5	0.025
-7.7	0.029
-7.9	0.031
-8.1	0.03
-8.3	0.029
-8.5	0.026
-8.7	0.022
-8.9	0.017
-9.1	0.013
-9.3	0.008
-9.5	0.005
-9.7	0.002
-9.9	0
-10	0

## 8.2.2. Tabella Involuppi Tasso di Sfruttamento a Momento - SteelWorld : RIGHT

Involuppi Tasso di Sfruttamento a Momento - SteelWorld	RIGHT
Z (m)	Tasso di Sfruttamento a Momento - SteelWorld
0	0
-0.2	0
-0.4	0.001
-0.5	0.002
-0.7	0.026
-0.9	0.053
-1.1	0.079
-1.3	0.105
-1.5	0.13
-1.7	0.154
-1.9	0.177
-2.1	0.199
-2.3	0.219
-2.5	0.238
-2.7	0.255
-2.9	0.27
-3.1	0.283
-3.3	0.295
-3.5	0.303
-3.7	0.31
-3.9	0.314
-4.1	0.315
-4.3	0.313
-4.5	0.309
-4.7	0.301
-4.9	0.291
-5.1	0.277
-5.3	0.259
-5.5	0.238
-5.7	0.215
-5.9	0.19
-6.1	0.164
-6.3	0.138
-6.5	0.112
-6.7	0.088
-6.9	0.067
-7.1	0.048
-7.3	0.032
-7.5	0.025
-7.7	0.029
-7.9	0.031
-8.1	0.03
-8.3	0.029
-8.5	0.026
-8.7	0.022
-8.9	0.017
-9.1	0.013
-9.3	0.008
-9.5	0.005
-9.7	0.002
-9.9	0
-10	0

### 8.2.3. Grafico Involuppi Tasso di Sfruttamento a Momento - SteelWorld



Involuppi  
 Tasso di Sfruttamento a Momento - SteelWorld

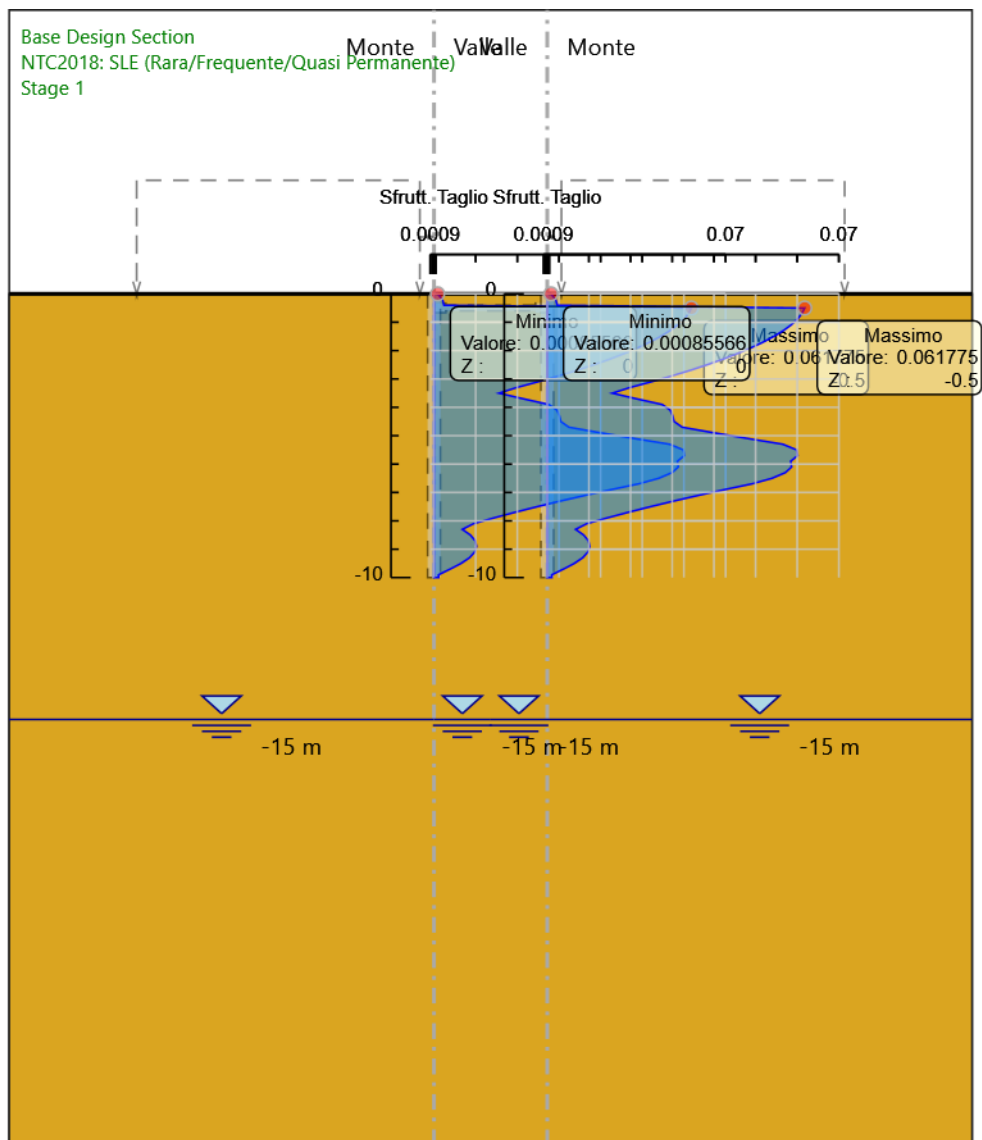
### 8.2.1. Tabella Involuppi Tasso di Sfruttamento a Taglio - SteelWorld : LEFT

Involuppi Tasso di Sfruttamento a Taglio - SteelWorld		LEFT
Z (m)	Tasso di Sfruttamento a Taglio - SteelWorld	
0	0.001	
-0.2	0.002	
-0.4	0.002	
-0.5	0.062	
-0.7	0.061	
-0.9	0.06	
-1.1	0.058	
-1.3	0.057	
-1.5	0.054	
-1.7	0.052	
-1.9	0.049	
-2.1	0.046	
-2.3	0.042	
-2.5	0.038	
-2.7	0.034	
-2.9	0.03	
-3.1	0.025	
-3.3	0.02	
-3.5	0.016	
-3.7	0.021	
-3.9	0.028	
-4.1	0.03	
-4.3	0.03	
-4.5	0.03	
-4.7	0.032	
-4.9	0.04	
-5.1	0.048	
-5.3	0.057	
-5.5	0.06	
-5.7	0.06	
-5.9	0.058	
-6.1	0.059	
-6.3	0.057	
-6.5	0.054	
-6.7	0.049	
-6.9	0.043	
-7.1	0.036	
-7.3	0.03	
-7.5	0.025	
-7.7	0.019	
-7.9	0.014	
-8.1	0.009	
-8.3	0.007	
-8.5	0.009	
-8.7	0.01	
-8.9	0.01	
-9.1	0.01	
-9.3	0.009	
-9.5	0.006	
-9.7	0.004	
-9.9	0.001	
-10	0.001	

## 8.2.2. Tabella Involuppi Tasso di Sfruttamento a Taglio - SteelWorld : RIGHT

Involuppi Tasso di Sfruttamento a Taglio - SteelWorld		RIGHT
Z (m)	Tasso di Sfruttamento a Taglio - SteelWorld	
0	0.001	
-0.2	0.002	
-0.4	0.002	
-0.5	0.062	
-0.7	0.061	
-0.9	0.06	
-1.1	0.058	
-1.3	0.057	
-1.5	0.054	
-1.7	0.052	
-1.9	0.049	
-2.1	0.046	
-2.3	0.042	
-2.5	0.038	
-2.7	0.034	
-2.9	0.03	
-3.1	0.025	
-3.3	0.02	
-3.5	0.016	
-3.7	0.021	
-3.9	0.028	
-4.1	0.03	
-4.3	0.03	
-4.5	0.03	
-4.7	0.032	
-4.9	0.04	
-5.1	0.048	
-5.3	0.057	
-5.5	0.06	
-5.7	0.06	
-5.9	0.058	
-6.1	0.059	
-6.3	0.057	
-6.5	0.054	
-6.7	0.049	
-6.9	0.043	
-7.1	0.036	
-7.3	0.03	
-7.5	0.025	
-7.7	0.019	
-7.9	0.014	
-8.1	0.009	
-8.3	0.007	
-8.5	0.009	
-8.7	0.01	
-8.9	0.01	
-9.1	0.01	
-9.3	0.009	
-9.5	0.006	
-9.7	0.004	
-9.9	0.001	
-10	0.001	

### 8.2.3. Grafico Involuppi Tasso di Sfruttamento a Taglio - SteelWorld



Involuppi  
 Tasso di Sfruttamento a Taglio - SteelWorld



### 8.3. Verifiche Puntoni Nominal

Design Assump- tion: Nominal		Tipo Risultato: Verifiche											
Puntone	Puntoni Sezione	Mate- riale	Spaziatura orizzontale	Lun- ghezza	Stage	Carico distri- buito (kN/m)	Assiale (kN)	Ratio mo- mento	Ratio taglio	Insta- bilità	$\lambda$ y	$\lambda$ z	$\lambda$ late- rale
Strut	Custom Pile:0.168x0.008	S275	2	4	Stage 4	0	0	0	0	0	0	0	0
Strut	Custom Pile:0.168x0.008	S275	2	4	Stage 5	-16.06	-32.12	0	0	0	0	0	0
Strut	Custom Pile:0.168x0.008	S275	2	4	Stage 6	-26.07	-52.141	0	0	0	0	0	0
Strut	Custom Pile:0.168x0.008	S275	2	4	Stage 7	-45.533	-91.066	0	0	0	0	0	0

## 8.4. Verifiche Puntoni NTC2018: SLE (Rara/Frequente/Quasi Permanente)

Design Assumption: NTC2018: Tipo Risultato: Veri- NTC2018														
SLE (Rara/Frequente/Quasi Permanente)	Puntone	Sezione	Materiale	Spazia- tura oriz- zontale	Lun- ghezza	Stage	Carico di- stribuito (kN/m)	Assiale (kN)	Ratio mo- mento	Ratio taglio	Insta- bilità	λ y	λ z	λ la- te- rale
	Strut	Custom Pile:0.168x0.008	S275	2	4	Stage 4	0	0	0	0.002	0	0	0	0
	Strut	Custom Pile:0.168x0.008	S275	2	4	Stage 5	-16.06	-32.12	0.03	0.002	0.039	71	71	0
	Strut	Custom Pile:0.168x0.008	S275	2	4	Stage 6	-26.07	-52.141	0.05	0.002	0.063	71	71	0
	Strut	Custom Pile:0.168x0.008	S275	2	4	Stage 7	-45.533	-91.066	0.086	0.002	0.11	71	71	0

## 8.5. Verifiche Puntoni NTC2018: A1+M1+R1 (R3 per tiranti)

Design Assumption: NTC2018: A1+M1+R1 (R3 per tiranti)		Tipo Risultato: Verifiche Puntoni		NTC2018 (ITA)									
Puntone	Sezione	Materiale	Spaziatura orizzontale	Lunghezza	Stage	Carico distribuito (kN/m)	Assiale (kN)	Ratio momento	Ratio taglio	Instabilità	$\lambda_y$	$\lambda_z$	$\lambda_{laterale}$
Strut	Custom Pile:0.168x0.008	S275	2	4	Stage 4	0	0	0	0.002	0	0	0	0
Strut	Custom Pile:0.168x0.008	S275	2	4	Stage 5	-20.878	-41.756	0.04	0.002	0.05	71	71	0
Strut	Custom Pile:0.168x0.008	S275	2	4	Stage 6	-33.891	-67.783	0.064	0.002	0.082	71	71	0
Strut	Custom Pile:0.168x0.008	S275	2	4	Stage 7	-59.193	-118.385	0.112	0.002	0.143	71	71	0

## 8.6. Verifiche Puntoni NTC2018: A2+M2+R1

Design Assumption: NTC2018: A2+M2+R1		Tipo Risultato: Verifiche Puntoni		NTC2018 (ITA)									
Puntone	Sezione	Materiale	Spaziatura orizzontale	Lun- ghezza	Stage	Carico distribuito (kN/m)	Assiale (kN)	Ratio momento	Ratio taglio	Instabilità	$\lambda_y$	$\lambda_z$	$\lambda_{laterale}$
Strut	Custom Pile:0.168x0.008	S275	2	4	Stage 4	0	0	0	0.002	0	71	71	0
Strut	Custom Pile:0.168x0.008	S275	2	4	Stage 5	-22.587	-45.174	0.043	0.002	0.054	71	71	0
Strut	Custom Pile:0.168x0.008	S275	2	4	Stage 6	-37.799	-75.597	0.072	0.002	0.091	71	71	0
Strut	Custom Pile:0.168x0.008	S275	2	4	Stage 7	-67.501	-135.002	0.128	0.002	0.163	71	71	0