



**AGENZIA INTERREGIONALE PER IL FIUME PO**  
**UFFICIO OPERATIVO DI MODENA**

**TORRENTE CROSTOLO**  
**COMUNI DI CADELBOSCO DI SOPRA**

**(RE - E - 990) LAVORI DI SOMMA URGENZA PER RIPRESA EROSIONE**  
**SPONDALE IN DESTRA IDRAULICA DEL TORRENTE CROSTOLO A VALLE**  
**DELLA CHIAVICA DI VICOZOARO**

**PROGETTO ESECUTIVO**

**PROGETTISTA**

Dott. ing. Tiziano Binini

**COORDINATORE DELLA SICUREZZA IN FASE**

**DI PROGETTAZIONE E DI ESECUZIONE DELL'OPERA**

Dott. ing. Tiziano Binini

**RESPONSABILE DEL PROCEDIMENTO**

Dott. ing. Mirella Vergnani

**Oggetto: RELAZIONE DI CALCOLO**

**D.03**

-

02 Revisione

01 Revisione

00 Emissione

Giugno 2019

**Progetto**



Binini Partners S.r.l.  
via Gazzata,4  
42121 Reggio Emilia  
tel. +39.0522.580.578  
tel. +39.0522.580.586

fax +39.0522.580.557  
e-mail: info@bininipartners.it  
www.bininipartners.it  
C.F. e P.IVA e R.I. 02409150352  
Capitale sociale €100.000 i.v.



## Descrizione Progetto

La presente relazione ha ipotizzato i dati sui terreni che dovranno essere verificati in seguito alle analisi in situ e in laboratorio e alle conseguenti considerazioni geologiche. Lo studio della palancola è stato effettuato in caso non drenato e l'inserimento dell'azione sismica.

## 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.

## Descrizione della Stratigrafia e degli Strati di Terreno

Tipo : HORIZONTAL

Quota : 15 m

OCR : 1

Strato di Terreno	Terreno	$\gamma$ dry	$\gamma$ sat	$\phi'$	$\phi$ cv	$\phi$ p	c'	Su	Modulo	Elastico	Eu	Evc	Eur	Ah	Avexp	Pa	Rur/Rvc	Rvc	Ku	Kvc	Kur
		kN/m <sup>3</sup>	kN/m <sup>3</sup>	°	°	°	kPa	kPa				kPa	kPa			kPa		kPa	kN/m <sup>3</sup>	kN/m <sup>3</sup>	kN/m <sup>3</sup>
1	Clay2	19	20	24	21.1		150		Constant		2000	2800	8400								

## **Descrizione Pareti**

X : 0 m

Quota in alto : 0 m

Quota di fondo : -7 m

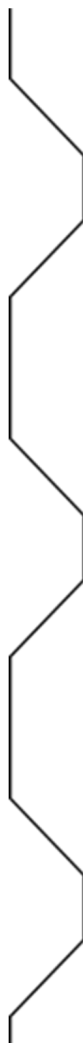
Muro di sinistra

Sezione : Default Section

Area equivalente : 0.0132 m

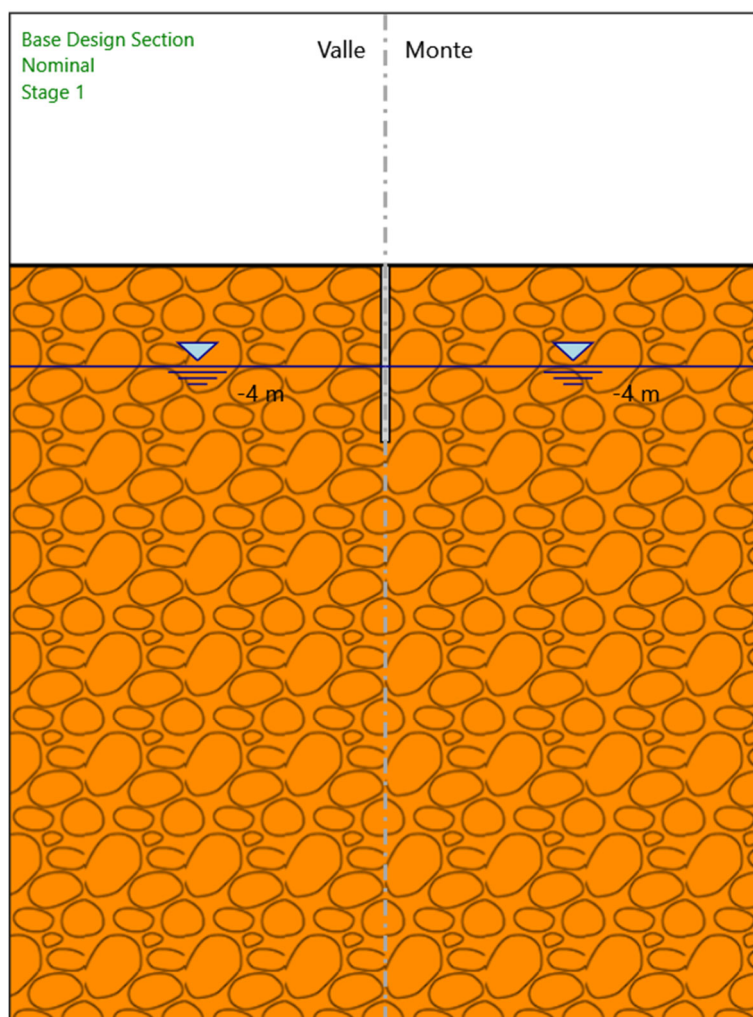
Inerzia equivalente : 0.0002 m<sup>4</sup>/m

Profilo palancola : AZ 14-770



## **Fasi di Calcolo**

### **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

Elementi strutturali

Paratia : WallElement

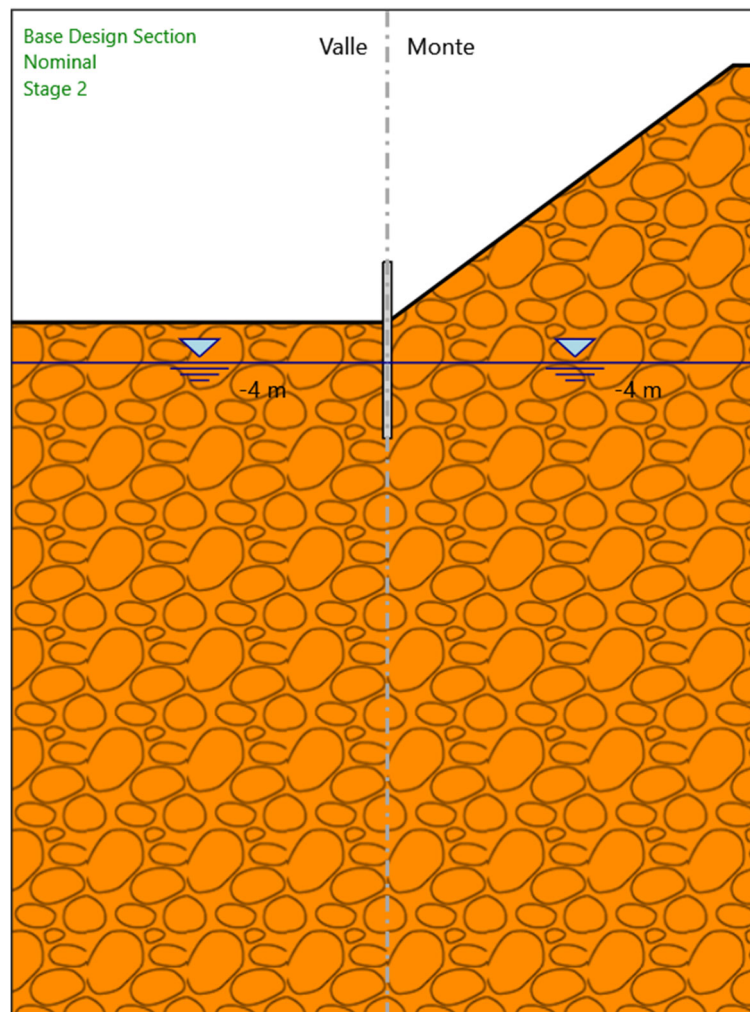
X : 0 m

Quota in alto : 0 m

Quota di fondo : -7 m

Sezione : Default Section

## Stage 2



Stage 2

Scavo

Muro di sinistra

Lato monte : -2.4 m

Lato valle : -2.4 m

Linea di scavo di sinistra (Orizzontale)

-2.4 m

Linea di scavo di destra (Irregolare)

(0;-2.4)

(13.82;7.8)

(15;7.8)

#### Elementi strutturali

Paratia : WallElement

X : 0 m

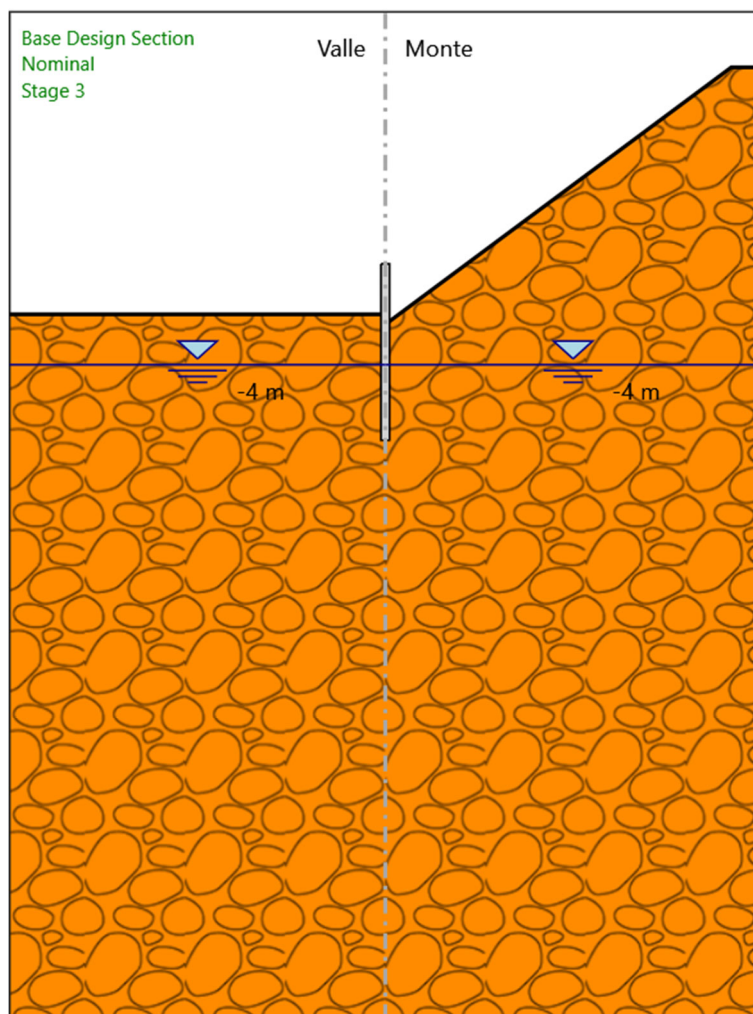
Quota in alto : 0 m

Quota di fondo : -7 m

Sezione : Default Section



## Stage 3



Stage 3

Scavo

Muro di sinistra

Lato monte : -2.4 m

Lato valle : -2 m

Linea di scavo di sinistra (Orizzontale)

-2 m

Linea di scavo di destra (Irregolare)

(0;-2.4)

(13.82;7.8)

(15;7.8)

#### Elementi strutturali

Paratia : WallElement

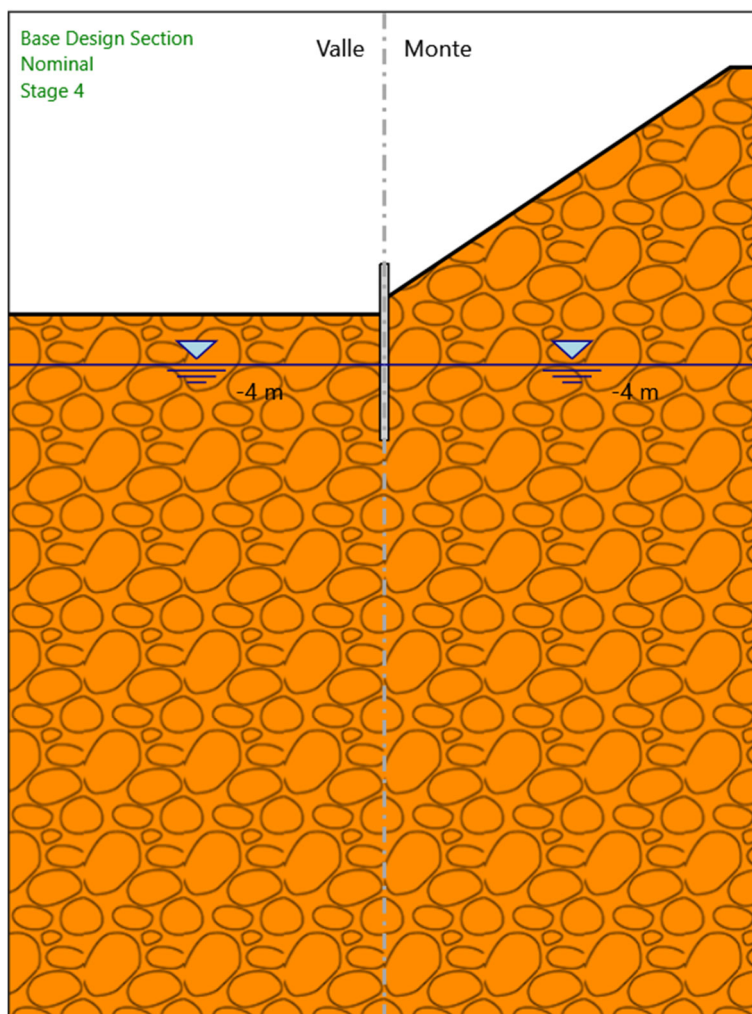
X : 0 m

Quota in alto : 0 m

Quota di fondo : -7 m

Sezione : Default Section

## Stage 4



Stage 4

Scavo

Muro di sinistra

Lato monte : -1.4 m

Lato valle : -2 m

Linea di scavo di sinistra (Orizzontale)

-2 m

Linea di scavo di destra (Irregolare)

(0;-1.4)

(13.82;7.8)

(15;7.8)

#### Elementi strutturali

Paratia : WallElement

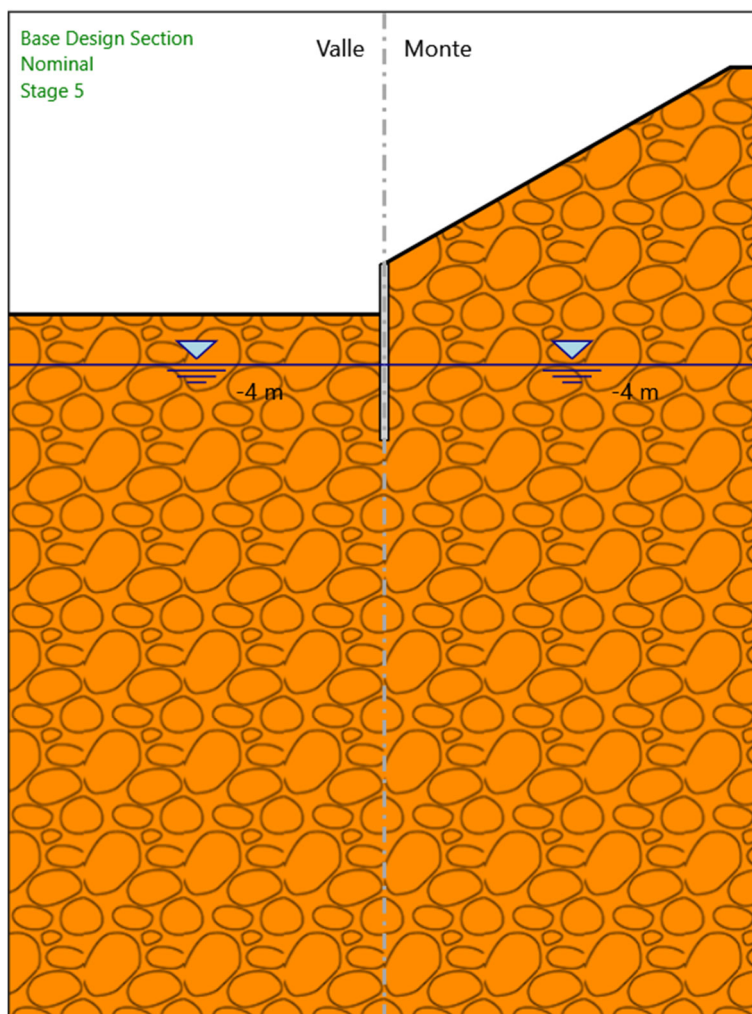
X : 0 m

Quota in alto : 0 m

Quota di fondo : -7 m

Sezione : Default Section

## Stage 5



Stage 5

Scavo

Muro di sinistra

Lato monte : 0 m

Lato valle : -2 m

Linea di scavo di sinistra (Orizzontale)

-2 m

Linea di scavo di destra (Irregolare)

(0;0)

(13.82;7.8)

(15;7.8)

#### Elementi strutturali

Paratia : WallElement

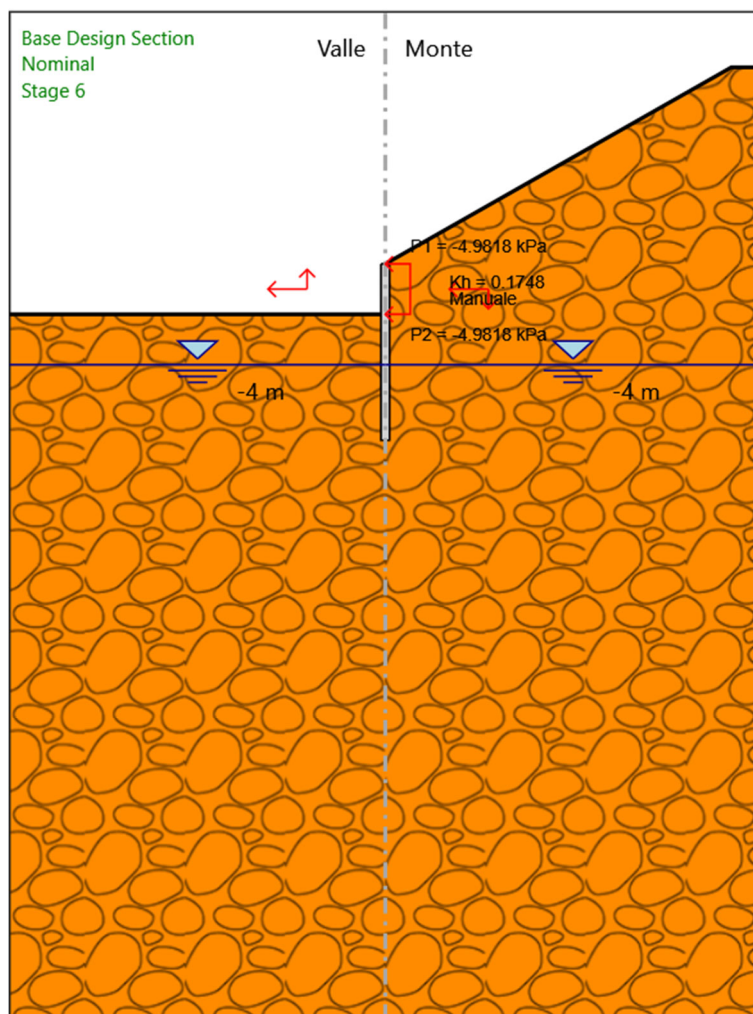
X : 0 m

Quota in alto : 0 m

Quota di fondo : -7 m

Sezione : Default Section

## Stage 6



Stage 6

Scavo

Muro di sinistra

Lato monte : 0 m



Lato valle : -2 m

Linea di scavo di sinistra (Orizzontale)

-2 m

Linea di scavo di destra (Irregolare)

(0;0)

(13.82;7.8)

(15;7.8)

#### Elementi strutturali

Paratia : WallElement

X : 0 m

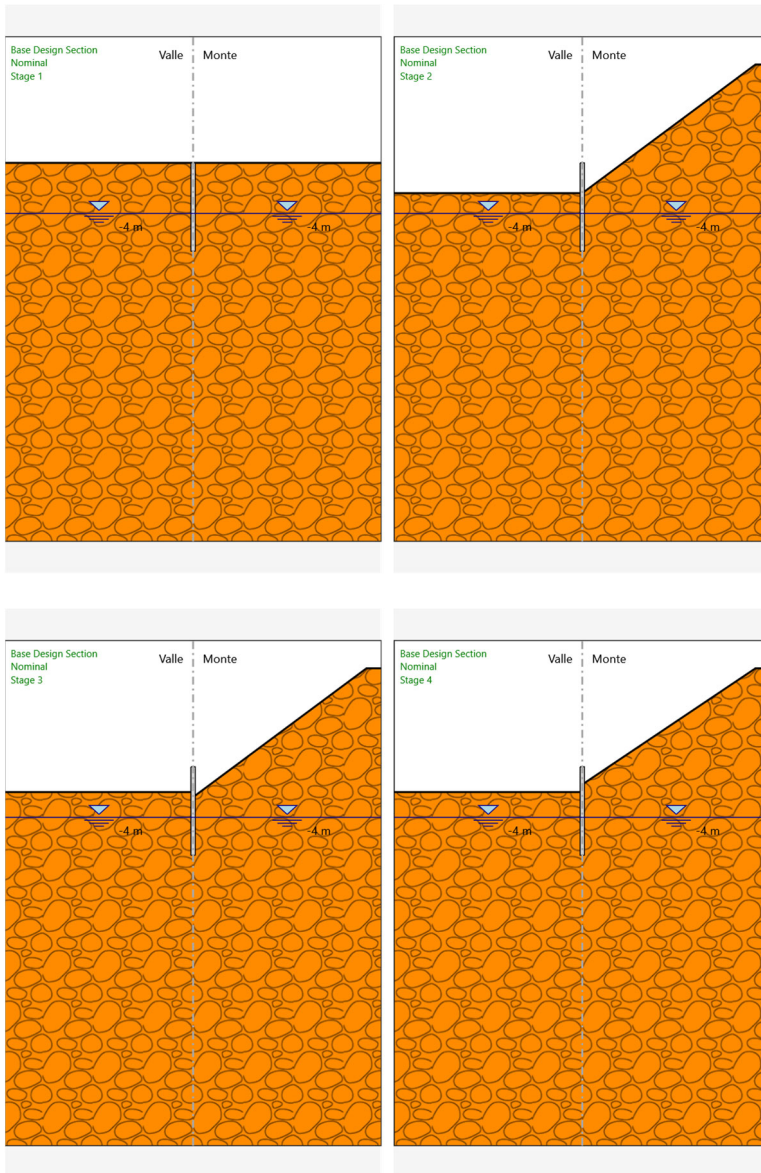
Quota in alto : 0 m

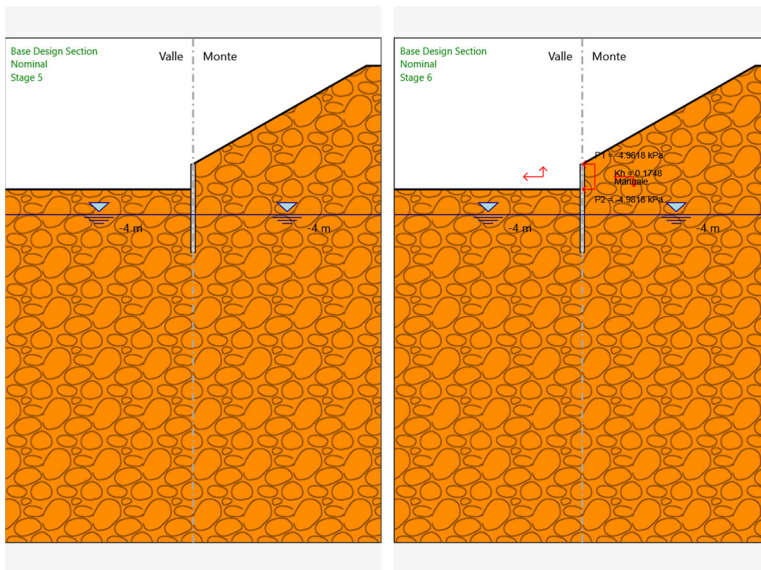
Quota di fondo : -7 m

Sezione : Default Section



## Tabella Configurazione Stage (Nominal)





## Grafici dei Risultati

### Design Assumption : Nominal

#### 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	-0.1	0	
Stage 1	-0.2	0	
Stage 1	-0.3	0	
Stage 1	-0.4	0	
Stage 1	-0.5	0	
Stage 1	-0.6	0	
Stage 1	-0.7	0	
Stage 1	-0.8	0	
Stage 1	-0.9	0	
Stage 1	-1	0	
Stage 1	-1.1	0	
Stage 1	-1.2	0	
Stage 1	-1.3	0	
Stage 1	-1.4	0	
Stage 1	-1.5	0	
Stage 1	-1.6	0	
Stage 1	-1.7	0	
Stage 1	-1.8	0	
Stage 1	-1.9	0	
Stage 1	-2	0	
Stage 1	-2.1	0	
Stage 1	-2.2	0	
Stage 1	-2.3	0	
Stage 1	-2.4	0	
Stage 1	-2.5	0	
Stage 1	-2.6	0	
Stage 1	-2.7	0	
Stage 1	-2.8	0	
Stage 1	-2.9	0	
Stage 1	-3	0	
Stage 1	-3.1	0	
Stage 1	-3.2	0	
Stage 1	-3.3	0	
Stage 1	-3.4	0	
Stage 1	-3.5	0	
Stage 1	-3.6	0	
Stage 1	-3.7	0	
Stage 1	-3.8	0	
Stage 1	-3.9	0	
Stage 1	-4	0	
Stage 1	-4.1	0	
Stage 1	-4.2	0	
Stage 1	-4.3	0	
Stage 1	-4.4	0	
Stage 1	-4.5	0	
Stage 1	-4.6	0	
Stage 1	-4.7	0	

**PROGETTO ESECUTIVO**

Design Assumption: Nominal Tipo Risultato: Spostamento			Muro: LEFT
Stage	Z (m)	Spostamento (mm)	
Stage 1	-4.8	0	
Stage 1	-4.9	0	
Stage 1	-5	0	
Stage 1	-5.1	0	
Stage 1	-5.2	0	
Stage 1	-5.3	0	
Stage 1	-5.4	0	
Stage 1	-5.5	0	
Stage 1	-5.6	0	
Stage 1	-5.7	0	
Stage 1	-5.8	0	
Stage 1	-5.9	0	
Stage 1	-6	0	
Stage 1	-6.1	0	
Stage 1	-6.2	0	
Stage 1	-6.3	0	
Stage 1	-6.4	0	
Stage 1	-6.5	0	
Stage 1	-6.6	0	
Stage 1	-6.7	0	
Stage 1	-6.8	0	
Stage 1	-6.9	0	
Stage 1	-7	0	

**Tabella Spostamento Nominal - LEFT Stage: Stage 2**

Design Assumption: Nominal Tipo Risultato: Spostamento			Muro: LEFT
Stage	Z (m)	Spostamento (mm)	
Stage 2	0	0	
Stage 2	-0.1	0	
Stage 2	-0.2	0	
Stage 2	-0.3	0	
Stage 2	-0.4	0	
Stage 2	-0.5	0	
Stage 2	-0.6	0	
Stage 2	-0.7	0	
Stage 2	-0.8	0	
Stage 2	-0.9	0	
Stage 2	-1	0	
Stage 2	-1.1	0	
Stage 2	-1.2	0	
Stage 2	-1.3	0	
Stage 2	-1.4	0	
Stage 2	-1.5	0	
Stage 2	-1.6	0	
Stage 2	-1.7	0	
Stage 2	-1.8	0	
Stage 2	-1.9	0	
Stage 2	-2	0	
Stage 2	-2.1	0	
Stage 2	-2.2	0	
Stage 2	-2.3	0	
Stage 2	-2.4	0	
Stage 2	-2.5	0	
Stage 2	-2.6	0	
Stage 2	-2.7	0	
Stage 2	-2.8	0	
Stage 2	-2.9	0	
Stage 2	-3	0	
Stage 2	-3.1	0	
Stage 2	-3.2	0	
Stage 2	-3.3	0	
Stage 2	-3.4	0	
Stage 2	-3.5	0	
Stage 2	-3.6	0	
Stage 2	-3.7	0	
Stage 2	-3.8	0	
Stage 2	-3.9	0	
Stage 2	-4	0	
Stage 2	-4.1	0	
Stage 2	-4.2	0	
Stage 2	-4.3	0	
Stage 2	-4.4	0	
Stage 2	-4.5	0	
Stage 2	-4.6	0	
Stage 2	-4.7	0	
Stage 2	-4.8	0	
Stage 2	-4.9	0	
Stage 2	-5	0	
Stage 2	-5.1	0	
Stage 2	-5.2	0	
Stage 2	-5.3	0	
Stage 2	-5.4	0	

**PROGETTO ESECUTIVO**

Design Assumption: Nominal Tipo Risultato: Spostamento			Muro: LEFT
Stage	Z (m)	Spostamento (mm)	
Stage 2	-5.5	0	
Stage 2	-5.6	0	
Stage 2	-5.7	0	
Stage 2	-5.8	0	
Stage 2	-5.9	0	
Stage 2	-6	0	
Stage 2	-6.1	0	
Stage 2	-6.2	0	
Stage 2	-6.3	0	
Stage 2	-6.4	0	
Stage 2	-6.5	0	
Stage 2	-6.6	0	
Stage 2	-6.7	0	
Stage 2	-6.8	0	
Stage 2	-6.9	0	
Stage 2	-7	0	

**Tabella Spostamento Nominal - LEFT Stage: Stage 3**

Design Assumption: Nominal Tipo Risultato: Spostamento			Muro: LEFT
Stage	Z (m)	Spostamento (mm)	
Stage 3	0	8.87	
Stage 3	-0.1	8.87	
Stage 3	-0.2	8.87	
Stage 3	-0.3	8.87	
Stage 3	-0.4	8.87	
Stage 3	-0.5	8.87	
Stage 3	-0.6	8.87	
Stage 3	-0.7	8.87	
Stage 3	-0.8	8.87	
Stage 3	-0.9	8.87	
Stage 3	-1	8.87	
Stage 3	-1.1	8.87	
Stage 3	-1.2	8.87	
Stage 3	-1.3	8.87	
Stage 3	-1.4	8.87	
Stage 3	-1.5	8.87	
Stage 3	-1.6	8.87	
Stage 3	-1.7	8.87	
Stage 3	-1.8	8.87	
Stage 3	-1.9	8.87	
Stage 3	-2	8.87	
Stage 3	-2.1	8.87	
Stage 3	-2.2	8.87	
Stage 3	-2.3	8.87	
Stage 3	-2.4	8.87	
Stage 3	-2.5	8.87	
Stage 3	-2.6	8.87	
Stage 3	-2.7	8.87	
Stage 3	-2.8	8.87	
Stage 3	-2.9	8.87	
Stage 3	-3	8.87	
Stage 3	-3.1	8.87	
Stage 3	-3.2	8.87	
Stage 3	-3.3	8.87	
Stage 3	-3.4	8.87	
Stage 3	-3.5	8.87	
Stage 3	-3.6	8.87	
Stage 3	-3.7	8.87	
Stage 3	-3.8	8.87	
Stage 3	-3.9	8.87	
Stage 3	-4	8.87	
Stage 3	-4.1	8.87	
Stage 3	-4.2	8.87	
Stage 3	-4.3	8.87	
Stage 3	-4.4	8.87	
Stage 3	-4.5	8.87	
Stage 3	-4.6	8.87	
Stage 3	-4.7	8.87	
Stage 3	-4.8	8.87	
Stage 3	-4.9	8.87	
Stage 3	-5	8.87	
Stage 3	-5.1	8.87	
Stage 3	-5.2	8.87	
Stage 3	-5.3	8.87	
Stage 3	-5.4	8.87	

**PROGETTO ESECUTIVO**

Design Assumption: Nominal Tipo Risultato: Spostamento			Muro: LEFT
Stage	Z (m)	Spostamento (mm)	
Stage 3	-5.5	8.87	
Stage 3	-5.6	8.87	
Stage 3	-5.7	8.87	
Stage 3	-5.8	8.87	
Stage 3	-5.9	8.87	
Stage 3	-6	8.87	
Stage 3	-6.1	8.87	
Stage 3	-6.2	8.87	
Stage 3	-6.3	8.87	
Stage 3	-6.4	8.87	
Stage 3	-6.5	8.87	
Stage 3	-6.6	8.87	
Stage 3	-6.7	8.87	
Stage 3	-6.8	8.87	
Stage 3	-6.9	8.87	
Stage 3	-7	8.87	



**Tabella Spostamento Nominal - LEFT Stage: Stage 4**

Design Assumption: Nominal Tipo Risultato: Spostamento			Muro: LEFT
Stage	Z (m)	Spostamento (mm)	
Stage 4	0	7.03	
Stage 4	-0.1	7	
Stage 4	-0.2	6.98	
Stage 4	-0.3	6.95	
Stage 4	-0.4	6.93	
Stage 4	-0.5	6.9	
Stage 4	-0.6	6.88	
Stage 4	-0.7	6.85	
Stage 4	-0.8	6.83	
Stage 4	-0.9	6.81	
Stage 4	-1	6.78	
Stage 4	-1.1	6.76	
Stage 4	-1.2	6.73	
Stage 4	-1.3	6.71	
Stage 4	-1.4	6.68	
Stage 4	-1.5	6.66	
Stage 4	-1.6	6.63	
Stage 4	-1.7	6.61	
Stage 4	-1.8	6.58	
Stage 4	-1.9	6.56	
Stage 4	-2	6.53	
Stage 4	-2.1	6.51	
Stage 4	-2.2	6.48	
Stage 4	-2.3	6.46	
Stage 4	-2.4	6.44	
Stage 4	-2.5	6.41	
Stage 4	-2.6	6.39	
Stage 4	-2.7	6.36	
Stage 4	-2.8	6.34	
Stage 4	-2.9	6.32	
Stage 4	-3	6.29	
Stage 4	-3.1	6.27	
Stage 4	-3.2	6.25	
Stage 4	-3.3	6.23	
Stage 4	-3.4	6.21	
Stage 4	-3.5	6.19	
Stage 4	-3.6	6.17	
Stage 4	-3.7	6.15	
Stage 4	-3.8	6.13	
Stage 4	-3.9	6.11	
Stage 4	-4	6.09	
Stage 4	-4.1	6.08	
Stage 4	-4.2	6.06	
Stage 4	-4.3	6.04	
Stage 4	-4.4	6.03	
Stage 4	-4.5	6.01	
Stage 4	-4.6	6	
Stage 4	-4.7	5.98	
Stage 4	-4.8	5.97	
Stage 4	-4.9	5.95	
Stage 4	-5	5.94	
Stage 4	-5.1	5.93	
Stage 4	-5.2	5.92	
Stage 4	-5.3	5.9	
Stage 4	-5.4	5.89	

**PROGETTO ESECUTIVO**

Design Assumption: Nominal Tipo Risultato: Spostamento			Muro: LEFT
Stage	Z (m)	Spostamento (mm)	
Stage 4	-5.5	5.88	
Stage 4	-5.6	5.87	
Stage 4	-5.7	5.86	
Stage 4	-5.8	5.84	
Stage 4	-5.9	5.83	
Stage 4	-6	5.82	
Stage 4	-6.1	5.81	
Stage 4	-6.2	5.8	
Stage 4	-6.3	5.79	
Stage 4	-6.4	5.78	
Stage 4	-6.5	5.77	
Stage 4	-6.6	5.76	
Stage 4	-6.7	5.75	
Stage 4	-6.8	5.74	
Stage 4	-6.9	5.73	
Stage 4	-7	5.71	

**Tabella Spostamento Nominal - LEFT Stage: Stage 5**

Design Assumption: Nominal Tipo Risultato: Spostamento			Muro: LEFT
Stage	Z (m)	Spostamento (mm)	
Stage 5	0	-11.12	
Stage 5	-0.1	-11.01	
Stage 5	-0.2	-10.9	
Stage 5	-0.3	-10.79	
Stage 5	-0.4	-10.67	
Stage 5	-0.5	-10.56	
Stage 5	-0.6	-10.45	
Stage 5	-0.7	-10.34	
Stage 5	-0.8	-10.23	
Stage 5	-0.9	-10.11	
Stage 5	-1	-10	
Stage 5	-1.1	-9.89	
Stage 5	-1.2	-9.78	
Stage 5	-1.3	-9.66	
Stage 5	-1.4	-9.55	
Stage 5	-1.5	-9.44	
Stage 5	-1.6	-9.33	
Stage 5	-1.7	-9.21	
Stage 5	-1.8	-9.1	
Stage 5	-1.9	-8.99	
Stage 5	-2	-8.88	
Stage 5	-2.1	-8.77	
Stage 5	-2.2	-8.66	
Stage 5	-2.3	-8.55	
Stage 5	-2.4	-8.44	
Stage 5	-2.5	-8.33	
Stage 5	-2.6	-8.23	
Stage 5	-2.7	-8.12	
Stage 5	-2.8	-8.02	
Stage 5	-2.9	-7.92	
Stage 5	-3	-7.82	
Stage 5	-3.1	-7.72	
Stage 5	-3.2	-7.62	
Stage 5	-3.3	-7.52	
Stage 5	-3.4	-7.42	
Stage 5	-3.5	-7.33	
Stage 5	-3.6	-7.23	
Stage 5	-3.7	-7.14	
Stage 5	-3.8	-7.05	
Stage 5	-3.9	-6.96	
Stage 5	-4	-6.87	
Stage 5	-4.1	-6.78	
Stage 5	-4.2	-6.69	
Stage 5	-4.3	-6.6	
Stage 5	-4.4	-6.52	
Stage 5	-4.5	-6.43	
Stage 5	-4.6	-6.35	
Stage 5	-4.7	-6.26	
Stage 5	-4.8	-6.18	
Stage 5	-4.9	-6.1	
Stage 5	-5	-6.02	
Stage 5	-5.1	-5.94	
Stage 5	-5.2	-5.86	
Stage 5	-5.3	-5.78	
Stage 5	-5.4	-5.7	

**PROGETTO ESECUTIVO**

Design Assumption: Nominal Tipo Risultato: Spostamento			Muro: LEFT
Stage	Z (m)		Spostamento (mm)
Stage 5	-5.5		-5.62
Stage 5	-5.6		-5.55
Stage 5	-5.7		-5.47
Stage 5	-5.8		-5.39
Stage 5	-5.9		-5.31
Stage 5	-6		-5.24
Stage 5	-6.1		-5.16
Stage 5	-6.2		-5.08
Stage 5	-6.3		-5.01
Stage 5	-6.4		-4.93
Stage 5	-6.5		-4.86
Stage 5	-6.6		-4.78
Stage 5	-6.7		-4.7
Stage 5	-6.8		-4.63
Stage 5	-6.9		-4.55
Stage 5	-7		-4.48

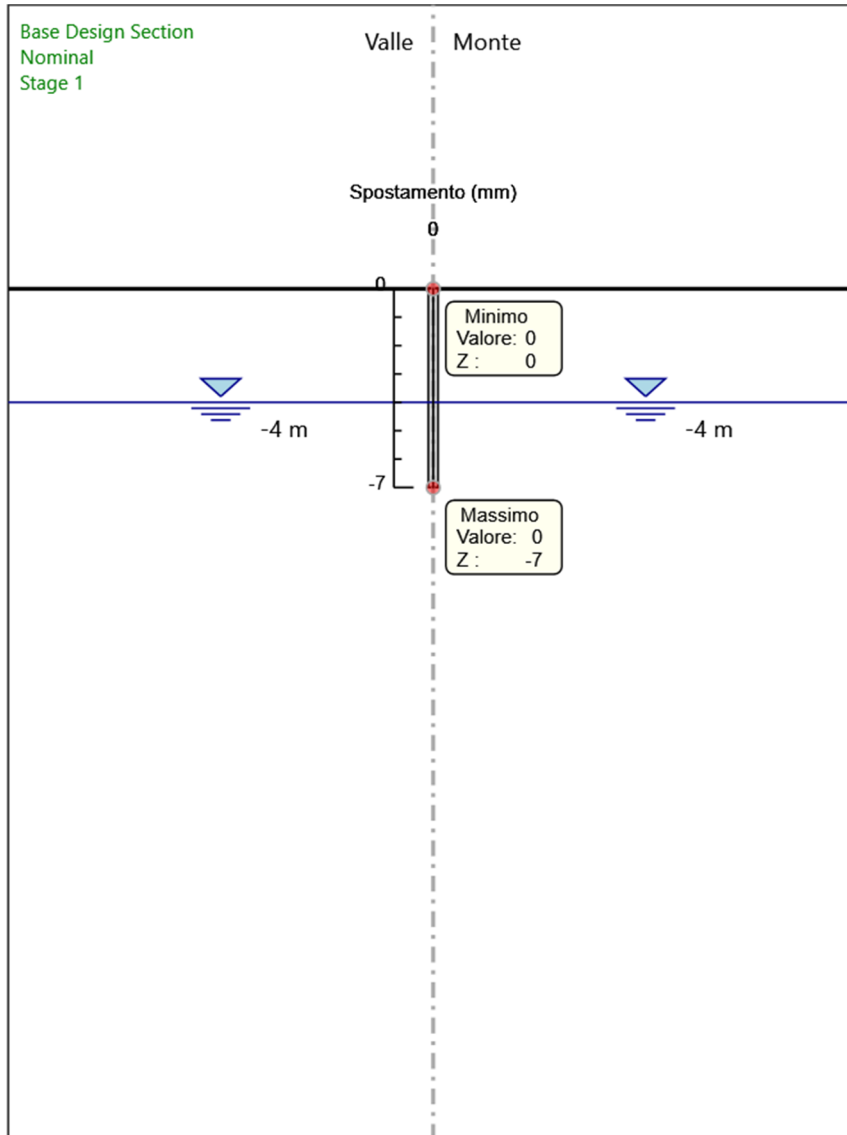
**Tabella Spostamento Nominal - LEFT Stage: Stage 6**

Design Assumption: Nominal Tipo Risultato: Spostamento			Muro: LEFT
Stage	Z (m)	Spostamento (mm)	
Stage 6	0	-19.05	
Stage 6	-0.1	-18.74	
Stage 6	-0.2	-18.44	
Stage 6	-0.3	-18.14	
Stage 6	-0.4	-17.83	
Stage 6	-0.5	-17.53	
Stage 6	-0.6	-17.23	
Stage 6	-0.7	-16.92	
Stage 6	-0.8	-16.62	
Stage 6	-0.9	-16.32	
Stage 6	-1	-16.02	
Stage 6	-1.1	-15.71	
Stage 6	-1.2	-15.41	
Stage 6	-1.3	-15.11	
Stage 6	-1.4	-14.81	
Stage 6	-1.5	-14.52	
Stage 6	-1.6	-14.22	
Stage 6	-1.7	-13.92	
Stage 6	-1.8	-13.63	
Stage 6	-1.9	-13.34	
Stage 6	-2	-13.05	
Stage 6	-2.1	-12.76	
Stage 6	-2.2	-12.48	
Stage 6	-2.3	-12.2	
Stage 6	-2.4	-11.92	
Stage 6	-2.5	-11.64	
Stage 6	-2.6	-11.37	
Stage 6	-2.7	-11.1	
Stage 6	-2.8	-10.84	
Stage 6	-2.9	-10.58	
Stage 6	-3	-10.33	
Stage 6	-3.1	-10.07	
Stage 6	-3.2	-9.83	
Stage 6	-3.3	-9.58	
Stage 6	-3.4	-9.34	
Stage 6	-3.5	-9.11	
Stage 6	-3.6	-8.87	
Stage 6	-3.7	-8.64	
Stage 6	-3.8	-8.42	
Stage 6	-3.9	-8.2	
Stage 6	-4	-7.98	
Stage 6	-4.1	-7.76	
Stage 6	-4.2	-7.55	
Stage 6	-4.3	-7.34	
Stage 6	-4.4	-7.14	
Stage 6	-4.5	-6.93	
Stage 6	-4.6	-6.73	
Stage 6	-4.7	-6.53	
Stage 6	-4.8	-6.34	
Stage 6	-4.9	-6.15	
Stage 6	-5	-5.95	
Stage 6	-5.1	-5.77	
Stage 6	-5.2	-5.58	
Stage 6	-5.3	-5.39	
Stage 6	-5.4	-5.21	

**PROGETTO ESECUTIVO**

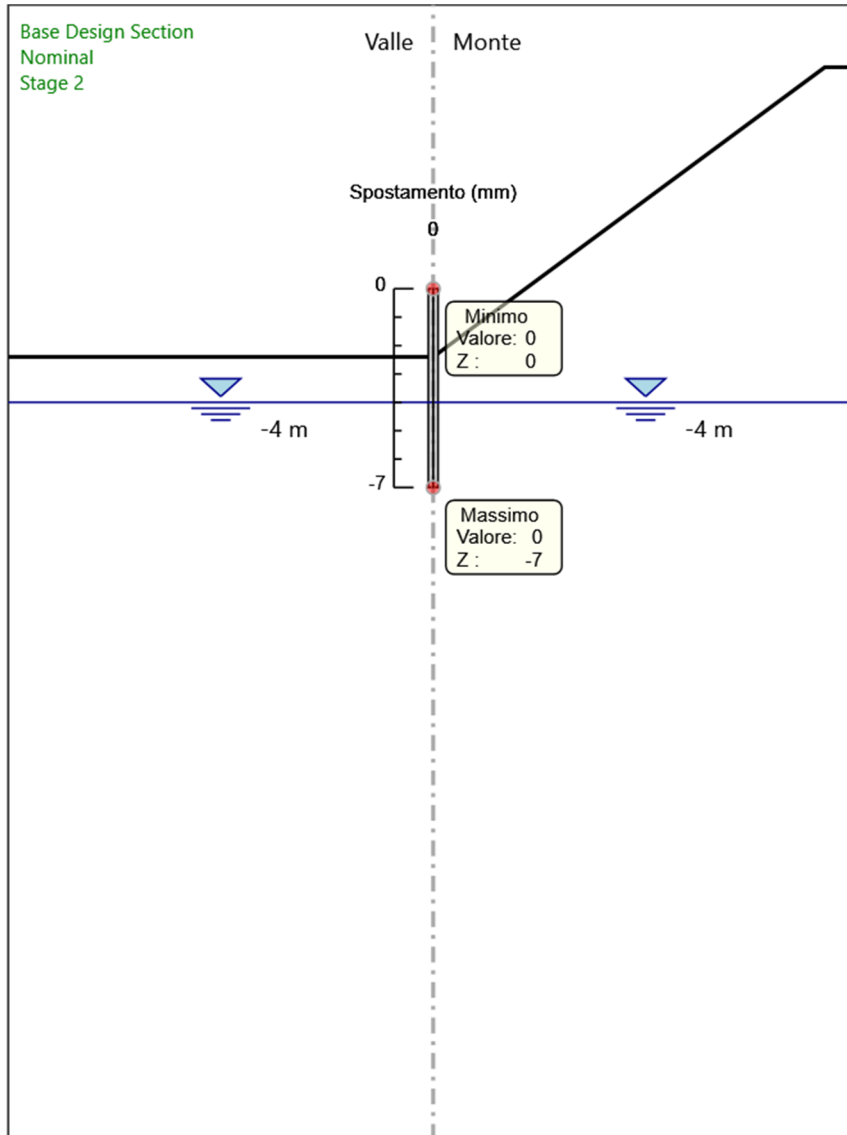
Design Assumption: Nominal Tipo Risultato: Spostamento			Muro: LEFT
Stage	Z (m)	Spostamento (mm)	
Stage 6	-5.5	-5.03	
Stage 6	-5.6	-4.84	
Stage 6	-5.7	-4.66	
Stage 6	-5.8	-4.48	
Stage 6	-5.9	-4.31	
Stage 6	-6	-4.13	
Stage 6	-6.1	-3.95	
Stage 6	-6.2	-3.77	
Stage 6	-6.3	-3.6	
Stage 6	-6.4	-3.42	
Stage 6	-6.5	-3.25	
Stage 6	-6.6	-3.07	
Stage 6	-6.7	-2.9	
Stage 6	-6.8	-2.72	
Stage 6	-6.9	-2.54	
Stage 6	-7	-2.37	

**Grafico Spostamento Nominal - Stage: Stage 1**



Design Assumption: Nominal  
Stage: Stage 1  
Spostamento

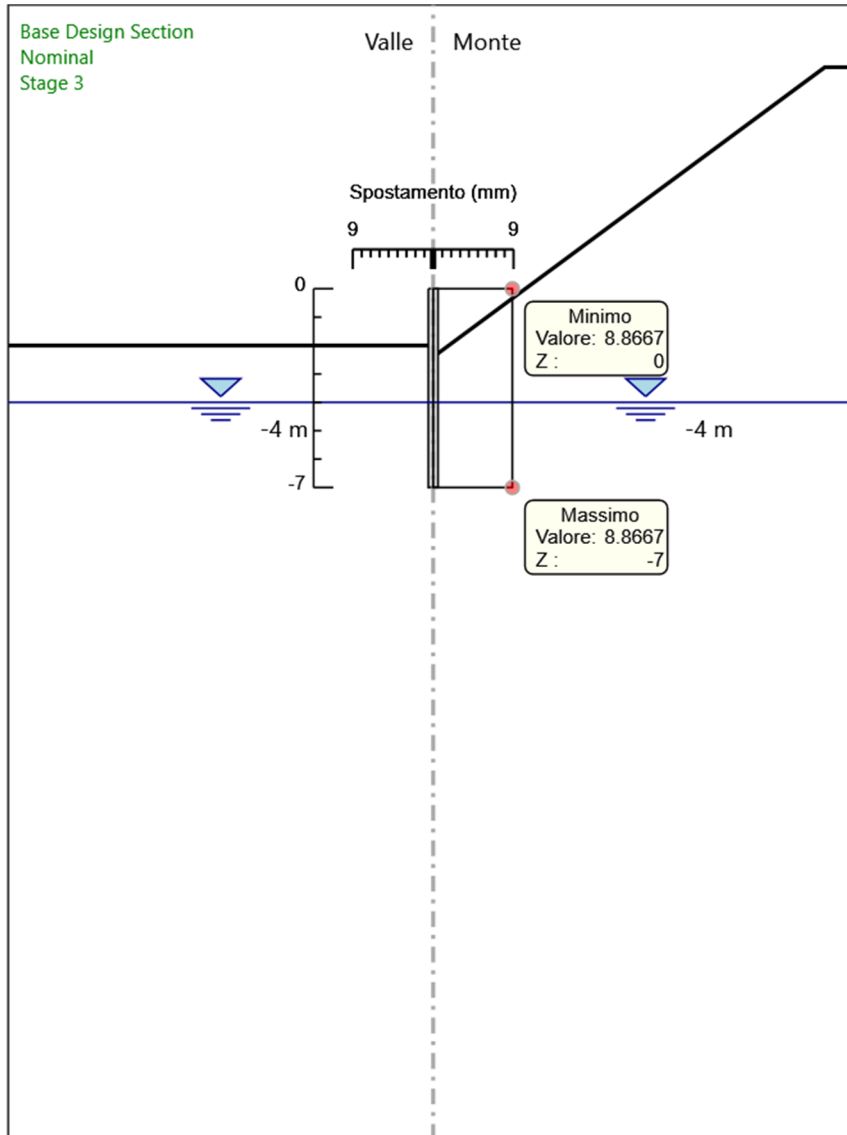
## Grafico Spostamento Nominal - Stage: Stage 2



Design Assumption: Nominal  
Stage: Stage 2  
Spostamento



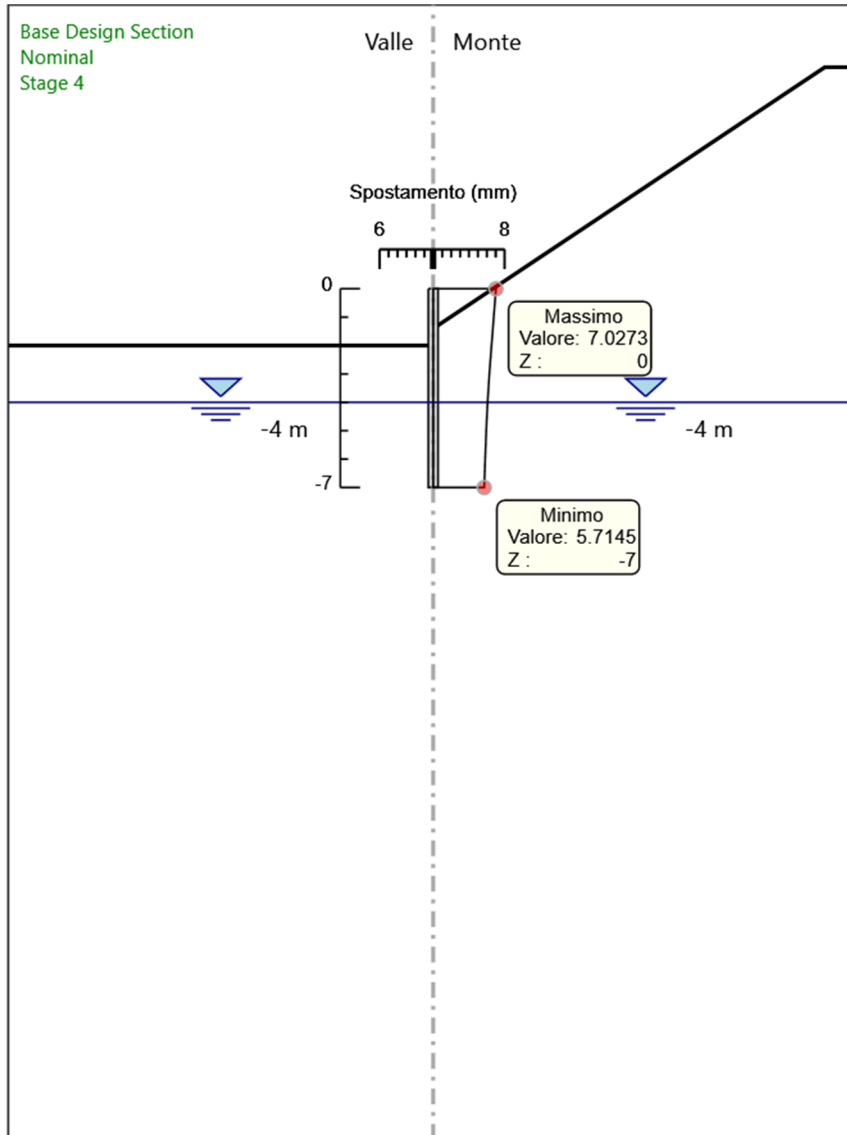
**Grafico Spostamento Nominal - Stage: Stage 3**



Design Assumption: Nominal  
Stage: Stage 3  
Spostamento

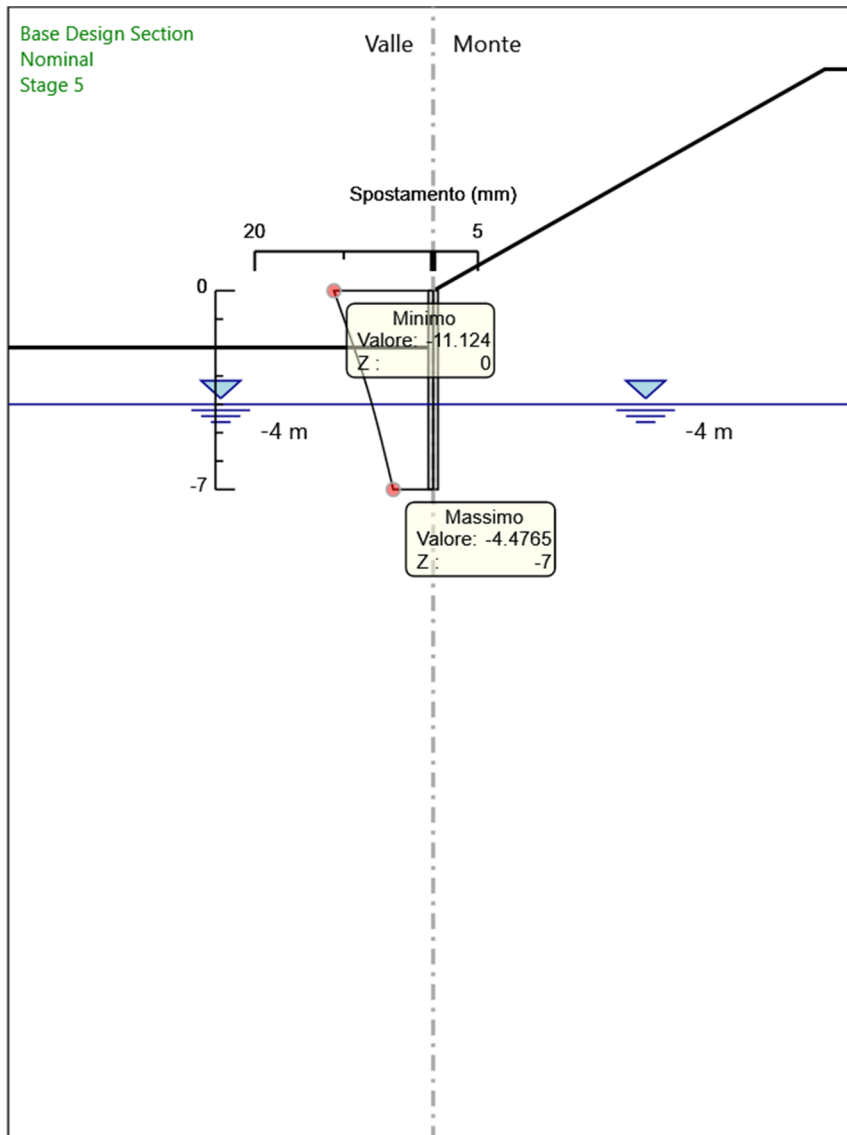


**Grafico Spostamento Nominal - Stage: Stage 4**



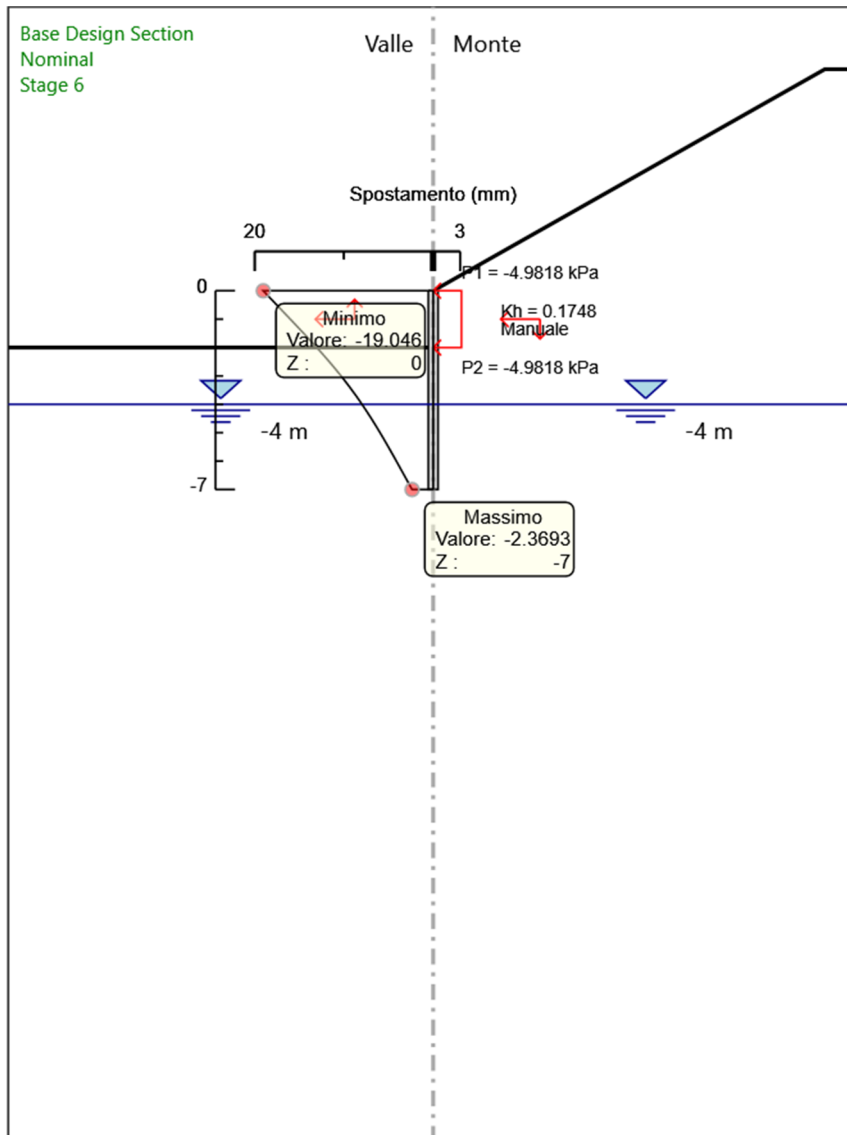
Design Assumption: Nominal  
Stage: Stage 4  
Spostamento

**Grafico Spostamento Nominal - Stage: Stage 5**



Design Assumption: Nominal  
Stage: Stage 5  
Spostamento

**Grafico Spostamento Nominal - Stage: Stage 6**



Design Assumption: Nominal  
Stage: Stage 6  
Spostamento

## **Inviluppi Spostamento Nominal**

## Risultati Paratia

**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	-0.1	0	0
Stage 1	-0.2	0	0
Stage 1	-0.3	0	0
Stage 1	-0.4	0	0
Stage 1	-0.5	0	0
Stage 1	-0.6	0	0
Stage 1	-0.7	0	0
Stage 1	-0.8	0	0
Stage 1	-0.9	0	0
Stage 1	-1	0	0
Stage 1	-1.1	0	0
Stage 1	-1.2	0	0
Stage 1	-1.3	0	0
Stage 1	-1.4	0	0
Stage 1	-1.5	0	0
Stage 1	-1.6	0	0
Stage 1	-1.7	0	0
Stage 1	-1.8	0	0
Stage 1	-1.9	0	0
Stage 1	-2	0	0
Stage 1	-2.1	0	0
Stage 1	-2.2	0	0
Stage 1	-2.3	0	0
Stage 1	-2.4	0	0
Stage 1	-2.5	0	0
Stage 1	-2.6	0	0
Stage 1	-2.7	0	0
Stage 1	-2.8	0	0
Stage 1	-2.9	0	0
Stage 1	-3	0	0
Stage 1	-3.1	0	0
Stage 1	-3.2	0	0
Stage 1	-3.3	0	0
Stage 1	-3.4	0	0
Stage 1	-3.5	0	0
Stage 1	-3.6	0	0
Stage 1	-3.7	0	0
Stage 1	-3.8	0	0
Stage 1	-3.9	0	0
Stage 1	-4	0	0
Stage 1	-4.1	0	0
Stage 1	-4.2	0	0
Stage 1	-4.3	0	0
Stage 1	-4.4	0	0
Stage 1	-4.5	0	0
Stage 1	-4.6	0	0
Stage 1	-4.7	0	0
Stage 1	-4.8	0	0
Stage 1	-4.9	0	0
Stage 1	-5	0	0
Stage 1	-5.1	0	0

**PROGETTO ESECUTIVO**

Design Assumption: Nominal Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 1	-5.2	0	0
Stage 1	-5.3	0	0
Stage 1	-5.4	0	0
Stage 1	-5.5	0	0
Stage 1	-5.6	0	0
Stage 1	-5.7	0	0
Stage 1	-5.8	0	0
Stage 1	-5.9	0	0
Stage 1	-6	0	0
Stage 1	-6.1	0	0
Stage 1	-6.2	0	0
Stage 1	-6.3	0	0
Stage 1	-6.4	0	0
Stage 1	-6.5	0	0
Stage 1	-6.6	0	0
Stage 1	-6.7	0	0
Stage 1	-6.8	0	0
Stage 1	-6.9	0	0
Stage 1	-7	0	0



**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	-0.1	0	0
Stage 2	-0.2	0	0
Stage 2	-0.3	0	0
Stage 2	-0.4	0	0
Stage 2	-0.5	0	0
Stage 2	-0.6	0	0
Stage 2	-0.7	0	0
Stage 2	-0.8	0	0
Stage 2	-0.9	0	0
Stage 2	-1	0	0
Stage 2	-1.1	0	0
Stage 2	-1.2	0	0
Stage 2	-1.3	0	0
Stage 2	-1.4	0	0
Stage 2	-1.5	0	0
Stage 2	-1.6	0	0
Stage 2	-1.7	0	0
Stage 2	-1.8	0	0
Stage 2	-1.9	0	0
Stage 2	-2	0	0
Stage 2	-2.1	0	0
Stage 2	-2.2	0	0
Stage 2	-2.3	0	0
Stage 2	-2.4	0	0
Stage 2	-2.5	0	0
Stage 2	-2.6	0	0
Stage 2	-2.7	0	0
Stage 2	-2.8	0	0
Stage 2	-2.9	0	0
Stage 2	-3	0	0
Stage 2	-3.1	0	0
Stage 2	-3.2	0	0
Stage 2	-3.3	0	0
Stage 2	-3.4	0	0
Stage 2	-3.5	0	0
Stage 2	-3.6	0	0
Stage 2	-3.7	0	0
Stage 2	-3.8	0	0
Stage 2	-3.9	0	0
Stage 2	-4	0	0
Stage 2	-4.1	0	0
Stage 2	-4.2	0	0
Stage 2	-4.3	0	0
Stage 2	-4.4	0	0
Stage 2	-4.5	0	0
Stage 2	-4.6	0	0
Stage 2	-4.7	0	0
Stage 2	-4.8	0	0
Stage 2	-4.9	0	0
Stage 2	-5	0	0
Stage 2	-5.1	0	0
Stage 2	-5.2	0	0
Stage 2	-5.3	0	0
Stage 2	-5.4	0	0

**PROGETTO ESECUTIVO**

Design Assumption: Nominal Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 2	-5.5	0	0
Stage 2	-5.6	0	0
Stage 2	-5.7	0	0
Stage 2	-5.8	0	0
Stage 2	-5.9	0	0
Stage 2	-6	0	0
Stage 2	-6.1	0	0
Stage 2	-6.2	0	0
Stage 2	-6.3	0	0
Stage 2	-6.4	0	0
Stage 2	-6.5	0	0
Stage 2	-6.6	0	0
Stage 2	-6.7	0	0
Stage 2	-6.8	0	0
Stage 2	-6.9	0	0
Stage 2	-7	0	0

**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	-0.1	0	0
Stage 3	-0.1	0	0
Stage 3	-0.2	0	0
Stage 3	-0.2	0	0
Stage 3	-0.3	0	0
Stage 3	-0.3	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	-0.6	0	0
Stage 3	-0.6	0	0
Stage 3	-0.7	0	0
Stage 3	-0.7	0	0
Stage 3	-0.8	0	0
Stage 3	-0.8	0	0
Stage 3	-0.9	0	0
Stage 3	-0.9	0	0
Stage 3	-1	0	0
Stage 3	-1	0	0
Stage 3	-1.1	0	0
Stage 3	-1.1	0	0
Stage 3	-1.2	0	0
Stage 3	-1.2	0	0
Stage 3	-1.3	0	0
Stage 3	-1.3	0	0
Stage 3	-1.4	0	0
Stage 3	-1.4	0	0
Stage 3	-1.5	0	0
Stage 3	-1.5	0	0
Stage 3	-1.6	0	0
Stage 3	-1.6	0	0
Stage 3	-1.7	0	0
Stage 3	-1.7	0	0
Stage 3	-1.8	0	0
Stage 3	-1.8	0	0
Stage 3	-1.9	0	0
Stage 3	-1.9	0	0
Stage 3	-2	0	0
Stage 3	-2	0	0
Stage 3	-2.1	0	0
Stage 3	-2.1	0	0
Stage 3	-2.2	0	0
Stage 3	-2.2	0	0
Stage 3	-2.3	0	0
Stage 3	-2.3	0	0
Stage 3	-2.4	0	0
Stage 3	-2.4	0	0
Stage 3	-2.5	0	0
Stage 3	-2.5	0	0
Stage 3	-2.6	0	0
Stage 3	-2.6	0	0
Stage 3	-2.7	0	0
Stage 3	-2.7	0	0

**PROGETTO ESECUTIVO**

Design Assumption: Nominal Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	-2.8	0	0
Stage 3	-2.8	0	0
Stage 3	-2.9	0	0
Stage 3	-2.9	0	0
Stage 3	-3	0	0
Stage 3	-3	0	0
Stage 3	-3.1	0	0
Stage 3	-3.1	0	0
Stage 3	-3.2	0	0
Stage 3	-3.2	0	0
Stage 3	-3.3	0	0
Stage 3	-3.3	0	0
Stage 3	-3.4	0	0
Stage 3	-3.4	0	0
Stage 3	-3.5	0	0
Stage 3	-3.5	0	0
Stage 3	-3.6	0	0
Stage 3	-3.6	0	0
Stage 3	-3.7	0	0
Stage 3	-3.7	0	0
Stage 3	-3.8	0	0
Stage 3	-3.8	0	0
Stage 3	-3.9	0	0
Stage 3	-3.9	0	0
Stage 3	-4	0	0
Stage 3	-4	0	0
Stage 3	-4.1	0	0
Stage 3	-4.1	0	0
Stage 3	-4.2	0	0
Stage 3	-4.2	0	0
Stage 3	-4.3	0	0
Stage 3	-4.3	0	0
Stage 3	-4.4	0	0
Stage 3	-4.4	0	0
Stage 3	-4.5	0	0
Stage 3	-4.5	0	0
Stage 3	-4.6	0	0
Stage 3	-4.6	0	0
Stage 3	-4.7	0	0
Stage 3	-4.7	0	0
Stage 3	-4.8	0	0
Stage 3	-4.8	0	0
Stage 3	-4.9	0	0
Stage 3	-4.9	0	0
Stage 3	-5	0	0
Stage 3	-5	0	0
Stage 3	-5.1	0	0
Stage 3	-5.1	0	0
Stage 3	-5.2	0	0
Stage 3	-5.2	0	0
Stage 3	-5.3	0	0
Stage 3	-5.3	0	0
Stage 3	-5.4	0	0
Stage 3	-5.4	0	0
Stage 3	-5.5	0	0
Stage 3	-5.5	0	0
Stage 3	-5.6	0	0
Stage 3	-5.6	0	0
Stage 3	-5.7	0	0

**PROGETTO ESECUTIVO**

Design Assumption: Nominal Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 3	-5.7	0	0
Stage 3	-5.8	0	0
Stage 3	-5.8	0	0
Stage 3	-5.9	0	0
Stage 3	-5.9	0	0
Stage 3	-6	0	0
Stage 3	-6	0	0
Stage 3	-6.1	0	0
Stage 3	-6.1	0	0
Stage 3	-6.2	0	0
Stage 3	-6.2	0	0
Stage 3	-6.3	0	0
Stage 3	-6.3	0	0
Stage 3	-6.4	0	0
Stage 3	-6.4	0	0
Stage 3	-6.5	0	0
Stage 3	-6.5	0	0
Stage 3	-6.6	0	0
Stage 3	-6.6	0	0
Stage 3	-6.7	0	0
Stage 3	-6.7	0	0
Stage 3	-6.8	0	0
Stage 3	-6.8	0	0
Stage 3	-6.9	0	0
Stage 3	-6.9	0	0
Stage 3	-7	0	0

**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	-0.1	0	0
Stage 4	-0.1	0	0
Stage 4	-0.2	0	0
Stage 4	-0.2	0	0
Stage 4	-0.3	0	0
Stage 4	-0.3	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	-0.6	0	0
Stage 4	-0.6	0	0
Stage 4	-0.7	0	0
Stage 4	-0.7	0	0
Stage 4	-0.8	0	0
Stage 4	-0.8	0	0
Stage 4	-0.9	0	0
Stage 4	-0.9	0	0
Stage 4	-1	0	0
Stage 4	-1	0	0
Stage 4	-1.1	0	0
Stage 4	-1.1	0	0
Stage 4	-1.2	0	0
Stage 4	-1.2	0	0
Stage 4	-1.3	0	0
Stage 4	-1.3	0	0
Stage 4	-1.4	0	0
Stage 4	-1.4	0	0
Stage 4	-1.5	0	0
Stage 4	-1.5	0	0
Stage 4	-1.6	0	0
Stage 4	-1.6	0	0
Stage 4	-1.7	0	0
Stage 4	-1.7	0	0
Stage 4	-1.8	0	0
Stage 4	-1.8	0	0
Stage 4	-1.9	0	0
Stage 4	-1.9	0	0
Stage 4	-2	0	0
Stage 4	-2	0	0
Stage 4	-2.1	-0.09	-0.93
Stage 4	-2.2	-0.27	-1.78
Stage 4	-2.3	-0.53	-2.55
Stage 4	-2.4	-0.85	-3.24
Stage 4	-2.5	-1.14	-2.91
Stage 4	-2.6	-1.4	-2.59
Stage 4	-2.7	-1.63	-2.28
Stage 4	-2.8	-1.83	-1.99
Stage 4	-2.9	-2	-1.72
Stage 4	-3	-2.14	-1.45
Stage 4	-3.1	-2.27	-1.21
Stage 4	-3.2	-2.36	-0.98
Stage 4	-3.3	-2.44	-0.76
Stage 4	-3.4	-2.49	-0.56

**PROGETTO ESECUTIVO**

Design Assumption: Nominal Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 4	-3.5	-2.53	-0.37
Stage 4	-3.6	-2.55	-0.19
Stage 4	-3.7	-2.55	-0.02
Stage 4	-3.8	-2.54	0.13
Stage 4	-3.9	-2.51	0.27
Stage 4	-4	-2.47	0.4
Stage 4	-4.1	-2.42	0.52
Stage 4	-4.2	-2.36	0.62
Stage 4	-4.3	-2.29	0.72
Stage 4	-4.4	-2.21	0.8
Stage 4	-4.5	-2.12	0.88
Stage 4	-4.6	-2.02	0.94
Stage 4	-4.7	-1.93	1
Stage 4	-4.8	-1.82	1.04
Stage 4	-4.9	-1.71	1.08
Stage 4	-5	-1.6	1.11
Stage 4	-5.1	-1.49	1.13
Stage 4	-5.2	-1.38	1.14
Stage 4	-5.3	-1.26	1.14
Stage 4	-5.4	-1.15	1.14
Stage 4	-5.5	-1.04	1.12
Stage 4	-5.6	-0.92	1.1
Stage 4	-5.7	-0.82	1.08
Stage 4	-5.8	-0.71	1.04
Stage 4	-5.9	-0.61	1
Stage 4	-6	-0.52	0.95
Stage 4	-6.1	-0.43	0.89
Stage 4	-6.2	-0.35	0.83
Stage 4	-6.3	-0.27	0.76
Stage 4	-6.4	-0.2	0.68
Stage 4	-6.5	-0.14	0.59
Stage 4	-6.6	-0.09	0.5
Stage 4	-6.7	-0.05	0.4
Stage 4	-6.8	-0.02	0.3
Stage 4	-6.9	-0.01	0.18
Stage 4	-7	0	0.06

**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
Stage 5	-0.1	0	0
Stage 5	-0.1	0	0
Stage 5	-0.2	0	0
Stage 5	-0.2	0	0
Stage 5	-0.3	0	0
Stage 5	-0.3	0	0
Stage 5	-0.4	0	0
Stage 5	-0.4	0	0
Stage 5	-0.5	0	0
Stage 5	-0.5	0	0
Stage 5	-0.6	0	0
Stage 5	-0.6	0	0
Stage 5	-0.7	0	0
Stage 5	-0.7	0	0
Stage 5	-0.8	0	0
Stage 5	-0.8	0	0
Stage 5	-0.9	0	0
Stage 5	-0.9	0	0
Stage 5	-1	0	0
Stage 5	-1	0	0
Stage 5	-1.1	0	0
Stage 5	-1.1	0	0
Stage 5	-1.2	0	0
Stage 5	-1.2	0	0
Stage 5	-1.3	0	0
Stage 5	-1.3	0	0
Stage 5	-1.4	0	0.01
Stage 5	-1.5	0.15	1.45
Stage 5	-1.6	0.44	2.9
Stage 5	-1.7	0.87	4.37
Stage 5	-1.8	1.46	5.84
Stage 5	-1.9	2.19	7.32
Stage 5	-2	3.07	8.82
Stage 5	-2.1	3.78	7.08
Stage 5	-2.2	4.32	5.45
Stage 5	-2.3	4.72	3.93
Stage 5	-2.4	4.97	2.52
Stage 5	-2.5	5.19	2.17
Stage 5	-2.6	5.37	1.84
Stage 5	-2.7	5.52	1.51
Stage 5	-2.8	5.64	1.2
Stage 5	-2.9	5.73	0.91
Stage 5	-3	5.79	0.63
Stage 5	-3.1	5.83	0.36
Stage 5	-3.2	5.84	0.1
Stage 5	-3.3	5.83	-0.14
Stage 5	-3.4	5.79	-0.37
Stage 5	-3.5	5.73	-0.59
Stage 5	-3.6	5.65	-0.79
Stage 5	-3.7	5.55	-0.98
Stage 5	-3.8	5.44	-1.16
Stage 5	-3.9	5.31	-1.32
Stage 5	-4	5.16	-1.47
Stage 5	-4.1	5	-1.61



**PROGETTO ESECUTIVO**

Design Assumption: Nominal Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 5	-4.2	4.83	-1.74
Stage 5	-4.3	4.64	-1.85
Stage 5	-4.4	4.45	-1.95
Stage 5	-4.5	4.24	-2.04
Stage 5	-4.6	4.03	-2.11
Stage 5	-4.7	3.81	-2.17
Stage 5	-4.8	3.59	-2.22
Stage 5	-4.9	3.36	-2.26
Stage 5	-5	3.14	-2.29
Stage 5	-5.1	2.91	-2.3
Stage 5	-5.2	2.68	-2.3
Stage 5	-5.3	2.45	-2.28
Stage 5	-5.4	2.22	-2.26
Stage 5	-5.5	2	-2.22
Stage 5	-5.6	1.78	-2.17
Stage 5	-5.7	1.57	-2.1
Stage 5	-5.8	1.37	-2.02
Stage 5	-5.9	1.18	-1.94
Stage 5	-6	1	-1.83
Stage 5	-6.1	0.82	-1.72
Stage 5	-6.2	0.66	-1.59
Stage 5	-6.3	0.52	-1.45
Stage 5	-6.4	0.39	-1.3
Stage 5	-6.5	0.28	-1.13
Stage 5	-6.6	0.18	-0.96
Stage 5	-6.7	0.1	-0.77
Stage 5	-6.8	0.05	-0.56
Stage 5	-6.9	0.01	-0.35
Stage 5	-7	0	-0.12

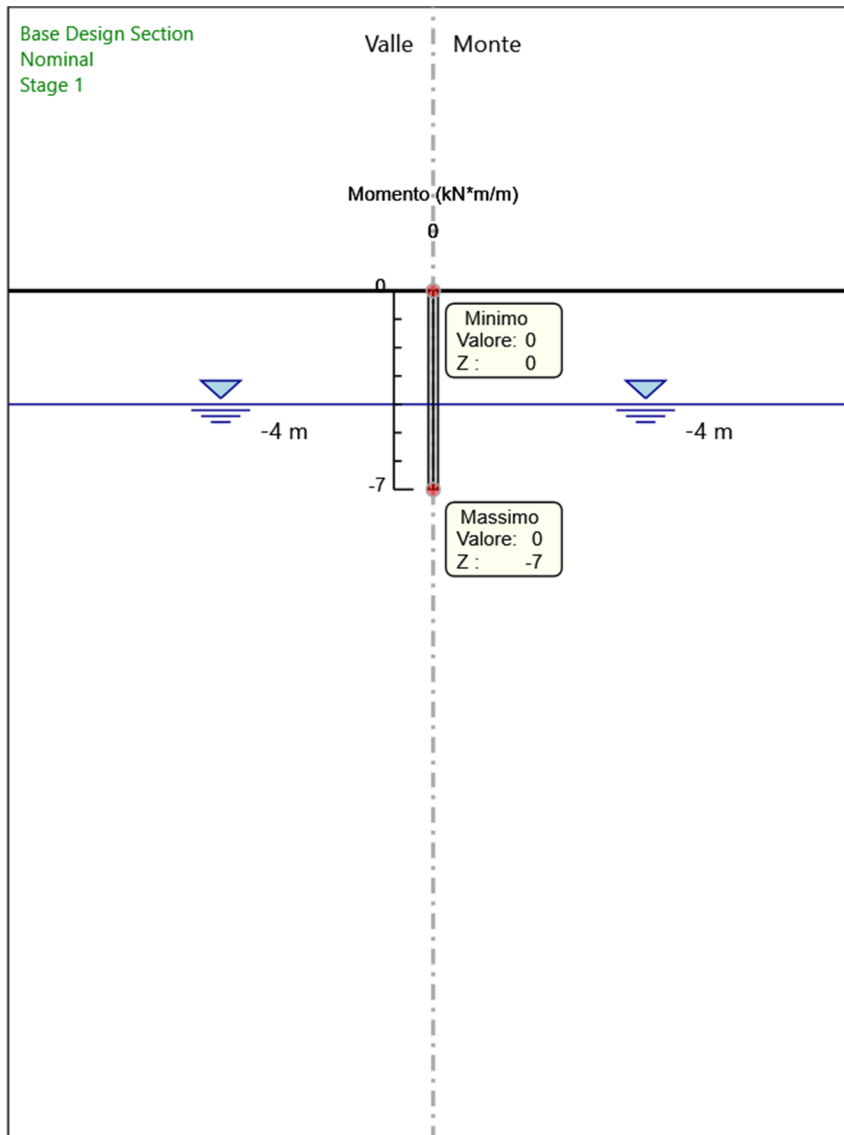
**Tabella Risultati Paratia Nominal - Stage: Stage 6**

Design Assumption: Nominal Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 6	0	0	0.26
Stage 6	-0.1	0.03	0.26
Stage 6	-0.2	0.1	0.77
Stage 6	-0.3	0.23	1.29
Stage 6	-0.4	0.41	1.81
Stage 6	-0.5	0.64	2.32
Stage 6	-0.6	0.93	2.84
Stage 6	-0.7	1.26	3.35
Stage 6	-0.8	1.65	3.87
Stage 6	-0.9	2.09	4.39
Stage 6	-1	2.58	4.9
Stage 6	-1.1	3.12	5.42
Stage 6	-1.2	3.71	5.93
Stage 6	-1.3	4.36	6.45
Stage 6	-1.4	5.06	6.97
Stage 6	-1.5	5.91	8.53
Stage 6	-1.6	6.92	10.12
Stage 6	-1.7	8.09	11.73
Stage 6	-1.8	9.43	13.37
Stage 6	-1.9	10.93	15.03
Stage 6	-2	12.6	16.71
Stage 6	-2.1	14.03	14.29
Stage 6	-2.2	15.21	11.77
Stage 6	-2.3	16.15	9.39
Stage 6	-2.4	16.86	7.16
Stage 6	-2.5	17.47	6.03
Stage 6	-2.6	17.96	4.94
Stage 6	-2.7	18.35	3.91
Stage 6	-2.8	18.65	2.94
Stage 6	-2.9	18.85	2
Stage 6	-3	18.96	1.12
Stage 6	-3.1	18.99	0.29
Stage 6	-3.2	18.94	-0.5
Stage 6	-3.3	18.82	-1.24
Stage 6	-3.4	18.62	-1.93
Stage 6	-3.5	18.36	-2.58
Stage 6	-3.6	18.05	-3.18
Stage 6	-3.7	17.67	-3.74
Stage 6	-3.8	17.25	-4.26
Stage 6	-3.9	16.77	-4.73
Stage 6	-4	16.26	-5.16
Stage 6	-4.1	15.7	-5.55
Stage 6	-4.2	15.11	-5.9
Stage 6	-4.3	14.49	-6.2
Stage 6	-4.4	13.85	-6.47
Stage 6	-4.5	13.18	-6.7
Stage 6	-4.6	12.49	-6.88
Stage 6	-4.7	11.79	-7.03
Stage 6	-4.8	11.07	-7.14
Stage 6	-4.9	10.35	-7.21
Stage 6	-5	9.62	-7.25
Stage 6	-5.1	8.9	-7.25
Stage 6	-5.2	8.18	-7.21
Stage 6	-5.3	7.47	-7.13
Stage 6	-5.4	6.77	-7.02

**PROGETTO ESECUTIVO**

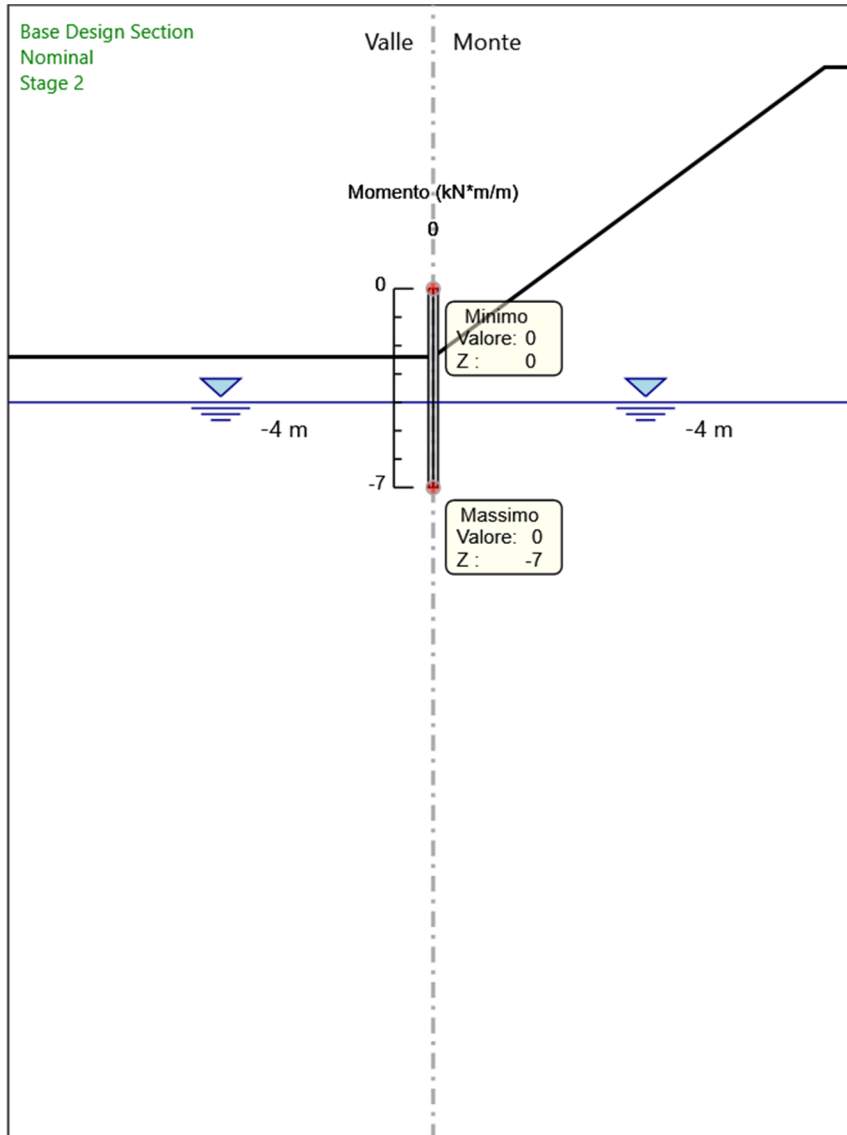
Design Assumption: Nominal Risultati Paratia		Muro: LEFT	
Stage	Z (m)	Momento (kN*m/m)	Taglio (kN/m)
Stage 6	-5.5	6.08	-6.87
Stage 6	-5.6	5.41	-6.68
Stage 6	-5.7	4.76	-6.46
Stage 6	-5.8	4.14	-6.2
Stage 6	-5.9	3.55	-5.91
Stage 6	-6	3	-5.58
Stage 6	-6.1	2.47	-5.21
Stage 6	-6.2	1.99	-4.82
Stage 6	-6.3	1.56	-4.38
Stage 6	-6.4	1.16	-3.91
Stage 6	-6.5	0.82	-3.41
Stage 6	-6.6	0.54	-2.87
Stage 6	-6.7	0.31	-2.29
Stage 6	-6.8	0.14	-1.68
Stage 6	-6.9	0.04	-1.04
Stage 6	-7	0	-0.36

**Grafico Momento Nominal - Stage: Stage 1**



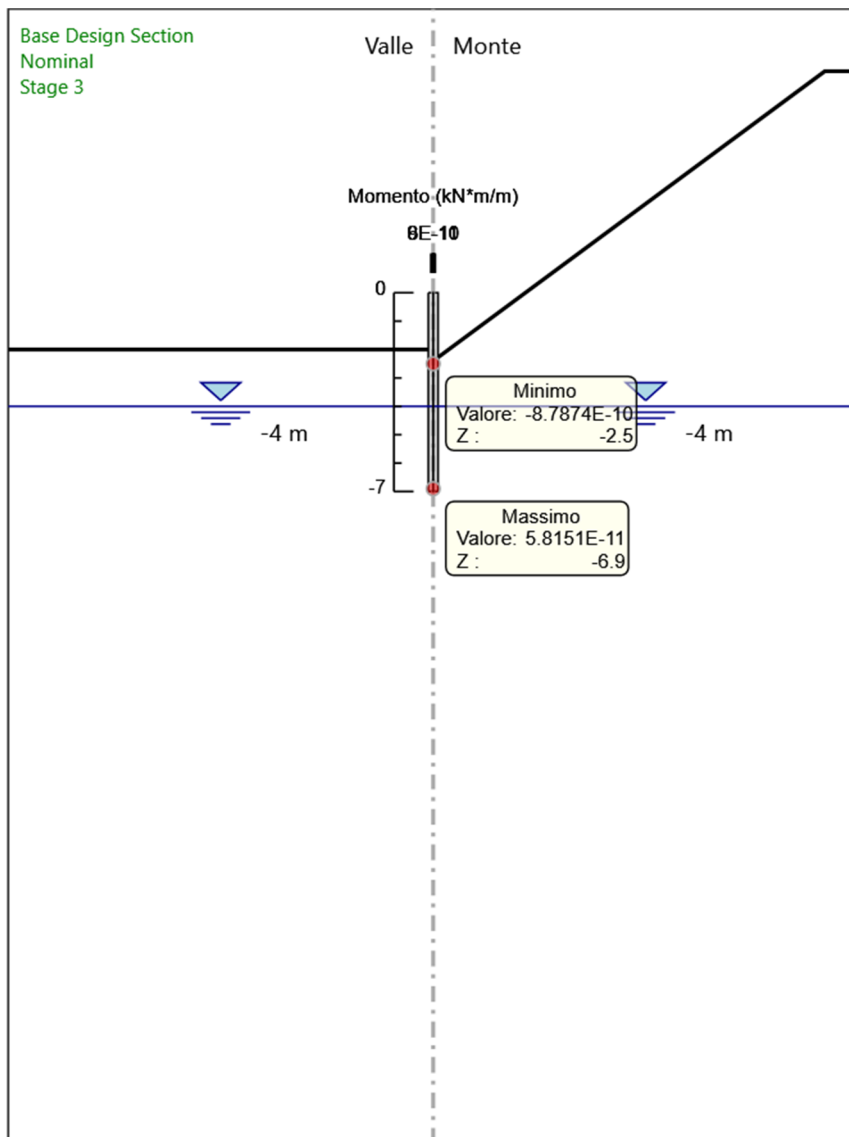
Design Assumption: Nominal  
 Stage: Stage 1  
 Momento

**Grafico Momento Nominal - Stage: Stage 2**



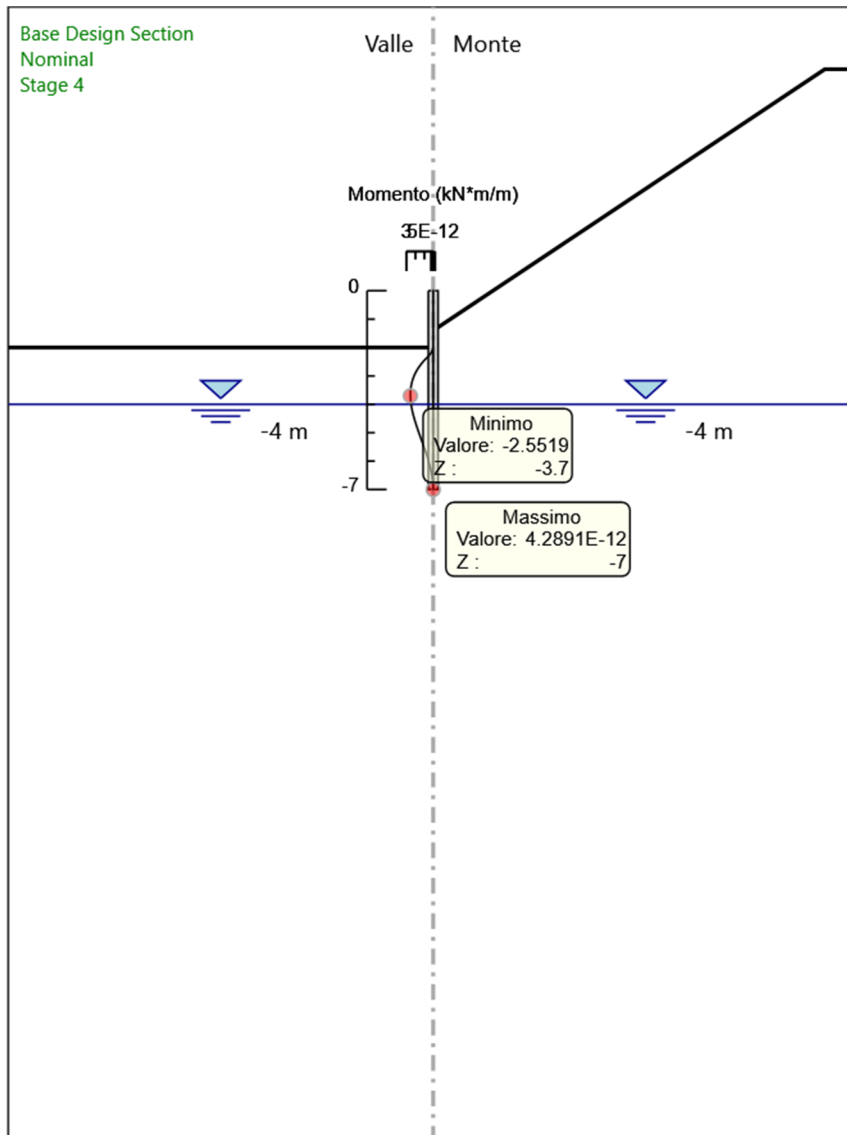
Design Assumption: Nominal  
 Stage: Stage 2  
 Momento

**Grafico Momento Nominal - Stage: Stage 3**



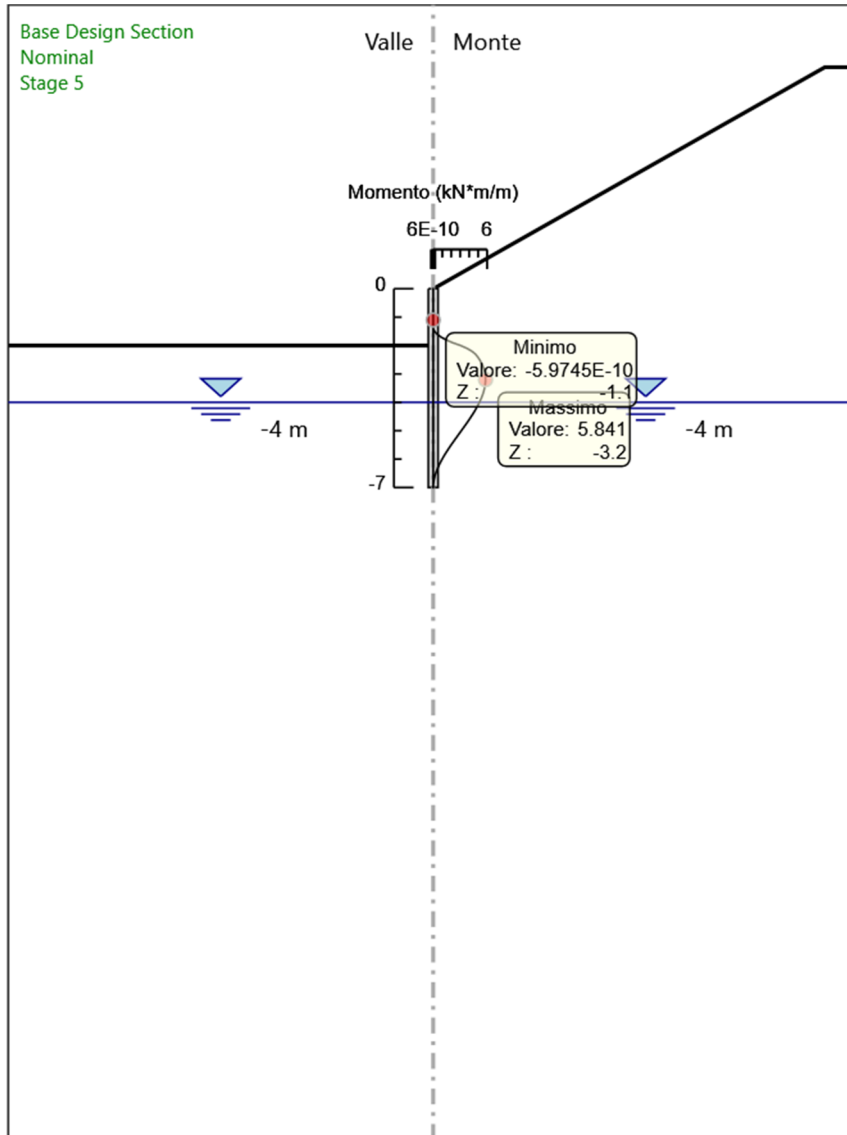
Design Assumption: Nominal  
 Stage: Stage 3  
 Momento

**Grafico Momento Nominal - Stage: Stage 4**



Design Assumption: Nominal  
 Stage: Stage 4  
 Momento

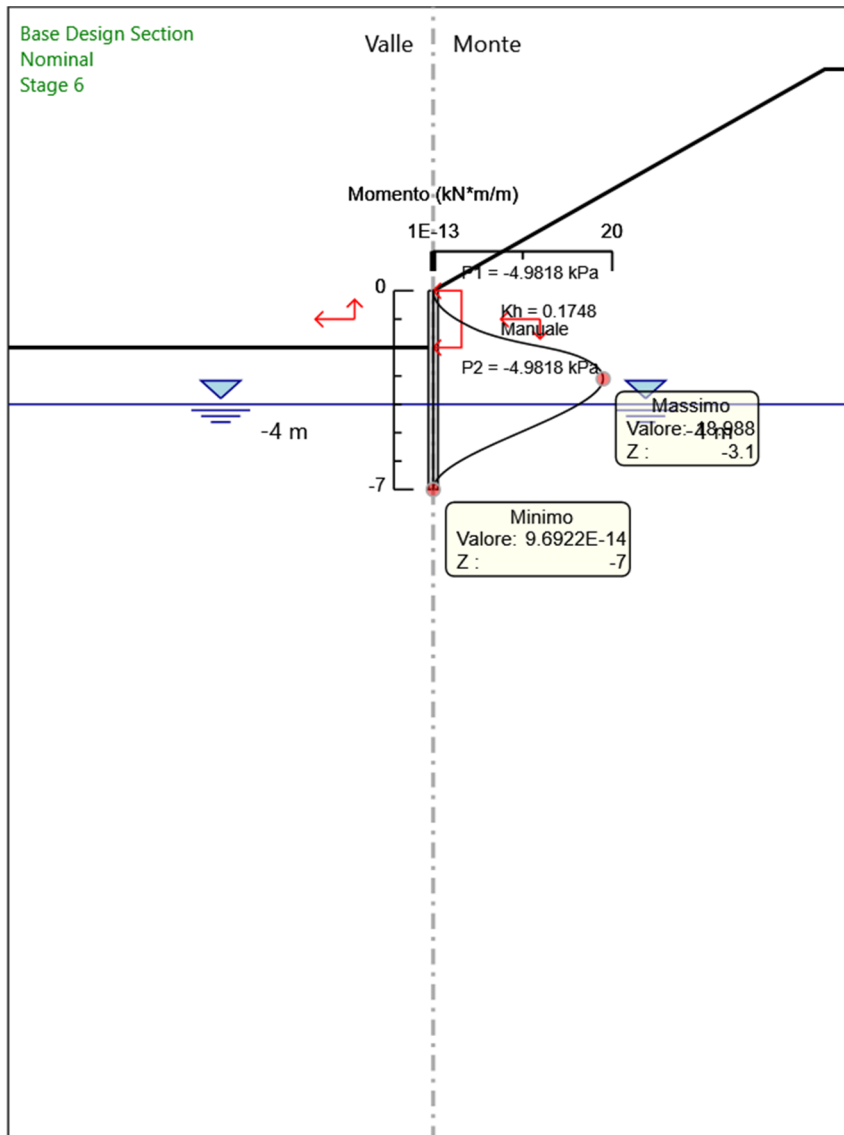
**Grafico Momento Nominal - Stage: Stage 5**



Design Assumption: Nominal  
Stage: Stage 5  
Momento

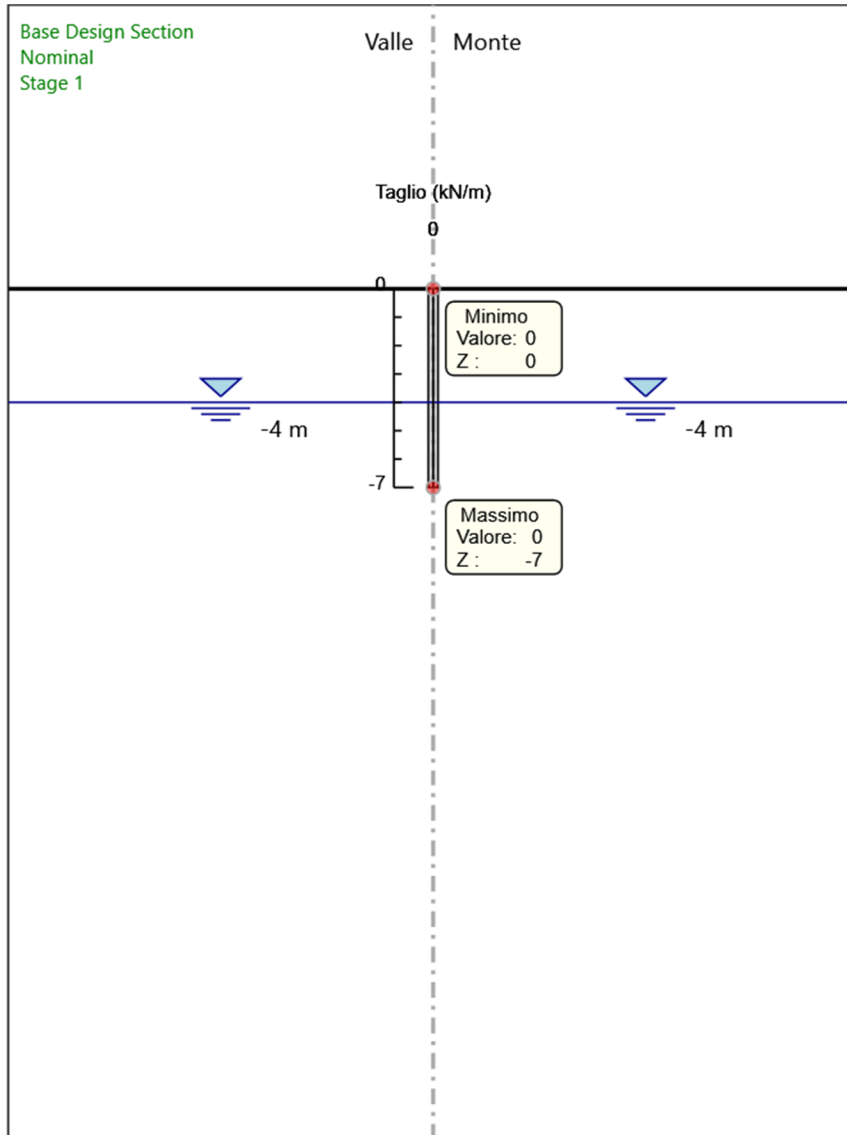


**Grafico Momento Nominal - Stage: Stage 6**



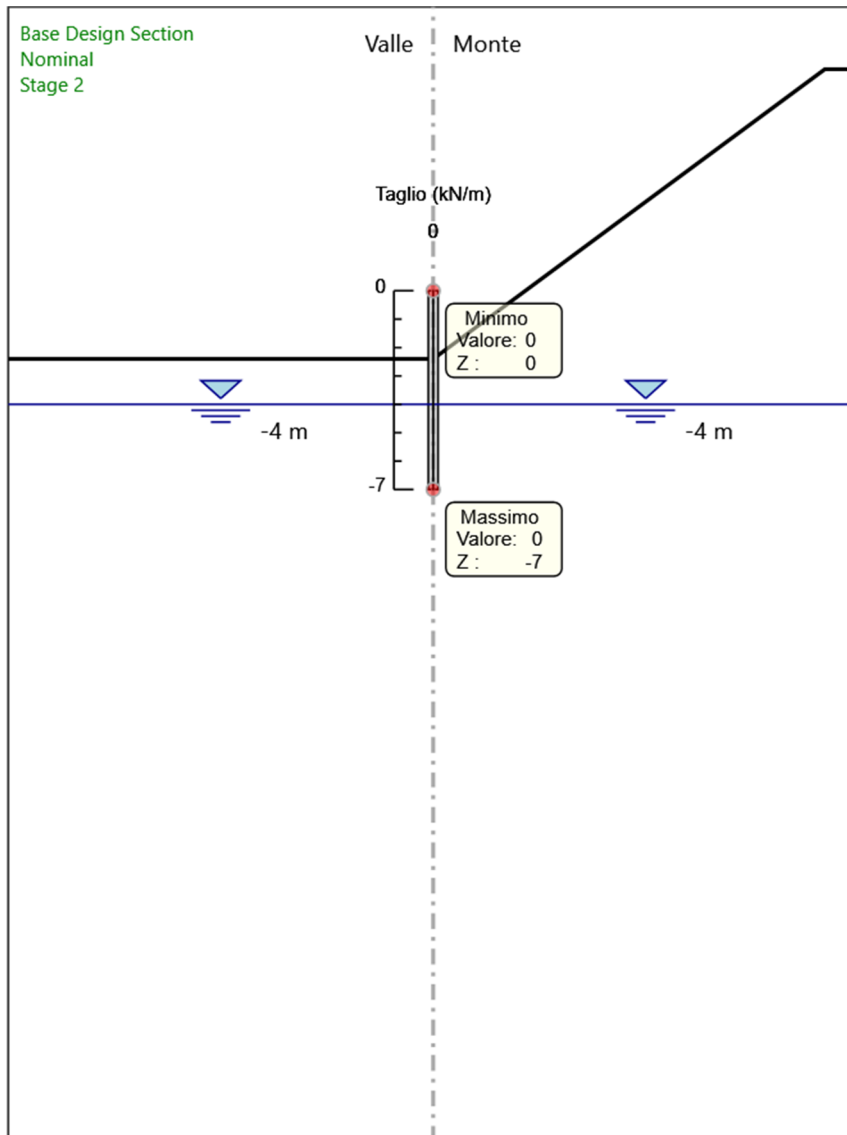
Design Assumption: Nominal  
Stage: Stage 6  
Momento

**Grafico Taglio Nominal - Stage: Stage 1**



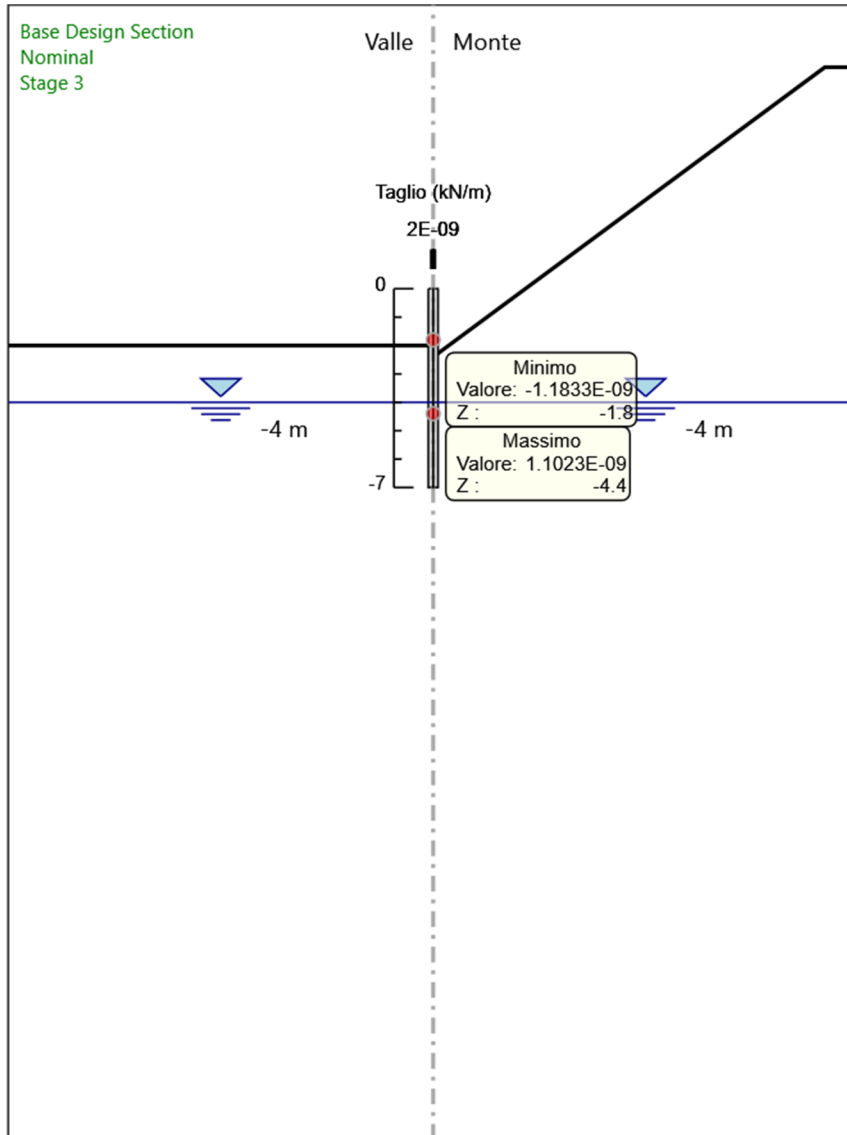
Design Assumption: Nominal  
 Stage: Stage 1  
 Taglio

**Grafico Taglio Nominal - Stage: Stage 2**



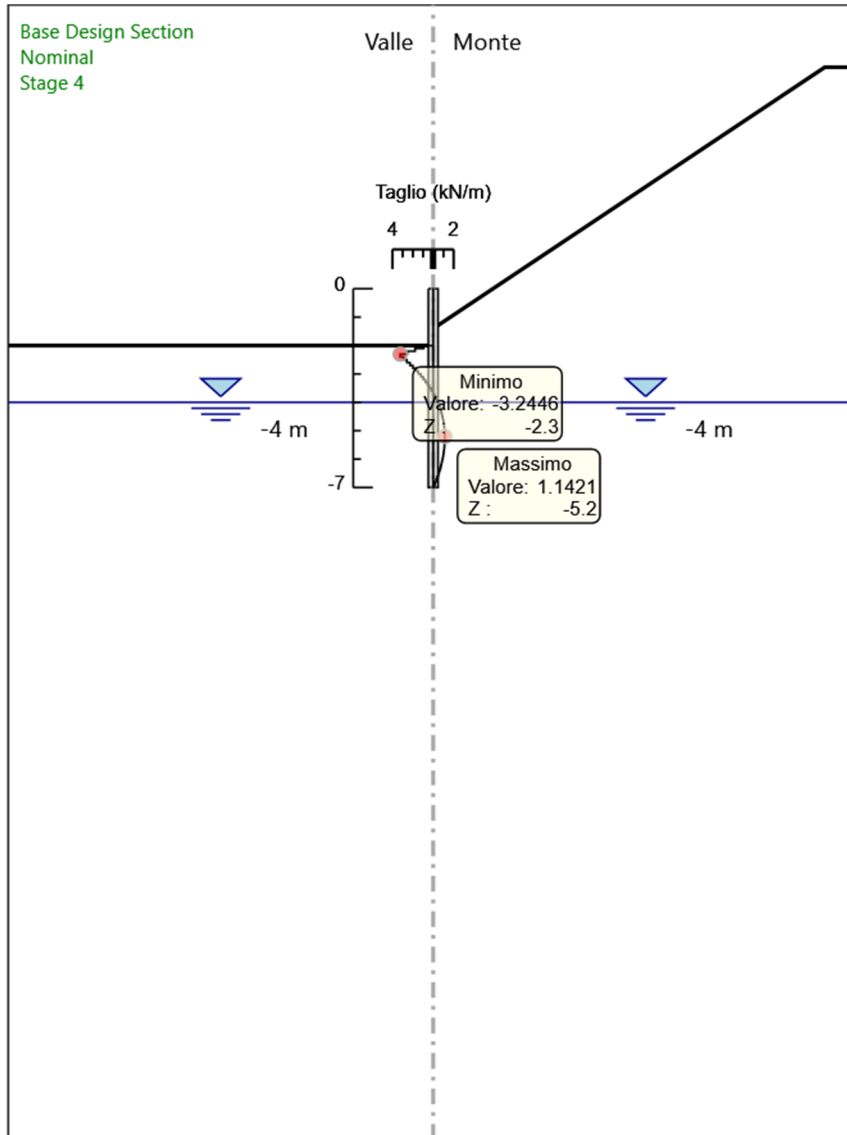
Design Assumption: Nominal  
Stage: Stage 2  
Taglio

**Grafico Taglio Nominal - Stage: Stage 3**



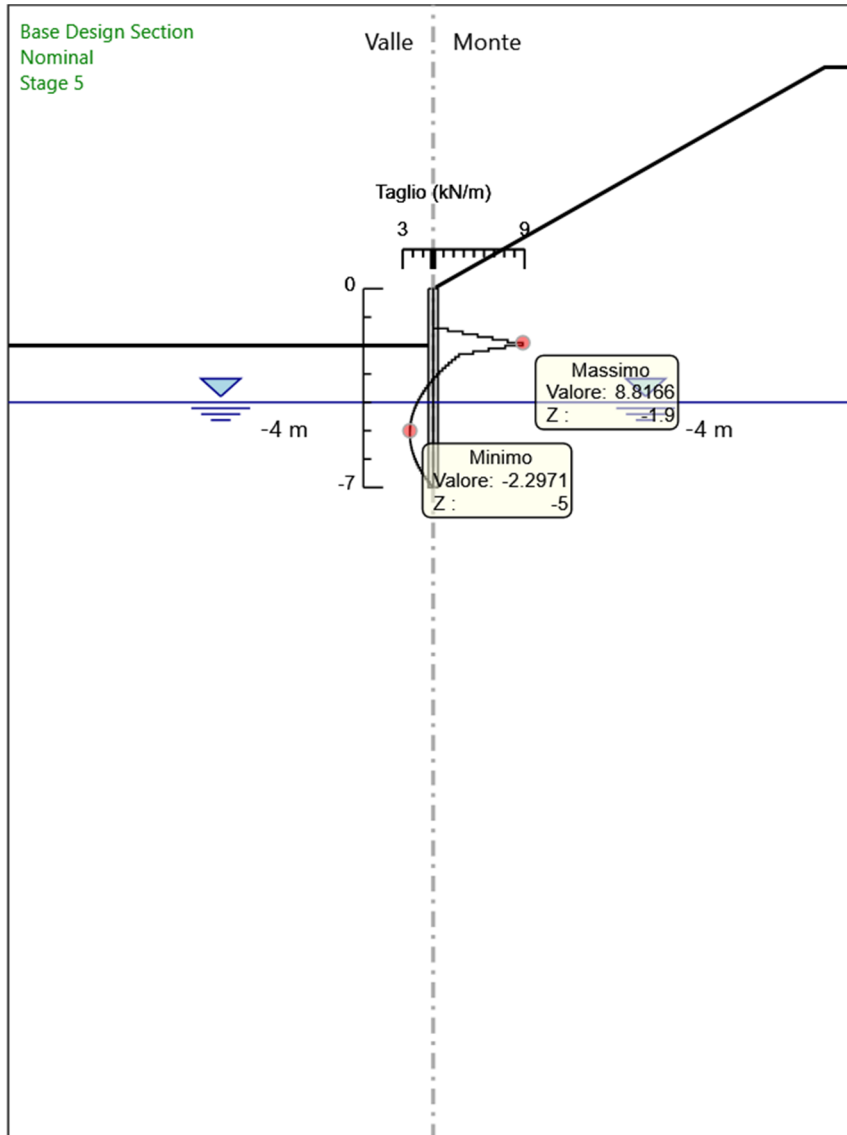
Design Assumption: Nominal  
 Stage: Stage 3  
 Taglio

**Grafico Taglio Nominal - Stage: Stage 4**



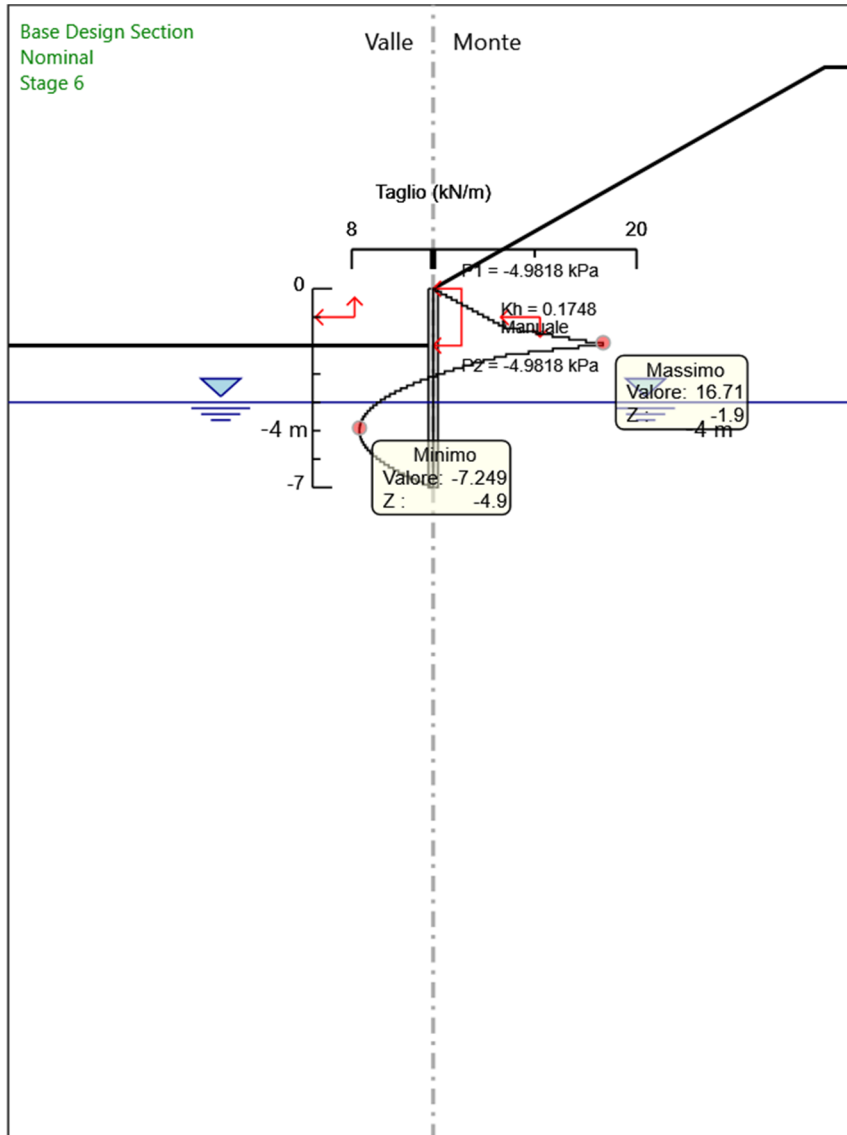
Design Assumption: Nominal  
Stage: Stage 4  
Taglio

**Grafico Taglio Nominal - Stage: Stage 5**



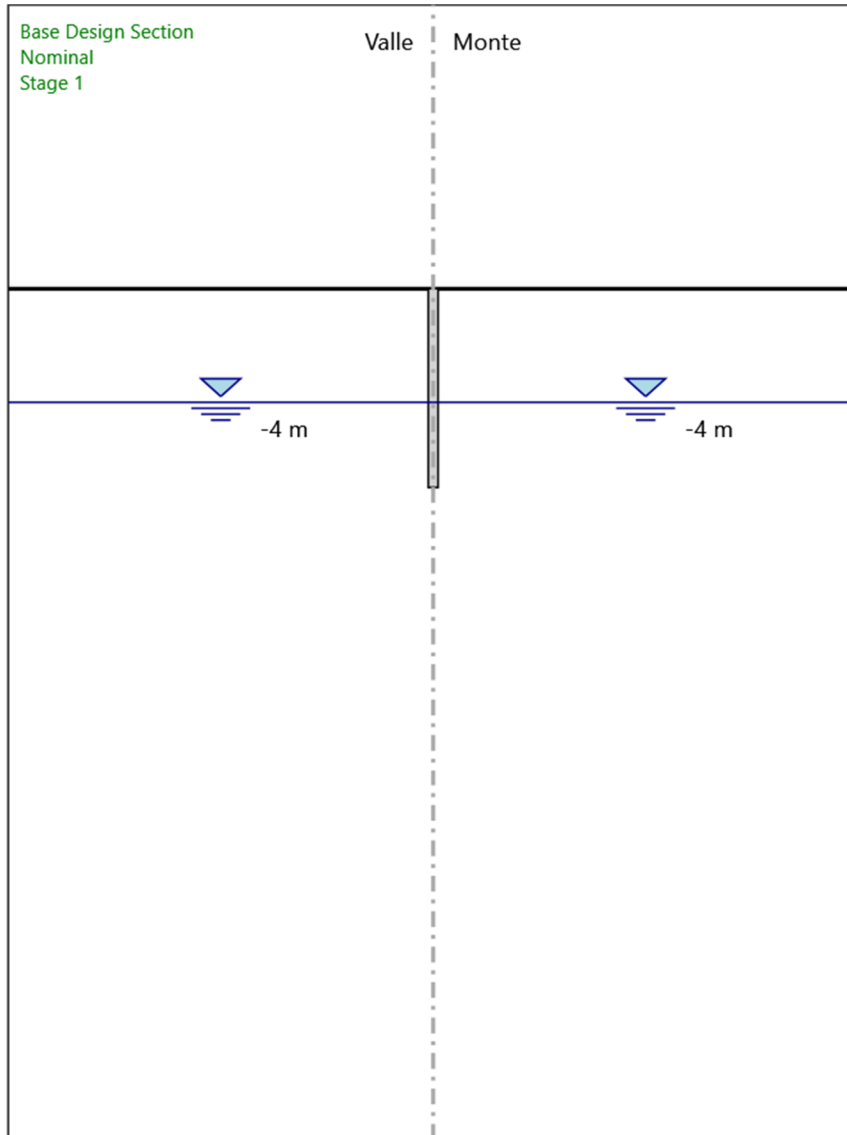
Design Assumption: Nominal  
Stage: Stage 5  
Taglio

**Grafico Taglio Nominal - Stage: Stage 6**



Design Assumption: Nominal  
Stage: Stage 6  
Taglio

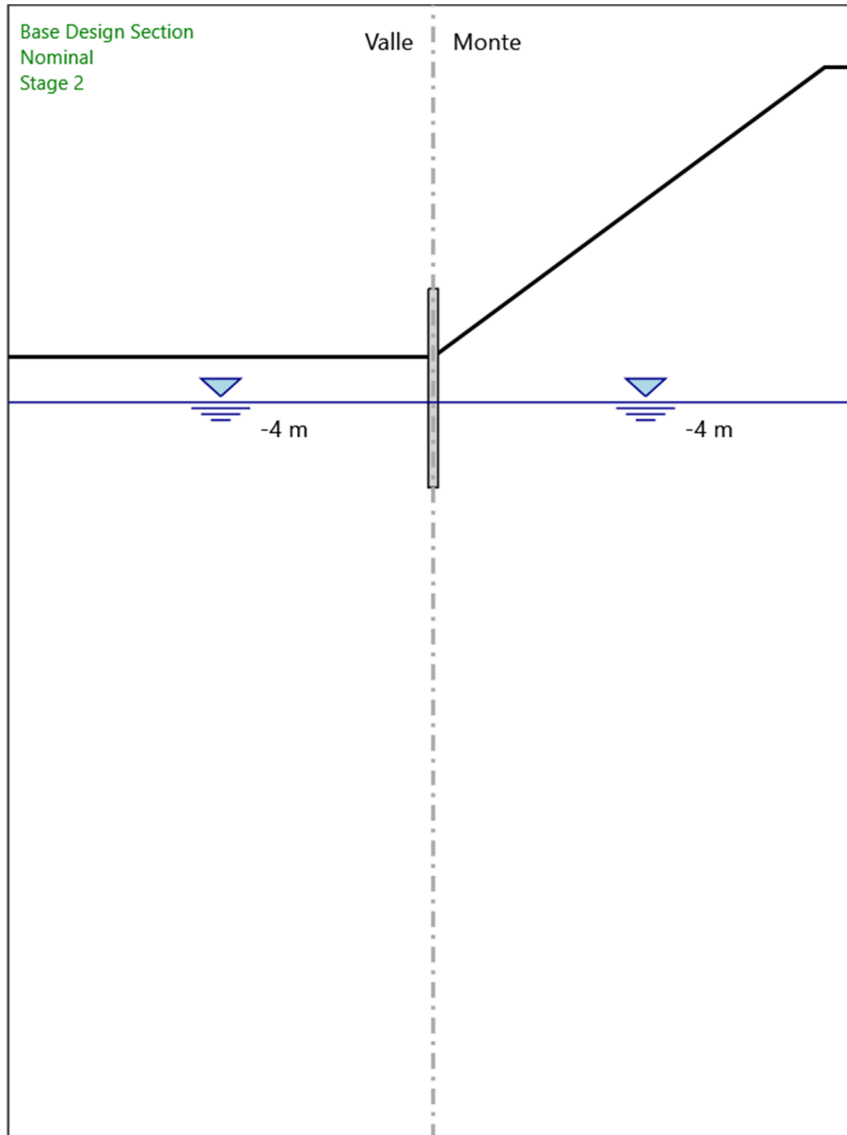
**Grafico Momento Nominal - Stage: Stage 1**



Design Assumption: Nominal  
Stage: Stage 1  
Momento

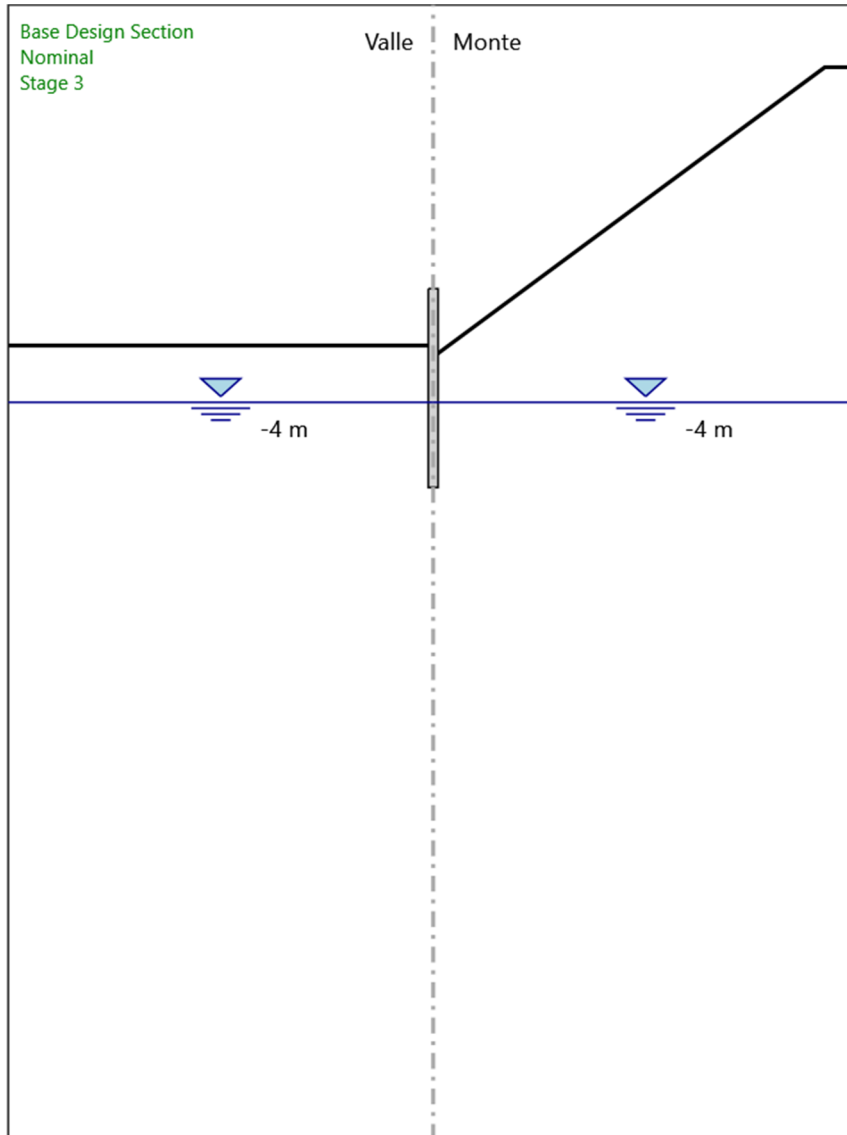


**Grafico Momento Nominal - Stage: Stage 2**



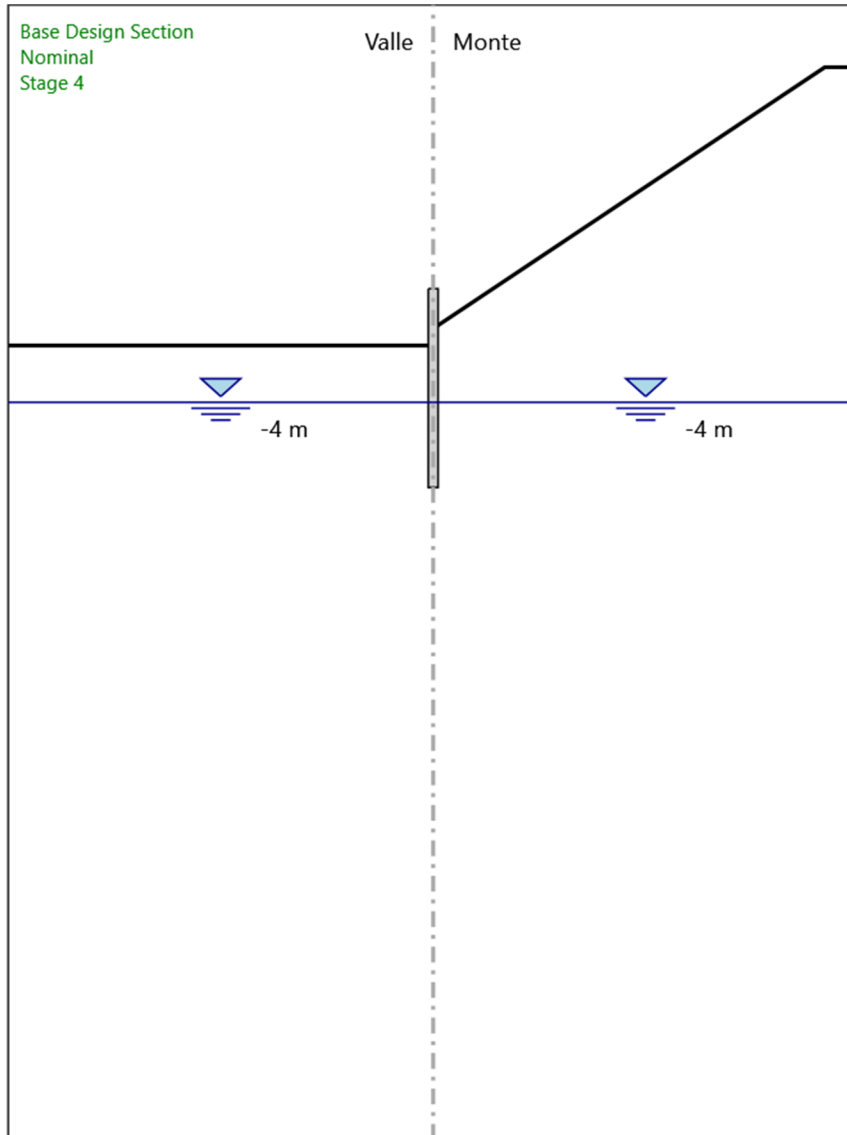
Design Assumption: Nominal  
 Stage: Stage 2  
 Momento

**Grafico Momento Nominal - Stage: Stage 3**



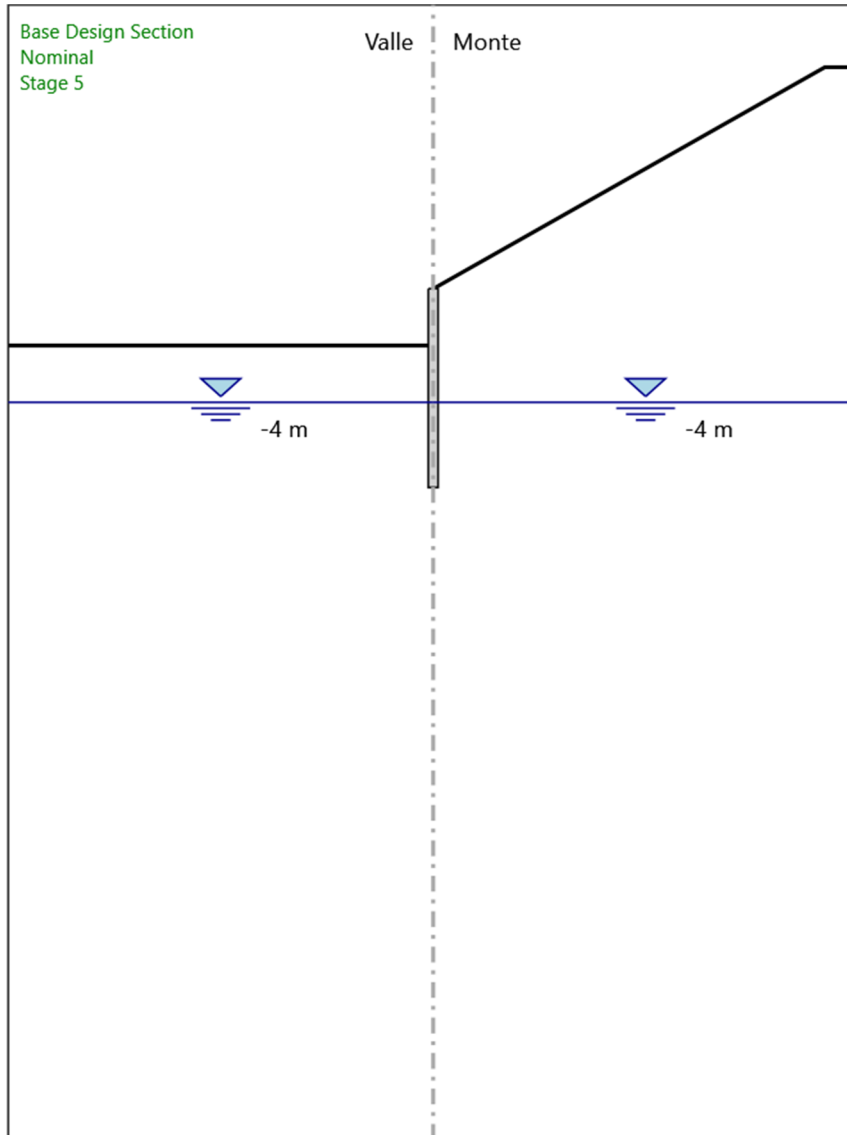
Design Assumption: Nominal  
Stage: Stage 3  
Momento

**Grafico Momento Nominal - Stage: Stage 4**



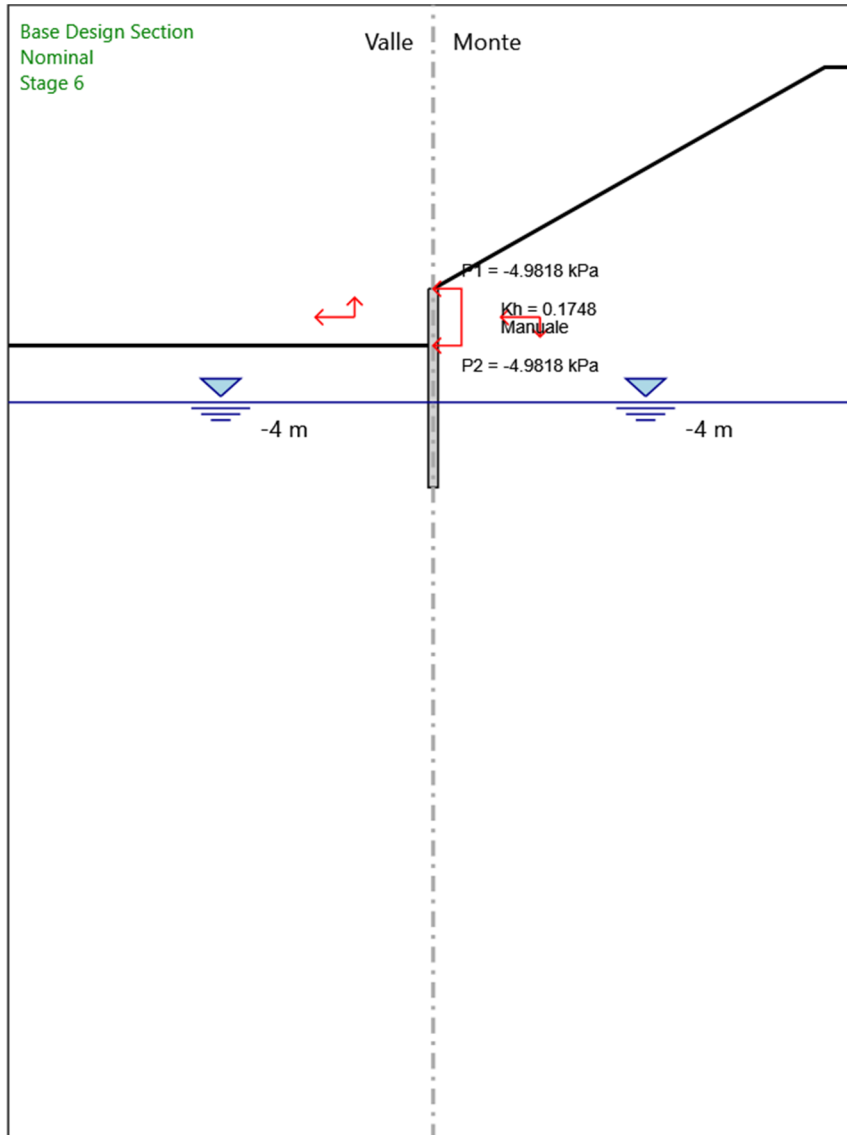
Design Assumption: Nominal  
 Stage: Stage 4  
 Momento

**Grafico Momento Nominal - Stage: Stage 5**



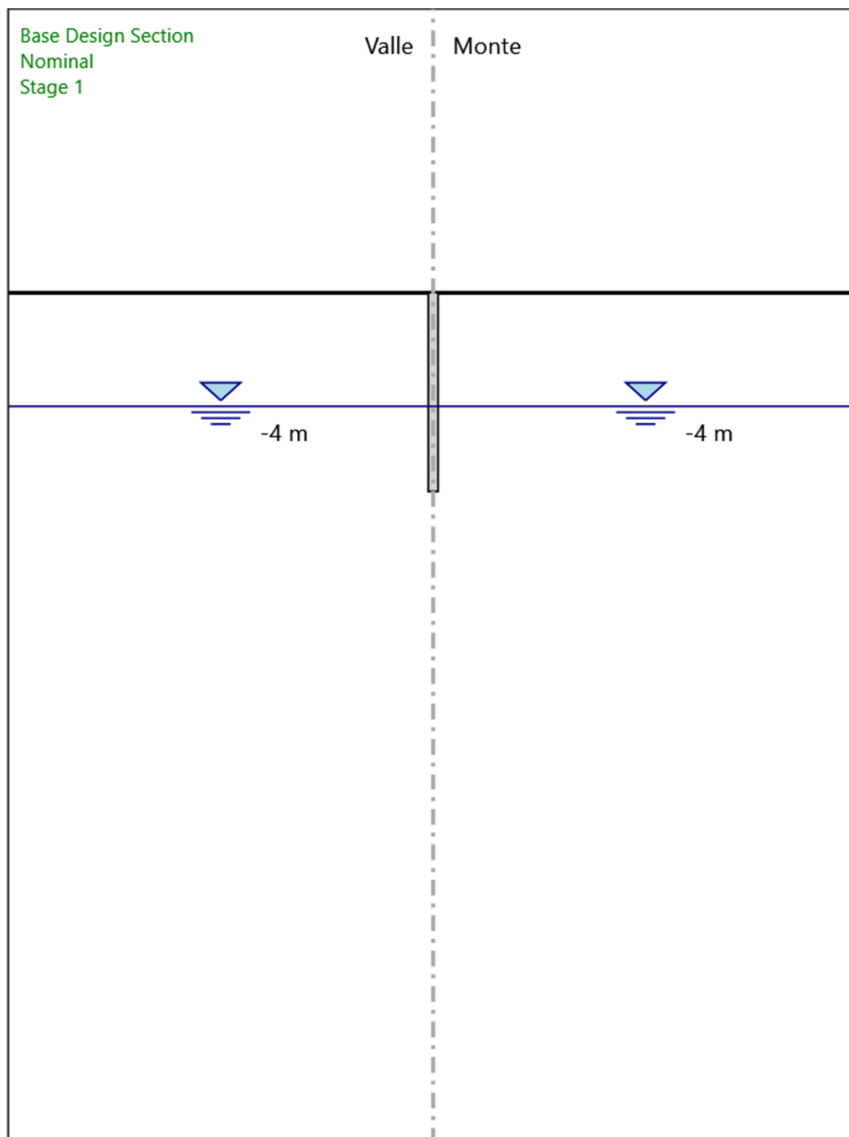
Design Assumption: Nominal  
 Stage: Stage 5  
 Momento

**Grafico Momento Nominal - Stage: Stage 6**



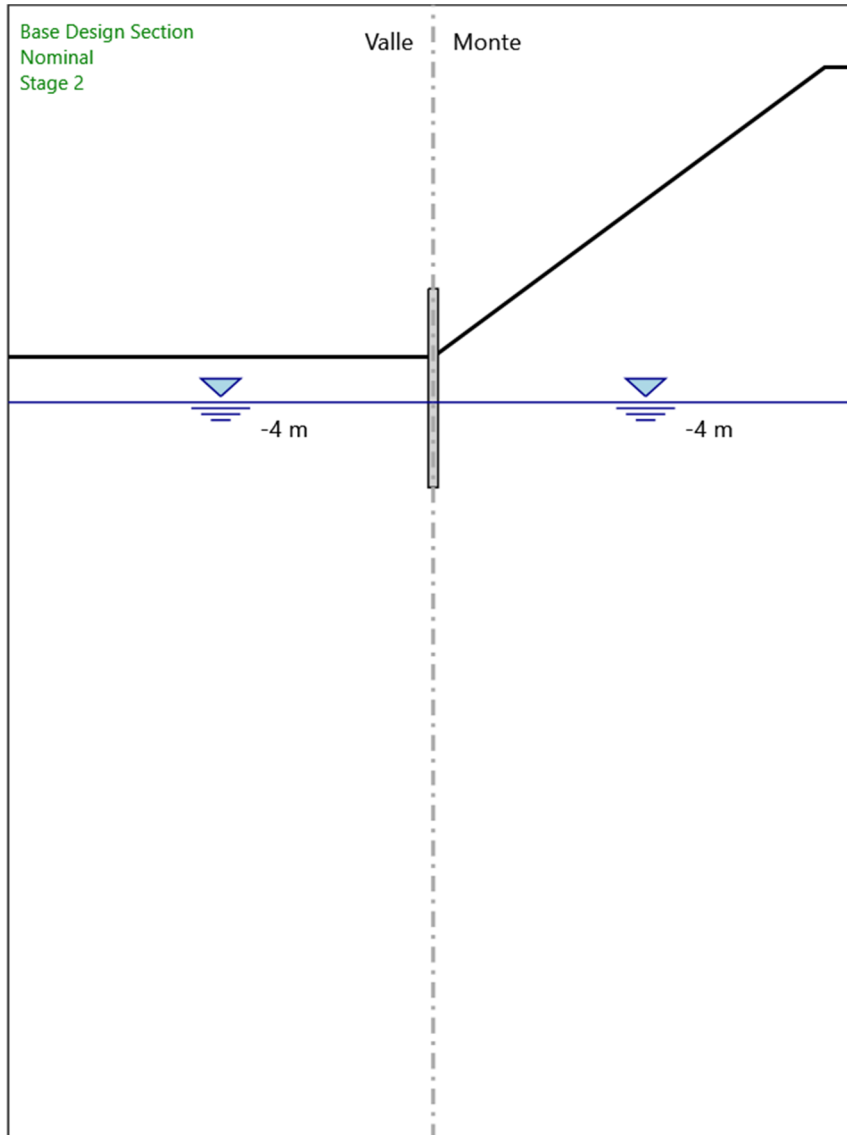
Design Assumption: Nominal  
Stage: Stage 6  
Momento

**Grafico Taglio Nominal - Stage: Stage 1**



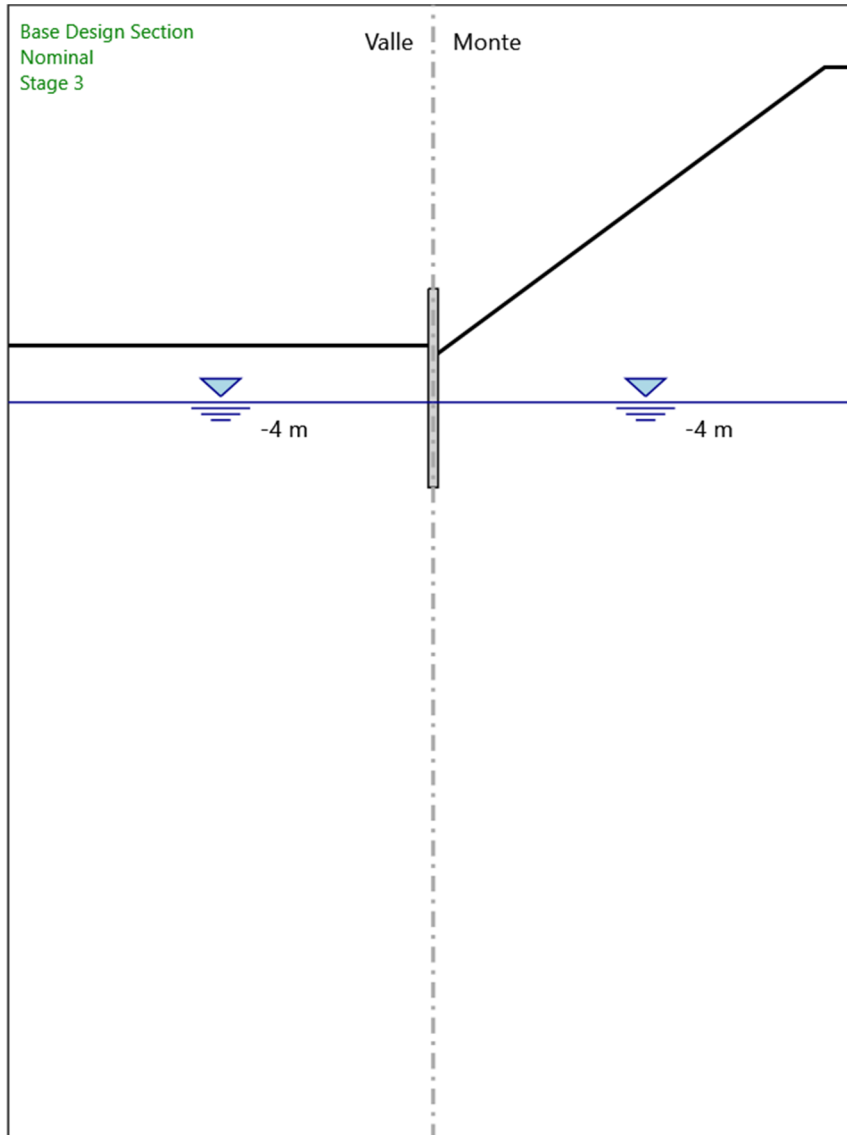
Design Assumption: Nominal  
 Stage: Stage 1  
 Taglio

**Grafico Taglio Nominal - Stage: Stage 2**



Design Assumption: Nominal  
 Stage: Stage 2  
 Taglio

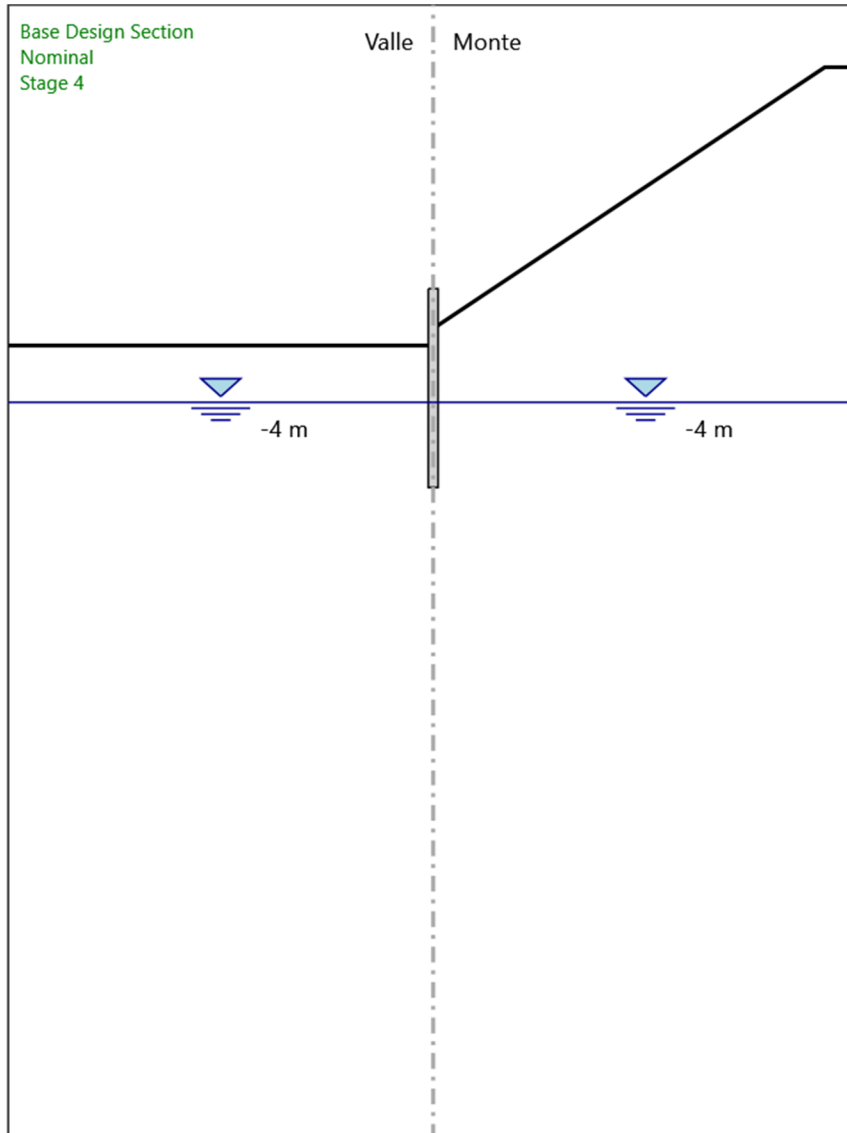
**Grafico Taglio Nominal - Stage: Stage 3**



Design Assumption: Nominal  
Stage: Stage 3  
Taglio

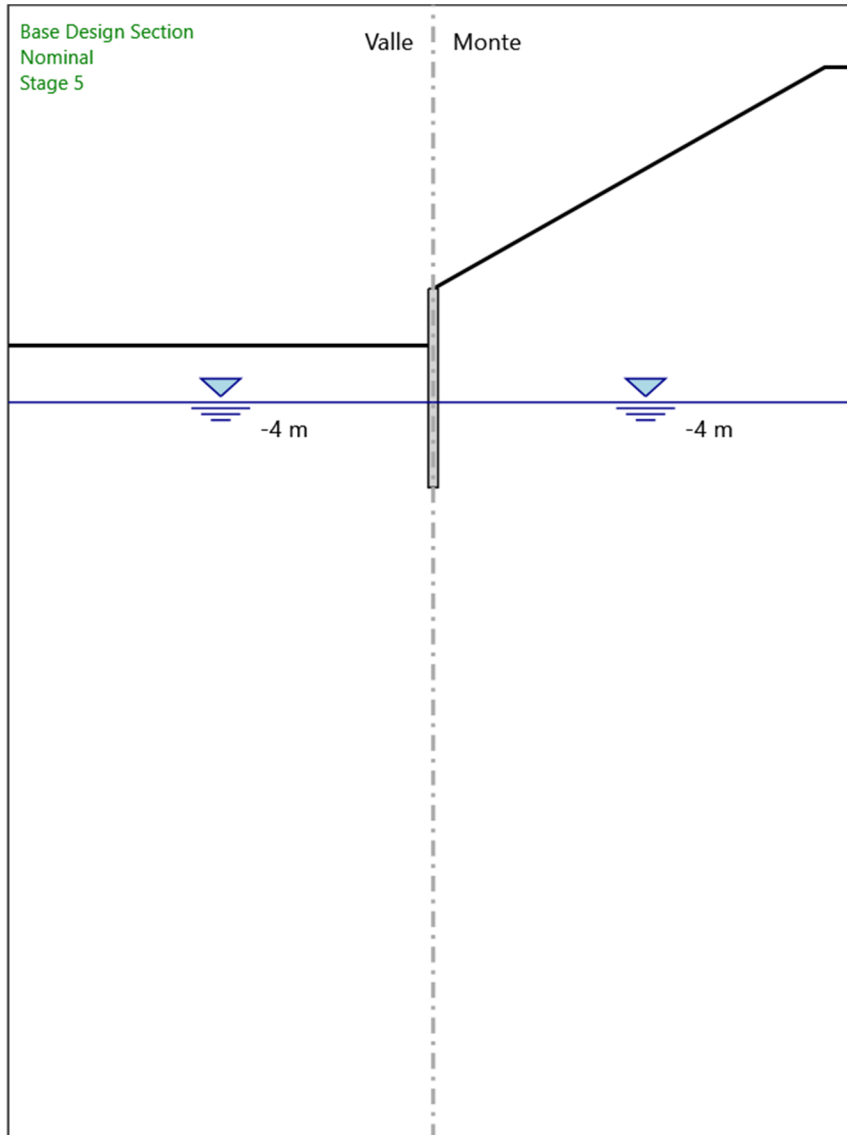


**Grafico Taglio Nominal - Stage: Stage 4**



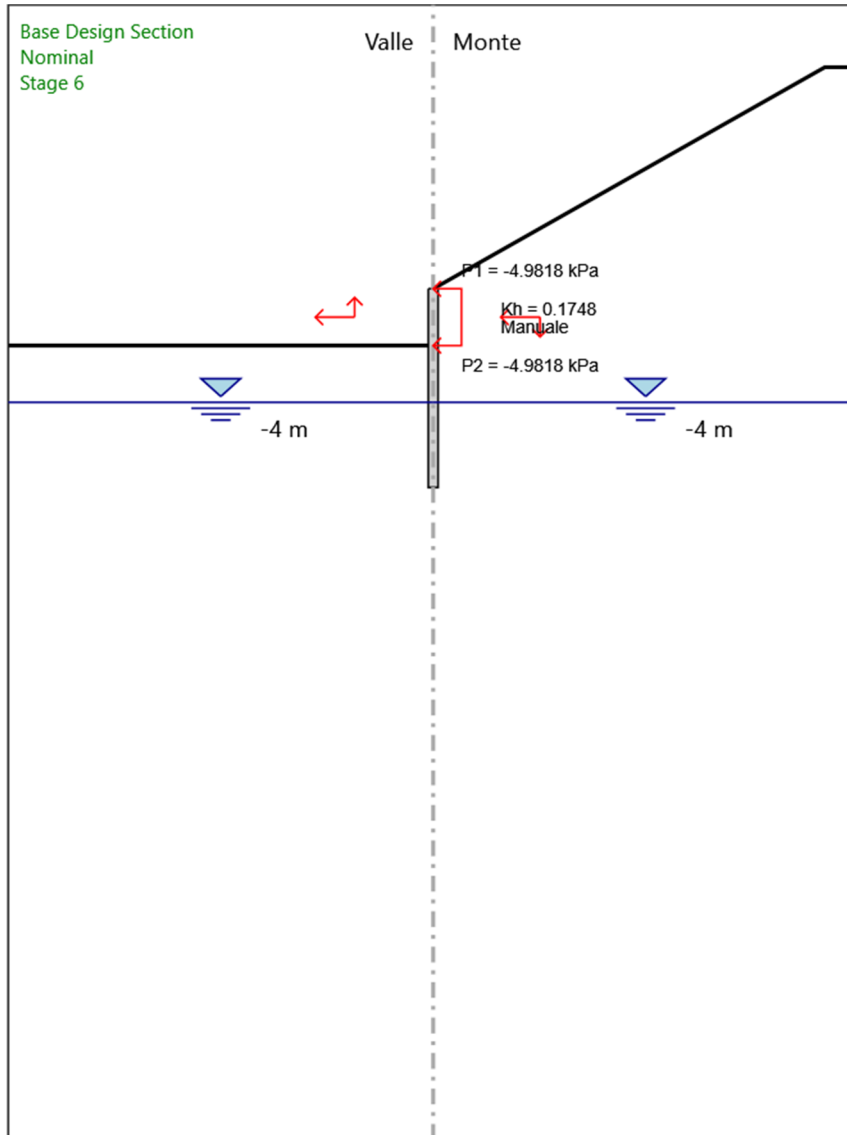
Design Assumption: Nominal  
 Stage: Stage 4  
 Taglio

**Grafico Taglio Nominal - Stage: Stage 5**



Design Assumption: Nominal  
 Stage: Stage 5  
 Taglio

**Grafico Taglio Nominal - Stage: Stage 6**



Design Assumption: Nominal  
Stage: Stage 6  
Taglio

## **Inviluppi Risultati Paratia Nominal**

## Descrizione Coefficienti Design Assumption

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- terD 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
NTC2018 : SI- SMICA STR	1	1	1	1	1	1	1	1	1	1	1	1	1
NTC2018 : SI- SMICA GEO	1	1	1	1	1	1	1	1	1	1	1.3	0.9	1

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
NTC2018: SISMICA STR	1	1	1	1	1
NTC2018: SISMICA GEO	1	1	1	1	1

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
NTC2018: SISMICA STR	1	1.2	1.1	1
NTC2018: SISMICA GEO	1	1.2	1.1	1

## Descrizione sintetica dei risultati delle Design Assumption (Inviluppi)

### Tabella Inviluppi Spostamento Left Wall

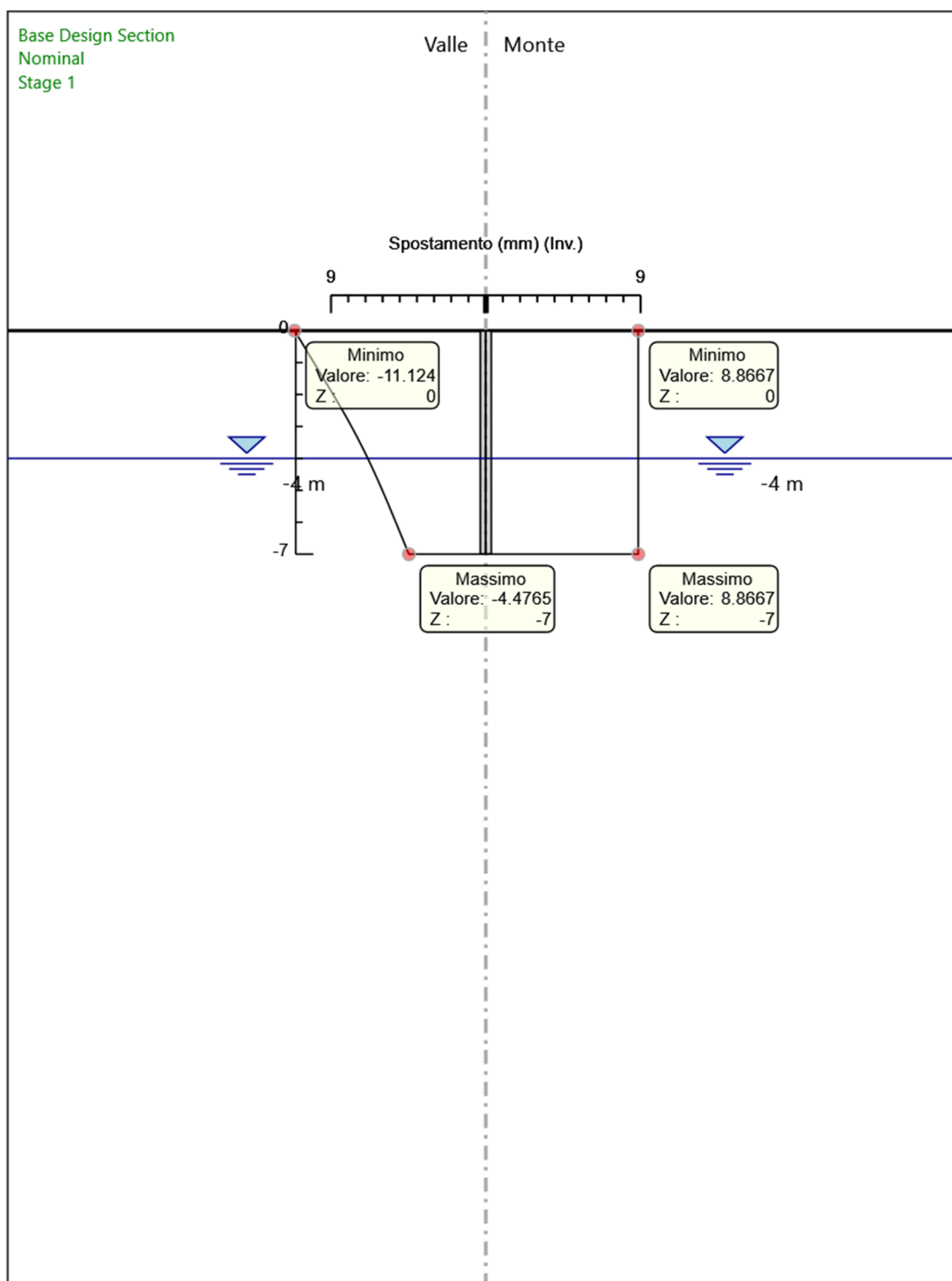
Design Assumption: Nominal Inviluppi: Spostamento Muro: LEFT		
Z (m)	Lato sinistro (mm)	Lato destro (mm)
0	-11.124	8.867
-0.1	-11.012	8.867
-0.2	-10.899	8.867
-0.3	-10.787	8.867
-0.4	-10.674	8.867
-0.5	-10.562	8.867
-0.6	-10.45	8.867
-0.7	-10.337	8.867
-0.8	-10.225	8.867
-0.9	-10.113	8.867
-1	-10	8.867
-1.1	-9.888	8.867
-1.2	-9.776	8.867
-1.3	-9.663	8.867
-1.4	-9.551	8.867
-1.5	-9.439	8.867
-1.6	-9.326	8.867
-1.7	-9.214	8.867
-1.8	-9.102	8.867
-1.9	-8.99	8.867
-2	-8.879	8.867
-2.1	-8.768	8.867
-2.2	-8.658	8.867
-2.3	-8.549	8.867
-2.4	-8.441	8.867
-2.5	-8.334	8.867
-2.6	-8.228	8.867
-2.7	-8.124	8.867
-2.8	-8.02	8.867
-2.9	-7.917	8.867
-3	-7.816	8.867
-3.1	-7.715	8.867
-3.2	-7.616	8.867
-3.3	-7.519	8.867
-3.4	-7.422	8.867
-3.5	-7.326	8.867
-3.6	-7.232	8.867
-3.7	-7.139	8.867
-3.8	-7.047	8.867
-3.9	-6.956	8.867
-4	-6.866	8.867
-4.1	-6.777	8.867
-4.2	-6.69	8.867
-4.3	-6.603	8.867
-4.4	-6.517	8.867
-4.5	-6.432	8.867
-4.6	-6.348	8.867
-4.7	-6.265	8.867
-4.8	-6.182	8.867
-4.9	-6.101	8.867
-5	-6.02	8.867

**PROGETTO ESECUTIVO**

Design Assumption: Nominal Involuppi: Spostamento Muro: LEFT		
Z (m)	Lato sinistro (mm)	Lato destro (mm)
-5.1	-5.939	8.867
-5.2	-5.859	8.867
-5.3	-5.78	8.867
-5.4	-5.701	8.867
-5.5	-5.623	8.867
-5.6	-5.545	8.867
-5.7	-5.468	8.867
-5.8	-5.39	8.867
-5.9	-5.314	8.867
-6	-5.237	8.867
-6.1	-5.16	8.867
-6.2	-5.084	8.867
-6.3	-5.008	8.867
-6.4	-4.932	8.867
-6.5	-4.856	8.867
-6.6	-4.78	8.867
-6.7	-4.704	8.867
-6.8	-4.628	8.867
-6.9	-4.552	8.867
-7	-4.476	8.867



## Grafico Inviluppi Spostamento



Spostamento

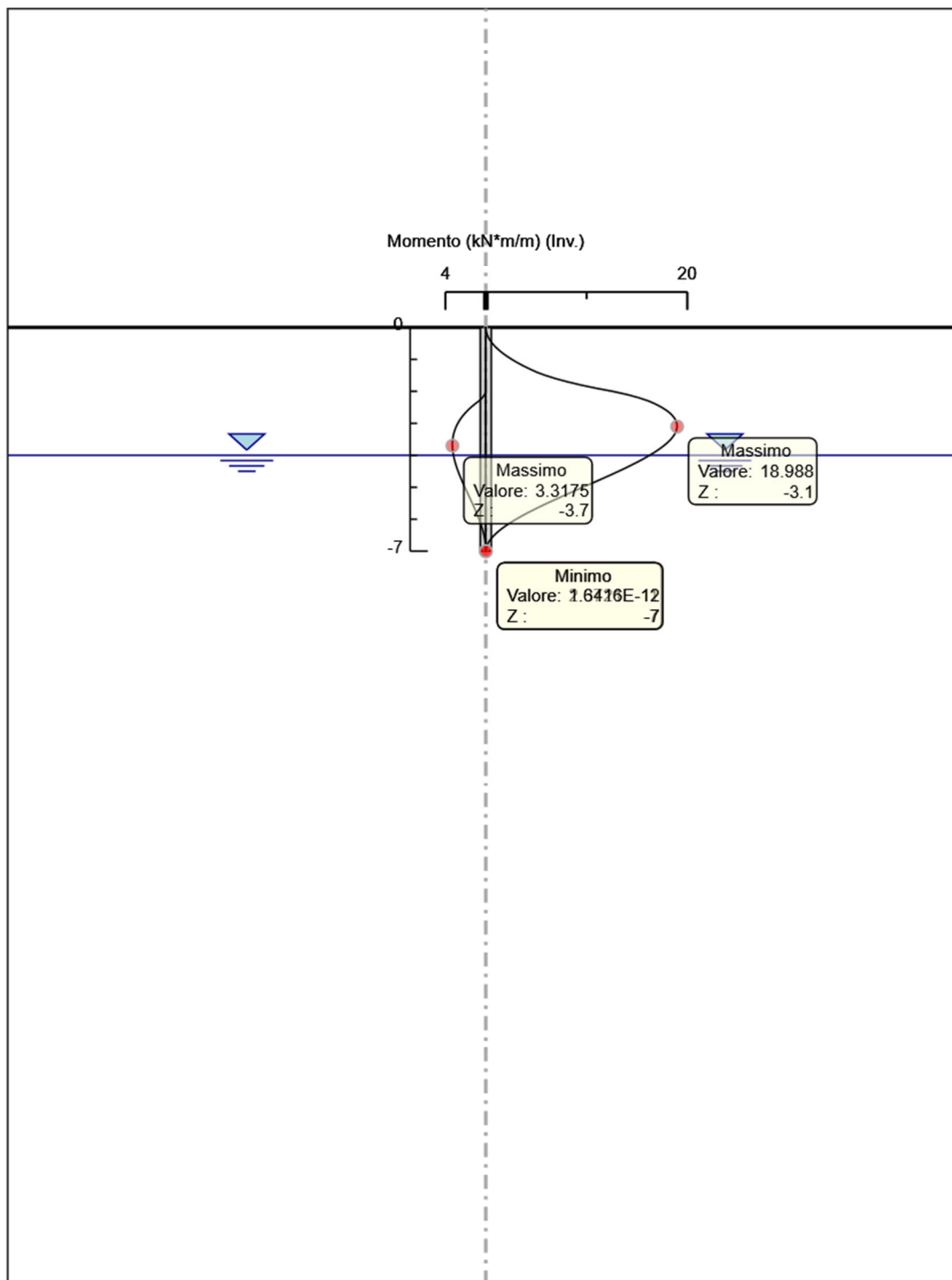
## Tabella Inviluppi Momento WallElement

Design Assumption: Nominal	Inviluppi: Momento	Muro: WallElement
Z (m)	Lato sinistro (kN*m/m)	Lato destro (kN*m/m)
0	0	0
-0.1	0	0.026
-0.2	0	0.103
-0.3	0	0.232
-0.4	0	0.413
-0.5	0	0.645
-0.6	0	0.929
-0.7	0	1.264
-0.8	0	1.651
-0.9	0	2.09
-1	0	2.58
-1.1	0	3.122
-1.2	0	3.715
-1.3	0	4.36
-1.4	0	5.057
-1.5	0	5.909
-1.6	0	6.921
-1.7	0	8.094
-1.8	0	9.431
-1.9	0	10.933
-2	0	12.604
-2.1	0.121	14.033
-2.2	0.352	15.21
-2.3	0.684	16.149
-2.4	1.106	16.865
-2.5	1.484	17.467
-2.6	1.82	17.962
-2.7	2.117	18.353
-2.8	2.375	18.647
-2.9	2.598	18.847
-3	2.787	18.96
-3.1	2.945	18.988
-3.2	3.072	18.939
-3.3	3.17	18.815
-3.4	3.243	18.622
-3.5	3.29	18.365
-3.6	3.314	18.046
-3.7	3.317	17.672
-3.8	3.301	17.247
-3.9	3.266	16.774
-4	3.214	16.258
-4.1	3.147	15.703
-4.2	3.066	15.114
-4.3	2.973	14.493
-4.4	2.869	13.847
-4.5	2.755	13.177
-4.6	2.632	12.489
-4.7	2.503	11.785
-4.8	2.367	11.071
-4.9	2.227	10.35
-5	2.083	9.625
-5.1	1.936	8.9
-5.2	1.788	8.18
-5.3	1.64	7.467

**PROGETTO ESECUTIVO**

Design Assumption: Nominal	Inviluppi: Momento	Muro: WallElement
Z (m)	Lato sinistro (kN*m/m)	Lato destro (kN*m/m)
-5.4	1.492	6.765
-5.5	1.346	6.079
-5.6	1.202	5.411
-5.7	1.062	4.765
-5.8	0.927	4.145
-5.9	0.797	3.554
-6	0.674	2.996
-6.1	0.558	2.475
-6.2	0.451	1.993
-6.3	0.353	1.555
-6.4	0.264	1.164
-6.5	0.188	0.823
-6.6	0.123	0.537
-6.7	0.07	0.308
-6.8	0.032	0.139
-6.9	0.008	0.036
-7	0	0

## Grafico Inviluppi Momento



Momento

## Tabella Involuppi Taglio WallElement

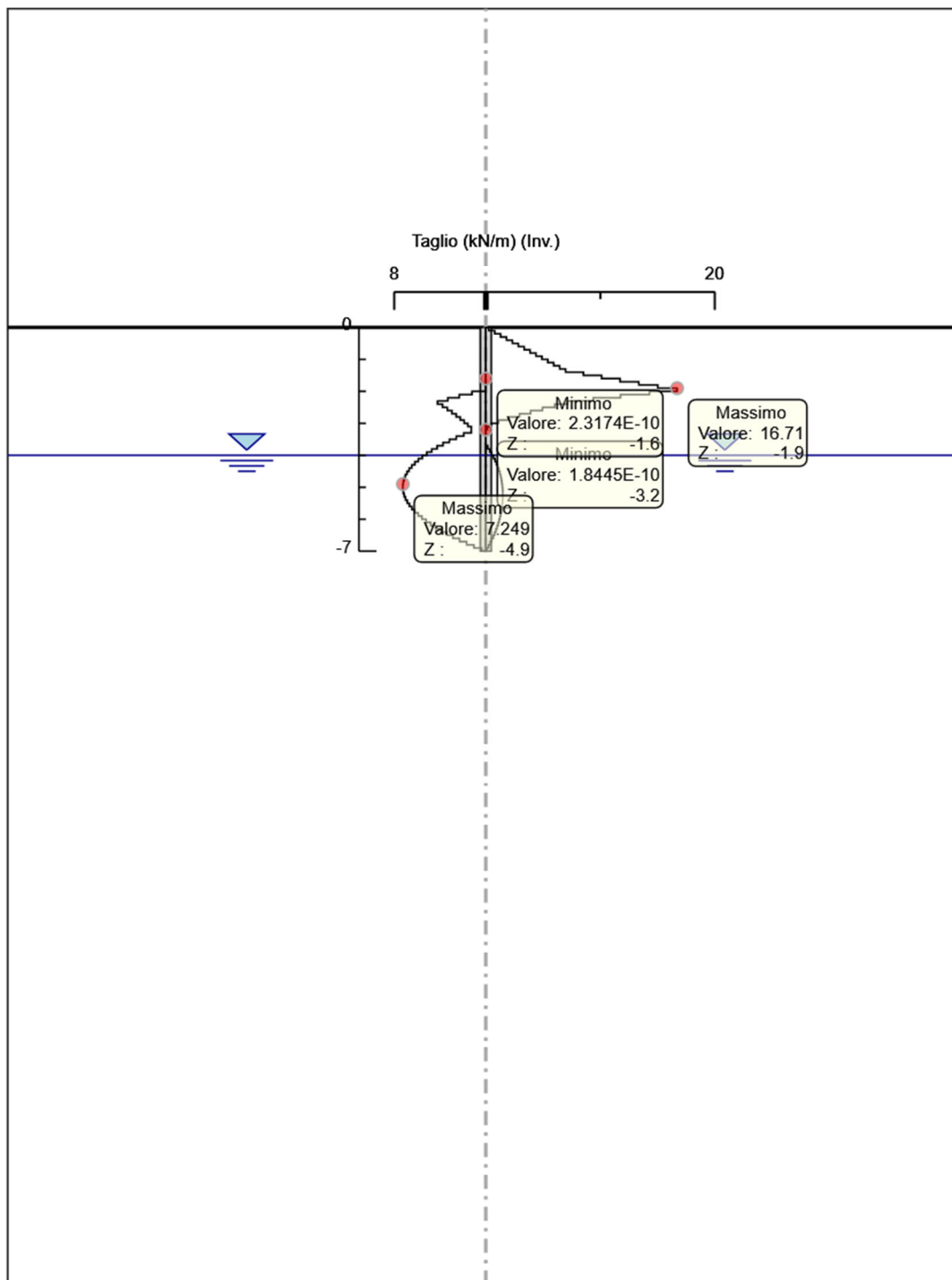
Design Assumption: Nominal	Involuppi: Taglio	Muro: WallElement
Z (m)	Lato sinistro (kN/m)	Lato destro (kN/m)
0	0	0.258
-0.1	0	0.774
-0.2	0	1.29
-0.3	0	1.806
-0.4	0	2.322
-0.5	0	2.838
-0.6	0	3.354
-0.7	0	3.87
-0.8	0	4.386
-0.9	0	4.902
-1	0	5.418
-1.1	0	5.934
-1.2	0	6.45
-1.3	0	6.966
-1.4	0	8.529
-1.5	0	10.117
-1.6	0	11.73
-1.7	0	13.366
-1.8	0	15.026
-1.9	0	16.71
-2	1.209	16.71
-2.1	2.315	14.292
-2.2	3.318	11.766
-2.3	4.218	9.388
-2.4	4.218	7.158
-2.5	3.78	6.026
-2.6	3.362	4.945
-2.7	2.965	3.915
-2.8	2.587	2.935
-2.9	2.23	2.005
-3	1.891	1.123
-3.1	1.571	0.465
-3.2	1.27	0.133
-3.3	1.929	0
-3.4	2.578	0
-3.5	3.181	0
-3.6	3.74	0
-3.7	4.256	0.168
-3.8	4.729	0.351
-3.9	5.159	0.518
-4	5.548	0.67
-4.1	5.896	0.808
-4.2	6.202	0.932
-4.3	6.469	1.042
-4.4	6.696	1.139
-4.5	6.884	1.224
-4.6	7.032	1.296
-4.7	7.142	1.356
-4.8	7.215	1.404
-4.9	7.249	1.441
-5	7.249	1.466
-5.1	7.246	1.481
-5.2	7.206	1.485
-5.3	7.129	1.485

**PROGETTO ESECUTIVO**

Design Assumption: Nominal	Inviluppi: Taglio	Muro: WallElement
Z (m)	Lato sinistro (kN/m)	Lato destro (kN/m)
-5.4	7.016	1.478
-5.5	6.866	1.462
-5.6	6.68	1.435
-5.7	6.458	1.399
-5.8	6.2	1.353
-5.9	5.907	1.297
-6	5.578	1.232
-6.1	5.214	1.158
-6.2	4.815	1.075
-6.3	4.381	0.982
-6.4	3.911	0.88
-6.5	3.406	0.77
-6.6	2.866	0.65
-6.7	2.292	0.521
-6.8	1.682	0.384
-6.9	1.037	0.238
-7	0.357	0.082



## Grafico Involuppi Taglio



Taglio

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

### **Normative Verifiche**

Calcestruzzo	NTC
Acciaio	NTC
Tirante	NTC

### **Coefficienti per Verifica Tiranti**

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

## Riepilogo Stage / Design Assumption per Inviluppo

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

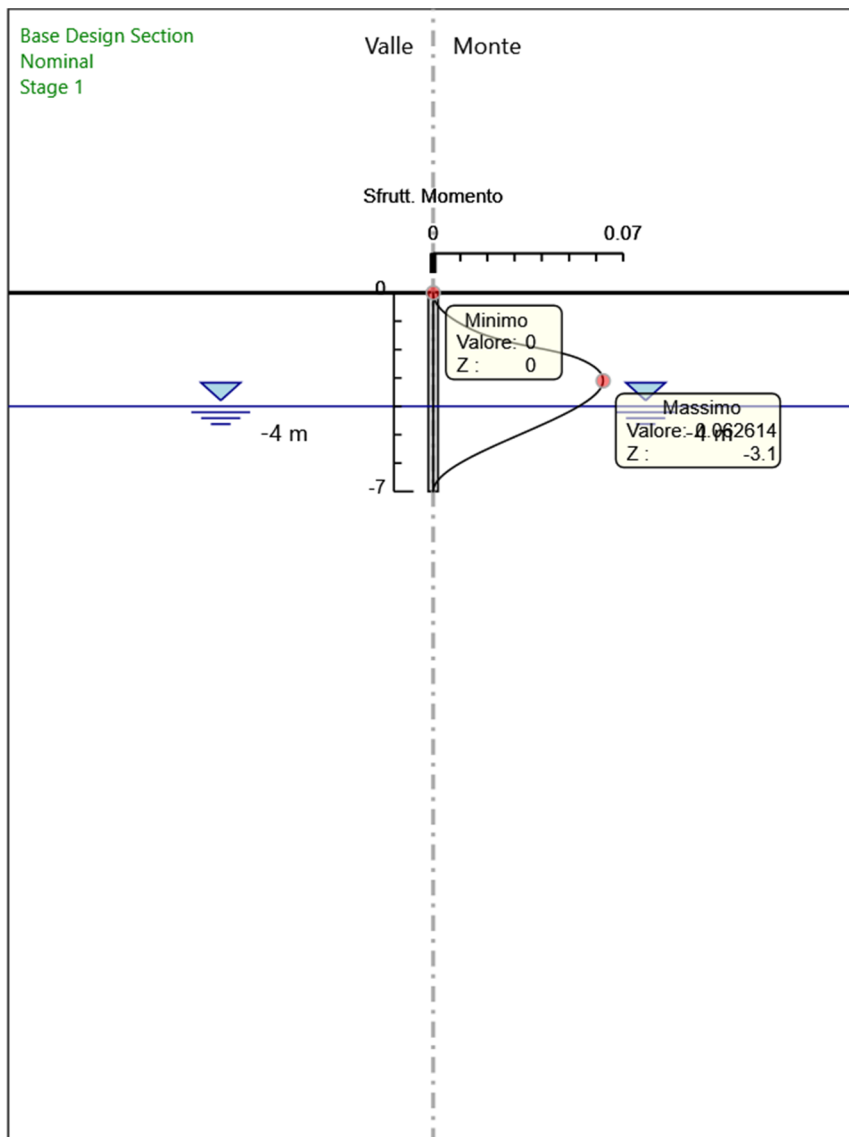
## Risultati SteelWorld

### Tabella Inviluppi Tasso di Sfruttamento a Momento - SteelWorld : LEFT

Inviluppi Tasso di Sfruttamento a Momento - SteelWorld		LEFT
Z (m)	Tasso di Sfruttamento a Momento - SteelWorld	
0	0	
-0.1	0	
-0.2	0	
-0.3	0.001	
-0.4	0.001	
-0.5	0.002	
-0.6	0.003	
-0.7	0.004	
-0.8	0.005	
-0.9	0.007	
-1	0.009	
-1.1	0.01	
-1.2	0.012	
-1.3	0.014	
-1.4	0.017	
-1.5	0.019	
-1.6	0.023	
-1.7	0.027	
-1.8	0.031	
-1.9	0.036	
-2	0.042	
-2.1	0.046	
-2.2	0.05	
-2.3	0.053	
-2.4	0.056	
-2.5	0.058	
-2.6	0.059	
-2.7	0.061	
-2.8	0.061	
-2.9	0.062	
-3	0.063	
-3.1	0.063	
-3.2	0.062	
-3.3	0.062	
-3.4	0.061	
-3.5	0.061	
-3.6	0.06	
-3.7	0.058	
-3.8	0.057	
-3.9	0.055	
-4	0.054	
-4.1	0.052	
-4.2	0.05	
-4.3	0.048	
-4.4	0.046	
-4.5	0.043	
-4.6	0.041	
-4.7	0.039	
-4.8	0.037	
-4.9	0.034	
-5	0.032	
-5.1	0.029	

Involuppi Tasso di Sfruttamento a Momento - SteelWorld		LEFT
Z (m)	Tasso di Sfruttamento a Momento - SteelWorld	
-5.2	0.027	
-5.3	0.025	
-5.4	0.022	
-5.5	0.02	
-5.6	0.018	
-5.7	0.016	
-5.8	0.014	
-5.9	0.012	
-6	0.01	
-6.1	0.008	
-6.2	0.007	
-6.3	0.005	
-6.4	0.004	
-6.5	0.003	
-6.6	0.002	
-6.7	0.001	
-6.8	0	
-6.9	0	
-7	0	

**Grafico Involuppi Tasso di Sfruttamento a Momento - SteelWorld**



Involuppi  
 Tasso di Sfruttamento a Momento - SteelWorld

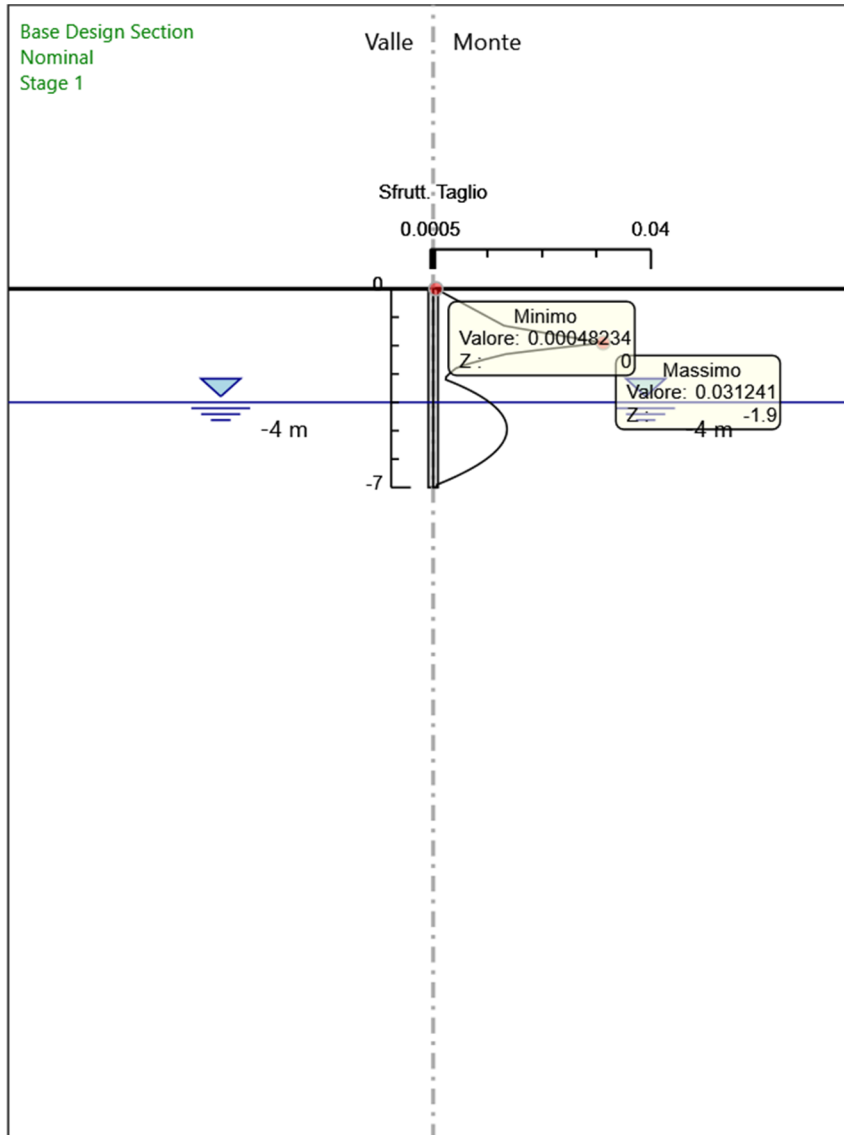
**Tabella Involuppi Tasso di Sfruttamento a Taglio - SteelWorld : LEFT**

Involuppi Tasso di Sfruttamento a Taglio - SteelWorld		LEFT
Z (m)	Tasso di Sfruttamento a Taglio - SteelWorld	
0	0	
-0.1	0.001	
-0.2	0.002	
-0.3	0.003	
-0.4	0.004	
-0.5	0.005	
-0.6	0.006	
-0.7	0.007	
-0.8	0.008	
-0.9	0.009	
-1	0.01	
-1.1	0.011	
-1.2	0.012	
-1.3	0.013	
-1.4	0.016	
-1.5	0.019	
-1.6	0.022	
-1.7	0.025	
-1.8	0.028	
-1.9	0.031	
-2	0.027	
-2.1	0.022	
-2.2	0.018	
-2.3	0.013	
-2.4	0.011	
-2.5	0.009	
-2.6	0.007	
-2.7	0.005	
-2.8	0.004	
-2.9	0.004	
-3	0.003	
-3.1	0.002	
-3.2	0.002	
-3.3	0.004	
-3.4	0.005	
-3.5	0.006	
-3.6	0.007	
-3.7	0.008	
-3.8	0.009	
-3.9	0.01	
-4	0.01	
-4.1	0.011	
-4.2	0.012	
-4.3	0.012	
-4.4	0.013	
-4.5	0.013	
-4.6	0.013	
-4.7	0.013	
-4.8	0.013	
-4.9	0.014	
-5	0.014	
-5.1	0.013	
-5.2	0.013	
-5.3	0.013	
-5.4	0.013	



Inviluppi Tasso di Sfruttamento a Taglio - SteelWorld		LEFT
Z (m)	Tasso di Sfruttamento a Taglio - SteelWorld	
-5.5	0.012	
-5.6	0.012	
-5.7	0.012	
-5.8	0.011	
-5.9	0.01	
-6	0.01	
-6.1	0.009	
-6.2	0.008	
-6.3	0.007	
-6.4	0.006	
-6.5	0.005	
-6.6	0.004	
-6.7	0.003	
-6.8	0.002	
-6.9	0.001	
-7	0.001	

**Grafico Involuppi Tasso di Sfruttamento a Taglio – SteelWorld**



Involuppi  
 Tasso di Sfruttamento a Taglio - SteelWorld