COMMITTENTE:

RFI RETE FERROVIARIA ITALIANA
GRUPPO FERROVIE DELLO STATO ITALIANE
DIREZIONE INVESTIMENTI
DIREZIONE PROGRAMMI INVESTIMENTI
DIRETTRICE SUD - PROGETTO ADRIATICA

PROGETTAZIONE:

ITALFERR
GRUPPO FERROVIE DELLO STATO ITALIANE

DIREZIONE TECNICA

U.O. OPERE CIVILI E GESTIONE DELLE VARIANTI

PROGETTO DEFINITIVO

Nuova linea Ferrandina - Matera La Martella per il collegamento di Matera con la rete ferroviaria nazionale

MIGLIORAMENTO SISMICO E OPERE DI COMPLETAMENTO DEI VIADOTTI ESISTENTI DELLA LINEA FERRANDINA MATERA

GEOTECNICA

Relazione di calcolo fondazioni dirette su micropali P16- P20

SCALA: -

COMMESSA	LOTTO	FASE	ENTE	TIPO DOC.	OPERA/DISCIPLINA	PROGR.	REV.
IA5F	01	D	09	CL	VI0803	004	A

Rev.	Descrizione	Redatto	Data	Verificato	Data	Approvato	Data	Autorizzato Data
A	EMISSIONE ESECUTIVA	S.Gasperoni	Luglio 2019	M.E.D'Effremo	Luglio 2019	F. Gernone	Luglio 2019	A. Vittozzi Luglio 2019

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INDICE

1. PREMESSA

Nella presente relazione si riporta il dimensionamento delle fondazioni dirette su micropali delle pile P16-P20 del viadotto Gravina (VI08) per miglioramentosismico nell'ambito della realizzazione della nuova Linea Ferrandina – Matera "La Martella" per il collegamento della città di Matera alla rete ferroviaria nazionale, in particolare con Salerno, per l'accesso al sistema AV/AC, e con Taranto, attraverso la linea Battipaglia-Potenza-Metaponto-Taranto.

In particolare verranno affrontati i seguenti aspetti:

- Descrizione dello stato di fatto delle fondazioni esistenti e degli interventi di progetto previsti per il viadotto;
- Inquadramento geotecnico: stratigrafia, parametri geotecnici e falda;
- Analisi delle fondazioni di progetto con le nuove azioni sismiche di progetto: determinazione delle sollecitazioni massime sui micropali e stima delle deformazioni;
- verifiche geotecniche di capacità portante delle fondazioni ai carichi verticali e verifiche carico limite orizzontale;
- verifiche strutturali dei micropali.

Tutte le analisi svolte nel seguito sono eseguite in conformità alla normativa italiana vigente sulle opere civili (DM 17/01/2018).

2. NORMATIVA E DOCUMENTI DI RIFERIMENTO

2.1 Normativa di riferimento

[N.1]. Norme Tecniche per le Costruzioni - D.M. 17-01-18 (NTC-2018);

[N.2]. Circolare N.7 del 21-01-2019, C.S.LL.PP. - Istruzioni per l'Applicazione Norme Tecniche Costruzioni di cui al Decreto Ministeriale 17 gennaio 2018.

[N.3]. RFI DTC SI PS MA IFS 001 C - Manuale di Progettazione delle Opere Civili - Parte II – Sezione 2 – Ponti e Strutture

[N.4]. Progetto DOC-Reluis 2005-2008 – linea 3: Valutazione e riduzione del rischio sismico di ponti esistenti – "linee guida e manuale applicativo per la valutazione della sicurezza sismica e il consolidamento dei ponti esistenti in c.a." marzo 2009

2.2 Documenti di riferimento

[DC1]. IA5F00D78RHGE0005001 - Nuova Linea Ferrandina – Matera La Martella per il collegamento di Matera con la rete ferroviaria nazionale. Progetto Definitivo. Relazione geotecnica;

[DC2]. IA5F00D78F6GE0005001 - Nuova Linea Ferrandina – Matera La Martella per il collegamento di Matera con la rete ferroviaria nazionale. Progetto Definitivo. Profilo Geotecnico.

[DC3]. E.0.2. - Progetto Esecutivo. Costruzione di un tratto di linea tra Matera e Ferrandina in funzione di collegamento diretto della città di Matera alla rete F.S.. Stazione di Ferrandina – Stazione di Matera la Martella. Relazione calcoli statici 2 a parte. Novembre 1985.

[DC4]. IA5F 01 D 09 RH VI0000 001 A - Nuova Linea Ferrandina – Matera La Martella per il collegamento di Matera con la rete ferroviaria nazionale. Progetto Definitivo. Criteri di calcolo delle fondazioni.

[DC5]. IA5F 01 D 09 RH VI0800 002 A - Nuova Linea Ferrandina – Matera La Martella per il collegamento di Matera con la rete ferroviaria nazionale. Progetto Definitivo. Relazione stabilità di versante.

[DC6]. F.8.1.1. e F.8.1.2 - Linea Ferrandina – Matera Centrale. Pianta e profilo longitudinale Tav.1 e 2. Novembre 1985.

[DC7]. Linea Ferrandina – Matera Centrale. Carpenterie fondazioni e piante. Novembre 1985.

[DC8]. F.8.8.4.P. - Progetto Esecutivo. Costruzione di un tratto di linea tra Matera e Ferrandina in funzione di collegamento diretto della città di Matera alla rete F.S.. Stazione di Ferrandina – Stazione di Matera la Martella. – Viadotto Gravina - Consolidamento del masso roccioso in corrispondenza della pila 21. Novembre 1985.

[DC9]. F.8.8.4.P. - Progetto Esecutivo. Costruzione di un tratto di linea tra Matera e Ferrandina in funzione di collegamento diretto della città di Matera alla rete F.S.. Stazione di Ferrandina – Stazione di Matera la Martella. – Viadotto Gravina - Consolidamento del masso roccioso in corrispondenza della pila 22. Novembre 1985.

[DC10]. Rv.1. Lunghezza pali in opera.

[DC11]. IA5F 01 D 09 RH VI0800001 A - Nuova Linea Ferrandina – Matera La Martella per il collegamento di Matera con la rete ferroviaria nazionale. Progetto Definitivo. Relazione descrittiva dello stato di fatto e degli interventi sul versante.

[DC12]. IA5F01D09ROVI0000001A Relazione tecnico-illustrativa: Materiali, Fattore di confidenza e criteri di calcolo

[DC13]. IA5F01D09P9VI0800003A VI08 - Pianta scavi e sezione longitudinale tav.1/6

[DC14]. IA5F01D09P9VI0800004A VI08 - Pianta scavi e sezione longitudinale tav.2/6

[DC15]. IA5F01D09P9VI0800005A VI08 - Pianta scavi e sezione longitudinale tav.3/6

[DC16]. IA5F01D09P9VI0800006A VI08 - Pianta scavi e sezione longitudinale tav.4/6

[DC17]. IA5F01D09P9VI0800007A VI08 - Pianta scavi e sezione longitudinale tav.5/6

[DC18]. IA5F01D09P9VI0800008A VI08 - Pianta scavi e sezione longitudinale tav.6/6

[DC19]. IA5F01D09P9VI0800009A VI08 - Pianta fondazione e sezione longitudinale 1

[DC20]. IA5F01D09P9VI0800010A VI08 - Pianta fondazione e sezione longitudinale 2

[DC21]. IA6F01D09P9VI0800011A VI08 - Pianta fondazione e sezione longitudinale 3

[DC22]. IA6F01D09P9VI0800012A VI08 - Pianta fondazione e sezione longitudinale 4

[DC23]. IA6F01D09P9VI0800013A VI08 - Pianta fondazione e sezione longitudinale 5

[DC24]. IA5F01D09P9VI0800014A VI08 - Pianta fondazione e sezione longitudinale 6

[DC25]. IA5F01D09BZVI0800001A Carpenteria interventi fondazioni pile P1-P3 e P26-P27

[DC26]. IA5F01D09BZVI0800002A Carpenteria interventi fondazioni pile 4-15 e 25

[DC27]. IA5F01D09BZVI0800003A Carpenteria interventi fondazioni pile 16-20

[DC28]. IA5F01D09BZVI0800004A Carpenteria interventi fondazioni pile 21-22

[DC29]. IA5F01D09BZVI0800005A Carpenteria interventi fondazioni pile 23-24

2.3 Programmi di calcolo utilizzati

- **APAL** (G. Guiducci, 2006). Studio Sintesi, Rimini (RN), Italia.
  Programma per l'analisi di pali caricati assialmente: curve carico-cediemnto trasferimento sforzo assiale.

- ***MAP Matrix Analysis of Piles (G. Guiducci, 1999). Rimini (RN), Italia.***

Programma di calcolo per analisi delle sollecitazioni e deformazioni di tipo lineare e non lineare di palificate di fondazione collegate da plinto rigido.

RC-SEC, Chiave hardware HID: 352678****
Programma di calcolo per le verifiche strutturali delle sezioni in .c.a.

3. MATERIALI

Le fondazioni esistenti presentano i seguenti materiali.

Calcestruzzo plinto di fondazione, pali	Rck > 25 MPa C25/30
Calcestruzzo sottoplinto (magrone)	Rck > 15 MPa C16/20
Acciaio in barre per c.a.	FeB 38 K fyk=380 MPa E=210000 MPa
Acciaio per armatura micropali	Fe 360 (S235) fyk=235 MPa E=210000 MPa

Per i materiali delle opere esistenti si definisce livello di conoscenza LC = 2 e quindi nelle verifiche si assume un fattore di confidenza FC = 1.2.

Per le nuove fondazioni in progetto si prevede:

Acciaio per armatura micropali	S355 fyk=355 MPa E=210000 MPa

4. DESCRIZIONE DELLE OPERE IN FONDAZIONE

4.1 Stato di fatto

Il viadotto è costituito da 27 pile e due spalle.
Le fondazioni delle pile sono costituite da plinti, di dimensioni variabili, fondati su pali (D1200 mm) o su micropali.
Le spalle sono costituite da fondazione su pali D1200 mm.
Inoltre per le pile di scavalco fiume è stato inserito un intervento di consolidamento lungo la scarpata con tiranti attivi (come da schema di figure seguenti).
Di seguito si riportano le tabelle riassuntive con le caratteristiche delle fondazioni esistenti del viadotto in esame:
Nelle figure seguenti sono mostrate le geometrie delle fondazioni.

Tabella 1 – Caratteristiche fondazioni esistenti

	spalla									
	H tot[m]	**dim plinto[m]**	**h plinto[m]**	**tipo fondaz.**	**d pali[mm]**	**num pali**	**Lunghezza pali[m]**	**Armatura longitudinale**	**spirale gabbia superiore**	**spirale gabbia inferiore**
A	8.00	11.50x9.20x2.00	2.00	pali	1200	9	13.7	28 ϕ30	ϕ8 passo 10	ϕ8 passo 20
B	7.50	11.50x9.20x2.00	2.00	pali	1200	9	24.9÷25.0	28 ϕ30	ϕ8 passo 10	ϕ8 passo 20

	pila									
	H tot[m]	**dim plinto[m]**	**h plinto[m]**	**tipo fondaz.**	**d pali[mm]**	**num pali /micropali**	**Lunghezza pali / micropali[m]**	**Armatura longitudinale**	**spirale gabbia superiore**	**spirale gabbia inferiore**
1	6.00	7.40x10.20x2.50	2.50	pali	1200	6	11.3	18 ϕ24	ϕ8 passo 10	ϕ8 passo 20
2	6.35	7.40x10.20x2.50	2.50	pali	1200	6	10.1÷10.3	18 ϕ24	ϕ8 passo 10	ϕ8 passo 20
3	6.80	7.40x10.20x2.50	2.50	pali	1200	6	9.3÷9.5	18 ϕ24	ϕ8 passo 10	ϕ8 passo 20
4	8.20	9.00x10.20x2.50	2.50	pali	1200	8	7.7÷9.5	18 ϕ24	ϕ8 passo 10	ϕ8 passo 20
5	9.00	9.00x10.20x2.50	2.50	pali	1200	8	6.6÷7.4	18 ϕ24	ϕ8 passo 10	ϕ8 passo 20
6	9.25	9.00x10.20x2.50	2.50	pali	1200	8	5.6÷6.8	18 ϕ24	ϕ8 passo 10	ϕ8 passo 20
7	9.00	9.00x10.20x2.50	2.50	pali	1200	8	6.2÷6.9	18 ϕ24	ϕ8 passo 10	ϕ8 passo 20
8	8.40	9.00x10.20x2.50	2.50	pali	1200	8	7.4÷8.1	18 ϕ24	ϕ8 passo 10	ϕ8 passo 20
9	7.95	9.00x10.20x2.50	2.50	pali	1200	8	7.9÷10.2	18 ϕ24	ϕ8 passo 10	ϕ8 passo 20
10	7.70	9.00x10.20x2.50	2.50	pali	1200	8	8.0÷8.7	18 ϕ24	ϕ8 passo 10	ϕ8 passo 20
11	8.20	9.00x10.20x2.50	2.50	pali	1200	8	8.1÷8.9	18 ϕ24	ϕ8 passo 10	ϕ8 passo 20
12	8.95	9.00x10.20x2.50	2.50	pali	1200	8	8.4÷8.7	18 ϕ24	ϕ8 passo 10	ϕ8 passo 20

13	10.45	9.00x10.20x2.50	2.50	pali	1200	8	8.3÷9.1	18 ϕ24	ϕ8 passo 10	ϕ8 passo 20
14	11.70	9.00x10.20x2.50	2.50	pali	1200	8	7.8÷12.2	18 ϕ24	ϕ8 passo 10	ϕ8 passo 20
15	13.30	9.00x10.20x2.50	2.50	pali	1200	8	6.9÷12.0	18 ϕ24	ϕ8 passo 10	ϕ8 passo 20
16	15.80	12.50x9.50x2.50	2.50	micropali	230	58	15	-	-	-
17	18.15	12.50x9.50x2.50	2.50	micropali	230	74	15	-	-	-
18	21.50	12.50x9.50x2.50	2.50	micropali	230	74	15	-	-	-
19	25.00	12.50x9.50x2.50	2.50	micropali	230	74	15	-	-	-
20	23.10	12.50x9.50x2.50	2.50	micropali	230	74	15	-	-	-
21	24.30	19.7x14.7x2.50	2.50	micropali	230	250	28	-	-	-
22	23.60	19.7x14.7x2.50	2.50	micropali	230	250	28	-	-	-
23	20.20	9.60x10.20x2.50	2.50	pali	1200	9	10.5÷10.9	18 ϕ24	ϕ8 passo 10	ϕ8 passo 20
24	16.50	9.60x10.20x2.50	2.50	pali	1200	9	14.3÷15.7	18 ϕ24	ϕ8 passo 10	ϕ8 passo 20
25	12.60	9.00x10.20x2.50	2.50	pali	1200	8	16.2÷17.4	18 ϕ24	ϕ8 passo 10	ϕ8 passo 20
26	9.30	7.40x10.20x2.50	2.50	pali	1200	6	19.9÷20.1	18 ϕ24	ϕ8 passo 10	ϕ8 passo 20
27	6.95	7.40x10.20x2.50	2.50	pali	1200	6	21.3÷22.1	18 ϕ24	ϕ8 passo 10	ϕ8 passo 20

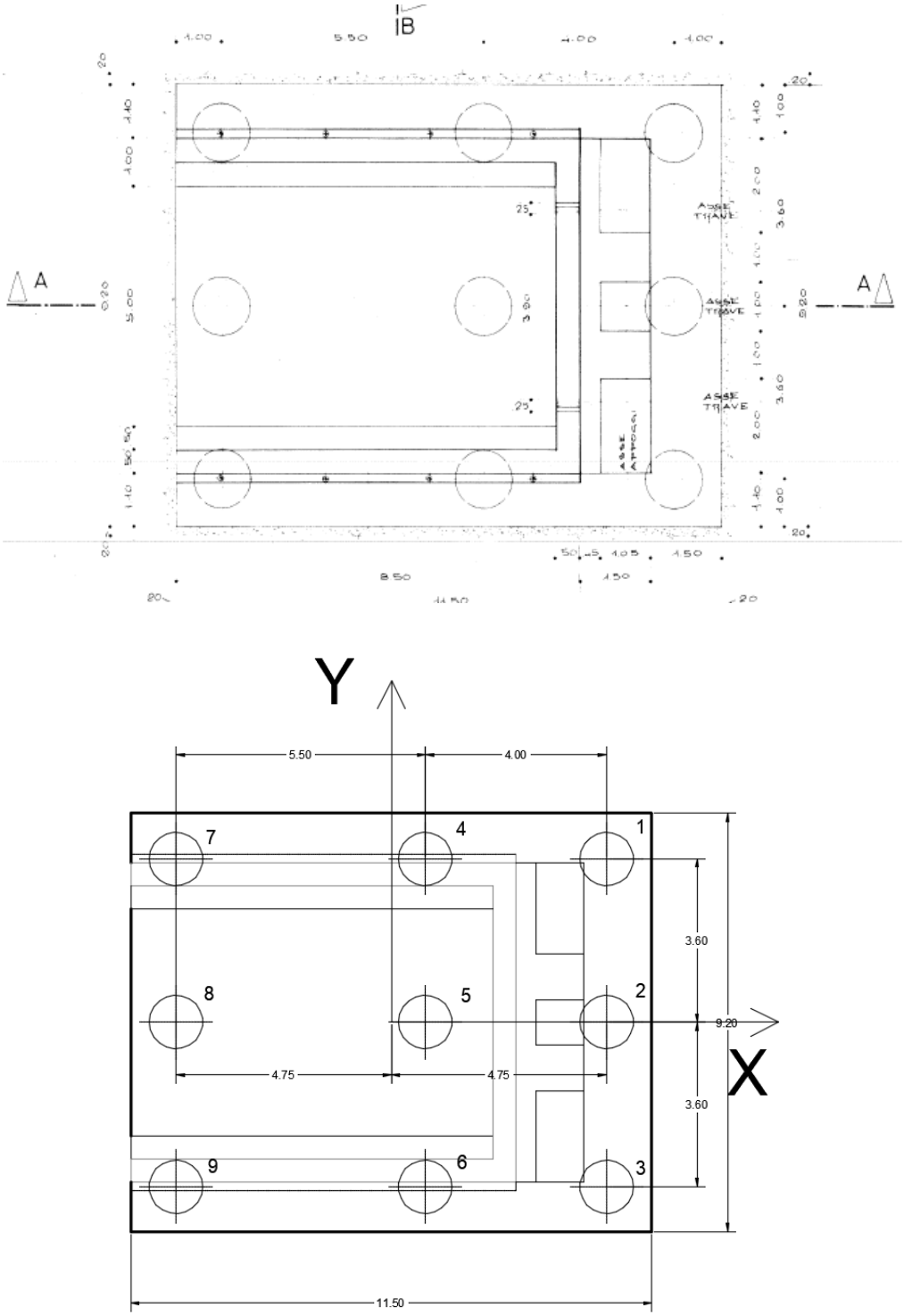


Figura 1 – Pianta Spalle

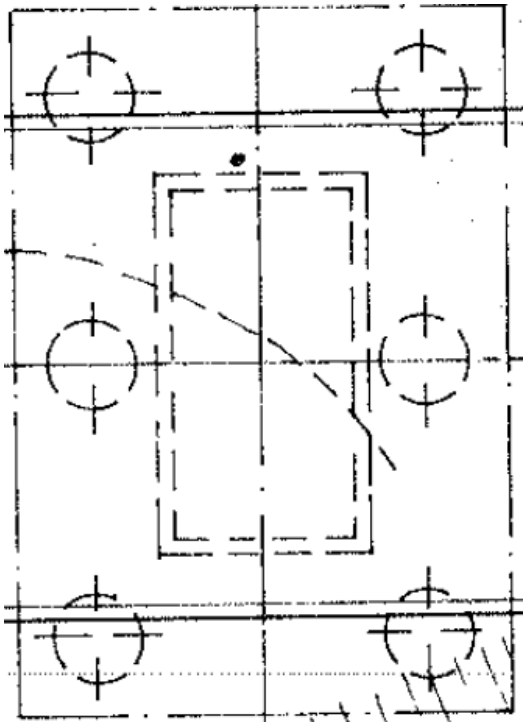


Figura 2 – Pianta Pile a 6 pali (P1÷P3, P26 e P27)

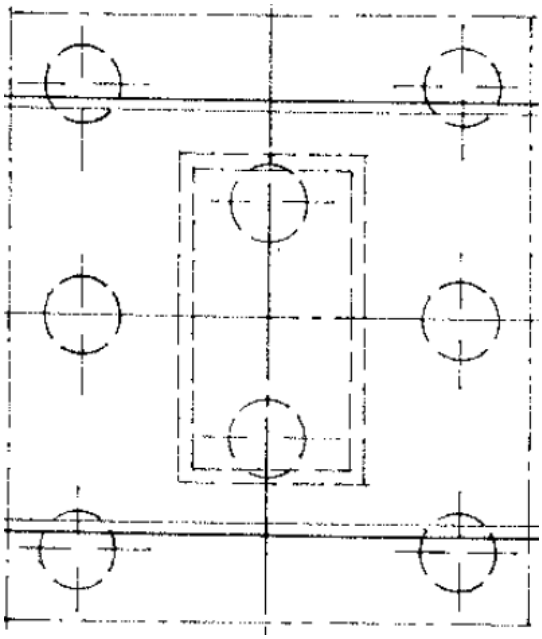


Figura 3 – Pianta Pile a 8 pali (P4÷P15 e P25)

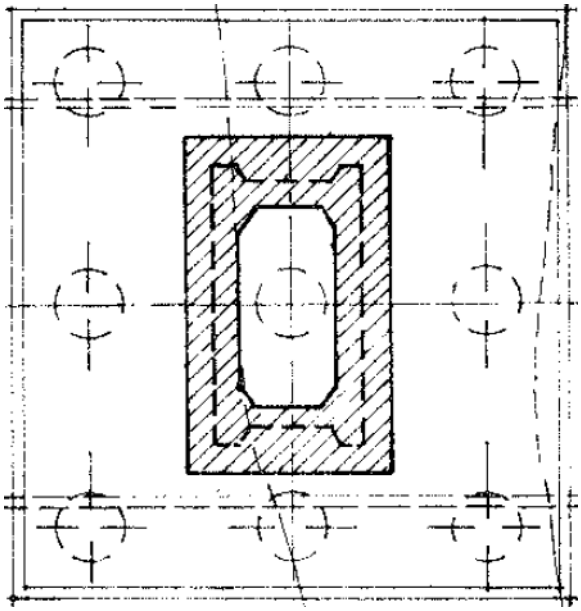


Figura 4 – Pianta Pile a 9 pali (P23 e P24)

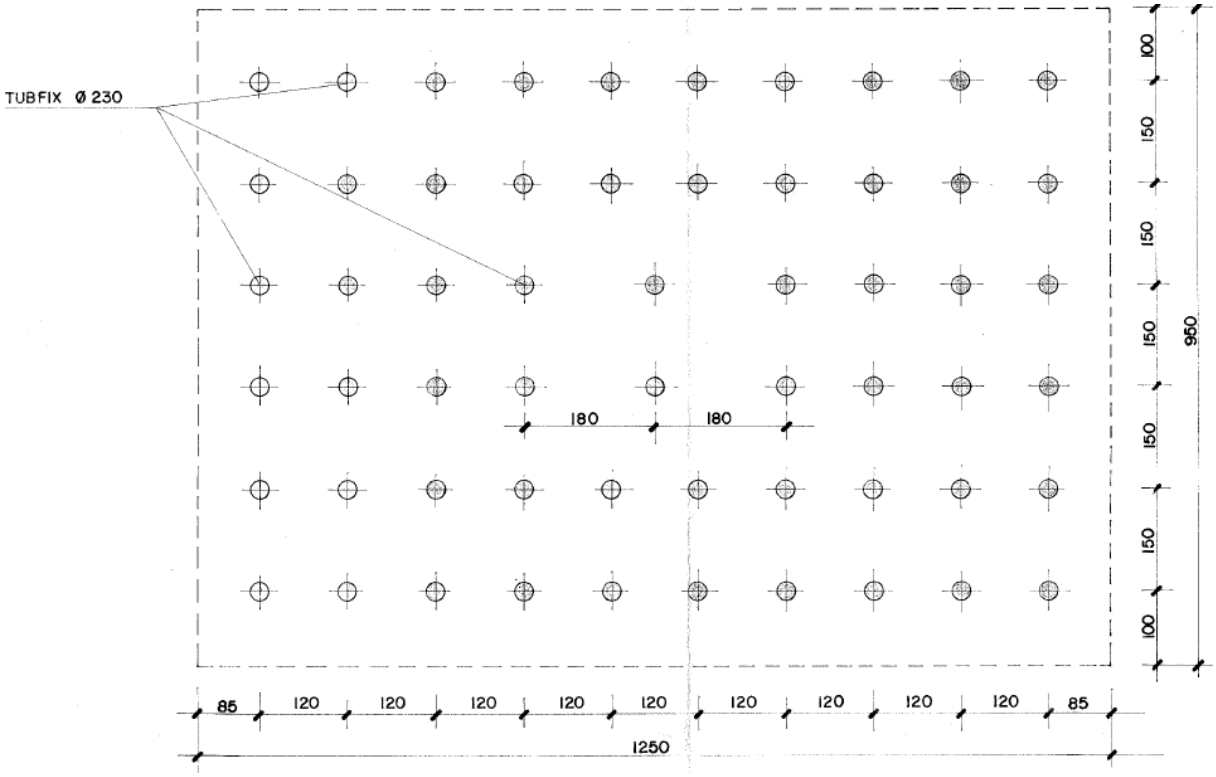


Figura 5 – Pianta pila P16 su fondazione diretta con n°58 micropali

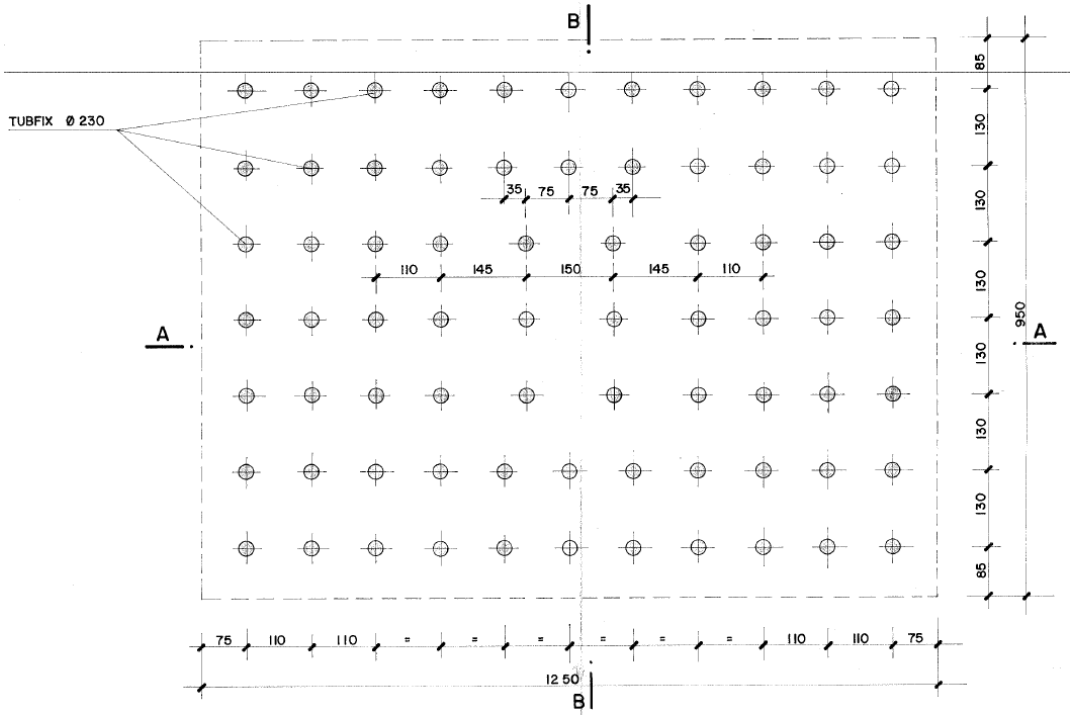


Figura 6 – Pianta pile P17÷P20 su fondazione diretta con n°74 micropali

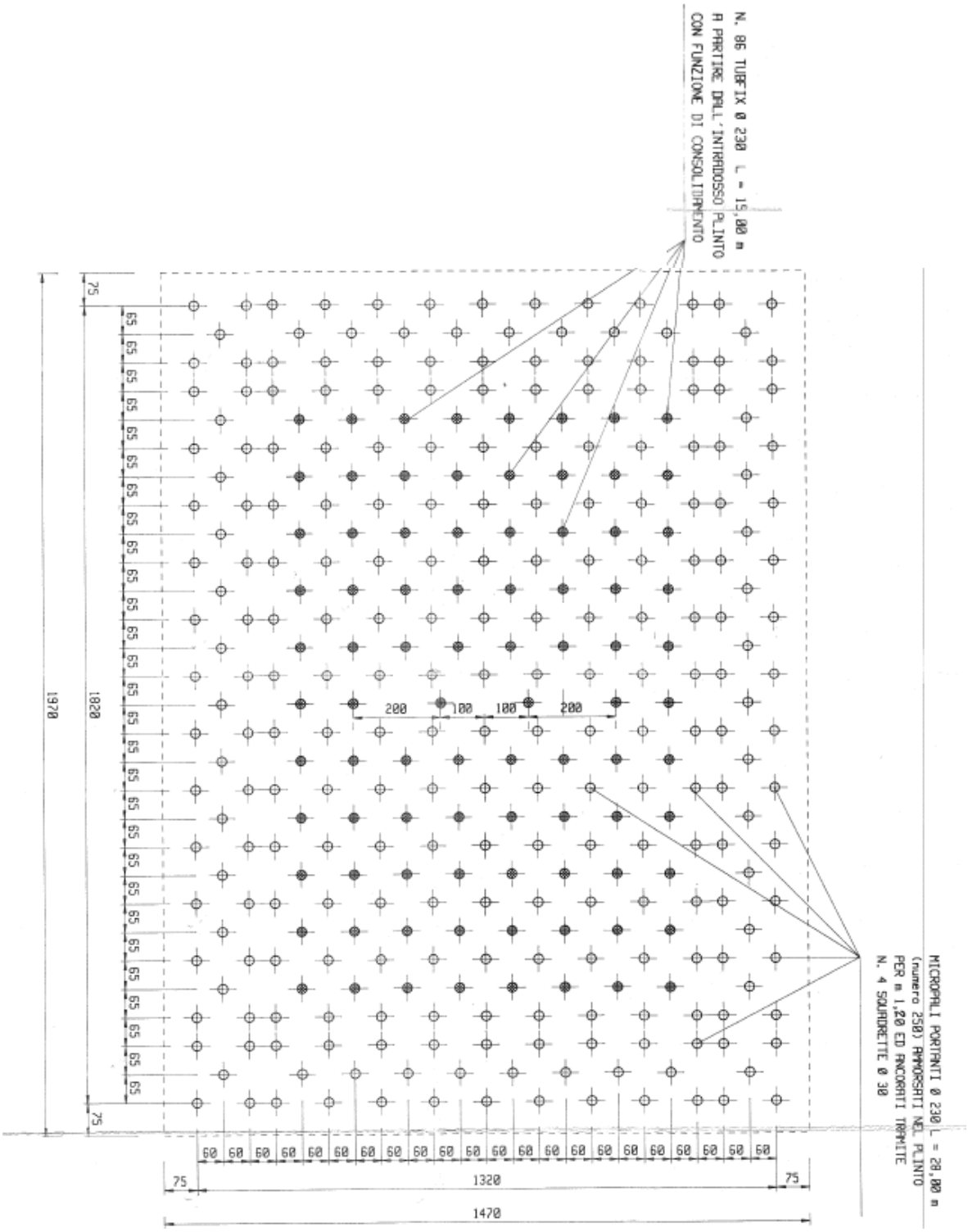


Figura 7 – Pianta pile P21÷P22 su fondazione diretta con 250 micropali

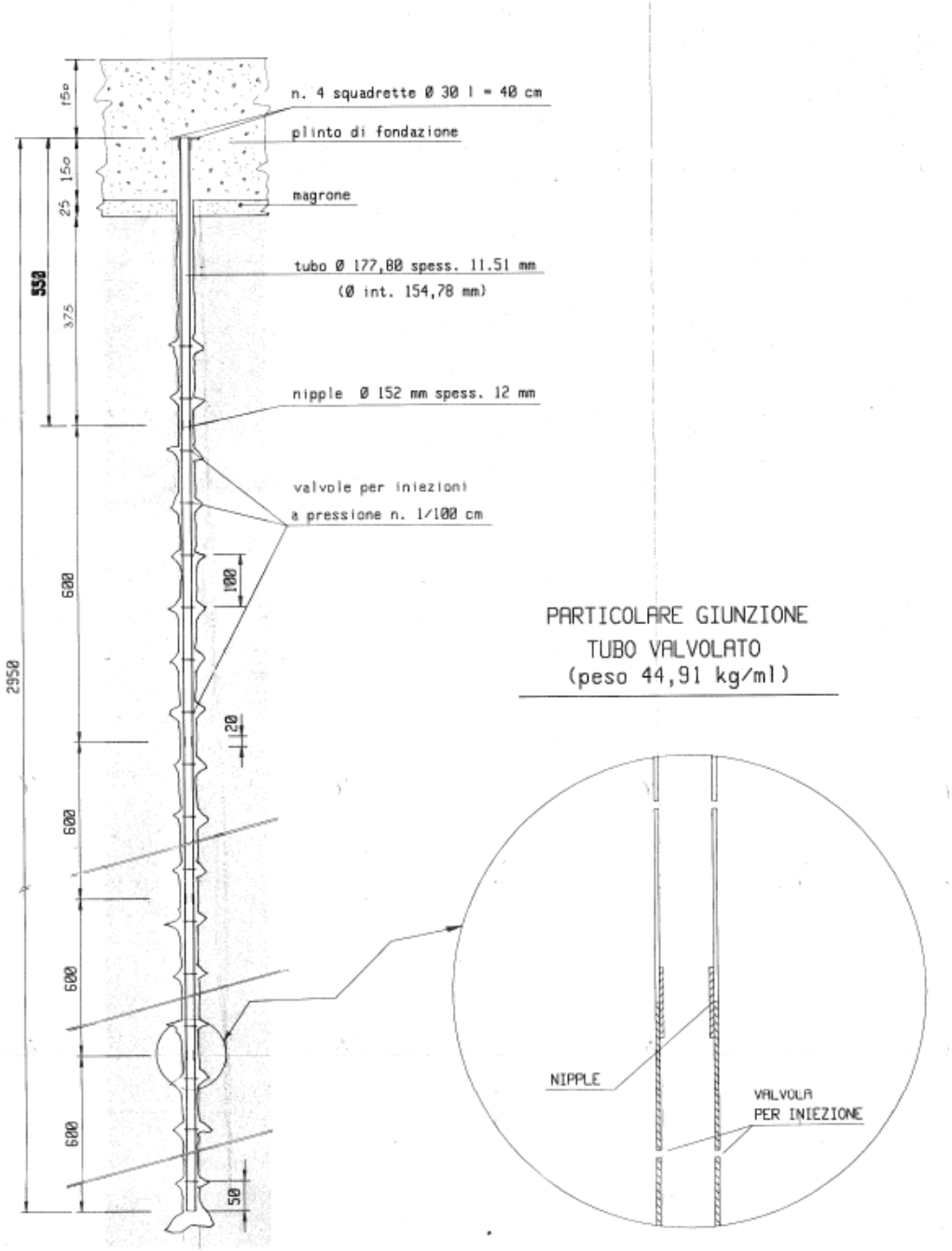


Figura 8 – Micropali pila P21-P22

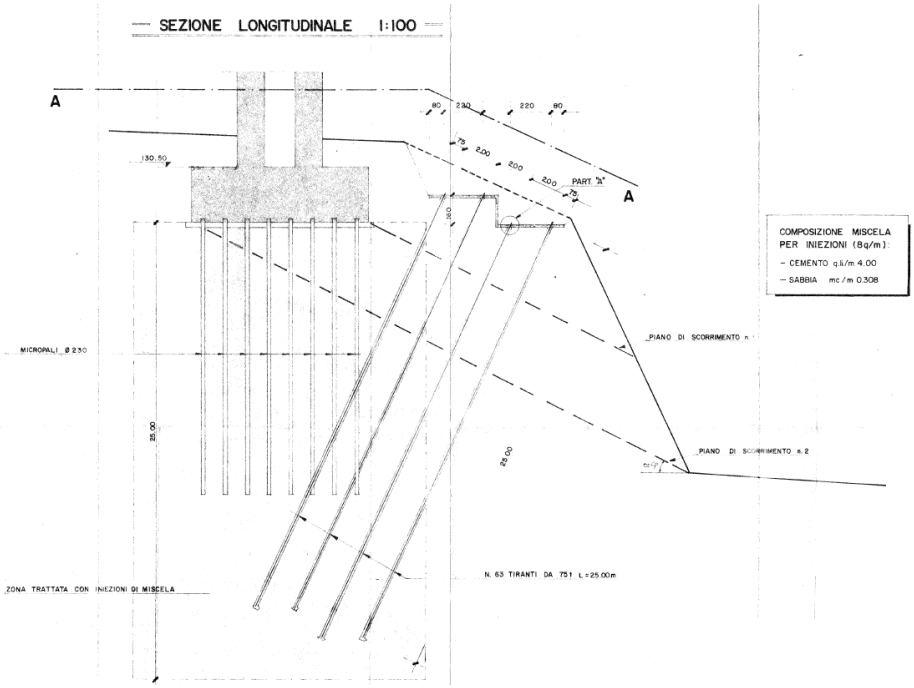


Figura 9 – Intervento di consolidamento scarpata Pila P21

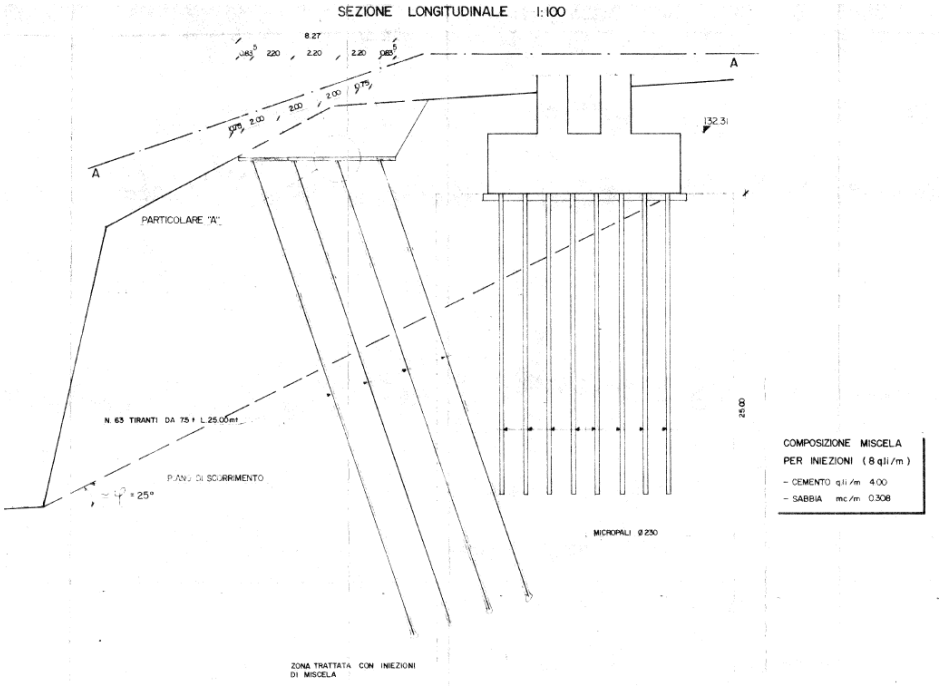


Figura 10 – Intervento di consolidamento scarpata Pila P22

Nella relazione di calcolo opere [DC3] per le fondazioni del viadotto si parla di "interventi di consolidamento" delle fondazioni; in particolare si afferma: "per le spalle e le pile con fondazione diretta sulle calcareniti sub-affioranti, sono adottati in rapporto ai problemi geotecnici interventi particolari" (vedasi interventi indicati nella seguente tabella). Come si evince dal documento [DC3], le fondazioni erano state dimensionate come dirette e gli interventi con micropali erano stati inseriti come consolidamento, definendo il numero di elementi in relazione alle pressioni massime in fondazione e definendo una portata massima dei micropali di 80 t (lunghezza micropali 15 m). L'intervento con iniezioni era finalizzato al riempimento di eventuali cavità/fratture presenti nell'ammasso roccioso interagente con l'opera.
Dalle tavole di progetto del 1985 si osserva che comunque i micropali sono stati opportunamente ancorati entro il plinto di fondazione, quindi i micropali possono essere considerati come elemento di fondazione e non solo consolidamento.

4.2 Interventi previsti in fondazione

Nella seguente tabella si riassumono gli interventi previsti in progetto per le fondazioni del viadotto in esame.
Per le pile su pali si prevede un ampliamento del plinto di fondazione ed integrazione con 6 nuovi pali D=1200 mm per ciasuna fondazione.
Per le pile su micropali si prevede un ampliamento del plinto di fondazione ed integrazione con nuovi micropali.
Non si prevedono interventi in fondazione per le spalle e per le pile di scavalco P21 e P22.
Nelle figure seguenti è mostrata la disposizione in pianta dei micropali integrativi previsti da progetto.

VI05	Plinto nuove dimensioni finali [m]	Pali / Micropali integrativi			
Fondazione		n. [-]	Dp [mm]	Tubo (acciaio S355)	L [m]
Pile a 6 pali esistenti	12.4 x 15.4	6	1200	-	(*)
Pile a 8 pali esistenti	13.8 x 15.6	6	1200	-	(*)
Pile a 9 pali esistenti	13.6 x 18.0	6	1200	-	(*)
Pila P16	Rettangolare 11.5 x 14.5	40	230	de=177.8 mm sp=11mm	20.0
Pile P17, P20	Rettangolare 11.5 x 14.5	46	230	de=177.8 mm sp=11mm	20.0
(*) vedasi elaborato specifico					

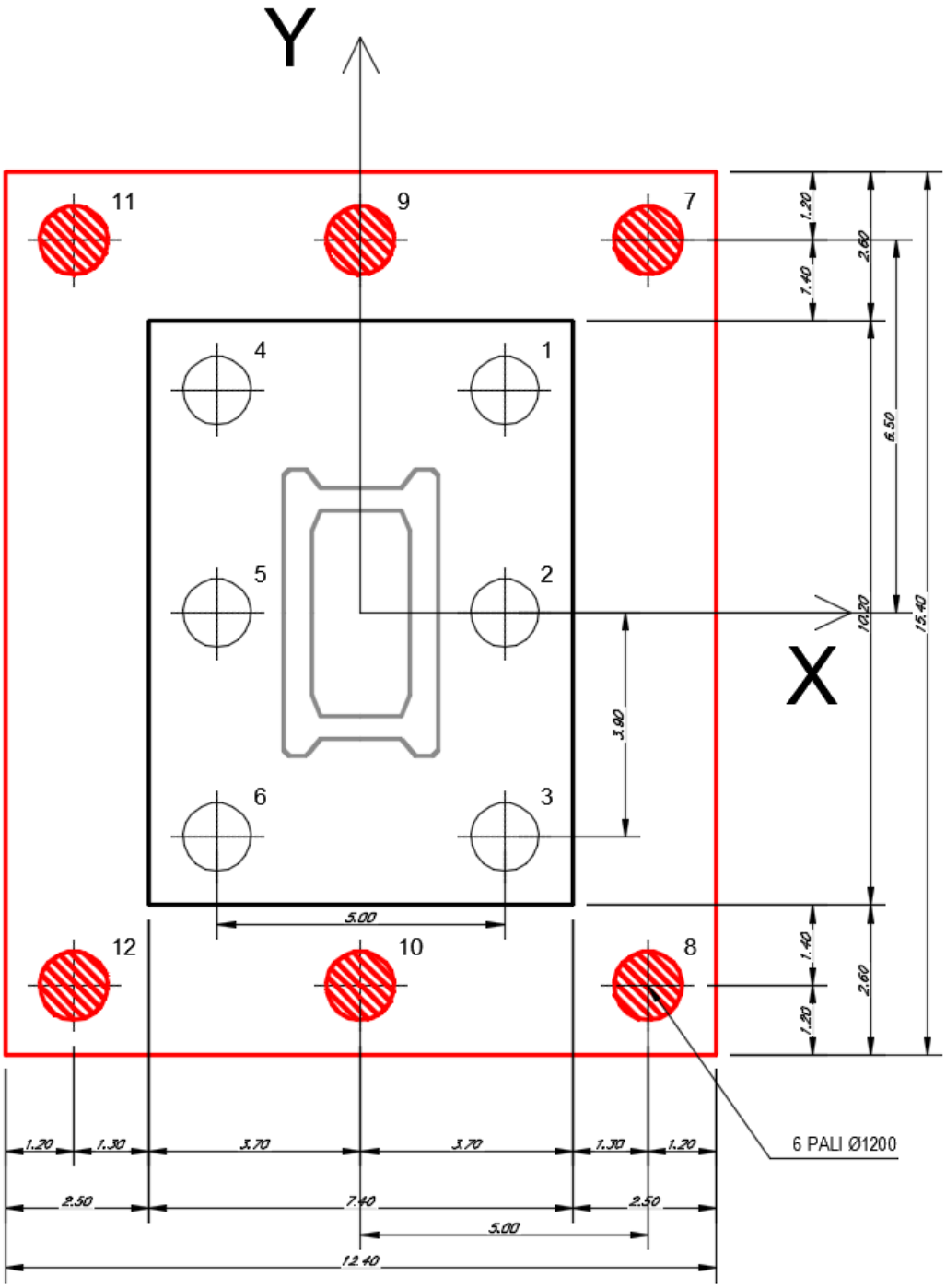


Figura 11 – Pile a 6 pali esistenti + 6 integrativi – Configurazione di progetto di miglioramentosismico – pianta

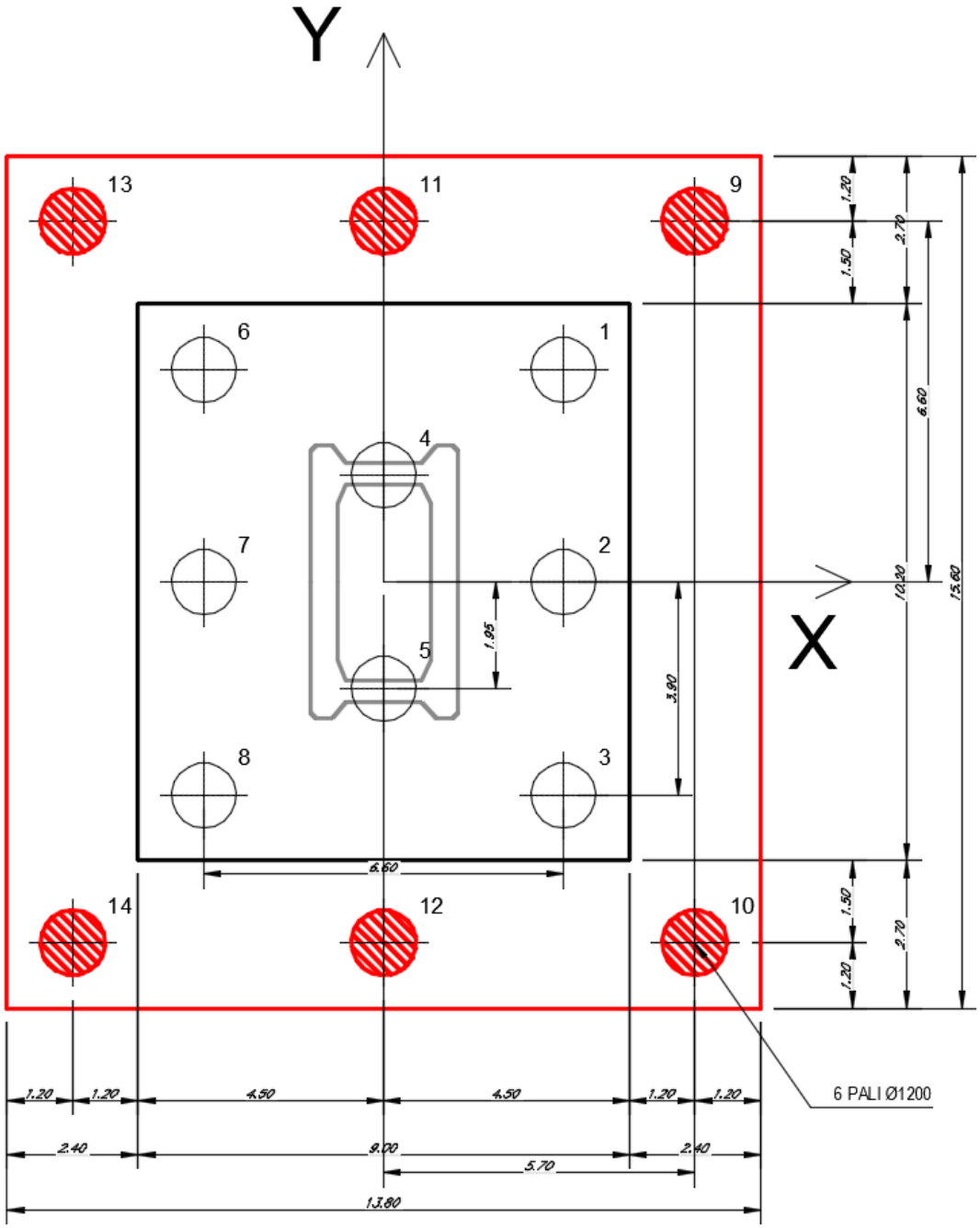


Figura 12 – Pile a 8 pali esistenti + 6 integrativi – Configurazione di progetto di miglioramentosismico – pianta

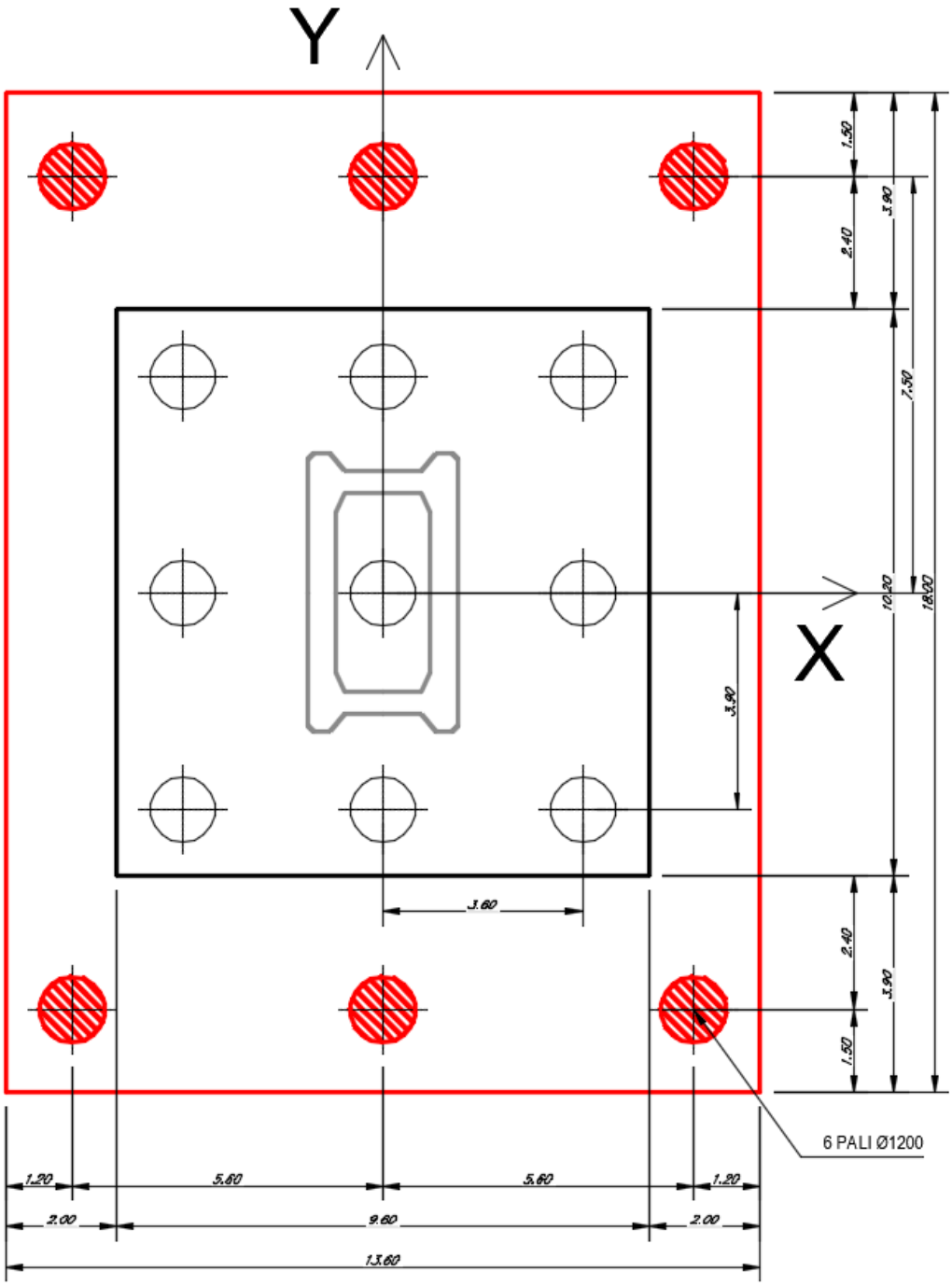


Figura 13 – Pile a 9 pali esistenti + 6 integrativi – Configurazione di progetto di miglioramentosismico – pianta

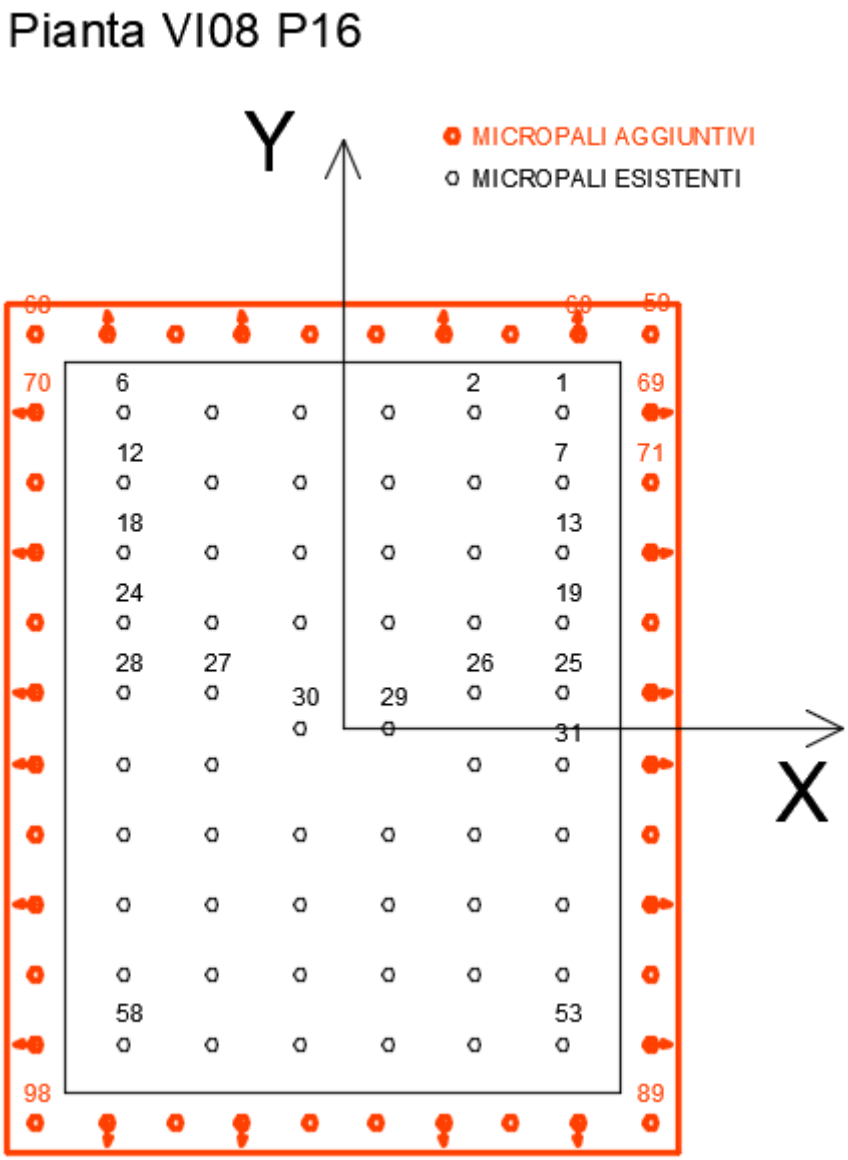


Figura 14 – Pila P16 – Configurazione di progetto di miglioramentosismico – pianta

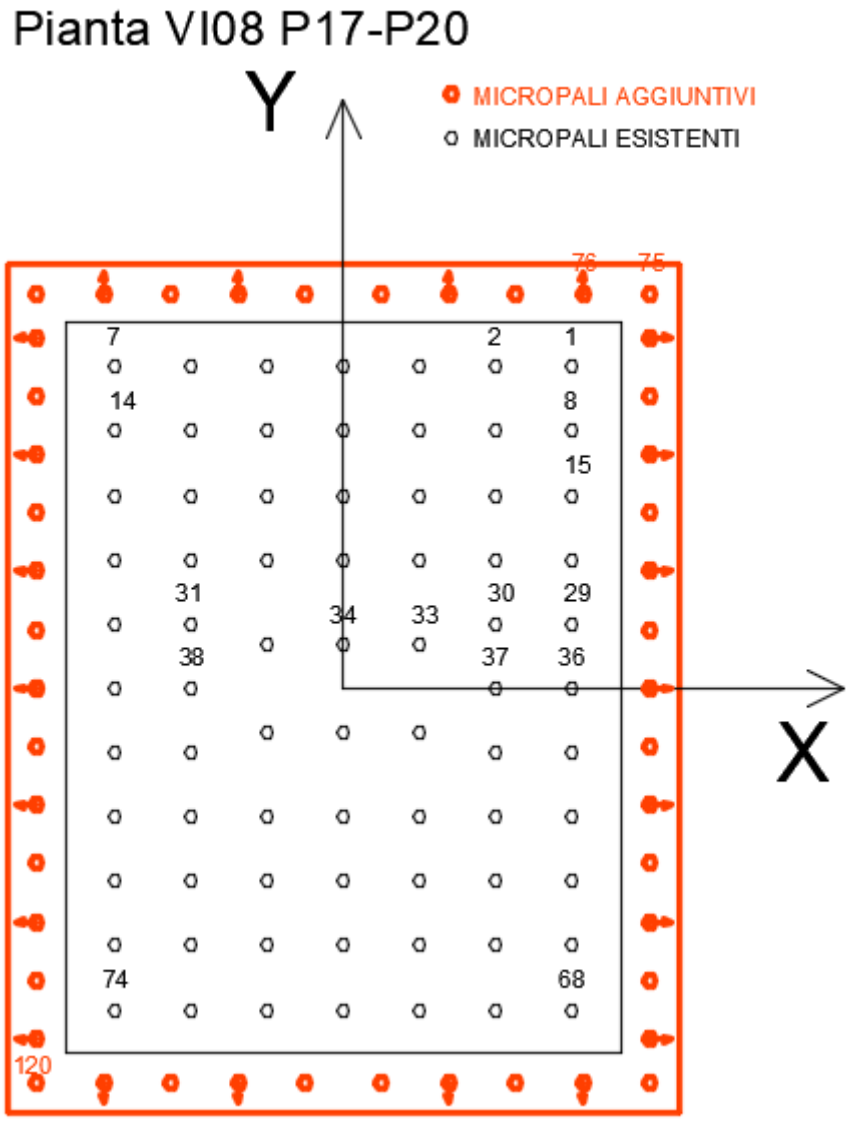


Figura 15 – Pila P17-P20 – Configurazione di progetto di miglioramentosismico - pianta

5. CARATTERIZZAZIONE GEOTECNICA

Nel presente capitolo si riporta la caratterizzazione geotecnica per il viadotto in esame, valutata sulla base dell'interpretazione delle indagini geotecniche svolte in prossimità dell'opera. In generale lungo la linea Ferrandina – Matera sono disponibili le indagini del progetto del 1984, indagini integrative del 1987 nell'ammasso roccioso in corrispondenza delle pile di scavalco e le nuove indagini integrative eseguite per il presente progetto del 2018/2019 (ancora in fase di completamento).

5.1 Indagini pregresse

Lungo il viadotto sono disponibili alcuni sondaggi della vecchia campagna indagine del 1984: M15, M16, M17, M18 e M19, di cui M17 e M18 in corrispondenza delle pile di scavalco P21 e P22 del fiume.

Inoltre, in corrispondenza delle pile P21 e P22 sono stati effettuati sondaggi aggiuntivi per individuare la eventuale presenza di cavità carsiche. Di seguito si riporta una figura con ubicazione dei sondaggi.

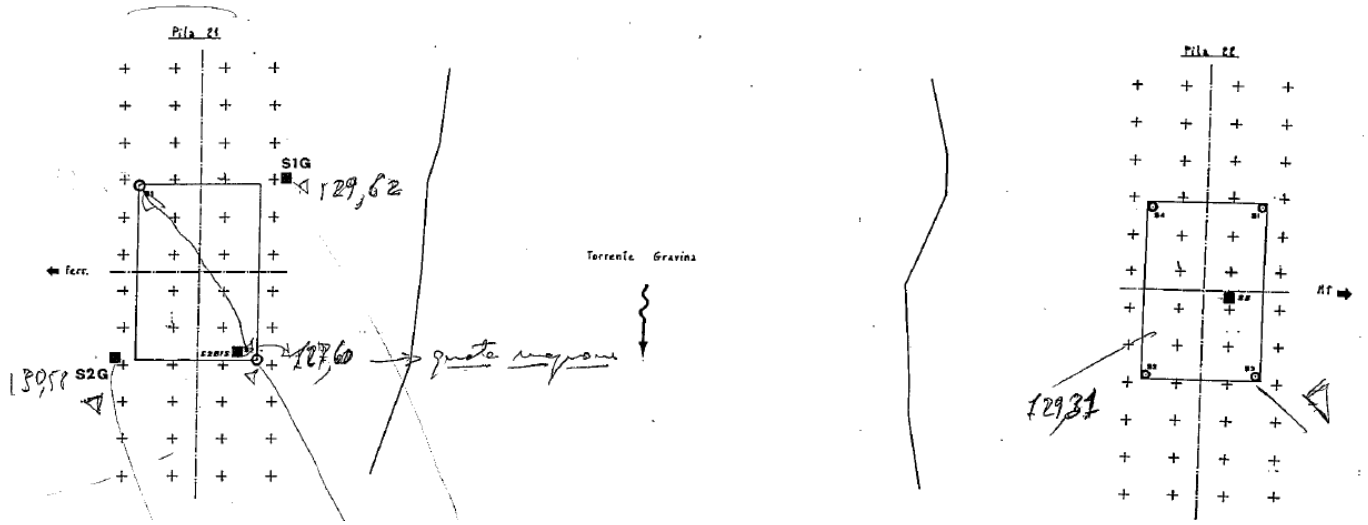


Figura 16: Sondaggi aggiuntivi per rilievo cavità carsiche

5.2 Indagini geotecniche eseguite nel 2018/2019

L'opera in esame è ubicata tra le progressive km 15+139.40 e km 16+030.31.

Sono disponibili le indagini integrative del 2018/2019 elencate nella seguente tabella. In particolare si osserva che:

- i sondaggi S10_DH_50 e S11_DH_50 sono stati eseguiti in corrispondenza del viadotto;
- il sondaggio S6_10 é ubicato poco prima della spalla A del viadotto.

Sondaggi / Indagini sismiche	Profondità [m]	Quota boccaforo [m] s.l.m.	n. campioni indisturbati	n. campioni rimaneggiati	N. prove SPT	n. prove Lefranc /Lugeon	n. prove pressiometriche	n. prove dilatometriche	Piezometro TA; CC / Prova DH/CH
S10_DH_50	30.0	140.949	1	4	3	2	1	-	DH [30]
S11_DH_50	50.0	134.580	-	7	1	2	-	2	DH [50]
S6_10	10.0	147.821	1	1	4	-	-	-	-
Masw10	-	-	-	-	-	-	-	-	-
Masw11	-	-	-	-	-	-	-	-	-
DH [m]: prova Down Hole [profondità prova]									

Non sono disponibili misure piezometriche in corrispondenza del viadotto in esame.

Durante la perforazione il sondaggio S10_DH_50 ha rilevato falda a 27 m da p.c., il sondaggio S11_DH_50 ha rilevato falda profonda, non interferente con le opere. Nel sondaggio S6_10 la falda è assente.

Il piezometro S9_PZ_30, installato nelle vicinanze dell'opera, indica falda a 3 m dal p.c..

5.3 Stratigrafia

I sondaggi della campagna integrativa del 2018/2019 evidenziano una copertura di depositi alluvionali terrazzati (unità 1e) di circa 1 m, poi le argille limose da molto consistenti a dure dell'unità 2 (ASP-Argille subappennine) fino a 8 m circa (S10_DH_50), poi le calcareniti di Gravina (unità 3) fino a 11.0 m per il sondaggio S10_DH_50 e fino a 18.0 m per il sondaggio S11_DH_50 con alterazione da media ad intensa, da intatta a fratturata (RQD tra 30 e 100%). La presenza di calcareniti è stata confermata anche dai sondaggi della campagna di indagine del 1984 (M17 e M18) che le intercettano fino alla profondità di 14÷16 m circa. A seguire si intercetta calcilutite (unità 4 – Cc11-8c Calcare di Altamura) a struttura compatta con alterazione da media ad elevata fino alla massima profondità investigata (50 m) (RQD tra 20 e 70%).

Di seguito si riporta uno stralcio del profilo geotecnico ricostruito sulla base delle nuove indagini dell'area.

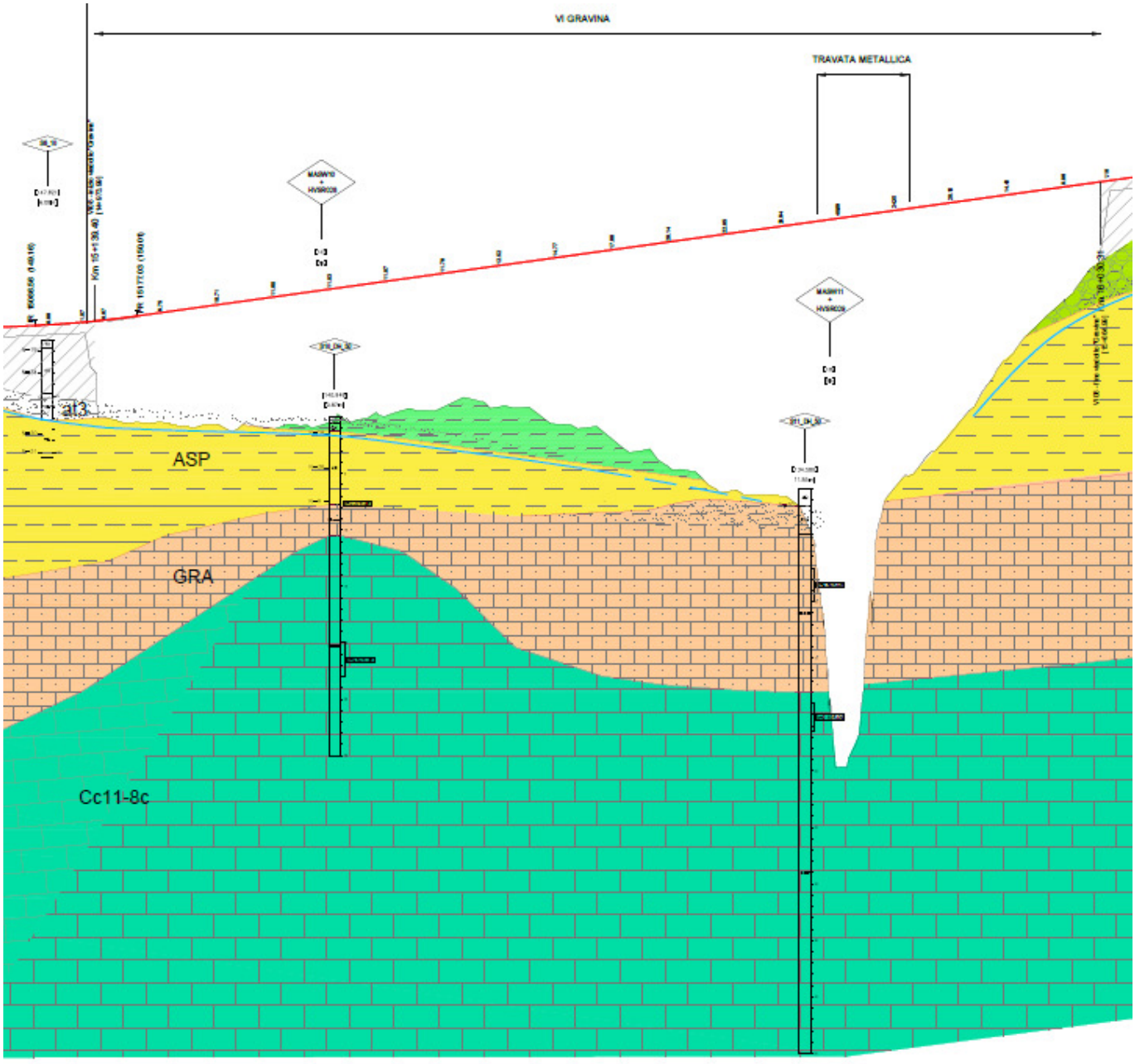


Figura 17 – Stralcio profilo geotecnico

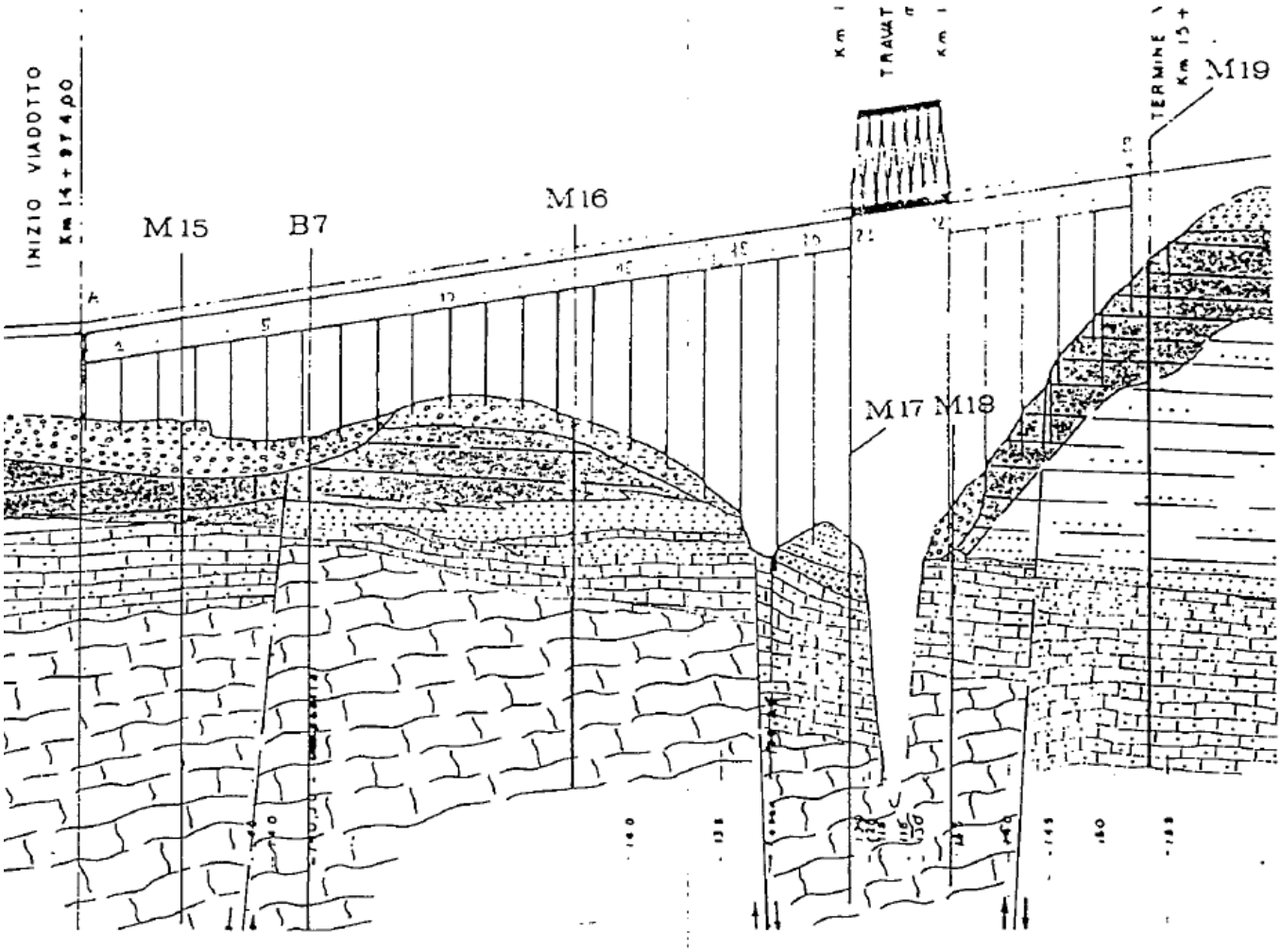


Figura 18 – Profilo geologico 1984

5.4 Sintesi dei parametri geotecnici di progetto

Nel seguito si riassumono i parametri geotecnici di progetto per le unità intercettate interagenti con le fondazioni.

Unità 1e – Depositi terrazzati del Fiume Bradano

$\gamma = 19.0$ kN/m^3	peso di volume naturale
c' = 0 kPa	coesione drenata
$\varphi' = 21 \div 23$ °	angolo di resistenza al taglio
Vs = 130÷400 m/s	velocità delle onde di taglio
Eo = 200÷500 MPa	modulo di deformazione elastico iniziale
$k = 3.5 \cdot 10^{-5} \div 4.5 \cdot 10^{-4}$ m/s	coefficiente di permeabilità

Unità 2 – Argille subappennine

γ = 19.0÷21.0 kN/m^3	peso di volume naturale
c' = 27÷32 kPa	coesione drenata
φ' = 22÷24 °	angolo di resistenza al taglio
c_u = 100÷300 kPa	resistenza al taglio in condizioni non drenate
Vs = 130÷210 m/s	velocità delle onde di taglio
Eo = 120÷200 MPa	modulo di deformazione elastico iniziale
k = 9.0 ·10^{-8} ÷ 1.0 ·10^{-7} m/s	coefficiente di permeabilità

Unità 3 – Calcareniti di Gravina

γ = 19.0÷21.0 kN/m^3	peso di volume naturale
GSI = 37	Geological Strength Index
σci = 3 MPa	resistenza a compressione della roccia intatta
mi = 9	costante per la roccia intatta
c' = 20 kPa	coesione drenata
φ' = 32 °	angolo di resistenza al taglio
Vs = 600÷1300 m/s	velocità delle onde di taglio
Eo = 4000÷12300 MPa	modulo di deformazione elastico iniziale
k = 8.0 ·10^{-7} ÷ 1.0 ·10^{-7} m/s	coefficiente di permeabilità

Unità 4 – Calcare di Altamura

γ = 24.0÷26.0 kN/m^3	peso di volume naturale
GSI = 45	Geological Strength Index
σci = 42 MPa	resistenza a compressione della roccia intatta
mi = 9	costante per la roccia intatta
c' = 130 kPa	coesione drenata
φ' = 40°	angolo di resistenza al taglio
Vs = 1400÷1800 m/s	velocità delle onde di taglio
Eo = 15600÷21500 MPa	modulo di deformazione elastico iniziale
k = 2.0 ·10^{-7}÷ 1.0 ·10^{-5} m/s	coefficiente di permeabilità

I moduli di deformabilità "operativi" (E') da adottare per le opere di sostegno e per le fondazioni, saranno assunti pari a 1/3÷1/5 di quello iniziale (E0).

I parametri di resistenza di progetto per le unità rocciose (calcareniti di Gravina e calcari di Bari) sono stati individuati con il programma "Roclab" a partire dalla caratterizzazione geomeccanica di base indicata nella relazione geotecnica generale valutata sulla base delle nuove indagini eseguite.

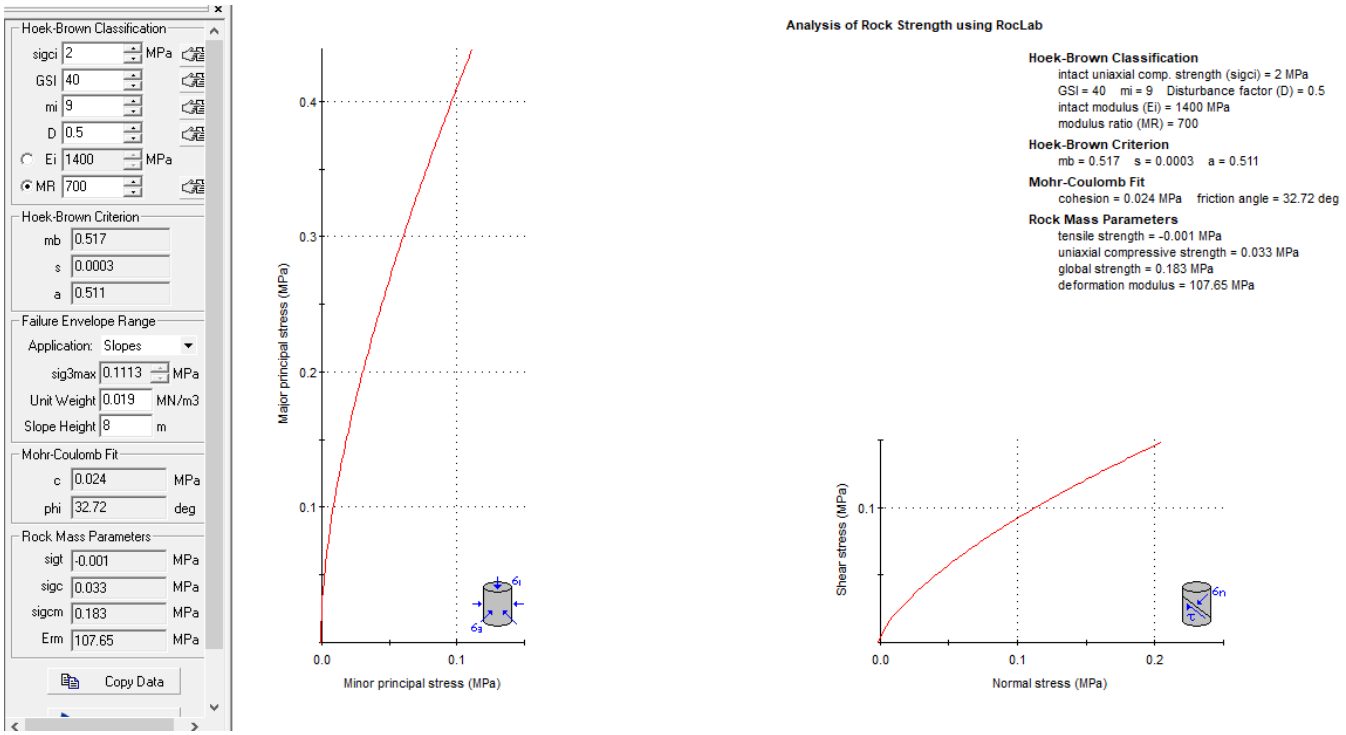


Figura 19 – Calcareniti di Gravina

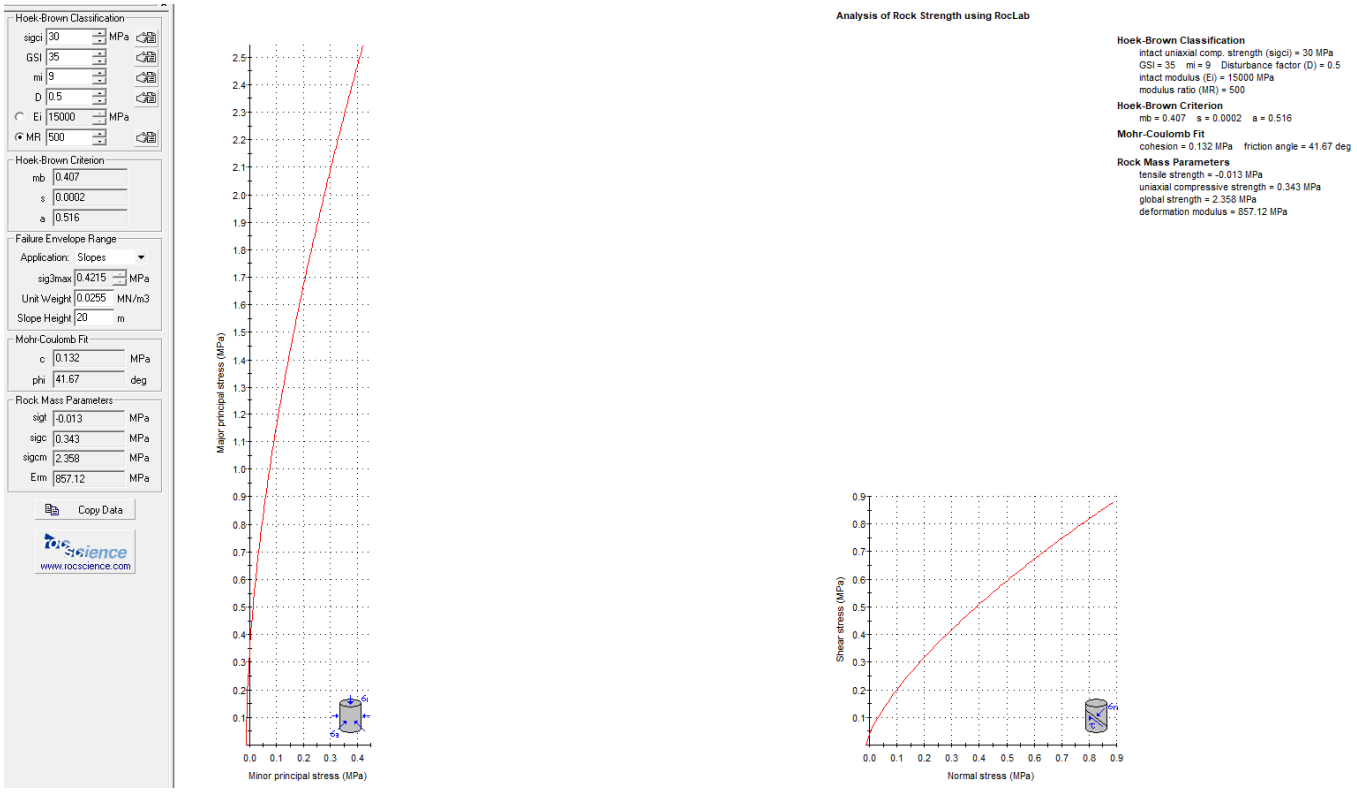


Figura 20 – Calcare di Bari

5.5 Categoria di sottosuolo

Dalle indagini sismiche Down-Hole (S10_DH_50 e S11_DH_50) e dalle indagini sismiche Masw (Masw10 e Masw11), si definisce una categoria di sottosuolo sismica di tipo E con i seguenti valori di Vs,eq (vedasi tabelle riportate di seguito):

- S10_DH_50: Vs,eq = 208 m/s
- S11_DH_50: Vs,eq = 131 m/s
- Masw10: Vs,eq = 249 m/s
- Masw11: Vs,eq = 228 m/s

Tabella 2 – S10_DH_50

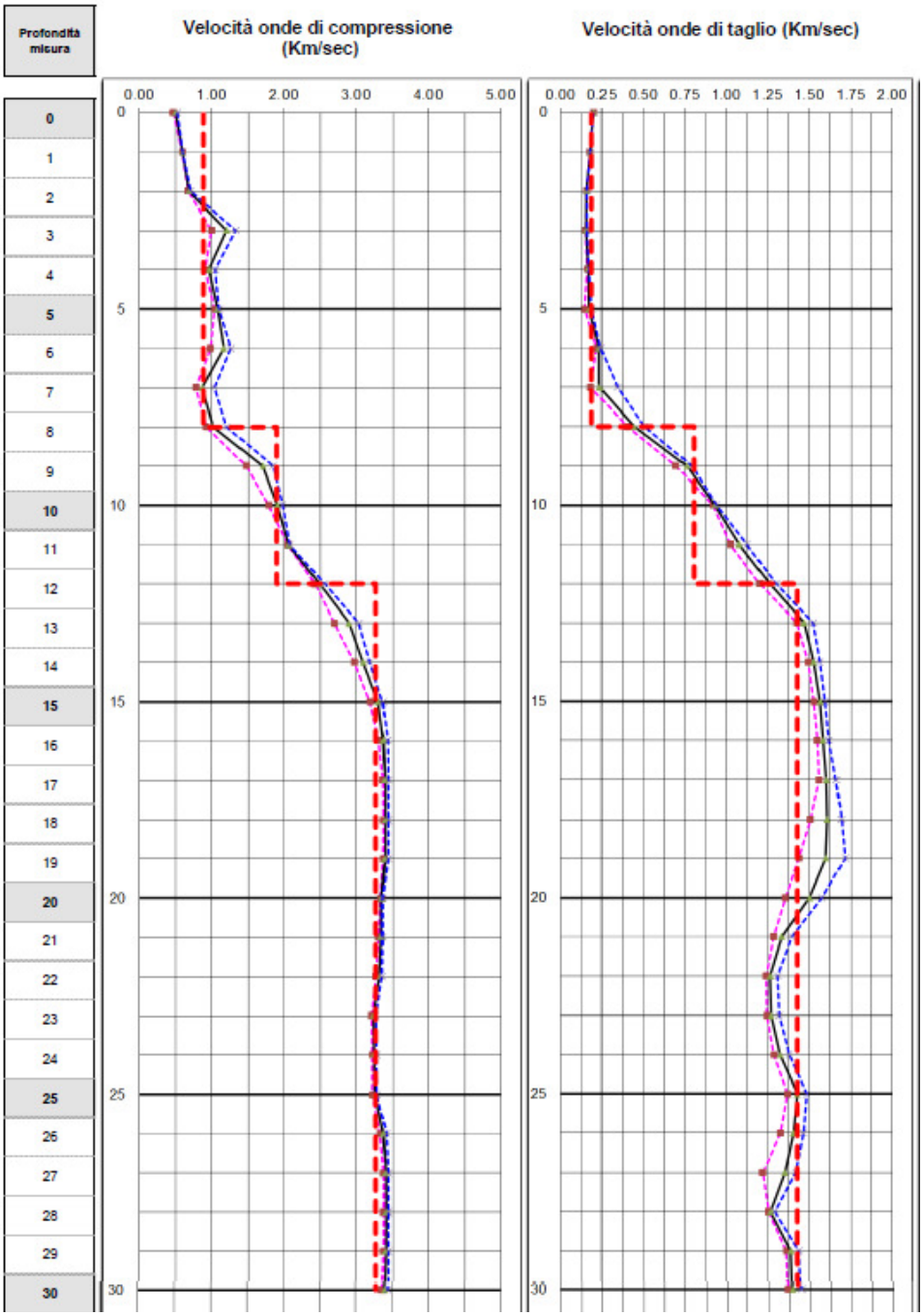


Tabella 3 – S11_DH_50

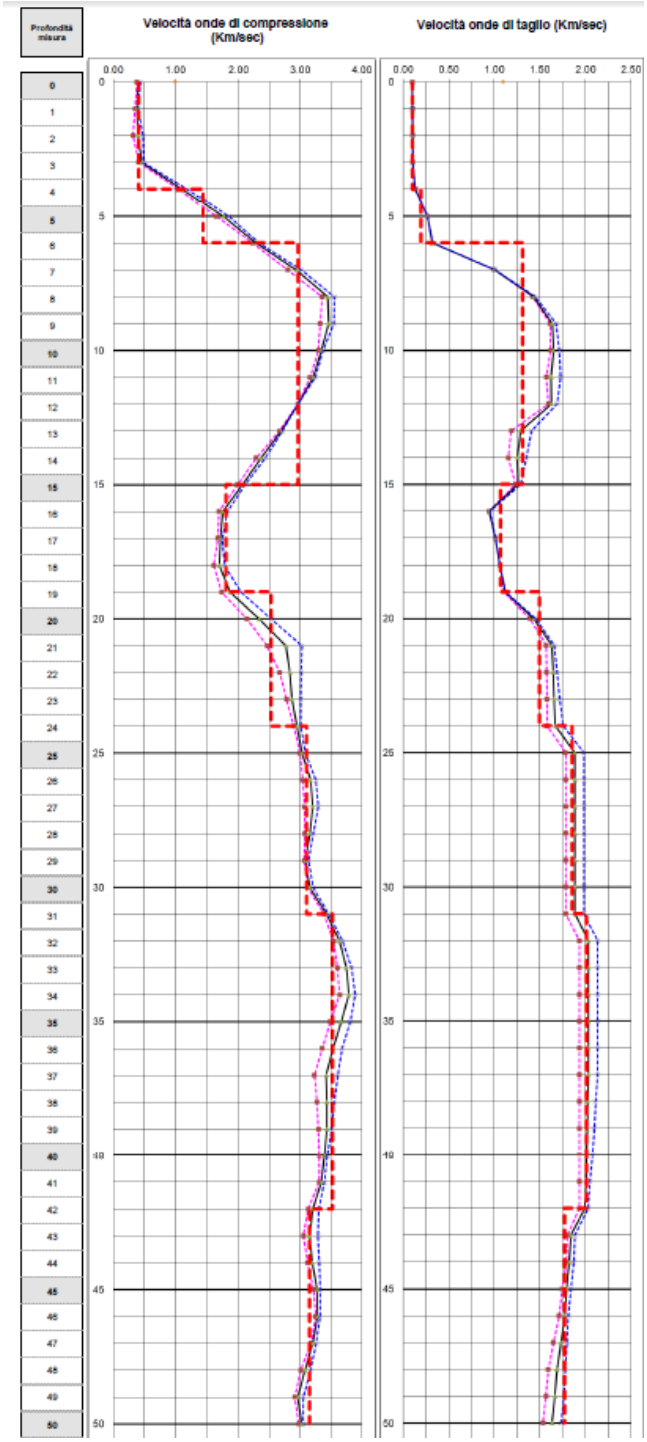
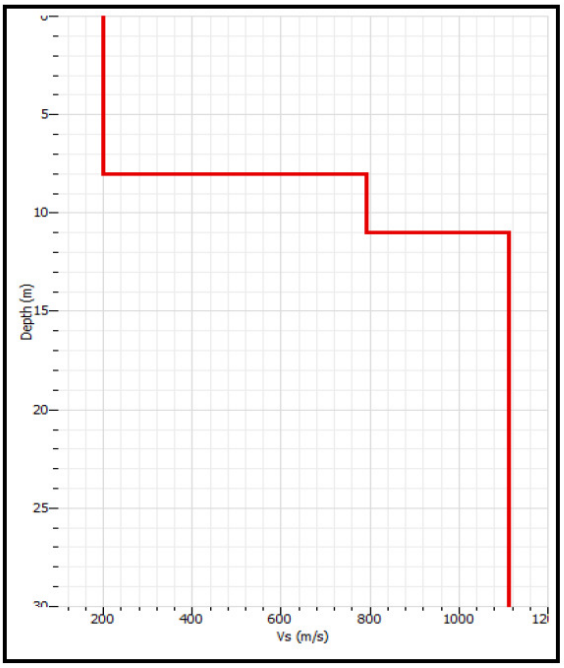


Tabella 4 – Masw10

PROFILO VELOCITA' ONDE DI TAGLIO



CALCOLO VS_{30}

SPESSORE	PROFONDITA'	Vs	SPESSORE/Vs
8	0	198	0.04040404
3	8	790	0.003797468
19	11	1110	
	30		

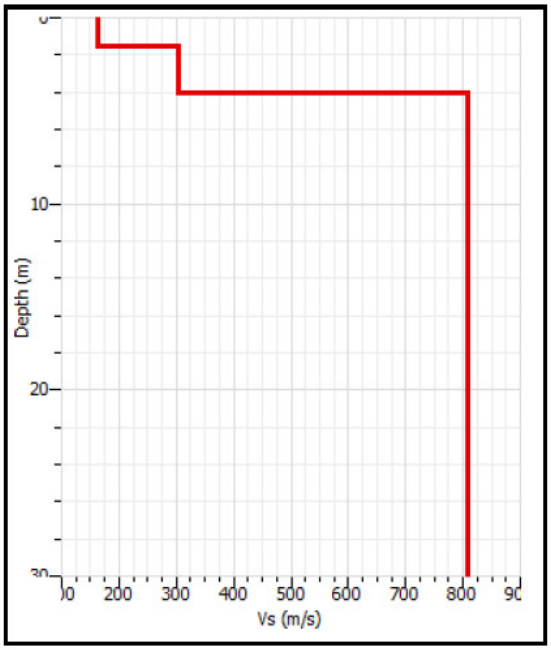
0.044201509

Vs_{eq11} = 249

Seismic classification of soils (It. D.M. 17/01/2018) **E**

Tabella 5 – Masw11

PROFILO VELOCITA' ONDE DI TAGLIO



CALCOLO VS_{30}

SPESSORE	PROFONDITA'	Vs	SPESSORE/Vs
1.5	0	160	0.009375
2.6	1.5	301	0.008637874
25.9	4.1	810	
	30		

0.018012874

Vs_{eq30} = 228

Seismic classification of soils (It. D.M. 17/01/2018) **E**

6. VALUTAZIONE CAPACITÀ PORTANTE MICROPALI

La verifica di capacità portante per i micropali è stata svolta con la metodologia di Bustamante e Doix, considerando l'Approccio 2 (A1+M1+R3) di normativa e quindi con i seguenti coefficienti parziali sulle resistenze di base e laterale:

- N. 5 verticale di indagine, da cui $\xi_3 = 1.50$,
- F_{SL} = fattore di sicurezza per la portata laterale a compressione ($=\xi_3 \cdot \gamma_s = 1.725$).
- $F_{SL,t}$ = fattore di sicurezza per la portata laterale a trazione ($=\xi_3 \cdot \gamma_s = 1.875$).
- Portata di base nulla.

Quindi per i micropali di fondazione si ha:

- micropali esistenti: La = 13.0 m lunghezza attiva portante (15.0-2.0 = 13.0 m)
- micropali integrativi di progetto La = 18.0 m lunghezza attiva portante (20.0-2.0 =18.0 m)
- Dp = 230 mm diametro di perforazione

Per i micropali esistenti, dalle tavole di progetto risultano realizzati con valvole ogni metro e iniezione a pressione. Comunque ipotizzando una corretta esecuzione dei micropali, secondo le indicazioni di progetto del 1985, si ipotizza un valore di resistenza di adesione micropalo-terreno: $\alpha\tau = 200$ kPa (Bustamante e Doix), da cui si stima:

pali esistenti:

$Rk = \pi \cdot Dp \cdot \alpha\tau \cdot La = 1878$ kN resistenza caratteristica

$Rd = Rk / F_{SL} = 1089$ kN resistenza di progetto a compressione

$Rd = Rk / F_{SL,t} = 1002$ kN resistenza di progetto a trazione

pali integrativi di progetto:

$Rk = \pi \cdot Dp \cdot \alpha\tau \cdot La = 2600$ kN resistenza caratteristica

$Rd = Rk / F_{SL} = 1507$ kN resistenza di progetto a compressione

$Rd = Rk / F_{SL,t} = 1387$ kN resistenza di progetto a trazione

7. ANALISI PALIFICATE DI FONDAZIONE

7.1 Premessa

Nel presente capitolo si riporta l'analisi delle palificate di fondazione, le cui metodologie di calcolo sono dettagliatamente esposte nell'apposito documento [DC4]. Nel seguito si riportano quindi i principali elementi utilizzati per il calcolo, quali geometria palificata, sistema di riferimento globale e dei carichi, carichi, ed infine i risultati.

7.2 Metodologia di calcolo

Per l'analisi della fondazione su pali singoli è stato utilizzato il codice di calcolo MAP (G. Guiducci), le cui metodologie sono esposte nel documento [DC4].

Nelle seguenti figure sono riportati i sistemi di riferimento globale e locale con le convenzioni sui segni delle variabili adottate.

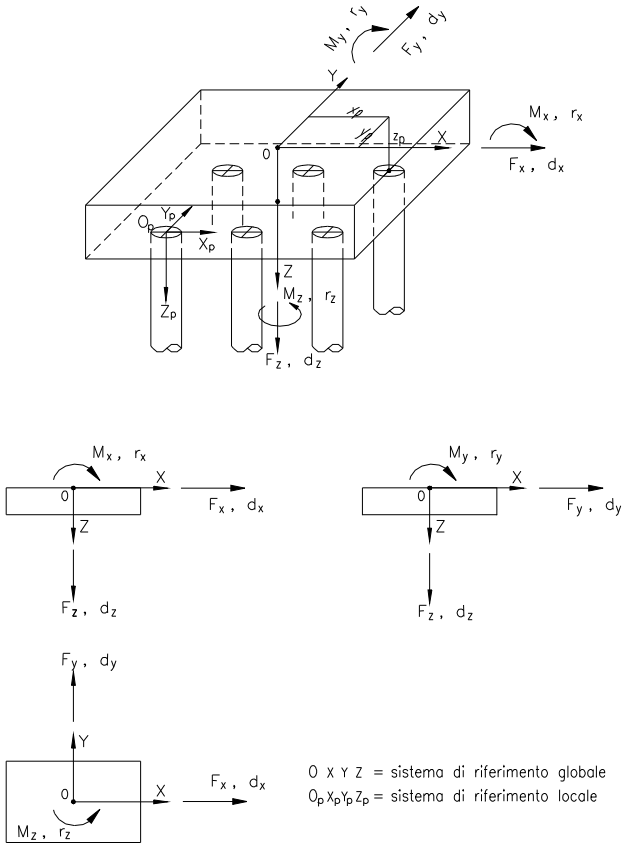


Figura 21– Definizione dei sistemi di riferimento globali adottati nelle analisi delle palificate

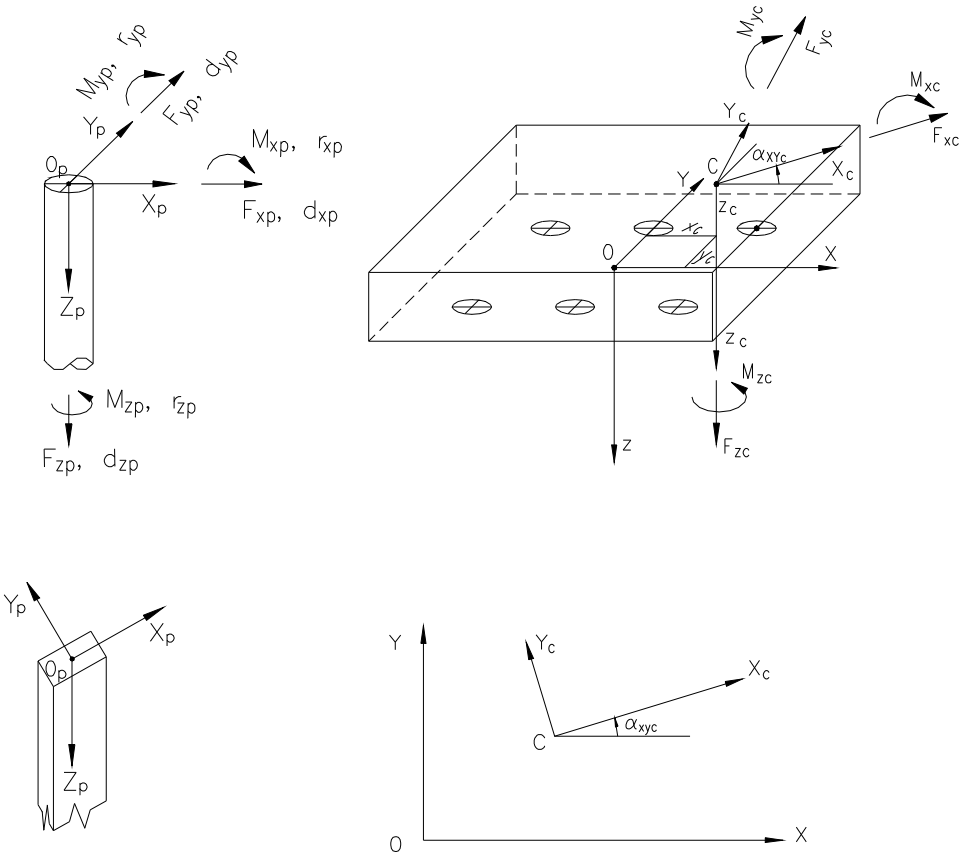


Figura 22– Definizione dei sistemi di riferimento locali e delle convenzioni sui centri di carico adottati nelle analisi delle palificate

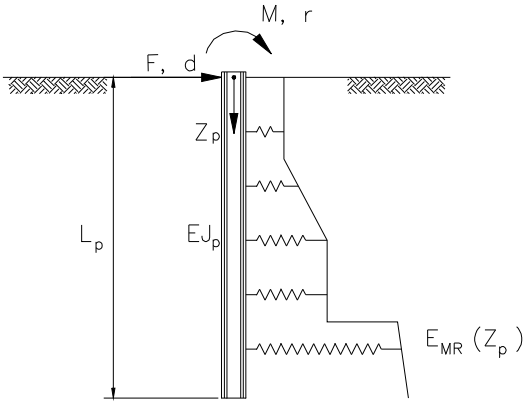


Figura 23– Pali soggetti a carichi trasversali: moduli di reazione del terreno

7.3 Caratterizzazione della palificata

La struttura della palificata è stata modellata ipotizzando un plinto infinitamente rigido. Per i pali di fondazione, la condizione di vincolo in testa è quella di incastro perfetto con il plinto. Ciascun micropalo di fondazione è stato modellato con una rigidezza flessionale ottenuta considerando la somma dei due contributi: tubo in acciaio e malta di perforazione, da cui si ottiene:

- microapli esistenti e micropali integrativi di progetto (Dp= 230 mm tubo de=177.8mm, sp=11mm):

  EJ = (EJ)tubo + (EJ)malta = 4228 + 2747 = 6975 kN m^2.

In Figura 14, Figura 15 è mostrata la pianta fondazione con numerazione micropali e sistema di riferimento globale palificata utilizzati nel calcolo.

Comportamento del palo soggetto a carichi verticali

La curva carico-cedimento del singolo palo viene caratterizzata attraverso la seguente relazione lineare:

dz = [Fz / Ak]

dove:

dz = spostamento verticale a testa palo/micropalo;

Fz = carico assiale a testa palo/micropalo.

Per le palificate in esame è stata valutata la curva carico-cedimento del singolo palo/micropalo con il programma APAL che utilizza il metodo delle curve di trasferimento riferite al fusto ed alla base dei pali sviluppate da Reese e O'Neill (curve t-s e q-s). Nel caso in esame, si ottiene la curva carico-cedimento mostrata nella figura seguente. In Appendice C sono riportati i tabulati di calcolo completi.

Per le palificate in esame si assume la seguente rigidezza assiale per i pali differenziata per i micropali esistenti ed i micropali nuovi integrativi:

Ak =125000 kN/m per micropalo integrativo Dp=230 mm

Ak =100000 kN/m per micropalo esistente Dp=230 mm

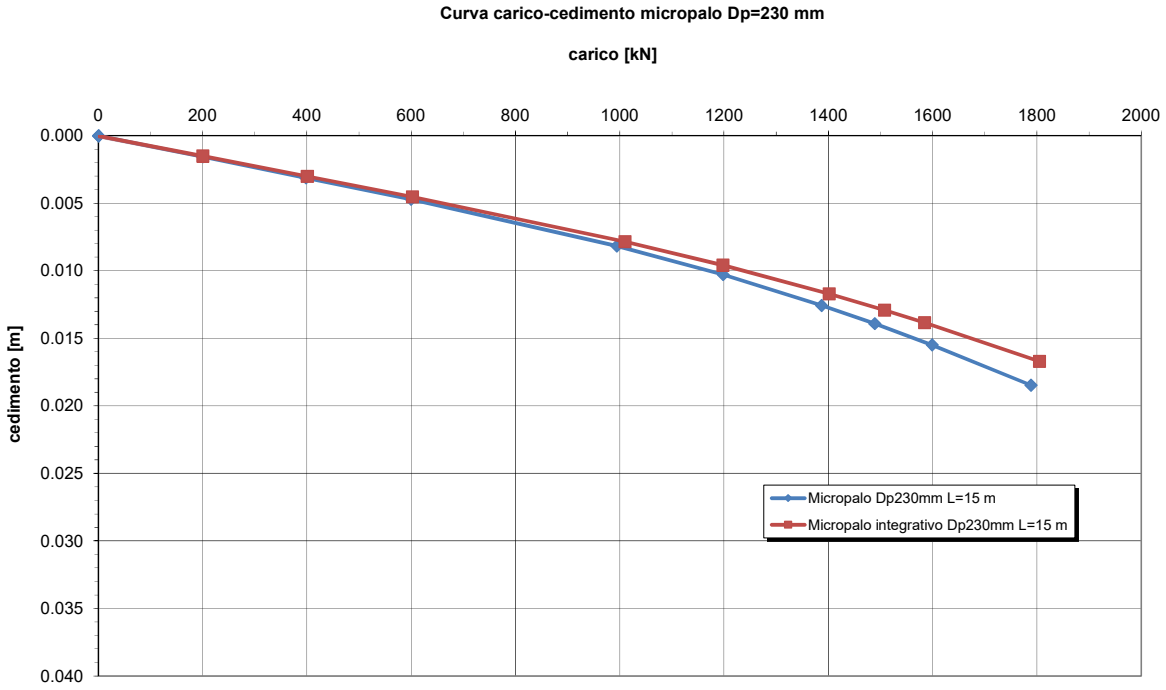


Figura 24– curva carico – cedimento - micropalo

Comportamento del palo soggetto ai carichi orizzontali

Lo studio dell'interazione tra palo soggetto ai carichi orizzontali ed il terreno viene effettuato ricorrendo alla teoria di Matlock e Reese che si basa sul noto modello di suolo alla Winkler (elastico-lineare), caratterizzato da un modulo di reazione orizzontale del terreno (E_{MR}) definito come il rapporto fra la reazione del terreno per unità di lunghezza del palo (p) ed il corrispondente spostamento orizzontale (y): $E_{MR} = p / y$. Definito il coefficiente di sottofondo alla Winkler (K_W), per un palo di diametro D, si ha questa relazione con il modulo di reazione orizzontale palo-terreno:

$$E_{MR} = K_W \cdot D$$

Nel caso in esame le fondazioni profonde interagiscono con il substrato calcarenitico per il quale si assume un valore massimo del coefficiente di Winkler di 100000 kN/m^3.

Quindi si è assunto il seguente andamento per il modulo di reazione micropalo-terreno con la profondità a partire da testa micropalo (diametro di perforazione Dp=230 mm):

Prof. m	E kN/m2
.00	23000.0
40.00	23000.0

7.4 Carichi

Di seguito si riportano i carichi esterni agenti in fondazione forniti dal progettista strutturale.

Per le pile i carichi sono agenti a quota intradosso plinto a baricentro fondazione e non includono il peso del plinto di fondazione, che è stato quindi valutato a parte con la seguente tabella.

Pila	L	B	h1	h2	L2	B2	A	A'	V1	V2	h3	A3	Vtot	hplinto	PP
	[m]	[m]	[m]	[m]	[m]	[m]	[m2]	[m2]	[m3]	[m3]	[m]	[m2]	[m3]	[m]	[kN]
P16	14.5	11.5	3	0.5	6	3.7	166.75	22.2	500.25	41.6	1	6.1	535.8	3.5	13395
P17-P20	14.5	11.5	3	0.5	6	3.7	166.75	22.2	500.25	41.6	1	6.1	535.8	3.5	13395

Tabella 6 - Carichi pile

TABLE: Joint Reactions				V long	V trasv	N	M trasv	M long	Mtorc		
Joint	OutputCase	CaseType	StepType	F1	F2	F3	M1	M2	M3		
Text	Text	Text	Text	KN	KN	KN	KN-m	KN-m	KN-m	PILA	comb.	
99	SLV_x	Combination	Max	4950	1354	8977	13957	46051	313	1	SLV 1	SLV_x Max
99	SLV_x	Combination	Min	-4950	-1354	7832	-13957	-45997	-313		SLV 2	SLV_x Min
99	SLV_y	Combination	Max	1485	4512	8910	46520	13837	1042		SLV 3	SLV_y Max
99	SLV_y	Combination	Min	-1485	-4512	7899	-46520	-13783	-1042		SLV 4	SLV_y Min
100	SLV_x	Combination	Max	4975	1408	9014	15039	48169	353	2	SLV 1	SLV_x Max
100	SLV_x	Combination	Min	-4975	-1408	7917	-15039	-48169	-353		SLV 2	SLV_x Min
100	SLV_y	Combination	Max	1493	4694	8968	50127	14453	1178		SLV 3	SLV_y Max
100	SLV_y	Combination	Min	-1493	-4694	7963	-50127	-14453	-1178		SLV 4	SLV_y Min
101	SLV_x	Combination	Max	5014	1395	9138	15409	50509	903	3	SLV 1	SLV_x Max
101	SLV_x	Combination	Min	-5014	-1395	8023	-15409	-50509	-903		SLV 2	SLV_x Min
101	SLV_y	Combination	Max	1505	4649	9092	51363	15156	3009		SLV 3	SLV_y Max
101	SLV_y	Combination	Min	-1505	-4649	8069	-51363	-15156	-3009		SLV 4	SLV_y Min
102	SLV_x	Combination	Max	5144	1436	9626	17739	58918	838	4	SLV 1	SLV_x Max
102	SLV_x	Combination	Min	-5144	-1436	8341	-17739	-58918	-838		SLV 2	SLV_x Min
102	SLV_y	Combination	Max	1543	4788	9545	59127	17678	2793		SLV 3	SLV_y Max
102	SLV_y	Combination	Min	-1543	-4788	8422	-59127	-17678	-2793		SLV 4	SLV_y Min
103	SLV_x	Combination	Max	5210	1515	9852	19852	63768	516	5	SLV 1	SLV_x Max
103	SLV_x	Combination	Min	-5210	-1515	8575	-19852	-63768	-516		SLV 2	SLV_x Min
103	SLV_y	Combination	Max	1563	5050	9788	66172	19132	1719		SLV 3	SLV_y Max
103	SLV_y	Combination	Min	-1563	-5050	8639	-66172	-19132	-1719		SLV 4	SLV_y Min
104	SLV_x	Combination	Max	5228	1615	9898	21618	65511	472	6	SLV 1	SLV_x Max
104	SLV_x	Combination	Min	-5228	-1615	8702	-21618	-65511	-472		SLV 2	SLV_x Min
104	SLV_y	Combination	Max	1569	5383	9867	72057	19655	1572		SLV 3	SLV_y Max
104	SLV_y	Combination	Min	-1569	-5383	8732	-72057	-19655	-1572		SLV 4	SLV_y Min
105	SLV_x	Combination	Max	5212	1515	9804	19854	63775	666	7	SLV 1	SLV_x Max
105	SLV_x	Combination	Min	-5212	-1515	8623	-19854	-63775	-666		SLV 2	SLV_x Min
105	SLV_y	Combination	Max	1564	5050	9774	66179	19134	2220		SLV 3	SLV_y Max
105	SLV_y	Combination	Min	-1564	-5050	8653	-66179	-19134	-2220		SLV 4	SLV_y Min
106	SLV_x	Combination	Max	5163	1462	9650	18335	60131	429	8	SLV 1	SLV_x Max
106	SLV_x	Combination	Min	-5163	-1462	8432	-18335	-60131	-429		SLV 2	SLV_x Min
106	SLV_y	Combination	Max	1549	4873	9596	61112	18041	1429		SLV 3	SLV_y Max
106	SLV_y	Combination	Min	-1549	-4873	8486	-61112	-18041	-1429		SLV 4	SLV_y Min
107	SLV_x	Combination	Max	5126	1455	9507	17705	57681	298	9	SLV 1	SLV_x Max
107	SLV_x	Combination	Min	-5126	-1455	8345	-17705	-57681	-298		SLV 2	SLV_x Min
107	SLV_y	Combination	Max	1538	4851	9466	59015	17306	994		SLV 3	SLV_y Max
107	SLV_y	Combination	Min	-1538	-4851	8386	-59015	-17306	-994		SLV 4	SLV_y Min
108	SLV_x	Combination	Max	5119	1383	9402	16440	56087	445	10	SLV 1	SLV_x Max
108	SLV_x	Combination	Min	-5119	-1383	8277	-16440	-56087	-445		SLV 2	SLV_x Min
108	SLV_y	Combination	Max	1536	4611	9369	54798	16829	1483		SLV 3	SLV_y Max
108	SLV_y	Combination	Min	-1536	-4611	8310	-54798	-16829	-1483		SLV 4	SLV_y Min
109	SLV_x	Combination	Max	5144	1448	9582	17880	58900	737	11	SLV 1	SLV_x Max
109	SLV_x	Combination	Min	-5144	-1448	8385	-17880	-58900	-737		SLV 2	SLV_x Min
109	SLV_y	Combination	Max	1543	4825	9532	59598	17672	2458		SLV 3	SLV_y Max
109	SLV_y	Combination	Min	-1543	-4825	8435	-59598	-17672	-2458		SLV 4	SLV_y Min
110	SLV_x	Combination	Max	5210	1466	9833	19135	63502	1268	12	SLV 1	SLV_x Max
110	SLV_x	Combination	Min	-5210	-1466	8565	-19135	-63502	-1268		SLV 2	SLV_x Min
110	SLV_y	Combination	Max	1563	4886	9772	63781	19055	4226		SLV 3	SLV_y Max
110	SLV_y	Combination	Min	-1563	-4886	8627	-63781	-19055	-4226		SLV 4	SLV_y Min
111	SLV_x	Combination	Max	5352	1491	10325	21643	73419	1323	13	SLV 1	SLV_x Max
111	SLV_x	Combination	Min	-5352	-1491	8966	-21643	-73419	-1323		SLV 2	SLV_x Min
111	SLV_y	Combination	Max	1606	4970	10246	72143	22028	4409		SLV 3	SLV_y Max
111	SLV_y	Combination	Min	-1606	-4970	9045	-72143	-22028	-4409		SLV 4	SLV_y Min
112	SLV_x	Combination	Max	5458	1530	10670	23950	81328	1746	14	SLV 1	SLV_x Max
112	SLV_x	Combination	Min	-5458	-1530	9311	-23950	-81328	-1746		SLV 2	SLV_x Min
112	SLV_y	Combination	Max	1638	5098	10599	79829	24401	5818		SLV 3	SLV_y Max
112	SLV_y	Combination	Min	-1638	-5098	9382	-79829	-24401	-5818		SLV 4	SLV_y Min
113	SLV_x	Combination	Max	5602	1549	11152	26626	92319	2104	15	SLV 1	SLV_x Max
113	SLV_x	Combination	Min	-5602	-1549	9750	-26626	-92319	-2104		SLV 2	SLV_x Min
113	SLV_y	Combination	Max	1681	5165	11077	88754	27697	7012		SLV 3	SLV_y Max
113	SLV_y	Combination	Min	-1681	-5165	9825	-88754	-27697	-7012		SLV 4	SLV_y Min
119	SLV_x	Combination	Max	5931	1661	12944	32037	111452	2452	16	SLV 1	SLV_x Max
119	SLV_x	Combination	Min	-5931	-1661	11479	-32037	-111452	-2452		SLV 2	SLV_x Min
119	SLV_y	Combination	Max	1780	5535	12886	106790	33441	8172		SLV 3	SLV_y Max
119	SLV_y	Combination	Min	-1780	-5535	11536	-106790	-33441	-8172		SLV 4	SLV_y Min
120	SLV_x	Combination	Max	5759	1760	14222	36997	118581	3541	17	SLV 1	SLV_x Max
120	SLV_x	Combination	Min	-5759	-1760	12612	-36997	-118581	-3541		SLV 2	SLV_x Min
120	SLV_y	Combination	Max	1731	5866	14150	123321	35589	11804		SLV 3	SLV_y Max
120	SLV_y	Combination	Min	-1731	-5866	12684	-123321	-35589	-11804		SLV 4	SLV_y Min
121	SLV_x	Combination	Max	5372	1870	16014	43805	123910	5476	18	SLV 1	SLV_x Max
121	SLV_x	Combination	Min	-5372	-1870	14258	-43805	-123910	-5476		SLV 2	SLV_x Min
121	SLV_y	Combination	Max	1612	6232	15939	146018	37177	18253		SLV 3	SLV_y Max
121	SLV_y	Combination	Min	-1612	-6232	14333	-146018	-37177	-18253		SLV 4	SLV_y Min
122	SLV_x	Combination	Max	5085	2404	17868	62259	128135	3377	19	SLV 1	SLV_x Max
122	SLV_x	Combination	Min	-5085	-2404	15996	-62259	-128135	-3377		SLV 2	SLV_x Min
122	SLV_y	Combination	Max	1526	8013	17805	207529	38442	11257		SLV 3	SLV_y Max
122	SLV_y	Combination	Min	-1526	-8013	16058	-207529	-38442	-11257		SLV 4	SLV_y Min
123	SLV_x	Combination	Max	5255	1984	16830	48847	125998	3403	20	SLV 1	SLV_x Max
123	SLV_x	Combination	Min	-5255	-1984	15084	-48847	-125998	-3403		SLV 2	SLV_x Min
123	SLV_y	Combination	Max	1577	6613	16783	162821	37802	11343		SLV 3	SLV_y Max
123	SLV_y	Combination	Min	-1577	-6613	15131	-162821	-37802	-11343		SLV 4	SLV_y Min
124	SLV_x_T4	Combination	Max	11210	4140	25596	97520	261290	1190	21	SLV 1 (T4)	SLV_x_T4 Max
124	SLV_x_T4	Combination	Min	-11210	-4140	22202	-97520	-260798	-1190		SLV 2 (T4)	SLV_x_T4 Min
124	SLV_y_T4	Combination	Max	3365	13799	25521	325064	78572	3965		SLV 3 (T4)	SLV_y_T4 Max
124	SLV_y_T4	Combination	Min	-3365	-13799	22277	-325064	-78080	-3965		SLV 4 (T4)	SLV_y_T4 Min
125	SLV_x_T4	Combination	Max	11691	4206	24776	97230	267577	4930	22	SLV 1 (T4)	SLV_x_T4 Max
125	SLV_x_T4	Combination	Min	-11691	-4206	21577	-97230	-268069	-4930		SLV 2 (T4)	SLV_x_T4 Min
125	SLV_y_T4	Combination	Max	3510	14021	24738	324099	80116	16434		SLV 3 (T4)	SLV_y_T4 Max
125	SLV_y_T4	Combination	Min	-3510	-14021	21615	-324099	-80608	-16434		SLV 4 (T4)	SLV_y_T4 Min
114	SLV_x	Combination	Max	5640	1759	15123	39043	122802	2854	23	SLV 1	SLV_x Max
114	SLV_x	Combination	Min	-5640	-1759	13558	-39043	-122802	-2854		SLV 2	SLV_x Min
114	SLV_y	Combination	Max	1693	5863	15087	130143	36845	9514		SLV 3	SLV_y Max
114	SLV_y	Combination	Min	-1693	-5863	13594	-130143	-36845	-9514		SLV 4	SLV_y Min
115	SLV_x	Combination	Max	5952	1647	13208	32031	112828	2053	24	SLV 1	SLV_x Max
115	SLV_x	Combination	Min	-5952	-1647	11676	-32031	-112828	-2053		SLV 2	SLV_x Min
115	SLV_y	Combination	Max	1788	5489	13129	106768	33858	6844		SLV 3	SLV_y Max
115	SLV_y	Combination	Min	-1788	-5489	11755	-106768	-33858	-6844		SLV 4	SLV_y Min
116	SLV_x	Combination	Max	5545	1478	10945	24412	87537	1593	25	SLV 1	SLV_x Max
116	SLV_x	Combination	Min	-5545	-1478	9554	-24412	-87537	-1593		SLV 2	SLV_x Min
116	SLV_y	Combination	Max	1664	4928	10869	81371	26265	5310		SLV 3	SLV_y Max
116	SLV_y	Combination	Min	-1664	-4928	9630	-81371	-26265	-5310		SLV 4	SLV_y Min
117	SLV_x	Combination	Max	5242	1458	9978	19512	65717	1038	26	SLV 1	SLV_x Max
117	SLV_x	Combination	Min	-5242	-1458	8622	-19512	-65717	-1038		SLV 2	SLV_x Min
117	SLV_y	Combination	Max	1573	4861	9892	65038	19721	3459		SLV 3	SLV_y Max
117	SLV_y	Combination	Min	-1573	-4861	8708	-65038	-19721	-3459		SLV 4	SLV_y Min
118	SLV_x	Combination	Max	5105	1368	9315	15364	52451	638	27	SLV 1	SLV_x Max
118	SLV_x	Combination	Min	-5105	-1368	8069	-15364	-52505	-638		SLV 2	SLV_x Min
118	SLV_y	Combination	Max	1532	4559	9230	51212	15721	2127		SLV 3	SLV_y Max
118	SLV_y	Combination	Min	-1532	-4559	8154	-51212	-15775	-2127		SLV 4	SLV_y Min

7.5 Risultati pila P16

Nella seguente tabella si sintetizzano le massime sollecitazioni a testa palo per le condizioni di carico analizzate e le deformazioni massime del plinto. In **Appendice B** si riportano i tabulati di calcolo completi. In particolare sono state distinte le tabelle di sintesi risultati per i pali esistenti e per i pali nuovi integrativi.

Tabella 7 – pila P16 – Analisi SLV – pali n. 1-58 esistenti

LINEA FS FERRANDINA MATERA
VI08 Pila P16 - Analisi SLV

98 pali D = 230 mm

Sollecitazioni massime in sommita' ai pali

	Fz kN	M kN*m	T kN	palo	c.d.c.
S.1	634.4	20.3	49.6	1	1
S.2	-157.5	20.3	49.6	1	2
S.3	66.8	31.6	67.9	53	3
S.4	66.8	31.6	67.9	53	3
T.1	607.5	28.5	61.2	1	3
T.2	-130.6	28.5	61.2	1	4

S.1: cond. di carico con Sforzo Normale Massimo
VI08 - P16 - SLV_x
S.2: cond. di carico con Sforzo Normale Minimo
VI08 - P16 - SLV_x
S.3: cond. di carico con Momento Massimo
VI08 - P16 - SLV_y
S.4: cond. di carico con Taglio Massimo
VI08 - P16 - SLV_y
T.1: cond. di carico con Tensione Massima (sez. interamente reagente)
VI08 - P16 - SLV_y
T.2: cond. di carico con Tensione Minima (sez. interamente reagente)
VI08 - P16 - SLV_y

Deformazioni massime del plinto

	dz mm	dx mm	rx mRad	dy mm	ry mRad	c.d.c.
D.1	2.453	2.517	.821	.713	.150	1
D.2	2.453	2.517	.821	.713	.150	1
D.3	2.453	2.517	.821	.713	.150	1
D.4	2.447	.756	.246	2.378	.501	3
D.5	2.447	.756	.246	2.378	.501	3

D.1: cond. di carico con dz massimo
VI08 - P16 - SLV_x
D.2: cond. di carico con dx massimo
VI08 - P16 - SLV_x
D.3: cond. di carico con rx massimo
VI08 - P16 - SLV_x
D.4: cond. di carico con dy massimo
VI08 - P16 - SLV_y
D.5: cond. di carico con ry massimo
VI08 - P16 - SLV_y

Tabella 8 – pila P16 – Analisi SLV – pali n. 59-98 integrativi

```
LINEA FS FERRANDINA MATERA
VI08 Pila P16 - Analisi SLV

    98 pali   D =  230 mm

Sollecitazioni massime in sommita' ai pali

-------------------------------------------------
        Fz         M         T     palo   c.d.c.
        kN       kN*m       kN
-------------------------------------------------
S.1    983.3       9.2      23.7    69       1
S.2   -396.3      15.0      38.8    69       2
S.3    429.9      37.3      78.9    87       4
S.4    429.9      37.3      78.9    87       4
T.1    796.7      34.0      70.2    69       3
T.2   -294.0      30.7      65.2    59       4
-------------------------------------------------
S.1: cond. di carico con Sforzo Normale Massimo
     VI08 - P16 - SLV_x
S.2: cond. di carico con Sforzo Normale Minimo
     VI08 - P16 - SLV_x
S.3: cond. di carico con Momento Massimo
     VI08 - P16 - SLV_y
S.4: cond. di carico con Taglio Massimo
     VI08 - P16 - SLV_y
T.1: cond. di carico con Tensione Massima (sez. interamente reagente)
     VI08 - P16 - SLV_y
T.2: cond. di carico con Tensione Minima  (sez. interamente reagente)
     VI08 - P16 - SLV_y


Deformazioni massime del plinto

-------------------------------------------------------------
        dz        dx        rx        dy        ry     c.d.c.
        mm        mm       mRad       mm       mRad
-------------------------------------------------------------
D.1    2.453     2.517      .821      .713      .150      1
D.2    2.453     2.517      .821      .713      .150      1
D.3    2.453     2.517      .821      .713      .150      1
D.4    2.447      .756      .246     2.378      .501      3
D.5    2.447      .756      .246     2.378      .501      3
-------------------------------------------------------------
D.1: cond. di carico con  dz  massimo
     VI08 - P16 - SLV_x
D.2: cond. di carico con  dx  massimo
     VI08 - P16 - SLV_x
D.3: cond. di carico con  rx  massimo
     VI08 - P16 - SLV_x
D.4: cond. di carico con  dy  massimo
     VI08 - P16 - SLV_y
D.5: cond. di carico con  ry  massimo
     VI08 - P16 - SLV_y
```

7.6 Risultati pile P17÷P20

Nella seguente tabella si sintetizzano le massime sollecitazioni a testa palo per le condizioni di carico analizzate e le deformazioni massime del plinto. In **Appendice B** si riportano i tabulati di calcolo completi. In particolare sono state distinte le tabelle di sintesi risultati per i pali esistenti e per i pali nuovi integrativi.

Tabella 9 – pile P17÷P20 – Analisi SLV – pali n. 1-74 esistenti

LINEA FS FERRANDINA MATERA
VI08 Pile P17-P20 - Analisi SLV

120 pali D = 230 mm

Sollecitazioni massime in sommita' ai pali

	Fz kN	M kN*m	T kN	palo	c.d.c.
S.1	783.0	32.0	71.9	1	11
S.2	-319.4	32.0	71.9	1	12
S.3	-11.5	35.6	76.3	68	7
S.4	-129.3	34.0	76.5	68	11
T.1	783.0	32.0	71.9	1	11
T.2	-319.4	32.0	71.9	1	12

S.1: cond. di carico con Sforzo Normale Massimo
VI08 - P19 - SLV_y
S.2: cond. di carico con Sforzo Normale Minimo
VI08 - P19 - SLV_y
S.3: cond. di carico con Momento Massimo
VI08 - P18 - SLV_y
S.4: cond. di carico con Taglio Massimo
VI08 - P19 - SLV_y
T.1: cond. di carico con Tensione Massima (sez. interamente reagente)
VI08 - P19 - SLV_y
T.2: cond. di carico con Tensione Minima (sez. interamente reagente)
VI08 - P19 - SLV_y

Deformazioni massime del plinto

	dz mm	dx mm	rx mRad	dy mm	ry mRad	c.d.c.
D.1	2.390	1.790	.756	.872	.249	9
D.2	2.111	2.015	.700	.631	.148	1
D.3	2.390	1.790	.756	.872	.249	9
D.4	2.385	.537	.227	2.905	.829	11
D.5	2.385	.537	.227	2.905	.829	11

D.1: cond. di carico con dz massimo
VI08 - P19 - SLV_x
D.2: cond. di carico con dx massimo
VI08 - P17 - SLV_x
D.3: cond. di carico con rx massimo
VI08 - P19 - SLV_x
D.4: cond. di carico con dy massimo
VI08 - P19 - SLV_y
D.5: cond. di carico con ry massimo
VI08 - P19 - SLV_y

Tabella 10 – pile P17÷P20 – Analisi SLV – pali n. 75-120 integrativi

LINEA FS FERRANDINA MATERA
VI08 Pile P17-P20 - Analisi SLV

120 pali D = 230 mm

Sollecitazioni massime in sommita' ai pali

	Fz kN	M kN*m	T kN	palo	c.d.c.
S.1	1171.4	13.9	35.2	76	11
S.2	-600.7	23.1	54.1	76	12
S.3	511.6	44.4	93.2	109	8
S.4	511.6	44.4	93.2	109	8
T.1	1047.9	41.6	87.4	85	11
T.2	-567.1	34.5	76.4	75	12

S.1: cond. di carico con Sforzo Normale Massimo
VI08 - P19 - SLV_y
S.2: cond. di carico con Sforzo Normale Minimo
VI08 - P19 - SLV_y
S.3: cond. di carico con Momento Massimo
VI08 - P18 - SLV_y
S.4: cond. di carico con Taglio Massimo
VI08 - P18 - SLV_y
T.1: cond. di carico con Tensione Massima (sez. interamente reagente)
VI08 - P19 - SLV_y
T.2: cond. di carico con Tensione Minima (sez. interamente reagente)
VI08 - P19 - SLV_y

Deformazioni massime del plinto

	dz mm	dx mm	rx mRad	dy mm	ry mRad	c.d.c.
D.1	2.390	1.790	.756	.872	.249	9
D.2	2.111	2.015	.700	.631	.148	1
D.3	2.390	1.790	.756	.872	.249	9
D.4	2.385	.537	.227	2.905	.829	11
D.5	2.385	.537	.227	2.905	.829	11

D.1: cond. di carico con dz massimo
VI08 - P19 - SLV_x
D.2: cond. di carico con dx massimo
VI08 - P17 - SLV_x
D.3: cond. di carico con rx massimo
VI08 - P19 - SLV_x
D.4: cond. di carico con dy massimo
VI08 - P19 - SLV_y
D.5: cond. di carico con ry massimo
VI08 - P19 - SLV_y

8. VERIFICHE GEOTECNICHE

8.1 Verifica capacità portante fondazioni su pali

Le verifiche di capacità portante dei pali sono condotte in accordo alla normativa vigente (NTC 2018), in particolare si è fatto riferimento alla combinazione (A1+M1+R3). Nelle seguenti tabelle si sintetizzano le massime sollecitazioni in testa ai pali (Nmax) per le analisi eseguite, le lunghezze dei pali e le relative portate di progetto a compressione (Qd).

Le curve di capacità portante sono riportate al capitolo .

Le verifiche di portanza dei micropali sono riportate nella seguente tabella, da cui si osserva che le verifiche di portanza sono soddisfatte sia per i microapli esistenti, che per i nuovi integrativi di progetto.

Tabella 11 – Verifica capacità portante micropali Dp=230 mm

Pila	Micropali	Nmax [kN] compressione	Rd [kN] compressione	Nmax,t [kN] trazione	Rd,t [kN] trazione	Lmicropalo [m]
P16	Micropali esistenti da n. 1 a n. 58	634	1089	158	1002	15.0
	Micropali integrativi di progetto da n. 59 n. 98	983	1507	396	1387	20.0
P17-P20	Micropali esistenti da n. 1 a n. 74	783	1089	319	1002	15.0
	Micropali integrativi di progetto da n. 75 n. 120	1171	1507	601	1387	20.0

8.2 Verifica carico limite orizzontale

Per la verifica del carico limite orizzontale si fa generalmente riferimento alla teoria di Broms per il caso di pali con rotazione in testa impedita. Le metodologie di calcolo sono riportate nel documento [DC4].

Il valore della azione resistente di progetto (Hd) è valutato dal valore caratteristico della resistenza (Hk) con il fattore di correlazione $\xi_3 = 1.5$ (cinque verticali di indagine), il coefficiente parziale $\gamma_T = 1.3$ ed un fattore di effetto gruppo orizzontale assunto cautelativamente pari a 0.80.

Per la resistenza del terreno si considerano i valori medi di resistenza laterale lungo il palo, valutati in tensioni totali in quanto le condizioni di acrico massime sono sismiche. Inoltre le fondazioni sono in roccia e quindi la resistenza verrà dedotta dalla resistenza a compressione monoassiale minima indicata per la roccia (σc=3MPa).

Nella seguente tabella si riassumono i risultati delle verifiche per la pila con le sollecitazioni di taglio massime (P19 e P18). La verifica a carico limite orizzontale è sempre soddisfatta, in quanto la massima azione di taglio di progetto, valutata con effetto gruppo orizzontale, risulta sempre inferiore all'azione di taglio resistente ($H_{max,EG}$ = Hmax/0.8 < Hd = Hk/ ($\xi_3 \cdot \gamma_T$)).

OPERA	D [mm]	L [m]	My [kNm]	φ [°]	cu [kPa]	$H_{max,EG}$ [kN]	Hk [kN]	Hd [kN]
Micropali esistenti	230	15.0	65.4 (de=177.8mm sp=11mm)	-	1500 (σc/2)	76.5/0.8=95.6 associato a Ntrazione =-129kN	328.9	168.6
Micropali integrativi di progetto	230	20.0	114.8 (de=177.8mm sp=11mm)	-	1500 (σc/2)	93/0.8=116.3	533.0	273.4

My = momento di plasticizzazzione.
$H_{max,EG}$ = azione massima orizzontale di progetto con effetto gruppo orizzontale.
Hd = Hk / ($\gamma_R \cdot \xi_3$) = resistenza orizzontale di progetto.
D = diametro palo.
L = lunghezza palo.

9. VERIFICHE STRUTTURALI

9.1 Verifica dell'armatura tubolare in acciaio dei micropali

La verifica è svolta in accordo alle normative vigenti NTC 2018 con riferimento alle massime sollecitazioni individuate dall'analisi eseguita.

I micropali esistenti sono armati con tubo de= 177.8 mm sp=11 mm acciaio ex. Fe360 (S235). Per i materiali delle opere esistenti si definisce livello di conoscenza LC = 2 e quindi nelle verifiche si assume un fattore di confidenza FC = 1.2.

I micropali integrativi di progetto sono previsti con tubo de= 177.8 mm sp=11 mm acciaio S355.

Come si evince dalle seguenti tabelle, per i micropali esistenti, le verifiche strutturali del tubo di armatura sono tutte soddisfatte ad eccezione di un'unica combinazione relativa alla P19 SLV con Nmax associato a massimo momento trasversale, tutte altre combinazioni di carico della pila P19 sono ampiamante soddisfatte.

Tabella 12 – Verifica strutturale micropali esistenti

	AZIONI DI PROGETTO (F_{Ed})			RESISTENZE DI PROGETTO (R_d)						VERIFICA (>1)	
Sezione	N_{Ed}	M_{Ed}	V_{Ed}	$N_{pl,Rd}$	$M_{c,Rd}$	$V_{c,Rd}$	$M_{y,V,Rd}$	$M_{N,y,Rd}$	$M_{y,V,Rd}$	$(R_d/F_{Ed})_{min}$	
-	kN	kNm	kN	kN	kNm	kN	kNm	kNm	kNm	--	
P16	634	20	50	1075	57	395	57	24	24	1.21	OK
P17-P20	67	32	68	1075	57	395	57	56	56	1.78	OK
P21-P22	608	29	61	1075	57	395	57	31	31	1.10	OK
P19-SLV-y	593	34	77	1075	57	395	57	35	35	1.03	OK
P20-SLV-y	676	28	62	1075	57	395	57	29	29	1.04	OK
P18-SLV-y	630	32	68	1075	57	395	57	33	33	1.03	OK
P19-SLV-y(Nmax, Mtmax)	783	32	72	1075	57	395	57	29	29	0.90	KO

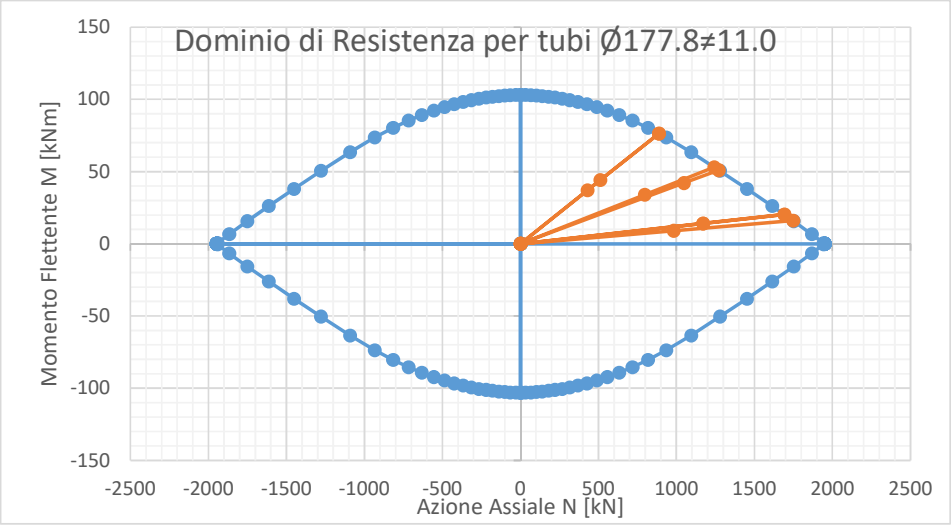
Si ritiene che il coefficiente 0.9 sia sufficiente in quanto, si verifica per una sola combinazione in cui si raggiunge comunque un adeguamento prossimo al cento per cento, e omettendo nella verifica il fattore di confidenza sui materiali, la verifica è ampiamente soddisfatta (vedasi tabella seguente).

	AZIONI DI PROGETTO (F_{Ed})			RESISTENZE DI PROGETTO (R_d)						VERIFICA (>1)	
Sezione	N_{Ed}	M_{Ed}	V_{Ed}	$N_{pl,Rd}$	$M_{c,Rd}$	$V_{c,Rd}$	$M_{y,V,Rd}$	$M_{N,y,Rd}$	$M_{y,V,Rd}$	$(R_d/F_{Ed})_{min}$	
-	kN	kNm	kN	kN	kNm	kN	kNm	kNm	kNm	--	
P19-SLV-y(Nmax, Mtmax)	783	32	72	1290	69	474	69	34	34	1.08	OK

Come si evince dalle seguenti tabelle le verifiche strutturali del tubo di armatura sono tutte soddisfatte per i micropali integrativi di progetto.

Tabella 13 – Verifica strutturale micropali integrativi

	AZIONI DI PROGETTO (F_{Ed})			RESISTENZE DI PROGETTO (R_d)						VERIFICA (>1)	
Sezione	N_{Ed}	M_{Ed}	V_{Ed}	$N_{pl,Rd}$	$M_{c,Rd}$	$V_{c,Rd}$	$M_{y,V,Rd}$	$M_{N,y,Rd}$	$M_{y,V,Rd}$	$(R_d/F_{Ed})_{min}$	
-	kN	kNm	kN	kN	kNm	kN	kNm	kNm	kNm	--	
P16	983	9	24	1949	104	716	104	16	16	1.78	OK
P17-P20	430	37	79	1949	104	716	104	76	76	2.06	OK
P21-P22	797	34	70	1949	104	716	104	53	53	1.56	OK
P17-SLV-y	1171	14	35	1949	104	716	104	20	20	1.44	OK
P18-SLV-y	512	44	93	1949	104	716	104	76	76	1.73	OK
P17-SLV-y	1048	42	87	1949	104	716	104	51	51	1.21	OK



10. APPENDICE A. CURVE CARICO-CEDIMENTO. TABULATI DI CALCOLO APAL

10.1 Micropali DP230mm esistenti

```
GRAVINA D230mm


Caratteristiche palo

Lunghezza                  =       15.00  m
Diametro                   =         .23  m
Modulo elastico            = 20000000.00  kPa
Peso di volume immerso     =        5.00  kN/m3


Carico in sommita al palo  =         .00  kN


Caratteristiche alla base del palo

Pressione limite specifica    =  5000.000  kPa
Parametro deformazione limite =      .200
   cedimento per press. lim.  =  .200 x D =   46. mm
Parametro forma curva         =      .090


Caratteristiche di adesione laterale

-----------------------------------
prof.    ades. limite      s. lim.
   m          kPa            mm
-----------------------------------
  .00         100.0          5.0
 3.00         100.0          5.0
 3.10         220.0          5.0
20.00         220.0          5.0
-----------------------------------


Definizione cedimenti del terreno

----------------------
prof.        cedimento
   m            mm
----------------------
----------------------



STAMPA DEI RISULTATI

---------------------------------------
prof.      sforzo normale    cedimento
  m               kN              mm
---------------------------------------
   .00             .7             .01
   .50             .7             .01
  1.00             .7             .01
  1.50             .7             .01
  2.00             .8             .01
  2.50             .8             .01
  3.00             .8             .01
  3.50             .7             .01
  4.00             .7             .01
  4.50             .6             .01
  5.00             .6             .01
  5.50             .5             .01
  6.00             .5             .01
  6.50             .4             .01
  7.00             .4             .01
  7.50             .4             .01
  8.00             .4             .01
  8.50             .3             .01
  9.00             .3             .01
  9.50             .3             .01
 10.00             .3             .01
 10.50             .3             .01
 11.00             .3             .01
```

11.50	.3	.01
12.00	.3	.01
12.50	.3	.01
13.00	.3	.01
13.50	.3	.01
14.00	.3	.01
14.50	.3	.01
15.00	.3	.01

Carico in sommita al palo = 1.00 kN

STAMPA DEI RISULTATI

prof. m	sforzo normale kN	cedimento mm
.00	.7	.01
.50	.7	.01
1.00	.7	.01
1.50	.7	.01
2.00	.8	.01
2.50	.8	.01
3.00	.8	.01
3.50	.7	.01
4.00	.7	.01
4.50	.6	.01
5.00	.6	.01
5.50	.5	.01
6.00	.5	.01
6.50	.4	.01
7.00	.4	.01
7.50	.4	.01
8.00	.4	.01
8.50	.3	.01
9.00	.3	.01
9.50	.3	.01
10.00	.3	.01
10.50	.3	.01
11.00	.3	.01
11.50	.3	.01
12.00	.3	.01
12.50	.3	.01
13.00	.3	.01
13.50	.3	.01
14.00	.3	.01
14.50	.3	.01
15.00	.3	.01

Carico in sommita al palo = 200.00 kN

STAMPA DEI RISULTATI

prof. m	sforzo normale kN	cedimento mm
.00	200.9	1.58
.50	190.5	1.46
1.00	180.8	1.35
1.50	171.9	1.25
2.00	163.7	1.15
2.50	156.3	1.05
3.00	149.4	.96
3.50	135.7	.87
4.00	123.2	.79
4.50	111.8	.72
5.00	101.5	.66
5.50	92.0	.60

6.00	83.4	.55
6.50	75.6	.50
7.00	68.4	.46
7.50	61.9	.42
8.00	56.0	.38
8.50	50.5	.35
9.00	45.5	.32
9.50	40.9	.29
10.00	36.7	.27
10.50	32.9	.25
11.00	29.3	.23
11.50	26.0	.21
12.00	22.9	.20
12.50	20.0	.19
13.00	17.3	.18
13.50	14.8	.17
14.00	12.4	.16
14.50	10.1	.15
15.00	7.9	.15

Carico in sommita al palo = 400.00 kN

STAMPA DEI RISULTATI

prof. m	sforzo normale kN	cedimento mm
.00	398.1	3.13
.50	377.3	2.89
1.00	358.1	2.67
1.50	340.4	2.46
2.00	324.2	2.26
2.50	309.3	2.07
3.00	295.8	1.89
3.50	268.6	1.72
4.00	243.8	1.56
4.50	221.3	1.42
5.00	200.7	1.30
5.50	182.1	1.18
6.00	165.0	1.08
6.50	149.5	.98
7.00	135.4	.90
7.50	122.4	.82
8.00	110.6	.75
8.50	99.8	.69
9.00	89.9	.63
9.50	80.8	.58
10.00	72.5	.53
10.50	64.8	.49
11.00	57.7	.45
11.50	51.1	.42
12.00	45.0	.39
12.50	39.3	.37
13.00	33.9	.34
13.50	28.8	.33
14.00	24.0	.31
14.50	19.4	.30
15.00	14.9	.29

Carico in sommita al palo = 600.00 kN

STAMPA DEI RISULTATI

prof. m	sforzo normale kN	cedimento mm
.00	600.0	4.71

.50	568.7	4.36
1.00	539.7	4.02
1.50	513.0	3.71
2.00	488.5	3.40
2.50	466.1	3.12
3.00	445.7	2.84
3.50	404.7	2.59
4.00	367.4	2.35
4.50	333.4	2.14
5.00	302.5	1.95
5.50	274.3	1.78
6.00	248.6	1.62
6.50	225.2	1.48
7.00	203.9	1.35
7.50	184.4	1.23
8.00	166.5	1.13
8.50	150.2	1.03
9.00	135.3	.95
9.50	121.6	.87
10.00	109.0	.80
10.50	97.4	.74
11.00	86.6	.68
11.50	76.7	.63
12.00	67.4	.59
12.50	58.8	.55
13.00	50.6	.52
13.50	42.9	.49
14.00	35.6	.47
14.50	28.6	.45
15.00	21.8	.43

Carico in sommita al palo = 1000.00 kN

STAMPA DEI RISULTATI

prof. m	sforzo normale kN	cedimento mm
.00	994.4	8.16
.50	958.4	7.57
1.00	922.3	7.01
1.50	886.3	6.46
2.00	850.3	5.94
2.50	814.3	5.44
3.00	778.5	4.96
3.50	706.8	4.52
4.00	641.6	4.11
4.50	582.2	3.74
5.00	528.1	3.41
5.50	478.9	3.10
6.00	434.0	2.83
6.50	393.1	2.58
7.00	355.7	2.36
7.50	321.6	2.15
8.00	290.4	1.97
8.50	261.9	1.80
9.00	235.8	1.65
9.50	211.7	1.52
10.00	189.6	1.40
10.50	169.3	1.29
11.00	150.4	1.19
11.50	132.9	1.11
12.00	116.6	1.03
12.50	101.3	.97
13.00	87.0	.91
13.50	73.4	.86
14.00	60.4	.82
14.50	48.0	.79
15.00	35.9	.76

Carico in sommita al palo = 1200.00 kN

STAMPA DEI RISULTATI

prof. m	sforzo normale kN	cedimento mm
.00	1198.2	10.30
.50	1162.2	9.59
1.00	1126.2	8.90
1.50	1090.1	8.23
2.00	1054.1	7.59
2.50	1018.1	6.96
3.00	982.1	6.36
3.50	902.7	5.79
4.00	823.3	5.27
4.50	747.1	4.80
5.00	677.7	4.37
5.50	614.4	3.98
6.00	556.8	3.63
6.50	504.2	3.31
7.00	456.3	3.02
7.50	412.5	2.76
8.00	372.4	2.53
8.50	335.7	2.31
9.00	302.1	2.12
9.50	271.2	1.95
10.00	242.8	1.79
10.50	216.6	1.66
11.00	192.3	1.53
11.50	169.8	1.42
12.00	148.7	1.33
12.50	129.1	1.24
13.00	110.5	1.17
13.50	93.0	1.11
14.00	76.2	1.06
14.50	60.1	1.02
15.00	44.5	.99

Carico in sommita al palo = 1400.00 kN

STAMPA DEI RISULTATI

prof. m	sforzo normale kN	cedimento mm
.00	1387.2	12.57
.50	1351.2	11.74
1.00	1315.2	10.94
1.50	1279.2	10.16
2.00	1243.1	9.40
2.50	1207.1	8.66
3.00	1171.1	7.95
3.50	1091.7	7.27
4.00	1012.3	6.64
4.50	932.9	6.05
5.00	853.6	5.51
5.50	774.2	5.02
6.00	701.5	4.58
6.50	635.2	4.18
7.00	574.7	3.81
7.50	519.4	3.48
8.00	468.9	3.19
8.50	422.6	2.92
9.00	380.1	2.68
9.50	341.1	2.46
10.00	305.2	2.27
10.50	272.1	2.09
11.00	241.4	1.94
11.50	212.9	1.80
12.00	186.3	1.68
12.50	161.3	1.58
13.00	137.8	1.49
13.50	115.5	1.41
14.00	94.2	1.35
14.50	73.7	1.30

15.00	53.8	1.26

Carico in sommita al palo = 1500.00 kN

STAMPA DEI RISULTATI

prof. m	sforzo normale kN	cedimento mm
.00	1489.0	13.92
.50	1453.0	13.04
1.00	1416.9	12.17
1.50	1380.9	11.33
2.00	1344.9	10.51
2.50	1308.9	9.71
3.00	1272.8	8.94
3.50	1193.5	8.20
4.00	1114.1	7.50
4.50	1034.7	6.86
5.00	955.3	6.26
5.50	875.9	5.71
6.00	796.6	5.20
6.50	721.2	4.75
7.00	652.5	4.33
7.50	589.6	3.96
8.00	532.2	3.62
8.50	479.6	3.32
9.00	431.3	3.04
9.50	387.0	2.80
10.00	346.1	2.58
10.50	308.4	2.38
11.00	273.5	2.20
11.50	241.0	2.05
12.00	210.7	1.91
12.50	182.3	1.80
13.00	155.4	1.69
13.50	130.0	1.61
14.00	105.7	1.54
14.50	82.2	1.48
15.00	59.5	1.44

Carico in sommita al palo = 1600.00 kN

STAMPA DEI RISULTATI

prof. m	sforzo normale kN	cedimento mm
.00	1599.3	15.49
.50	1563.3	14.54
1.00	1527.2	13.61
1.50	1491.2	12.70
2.00	1455.2	11.81
2.50	1419.2	10.95
3.00	1383.1	10.10
3.50	1303.8	9.30
4.00	1224.4	8.54
4.50	1145.0	7.82
5.00	1065.6	7.16
5.50	986.2	6.54
6.00	906.9	5.97
6.50	827.5	5.45
7.00	748.5	4.97
7.50	676.4	4.55
8.00	610.4	4.16
8.50	549.9	3.81
9.00	494.4	3.50

9.50	443.5	3.21
10.00	396.5	2.96
10.50	353.1	2.74
11.00	312.9	2.53
11.50	275.6	2.36
12.00	240.7	2.20
12.50	207.9	2.07
13.00	177.0	1.95
13.50	147.6	1.85
14.00	119.5	1.77
14.50	92.4	1.71
15.00	66.1	1.66

Carico in sommita al palo = 1800.00 kN

STAMPA DEI RISULTATI

prof. m	sforzo normale kN	cedimento mm
.00	1788.9	18.47
.50	1752.9	17.40
1.00	1716.9	16.36
1.50	1680.9	15.34
2.00	1644.9	14.34
2.50	1608.8	13.36
3.00	1572.8	12.40
3.50	1493.4	11.48
4.00	1414.0	10.60
4.50	1334.7	9.77
5.00	1255.3	9.00
5.50	1175.9	8.26
6.00	1096.5	7.58
6.50	1017.2	6.94
7.00	937.8	6.36
7.50	858.4	5.82
8.00	779.0	5.32
8.50	701.6	4.88
9.00	630.5	4.48
9.50	565.2	4.12
10.00	504.9	3.80
10.50	449.3	3.51
11.00	397.6	3.25
11.50	349.6	3.03
12.00	304.7	2.83
12.50	262.5	2.66
13.00	222.6	2.52
13.50	184.7	2.39
14.00	148.3	2.29
14.50	113.2	2.21
15.00	79.0	2.16

STAMPA tabella carichi-cedimenti a testa palo

carico kN	cedimento mm
.7	.01
.7	.01
200.9	1.58
398.1	3.13
600.0	4.71
994.4	8.16
1198.2	10.30
1387.2	12.57
1489.0	13.92
1599.3	15.49
1788.9	18.47

```
STAMPA tabella carichi a testa palo-sforzi normali massimi

-------------------------------------------
  carico a     sforzo normale    profondita'
 testa palo       massimo       sf. massimo
     kN             kN              m
-------------------------------------------
       .7             .8           3.00
       .7             .8           3.00
    200.9          200.9            .00
    398.1          398.1            .00
    600.0          600.0            .00
    994.4          994.4            .00
   1198.2         1198.2            .00
   1387.2         1387.2            .00
   1489.0         1489.0            .00
   1599.3         1599.3            .00
   1788.9         1788.9            .00
-------------------------------------------
```

10.2 Micropali DP230mm integrativi di progetto

```
GRAVINA D230mm


Caratteristiche palo

Lunghezza                  =       15.00  m
Diametro                   =         .23  m
Modulo elastico            = 20000000.00  kPa
Peso di volume immerso     =        5.00  kN/m3


Carico in sommita al palo  =         .00  kN


Caratteristiche alla base del palo

Pressione limite specifica    =  5000.000  kPa
Parametro deformazione limite =      .200
   cedimento per press. lim.  =  .200 x D =   46. mm
Parametro forma curva         =      .090


Caratteristiche di adesione laterale

-----------------------------------
prof.    ades. limite      s. lim.
   m           kPa            mm
-----------------------------------
  .00         100.0          5.0
 3.00         100.0          5.0
 3.10         270.0          5.0
20.00         270.0          5.0
-----------------------------------


Definizione cedimenti del terreno

----------------------
prof.        cedimento
   m            mm
----------------------
----------------------


STAMPA DEI RISULTATI

---------------------------------------
prof.      sforzo normale    cedimento
  m              kN             mm
```

.00	-.2	.01
.50	-.1	.01
1.00	.0	.01
1.50	.0	.01
2.00	.1	.01
2.50	.1	.01
3.00	.2	.01
3.50	.2	.01
4.00	.2	.01
4.50	.1	.01
5.00	.1	.01
5.50	.1	.01
6.00	.1	.01
6.50	.1	.01
7.00	.1	.01
7.50	.1	.01
8.00	.1	.01
8.50	.1	.01
9.00	.1	.01
9.50	.1	.01
10.00	.1	.01
10.50	.1	.01
11.00	.1	.01
11.50	.1	.00
12.00	.1	.00
12.50	.2	.00
13.00	.2	.00
13.50	.2	.00
14.00	.2	.00
14.50	.2	.00
15.00	.2	.00

Carico in sommita al palo = 1.00 kN

STAMPA DEI RISULTATI

prof. m	sforzo normale kN	cedimento mm
.00	-.2	.01
.50	-.1	.01
1.00	.0	.01
1.50	.0	.01
2.00	.1	.01
2.50	.1	.01
3.00	.2	.01
3.50	.2	.01
4.00	.2	.01
4.50	.1	.01
5.00	.1	.01
5.50	.1	.01
6.00	.1	.01
6.50	.1	.01
7.00	.1	.01
7.50	.1	.01
8.00	.1	.01
8.50	.1	.01
9.00	.1	.01
9.50	.1	.01
10.00	.1	.01
10.50	.1	.01
11.00	.1	.01
11.50	.1	.00
12.00	.1	.00

12.50	.2	.00
13.00	.2	.00
13.50	.2	.00
14.00	.2	.00
14.50	.2	.00
15.00	.2	.00

Carico in sommita al palo = 200.00 kN

STAMPA DEI RISULTATI

prof. m	sforzo normale kN	cedimento mm
.00	200.2	1.51
.50	190.3	1.39
1.00	181.1	1.28
1.50	172.8	1.17
2.00	165.2	1.07
2.50	158.3	.97
3.00	152.0	.88
3.50	136.7	.79
4.00	122.9	.71
4.50	110.5	.64
5.00	99.3	.58
5.50	89.2	.52
6.00	80.1	.47
6.50	71.9	.43
7.00	64.5	.38
7.50	57.8	.35
8.00	51.7	.32
8.50	46.3	.29
9.00	41.3	.26
9.50	36.8	.24
10.00	32.7	.21
10.50	29.0	.20
11.00	25.6	.18
11.50	22.5	.17
12.00	19.6	.15
12.50	17.0	.14
13.00	14.5	.13
13.50	12.2	.12
14.00	10.0	.12
14.50	7.9	.11
15.00	5.9	.11

Carico in sommita al palo = 400.00 kN

STAMPA DEI RISULTATI

prof. m	sforzo normale kN	cedimento mm
.00	401.0	3.01
.50	381.1	2.77
1.00	362.8	2.55
1.50	346.0	2.34
2.00	330.7	2.13
2.50	316.8	1.94
3.00	304.2	1.75
3.50	273.6	1.58
4.00	245.9	1.42
4.50	221.1	1.28
5.00	198.6	1.15
5.50	178.4	1.04
6.00	160.2	.94
6.50	143.8	.85
7.00	129.0	.77
7.50	115.6	.69
8.00	103.5	.63
8.50	92.5	.57
9.00	82.6	.51
9.50	73.6	.47
10.00	65.4	.43
10.50	57.9	.39
11.00	51.1	.36
11.50	44.8	.33
12.00	39.0	.30
12.50	33.7	.28
13.00	28.7	.26
13.50	24.0	.25
14.00	19.6	.23
14.50	15.4	.22
15.00	11.3	.21

Carico in sommita al palo = 600.00 kN

STAMPA DEI RISULTATI

prof. m	sforzo normale kN	cedimento mm
.00	602.4	4.52
.50	572.4	4.16
1.00	544.9	3.83
1.50	519.7	3.51
2.00	496.6	3.20
2.50	475.7	2.91
3.00	456.8	2.63
3.50	410.8	2.37
4.00	369.3	2.13
4.50	331.9	1.92
5.00	298.3	1.73
5.50	267.9	1.56
6.00	240.6	1.41
6.50	215.9	1.27
7.00	193.6	1.15
7.50	173.5	1.04
8.00	155.3	.94
8.50	138.8	.85
9.00	123.9	.77
9.50	110.4	.70

10.00	98.0	.64
10.50	86.8	.58
11.00	76.5	.53
11.50	67.1	.49
12.00	58.4	.45
12.50	50.3	.42
13.00	42.8	.39
13.50	35.8	.37
14.00	29.1	.35
14.50	22.7	.33
15.00	16.6	.32

Carico in sommita al palo = 1000.00 kN

STAMPA DEI RISULTATI

prof. m	sforzo normale kN	cedimento mm
.00	1009.9	7.84
.50	973.9	7.24
1.00	937.9	6.66
1.50	901.9	6.11
2.00	865.8	5.58
2.50	829.8	5.07
3.00	796.8	4.58
3.50	716.5	4.12
4.00	644.1	3.71
4.50	578.9	3.35
5.00	520.2	3.02
5.50	467.2	2.72
6.00	419.5	2.45
6.50	376.4	2.21
7.00	337.5	2.00
7.50	302.4	1.81
8.00	270.6	1.63
8.50	241.9	1.48
9.00	215.8	1.34
9.50	192.1	1.22
10.00	170.6	1.11
10.50	150.9	1.01
11.00	132.9	.93
11.50	116.4	.85
12.00	101.2	.79
12.50	87.0	.73
13.00	73.8	.68
13.50	61.4	.64
14.00	49.7	.61
14.50	38.4	.58
15.00	27.6	.56

Carico in sommita al palo = 1200.00 kN

STAMPA DEI RISULTATI

prof. m	sforzo normale kN	cedimento mm
.00	1198.0	9.59
.50	1162.0	8.88
1.00	1126.0	8.19
1.50	1089.9	7.52
2.00	1053.9	6.88
2.50	1017.9	6.25
3.00	981.9	5.65
3.50	884.4	5.09

4.00	795.1	4.59
4.50	714.6	4.13
5.00	642.1	3.72
5.50	576.7	3.36
6.00	517.7	3.03
6.50	464.5	2.73
7.00	416.5	2.47
7.50	373.2	2.23
8.00	333.9	2.02
8.50	298.4	1.83
9.00	266.2	1.66
9.50	237.0	1.50
10.00	210.3	1.37
10.50	186.0	1.25
11.00	163.8	1.15
11.50	143.3	1.05
12.00	124.5	.97
12.50	107.0	.90
13.00	90.6	.84
13.50	75.2	.79
14.00	60.7	.75
14.50	46.7	.72
15.00	33.2	.70

Carico in sommita al palo = 1400.00 kN

STAMPA DEI RISULTATI

prof. m	sforzo normale kN	cedimento mm
.00	1401.8	11.71
.50	1365.8	10.88
1.00	1329.8	10.07
1.50	1293.8	9.28
2.00	1257.7	8.51
2.50	1221.7	7.77
3.00	1185.7	7.04
3.50	1088.2	6.36
4.00	990.8	5.73
4.50	893.4	5.16
5.00	802.7	4.65
5.50	720.9	4.20
6.00	647.2	3.78
6.50	580.7	3.41
7.00	520.6	3.08
7.50	466.3	2.79
8.00	417.3	2.52
8.50	372.8	2.28
9.00	332.5	2.07
9.50	295.9	1.88
10.00	262.6	1.71
10.50	232.2	1.56
11.00	204.3	1.43
11.50	178.7	1.32
12.00	155.0	1.22
12.50	133.0	1.13
13.00	112.5	1.06
13.50	93.2	1.00
14.00	74.9	.95
14.50	57.3	.91
15.00	40.3	.88

Carico in sommita al palo = 1500.00 kN

STAMPA DEI RISULTATI

prof. m	sforzo normale kN	cedimento mm
.00	1507.9	12.92
.50	1471.9	12.03
1.00	1435.9	11.15
1.50	1399.8	10.30
2.00	1363.8	9.47
2.50	1327.8	8.66
3.00	1291.8	7.87
3.50	1194.3	7.12
4.00	1096.9	6.43
4.50	999.4	5.80
5.00	902.0	5.23
5.50	810.1	4.72
6.00	727.2	4.25
6.50	652.5	3.84
7.00	585.0	3.47
7.50	524.0	3.13
8.00	468.8	2.83
8.50	418.8	2.57
9.00	373.5	2.33
9.50	332.3	2.12
10.00	294.8	1.93
10.50	260.6	1.76
11.00	229.3	1.61
11.50	200.4	1.48
12.00	173.8	1.37
12.50	149.0	1.27
13.00	125.9	1.19
13.50	104.1	1.12
14.00	83.5	1.07
14.50	63.7	1.02
15.00	44.5	.99

Carico in sommita al palo = 1600.00 kN

STAMPA DEI RISULTATI

prof. m	sforzo normale kN	cedimento mm
.00	1584.4	13.84
.50	1548.3	12.90
1.00	1512.3	11.98
1.50	1476.3	11.08
2.00	1440.3	10.20
2.50	1404.2	9.35
3.00	1368.2	8.51
3.50	1270.8	7.72
4.00	1173.3	6.98
4.50	1075.9	6.31
5.00	978.4	5.69
5.50	881.0	5.13
6.00	790.9	4.63
6.50	709.5	4.17
7.00	636.1	3.77
7.50	569.7	3.41
8.00	509.7	3.08
8.50	455.3	2.79
9.00	406.0	2.53

9.50	361.2	2.30
10.00	320.4	2.10
10.50	283.2	1.91
11.00	249.1	1.75
11.50	217.7	1.61
12.00	188.7	1.49
12.50	161.7	1.39
13.00	136.5	1.30
13.50	112.8	1.22
14.00	90.2	1.16
14.50	68.6	1.11
15.00	47.7	1.08

Carico in sommita al palo = 1800.00 kN

STAMPA DEI RISULTATI

prof. m	sforzo normale kN	cedimento mm
.00	1805.0	16.72
.50	1769.0	15.65
1.00	1733.0	14.59
1.50	1696.9	13.56
2.00	1660.9	12.55
2.50	1624.9	11.56
3.00	1588.9	10.59
3.50	1491.4	9.67
4.00	1394.0	8.80
4.50	1296.5	7.99
5.00	1199.1	7.24
5.50	1101.7	6.55
6.00	1004.2	5.91
6.50	906.8	5.34
7.00	812.8	4.82
7.50	727.9	4.36
8.00	651.1	3.94
8.50	581.5	3.57
9.00	518.4	3.24
9.50	461.0	2.95
10.00	408.8	2.68
10.50	361.0	2.45
11.00	317.3	2.25
11.50	277.0	2.07
12.00	239.8	1.91
12.50	205.1	1.78
13.00	172.7	1.67
13.50	142.1	1.57
14.00	113.1	1.50
14.50	85.2	1.44
15.00	58.1	1.39

STAMPA tabella carichi-cedimenti a testa palo

carico kN	cedimento mm
-.2	.01
-.2	.01
200.2	1.51
401.0	3.01
602.4	4.52
1009.9	7.84
1198.0	9.59
1401.8	11.71
1507.9	12.92
1584.4	13.84
1805.0	16.72

11. APPENDICE B: ANALISI DELLE PALIFICATE DI FONDAZIONE. TABULATI DI CALCOLO MAP

11.1 Pila P16 – Analisi SLV

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                M A P  -  Matrix Analysis of Piles
 Programma per l'analisi di palificate collegate da un plinto rigido

                (C)  G.Guiducci, S.G.I. - luglio 1994

                                                                  pag./  2

LINEA FS FERRANDINA MATERA
VI08 Pila P16 - Analisi SLV
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Geometria Palificata

palo	vin	X m	Y m	Z m	axz deg	ayz deg	axy deg	Box m	Boy m
1	0	3.750	5.400	.000	.00	.00	.00	.23	.00
2	0	2.250	5.400	.000	.00	.00	.00	.23	.00
3	0	.750	5.400	.000	.00	.00	.00	.23	.00
4	0	-.750	5.400	.000	.00	.00	.00	.23	.00
5	0	-2.250	5.400	.000	.00	.00	.00	.23	.00
6	0	-3.750	5.400	.000	.00	.00	.00	.23	.00
7	0	3.750	4.200	.000	.00	.00	.00	.23	.00
8	0	2.250	4.200	.000	.00	.00	.00	.23	.00
9	0	.750	4.200	.000	.00	.00	.00	.23	.00
10	0	-.750	4.200	.000	.00	.00	.00	.23	.00
11	0	-2.250	4.200	.000	.00	.00	.00	.23	.00
12	0	-3.750	4.200	.000	.00	.00	.00	.23	.00
13	0	3.750	3.000	.000	.00	.00	.00	.23	.00
14	0	2.250	3.000	.000	.00	.00	.00	.23	.00
15	0	.750	3.000	.000	.00	.00	.00	.23	.00
16	0	-.750	3.000	.000	.00	.00	.00	.23	.00
17	0	-2.250	3.000	.000	.00	.00	.00	.23	.00
18	0	-3.750	3.000	.000	.00	.00	.00	.23	.00
19	0	3.750	1.800	.000	.00	.00	.00	.23	.00
20	0	2.250	1.800	.000	.00	.00	.00	.23	.00
21	0	.750	1.800	.000	.00	.00	.00	.23	.00
22	0	-.750	1.800	.000	.00	.00	.00	.23	.00
23	0	-2.250	1.800	.000	.00	.00	.00	.23	.00
24	0	-3.750	1.800	.000	.00	.00	.00	.23	.00
25	0	3.750	.600	.000	.00	.00	.00	.23	.00
26	0	2.250	.600	.000	.00	.00	.00	.23	.00
27	0	-2.250	.600	.000	.00	.00	.00	.23	.00
28	0	-3.750	.600	.000	.00	.00	.00	.23	.00
29	0	.750	.000	.000	.00	.00	.00	.23	.00
30	0	-.750	.000	.000	.00	.00	.00	.23	.00
31	0	3.750	-.600	.000	.00	.00	.00	.23	.00
32	0	2.250	-.600	.000	.00	.00	.00	.23	.00
33	0	-2.250	-.600	.000	.00	.00	.00	.23	.00
34	0	-3.750	-.600	.000	.00	.00	.00	.23	.00
35	0	3.750	-1.800	.000	.00	.00	.00	.23	.00
36	0	2.250	-1.800	.000	.00	.00	.00	.23	.00
37	0	.750	-1.800	.000	.00	.00	.00	.23	.00
38	0	-.750	-1.800	.000	.00	.00	.00	.23	.00
39	0	-2.250	-1.800	.000	.00	.00	.00	.23	.00
40	0	-3.750	-1.800	.000	.00	.00	.00	.23	.00
41	0	3.750	-3.000	.000	.00	.00	.00	.23	.00
42	0	2.250	-3.000	.000	.00	.00	.00	.23	.00
43	0	.750	-3.000	.000	.00	.00	.00	.23	.00

44	0	-.750	-3.000	.000	.00	.00	.00	.23	.00
45	0	-2.250	-3.000	.000	.00	.00	.00	.23	.00
46	0	-3.750	-3.000	.000	.00	.00	.00	.23	.00
47	0	3.750	-4.200	.000	.00	.00	.00	.23	.00
48	0	2.250	-4.200	.000	.00	.00	.00	.23	.00
49	0	.750	-4.200	.000	.00	.00	.00	.23	.00
50	0	-.750	-4.200	.000	.00	.00	.00	.23	.00
51	0	-2.250	-4.200	.000	.00	.00	.00	.23	.00
52	0	-3.750	-4.200	.000	.00	.00	.00	.23	.00
53	0	3.750	-5.400	.000	.00	.00	.00	.23	.00
54	0	2.250	-5.400	.000	.00	.00	.00	.23	.00
55	0	.750	-5.400	.000	.00	.00	.00	.23	.00
56	0	-.750	-5.400	.000	.00	.00	.00	.23	.00
57	0	-2.250	-5.400	.000	.00	.00	.00	.23	.00
58	0	-3.750	-5.400	.000	.00	.00	.00	.23	.00
59	0	5.250	6.750	.000	.00	.00	.00	.23	.00
60	0	4.020	6.750	.000	.00	10.00	.00	.23	.00
61	0	2.870	6.750	.000	.00	.00	.00	.23	.00
62	0	1.720	6.750	.000	.00	10.00	.00	.23	.00
63	0	.570	6.750	.000	.00	.00	.00	.23	.00
64	0	-.570	6.750	.000	.00	.00	.00	.23	.00
65	0	-1.720	6.750	.000	.00	10.00	.00	.23	.00
66	0	-2.870	6.750	.000	.00	.00	.00	.23	.00
67	0	-4.020	6.750	.000	.00	10.00	.00	.23	.00
68	0	-5.250	6.750	.000	.00	.00	.00	.23	.00
69	0	5.250	5.400	.000	10.00	.00	.00	.23	.00
70	0	-5.250	5.400	.000	-10.00	.00	.00	.23	.00
71	0	5.250	4.200	.000	.00	.00	.00	.23	.00
72	0	-5.250	4.200	.000	.00	.00	.00	.23	.00
73	0	5.250	3.000	.000	10.00	.00	.00	.23	.00
74	0	-5.250	3.000	.000	-10.00	.00	.00	.23	.00
75	0	5.250	1.800	.000	.00	.00	.00	.23	.00
76	0	-5.250	1.800	.000	.00	.00	.00	.23	.00
77	0	5.250	.600	.000	10.00	.00	.00	.23	.00
78	0	-5.250	.600	.000	-10.00	.00	.00	.23	.00
79	0	5.250	-.600	.000	10.00	.00	.00	.23	.00
80	0	-5.250	-.600	.000	-10.00	.00	.00	.23	.00
81	0	5.250	-1.800	.000	.00	.00	.00	.23	.00
82	0	-5.250	-1.800	.000	.00	.00	.00	.23	.00
83	0	5.250	-3.000	.000	10.00	.00	.00	.23	.00
84	0	-5.250	-3.000	.000	-10.00	.00	.00	.23	.00
85	0	5.250	-4.200	.000	.00	.00	.00	.23	.00
86	0	-5.250	-4.200	.000	.00	.00	.00	.23	.00
87	0	5.250	-5.400	.000	10.00	.00	.00	.23	.00
88	0	-5.250	-5.400	.000	-10.00	.00	.00	.23	.00
89	0	5.250	-6.750	.000	.00	.00	.00	.23	.00
90	0	4.020	-6.750	.000	.00	-10.00	.00	.23	.00
91	0	2.870	-6.750	.000	.00	.00	.00	.23	.00
92	0	1.720	-6.750	.000	.00	-10.00	.00	.23	.00
93	0	.570	-6.750	.000	.00	.00	.00	.23	.00
94	0	-.570	-6.750	.000	.00	.00	.00	.23	.00
95	0	-1.720	-6.750	.000	.00	-10.00	.00	.23	.00
96	0	-2.870	-6.750	.000	.00	.00	.00	.23	.00
97	0	-4.020	-6.750	.000	.00	-10.00	.00	.23	.00
98	0	-5.250	-6.750	.000	.00	.00	.00	.23	.00

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vin = 0 - incastro; 1 - cerniera; 2 - appoggio
X, Y, Z = Coordinate testa pali
axz = Inclinazione palo nel piano Xp Z rispetto alla verticale
(positiva se verso Xp positivo)
ayz = Inclinazione palo nel piano Yp Z rispetto alla verticale
(positiva se verso Yp positivo)
axy = Rotazione assi Xp Yp (positiva se antioraria)
Box = Lato dell'elemento parallelo all'asse Xp
Boy = Lato dell'elemento parallelo all'asse Yp
se Boy = 0 D = Box: diametro
altrimenti D = sqr (Box * Boy * 1.273): diametro equivalente

Caratterizzazione dei pali soggetti a carichi assiali e torsionali

palo	AK kN/m	TK kN*m/rad
1	100000.	.0
2	100000.	.0
3	100000.	.0
4	100000.	.0
5	100000.	.0
6	100000.	.0
7	100000.	.0
8	100000.	.0
9	100000.	.0
10	100000.	.0
11	100000.	.0
12	100000.	.0
13	100000.	.0
14	100000.	.0
15	100000.	.0
16	100000.	.0
17	100000.	.0
18	100000.	.0
19	100000.	.0
20	100000.	.0
21	100000.	.0
22	100000.	.0
23	100000.	.0
24	100000.	.0
25	100000.	.0
26	100000.	.0
27	100000.	.0
28	100000.	.0
29	100000.	.0
30	100000.	.0
31	100000.	.0
32	100000.	.0
33	100000.	.0
34	100000.	.0
35	100000.	.0
36	100000.	.0
37	100000.	.0
38	100000.	.0
39	100000.	.0
40	100000.	.0
41	100000.	.0
42	100000.	.0
43	100000.	.0
44	100000.	.0
45	100000.	.0
46	100000.	.0
47	100000.	.0
48	100000.	.0
49	100000.	.0
50	100000.	.0
51	100000.	.0
52	100000.	.0
53	100000.	.0
54	100000.	.0
55	100000.	.0
56	100000.	.0
57	100000.	.0
58	100000.	.0
59	125000.	.0
60	125000.	.0
61	125000.	.0
62	125000.	.0
63	125000.	.0
64	125000.	.0
65	125000.	.0
66	125000.	.0

67	125000.	.0
68	125000.	.0
69	125000.	.0
70	125000.	.0
71	125000.	.0
72	125000.	.0
73	125000.	.0
74	125000.	.0
75	125000.	.0
76	125000.	.0
77	125000.	.0
78	125000.	.0
79	125000.	.0
80	125000.	.0
81	125000.	.0
82	125000.	.0
83	125000.	.0
84	125000.	.0
85	125000.	.0
86	125000.	.0
87	125000.	.0
88	125000.	.0
89	125000.	.0
90	125000.	.0
91	125000.	.0
92	125000.	.0
93	125000.	.0
94	125000.	.0
95	125000.	.0
96	125000.	.0
97	125000.	.0
98	125000.	.0

AK = Rigidezza assiale palo-terreno
TK = Rigidezza torsionale palo-terreno

Baricentro palificata: Xg = .000 m Yg = .000 m
Rotazione direzioni princip. di inerzia: .00 deg

Caratterizzazione del terreno per pali soggetti a carichi trasversali

Terreno tipo 1

Prof. m	E kN/m2
.00	23000.0
40.00	23000.0

Caratterizzazione dei pali soggetti a carichi trasversali
(uguali per tutti i pali)

palo	Lp m	EJx kN*m2	Itx	Ridx	EJy kN*m2	Ity	Ridy
1	15.00	6975.	1	1.000	6975.	1	1.000

Lp = Lunghezza palo (compreso eventuale tratto fuori terra)
EJ = Rigidezza flessionale del palo
It = Tipo di terreno
Rid = Moltiplicatore del modulo di reazione orizzontale

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VI08 Pila P16 - Analisi SLV

CONDIZIONE DI CARICO 1
VI08 - P16 - SLV_x

Coordinate Centri di Carico (c.c.)

c.c.	Xc m	Yc m	Zc m	Alfc deg
1	.000	.000	.000	.00
2	.000	.000	.000	.00

Componenti di Azioni Esterne riferite ai Centri di Carico

c.c.	Fzc kN	Fxc kN	Mxc kN*m	Fyc kN	Myc kN*m	Mzc kN*m
1	12943.6	5931.2	111451.8	1660.5	32037.1	2451.8
2	13395.0	.0	.0	.0	.0	.0

Componenti di Carico Risultanti (riferimento globale)

Fz kN	Fx kN	Mx kN*m	Fy kN	My kN*m	Mz kN*m
26338.6	5931.2	111451.8	1660.5	32037.1	2451.8

Punto di applic. carico verticale: Xv = 4.232 m Yv = 1.216 m

Componenti di Spostamento del Plinto (riferimento globale)

dz mm	dx mm	rx mRad	dy mm	ry mRad	rz mRad
2.453	2.517	.821	.713	.150	.033

Sollecitazioni in Sommita' ai Singoli Pali (riferimento locale)

palo	Fzp kN	Fxp kN	Mxp kN*m	Fyp kN	Myp kN*m	Mzp kN*m	Mris kN*m
1	634.4	46.1	-18.4	18.3	-8.5	.0	20.3
2	511.2	46.1	-18.4	17.1	-7.9	.0	20.1
3	388.0	46.1	-18.4	15.9	-7.3	.0	19.8
4	264.8	46.1	-18.4	14.7	-6.7	.0	19.6
5	141.6	46.1	-18.4	13.5	-6.0	.0	19.4
6	18.4	46.1	-18.4	12.3	-5.4	.0	19.2
7	616.3	47.1	-18.9	18.3	-8.5	.0	20.8
8	493.1	47.1	-18.9	17.1	-7.9	.0	20.5
9	369.9	47.1	-18.9	15.9	-7.3	.0	20.3
10	246.7	47.1	-18.9	14.7	-6.7	.0	20.1
11	123.5	47.1	-18.9	13.5	-6.0	.0	19.9
12	.3	47.1	-18.9	12.3	-5.4	.0	19.7
13	598.3	48.0	-19.4	18.3	-8.5	.0	21.2
14	475.1	48.0	-19.4	17.1	-7.9	.0	21.0

15	351.9	48.0	-19.4	15.9	-7.3	.0	20.8
16	228.7	48.0	-19.4	14.7	-6.7	.0	20.6
17	105.5	48.0	-19.4	13.5	-6.0	.0	20.4
18	-17.7	48.0	-19.4	12.3	-5.4	.0	20.2
19	580.3	49.0	-19.9	18.3	-8.5	.0	21.7
20	457.1	49.0	-19.9	17.1	-7.9	.0	21.5
21	333.9	49.0	-19.9	15.9	-7.3	.0	21.2
22	210.7	49.0	-19.9	14.7	-6.7	.0	21.0
23	87.5	49.0	-19.9	13.5	-6.0	.0	20.8
24	-35.7	49.0	-19.9	12.3	-5.4	.0	20.7
25	562.3	50.0	-20.4	18.3	-8.5	.0	22.2
26	439.1	50.0	-20.4	17.1	-7.9	.0	21.9
27	69.5	50.0	-20.4	13.5	-6.0	.0	21.3
28	-53.7	50.0	-20.4	12.3	-5.4	.0	21.1
29	306.9	50.4	-20.7	15.9	-7.3	.0	21.9
30	183.7	50.4	-20.7	14.7	-6.7	.0	21.7
31	544.2	50.9	-21.0	18.3	-8.5	.0	22.6
32	421.0	50.9	-21.0	17.1	-7.9	.0	22.4
33	51.4	50.9	-21.0	13.5	-6.0	.0	21.8
34	-71.8	50.9	-21.0	12.3	-5.4	.0	21.6
35	526.2	51.9	-21.5	18.3	-8.5	.0	23.1
36	403.0	51.9	-21.5	17.1	-7.9	.0	22.9
37	279.8	51.9	-21.5	15.9	-7.3	.0	22.7
38	156.6	51.9	-21.5	14.7	-6.7	.0	22.5
39	33.4	51.9	-21.5	13.5	-6.0	.0	22.3
40	-89.8	51.9	-21.5	12.3	-5.4	.0	22.1
41	508.2	52.9	-22.0	18.3	-8.5	.0	23.6
42	385.0	52.9	-22.0	17.1	-7.9	.0	23.3
43	261.8	52.9	-22.0	15.9	-7.3	.0	23.1
44	138.6	52.9	-22.0	14.7	-6.7	.0	22.9
45	15.4	52.9	-22.0	13.5	-6.0	.0	22.8
46	-107.8	52.9	-22.0	12.3	-5.4	.0	22.6
47	490.2	53.8	-22.5	18.3	-8.5	.0	24.0
48	367.0	53.8	-22.5	17.1	-7.9	.0	23.8
49	243.8	53.8	-22.5	15.9	-7.3	.0	23.6
50	120.6	53.8	-22.5	14.7	-6.7	.0	23.4
51	-2.6	53.8	-22.5	13.5	-6.0	.0	23.2
52	-125.8	53.8	-22.5	12.3	-5.4	.0	23.1
53	472.1	54.8	-23.0	18.3	-8.5	.0	24.5
54	348.9	54.8	-23.0	17.1	-7.9	.0	24.3
55	225.7	54.8	-23.0	15.9	-7.3	.0	24.1
56	102.5	54.8	-23.0	14.7	-6.7	.0	23.9
57	-20.7	54.8	-23.0	13.5	-6.0	.0	23.7
58	-143.9	54.8	-23.0	12.3	-5.4	.0	23.6
59	972.3	45.0	-17.9	19.5	-9.2	.0	20.1
60	851.6	45.1	-18.0	-10.1	6.3	.0	19.0
61	728.0	45.0	-17.9	17.6	-8.2	.0	19.7
62	617.4	45.1	-18.0	-4.0	3.1	.0	18.2
63	491.8	45.0	-17.9	15.8	-7.2	.0	19.3
64	374.8	45.0	-17.9	14.9	-6.7	.0	19.1
65	267.1	45.1	-18.0	5.1	-1.6	.0	18.0
66	138.6	45.0	-17.9	13.0	-5.8	.0	18.8
67	32.8	45.1	-18.0	11.2	-4.8	.0	18.6
68	-105.7	45.0	-17.9	11.1	-4.8	.0	18.5
69	983.3	13.5	-1.5	19.5	-9.1	.0	9.2
70	-179.8	40.9	-15.7	11.2	-4.9	.0	16.5
71	924.4	47.1	-18.9	19.5	-9.2	.0	21.0
72	-153.6	47.1	-18.9	11.1	-4.8	.0	19.5
73	940.7	16.9	-3.2	19.5	-9.1	.0	9.7
74	-225.9	41.2	-15.9	11.2	-4.9	.0	16.6
75	879.4	49.0	-19.9	19.5	-9.2	.0	21.9
76	-198.6	49.0	-19.9	11.1	-4.8	.0	20.5
77	898.0	20.3	-5.0	19.5	-9.1	.0	10.4
78	-272.0	41.6	-16.1	11.2	-4.9	.0	16.8
79	876.7	22.0	-5.9	19.5	-9.1	.0	10.9
80	-295.1	41.8	-16.2	11.2	-4.9	.0	16.9
81	811.8	51.9	-21.5	19.5	-9.2	.0	23.3
82	-266.2	51.9	-21.5	11.1	-4.8	.0	22.0
83	834.1	25.4	-7.7	19.5	-9.1	.0	11.9
84	-341.2	42.2	-16.4	11.2	-4.9	.0	17.1
85	766.7	53.8	-22.5	19.5	-9.2	.0	24.3
86	-311.3	53.8	-22.5	11.1	-4.8	.0	23.0
87	791.4	28.8	-9.5	19.5	-9.1	.0	13.1
88	-387.3	42.6	-16.6	11.2	-4.9	.0	17.3
89	718.8	55.9	-23.5	19.5	-9.2	.0	25.2
90	565.2	56.1	-23.8	38.1	-18.8	.0	30.3

91	474.5	55.9	-23.5	17.6	-8.2	.0	24.9
92	334.3	56.1	-23.8	28.4	-13.8	.0	27.5
93	238.4	55.9	-23.5	15.8	-7.2	.0	24.6
94	121.3	55.9	-23.5	14.9	-6.7	.0	24.5
95	-11.0	56.1	-23.8	13.8	-6.2	.0	24.6
96	-114.8	55.9	-23.5	13.0	-5.8	.0	24.2
97	-241.9	56.1	-23.8	4.1	-1.1	.0	23.8
98	-359.2	55.9	-23.5	11.1	-4.8	.0	24.0

Mris = (Mxp^2 + Myp^2)^0.5

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CONDIZIONE DI CARICO 2
VI08 - P16 - SLV_x

Coordinate Centri di Carico (c.c.)

c.c.	Xc m	Yc m	Zc m	Alfc deg
1	.000	.000	.000	.00
2	.000	.000	.000	.00

Componenti di Azioni Esterne riferite ai Centri di Carico

c.c.	Fzc kN	Fxc kN	Mxc kN*m	Fyc kN	Myc kN*m	Mzc kN*m
1	11478.9	-5931.2	-111451.8	-1660.5	-32037.1	-2451.8
2	13395.0	.0	.0	.0	.0	.0

Componenti di Carico Risultanti (riferimento globale)

Fz kN	Fx kN	Mx kN*m	Fy kN	My kN*m	Mz kN*m
24873.9	-5931.2	-111451.8	-1660.5	-32037.1	-2451.8

Punto di applic. carico verticale: Xv = -4.481 m Yv = -1.288 m

Componenti di Spostamento del Plinto (riferimento globale)

dz mm	dx mm	rx mRad	dy mm	ry mRad	rz mRad
2.316	-2.517	-.821	-.713	-.150	-.033

Sollecitazioni in Sommita' ai Singoli Pali (riferimento locale)

palo	Fzp kN	Fxp kN	Mxp kN*m	Fyp kN	Myp kN*m	Mzp kN*m	Mris kN*m
1	-157.5	-46.1	18.4	-18.3	8.5	.0	20.3
2	-34.3	-46.1	18.4	-17.1	7.9	.0	20.1
3	88.9	-46.1	18.4	-15.9	7.3	.0	19.8
4	212.1	-46.1	18.4	-14.7	6.7	.0	19.6
5	335.3	-46.1	18.4	-13.5	6.0	.0	19.4
6	458.5	-46.1	18.4	-12.3	5.4	.0	19.2
7	-139.5	-47.1	18.9	-18.3	8.5	.0	20.8
8	-16.3	-47.1	18.9	-17.1	7.9	.0	20.5
9	106.9	-47.1	18.9	-15.9	7.3	.0	20.3
10	230.1	-47.1	18.9	-14.7	6.7	.0	20.1
11	353.3	-47.1	18.9	-13.5	6.0	.0	19.9
12	476.5	-47.1	18.9	-12.3	5.4	.0	19.7
13	-121.4	-48.0	19.4	-18.3	8.5	.0	21.2
14	1.8	-48.0	19.4	-17.1	7.9	.0	21.0

15	125.0	-48.0	19.4	-15.9	7.3	.0	20.8
16	248.2	-48.0	19.4	-14.7	6.7	.0	20.6
17	371.4	-48.0	19.4	-13.5	6.0	.0	20.4
18	494.6	-48.0	19.4	-12.3	5.4	.0	20.2
19	-103.4	-49.0	19.9	-18.3	8.5	.0	21.7
20	19.8	-49.0	19.9	-17.1	7.9	.0	21.5
21	143.0	-49.0	19.9	-15.9	7.3	.0	21.2
22	266.2	-49.0	19.9	-14.7	6.7	.0	21.0
23	389.4	-49.0	19.9	-13.5	6.0	.0	20.8
24	512.6	-49.0	19.9	-12.3	5.4	.0	20.7
25	-85.4	-50.0	20.4	-18.3	8.5	.0	22.2
26	37.8	-50.0	20.4	-17.1	7.9	.0	21.9
27	407.4	-50.0	20.4	-13.5	6.0	.0	21.3
28	530.6	-50.0	20.4	-12.3	5.4	.0	21.1
29	170.0	-50.4	20.7	-15.9	7.3	.0	21.9
30	293.2	-50.4	20.7	-14.7	6.7	.0	21.7
31	-67.4	-50.9	21.0	-18.3	8.5	.0	22.6
32	55.8	-50.9	21.0	-17.1	7.9	.0	22.4
33	425.4	-50.9	21.0	-13.5	6.0	.0	21.8
34	548.6	-50.9	21.0	-12.3	5.4	.0	21.6
35	-49.3	-51.9	21.5	-18.3	8.5	.0	23.1
36	73.9	-51.9	21.5	-17.1	7.9	.0	22.9
37	197.1	-51.9	21.5	-15.9	7.3	.0	22.7
38	320.3	-51.9	21.5	-14.7	6.7	.0	22.5
39	443.5	-51.9	21.5	-13.5	6.0	.0	22.3
40	566.7	-51.9	21.5	-12.3	5.4	.0	22.1
41	-31.3	-52.9	22.0	-18.3	8.5	.0	23.6
42	91.9	-52.9	22.0	-17.1	7.9	.0	23.3
43	215.1	-52.9	22.0	-15.9	7.3	.0	23.1
44	338.3	-52.9	22.0	-14.7	6.7	.0	22.9
45	461.5	-52.9	22.0	-13.5	6.0	.0	22.8
46	584.7	-52.9	22.0	-12.3	5.4	.0	22.6
47	-13.3	-53.8	22.5	-18.3	8.5	.0	24.0
48	109.9	-53.8	22.5	-17.1	7.9	.0	23.8
49	233.1	-53.8	22.5	-15.9	7.3	.0	23.6
50	356.3	-53.8	22.5	-14.7	6.7	.0	23.4
51	479.5	-53.8	22.5	-13.5	6.0	.0	23.2
52	602.7	-53.8	22.5	-12.3	5.4	.0	23.1
53	4.7	-54.8	23.0	-18.3	8.5	.0	24.5
54	127.9	-54.8	23.0	-17.1	7.9	.0	24.3
55	251.1	-54.8	23.0	-15.9	7.3	.0	24.1
56	374.3	-54.8	23.0	-14.7	6.7	.0	23.9
57	497.5	-54.8	23.0	-13.5	6.0	.0	23.7
58	620.7	-54.8	23.0	-12.3	5.4	.0	23.6
59	-376.2	-45.0	17.9	-19.5	9.2	.0	20.1
60	-264.5	-45.1	18.0	-9.9	4.1	.0	18.4
61	-131.9	-45.0	17.9	-17.6	8.2	.0	19.7
62	-30.3	-45.1	18.0	-16.0	7.3	.0	19.4
63	104.3	-45.0	17.9	-15.8	7.2	.0	19.3
64	221.3	-45.0	17.9	-14.9	6.7	.0	19.1
65	320.0	-45.1	18.0	-25.1	12.0	.0	21.6
66	457.4	-45.0	17.9	-13.0	5.8	.0	18.8
67	554.2	-45.1	18.0	-31.2	15.2	.0	23.5
68	701.8	-45.0	17.9	-11.1	4.8	.0	18.5
69	-396.3	-33.5	11.9	-19.5	9.1	.0	15.0
70	766.8	-20.9	5.3	-11.2	4.9	.0	7.2
71	-328.3	-47.1	18.9	-19.5	9.2	.0	21.0
72	749.7	-47.1	18.9	-11.1	4.8	.0	19.5
73	-353.6	-36.9	13.6	-19.5	9.1	.0	16.4
74	812.9	-21.3	5.5	-11.2	4.9	.0	7.4
75	-283.3	-49.0	19.9	-19.5	9.2	.0	21.9
76	794.7	-49.0	19.9	-11.1	4.8	.0	20.5
77	-311.0	-40.3	15.4	-19.5	9.1	.0	17.9
78	859.0	-21.6	5.7	-11.2	4.9	.0	7.5
79	-289.7	-42.0	16.3	-19.5	9.1	.0	18.7
80	882.1	-21.8	5.8	-11.2	4.9	.0	7.6
81	-215.7	-51.9	21.5	-19.5	9.2	.0	23.3
82	862.3	-51.9	21.5	-11.1	4.8	.0	22.0
83	-247.0	-45.4	18.1	-19.5	9.1	.0	20.2
84	928.2	-22.2	6.0	-11.2	4.9	.0	7.7
85	-170.6	-53.8	22.5	-19.5	9.2	.0	24.3
86	907.4	-53.8	22.5	-11.1	4.8	.0	23.0
87	-204.4	-48.8	19.9	-19.5	9.1	.0	21.8
88	974.3	-22.6	6.2	-11.2	4.9	.0	7.9
89	-122.7	-55.9	23.5	-19.5	9.2	.0	25.2
90	21.9	-56.1	23.8	-18.1	8.4	.0	25.2

91	121.6	-55.9	23.5	-17.6	8.2	.0	24.9
92	252.8	-56.1	23.8	-8.4	3.4	.0	24.0
93	357.7	-55.9	23.5	-15.8	7.2	.0	24.6
94	474.8	-55.9	23.5	-14.9	6.7	.0	24.5
95	598.1	-56.1	23.8	6.2	-4.2	.0	24.1
96	710.9	-55.9	23.5	-13.0	5.8	.0	24.2
97	829.0	-56.1	23.8	15.9	-9.3	.0	25.5
98	955.3	-55.9	23.5	-11.1	4.8	.0	24.0

Mris = (Mxp^2 + Myp^2)^0.5

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VI08 Pila P16 - Analisi SLV

CONDIZIONE DI CARICO 3
VI08 - P16 - SLV_y

Coordinate Centri di Carico (c.c.)

c.c.	Xc m	Yc m	Zc m	Alfc deg
1	.000	.000	.000	.00
2	.000	.000	.000	.00

Componenti di Azioni Esterne riferite ai Centri di Carico

c.c.	Fzc kN	Fxc kN	Mxc kN*m	Fyc kN	Myc kN*m	Mzc kN*m
1	12886.1	1780.5	33441.1	5535.0	106789.6	8172.4
2	13395.0	.0	.0	.0	.0	.0

Componenti di Carico Risultanti (riferimento globale)

Fz kN	Fx kN	Mx kN*m	Fy kN	My kN*m	Mz kN*m
26281.1	1780.5	33441.1	5535.0	106789.6	8172.4

Punto di applic. carico verticale: Xv = 1.272 m Yv = 4.063 m

Componenti di Spostamento del Plinto (riferimento globale)

dz mm	dx mm	rx mRad	dy mm	ry mRad	rz mRad
2.447	.756	.246	2.378	.501	.111

Sollecitazioni in Sommita' ai Singoli Pali (riferimento locale)

palo	Fzp kN	Fxp kN	Mxp kN*m	Fyp kN	Myp kN*m	Mzp kN*m	Mris kN*m
1	607.5	.7	1.3	61.2	-28.4	.0	28.5
2	570.5	.7	1.3	57.1	-26.3	.0	26.4
3	533.6	.7	1.3	53.1	-24.3	.0	24.3
4	496.6	.7	1.3	49.1	-22.2	.0	22.2
5	459.6	.7	1.3	45.1	-20.1	.0	20.1
6	422.7	.7	1.3	41.1	-18.0	.0	18.0
7	547.4	3.9	-.4	61.2	-28.4	.0	28.4
8	510.5	3.9	-.4	57.1	-26.3	.0	26.3
9	473.5	3.9	-.4	53.1	-24.3	.0	24.3
10	436.5	3.9	-.4	49.1	-22.2	.0	22.2
11	399.6	3.9	-.4	45.1	-20.1	.0	20.1
12	362.6	3.9	-.4	41.1	-18.0	.0	18.0
13	487.3	7.1	-2.0	61.2	-28.4	.0	28.5
14	450.4	7.1	-2.0	57.1	-26.3	.0	26.4

15	413.4	7.1	-2.0	53.1	-24.3	.0	24.3
16	376.4	7.1	-2.0	49.1	-22.2	.0	22.3
17	339.5	7.1	-2.0	45.1	-20.1	.0	20.2
18	302.5	7.1	-2.0	41.1	-18.0	.0	18.1
19	427.3	10.3	-3.7	61.2	-28.4	.0	28.7
20	390.3	10.3	-3.7	57.1	-26.3	.0	26.6
21	353.3	10.3	-3.7	53.1	-24.3	.0	24.5
22	316.4	10.3	-3.7	49.1	-22.2	.0	22.5
23	279.4	10.3	-3.7	45.1	-20.1	.0	20.4
24	242.4	10.3	-3.7	41.1	-18.0	.0	18.4
25	367.2	13.5	-5.4	61.2	-28.4	.0	28.9
26	330.2	13.5	-5.4	57.1	-26.3	.0	26.9
27	219.3	13.5	-5.4	45.1	-20.1	.0	20.8
28	182.3	13.5	-5.4	41.1	-18.0	.0	18.8
29	263.2	15.1	-6.2	53.1	-24.3	.0	25.0
30	226.2	15.1	-6.2	49.1	-22.2	.0	23.0
31	307.1	16.8	-7.1	61.2	-28.4	.0	29.3
32	270.1	16.8	-7.1	57.1	-26.3	.0	27.3
33	159.2	16.8	-7.1	45.1	-20.1	.0	21.3
34	122.3	16.8	-7.1	41.1	-18.0	.0	19.3
35	247.0	20.0	-8.7	61.2	-28.4	.0	29.7
36	210.1	20.0	-8.7	57.1	-26.3	.0	27.8
37	173.1	20.0	-8.7	53.1	-24.3	.0	25.8
38	136.1	20.0	-8.7	49.1	-22.2	.0	23.8
39	99.2	20.0	-8.7	45.1	-20.1	.0	21.9
40	62.2	20.0	-8.7	41.1	-18.0	.0	20.0
41	186.9	23.2	-10.4	61.2	-28.4	.0	30.3
42	150.0	23.2	-10.4	57.1	-26.3	.0	28.3
43	113.0	23.2	-10.4	53.1	-24.3	.0	26.4
44	76.0	23.2	-10.4	49.1	-22.2	.0	24.5
45	39.1	23.2	-10.4	45.1	-20.1	.0	22.6
46	2.1	23.2	-10.4	41.1	-18.0	.0	20.8
47	126.9	26.4	-12.1	61.2	-28.4	.0	30.9
48	89.9	26.4	-12.1	57.1	-26.3	.0	29.0
49	52.9	26.4	-12.1	53.1	-24.3	.0	27.1
50	16.0	26.4	-12.1	49.1	-22.2	.0	25.2
51	-21.0	26.4	-12.1	45.1	-20.1	.0	23.4
52	-58.0	26.4	-12.1	41.1	-18.0	.0	21.7
53	66.8	29.6	-13.7	61.2	-28.4	.0	31.6
54	29.8	29.6	-13.7	57.1	-26.3	.0	29.7
55	-7.2	29.6	-13.7	53.1	-24.3	.0	27.9
56	-44.1	29.6	-13.7	49.1	-22.2	.0	26.1
57	-81.1	29.6	-13.7	45.1	-20.1	.0	24.3
58	-118.1	29.6	-13.7	41.1	-18.0	.0	22.6
59	890.1	-2.9	3.2	65.2	-30.5	.0	30.7
60	900.5	-3.1	3.4	32.3	-13.4	.0	13.8
61	816.8	-2.9	3.2	58.8	-27.2	.0	27.4
62	825.2	-3.1	3.4	28.6	-11.5	.0	12.0
63	745.9	-2.9	3.2	52.6	-24.0	.0	24.2
64	710.8	-2.9	3.2	49.6	-22.4	.0	22.6
65	712.6	-3.1	3.4	23.1	-8.6	.0	9.3
66	639.9	-2.9	3.2	43.4	-19.2	.0	19.5
67	637.3	-3.1	3.4	19.4	-6.7	.0	7.5
68	566.6	-2.9	3.2	37.1	-15.9	.0	16.2
69	796.7	-26.4	15.4	65.0	-30.4	.0	34.0
70	471.4	16.8	-7.1	37.4	-16.3	.0	17.7
71	730.5	3.9	-.4	65.2	-30.5	.0	30.5
72	407.0	3.9	-.4	37.1	-15.9	.0	15.9
73	654.6	-15.0	9.5	65.0	-30.4	.0	31.8
74	317.7	18.1	-7.7	37.4	-16.3	.0	18.0
75	580.3	10.3	-3.7	65.2	-30.5	.0	30.7
76	256.8	10.3	-3.7	37.1	-15.9	.0	16.3
77	512.5	-3.7	3.6	65.0	-30.4	.0	30.6
78	164.0	19.4	-8.4	37.4	-16.3	.0	18.3
79	441.4	2.0	.6	65.0	-30.4	.0	30.4
80	87.2	20.0	-8.8	37.4	-16.3	.0	18.5
81	355.0	20.0	-8.7	65.2	-30.5	.0	31.7
82	31.5	20.0	-8.7	37.1	-15.9	.0	18.1
83	299.3	13.4	-5.3	65.0	-30.4	.0	30.8
84	-66.5	21.3	-9.4	37.4	-16.3	.0	18.8
85	204.8	26.4	-12.1	65.2	-30.5	.0	32.8
86	-118.7	26.4	-12.1	37.1	-15.9	.0	20.0
87	157.1	24.8	-11.2	65.0	-30.4	.0	32.4
88	-220.2	22.6	-10.1	37.4	-16.3	.0	19.1
89	45.2	33.2	-15.6	65.2	-30.5	.0	34.3
90	-54.1	33.5	-15.9	61.1	-28.4	.0	32.6

91	-28.1	33.2	-15.6	58.8	-27.2	.0	31.4
92	-118.3	33.5	-15.9	52.6	-24.0	.0	28.8
93	-99.0	33.2	-15.6	52.6	-24.0	.0	28.6
94	-134.1	33.2	-15.6	49.6	-22.4	.0	27.3
95	-214.4	33.5	-15.9	40.0	-17.4	.0	23.6
96	-204.9	33.2	-15.6	43.4	-19.2	.0	24.8
97	-278.7	33.5	-15.9	31.6	-13.0	.0	20.6
98	-278.3	33.2	-15.6	37.1	-15.9	.0	22.3

Mris = (Mxp^2 + Myp^2)^0.5

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VI08 Pila P16 - Analisi SLV

CONDIZIONE DI CARICO 4
VI08 - P16 - SLV_y

Coordinate Centri di Carico (c.c.)

c.c.	Xc m	Yc m	Zc m	Alfc deg
1	.000	.000	.000	.00
2	.000	.000	.000	.00

Componenti di Azioni Esterne riferite ai Centri di Carico

c.c.	Fzc kN	Fxc kN	Mxc kN*m	Fyc kN	Myc kN*m	Mzc kN*m
1	11536.4	-1780.5	-33441.1	-5535.0	-106789.6	-8172.4
2	13395.0	.0	.0	.0	.0	.0

Componenti di Carico Risultanti (riferimento globale)

Fz kN	Fx kN	Mx kN*m	Fy kN	My kN*m	Mz kN*m
24931.4	-1780.5	-33441.1	-5535.0	-106789.6	-8172.4

Punto di applic. carico verticale: Xv = -1.341 m Yv = -4.283 m

Componenti di Spostamento del Plinto (riferimento globale)

dz mm	dx mm	rx mRad	dy mm	ry mRad	rz mRad
2.322	-.756	-.246	-2.378	-.501	-.111

Sollecitazioni in Sommita' ai Singoli Pali (riferimento locale)

palo	Fzp kN	Fxp kN	Mxp kN*m	Fyp kN	Myp kN*m	Mzp kN*m	Mris kN*m
1	-130.6	-.7	-1.3	-61.2	28.4	.0	28.5
2	-93.7	-.7	-1.3	-57.1	26.3	.0	26.4
3	-56.7	-.7	-1.3	-53.1	24.3	.0	24.3
4	-19.7	-.7	-1.3	-49.1	22.2	.0	22.2
5	17.2	-.7	-1.3	-45.1	20.1	.0	20.1
6	54.2	-.7	-1.3	-41.1	18.0	.0	18.0
7	-70.5	-3.9	.4	-61.2	28.4	.0	28.4
8	-33.6	-3.9	.4	-57.1	26.3	.0	26.3
9	3.4	-3.9	.4	-53.1	24.3	.0	24.3
10	40.4	-3.9	.4	-49.1	22.2	.0	22.2
11	77.3	-3.9	.4	-45.1	20.1	.0	20.1
12	114.3	-3.9	.4	-41.1	18.0	.0	18.0
13	-10.5	-7.1	2.0	-61.2	28.4	.0	28.5
14	26.5	-7.1	2.0	-57.1	26.3	.0	26.4

15	63.5	-7.1	2.0	-53.1	24.3	.0	24.3
16	100.4	-7.1	2.0	-49.1	22.2	.0	22.3
17	137.4	-7.1	2.0	-45.1	20.1	.0	20.2
18	174.4	-7.1	2.0	-41.1	18.0	.0	18.1
19	49.6	-10.3	3.7	-61.2	28.4	.0	28.7
20	86.6	-10.3	3.7	-57.1	26.3	.0	26.6
21	123.6	-10.3	3.7	-53.1	24.3	.0	24.5
22	160.5	-10.3	3.7	-49.1	22.2	.0	22.5
23	197.5	-10.3	3.7	-45.1	20.1	.0	20.4
24	234.4	-10.3	3.7	-41.1	18.0	.0	18.4
25	109.7	-13.5	5.4	-61.2	28.4	.0	28.9
26	146.7	-13.5	5.4	-57.1	26.3	.0	26.9
27	257.6	-13.5	5.4	-45.1	20.1	.0	20.8
28	294.5	-13.5	5.4	-41.1	18.0	.0	18.8
29	213.7	-15.1	6.2	-53.1	24.3	.0	25.0
30	250.6	-15.1	6.2	-49.1	22.2	.0	23.0
31	169.8	-16.8	7.1	-61.2	28.4	.0	29.3
32	206.7	-16.8	7.1	-57.1	26.3	.0	27.3
33	317.6	-16.8	7.1	-45.1	20.1	.0	21.3
34	354.6	-16.8	7.1	-41.1	18.0	.0	19.3
35	229.9	-20.0	8.7	-61.2	28.4	.0	29.7
36	266.8	-20.0	8.7	-57.1	26.3	.0	27.8
37	303.8	-20.0	8.7	-53.1	24.3	.0	25.8
38	340.8	-20.0	8.7	-49.1	22.2	.0	23.8
39	377.7	-20.0	8.7	-45.1	20.1	.0	21.9
40	414.7	-20.0	8.7	-41.1	18.0	.0	20.0
41	289.9	-23.2	10.4	-61.2	28.4	.0	30.3
42	326.9	-23.2	10.4	-57.1	26.3	.0	28.3
43	363.9	-23.2	10.4	-53.1	24.3	.0	26.4
44	400.8	-23.2	10.4	-49.1	22.2	.0	24.5
45	437.8	-23.2	10.4	-45.1	20.1	.0	22.6
46	474.8	-23.2	10.4	-41.1	18.0	.0	20.8
47	350.0	-26.4	12.1	-61.2	28.4	.0	30.9
48	387.0	-26.4	12.1	-57.1	26.3	.0	29.0
49	424.0	-26.4	12.1	-53.1	24.3	.0	27.1
50	460.9	-26.4	12.1	-49.1	22.2	.0	25.2
51	497.9	-26.4	12.1	-45.1	20.1	.0	23.4
52	534.9	-26.4	12.1	-41.1	18.0	.0	21.7
53	410.1	-29.6	13.7	-61.2	28.4	.0	31.6
54	447.1	-29.6	13.7	-57.1	26.3	.0	29.7
55	484.0	-29.6	13.7	-53.1	24.3	.0	27.9
56	521.0	-29.6	13.7	-49.1	22.2	.0	26.1
57	558.0	-29.6	13.7	-45.1	20.1	.0	24.3
58	594.9	-29.6	13.7	-41.1	18.0	.0	22.6
59	-294.0	2.9	-3.2	-65.2	30.5	.0	30.7
60	-313.5	3.1	-3.4	-52.2	23.8	.0	24.0
61	-220.7	2.9	-3.2	-58.8	27.2	.0	27.4
62	-238.2	3.1	-3.4	-48.6	21.9	.0	22.1
63	-149.8	2.9	-3.2	-52.6	24.0	.0	24.2
64	-114.7	2.9	-3.2	-49.6	22.4	.0	22.6
65	-125.5	3.1	-3.4	-43.0	19.0	.0	19.3
66	-43.8	2.9	-3.2	-43.4	19.2	.0	19.5
67	-50.2	3.1	-3.4	-39.4	17.1	.0	17.4
68	29.5	2.9	-3.2	-37.1	15.9	.0	16.2
69	-209.7	6.4	-5.0	-65.0	30.4	.0	30.8
70	115.6	3.2	-3.3	-37.4	16.3	.0	16.6
71	-134.4	-3.9	.4	-65.2	30.5	.0	30.5
72	189.1	-3.9	.4	-37.1	15.9	.0	15.9
73	-67.6	-5.0	.9	-65.0	30.4	.0	30.4
74	269.3	1.9	-2.7	-37.4	16.3	.0	16.5
75	15.8	-10.3	3.7	-65.2	30.5	.0	30.7
76	339.3	-10.3	3.7	-37.1	15.9	.0	16.3
77	74.6	-16.3	6.8	-65.0	30.4	.0	31.1
78	423.0	.6	-2.0	-37.4	16.3	.0	16.4
79	145.6	-22.0	9.8	-65.0	30.4	.0	31.9
80	499.9	.0	-1.6	-37.4	16.3	.0	16.3
81	241.1	-20.0	8.7	-65.2	30.5	.0	31.7
82	564.6	-20.0	8.7	-37.1	15.9	.0	18.1
83	287.8	-33.4	15.7	-65.0	30.4	.0	34.2
84	653.6	-1.3	-1.0	-37.4	16.3	.0	16.3
85	391.3	-26.4	12.1	-65.2	30.5	.0	32.8
86	714.8	-26.4	12.1	-37.1	15.9	.0	20.0
87	429.9	-44.7	21.6	-65.0	30.4	.0	37.3
88	807.3	-2.6	-.3	-37.4	16.3	.0	16.3
89	550.9	-33.2	15.6	-65.2	30.5	.0	34.3
90	641.1	-33.5	15.9	-41.1	18.0	.0	24.0

91	624.2	-33.2	15.6	-58.8	27.2	.0	31.4
92	705.4	-33.5	15.9	-32.7	13.6	.0	20.9
93	695.1	-33.2	15.6	-52.6	24.0	.0	28.6
94	730.2	-33.2	15.6	-49.6	22.4	.0	27.3
95	801.5	-33.5	15.9	-20.0	7.0	.0	17.4
96	801.0	-33.2	15.6	-43.4	19.2	.0	24.8
97	865.7	-33.5	15.9	-11.6	2.6	.0	16.1
98	874.4	-33.2	15.6	-37.1	15.9	.0	22.3

Mris = (Mxp^2 + Myp^2)^0.5

11.2 Pila P17-P20 – Analisi SLV

M A P - Matrix Analysis of Piles
Programma per l'analisi di palificate collegate da un plinto rigido

(C) G.Guiducci, S.G.I. - luglio 1994

pag./ 2

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VI08 Pile P17-P20 - Analisi SLV

Geometria Palificata

palo	vin	X m	Y m	Z m	axz deg	ayz deg	axy deg	Box m	Boy m
1	0	3.900	5.500	.000	.00	.00	.00	.23	.00
2	0	2.600	5.500	.000	.00	.00	.00	.23	.00
3	0	1.300	5.500	.000	.00	.00	.00	.23	.00
4	0	.000	5.500	.000	.00	.00	.00	.23	.00
5	0	-1.300	5.500	.000	.00	.00	.00	.23	.00
6	0	-2.600	5.500	.000	.00	.00	.00	.23	.00
7	0	-3.900	5.500	.000	.00	.00	.00	.23	.00
8	0	3.900	4.400	.000	.00	.00	.00	.23	.00
9	0	2.600	4.400	.000	.00	.00	.00	.23	.00
10	0	1.300	4.400	.000	.00	.00	.00	.23	.00
11	0	.000	4.400	.000	.00	.00	.00	.23	.00
12	0	-1.300	4.400	.000	.00	.00	.00	.23	.00
13	0	-2.600	4.400	.000	.00	.00	.00	.23	.00
14	0	-3.900	4.400	.000	.00	.00	.00	.23	.00
15	0	3.900	3.300	.000	.00	.00	.00	.23	.00
16	0	2.600	3.300	.000	.00	.00	.00	.23	.00
17	0	1.300	3.300	.000	.00	.00	.00	.23	.00
18	0	.000	3.300	.000	.00	.00	.00	.23	.00
19	0	-1.300	3.300	.000	.00	.00	.00	.23	.00
20	0	-2.600	3.300	.000	.00	.00	.00	.23	.00
21	0	-3.900	3.300	.000	.00	.00	.00	.23	.00
22	0	3.900	2.200	.000	.00	.00	.00	.23	.00
23	0	2.600	2.200	.000	.00	.00	.00	.23	.00
24	0	1.300	2.200	.000	.00	.00	.00	.23	.00
25	0	.000	2.200	.000	.00	.00	.00	.23	.00
26	0	-1.300	2.200	.000	.00	.00	.00	.23	.00
27	0	-2.600	2.200	.000	.00	.00	.00	.23	.00
28	0	-3.900	2.200	.000	.00	.00	.00	.23	.00
29	0	3.900	1.100	.000	.00	.00	.00	.23	.00
30	0	2.600	1.100	.000	.00	.00	.00	.23	.00
31	0	-2.600	1.100	.000	.00	.00	.00	.23	.00
32	0	-3.900	1.100	.000	.00	.00	.00	.23	.00
33	0	1.300	.750	.000	.00	.00	.00	.23	.00

34	0	.000	.750	.000	.00	.00	.00	.23	.00
35	0	-1.300	.750	.000	.00	.00	.00	.23	.00
36	0	3.900	.000	.000	.00	.00	.00	.23	.00
37	0	2.600	.000	.000	.00	.00	.00	.23	.00
38	0	-2.600	.000	.000	.00	.00	.00	.23	.00
39	0	-3.900	.000	.000	.00	.00	.00	.23	.00
40	0	1.300	-.750	.000	.00	.00	.00	.23	.00
41	0	.000	-.750	.000	.00	.00	.00	.23	.00
42	0	-1.300	-.750	.000	.00	.00	.00	.23	.00
43	0	3.900	-1.100	.000	.00	.00	.00	.23	.00
44	0	2.600	-1.100	.000	.00	.00	.00	.23	.00
45	0	-2.600	-1.100	.000	.00	.00	.00	.23	.00
46	0	-3.900	-1.100	.000	.00	.00	.00	.23	.00
47	0	3.900	-2.200	.000	.00	.00	.00	.23	.00
48	0	2.600	-2.200	.000	.00	.00	.00	.23	.00
49	0	1.300	-2.200	.000	.00	.00	.00	.23	.00
50	0	.000	-2.200	.000	.00	.00	.00	.23	.00
51	0	-1.300	-2.200	.000	.00	.00	.00	.23	.00
52	0	-2.600	-2.200	.000	.00	.00	.00	.23	.00
53	0	-3.900	-2.200	.000	.00	.00	.00	.23	.00
54	0	3.900	-3.300	.000	.00	.00	.00	.23	.00
55	0	2.600	-3.300	.000	.00	.00	.00	.23	.00
56	0	1.300	-3.300	.000	.00	.00	.00	.23	.00
57	0	.000	-3.300	.000	.00	.00	.00	.23	.00
58	0	-1.300	-3.300	.000	.00	.00	.00	.23	.00
59	0	-2.600	-3.300	.000	.00	.00	.00	.23	.00
60	0	-3.900	-3.300	.000	.00	.00	.00	.23	.00
61	0	3.900	-4.400	.000	.00	.00	.00	.23	.00
62	0	2.600	-4.400	.000	.00	.00	.00	.23	.00
63	0	1.300	-4.400	.000	.00	.00	.00	.23	.00
64	0	.000	-4.400	.000	.00	.00	.00	.23	.00
65	0	-1.300	-4.400	.000	.00	.00	.00	.23	.00
66	0	-2.600	-4.400	.000	.00	.00	.00	.23	.00
67	0	-3.900	-4.400	.000	.00	.00	.00	.23	.00
68	0	3.900	-5.500	.000	.00	.00	.00	.23	.00
69	0	2.600	-5.500	.000	.00	.00	.00	.23	.00
70	0	1.300	-5.500	.000	.00	.00	.00	.23	.00
71	0	.000	-5.500	.000	.00	.00	.00	.23	.00
72	0	-1.300	-5.500	.000	.00	.00	.00	.23	.00
73	0	-2.600	-5.500	.000	.00	.00	.00	.23	.00
74	0	-3.900	-5.500	.000	.00	.00	.00	.23	.00
75	0	5.250	6.750	.000	.00	.00	.00	.23	.00
76	0	4.100	6.750	.000	.00	10.00	.00	.23	.00
77	0	2.950	6.750	.000	.00	.00	.00	.23	.00
78	0	1.800	6.750	.000	.00	10.00	.00	.23	.00
79	0	.650	6.750	.000	.00	.00	.00	.23	.00
80	0	-.650	6.750	.000	.00	.00	.00	.23	.00
81	0	-1.800	6.750	.000	.00	10.00	.00	.23	.00
82	0	-2.950	6.750	.000	.00	.00	.00	.23	.00
83	0	-4.100	6.750	.000	.00	10.00	.00	.23	.00
84	0	-5.250	6.750	.000	.00	.00	.00	.23	.00
85	0	5.250	6.000	.000	10.00	.00	.00	.23	.00
86	0	-5.250	6.000	.000	-10.00	.00	.00	.23	.00
87	0	5.250	5.000	.000	.00	.00	.00	.23	.00
88	0	-5.250	5.000	.000	.00	.00	.00	.23	.00
89	0	5.250	4.000	.000	10.00	.00	.00	.23	.00
90	0	-5.250	4.000	.000	-10.00	.00	.00	.23	.00
91	0	5.250	3.000	.000	.00	.00	.00	.23	.00
92	0	-5.250	3.000	.000	.00	.00	.00	.23	.00
93	0	5.250	2.000	.000	10.00	.00	.00	.23	.00
94	0	-5.250	2.000	.000	-10.00	.00	.00	.23	.00
95	0	5.250	1.000	.000	.00	.00	.00	.23	.00
96	0	-5.250	1.000	.000	.00	.00	.00	.23	.00
97	0	5.250	.000	.000	10.00	.00	.00	.23	.00
98	0	-5.250	.000	.000	-10.00	.00	.00	.23	.00
99	0	5.250	-1.000	.000	.00	.00	.00	.23	.00
100	0	-5.250	-1.000	.000	.00	.00	.00	.23	.00
101	0	5.250	-2.000	.000	10.00	.00	.00	.23	.00
102	0	-5.250	-2.000	.000	-10.00	.00	.00	.23	.00
103	0	5.250	-3.000	.000	.00	.00	.00	.23	.00
104	0	-5.250	-3.000	.000	.00	.00	.00	.23	.00
105	0	5.250	-4.000	.000	10.00	.00	.00	.23	.00
106	0	-5.250	-4.000	.000	-10.00	.00	.00	.23	.00
107	0	5.250	-5.000	.000	.00	.00	.00	.23	.00
108	0	-5.250	-5.000	.000	.00	.00	.00	.23	.00
109	0	5.250	-6.000	.000	10.00	.00	.00	.23	.00

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110    0  -5.250  -6.000    .000 -10.00    .00    .00    .23    .00
111    0   5.250  -6.750    .000    .00    .00    .00    .23    .00
112    0   4.100  -6.750    .000    .00 -10.00    .00    .23    .00
113    0   2.950  -6.750    .000    .00    .00    .00    .23    .00
114    0   1.800  -6.750    .000    .00 -10.00    .00    .23    .00
115    0    .650  -6.750    .000    .00    .00    .00    .23    .00
116    0   -.650  -6.750    .000    .00    .00    .00    .23    .00
117    0  -1.800  -6.750    .000    .00 -10.00    .00    .23    .00
118    0  -2.950  -6.750    .000    .00    .00    .00    .23    .00
119    0  -4.100  -6.750    .000    .00 -10.00    .00    .23    .00
120    0  -5.250  -6.750    .000    .00    .00    .00    .23    .00
-----------------------------------------------------------------

vin     = 0 - incastro;   1 - cerniera;   2 - appoggio
X, Y, Z = Coordinate testa pali
axz     = Inclinazione palo nel piano  Xp Z  rispetto alla verticale
             (positiva se verso  Xp positivo)
ayz     = Inclinazione palo nel piano  Yp Z  rispetto alla verticale
             (positiva se verso  Yp  positivo)
axy     = Rotazione assi  Xp Yp     (positiva se antioraria)
Box     = Lato dell'elemento parallelo all'asse  Xp
Boy     = Lato dell'elemento parallelo all'asse  Yp
          se  Boy = 0   D = Box:  diametro
          altrimenti    D = sqr (Box * Boy * 1.273): diametro equivalente
```

Caratterizzazione dei pali soggetti a carichi assiali e torsionali

palo	AK kN/m	TK kN*m/rad
1	100000.	.0
2	100000.	.0
3	100000.	.0
4	100000.	.0
5	100000.	.0
6	100000.	.0
7	100000.	.0
8	100000.	.0
9	100000.	.0
10	100000.	.0
11	100000.	.0
12	100000.	.0
13	100000.	.0
14	100000.	.0
15	100000.	.0
16	100000.	.0
17	100000.	.0
18	100000.	.0
19	100000.	.0
20	100000.	.0
21	100000.	.0
22	100000.	.0
23	100000.	.0
24	100000.	.0
25	100000.	.0
26	100000.	.0
27	100000.	.0
28	100000.	.0
29	100000.	.0
30	100000.	.0
31	100000.	.0
32	100000.	.0
33	100000.	.0
34	100000.	.0
35	100000.	.0
36	100000.	.0
37	100000.	.0
38	100000.	.0
39	100000.	.0
40	100000.	.0
41	100000.	.0
42	100000.	.0
43	100000.	.0
44	100000.	.0
45	100000.	.0
46	100000.	.0
47	100000.	.0
48	100000.	.0
49	100000.	.0
50	100000.	.0
51	100000.	.0
52	100000.	.0
53	100000.	.0
54	100000.	.0
55	100000.	.0
56	100000.	.0
57	100000.	.0
58	100000.	.0
59	100000.	.0
60	100000.	.0
61	100000.	.0
62	100000.	.0
63	100000.	.0
64	100000.	.0
65	100000.	.0
66	100000.	.0

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  67        100000.         .0
  68        100000.         .0
  69        100000.         .0
  70        100000.         .0
  71        100000.         .0
  72        100000.         .0
  73        100000.         .0
  74        100000.         .0
  75        125000.         .0
  76        125000.         .0
  77        125000.         .0
  78        125000.         .0
  79        125000.         .0
  80        125000.         .0
  81        125000.         .0
  82        125000.         .0
  83        125000.         .0
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  **        125000.         .0
  **        125000.         .0
  **        125000.         .0
  **        125000.         .0
-------------------------------

AK = Rigidezza assiale    palo-terreno
TK = Rigidezza torsionale palo-terreno


Baricentro palificata:               Xg =     .000 m   Yg =     .000 m
Rotazione direzioni princip. di inerzia:      .00 deg



Caratterizzazione del terreno per pali soggetti a carichi trasversali


Terreno tipo  1

          ------------------
           Prof.        E
             m        kN/m2
          ------------------
             .00     23000.0
           40.00     23000.0
```

Caratterizzazione dei pali soggetti a carichi trasversali
(uguali per tutti i pali)

palo	Lp m	EJx kN*m2	Itx	Ridx	EJy kN*m2	Ity	Ridy
1	15.00	6975.	1	1.000	6975.	1	1.000

Lp = Lunghezza palo (compreso eventuale tratto fuori terra)
EJ = Rigidezza flessionale del palo
It = Tipo di terreno
Rid = Moltiplicatore del modulo di reazione orizzontale

LINEA FS FERRANDINA MATERA
VI08 Pile P17-P20 - Analisi SLV

CONDIZIONE DI CARICO 1
VI08 - P17 - SLV_x

Coordinate Centri di Carico (c.c.)

c.c.	Xc m	Yc m	Zc m	Alfc deg
1	.000	.000	.000	.00
2	.000	.000	.000	.00

Componenti di Azioni Esterne riferite ai Centri di Carico

c.c.	Fzc kN	Fxc kN	Mxc kN*m	Fyc kN	Myc kN*m	Mzc kN*m
1	14222.2	5759.3	118580.8	1759.9	36996.6	3541.3
2	13395.0	.0	.0	.0	.0	.0

Componenti di Carico Risultanti (riferimento globale)

Fz kN	Fx kN	Mx kN*m	Fy kN	My kN*m	Mz kN*m
27617.2	5759.3	118580.8	1759.9	36996.6	3541.3

Punto di applic. carico verticale: Xv = 4.294 m Yv = 1.340 m

Componenti di Spostamento del Plinto (riferimento globale)

dz mm	dx mm	rx mRad	dy mm	ry mRad	rz mRad
2.111	2.015	.700	.631	.148	.040

Sollecitazioni in Sommita' ai Singoli Pali (riferimento locale)

palo	Fzp kN	Fxp kN	Mxp kN*m	Fyp kN	Myp kN*m	Mzp kN*m	Mris kN*m
1	565.4	34.6	-13.3	17.1	-7.9	.0	15.5
2	474.5	34.6	-13.3	15.9	-7.3	.0	15.1
3	383.5	34.6	-13.3	14.6	-6.6	.0	14.8
4	292.6	34.6	-13.3	13.4	-6.0	.0	14.6
5	201.6	34.6	-13.3	12.1	-5.3	.0	14.3
6	110.6	34.6	-13.3	10.9	-4.7	.0	14.1
7	19.7	34.6	-13.3	9.6	-4.0	.0	13.9
8	549.1	35.7	-13.8	17.1	-7.9	.0	15.9
9	458.2	35.7	-13.8	15.9	-7.3	.0	15.6
10	367.2	35.7	-13.8	14.6	-6.6	.0	15.3
11	276.3	35.7	-13.8	13.4	-6.0	.0	15.1
12	185.3	35.7	-13.8	12.1	-5.3	.0	14.8
13	94.3	35.7	-13.8	10.9	-4.7	.0	14.6
14	3.4	35.7	-13.8	9.6	-4.0	.0	14.4

15	532.8	36.7	-14.4	17.1	-7.9	.0	16.4
16	441.9	36.7	-14.4	15.9	-7.3	.0	16.1
17	350.9	36.7	-14.4	14.6	-6.6	.0	15.8
18	260.0	36.7	-14.4	13.4	-6.0	.0	15.6
19	169.0	36.7	-14.4	12.1	-5.3	.0	15.3
20	78.1	36.7	-14.4	10.9	-4.7	.0	15.1
21	-12.9	36.7	-14.4	9.6	-4.0	.0	14.9
22	516.6	37.8	-14.9	17.1	-7.9	.0	16.9
23	425.6	37.8	-14.9	15.9	-7.3	.0	16.6
24	334.6	37.8	-14.9	14.6	-6.6	.0	16.3
25	243.7	37.8	-14.9	13.4	-6.0	.0	16.1
26	152.7	37.8	-14.9	12.1	-5.3	.0	15.8
27	61.8	37.8	-14.9	10.9	-4.7	.0	15.6
28	-29.2	37.8	-14.9	9.6	-4.0	.0	15.5
29	500.3	38.8	-15.5	17.1	-7.9	.0	17.4
30	409.3	38.8	-15.5	15.9	-7.3	.0	17.1
31	45.5	38.8	-15.5	10.9	-4.7	.0	16.2
32	-45.5	38.8	-15.5	9.6	-4.0	.0	16.0
33	313.2	39.1	-15.6	14.6	-6.6	.0	17.0
34	222.2	39.1	-15.6	13.4	-6.0	.0	16.7
35	131.2	39.1	-15.6	12.1	-5.3	.0	16.5
36	484.0	39.9	-16.0	17.1	-7.9	.0	17.9
37	393.0	39.9	-16.0	15.9	-7.3	.0	17.6
38	29.2	39.9	-16.0	10.9	-4.7	.0	16.7
39	-61.8	39.9	-16.0	9.6	-4.0	.0	16.5
40	290.9	40.6	-16.4	14.6	-6.6	.0	17.7
41	200.0	40.6	-16.4	13.4	-6.0	.0	17.4
42	109.0	40.6	-16.4	12.1	-5.3	.0	17.2
43	467.7	40.9	-16.6	17.1	-7.9	.0	18.4
44	376.7	40.9	-16.6	15.9	-7.3	.0	18.1
45	12.9	40.9	-16.6	10.9	-4.7	.0	17.2
46	-78.1	40.9	-16.6	9.6	-4.0	.0	17.0
47	451.4	42.0	-17.1	17.1	-7.9	.0	18.8
48	360.4	42.0	-17.1	15.9	-7.3	.0	18.6
49	269.5	42.0	-17.1	14.6	-6.6	.0	18.3
50	178.5	42.0	-17.1	13.4	-6.0	.0	18.1
51	87.5	42.0	-17.1	12.1	-5.3	.0	17.9
52	-3.4	42.0	-17.1	10.9	-4.7	.0	17.7
53	-94.4	42.0	-17.1	9.6	-4.0	.0	17.6
54	435.1	43.0	-17.7	17.1	-7.9	.0	19.3
55	344.1	43.0	-17.7	15.9	-7.3	.0	19.1
56	253.2	43.0	-17.7	14.6	-6.6	.0	18.9
57	162.2	43.0	-17.7	13.4	-6.0	.0	18.6
58	71.3	43.0	-17.7	12.1	-5.3	.0	18.4
59	-19.7	43.0	-17.7	10.9	-4.7	.0	18.3
60	-110.7	43.0	-17.7	9.6	-4.0	.0	18.1
61	418.8	44.1	-18.2	17.1	-7.9	.0	19.8
62	327.8	44.1	-18.2	15.9	-7.3	.0	19.6
63	236.9	44.1	-18.2	14.6	-6.6	.0	19.4
64	145.9	44.1	-18.2	13.4	-6.0	.0	19.2
65	55.0	44.1	-18.2	12.1	-5.3	.0	19.0
66	-36.0	44.1	-18.2	10.9	-4.7	.0	18.8
67	-127.0	44.1	-18.2	9.6	-4.0	.0	18.6
68	402.5	45.1	-18.8	17.1	-7.9	.0	20.4
69	311.5	45.1	-18.8	15.9	-7.3	.0	20.1
70	220.6	45.1	-18.8	14.6	-6.6	.0	19.9
71	129.6	45.1	-18.8	13.4	-6.0	.0	19.7
72	38.7	45.1	-18.8	12.1	-5.3	.0	19.5
73	-52.3	45.1	-18.8	10.9	-4.7	.0	19.3
74	-143.2	45.1	-18.8	9.6	-4.0	.0	19.2
75	848.0	33.4	-12.7	18.4	-8.6	.0	15.3
76	753.3	33.4	-12.7	-8.0	5.2	.0	13.7
77	646.8	33.4	-12.7	16.2	-7.4	.0	14.7
78	553.2	33.4	-12.7	-3.5	2.8	.0	13.0
79	445.7	33.4	-12.7	14.0	-6.3	.0	14.1
80	332.0	33.4	-12.7	12.8	-5.6	.0	13.9
81	240.0	33.4	-12.7	3.7	-.9	.0	12.7
82	130.8	33.4	-12.7	10.6	-4.5	.0	13.4
83	40.0	33.4	-12.7	8.3	-3.3	.0	13.1
84	-70.3	33.4	-12.7	8.4	-3.3	.0	13.1
85	860.0	5.5	1.9	18.4	-8.5	.0	8.7
86	-121.5	30.6	-11.2	8.5	-3.5	.0	11.7
87	815.6	35.1	-13.5	18.4	-8.6	.0	16.0
88	-102.7	35.1	-13.5	8.4	-3.3	.0	13.9
89	825.3	8.6	.2	18.4	-8.5	.0	8.5
90	-159.7	31.3	-11.6	8.5	-3.5	.0	12.1

91	778.6	37.0	-14.5	18.4	-8.6	.0	16.9
92	-139.8	37.0	-14.5	8.4	-3.3	.0	14.9
93	790.5	11.7	-1.4	18.4	-8.5	.0	8.6
94	-197.9	31.9	-11.9	8.5	-3.5	.0	12.4
95	741.5	38.9	-15.5	18.4	-8.6	.0	17.7
96	-176.8	38.9	-15.5	8.4	-3.3	.0	15.9
97	755.8	14.9	-3.0	18.4	-8.5	.0	9.0
98	-236.1	32.6	-12.2	8.5	-3.5	.0	12.7
99	704.5	40.8	-16.5	18.4	-8.6	.0	18.6
100	-213.8	40.8	-16.5	8.4	-3.3	.0	16.8
101	721.0	18.0	-4.6	18.4	-8.5	.0	9.7
102	-274.3	33.2	-12.6	8.5	-3.5	.0	13.0
103	667.5	42.7	-17.5	18.4	-8.6	.0	19.5
104	-250.8	42.7	-17.5	8.4	-3.3	.0	17.8
105	686.3	21.1	-6.3	18.4	-8.5	.0	10.6
106	-312.5	33.9	-12.9	8.5	-3.5	.0	13.4
107	630.5	44.6	-18.5	18.4	-8.6	.0	20.4
108	-287.9	44.6	-18.5	8.4	-3.3	.0	18.8
109	651.6	24.3	-7.9	18.4	-8.5	.0	11.6
110	-350.6	34.5	-13.2	8.5	-3.5	.0	13.7
111	598.1	46.3	-19.4	18.4	-8.6	.0	21.2
112	472.7	46.5	-19.6	33.7	-16.5	.0	25.7
113	396.9	46.3	-19.4	16.2	-7.4	.0	20.8
114	276.6	46.5	-19.6	24.8	-11.9	.0	22.9
115	195.7	46.3	-19.4	14.0	-6.3	.0	20.4
116	82.0	46.3	-19.4	12.8	-5.6	.0	20.2
117	-30.4	46.5	-19.6	10.8	-4.6	.0	20.2
118	-119.1	46.3	-19.4	10.6	-4.5	.0	19.9
119	-226.5	46.5	-19.6	1.9	.0	.0	19.6
120	-320.3	46.3	-19.4	8.4	-3.3	.0	19.7

Mris = (Mxp^2 + Myp^2)^0.5

LINEA FS FERRANDINA MATERA
VI08 Pile P17-P20 - Analisi SLV

CONDIZIONE DI CARICO 2
VI08 - P17 - SLV_x

Coordinate Centri di Carico (c.c.)

c.c.	Xc m	Yc m	Zc m	Alfc deg
1	.000	.000	.000	.00
2	.000	.000	.000	.00

Componenti di Azioni Esterne riferite ai Centri di Carico

c.c.	Fzc kN	Fxc kN	Mxc kN*m	Fyc kN	Myc kN*m	Mzc kN*m
1	12611.9	-5759.3	-118580.8	-1759.9	-36996.6	-3541.3
2	13395.0	.0	.0	.0	.0	.0

Componenti di Carico Risultanti (riferimento globale)

Fz kN	Fx kN	Mx kN*m	Fy kN	My kN*m	Mz kN*m
26006.9	-5759.3	-118580.8	-1759.9	-36996.6	-3541.3

Punto di applic. carico verticale: Xv = -4.560 m Yv = -1.423 m

Componenti di Spostamento del Plinto (riferimento globale)

dz mm	dx mm	rx mRad	dy mm	ry mRad	rz mRad
1.988	-2.015	-.700	-.631	-.148	-.040

Sollecitazioni in Sommita' ai Singoli Pali (riferimento locale)

palo	Fzp kN	Fxp kN	Mxp kN*m	Fyp kN	Myp kN*m	Mzp kN*m	Mris kN*m
1	-155.6	-34.6	13.3	-17.1	7.9	.0	15.5
2	-64.6	-34.6	13.3	-15.9	7.3	.0	15.1
3	26.4	-34.6	13.3	-14.6	6.6	.0	14.8
4	117.3	-34.6	13.3	-13.4	6.0	.0	14.6
5	208.3	-34.6	13.3	-12.1	5.3	.0	14.3
6	299.2	-34.6	13.3	-10.9	4.7	.0	14.1
7	390.2	-34.6	13.3	-9.6	4.0	.0	13.9
8	-139.3	-35.7	13.8	-17.1	7.9	.0	15.9
9	-48.3	-35.7	13.8	-15.9	7.3	.0	15.6
10	42.7	-35.7	13.8	-14.6	6.6	.0	15.3
11	133.6	-35.7	13.8	-13.4	6.0	.0	15.1
12	224.6	-35.7	13.8	-12.1	5.3	.0	14.8
13	315.5	-35.7	13.8	-10.9	4.7	.0	14.6
14	406.5	-35.7	13.8	-9.6	4.0	.0	14.4

15	-123.0	-36.7	14.4	-17.1	7.9	.0	16.4
16	-32.0	-36.7	14.4	-15.9	7.3	.0	16.1
17	58.9	-36.7	14.4	-14.6	6.6	.0	15.8
18	149.9	-36.7	14.4	-13.4	6.0	.0	15.6
19	240.9	-36.7	14.4	-12.1	5.3	.0	15.3
20	331.8	-36.7	14.4	-10.9	4.7	.0	15.1
21	422.8	-36.7	14.4	-9.6	4.0	.0	14.9
22	-106.7	-37.8	14.9	-17.1	7.9	.0	16.9
23	-15.7	-37.8	14.9	-15.9	7.3	.0	16.6
24	75.2	-37.8	14.9	-14.6	6.6	.0	16.3
25	166.2	-37.8	14.9	-13.4	6.0	.0	16.1
26	257.2	-37.8	14.9	-12.1	5.3	.0	15.8
27	348.1	-37.8	14.9	-10.9	4.7	.0	15.6
28	439.1	-37.8	14.9	-9.6	4.0	.0	15.5
29	-90.4	-38.8	15.5	-17.1	7.9	.0	17.4
30	.6	-38.8	15.5	-15.9	7.3	.0	17.1
31	364.4	-38.8	15.5	-10.9	4.7	.0	16.2
32	455.4	-38.8	15.5	-9.6	4.0	.0	16.0
33	96.7	-39.1	15.6	-14.6	6.6	.0	17.0
34	187.7	-39.1	15.6	-13.4	6.0	.0	16.7
35	278.6	-39.1	15.6	-12.1	5.3	.0	16.5
36	-74.1	-39.9	16.0	-17.1	7.9	.0	17.9
37	16.9	-39.9	16.0	-15.9	7.3	.0	17.6
38	380.7	-39.9	16.0	-10.9	4.7	.0	16.7
39	471.7	-39.9	16.0	-9.6	4.0	.0	16.5
40	118.9	-40.6	16.4	-14.6	6.6	.0	17.7
41	209.9	-40.6	16.4	-13.4	6.0	.0	17.4
42	300.8	-40.6	16.4	-12.1	5.3	.0	17.2
43	-57.8	-40.9	16.6	-17.1	7.9	.0	18.4
44	33.2	-40.9	16.6	-15.9	7.3	.0	18.1
45	397.0	-40.9	16.6	-10.9	4.7	.0	17.2
46	488.0	-40.9	16.6	-9.6	4.0	.0	17.0
47	-41.5	-42.0	17.1	-17.1	7.9	.0	18.8
48	49.4	-42.0	17.1	-15.9	7.3	.0	18.6
49	140.4	-42.0	17.1	-14.6	6.6	.0	18.3
50	231.4	-42.0	17.1	-13.4	6.0	.0	18.1
51	322.3	-42.0	17.1	-12.1	5.3	.0	17.9
52	413.3	-42.0	17.1	-10.9	4.7	.0	17.7
53	504.2	-42.0	17.1	-9.6	4.0	.0	17.6
54	-25.2	-43.0	17.7	-17.1	7.9	.0	19.3
55	65.7	-43.0	17.7	-15.9	7.3	.0	19.1
56	156.7	-43.0	17.7	-14.6	6.6	.0	18.9
57	247.7	-43.0	17.7	-13.4	6.0	.0	18.6
58	338.6	-43.0	17.7	-12.1	5.3	.0	18.4
59	429.6	-43.0	17.7	-10.9	4.7	.0	18.3
60	520.5	-43.0	17.7	-9.6	4.0	.0	18.1
61	-8.9	-44.1	18.2	-17.1	7.9	.0	19.8
62	82.0	-44.1	18.2	-15.9	7.3	.0	19.6
63	173.0	-44.1	18.2	-14.6	6.6	.0	19.4
64	264.0	-44.1	18.2	-13.4	6.0	.0	19.2
65	354.9	-44.1	18.2	-12.1	5.3	.0	19.0
66	445.9	-44.1	18.2	-10.9	4.7	.0	18.8
67	536.8	-44.1	18.2	-9.6	4.0	.0	18.6
68	7.4	-45.1	18.8	-17.1	7.9	.0	20.4
69	98.3	-45.1	18.8	-15.9	7.3	.0	20.1
70	189.3	-45.1	18.8	-14.6	6.6	.0	19.9
71	280.2	-45.1	18.8	-13.4	6.0	.0	19.7
72	371.2	-45.1	18.8	-12.1	5.3	.0	19.5
73	462.2	-45.1	18.8	-10.9	4.7	.0	19.3
74	553.1	-45.1	18.8	-9.6	4.0	.0	19.2
75	-335.7	-33.4	12.7	-18.4	8.6	.0	15.3
76	-248.7	-33.4	12.7	-9.1	3.8	.0	13.2
77	-134.5	-33.4	12.7	-16.2	7.4	.0	14.7
78	-48.7	-33.4	12.7	-13.7	6.1	.0	14.1
79	66.7	-33.4	12.7	-14.0	6.3	.0	14.1
80	180.4	-33.4	12.7	-12.8	5.6	.0	13.9
81	264.5	-33.4	12.7	-20.9	9.9	.0	16.1
82	381.5	-33.4	12.7	-10.6	4.5	.0	13.4
83	464.6	-33.4	12.7	-25.5	12.2	.0	17.6
84	582.7	-33.4	12.7	-8.4	3.3	.0	13.1
85	-355.5	-22.7	7.1	-18.4	8.5	.0	11.1
86	626.1	-13.5	2.3	-8.5	3.5	.0	4.1
87	-303.3	-35.1	13.5	-18.4	8.6	.0	16.0
88	615.1	-35.1	13.5	-8.4	3.3	.0	13.9
89	-320.7	-25.8	8.7	-18.4	8.5	.0	12.2
90	664.3	-14.1	2.6	-8.5	3.5	.0	4.3

91	-266.2	-37.0	14.5	-18.4	8.6	.0	16.9
92	652.1	-37.0	14.5	-8.4	3.3	.0	14.9
93	-286.0	-28.9	10.3	-18.4	8.5	.0	13.4
94	702.5	-14.7	2.9	-8.5	3.5	.0	4.6
95	-229.2	-38.9	15.5	-18.4	8.6	.0	17.7
96	689.1	-38.9	15.5	-8.4	3.3	.0	15.9
97	-251.2	-32.1	12.0	-18.4	8.5	.0	14.7
98	740.6	-15.4	3.3	-8.5	3.5	.0	4.8
99	-192.2	-40.8	16.5	-18.4	8.6	.0	18.6
100	726.2	-40.8	16.5	-8.4	3.3	.0	16.8
101	-216.5	-35.2	13.6	-18.4	8.5	.0	16.0
102	778.8	-16.0	3.6	-8.5	3.5	.0	5.0
103	-155.1	-42.7	17.5	-18.4	8.6	.0	19.5
104	763.2	-42.7	17.5	-8.4	3.3	.0	17.8
105	-181.7	-38.3	15.2	-18.4	8.5	.0	17.4
106	817.0	-16.7	4.0	-8.5	3.5	.0	5.3
107	-118.1	-44.6	18.5	-18.4	8.6	.0	20.4
108	800.2	-44.6	18.5	-8.4	3.3	.0	18.8
109	-147.0	-41.4	16.8	-18.4	8.5	.0	18.9
110	855.2	-17.3	4.3	-8.5	3.5	.0	5.5
111	-85.7	-46.3	19.4	-18.4	8.6	.0	21.2
112	31.9	-46.5	19.6	-16.5	7.6	.0	21.0
113	115.4	-46.3	19.4	-16.2	7.4	.0	20.8
114	228.0	-46.5	19.6	-7.6	3.0	.0	19.8
115	316.6	-46.3	19.4	-14.0	6.3	.0	20.4
116	430.3	-46.3	19.4	-12.8	5.6	.0	20.2
117	535.0	-46.5	19.6	6.3	-4.3	.0	20.1
118	631.5	-46.3	19.4	-10.6	4.5	.0	19.9
119	731.1	-46.5	19.6	15.3	-8.9	.0	21.6
120	832.6	-46.3	19.4	-8.4	3.3	.0	19.7

Mris = (Mxp^2 + Myp^2)^0.5

LINEA FS FERRANDINA MATERA
VI08 Pile P17-P20 - Analisi SLV

CONDIZIONE DI CARICO 3
VI08 - P17 - SLV_y

Coordinate Centri di Carico (c.c.)

c.c.	Xc m	Yc m	Zc m	Alfc deg
1	.000	.000	.000	.00
2	.000	.000	.000	.00

Componenti di Azioni Esterne riferite ai Centri di Carico

c.c.	Fzc kN	Fxc kN	Mxc kN*m	Fyc kN	Myc kN*m	Mzc kN*m
1	14149.6	1730.9	35588.9	5866.3	123320.7	11804.2
2	13395.0	.0	.0	.0	.0	.0

Componenti di Carico Risultanti (riferimento globale)

Fz kN	Fx kN	Mx kN*m	Fy kN	My kN*m	Mz kN*m
27544.6	1730.9	35588.9	5866.3	123320.7	11804.2

Punto di applic. carico verticale: Xv = 1.292 m Yv = 4.477 m

Componenti di Spostamento del Plinto (riferimento globale)

dz mm	dx mm	rx mRad	dy mm	ry mRad	rz mRad
2.105	.606	.210	2.105	.494	.132

Sollecitazioni in Sommita' ai Singoli Pali (riferimento locale)

palo	Fzp kN	Fxp kN	Mxp kN*m	Fyp kN	Myp kN*m	Mzp kN*m	Mris kN*m
1	564.0	-5.6	4.3	57.1	-26.4	.0	26.7
2	536.7	-5.6	4.3	52.9	-24.2	.0	24.6
3	509.4	-5.6	4.3	48.8	-22.0	.0	22.5
4	482.1	-5.6	4.3	44.6	-19.9	.0	20.3
5	454.8	-5.6	4.3	40.5	-17.7	.0	18.2
6	427.5	-5.6	4.3	36.3	-15.6	.0	16.1
7	400.2	-5.6	4.3	32.2	-13.4	.0	14.1
8	509.7	-2.1	2.5	57.1	-26.4	.0	26.5
9	482.4	-2.1	2.5	52.9	-24.2	.0	24.3
10	455.1	-2.1	2.5	48.8	-22.0	.0	22.2
11	427.8	-2.1	2.5	44.6	-19.9	.0	20.0
12	400.5	-2.1	2.5	40.5	-17.7	.0	17.9
13	373.2	-2.1	2.5	36.3	-15.6	.0	15.8
14	345.9	-2.1	2.5	32.2	-13.4	.0	13.6

15	455.4	1.5	.7	57.1	-26.4	.0	26.4
16	428.1	1.5	.7	52.9	-24.2	.0	24.2
17	400.8	1.5	.7	48.8	-22.0	.0	22.0
18	373.5	1.5	.7	44.6	-19.9	.0	19.9
19	346.2	1.5	.7	40.5	-17.7	.0	17.7
20	318.9	1.5	.7	36.3	-15.6	.0	15.6
21	291.6	1.5	.7	32.2	-13.4	.0	13.4
22	401.0	5.0	-1.2	57.1	-26.4	.0	26.4
23	373.7	5.0	-1.2	52.9	-24.2	.0	24.2
24	346.5	5.0	-1.2	48.8	-22.0	.0	22.1
25	319.2	5.0	-1.2	44.6	-19.9	.0	19.9
26	291.9	5.0	-1.2	40.5	-17.7	.0	17.8
27	264.6	5.0	-1.2	36.3	-15.6	.0	15.6
28	237.3	5.0	-1.2	32.2	-13.4	.0	13.5
29	346.7	8.5	-3.0	57.1	-26.4	.0	26.5
30	319.4	8.5	-3.0	52.9	-24.2	.0	24.4
31	210.2	8.5	-3.0	36.3	-15.6	.0	15.8
32	182.9	8.5	-3.0	32.2	-13.4	.0	13.7
33	274.9	9.6	-3.6	48.8	-22.0	.0	22.3
34	247.6	9.6	-3.6	44.6	-19.9	.0	20.2
35	220.3	9.6	-3.6	40.5	-17.7	.0	18.1
36	292.4	12.0	-4.8	57.1	-26.4	.0	26.8
37	265.1	12.0	-4.8	52.9	-24.2	.0	24.7
38	155.9	12.0	-4.8	36.3	-15.6	.0	16.3
39	128.6	12.0	-4.8	32.2	-13.4	.0	14.2
40	200.8	14.4	-6.1	48.8	-22.0	.0	22.9
41	173.5	14.4	-6.1	44.6	-19.9	.0	20.8
42	146.2	14.4	-6.1	40.5	-17.7	.0	18.7
43	238.1	15.5	-6.6	57.1	-26.4	.0	27.2
44	210.8	15.5	-6.6	52.9	-24.2	.0	25.1
45	101.6	15.5	-6.6	36.3	-15.6	.0	16.9
46	74.3	15.5	-6.6	32.2	-13.4	.0	15.0
47	183.8	19.0	-8.5	57.1	-26.4	.0	27.7
48	156.5	19.0	-8.5	52.9	-24.2	.0	25.6
49	129.2	19.0	-8.5	48.8	-22.0	.0	23.6
50	101.9	19.0	-8.5	44.6	-19.9	.0	21.6
51	74.6	19.0	-8.5	40.5	-17.7	.0	19.6
52	47.3	19.0	-8.5	36.3	-15.6	.0	17.7
53	20.0	19.0	-8.5	32.2	-13.4	.0	15.9
54	129.5	22.5	-10.3	57.1	-26.4	.0	28.3
55	102.2	22.5	-10.3	52.9	-24.2	.0	26.3
56	74.9	22.5	-10.3	48.8	-22.0	.0	24.3
57	47.6	22.5	-10.3	44.6	-19.9	.0	22.4
58	20.3	22.5	-10.3	40.5	-17.7	.0	20.5
59	-7.0	22.5	-10.3	36.3	-15.6	.0	18.7
60	-34.3	22.5	-10.3	32.2	-13.4	.0	16.9
61	75.2	26.0	-12.1	57.1	-26.4	.0	29.0
62	47.9	26.0	-12.1	52.9	-24.2	.0	27.1
63	20.6	26.0	-12.1	48.8	-22.0	.0	25.1
64	-6.7	26.0	-12.1	44.6	-19.9	.0	23.3
65	-34.0	26.0	-12.1	40.5	-17.7	.0	21.5
66	-61.3	26.0	-12.1	36.3	-15.6	.0	19.7
67	-88.6	26.0	-12.1	32.2	-13.4	.0	18.1
68	20.9	29.5	-13.9	57.1	-26.4	.0	29.8
69	-6.4	29.5	-13.9	52.9	-24.2	.0	27.9
70	-33.7	29.5	-13.9	48.8	-22.0	.0	26.1
71	-61.0	29.5	-13.9	44.6	-19.9	.0	24.3
72	-88.3	29.5	-13.9	40.5	-17.7	.0	22.6
73	-115.6	29.5	-13.9	36.3	-15.6	.0	20.9
74	-142.9	29.5	-13.9	32.2	-13.4	.0	19.3
75	817.5	-9.6	6.4	61.4	-28.6	.0	29.3
76	832.8	-9.8	6.7	30.3	-12.4	.0	14.1
77	757.2	-9.6	6.4	54.0	-24.8	.0	25.6
78	766.8	-9.8	6.7	25.1	-9.7	.0	11.8
79	696.8	-9.6	6.4	46.7	-21.0	.0	21.9
80	662.7	-9.6	6.4	42.5	-18.8	.0	19.9
81	663.4	-9.8	6.7	17.0	-5.5	.0	8.6
82	602.3	-9.6	6.4	35.2	-15.0	.0	16.3
83	597.3	-9.8	6.7	11.8	-2.8	.0	7.2
84	541.9	-9.6	6.4	27.9	-11.2	.0	12.9
85	755.5	-33.0	18.6	61.2	-28.4	.0	33.9
86	492.2	9.5	-3.5	28.2	-11.6	.0	12.1
87	709.5	-4.0	3.5	61.4	-28.6	.0	28.8
88	433.9	-4.0	3.5	27.9	-11.2	.0	11.7
89	639.7	-22.5	13.1	61.2	-28.4	.0	31.3
90	364.9	11.7	-4.7	28.2	-11.6	.0	12.5

91	586.1	2.4	.2	61.4	-28.6	.0	28.6
92	310.5	2.4	.2	27.9	-11.2	.0	11.2
93	523.8	-12.1	7.7	61.2	-28.4	.0	29.4
94	237.6	13.8	-5.8	28.2	-11.6	.0	12.9
95	462.7	8.8	-3.2	61.4	-28.6	.0	28.8
96	187.1	8.8	-3.2	27.9	-11.2	.0	11.6
97	408.0	-1.7	2.3	61.2	-28.4	.0	28.5
98	110.3	16.0	-6.9	28.2	-11.6	.0	13.5
99	339.3	15.2	-6.5	61.4	-28.6	.0	29.3
100	63.6	15.2	-6.5	27.9	-11.2	.0	12.9
101	292.2	8.7	-3.1	61.2	-28.4	.0	28.6
102	-17.0	18.1	-8.0	28.2	-11.6	.0	14.1
103	215.8	21.6	-9.8	61.4	-28.6	.0	30.2
104	-59.8	21.6	-9.8	27.9	-11.2	.0	14.9
105	176.4	19.2	-8.6	61.2	-28.4	.0	29.6
106	-144.3	20.3	-9.1	28.2	-11.6	.0	14.7
107	92.4	27.9	-13.1	61.4	-28.6	.0	31.5
108	-183.2	27.9	-13.1	27.9	-11.2	.0	17.2
109	60.6	29.6	-14.0	61.2	-28.4	.0	31.6
110	-271.6	22.4	-10.2	28.2	-11.6	.0	15.4
111	-15.6	33.5	-16.0	61.4	-28.6	.0	32.8
112	-102.5	33.9	-16.4	55.2	-25.4	.0	30.2
113	-76.0	33.5	-16.0	54.0	-24.8	.0	29.5
114	-155.4	33.9	-16.4	45.9	-20.6	.0	26.3
115	-136.3	33.5	-16.0	46.7	-21.0	.0	26.4
116	-170.5	33.5	-16.0	42.5	-18.8	.0	24.7
117	-238.1	33.9	-16.4	31.5	-13.0	.0	20.9
118	-230.8	33.5	-16.0	35.2	-15.0	.0	21.9
119	-291.0	33.9	-16.4	22.2	-8.2	.0	18.3
120	-291.2	33.5	-16.0	27.9	-11.2	.0	19.5

Mris = (Mxp^2 + Myp^2)^0.5

LINEA FS FERRANDINA MATERA
VI08 Pile P17-P20 - Analisi SLV

CONDIZIONE DI CARICO 4
VI08 - P17 - SLV_y

Coordinate Centri di Carico (c.c.)

c.c.	Xc m	Yc m	Zc m	Alfc deg
1	.000	.000	.000	.00
2	.000	.000	.000	.00

Componenti di Azioni Esterne riferite ai Centri di Carico

c.c.	Fzc kN	Fxc kN	Mxc kN*m	Fyc kN	Myc kN*m	Mzc kN*m
1	12684.5	-1730.9	-35588.9	-5866.3	-123320.7	-11804.2
2	13395.0	.0	.0	.0	.0	.0

Componenti di Carico Risultanti (riferimento globale)

Fz kN	Fx kN	Mx kN*m	Fy kN	My kN*m	Mz kN*m
26079.5	-1730.9	-35588.9	-5866.3	-123320.7	-11804.2

Punto di applic. carico verticale: Xv = -1.365 m Yv = -4.729 m

Componenti di Spostamento del Plinto (riferimento globale)

dz mm	dx mm	rx mRad	dy mm	ry mRad	rz mRad
1.993	-.606	-.210	-2.105	-.494	-.132

Sollecitazioni in Sommita' ai Singoli Pali (riferimento locale)

palo	Fzp kN	Fxp kN	Mxp kN*m	Fyp kN	Myp kN*m	Mzp kN*m	Mris kN*m
1	-154.1	5.6	-4.3	-57.1	26.4	.0	26.7
2	-126.8	5.6	-4.3	-52.9	24.2	.0	24.6
3	-99.5	5.6	-4.3	-48.8	22.0	.0	22.5
4	-72.2	5.6	-4.3	-44.6	19.9	.0	20.3
5	-44.9	5.6	-4.3	-40.5	17.7	.0	18.2
6	-17.6	5.6	-4.3	-36.3	15.6	.0	16.1
7	9.7	5.6	-4.3	-32.2	13.4	.0	14.1
8	-99.8	2.1	-2.5	-57.1	26.4	.0	26.5
9	-72.5	2.1	-2.5	-52.9	24.2	.0	24.3
10	-45.2	2.1	-2.5	-48.8	22.0	.0	22.2
11	-17.9	2.1	-2.5	-44.6	19.9	.0	20.0
12	9.4	2.1	-2.5	-40.5	17.7	.0	17.9
13	36.7	2.1	-2.5	-36.3	15.6	.0	15.8
14	64.0	2.1	-2.5	-32.2	13.4	.0	13.6

15	-45.5	-1.5	-.7	-57.1	26.4	.0	26.4
16	-18.2	-1.5	-.7	-52.9	24.2	.0	24.2
17	9.1	-1.5	-.7	-48.8	22.0	.0	22.0
18	36.4	-1.5	-.7	-44.6	19.9	.0	19.9
19	63.7	-1.5	-.7	-40.5	17.7	.0	17.7
20	91.0	-1.5	-.7	-36.3	15.6	.0	15.6
21	118.3	-1.5	-.7	-32.2	13.4	.0	13.4
22	8.8	-5.0	1.2	-57.1	26.4	.0	26.4
23	36.1	-5.0	1.2	-52.9	24.2	.0	24.2
24	63.4	-5.0	1.2	-48.8	22.0	.0	22.1
25	90.7	-5.0	1.2	-44.6	19.9	.0	19.9
26	118.0	-5.0	1.2	-40.5	17.7	.0	17.8
27	145.3	-5.0	1.2	-36.3	15.6	.0	15.6
28	172.6	-5.0	1.2	-32.2	13.4	.0	13.5
29	63.1	-8.5	3.0	-57.1	26.4	.0	26.5
30	90.4	-8.5	3.0	-52.9	24.2	.0	24.4
31	199.6	-8.5	3.0	-36.3	15.6	.0	15.8
32	226.9	-8.5	3.0	-32.2	13.4	.0	13.7
33	135.0	-9.6	3.6	-48.8	22.0	.0	22.3
34	162.3	-9.6	3.6	-44.6	19.9	.0	20.2
35	189.6	-9.6	3.6	-40.5	17.7	.0	18.1
36	117.4	-12.0	4.8	-57.1	26.4	.0	26.8
37	144.7	-12.0	4.8	-52.9	24.2	.0	24.7
38	253.9	-12.0	4.8	-36.3	15.6	.0	16.3
39	281.2	-12.0	4.8	-32.2	13.4	.0	14.2
40	209.1	-14.4	6.1	-48.8	22.0	.0	22.9
41	236.4	-14.4	6.1	-44.6	19.9	.0	20.8
42	263.7	-14.4	6.1	-40.5	17.7	.0	18.7
43	171.7	-15.5	6.6	-57.1	26.4	.0	27.2
44	199.0	-15.5	6.6	-52.9	24.2	.0	25.1
45	308.2	-15.5	6.6	-36.3	15.6	.0	16.9
46	335.5	-15.5	6.6	-32.2	13.4	.0	15.0
47	226.1	-19.0	8.5	-57.1	26.4	.0	27.7
48	253.4	-19.0	8.5	-52.9	24.2	.0	25.6
49	280.7	-19.0	8.5	-48.8	22.0	.0	23.6
50	308.0	-19.0	8.5	-44.6	19.9	.0	21.6
51	335.3	-19.0	8.5	-40.5	17.7	.0	19.6
52	362.6	-19.0	8.5	-36.3	15.6	.0	17.7
53	389.8	-19.0	8.5	-32.2	13.4	.0	15.9
54	280.4	-22.5	10.3	-57.1	26.4	.0	28.3
55	307.7	-22.5	10.3	-52.9	24.2	.0	26.3
56	335.0	-22.5	10.3	-48.8	22.0	.0	24.3
57	362.3	-22.5	10.3	-44.6	19.9	.0	22.4
58	389.6	-22.5	10.3	-40.5	17.7	.0	20.5
59	416.9	-22.5	10.3	-36.3	15.6	.0	18.7
60	444.2	-22.5	10.3	-32.2	13.4	.0	16.9
61	334.7	-26.0	12.1	-57.1	26.4	.0	29.0
62	362.0	-26.0	12.1	-52.9	24.2	.0	27.1
63	389.3	-26.0	12.1	-48.8	22.0	.0	25.1
64	416.6	-26.0	12.1	-44.6	19.9	.0	23.3
65	443.9	-26.0	12.1	-40.5	17.7	.0	21.5
66	471.2	-26.0	12.1	-36.3	15.6	.0	19.7
67	498.5	-26.0	12.1	-32.2	13.4	.0	18.1
68	389.0	-29.5	13.9	-57.1	26.4	.0	29.8
69	416.3	-29.5	13.9	-52.9	24.2	.0	27.9
70	443.6	-29.5	13.9	-48.8	22.0	.0	26.1
71	470.9	-29.5	13.9	-44.6	19.9	.0	24.3
72	498.2	-29.5	13.9	-40.5	17.7	.0	22.6
73	525.5	-29.5	13.9	-36.3	15.6	.0	20.9
74	552.8	-29.5	13.9	-32.2	13.4	.0	19.3
75	-305.2	9.6	-6.4	-61.4	28.6	.0	29.3
76	-328.3	9.8	-6.7	-47.5	21.4	.0	22.4
77	-244.8	9.6	-6.4	-54.0	24.8	.0	25.6
78	-262.2	9.8	-6.7	-42.3	18.7	.0	19.8
79	-184.5	9.6	-6.4	-46.7	21.0	.0	21.9
80	-150.3	9.6	-6.4	-42.5	18.8	.0	19.9
81	-158.8	9.8	-6.7	-34.2	14.4	.0	15.9
82	-90.0	9.6	-6.4	-35.2	15.0	.0	16.3
83	-92.8	9.8	-6.7	-28.9	11.7	.0	13.5
84	-29.6	9.6	-6.4	-27.9	11.2	.0	12.9
85	-250.9	15.8	-9.6	-61.2	28.4	.0	30.0
86	12.4	7.7	-5.4	-28.2	11.6	.0	12.8
87	-197.2	4.0	-3.5	-61.4	28.6	.0	28.8
88	78.4	4.0	-3.5	-27.9	11.2	.0	11.7
89	-135.1	5.4	-4.2	-61.2	28.4	.0	28.7
90	139.7	5.5	-4.3	-28.2	11.6	.0	12.3

91	-73.8	-2.4	-.2	-61.4	28.6	.0	28.6
92	201.8	-2.4	-.2	-27.9	11.2	.0	11.2
93	-19.3	-5.1	1.2	-61.2	28.4	.0	28.4
94	267.0	3.4	-3.2	-28.2	11.6	.0	12.0
95	49.7	-8.8	3.2	-61.4	28.6	.0	28.8
96	325.3	-8.8	3.2	-27.9	11.2	.0	11.6
97	96.5	-15.5	6.6	-61.2	28.4	.0	29.2
98	394.2	1.2	-2.1	-28.2	11.6	.0	11.7
99	173.1	-15.2	6.5	-61.4	28.6	.0	29.3
100	448.7	-15.2	6.5	-27.9	11.2	.0	12.9
101	212.3	-25.9	12.1	-61.2	28.4	.0	30.8
102	521.5	-.9	-.9	-28.2	11.6	.0	11.6
103	296.5	-21.6	9.8	-61.4	28.6	.0	30.2
104	572.1	-21.6	9.8	-27.9	11.2	.0	14.9
105	328.1	-36.3	17.5	-61.2	28.4	.0	33.3
106	648.8	-3.1	.2	-28.2	11.6	.0	11.6
107	419.9	-27.9	13.1	-61.4	28.6	.0	31.5
108	695.5	-27.9	13.1	-27.9	11.2	.0	17.2
109	444.0	-46.8	22.9	-61.2	28.4	.0	36.5
110	776.1	-5.2	1.3	-28.2	11.6	.0	11.6
111	527.9	-33.5	16.0	-61.4	28.6	.0	32.8
112	607.1	-33.9	16.4	-38.0	16.4	.0	23.2
113	588.3	-33.5	16.0	-54.0	24.8	.0	29.5
114	659.9	-33.9	16.4	-28.8	11.6	.0	20.1
115	648.7	-33.5	16.0	-46.7	21.0	.0	26.4
116	682.8	-33.5	16.0	-42.5	18.8	.0	24.7
117	742.7	-33.9	16.4	-14.3	4.1	.0	16.9
118	743.2	-33.5	16.0	-35.2	15.0	.0	21.9
119	795.5	-33.9	16.4	-5.0	-.7	.0	16.4
120	803.5	-33.5	16.0	-27.9	11.2	.0	19.5

Mris = (Mxp^2 + Myp^2)^0.5

LINEA FS FERRANDINA MATERA
VI08 Pile P17-P20 - Analisi SLV

CONDIZIONE DI CARICO 5
VI08 - P18 - SLV_x

Coordinate Centri di Carico (c.c.)

c.c.	Xc m	Yc m	Zc m	Alfc deg
1	.000	.000	.000	.00
2	.000	.000	.000	.00

Componenti di Azioni Esterne riferite ai Centri di Carico

c.c.	Fzc kN	Fxc kN	Mxc kN*m	Fyc kN	Myc kN*m	Mzc kN*m
1	16014.1	5372.2	123910.1	1869.6	43805.5	5476.0
2	13395.0	.0	.0	.0	.0	.0

Componenti di Carico Risultanti (riferimento globale)

Fz kN	Fx kN	Mx kN*m	Fy kN	My kN*m	Mz kN*m
29409.1	5372.2	123910.1	1869.6	43805.5	5476.0

Punto di applic. carico verticale: Xv = 4.213 m Yv = 1.490 m

Componenti di Spostamento del Plinto (riferimento globale)

dz mm	dx mm	rx mRad	dy mm	ry mRad	rz mRad
2.248	1.886	.731	.674	.175	.061

Sollecitazioni in Sommita' ai Singoli Pali (riferimento locale)

palo	Fzp kN	Fxp kN	Mxp kN*m	Fyp kN	Myp kN*m	Mzp kN*m	Mris kN*m
1	606.2	28.2	-9.7	19.9	-9.1	.0	13.4
2	511.2	28.2	-9.7	17.9	-8.1	.0	12.7
3	416.2	28.2	-9.7	16.0	-7.1	.0	12.1
4	321.2	28.2	-9.7	14.1	-6.1	.0	11.5
5	226.1	28.2	-9.7	12.2	-5.1	.0	11.0
6	131.1	28.2	-9.7	10.2	-4.1	.0	10.6
7	36.1	28.2	-9.7	8.3	-3.1	.0	10.2
8	586.9	29.8	-10.6	19.9	-9.1	.0	14.0
9	491.9	29.8	-10.6	17.9	-8.1	.0	13.4
10	396.9	29.8	-10.6	16.0	-7.1	.0	12.8
11	301.9	29.8	-10.6	14.1	-6.1	.0	12.2
12	206.9	29.8	-10.6	12.2	-5.1	.0	11.8
13	111.9	29.8	-10.6	10.2	-4.1	.0	11.4
14	16.9	29.8	-10.6	8.3	-3.1	.0	11.0

15	567.6	31.5	-11.4	19.9	-9.1	.0	14.6
16	472.6	31.5	-11.4	17.9	-8.1	.0	14.0
17	377.6	31.5	-11.4	16.0	-7.1	.0	13.5
18	282.6	31.5	-11.4	14.1	-6.1	.0	13.0
19	187.6	31.5	-11.4	12.2	-5.1	.0	12.5
20	92.6	31.5	-11.4	10.2	-4.1	.0	12.2
21	-2.4	31.5	-11.4	8.3	-3.1	.0	11.9
22	548.4	33.1	-12.3	19.9	-9.1	.0	15.3
23	453.3	33.1	-12.3	17.9	-8.1	.0	14.7
24	358.3	33.1	-12.3	16.0	-7.1	.0	14.2
25	263.3	33.1	-12.3	14.1	-6.1	.0	13.7
26	168.3	33.1	-12.3	12.2	-5.1	.0	13.3
27	73.3	33.1	-12.3	10.2	-4.1	.0	13.0
28	-21.7	33.1	-12.3	8.3	-3.1	.0	12.7
29	529.1	34.7	-13.1	19.9	-9.1	.0	16.0
30	434.1	34.7	-13.1	17.9	-8.1	.0	15.5
31	54.0	34.7	-13.1	10.2	-4.1	.0	13.8
32	-41.0	34.7	-13.1	8.3	-3.1	.0	13.5
33	332.9	35.2	-13.4	16.0	-7.1	.0	15.2
34	237.9	35.2	-13.4	14.1	-6.1	.0	14.7
35	142.9	35.2	-13.4	12.2	-5.1	.0	14.4
36	509.8	36.4	-14.0	19.9	-9.1	.0	16.7
37	414.8	36.4	-14.0	17.9	-8.1	.0	16.2
38	34.8	36.4	-14.0	10.2	-4.1	.0	14.6
39	-60.2	36.4	-14.0	8.3	-3.1	.0	14.3
40	306.7	37.5	-14.6	16.0	-7.1	.0	16.2
41	211.6	37.5	-14.6	14.1	-6.1	.0	15.8
42	116.6	37.5	-14.6	12.2	-5.1	.0	15.4
43	490.5	38.0	-14.8	19.9	-9.1	.0	17.4
44	395.5	38.0	-14.8	17.9	-8.1	.0	16.9
45	15.5	38.0	-14.8	10.2	-4.1	.0	15.4
46	-79.5	38.0	-14.8	8.3	-3.1	.0	15.2
47	471.3	39.6	-15.7	19.9	-9.1	.0	18.1
48	376.3	39.6	-15.7	17.9	-8.1	.0	17.7
49	281.2	39.6	-15.7	16.0	-7.1	.0	17.2
50	186.2	39.6	-15.7	14.1	-6.1	.0	16.8
51	91.2	39.6	-15.7	12.2	-5.1	.0	16.5
52	-3.8	39.6	-15.7	10.2	-4.1	.0	16.2
53	-98.8	39.6	-15.7	8.3	-3.1	.0	16.0
54	452.0	41.2	-16.5	19.9	-9.1	.0	18.9
55	357.0	41.2	-16.5	17.9	-8.1	.0	18.4
56	262.0	41.2	-16.5	16.0	-7.1	.0	18.0
57	167.0	41.2	-16.5	14.1	-6.1	.0	17.6
58	72.0	41.2	-16.5	12.2	-5.1	.0	17.3
59	-23.0	41.2	-16.5	10.2	-4.1	.0	17.0
60	-118.1	41.2	-16.5	8.3	-3.1	.0	16.8
61	432.7	42.9	-17.4	19.9	-9.1	.0	19.6
62	337.7	42.9	-17.4	17.9	-8.1	.0	19.2
63	242.7	42.9	-17.4	16.0	-7.1	.0	18.8
64	147.7	42.9	-17.4	14.1	-6.1	.0	18.4
65	52.7	42.9	-17.4	12.2	-5.1	.0	18.1
66	-42.3	42.9	-17.4	10.2	-4.1	.0	17.9
67	-137.3	42.9	-17.4	8.3	-3.1	.0	17.6
68	413.4	44.5	-18.2	19.9	-9.1	.0	20.4
69	318.4	44.5	-18.2	17.9	-8.1	.0	20.0
70	223.4	44.5	-18.2	16.0	-7.1	.0	19.6
71	128.4	44.5	-18.2	14.1	-6.1	.0	19.2
72	33.4	44.5	-18.2	12.2	-5.1	.0	18.9
73	-61.6	44.5	-18.2	10.2	-4.1	.0	18.7
74	-156.6	44.5	-18.2	8.3	-3.1	.0	18.5
75	908.4	26.4	-8.8	21.8	-10.2	.0	13.4
76	811.3	26.4	-8.8	-7.1	4.9	.0	10.1
77	698.3	26.4	-8.8	18.4	-8.4	.0	12.2
78	601.3	26.4	-8.8	-3.4	3.0	.0	9.3
79	488.2	26.4	-8.8	15.0	-6.6	.0	11.0
80	369.4	26.4	-8.8	13.1	-5.6	.0	10.4
81	272.6	26.4	-8.8	2.3	.0	.0	8.8
82	159.3	26.4	-8.8	9.7	-3.9	.0	9.6
83	62.6	26.4	-8.8	6.0	-2.0	.0	9.0
84	-50.8	26.4	-8.8	6.3	-2.1	.0	9.0
85	911.4	-3.0	6.5	21.7	-10.1	.0	12.0
86	-99.1	24.7	-7.9	6.5	-2.3	.0	8.2
87	870.1	29.0	-10.1	21.8	-10.2	.0	14.4
88	-89.1	29.0	-10.1	6.3	-2.1	.0	10.3
89	870.9	1.4	4.2	21.7	-10.1	.0	10.9
90	-144.9	26.1	-8.6	6.5	-2.3	.0	8.9

91	826.3	31.9	-11.7	21.8	-10.2	.0	15.5
92	-132.9	31.9	-11.7	6.3	-2.1	.0	11.9
93	830.4	5.8	1.9	21.7	-10.1	.0	10.3
94	-190.7	27.6	-9.4	6.5	-2.3	.0	9.7
95	782.5	34.9	-13.2	21.8	-10.2	.0	16.7
96	-176.7	34.9	-13.2	6.3	-2.1	.0	13.4
97	790.0	10.2	-.3	21.7	-10.1	.0	10.1
98	-236.5	29.0	-10.2	6.5	-2.3	.0	10.4
99	738.7	37.8	-14.7	21.8	-10.2	.0	17.9
100	-220.5	37.8	-14.7	6.3	-2.1	.0	14.9
101	749.5	14.5	-2.6	21.7	-10.1	.0	10.4
102	-282.3	30.4	-10.9	6.5	-2.3	.0	11.1
103	694.9	40.8	-16.3	21.8	-10.2	.0	19.2
104	-264.3	40.8	-16.3	6.3	-2.1	.0	16.4
105	709.0	18.9	-4.9	21.7	-10.1	.0	11.2
106	-328.1	31.9	-11.7	6.5	-2.3	.0	11.9
107	651.1	43.8	-17.8	21.8	-10.2	.0	20.5
108	-308.1	43.8	-17.8	6.3	-2.1	.0	18.0
109	668.6	23.3	-7.2	21.7	-10.1	.0	12.4
110	-373.9	33.3	-12.4	6.5	-2.3	.0	12.6
111	612.8	46.3	-19.2	21.8	-10.2	.0	21.7
112	479.9	46.6	-19.5	36.8	-18.0	.0	26.5
113	402.6	46.3	-19.2	18.4	-8.4	.0	20.9
114	276.0	46.6	-19.5	26.4	-12.6	.0	23.2
115	192.5	46.3	-19.2	15.0	-6.6	.0	20.3
116	73.8	46.3	-19.2	13.1	-5.6	.0	20.0
117	-43.0	46.6	-19.5	10.2	-4.1	.0	19.9
118	-136.3	46.3	-19.2	9.7	-3.9	.0	19.6
119	-246.9	46.6	-19.5	-.2	1.3	.0	19.5
120	-346.4	46.3	-19.2	6.3	-2.1	.0	19.3

Mris = (Mxp^2 + Myp^2)^0.5

LINEA FS FERRANDINA MATERA
VI08 Pile P17-P20 - Analisi SLV

CONDIZIONE DI CARICO 6
VI08 - P18 - SLV_x

Coordinate Centri di Carico (c.c.)

c.c.	Xc m	Yc m	Zc m	Alfc deg
1	.000	.000	.000	.00
2	.000	.000	.000	.00

Componenti di Azioni Esterne riferite ai Centri di Carico

c.c.	Fzc kN	Fxc kN	Mxc kN*m	Fyc kN	Myc kN*m	Mzc kN*m
1	14257.8	-5372.2	-123910.1	-1869.6	-43805.5	-5476.0
2	13395.0	.0	.0	.0	.0	.0

Componenti di Carico Risultanti (riferimento globale)

Fz kN	Fx kN	Mx kN*m	Fy kN	My kN*m	Mz kN*m
27652.8	-5372.2	-123910.1	-1869.6	-43805.5	-5476.0

Punto di applic. carico verticale: Xv = -4.481 m Yv = -1.584 m

Componenti di Spostamento del Plinto (riferimento globale)

dz mm	dx mm	rx mRad	dy mm	ry mRad	rz mRad
2.114	-1.886	-.731	-.674	-.175	-.061

Sollecitazioni in Sommita' ai Singoli Pali (riferimento locale)

palo	Fzp kN	Fxp kN	Mxp kN*m	Fyp kN	Myp kN*m	Mzp kN*m	Mris kN*m
1	-170.0	-28.2	9.7	-19.9	9.1	.0	13.4
2	-75.0	-28.2	9.7	-17.9	8.1	.0	12.7
3	20.0	-28.2	9.7	-16.0	7.1	.0	12.1
4	115.0	-28.2	9.7	-14.1	6.1	.0	11.5
5	210.0	-28.2	9.7	-12.2	5.1	.0	11.0
6	305.0	-28.2	9.7	-10.2	4.1	.0	10.6
7	400.0	-28.2	9.7	-8.3	3.1	.0	10.2
8	-150.7	-29.8	10.6	-19.9	9.1	.0	14.0
9	-55.7	-29.8	10.6	-17.9	8.1	.0	13.4
10	39.3	-29.8	10.6	-16.0	7.1	.0	12.8
11	134.3	-29.8	10.6	-14.1	6.1	.0	12.2
12	229.3	-29.8	10.6	-12.2	5.1	.0	11.8
13	324.3	-29.8	10.6	-10.2	4.1	.0	11.4
14	419.3	-29.8	10.6	-8.3	3.1	.0	11.0

15	-131.5	-31.5	11.4	-19.9	9.1	.0	14.6
16	-36.5	-31.5	11.4	-17.9	8.1	.0	14.0
17	58.5	-31.5	11.4	-16.0	7.1	.0	13.5
18	153.5	-31.5	11.4	-14.1	6.1	.0	13.0
19	248.6	-31.5	11.4	-12.2	5.1	.0	12.5
20	343.6	-31.5	11.4	-10.2	4.1	.0	12.2
21	438.6	-31.5	11.4	-8.3	3.1	.0	11.9
22	-112.2	-33.1	12.3	-19.9	9.1	.0	15.3
23	-17.2	-33.1	12.3	-17.9	8.1	.0	14.7
24	77.8	-33.1	12.3	-16.0	7.1	.0	14.2
25	172.8	-33.1	12.3	-14.1	6.1	.0	13.7
26	267.8	-33.1	12.3	-12.2	5.1	.0	13.3
27	362.8	-33.1	12.3	-10.2	4.1	.0	13.0
28	457.8	-33.1	12.3	-8.3	3.1	.0	12.7
29	-92.9	-34.7	13.1	-19.9	9.1	.0	16.0
30	2.1	-34.7	13.1	-17.9	8.1	.0	15.5
31	382.1	-34.7	13.1	-10.2	4.1	.0	13.8
32	477.1	-34.7	13.1	-8.3	3.1	.0	13.5
33	103.2	-35.2	13.4	-16.0	7.1	.0	15.2
34	198.2	-35.2	13.4	-14.1	6.1	.0	14.7
35	293.2	-35.2	13.4	-12.2	5.1	.0	14.4
36	-73.7	-36.4	14.0	-19.9	9.1	.0	16.7
37	21.3	-36.4	14.0	-17.9	8.1	.0	16.2
38	401.4	-36.4	14.0	-10.2	4.1	.0	14.6
39	496.4	-36.4	14.0	-8.3	3.1	.0	14.3
40	129.5	-37.5	14.6	-16.0	7.1	.0	16.2
41	224.5	-37.5	14.6	-14.1	6.1	.0	15.8
42	319.5	-37.5	14.6	-12.2	5.1	.0	15.4
43	-54.4	-38.0	14.8	-19.9	9.1	.0	17.4
44	40.6	-38.0	14.8	-17.9	8.1	.0	16.9
45	420.6	-38.0	14.8	-10.2	4.1	.0	15.4
46	515.7	-38.0	14.8	-8.3	3.1	.0	15.2
47	-35.1	-39.6	15.7	-19.9	9.1	.0	18.1
48	59.9	-39.6	15.7	-17.9	8.1	.0	17.7
49	154.9	-39.6	15.7	-16.0	7.1	.0	17.2
50	249.9	-39.6	15.7	-14.1	6.1	.0	16.8
51	344.9	-39.6	15.7	-12.2	5.1	.0	16.5
52	439.9	-39.6	15.7	-10.2	4.1	.0	16.2
53	534.9	-39.6	15.7	-8.3	3.1	.0	16.0
54	-15.8	-41.2	16.5	-19.9	9.1	.0	18.9
55	79.2	-41.2	16.5	-17.9	8.1	.0	18.4
56	174.2	-41.2	16.5	-16.0	7.1	.0	18.0
57	269.2	-41.2	16.5	-14.1	6.1	.0	17.6
58	364.2	-41.2	16.5	-12.2	5.1	.0	17.3
59	459.2	-41.2	16.5	-10.2	4.1	.0	17.0
60	554.2	-41.2	16.5	-8.3	3.1	.0	16.8
61	3.4	-42.9	17.4	-19.9	9.1	.0	19.6
62	98.4	-42.9	17.4	-17.9	8.1	.0	19.2
63	193.4	-42.9	17.4	-16.0	7.1	.0	18.8
64	288.5	-42.9	17.4	-14.1	6.1	.0	18.4
65	383.5	-42.9	17.4	-12.2	5.1	.0	18.1
66	478.5	-42.9	17.4	-10.2	4.1	.0	17.9
67	573.5	-42.9	17.4	-8.3	3.1	.0	17.6
68	22.7	-44.5	18.2	-19.9	9.1	.0	20.4
69	117.7	-44.5	18.2	-17.9	8.1	.0	20.0
70	212.7	-44.5	18.2	-16.0	7.1	.0	19.6
71	307.7	-44.5	18.2	-14.1	6.1	.0	19.2
72	402.7	-44.5	18.2	-12.2	5.1	.0	18.9
73	497.7	-44.5	18.2	-10.2	4.1	.0	18.7
74	592.7	-44.5	18.2	-8.3	3.1	.0	18.5
75	-363.2	-26.4	8.8	-21.8	10.2	.0	13.4
76	-274.3	-26.4	8.8	-11.1	4.6	.0	9.9
77	-153.1	-26.4	8.8	-18.4	8.4	.0	12.2
78	-64.4	-26.4	8.8	-14.8	6.5	.0	11.0
79	57.0	-26.4	8.8	-15.0	6.6	.0	11.0
80	175.8	-26.4	8.8	-13.1	5.6	.0	10.4
81	264.3	-26.4	8.8	-20.6	9.5	.0	13.0
82	385.9	-26.4	8.8	-9.7	3.9	.0	9.6
83	474.3	-26.4	8.8	-24.3	11.5	.0	14.4
84	596.0	-26.4	8.8	-6.3	2.1	.0	9.0
85	-374.5	-15.3	3.0	-21.7	10.1	.0	10.5
86	636.1	-6.4	-1.6	-6.5	2.3	.0	2.8
87	-324.9	-29.0	10.1	-21.8	10.2	.0	14.4
88	634.3	-29.0	10.1	-6.3	2.1	.0	10.3
89	-334.0	-19.7	5.3	-21.7	10.1	.0	11.4
90	681.9	-7.8	-.9	-6.5	2.3	.0	2.4

91	-281.1	-31.9	11.7	-21.8	10.2	.0	15.5
92	678.1	-31.9	11.7	-6.3	2.1	.0	11.9
93	-293.5	-24.1	7.6	-21.7	10.1	.0	12.6
94	727.7	-9.3	-.1	-6.5	2.3	.0	2.3
95	-237.3	-34.9	13.2	-21.8	10.2	.0	16.7
96	721.9	-34.9	13.2	-6.3	2.1	.0	13.4
97	-253.1	-28.4	9.9	-21.7	10.1	.0	14.1
98	773.4	-10.7	.6	-6.5	2.3	.0	2.4
99	-193.5	-37.8	14.7	-21.8	10.2	.0	17.9
100	765.7	-37.8	14.7	-6.3	2.1	.0	14.9
101	-212.6	-32.8	12.1	-21.7	10.1	.0	15.8
102	819.2	-12.2	1.4	-6.5	2.3	.0	2.7
103	-149.7	-40.8	16.3	-21.8	10.2	.0	19.2
104	809.5	-40.8	16.3	-6.3	2.1	.0	16.4
105	-172.1	-37.2	14.4	-21.7	10.1	.0	17.6
106	865.0	-13.6	2.1	-6.5	2.3	.0	3.1
107	-105.9	-43.8	17.8	-21.8	10.2	.0	20.5
108	853.3	-43.8	17.8	-6.3	2.1	.0	18.0
109	-131.6	-41.6	16.7	-21.7	10.1	.0	19.5
110	910.8	-15.1	2.9	-6.5	2.3	.0	3.7
111	-67.6	-46.3	19.2	-21.8	10.2	.0	21.7
112	57.0	-46.6	19.5	-18.6	8.5	.0	21.2
113	142.5	-46.3	19.2	-18.4	8.4	.0	20.9
114	260.9	-46.6	19.5	-8.2	3.1	.0	19.7
115	352.7	-46.3	19.2	-15.0	6.6	.0	20.3
116	471.4	-46.3	19.2	-13.1	5.6	.0	20.0
117	580.0	-46.6	19.5	8.1	-5.4	.0	20.2
118	681.5	-46.3	19.2	-9.7	3.9	.0	19.6
119	783.8	-46.6	19.5	18.5	-10.8	.0	22.3
120	891.6	-46.3	19.2	-6.3	2.1	.0	19.3

Mris = (Mxp^2 + Myp^2)^0.5

LINEA FS FERRANDINA MATERA
VI08 Pile P17-P20 - Analisi SLV

CONDIZIONE DI CARICO 7
VI08 - P18 - SLV_y

Coordinate Centri di Carico (c.c.)

c.c.	Xc m	Yc m	Zc m	Alfc deg
1	.000	.000	.000	.00
2	.000	.000	.000	.00

Componenti di Azioni Esterne riferite ai Centri di Carico

c.c.	Fzc kN	Fxc kN	Mxc kN*m	Fyc kN	Myc kN*m	Mzc kN*m
1	15939.3	1612.4	37176.6	6231.9	146017.8	18253.4
2	13395.0	.0	.0	.0	.0	.0

Componenti di Carico Risultanti (riferimento globale)

Fz kN	Fx kN	Mx kN*m	Fy kN	My kN*m	Mz kN*m
29334.3	1612.4	37176.6	6231.9	146017.8	18253.4

Punto di applic. carico verticale: Xv = 1.267 m Yv = 4.978 m

Componenti di Spostamento del Plinto (riferimento globale)

dz mm	dx mm	rx mRad	dy mm	ry mRad	rz mRad
2.242	.566	.219	2.248	.584	.204

Sollecitazioni in Sommita' ai Singoli Pali (riferimento locale)

palo	Fzp kN	Fxp kN	Mxp kN*m	Fyp kN	Myp kN*m	Mzp kN*m	Mris kN*m
1	630.9	-16.2	9.9	66.2	-30.5	.0	32.1
2	602.4	-16.2	9.9	59.8	-27.1	.0	28.9
3	573.9	-16.2	9.9	53.3	-23.8	.0	25.8
4	545.4	-16.2	9.9	46.9	-20.5	.0	22.7
5	516.9	-16.2	9.9	40.5	-17.1	.0	19.8
6	488.4	-16.2	9.9	34.1	-13.8	.0	17.0
7	459.9	-16.2	9.9	27.7	-10.5	.0	14.4
8	566.7	-10.8	7.1	66.2	-30.5	.0	31.3
9	538.2	-10.8	7.1	59.8	-27.1	.0	28.1
10	509.7	-10.8	7.1	53.3	-23.8	.0	24.8
11	481.2	-10.8	7.1	46.9	-20.5	.0	21.7
12	452.7	-10.8	7.1	40.5	-17.1	.0	18.5
13	424.2	-10.8	7.1	34.1	-13.8	.0	15.5
14	395.7	-10.8	7.1	27.7	-10.5	.0	12.6

15	502.5	-5.4	4.3	66.2	-30.5	.0	30.8
16	474.0	-5.4	4.3	59.8	-27.1	.0	27.5
17	445.4	-5.4	4.3	53.3	-23.8	.0	24.2
18	416.9	-5.4	4.3	46.9	-20.5	.0	20.9
19	388.4	-5.4	4.3	40.5	-17.1	.0	17.7
20	359.9	-5.4	4.3	34.1	-13.8	.0	14.4
21	331.4	-5.4	4.3	27.7	-10.5	.0	11.3
22	438.2	.1	1.5	66.2	-30.5	.0	30.5
23	409.7	.1	1.5	59.8	-27.1	.0	27.2
24	381.2	.1	1.5	53.3	-23.8	.0	23.9
25	352.7	.1	1.5	46.9	-20.5	.0	20.5
26	324.2	.1	1.5	40.5	-17.1	.0	17.2
27	295.7	.1	1.5	34.1	-13.8	.0	13.9
28	267.2	.1	1.5	27.7	-10.5	.0	10.6
29	374.0	5.5	-1.4	66.2	-30.5	.0	30.5
30	345.5	5.5	-1.4	59.8	-27.1	.0	27.2
31	231.4	5.5	-1.4	34.1	-13.8	.0	13.9
32	202.9	5.5	-1.4	27.7	-10.5	.0	10.5
33	296.5	7.2	-2.3	53.3	-23.8	.0	23.9
34	268.0	7.2	-2.3	46.9	-20.5	.0	20.6
35	239.5	7.2	-2.3	40.5	-17.1	.0	17.3
36	309.7	10.9	-4.2	66.2	-30.5	.0	30.8
37	281.2	10.9	-4.2	59.8	-27.1	.0	27.5
38	167.2	10.9	-4.2	34.1	-13.8	.0	14.4
39	138.7	10.9	-4.2	27.7	-10.5	.0	11.3
40	208.9	14.6	-6.1	53.3	-23.8	.0	24.6
41	180.4	14.6	-6.1	46.9	-20.5	.0	21.4
42	151.9	14.6	-6.1	40.5	-17.1	.0	18.2
43	245.5	16.3	-7.0	66.2	-30.5	.0	31.3
44	217.0	16.3	-7.0	59.8	-27.1	.0	28.0
45	103.0	16.3	-7.0	34.1	-13.8	.0	15.5
46	74.5	16.3	-7.0	27.7	-10.5	.0	12.6
47	181.2	21.8	-9.8	66.2	-30.5	.0	32.0
48	152.7	21.8	-9.8	59.8	-27.1	.0	28.9
49	124.2	21.8	-9.8	53.3	-23.8	.0	25.8
50	95.7	21.8	-9.8	46.9	-20.5	.0	22.7
51	67.2	21.8	-9.8	40.5	-17.1	.0	19.8
52	38.7	21.8	-9.8	34.1	-13.8	.0	16.9
53	10.2	21.8	-9.8	27.7	-10.5	.0	14.4
54	117.0	27.2	-12.7	66.2	-30.5	.0	33.0
55	88.5	27.2	-12.7	59.8	-27.1	.0	30.0
56	60.0	27.2	-12.7	53.3	-23.8	.0	27.0
57	31.5	27.2	-12.7	46.9	-20.5	.0	24.1
58	3.0	27.2	-12.7	40.5	-17.1	.0	21.3
59	-25.5	27.2	-12.7	34.1	-13.8	.0	18.7
60	-54.0	27.2	-12.7	27.7	-10.5	.0	16.4
61	52.8	32.6	-15.5	66.2	-30.5	.0	34.2
62	24.3	32.6	-15.5	59.8	-27.1	.0	31.3
63	-4.2	32.6	-15.5	53.3	-23.8	.0	28.4
64	-32.8	32.6	-15.5	46.9	-20.5	.0	25.7
65	-61.3	32.6	-15.5	40.5	-17.1	.0	23.1
66	-89.8	32.6	-15.5	34.1	-13.8	.0	20.7
67	-118.3	32.6	-15.5	27.7	-10.5	.0	18.7
68	-11.5	38.1	-18.3	66.2	-30.5	.0	35.6
69	-40.0	38.1	-18.3	59.8	-27.1	.0	32.7
70	-68.5	38.1	-18.3	53.3	-23.8	.0	30.0
71	-97.0	38.1	-18.3	46.9	-20.5	.0	27.5
72	-125.5	38.1	-18.3	40.5	-17.1	.0	25.1
73	-154.0	38.1	-18.3	34.1	-13.8	.0	22.9
74	-182.5	38.1	-18.3	27.7	-10.5	.0	21.1
75	916.9	-22.4	13.1	72.8	-34.0	.0	36.4
76	938.9	-22.8	13.6	36.3	-15.0	.0	20.2
77	853.9	-22.4	13.1	61.5	-28.0	.0	31.0
78	866.7	-22.8	13.6	27.3	-10.2	.0	17.0
79	790.8	-22.4	13.1	50.1	-22.1	.0	25.7
80	755.2	-22.4	13.1	43.7	-18.8	.0	22.9
81	753.5	-22.8	13.6	13.1	-2.9	.0	13.9
82	692.2	-22.4	13.1	32.4	-12.9	.0	18.4
83	681.2	-22.8	13.6	4.0	1.9	.0	13.7
84	629.1	-22.4	13.1	21.0	-7.0	.0	14.9
85	834.7	-47.4	26.1	72.5	-33.6	.0	42.6
86	580.0	.8	1.1	21.6	-7.6	.0	7.7
87	789.2	-13.8	8.6	72.8	-34.0	.0	35.0
88	501.4	-13.8	8.6	21.0	-7.0	.0	11.1
89	699.8	-32.8	18.5	72.5	-33.6	.0	38.4
90	427.3	5.6	-1.4	21.6	-7.6	.0	7.7

91	643.2	-3.9	3.5	72.8	-34.0	.0	34.1
92	355.4	-3.9	3.5	21.0	-7.0	.0	7.8
93	564.9	-18.1	10.9	72.5	-33.6	.0	35.3
94	274.7	10.5	-4.0	21.6	-7.6	.0	8.6
95	497.2	6.0	-1.6	72.8	-34.0	.0	34.0
96	209.4	6.0	-1.6	21.0	-7.0	.0	7.2
97	430.0	-3.5	3.3	72.5	-33.6	.0	33.8
98	122.0	15.3	-6.5	21.6	-7.6	.0	10.0
99	351.2	15.8	-6.8	72.8	-34.0	.0	34.6
100	63.4	15.8	-6.8	21.0	-7.0	.0	9.7
101	295.1	11.1	-4.3	72.5	-33.6	.0	33.9
102	-30.6	20.1	-9.0	21.6	-7.6	.0	11.7
103	205.2	25.7	-11.9	72.8	-34.0	.0	36.0
104	-82.6	25.7	-11.9	21.0	-7.0	.0	13.8
105	160.2	25.7	-11.9	72.5	-33.6	.0	35.6
106	-183.3	24.9	-11.5	21.6	-7.6	.0	13.8
107	59.2	35.6	-17.0	72.8	-34.0	.0	38.0
108	-228.6	35.6	-17.0	21.0	-7.0	.0	18.4
109	25.3	40.3	-19.5	72.5	-33.6	.0	38.8
110	-336.0	29.7	-14.0	21.6	-7.6	.0	15.9
111	-68.6	44.2	-21.5	72.8	-34.0	.0	40.2
112	-165.6	44.7	-22.0	62.7	-28.7	.0	36.2
113	-131.6	44.2	-21.5	61.5	-28.0	.0	35.4
114	-217.5	44.7	-22.0	49.4	-21.7	.0	31.0
115	-194.7	44.2	-21.5	50.1	-22.1	.0	30.9
116	-230.3	44.2	-21.5	43.7	-18.8	.0	28.6
117	-298.7	44.7	-22.0	28.6	-10.9	.0	24.6
118	-293.4	44.2	-21.5	32.4	-12.9	.0	25.1
119	-350.5	44.7	-22.0	15.3	-4.0	.0	22.4
120	-356.4	44.2	-21.5	21.0	-7.0	.0	22.6

Mris = (Mxp^2 + Myp^2)^0.5

LINEA FS FERRANDINA MATERA
VI08 Pile P17-P20 - Analisi SLV

CONDIZIONE DI CARICO 8
VI08 - P18 - SLV_y

Coordinate Centri di Carico (c.c.)

c.c.	Xc m	Yc m	Zc m	Alfc deg
1	.000	.000	.000	.00
2	.000	.000	.000	.00

Componenti di Azioni Esterne riferite ai Centri di Carico

c.c.	Fzc kN	Fxc kN	Mxc kN*m	Fyc kN	Myc kN*m	Mzc kN*m
1	14332.6	-1612.4	-37176.6	-6231.9	-146017.8	-18253.4
2	13395.0	.0	.0	.0	.0	.0

Componenti di Carico Risultanti (riferimento globale)

Fz kN	Fx kN	Mx kN*m	Fy kN	My kN*m	Mz kN*m
27727.6	-1612.4	-37176.6	-6231.9	-146017.8	-18253.4

Punto di applic. carico verticale: Xv = -1.341 m Yv = -5.266 m

Componenti di Spostamento del Plinto (riferimento globale)

dz mm	dx mm	rx mRad	dy mm	ry mRad	rz mRad
2.119	-.566	-.219	-2.248	-.584	-.204

Sollecitazioni in Sommita' ai Singoli Pali (riferimento locale)

palo	Fzp kN	Fxp kN	Mxp kN*m	Fyp kN	Myp kN*m	Mzp kN*m	Mris kN*m
1	-194.8	16.2	-9.9	-66.2	30.5	.0	32.1
2	-166.3	16.2	-9.9	-59.8	27.1	.0	28.9
3	-137.8	16.2	-9.9	-53.3	23.8	.0	25.8
4	-109.3	16.2	-9.9	-46.9	20.5	.0	22.7
5	-80.8	16.2	-9.9	-40.5	17.1	.0	19.8
6	-52.3	16.2	-9.9	-34.1	13.8	.0	17.0
7	-23.8	16.2	-9.9	-27.7	10.5	.0	14.4
8	-130.5	10.8	-7.1	-66.2	30.5	.0	31.3
9	-102.0	10.8	-7.1	-59.8	27.1	.0	28.1
10	-73.5	10.8	-7.1	-53.3	23.8	.0	24.8
11	-45.0	10.8	-7.1	-46.9	20.5	.0	21.7
12	-16.5	10.8	-7.1	-40.5	17.1	.0	18.5
13	12.0	10.8	-7.1	-34.1	13.8	.0	15.5
14	40.5	10.8	-7.1	-27.7	10.5	.0	12.6

15	-66.3	5.4	-4.3	-66.2	30.5	.0	30.8
16	-37.8	5.4	-4.3	-59.8	27.1	.0	27.5
17	-9.3	5.4	-4.3	-53.3	23.8	.0	24.2
18	19.2	5.4	-4.3	-46.9	20.5	.0	20.9
19	47.7	5.4	-4.3	-40.5	17.1	.0	17.7
20	76.2	5.4	-4.3	-34.1	13.8	.0	14.4
21	104.7	5.4	-4.3	-27.7	10.5	.0	11.3
22	-2.1	-.1	-1.5	-66.2	30.5	.0	30.5
23	26.4	-.1	-1.5	-59.8	27.1	.0	27.2
24	54.9	-.1	-1.5	-53.3	23.8	.0	23.9
25	83.5	-.1	-1.5	-46.9	20.5	.0	20.5
26	112.0	-.1	-1.5	-40.5	17.1	.0	17.2
27	140.5	-.1	-1.5	-34.1	13.8	.0	13.9
28	169.0	-.1	-1.5	-27.7	10.5	.0	10.6
29	62.2	-5.5	1.4	-66.2	30.5	.0	30.5
30	90.7	-5.5	1.4	-59.8	27.1	.0	27.2
31	204.7	-5.5	1.4	-34.1	13.8	.0	13.9
32	233.2	-5.5	1.4	-27.7	10.5	.0	10.5
33	139.6	-7.2	2.3	-53.3	23.8	.0	23.9
34	168.1	-7.2	2.3	-46.9	20.5	.0	20.6
35	196.6	-7.2	2.3	-40.5	17.1	.0	17.3
36	126.4	-10.9	4.2	-66.2	30.5	.0	30.8
37	154.9	-10.9	4.2	-59.8	27.1	.0	27.5
38	268.9	-10.9	4.2	-34.1	13.8	.0	14.4
39	297.4	-10.9	4.2	-27.7	10.5	.0	11.3
40	227.2	-14.6	6.1	-53.3	23.8	.0	24.6
41	255.7	-14.6	6.1	-46.9	20.5	.0	21.4
42	284.2	-14.6	6.1	-40.5	17.1	.0	18.2
43	190.7	-16.3	7.0	-66.2	30.5	.0	31.3
44	219.2	-16.3	7.0	-59.8	27.1	.0	28.0
45	333.2	-16.3	7.0	-34.1	13.8	.0	15.5
46	361.7	-16.3	7.0	-27.7	10.5	.0	12.6
47	254.9	-21.8	9.8	-66.2	30.5	.0	32.0
48	283.4	-21.8	9.8	-59.8	27.1	.0	28.9
49	311.9	-21.8	9.8	-53.3	23.8	.0	25.8
50	340.4	-21.8	9.8	-46.9	20.5	.0	22.7
51	368.9	-21.8	9.8	-40.5	17.1	.0	19.8
52	397.4	-21.8	9.8	-34.1	13.8	.0	16.9
53	425.9	-21.8	9.8	-27.7	10.5	.0	14.4
54	319.1	-27.2	12.7	-66.2	30.5	.0	33.0
55	347.7	-27.2	12.7	-59.8	27.1	.0	30.0
56	376.2	-27.2	12.7	-53.3	23.8	.0	27.0
57	404.7	-27.2	12.7	-46.9	20.5	.0	24.1
58	433.2	-27.2	12.7	-40.5	17.1	.0	21.3
59	461.7	-27.2	12.7	-34.1	13.8	.0	18.7
60	490.2	-27.2	12.7	-27.7	10.5	.0	16.4
61	383.4	-32.6	15.5	-66.2	30.5	.0	34.2
62	411.9	-32.6	15.5	-59.8	27.1	.0	31.3
63	440.4	-32.6	15.5	-53.3	23.8	.0	28.4
64	468.9	-32.6	15.5	-46.9	20.5	.0	25.7
65	497.4	-32.6	15.5	-40.5	17.1	.0	23.1
66	525.9	-32.6	15.5	-34.1	13.8	.0	20.7
67	554.4	-32.6	15.5	-27.7	10.5	.0	18.7
68	447.6	-38.1	18.3	-66.2	30.5	.0	35.6
69	476.1	-38.1	18.3	-59.8	27.1	.0	32.7
70	504.6	-38.1	18.3	-53.3	23.8	.0	30.0
71	533.1	-38.1	18.3	-46.9	20.5	.0	27.5
72	561.6	-38.1	18.3	-40.5	17.1	.0	25.1
73	590.2	-38.1	18.3	-34.1	13.8	.0	22.9
74	618.7	-38.1	18.3	-27.7	10.5	.0	21.1
75	-371.7	22.4	-13.1	-72.8	34.0	.0	36.4
76	-402.0	22.8	-13.6	-54.6	24.5	.0	28.0
77	-308.7	22.4	-13.1	-61.5	28.0	.0	31.0
78	-329.7	22.8	-13.6	-45.6	19.8	.0	24.0
79	-245.7	22.4	-13.1	-50.1	22.1	.0	25.7
80	-210.0	22.4	-13.1	-43.7	18.8	.0	22.9
81	-216.6	22.8	-13.6	-31.4	12.4	.0	18.4
82	-147.0	22.4	-13.1	-32.4	12.9	.0	18.4
83	-144.3	22.8	-13.6	-22.3	7.7	.0	15.6
84	-84.0	22.4	-13.1	-21.0	7.0	.0	14.9
85	-297.8	29.1	-16.6	-72.5	33.6	.0	37.5
86	-43.1	17.5	-10.6	-21.6	7.6	.0	13.0
87	-244.0	13.8	-8.6	-72.8	34.0	.0	35.0
88	43.8	13.8	-8.6	-21.0	7.0	.0	11.1
89	-162.9	14.5	-9.0	-72.5	33.6	.0	34.8
90	109.6	12.7	-8.1	-21.6	7.6	.0	11.1

91	-98.0	3.9	-3.5	-72.8	34.0	.0	34.1
92	189.8	3.9	-3.5	-21.0	7.0	.0	7.8
93	-28.0	-.1	-1.4	-72.5	33.6	.0	33.6
94	262.2	7.8	-5.6	-21.6	7.6	.0	9.4
95	48.0	-6.0	1.6	-72.8	34.0	.0	34.0
96	335.8	-6.0	1.6	-21.0	7.0	.0	7.2
97	106.9	-14.8	6.2	-72.5	33.6	.0	34.2
98	414.9	3.0	-3.0	-21.6	7.6	.0	8.2
99	194.0	-15.8	6.8	-72.8	34.0	.0	34.6
100	481.8	-15.8	6.8	-21.0	7.0	.0	9.7
101	241.8	-29.4	13.8	-72.5	33.6	.0	36.3
102	567.6	-1.8	-.5	-21.6	7.6	.0	7.6
103	340.0	-25.7	11.9	-72.8	34.0	.0	36.0
104	627.8	-25.7	11.9	-21.0	7.0	.0	13.8
105	376.7	-44.0	21.4	-72.5	33.6	.0	39.8
106	720.2	-6.6	2.0	-21.6	7.6	.0	7.8
107	486.0	-35.6	17.0	-72.8	34.0	.0	38.0
108	773.8	-35.6	17.0	-21.0	7.0	.0	18.4
109	511.6	-58.6	29.0	-72.5	33.6	.0	44.4
110	872.9	-11.5	4.5	-21.6	7.6	.0	8.8
111	613.8	-44.2	21.5	-72.8	34.0	.0	40.2
112	702.5	-44.7	22.0	-44.4	19.1	.0	29.2
113	676.8	-44.2	21.5	-61.5	28.0	.0	35.4
114	754.4	-44.7	22.0	-31.1	12.2	.0	25.2
115	739.9	-44.2	21.5	-50.1	22.1	.0	30.9
116	775.5	-44.2	21.5	-43.7	18.8	.0	28.6
117	835.6	-44.7	22.0	-10.3	1.4	.0	22.1
118	838.5	-44.2	21.5	-32.4	12.9	.0	25.1
119	887.4	-44.7	22.0	3.0	-5.5	.0	22.7
120	901.6	-44.2	21.5	-21.0	7.0	.0	22.6

Mris = (Mxp^2 + Myp^2)^0.5

LINEA FS FERRANDINA MATERA
VI08 Pile P17-P20 - Analisi SLV

CONDIZIONE DI CARICO 9
VI08 - P19 - SLV_x

Coordinate Centri di Carico (c.c.)

c.c.	Xc m	Yc m	Zc m	Alfc deg
1	.000	.000	.000	.00
2	.000	.000	.000	.00

Componenti di Azioni Esterne riferite ai Centri di Carico

c.c.	Fzc kN	Fxc kN	Mxc kN*m	Fyc kN	Myc kN*m	Mzc kN*m
1	17867.7	5084.6	128135.4	2403.9	62258.9	3377.1
2	13395.0	.0	.0	.0	.0	.0

Componenti di Carico Risultanti (riferimento globale)

Fz kN	Fx kN	Mx kN*m	Fy kN	My kN*m	Mz kN*m
31262.7	5084.6	128135.4	2403.9	62258.9	3377.1

Punto di applic. carico verticale: Xv = 4.099 m Yv = 1.991 m

Componenti di Spostamento del Plinto (riferimento globale)

dz mm	dx mm	rx mRad	dy mm	ry mRad	rz mRad
2.390	1.790	.756	.872	.249	.038

Sollecitazioni in Sommita' ai Singoli Pali (riferimento locale)

palo	Fzp kN	Fxp kN	Mxp kN*m	Fyp kN	Myp kN*m	Mzp kN*m	Mris kN*m
1	670.5	28.7	-9.8	21.5	-9.5	.0	13.7
2	572.2	28.7	-9.8	20.3	-8.9	.0	13.2
3	474.0	28.7	-9.8	19.1	-8.3	.0	12.8
4	375.8	28.7	-9.8	17.9	-7.6	.0	12.5
5	277.6	28.7	-9.8	16.7	-7.0	.0	12.1
6	179.4	28.7	-9.8	15.5	-6.4	.0	11.7
7	81.1	28.7	-9.8	14.4	-5.8	.0	11.4
8	643.1	29.7	-10.4	21.5	-9.5	.0	14.0
9	544.9	29.7	-10.4	20.3	-8.9	.0	13.6
10	446.7	29.7	-10.4	19.1	-8.3	.0	13.2
11	348.4	29.7	-10.4	17.9	-7.6	.0	12.9
12	250.2	29.7	-10.4	16.7	-7.0	.0	12.5
13	152.0	29.7	-10.4	15.5	-6.4	.0	12.2
14	53.8	29.7	-10.4	14.4	-5.8	.0	11.9

15	615.7	30.7	-10.9	21.5	-9.5	.0	14.4
16	517.5	30.7	-10.9	20.3	-8.9	.0	14.0
17	419.3	30.7	-10.9	19.1	-8.3	.0	13.7
18	321.1	30.7	-10.9	17.9	-7.6	.0	13.3
19	222.8	30.7	-10.9	16.7	-7.0	.0	12.9
20	124.6	30.7	-10.9	15.5	-6.4	.0	12.6
21	26.4	30.7	-10.9	14.4	-5.8	.0	12.3
22	588.3	31.7	-11.4	21.5	-9.5	.0	14.8
23	490.1	31.7	-11.4	20.3	-8.9	.0	14.4
24	391.9	31.7	-11.4	19.1	-8.3	.0	14.1
25	293.7	31.7	-11.4	17.9	-7.6	.0	13.7
26	195.5	31.7	-11.4	16.7	-7.0	.0	13.4
27	97.3	31.7	-11.4	15.5	-6.4	.0	13.1
28	-1.0	31.7	-11.4	14.4	-5.8	.0	12.8
29	561.0	32.7	-11.9	21.5	-9.5	.0	15.2
30	462.8	32.7	-11.9	20.3	-8.9	.0	14.9
31	69.9	32.7	-11.9	15.5	-6.4	.0	13.5
32	-28.3	32.7	-11.9	14.4	-5.8	.0	13.3
33	355.8	33.0	-12.1	19.1	-8.3	.0	14.6
34	257.6	33.0	-12.1	17.9	-7.6	.0	14.3
35	159.4	33.0	-12.1	16.7	-7.0	.0	14.0
36	533.6	33.7	-12.4	21.5	-9.5	.0	15.7
37	435.4	33.7	-12.4	20.3	-8.9	.0	15.3
38	42.5	33.7	-12.4	15.5	-6.4	.0	14.0
39	-55.7	33.7	-12.4	14.4	-5.8	.0	13.7
40	318.5	34.4	-12.8	19.1	-8.3	.0	15.2
41	220.3	34.4	-12.8	17.9	-7.6	.0	14.9
42	122.1	34.4	-12.8	16.7	-7.0	.0	14.6
43	506.2	34.7	-13.0	21.5	-9.5	.0	16.1
44	408.0	34.7	-13.0	20.3	-8.9	.0	15.7
45	15.1	34.7	-13.0	15.5	-6.4	.0	14.5
46	-83.1	34.7	-13.0	14.4	-5.8	.0	14.2
47	478.9	35.7	-13.5	21.5	-9.5	.0	16.5
48	380.7	35.7	-13.5	20.3	-8.9	.0	16.1
49	282.4	35.7	-13.5	19.1	-8.3	.0	15.8
50	184.2	35.7	-13.5	17.9	-7.6	.0	15.5
51	86.0	35.7	-13.5	16.7	-7.0	.0	15.2
52	-12.2	35.7	-13.5	15.5	-6.4	.0	14.9
53	-110.4	35.7	-13.5	14.4	-5.8	.0	14.7
54	451.5	36.7	-14.0	21.5	-9.5	.0	16.9
55	353.3	36.7	-14.0	20.3	-8.9	.0	16.6
56	255.1	36.7	-14.0	19.1	-8.3	.0	16.3
57	156.8	36.7	-14.0	17.9	-7.6	.0	16.0
58	58.6	36.7	-14.0	16.7	-7.0	.0	15.7
59	-39.6	36.7	-14.0	15.5	-6.4	.0	15.4
60	-137.8	36.7	-14.0	14.4	-5.8	.0	15.2
61	424.1	37.7	-14.5	21.5	-9.5	.0	17.4
62	325.9	37.7	-14.5	20.3	-8.9	.0	17.0
63	227.7	37.7	-14.5	19.1	-8.3	.0	16.7
64	129.5	37.7	-14.5	17.9	-7.6	.0	16.4
65	31.3	37.7	-14.5	16.7	-7.0	.0	16.1
66	-67.0	37.7	-14.5	15.5	-6.4	.0	15.9
67	-165.2	37.7	-14.5	14.4	-5.8	.0	15.6
68	396.8	38.7	-15.1	21.5	-9.5	.0	17.8
69	298.5	38.7	-15.1	20.3	-8.9	.0	17.5
70	200.3	38.7	-15.1	19.1	-8.3	.0	17.2
71	102.1	38.7	-15.1	17.9	-7.6	.0	16.9
72	3.9	38.7	-15.1	16.7	-7.0	.0	16.6
73	-94.3	38.7	-15.1	15.5	-6.4	.0	16.4
74	-192.5	38.7	-15.1	14.4	-5.8	.0	16.1
75	1004.4	27.6	-9.2	22.7	-10.1	.0	13.7
76	904.5	27.6	-9.3	-8.8	6.2	.0	11.2
77	787.2	27.6	-9.2	20.6	-9.0	.0	12.9
78	688.7	27.6	-9.3	-3.5	3.5	.0	9.9
79	570.0	27.6	-9.2	18.5	-7.9	.0	12.2
80	447.2	27.6	-9.2	17.3	-7.3	.0	11.8
81	350.9	27.6	-9.3	4.6	-.7	.0	9.3
82	230.0	27.6	-9.2	15.2	-6.2	.0	11.1
83	135.1	27.6	-9.3	9.8	-3.4	.0	9.9
84	12.8	27.6	-9.2	13.1	-5.1	.0	10.6
85	1000.1	-5.2	7.8	22.7	-10.1	.0	12.8
86	-44.3	27.3	-9.1	13.3	-5.3	.0	10.5
87	950.0	29.2	-10.1	22.7	-10.1	.0	14.3
88	-41.6	29.2	-10.1	13.1	-5.1	.0	11.3
89	940.5	-1.3	5.8	22.7	-10.1	.0	11.6
90	-107.2	27.0	-9.0	13.3	-5.3	.0	10.4

91	887.8	31.0	-11.0	22.7	-10.1	.0	15.0
92	-103.8	31.0	-11.0	13.1	-5.1	.0	12.2
93	880.9	2.5	3.8	22.7	-10.1	.0	10.8
94	-170.1	26.7	-8.8	13.3	-5.3	.0	10.3
95	825.6	32.8	-12.0	22.7	-10.1	.0	15.7
96	-166.0	32.8	-12.0	13.1	-5.1	.0	13.0
97	821.3	6.4	1.8	22.7	-10.1	.0	10.3
98	-233.0	26.5	-8.7	13.3	-5.3	.0	10.1
99	763.4	34.6	-12.9	22.7	-10.1	.0	16.4
100	-228.2	34.6	-12.9	13.1	-5.1	.0	13.9
101	761.7	10.3	-.3	22.7	-10.1	.0	10.1
102	-295.9	26.2	-8.5	13.3	-5.3	.0	10.0
103	701.2	36.5	-13.9	22.7	-10.1	.0	17.2
104	-290.4	36.5	-13.9	13.1	-5.1	.0	14.8
105	702.1	14.2	-2.3	22.7	-10.1	.0	10.4
106	-358.8	25.9	-8.4	13.3	-5.3	.0	9.9
107	639.0	38.3	-14.8	22.7	-10.1	.0	18.0
108	-352.6	38.3	-14.8	13.1	-5.1	.0	15.7
109	642.4	18.1	-4.3	22.7	-10.1	.0	11.0
110	-421.7	25.6	-8.2	13.3	-5.3	.0	9.8
111	584.6	39.9	-15.7	22.7	-10.1	.0	18.6
112	446.4	40.1	-15.9	37.2	-17.7	.0	23.8
113	367.4	39.9	-15.7	20.6	-9.0	.0	18.1
114	234.4	40.1	-15.9	27.9	-12.8	.0	20.4
115	150.1	39.9	-15.7	18.5	-7.9	.0	17.6
116	27.4	39.9	-15.7	17.3	-7.3	.0	17.3
117	-97.4	40.1	-15.9	13.3	-5.2	.0	16.7
118	-189.8	39.9	-15.7	15.2	-6.2	.0	16.9
119	-309.5	40.1	-15.9	3.9	-.3	.0	15.9
120	-407.1	39.9	-15.7	13.1	-5.1	.0	16.5

Mris = (Mxp^2 + Myp^2)^0.5

LINEA FS FERRANDINA MATERA
VI08 Pile P17-P20 - Analisi SLV

CONDIZIONE DI CARICO 10
VI08 - P19 - SLV_x

Coordinate Centri di Carico (c.c.)

c.c.	Xc m	Yc m	Zc m	Alfc deg
1	.000	.000	.000	.00
2	.000	.000	.000	.00

Componenti di Azioni Esterne riferite ai Centri di Carico

c.c.	Fzc kN	Fxc kN	Mxc kN*m	Fyc kN	Myc kN*m	Mzc kN*m
1	15995.9	-5084.6	-128135.4	-2403.9	-62258.9	-3377.1
2	13395.0	.0	.0	.0	.0	.0

Componenti di Carico Risultanti (riferimento globale)

Fz kN	Fx kN	Mx kN*m	Fy kN	My kN*m	Mz kN*m
29390.9	-5084.6	-128135.4	-2403.9	-62258.9	-3377.1

Punto di applic. carico verticale: Xv = -4.360 m Yv = -2.118 m

Componenti di Spostamento del Plinto (riferimento globale)

dz mm	dx mm	rx mRad	dy mm	ry mRad	rz mRad
2.246	-1.790	-.756	-.872	-.249	-.038

Sollecitazioni in Sommita' ai Singoli Pali (riferimento locale)

palo	Fzp kN	Fxp kN	Mxp kN*m	Fyp kN	Myp kN*m	Mzp kN*m	Mris kN*m
1	-206.9	-28.7	9.8	-21.5	9.5	.0	13.7
2	-108.6	-28.7	9.8	-20.3	8.9	.0	13.2
3	-10.4	-28.7	9.8	-19.1	8.3	.0	12.8
4	87.8	-28.7	9.8	-17.9	7.6	.0	12.5
5	186.0	-28.7	9.8	-16.7	7.0	.0	12.1
6	284.2	-28.7	9.8	-15.5	6.4	.0	11.7
7	382.5	-28.7	9.8	-14.4	5.8	.0	11.4
8	-179.5	-29.7	10.4	-21.5	9.5	.0	14.0
9	-81.3	-29.7	10.4	-20.3	8.9	.0	13.6
10	17.0	-29.7	10.4	-19.1	8.3	.0	13.2
11	115.2	-29.7	10.4	-17.9	7.6	.0	12.9
12	213.4	-29.7	10.4	-16.7	7.0	.0	12.5
13	311.6	-29.7	10.4	-15.5	6.4	.0	12.2
14	409.8	-29.7	10.4	-14.4	5.8	.0	11.9

15	-152.1	-30.7	10.9	-21.5	9.5	.0	14.4
16	-53.9	-30.7	10.9	-20.3	8.9	.0	14.0
17	44.3	-30.7	10.9	-19.1	8.3	.0	13.7
18	142.5	-30.7	10.9	-17.9	7.6	.0	13.3
19	240.8	-30.7	10.9	-16.7	7.0	.0	12.9
20	339.0	-30.7	10.9	-15.5	6.4	.0	12.6
21	437.2	-30.7	10.9	-14.4	5.8	.0	12.3
22	-124.7	-31.7	11.4	-21.5	9.5	.0	14.8
23	-26.5	-31.7	11.4	-20.3	8.9	.0	14.4
24	71.7	-31.7	11.4	-19.1	8.3	.0	14.1
25	169.9	-31.7	11.4	-17.9	7.6	.0	13.7
26	268.1	-31.7	11.4	-16.7	7.0	.0	13.4
27	366.3	-31.7	11.4	-15.5	6.4	.0	13.1
28	464.6	-31.7	11.4	-14.4	5.8	.0	12.8
29	-97.4	-32.7	11.9	-21.5	9.5	.0	15.2
30	.8	-32.7	11.9	-20.3	8.9	.0	14.9
31	393.7	-32.7	11.9	-15.5	6.4	.0	13.5
32	491.9	-32.7	11.9	-14.4	5.8	.0	13.3
33	107.8	-33.0	12.1	-19.1	8.3	.0	14.6
34	206.0	-33.0	12.1	-17.9	7.6	.0	14.3
35	304.2	-33.0	12.1	-16.7	7.0	.0	14.0
36	-70.0	-33.7	12.4	-21.5	9.5	.0	15.7
37	28.2	-33.7	12.4	-20.3	8.9	.0	15.3
38	421.1	-33.7	12.4	-15.5	6.4	.0	14.0
39	519.3	-33.7	12.4	-14.4	5.8	.0	13.7
40	145.1	-34.4	12.8	-19.1	8.3	.0	15.2
41	243.3	-34.4	12.8	-17.9	7.6	.0	14.9
42	341.5	-34.4	12.8	-16.7	7.0	.0	14.6
43	-42.6	-34.7	13.0	-21.5	9.5	.0	16.1
44	55.6	-34.7	13.0	-20.3	8.9	.0	15.7
45	448.5	-34.7	13.0	-15.5	6.4	.0	14.5
46	546.7	-34.7	13.0	-14.4	5.8	.0	14.2
47	-15.3	-35.7	13.5	-21.5	9.5	.0	16.5
48	83.0	-35.7	13.5	-20.3	8.9	.0	16.1
49	181.2	-35.7	13.5	-19.1	8.3	.0	15.8
50	279.4	-35.7	13.5	-17.9	7.6	.0	15.5
51	377.6	-35.7	13.5	-16.7	7.0	.0	15.2
52	475.8	-35.7	13.5	-15.5	6.4	.0	14.9
53	574.0	-35.7	13.5	-14.4	5.8	.0	14.7
54	12.1	-36.7	14.0	-21.5	9.5	.0	16.9
55	110.3	-36.7	14.0	-20.3	8.9	.0	16.6
56	208.5	-36.7	14.0	-19.1	8.3	.0	16.3
57	306.8	-36.7	14.0	-17.9	7.6	.0	16.0
58	405.0	-36.7	14.0	-16.7	7.0	.0	15.7
59	503.2	-36.7	14.0	-15.5	6.4	.0	15.4
60	601.4	-36.7	14.0	-14.4	5.8	.0	15.2
61	39.5	-37.7	14.5	-21.5	9.5	.0	17.4
62	137.7	-37.7	14.5	-20.3	8.9	.0	17.0
63	235.9	-37.7	14.5	-19.1	8.3	.0	16.7
64	334.1	-37.7	14.5	-17.9	7.6	.0	16.4
65	432.3	-37.7	14.5	-16.7	7.0	.0	16.1
66	530.6	-37.7	14.5	-15.5	6.4	.0	15.9
67	628.8	-37.7	14.5	-14.4	5.8	.0	15.6
68	66.8	-38.7	15.1	-21.5	9.5	.0	17.8
69	165.1	-38.7	15.1	-20.3	8.9	.0	17.5
70	263.3	-38.7	15.1	-19.1	8.3	.0	17.2
71	361.5	-38.7	15.1	-17.9	7.6	.0	16.9
72	459.7	-38.7	15.1	-16.7	7.0	.0	16.6
73	557.9	-38.7	15.1	-15.5	6.4	.0	16.4
74	656.2	-38.7	15.1	-14.4	5.8	.0	16.1
75	-424.9	-27.6	9.2	-22.7	10.1	.0	13.7
76	-333.8	-27.6	9.3	-10.7	3.9	.0	10.1
77	-207.7	-27.6	9.2	-20.6	9.0	.0	12.9
78	-118.0	-27.6	9.3	-15.9	6.6	.0	11.4
79	9.5	-27.6	9.2	-18.5	7.9	.0	12.2
80	132.3	-27.6	9.2	-17.3	7.3	.0	11.8
81	219.8	-27.6	9.3	-24.1	10.8	.0	14.3
82	349.5	-27.6	9.2	-15.2	6.2	.0	11.1
83	435.6	-27.6	9.3	-29.3	13.5	.0	16.4
84	566.7	-27.6	9.2	-13.1	5.1	.0	10.6
85	-429.4	-14.2	2.3	-22.7	10.1	.0	10.4
86	615.0	-7.9	-1.0	-13.3	5.3	.0	5.4
87	-370.5	-29.2	10.1	-22.7	10.1	.0	14.3
88	621.1	-29.2	10.1	-13.1	5.1	.0	11.3
89	-369.8	-18.1	4.3	-22.7	10.1	.0	11.0
90	677.9	-7.6	-1.1	-13.3	5.3	.0	5.4

91	-308.3	-31.0	11.0	-22.7	10.1	.0	15.0
92	683.3	-31.0	11.0	-13.1	5.1	.0	12.2
93	-310.2	-22.0	6.3	-22.7	10.1	.0	11.9
94	740.8	-7.3	-1.3	-13.3	5.3	.0	5.4
95	-246.1	-32.8	12.0	-22.7	10.1	.0	15.7
96	745.5	-32.8	12.0	-13.1	5.1	.0	13.0
97	-250.6	-25.9	8.4	-22.7	10.1	.0	13.1
98	803.7	-7.0	-1.4	-13.3	5.3	.0	5.5
99	-183.9	-34.6	12.9	-22.7	10.1	.0	16.4
100	807.7	-34.6	12.9	-13.1	5.1	.0	13.9
101	-191.0	-29.7	10.4	-22.7	10.1	.0	14.5
102	866.6	-6.7	-1.6	-13.3	5.3	.0	5.5
103	-121.7	-36.5	13.9	-22.7	10.1	.0	17.2
104	869.9	-36.5	13.9	-13.1	5.1	.0	14.8
105	-131.4	-33.6	12.4	-22.7	10.1	.0	16.0
106	929.5	-6.5	-1.7	-13.3	5.3	.0	5.6
107	-59.5	-38.3	14.8	-22.7	10.1	.0	18.0
108	932.1	-38.3	14.8	-13.1	5.1	.0	15.7
109	-71.7	-37.5	14.4	-22.7	10.1	.0	17.6
110	992.4	-6.2	-1.9	-13.3	5.3	.0	5.6
111	-5.1	-39.9	15.7	-22.7	10.1	.0	18.6
112	124.3	-40.1	15.9	-17.8	7.6	.0	17.6
113	212.1	-39.9	15.7	-20.6	9.0	.0	18.1
114	336.3	-40.1	15.9	-8.5	2.7	.0	16.1
115	429.4	-39.9	15.7	-18.5	7.9	.0	17.6
116	552.1	-39.9	15.7	-17.3	7.3	.0	17.3
117	668.1	-40.1	15.9	6.2	-4.9	.0	16.6
118	769.3	-39.9	15.7	-15.2	6.2	.0	16.9
119	880.2	-40.1	15.9	15.5	-9.8	.0	18.7
120	986.6	-39.9	15.7	-13.1	5.1	.0	16.5

Mris = (Mxp^2 + Myp^2)^0.5

LINEA FS FERRANDINA MATERA
VI08 Pile P17-P20 - Analisi SLV

CONDIZIONE DI CARICO 11
VI08 - P19 - SLV_y

Coordinate Centri di Carico (c.c.)

c.c.	Xc m	Yc m	Zc m	Alfc deg
1	.000	.000	.000	.00
2	.000	.000	.000	.00

Componenti di Azioni Esterne riferite ai Centri di Carico

c.c.	Fzc kN	Fxc kN	Mxc kN*m	Fyc kN	Myc kN*m	Mzc kN*m
1	17805.4	1525.6	38441.9	8012.8	207529.0	11256.9
2	13395.0	.0	.0	.0	.0	.0

Componenti di Carico Risultanti (riferimento globale)

Fz kN	Fx kN	Mx kN*m	Fy kN	My kN*m	Mz kN*m
31200.4	1525.6	38441.9	8012.8	207529.0	11256.9

Punto di applic. carico verticale: Xv = 1.232 m Yv = 6.651 m

Componenti di Spostamento del Plinto (riferimento globale)

dz mm	dx mm	rx mRad	dy mm	ry mRad	rz mRad
2.385	.537	.227	2.905	.829	.126

Sollecitazioni in Sommita' ai Singoli Pali (riferimento locale)

palo	Fzp kN	Fxp kN	Mxp kN*m	Fyp kN	Myp kN*m	Mzp kN*m	Mris kN*m
1	783.0	-6.6	5.0	71.6	-31.6	.0	32.0
2	753.6	-6.6	5.0	67.6	-29.6	.0	30.0
3	724.1	-6.6	5.0	63.7	-27.5	.0	28.0
4	694.6	-6.6	5.0	59.7	-25.5	.0	26.0
5	665.2	-6.6	5.0	55.8	-23.4	.0	23.9
6	635.7	-6.6	5.0	51.8	-21.4	.0	21.9
7	606.2	-6.6	5.0	47.8	-19.3	.0	19.9
8	691.8	-3.3	3.2	71.6	-31.6	.0	31.8
9	662.3	-3.3	3.2	67.6	-29.6	.0	29.8
10	632.9	-3.3	3.2	63.7	-27.5	.0	27.7
11	603.4	-3.3	3.2	59.7	-25.5	.0	25.7
12	573.9	-3.3	3.2	55.8	-23.4	.0	23.6
13	544.5	-3.3	3.2	51.8	-21.4	.0	21.6
14	515.0	-3.3	3.2	47.8	-19.3	.0	19.6

15	600.6	.1	1.5	71.6	-31.6	.0	31.7
16	571.1	.1	1.5	67.6	-29.6	.0	29.6
17	541.6	.1	1.5	63.7	-27.5	.0	27.6
18	512.2	.1	1.5	59.7	-25.5	.0	25.5
19	482.7	.1	1.5	55.8	-23.4	.0	23.5
20	453.2	.1	1.5	51.8	-21.4	.0	21.4
21	423.8	.1	1.5	47.8	-19.3	.0	19.4
22	509.3	3.4	-.3	71.6	-31.6	.0	31.6
23	479.9	3.4	-.3	67.6	-29.6	.0	29.6
24	450.4	3.4	-.3	63.7	-27.5	.0	27.5
25	420.9	3.4	-.3	59.7	-25.5	.0	25.5
26	391.5	3.4	-.3	55.8	-23.4	.0	23.4
27	362.0	3.4	-.3	51.8	-21.4	.0	21.4
28	332.5	3.4	-.3	47.8	-19.3	.0	19.3
29	418.1	6.8	-2.0	71.6	-31.6	.0	31.7
30	388.6	6.8	-2.0	67.6	-29.6	.0	29.7
31	270.8	6.8	-2.0	51.8	-21.4	.0	21.4
32	241.3	6.8	-2.0	47.8	-19.3	.0	19.4
33	330.1	7.8	-2.5	63.7	-27.5	.0	27.6
34	300.7	7.8	-2.5	59.7	-25.5	.0	25.6
35	271.2	7.8	-2.5	55.8	-23.4	.0	23.5
36	326.9	10.1	-3.7	71.6	-31.6	.0	31.9
37	297.4	10.1	-3.7	67.6	-29.6	.0	29.8
38	179.5	10.1	-3.7	51.8	-21.4	.0	21.7
39	150.1	10.1	-3.7	47.8	-19.3	.0	19.7
40	205.7	12.4	-4.9	63.7	-27.5	.0	28.0
41	176.3	12.4	-4.9	59.7	-25.5	.0	25.9
42	146.8	12.4	-4.9	55.8	-23.4	.0	23.9
43	235.6	13.5	-5.5	71.6	-31.6	.0	32.1
44	206.2	13.5	-5.5	67.6	-29.6	.0	30.1
45	88.3	13.5	-5.5	51.8	-21.4	.0	22.0
46	58.8	13.5	-5.5	47.8	-19.3	.0	20.1
47	144.4	16.8	-7.2	71.6	-31.6	.0	32.5
48	114.9	16.8	-7.2	67.6	-29.6	.0	30.5
49	85.5	16.8	-7.2	63.7	-27.5	.0	28.5
50	56.0	16.8	-7.2	59.7	-25.5	.0	26.5
51	26.5	16.8	-7.2	55.8	-23.4	.0	24.5
52	-2.9	16.8	-7.2	51.8	-21.4	.0	22.5
53	-32.4	16.8	-7.2	47.8	-19.3	.0	20.6
54	53.2	20.2	-9.0	71.6	-31.6	.0	32.9
55	23.7	20.2	-9.0	67.6	-29.6	.0	30.9
56	-5.8	20.2	-9.0	63.7	-27.5	.0	28.9
57	-35.2	20.2	-9.0	59.7	-25.5	.0	27.0
58	-64.7	20.2	-9.0	55.8	-23.4	.0	25.1
59	-94.2	20.2	-9.0	51.8	-21.4	.0	23.2
60	-123.6	20.2	-9.0	47.8	-19.3	.0	21.3
61	-38.1	23.5	-10.7	71.6	-31.6	.0	33.4
62	-67.5	23.5	-10.7	67.6	-29.6	.0	31.5
63	-97.0	23.5	-10.7	63.7	-27.5	.0	29.5
64	-126.5	23.5	-10.7	59.7	-25.5	.0	27.6
65	-155.9	23.5	-10.7	55.8	-23.4	.0	25.7
66	-185.4	23.5	-10.7	51.8	-21.4	.0	23.9
67	-214.8	23.5	-10.7	47.8	-19.3	.0	22.1
68	-129.3	26.9	-12.4	71.6	-31.6	.0	34.0
69	-158.7	26.9	-12.4	67.6	-29.6	.0	32.1
70	-188.2	26.9	-12.4	63.7	-27.5	.0	30.2
71	-217.7	26.9	-12.4	59.7	-25.5	.0	28.3
72	-247.1	26.9	-12.4	55.8	-23.4	.0	26.5
73	-276.6	26.9	-12.4	51.8	-21.4	.0	24.7
74	-306.1	26.9	-12.4	47.8	-19.3	.0	23.0
75	1146.6	-10.4	7.0	75.7	-33.8	.0	34.5
76	1171.4	-10.7	7.2	33.6	-11.9	.0	13.9
77	1081.5	-10.4	7.0	68.7	-30.1	.0	30.9
78	1100.9	-10.7	7.2	28.9	-9.4	.0	11.9
79	1016.3	-10.4	7.0	61.7	-26.5	.0	27.4
80	979.5	-10.4	7.0	57.7	-24.4	.0	25.4
81	990.6	-10.7	7.2	21.5	-5.6	.0	9.1
82	914.3	-10.4	7.0	50.7	-20.8	.0	21.9
83	920.2	-10.7	7.2	16.8	-3.1	.0	7.9
84	849.1	-10.4	7.0	43.7	-17.2	.0	18.5
85	1047.9	-43.9	24.4	75.6	-33.7	.0	41.6
86	764.4	17.8	-7.7	44.2	-17.6	.0	19.2
87	965.2	-5.1	4.2	75.7	-33.8	.0	34.0
88	667.7	-5.1	4.2	43.7	-17.2	.0	17.7
89	849.2	-31.0	17.6	75.6	-33.7	.0	38.0
90	554.8	16.8	-7.2	44.2	-17.6	.0	19.0

91	757.9	1.0	1.0	75.7	-33.8	.0	33.8
92	460.4	1.0	1.0	43.7	-17.2	.0	17.2
93	650.4	-18.0	10.9	75.6	-33.7	.0	35.4
94	345.1	15.9	-6.7	44.2	-17.6	.0	18.9
95	550.5	7.1	-2.2	75.7	-33.8	.0	33.9
96	253.0	7.1	-2.2	43.7	-17.2	.0	17.3
97	451.7	-5.1	4.2	75.6	-33.7	.0	33.9
98	135.4	14.9	-6.2	44.2	-17.6	.0	18.7
99	343.2	13.2	-5.3	75.7	-33.8	.0	34.2
100	45.7	13.2	-5.3	43.7	-17.2	.0	18.0
101	253.0	7.9	-2.6	75.6	-33.7	.0	33.8
102	-74.2	14.0	-5.7	44.2	-17.6	.0	18.5
103	135.8	19.3	-8.5	75.7	-33.8	.0	34.8
104	-161.7	19.3	-8.5	43.7	-17.2	.0	19.1
105	54.3	20.8	-9.3	75.6	-33.7	.0	34.9
106	-283.9	13.0	-5.2	44.2	-17.6	.0	18.4
107	-71.5	25.3	-11.7	75.7	-33.8	.0	35.7
108	-369.0	25.3	-11.7	43.7	-17.2	.0	20.7
109	-144.5	33.8	-16.0	75.6	-33.7	.0	37.3
110	-493.6	12.1	-4.7	44.2	-17.6	.0	18.2
111	-252.9	30.7	-14.4	75.7	-33.8	.0	36.7
112	-355.5	31.0	-14.8	61.4	-26.3	.0	30.2
113	-318.1	30.7	-14.4	68.7	-30.1	.0	33.4
114	-413.4	31.0	-14.8	52.3	-21.6	.0	26.2
115	-383.3	30.7	-14.4	61.7	-26.5	.0	30.2
116	-420.1	30.7	-14.4	57.7	-24.4	.0	28.4
117	-504.0	31.0	-14.8	38.1	-14.2	.0	20.5
118	-485.3	30.7	-14.4	50.7	-20.8	.0	25.3
119	-561.8	31.0	-14.8	29.0	-9.5	.0	17.5
120	-550.4	30.7	-14.4	43.7	-17.2	.0	22.4

Mris = (Mxp^2 + Myp^2)^0.5

LINEA FS FERRANDINA MATERA
VI08 Pile P17-P20 - Analisi SLV

CONDIZIONE DI CARICO 12
VI08 - P19 - SLV_y

Coordinate Centri di Carico (c.c.)

c.c.	Xc m	Yc m	Zc m	Alfc deg
1	.000	.000	.000	.00
2	.000	.000	.000	.00

Componenti di Azioni Esterne riferite ai Centri di Carico

c.c.	Fzc kN	Fxc kN	Mxc kN*m	Fyc kN	Myc kN*m	Mzc kN*m
1	16058.1	-1525.6	-38441.9	-8012.8	-207529.0	-11256.9
2	13395.0	.0	.0	.0	.0	.0

Componenti di Carico Risultanti (riferimento globale)

Fz kN	Fx kN	Mx kN*m	Fy kN	My kN*m	Mz kN*m
29453.1	-1525.6	-38441.9	-8012.8	-207529.0	-11256.9

Punto di applic. carico verticale: Xv = -1.305 m Yv = -7.046 m

Componenti di Spostamento del Plinto (riferimento globale)

dz mm	dx mm	rx mRad	dy mm	ry mRad	rz mRad
2.251	-.537	-.227	-2.905	-.829	-.126

Sollecitazioni in Sommita' ai Singoli Pali (riferimento locale)

palo	Fzp kN	Fxp kN	Mxp kN*m	Fyp kN	Myp kN*m	Mzp kN*m	Mris kN*m
1	-319.4	6.6	-5.0	-71.6	31.6	.0	32.0
2	-290.0	6.6	-5.0	-67.6	29.6	.0	30.0
3	-260.5	6.6	-5.0	-63.7	27.5	.0	28.0
4	-231.0	6.6	-5.0	-59.7	25.5	.0	26.0
5	-201.6	6.6	-5.0	-55.8	23.4	.0	23.9
6	-172.1	6.6	-5.0	-51.8	21.4	.0	21.9
7	-142.6	6.6	-5.0	-47.8	19.3	.0	19.9
8	-228.2	3.3	-3.2	-71.6	31.6	.0	31.8
9	-198.7	3.3	-3.2	-67.6	29.6	.0	29.8
10	-169.3	3.3	-3.2	-63.7	27.5	.0	27.7
11	-139.8	3.3	-3.2	-59.7	25.5	.0	25.7
12	-110.3	3.3	-3.2	-55.8	23.4	.0	23.6
13	-80.9	3.3	-3.2	-51.8	21.4	.0	21.6
14	-51.4	3.3	-3.2	-47.8	19.3	.0	19.6

15	-137.0	-.1	-1.5	-71.6	31.6	.0	31.7
16	-107.5	-.1	-1.5	-67.6	29.6	.0	29.6
17	-78.0	-.1	-1.5	-63.7	27.5	.0	27.6
18	-48.6	-.1	-1.5	-59.7	25.5	.0	25.5
19	-19.1	-.1	-1.5	-55.8	23.4	.0	23.5
20	10.4	-.1	-1.5	-51.8	21.4	.0	21.4
21	39.8	-.1	-1.5	-47.8	19.3	.0	19.4
22	-45.7	-3.4	.3	-71.6	31.6	.0	31.6
23	-16.3	-3.4	.3	-67.6	29.6	.0	29.6
24	13.2	-3.4	.3	-63.7	27.5	.0	27.5
25	42.7	-3.4	.3	-59.7	25.5	.0	25.5
26	72.1	-3.4	.3	-55.8	23.4	.0	23.4
27	101.6	-3.4	.3	-51.8	21.4	.0	21.4
28	131.1	-3.4	.3	-47.8	19.3	.0	19.3
29	45.5	-6.8	2.0	-71.6	31.6	.0	31.7
30	75.0	-6.8	2.0	-67.6	29.6	.0	29.7
31	192.8	-6.8	2.0	-51.8	21.4	.0	21.4
32	222.3	-6.8	2.0	-47.8	19.3	.0	19.4
33	133.5	-7.8	2.5	-63.7	27.5	.0	27.6
34	162.9	-7.8	2.5	-59.7	25.5	.0	25.6
35	192.4	-7.8	2.5	-55.8	23.4	.0	23.5
36	136.7	-10.1	3.7	-71.6	31.6	.0	31.9
37	166.2	-10.1	3.7	-67.6	29.6	.0	29.8
38	284.1	-10.1	3.7	-51.8	21.4	.0	21.7
39	313.5	-10.1	3.7	-47.8	19.3	.0	19.7
40	257.9	-12.4	4.9	-63.7	27.5	.0	28.0
41	287.3	-12.4	4.9	-59.7	25.5	.0	25.9
42	316.8	-12.4	4.9	-55.8	23.4	.0	23.9
43	228.0	-13.5	5.5	-71.6	31.6	.0	32.1
44	257.4	-13.5	5.5	-67.6	29.6	.0	30.1
45	375.3	-13.5	5.5	-51.8	21.4	.0	22.0
46	404.8	-13.5	5.5	-47.8	19.3	.0	20.1
47	319.2	-16.8	7.2	-71.6	31.6	.0	32.5
48	348.7	-16.8	7.2	-67.6	29.6	.0	30.5
49	378.1	-16.8	7.2	-63.7	27.5	.0	28.5
50	407.6	-16.8	7.2	-59.7	25.5	.0	26.5
51	437.1	-16.8	7.2	-55.8	23.4	.0	24.5
52	466.5	-16.8	7.2	-51.8	21.4	.0	22.5
53	496.0	-16.8	7.2	-47.8	19.3	.0	20.6
54	410.4	-20.2	9.0	-71.6	31.6	.0	32.9
55	439.9	-20.2	9.0	-67.6	29.6	.0	30.9
56	469.4	-20.2	9.0	-63.7	27.5	.0	28.9
57	498.8	-20.2	9.0	-59.7	25.5	.0	27.0
58	528.3	-20.2	9.0	-55.8	23.4	.0	25.1
59	557.8	-20.2	9.0	-51.8	21.4	.0	23.2
60	587.2	-20.2	9.0	-47.8	19.3	.0	21.3
61	501.7	-23.5	10.7	-71.6	31.6	.0	33.4
62	531.1	-23.5	10.7	-67.6	29.6	.0	31.5
63	560.6	-23.5	10.7	-63.7	27.5	.0	29.5
64	590.1	-23.5	10.7	-59.7	25.5	.0	27.6
65	619.5	-23.5	10.7	-55.8	23.4	.0	25.7
66	649.0	-23.5	10.7	-51.8	21.4	.0	23.9
67	678.5	-23.5	10.7	-47.8	19.3	.0	22.1
68	592.9	-26.9	12.4	-71.6	31.6	.0	34.0
69	622.4	-26.9	12.4	-67.6	29.6	.0	32.1
70	651.8	-26.9	12.4	-63.7	27.5	.0	30.2
71	681.3	-26.9	12.4	-59.7	25.5	.0	28.3
72	710.8	-26.9	12.4	-55.8	23.4	.0	26.5
73	740.2	-26.9	12.4	-51.8	21.4	.0	24.7
74	769.7	-26.9	12.4	-47.8	19.3	.0	23.0
75	-567.1	10.4	-7.0	-75.7	33.8	.0	34.5
76	-600.7	10.7	-7.2	-53.0	22.0	.0	23.1
77	-502.0	10.4	-7.0	-68.7	30.1	.0	30.9
78	-530.2	10.7	-7.2	-48.3	19.5	.0	20.8
79	-436.8	10.4	-7.0	-61.7	26.5	.0	27.4
80	-400.0	10.4	-7.0	-57.7	24.4	.0	25.4
81	-419.9	10.7	-7.2	-40.9	15.7	.0	17.3
82	-334.8	10.4	-7.0	-50.7	20.8	.0	21.9
83	-349.5	10.7	-7.2	-36.2	13.2	.0	15.1
84	-269.6	10.4	-7.0	-43.7	17.2	.0	18.5
85	-477.2	24.5	-14.3	-75.6	33.7	.0	36.6
86	-193.7	1.6	-2.4	-44.2	17.6	.0	17.8
87	-385.7	5.1	-4.2	-75.7	33.8	.0	34.0
88	-88.2	5.1	-4.2	-43.7	17.2	.0	17.7
89	-278.5	11.5	-7.5	-75.6	33.7	.0	34.5
90	15.9	2.6	-2.9	-44.2	17.6	.0	17.8

91	-178.4	-1.0	-1.0	-75.7	33.8	.0	33.8
92	119.1	-1.0	-1.0	-43.7	17.2	.0	17.2
93	-79.7	-1.4	-.8	-75.6	33.7	.0	33.7
94	225.6	3.5	-3.4	-44.2	17.6	.0	17.9
95	29.0	-7.1	2.2	-75.7	33.8	.0	33.9
96	326.5	-7.1	2.2	-43.7	17.2	.0	17.3
97	119.0	-14.4	5.9	-75.6	33.7	.0	34.2
98	435.3	4.5	-3.9	-44.2	17.6	.0	18.0
99	236.3	-13.2	5.3	-75.7	33.8	.0	34.2
100	533.8	-13.2	5.3	-43.7	17.2	.0	18.0
101	317.7	-27.3	12.7	-75.6	33.7	.0	36.0
102	644.9	5.5	-4.4	-44.2	17.6	.0	18.1
103	443.7	-19.3	8.5	-75.7	33.8	.0	34.8
104	741.2	-19.3	8.5	-43.7	17.2	.0	19.1
105	516.4	-40.3	19.4	-75.6	33.7	.0	38.9
106	854.6	6.4	-4.9	-44.2	17.6	.0	18.3
107	651.0	-25.3	11.7	-75.7	33.8	.0	35.7
108	948.5	-25.3	11.7	-43.7	17.2	.0	20.7
109	715.1	-53.2	26.2	-75.6	33.7	.0	42.6
110	1064.3	7.4	-5.4	-44.2	17.6	.0	18.4
111	832.4	-30.7	14.4	-75.7	33.8	.0	36.7
112	926.2	-31.0	14.8	-41.9	16.2	.0	21.9
113	897.6	-30.7	14.4	-68.7	30.1	.0	33.4
114	984.1	-31.0	14.8	-32.9	11.5	.0	18.7
115	962.8	-30.7	14.4	-61.7	26.5	.0	30.2
116	999.6	-30.7	14.4	-57.7	24.4	.0	28.4
117	1074.7	-31.0	14.8	-18.6	4.1	.0	15.3
118	1064.8	-30.7	14.4	-50.7	20.8	.0	25.3
119	1132.5	-31.0	14.8	-9.6	-.6	.0	14.8
120	1129.9	-30.7	14.4	-43.7	17.2	.0	22.4

Mris = (Mxp^2 + Myp^2)^0.5

LINEA FS FERRANDINA MATERA
VI08 Pile P17-P20 - Analisi SLV

CONDIZIONE DI CARICO 13
VI08 - P20 - SLV_x

Coordinate Centri di Carico (c.c.)

c.c.	Xc m	Yc m	Zc m	Alfc deg
1	.000	.000	.000	.00
2	.000	.000	.000	.00

Componenti di Azioni Esterne riferite ai Centri di Carico

c.c.	Fzc kN	Fxc kN	Mxc kN*m	Fyc kN	Myc kN*m	Mzc kN*m
1	16829.8	5255.0	125997.6	1983.9	48846.6	3402.8
2	13395.0	.0	.0	.0	.0	.0

Componenti di Carico Risultanti (riferimento globale)

Fz kN	Fx kN	Mx kN*m	Fy kN	My kN*m	Mz kN*m
30224.8	5255.0	125997.6	1983.9	48846.6	3402.8

Punto di applic. carico verticale: Xv = 4.169 m Yv = 1.616 m

Componenti di Spostamento del Plinto (riferimento globale)

dz mm	dx mm	rx mRad	dy mm	ry mRad	rz mRad
2.310	1.847	.743	.717	.195	.038

Sollecitazioni in Sommita' ai Singoli Pali (riferimento locale)

palo	Fzp kN	Fxp kN	Mxp kN*m	Fyp kN	Myp kN*m	Mzp kN*m	Mris kN*m
1	628.2	30.2	-10.7	18.5	-8.3	.0	13.5
2	531.6	30.2	-10.7	17.3	-7.7	.0	13.2
3	435.0	30.2	-10.7	16.1	-7.0	.0	12.8
4	338.4	30.2	-10.7	14.9	-6.4	.0	12.5
5	241.8	30.2	-10.7	13.7	-5.8	.0	12.2
6	145.2	30.2	-10.7	12.5	-5.2	.0	11.9
7	48.6	30.2	-10.7	11.3	-4.5	.0	11.6
8	606.7	31.2	-11.2	18.5	-8.3	.0	13.9
9	510.1	31.2	-11.2	17.3	-7.7	.0	13.6
10	413.5	31.2	-11.2	16.1	-7.0	.0	13.2
11	316.9	31.2	-11.2	14.9	-6.4	.0	12.9
12	220.4	31.2	-11.2	13.7	-5.8	.0	12.6
13	123.8	31.2	-11.2	12.5	-5.2	.0	12.4
14	27.2	31.2	-11.2	11.3	-4.5	.0	12.1

15	585.3	32.2	-11.7	18.5	-8.3	.0	14.4
16	488.7	32.2	-11.7	17.3	-7.7	.0	14.0
17	392.1	32.2	-11.7	16.1	-7.0	.0	13.7
18	295.5	32.2	-11.7	14.9	-6.4	.0	13.4
19	198.9	32.2	-11.7	13.7	-5.8	.0	13.1
20	102.3	32.2	-11.7	12.5	-5.2	.0	12.8
21	5.7	32.2	-11.7	11.3	-4.5	.0	12.6
22	563.8	33.2	-12.3	18.5	-8.3	.0	14.8
23	467.2	33.2	-12.3	17.3	-7.7	.0	14.5
24	370.6	33.2	-12.3	16.1	-7.0	.0	14.1
25	274.0	33.2	-12.3	14.9	-6.4	.0	13.8
26	177.4	33.2	-12.3	13.7	-5.8	.0	13.6
27	80.8	33.2	-12.3	12.5	-5.2	.0	13.3
28	-15.8	33.2	-12.3	11.3	-4.5	.0	13.1
29	542.3	34.2	-12.8	18.5	-8.3	.0	15.2
30	445.7	34.2	-12.8	17.3	-7.7	.0	14.9
31	59.3	34.2	-12.8	12.5	-5.2	.0	13.8
32	-37.3	34.2	-12.8	11.3	-4.5	.0	13.6
33	342.3	34.6	-13.0	16.1	-7.0	.0	14.8
34	245.7	34.6	-13.0	14.9	-6.4	.0	14.5
35	149.1	34.6	-13.0	13.7	-5.8	.0	14.2
36	520.8	35.3	-13.3	18.5	-8.3	.0	15.7
37	424.2	35.3	-13.3	17.3	-7.7	.0	15.4
38	37.8	35.3	-13.3	12.5	-5.2	.0	14.3
39	-58.8	35.3	-13.3	11.3	-4.5	.0	14.1
40	313.0	36.0	-13.7	16.1	-7.0	.0	15.4
41	216.4	36.0	-13.7	14.9	-6.4	.0	15.1
42	119.8	36.0	-13.7	13.7	-5.8	.0	14.9
43	499.3	36.3	-13.9	18.5	-8.3	.0	16.1
44	402.7	36.3	-13.9	17.3	-7.7	.0	15.8
45	16.3	36.3	-13.9	12.5	-5.2	.0	14.8
46	-80.2	36.3	-13.9	11.3	-4.5	.0	14.6
47	477.8	37.3	-14.4	18.5	-8.3	.0	16.6
48	381.2	37.3	-14.4	17.3	-7.7	.0	16.3
49	284.7	37.3	-14.4	16.1	-7.0	.0	16.0
50	188.1	37.3	-14.4	14.9	-6.4	.0	15.7
51	91.5	37.3	-14.4	13.7	-5.8	.0	15.5
52	-5.1	37.3	-14.4	12.5	-5.2	.0	15.3
53	-101.7	37.3	-14.4	11.3	-4.5	.0	15.1
54	456.4	38.3	-14.9	18.5	-8.3	.0	17.1
55	359.8	38.3	-14.9	17.3	-7.7	.0	16.8
56	263.2	38.3	-14.9	16.1	-7.0	.0	16.5
57	166.6	38.3	-14.9	14.9	-6.4	.0	16.2
58	70.0	38.3	-14.9	13.7	-5.8	.0	16.0
59	-26.6	38.3	-14.9	12.5	-5.2	.0	15.8
60	-123.2	38.3	-14.9	11.3	-4.5	.0	15.6
61	434.9	39.3	-15.4	18.5	-8.3	.0	17.5
62	338.3	39.3	-15.4	17.3	-7.7	.0	17.2
63	241.7	39.3	-15.4	16.1	-7.0	.0	17.0
64	145.1	39.3	-15.4	14.9	-6.4	.0	16.7
65	48.5	39.3	-15.4	13.7	-5.8	.0	16.5
66	-48.1	39.3	-15.4	12.5	-5.2	.0	16.3
67	-144.7	39.3	-15.4	11.3	-4.5	.0	16.1
68	413.4	40.3	-16.0	18.5	-8.3	.0	18.0
69	316.8	40.3	-16.0	17.3	-7.7	.0	17.7
70	220.2	40.3	-16.0	16.1	-7.0	.0	17.4
71	123.6	40.3	-16.0	14.9	-6.4	.0	17.2
72	27.0	40.3	-16.0	13.7	-5.8	.0	17.0
73	-69.6	40.3	-16.0	12.5	-5.2	.0	16.8
74	-166.2	40.3	-16.0	11.3	-4.5	.0	16.6
75	941.2	29.1	-10.1	19.7	-8.9	.0	13.5
76	840.6	29.1	-10.2	-9.7	6.3	.0	12.0
77	727.5	29.1	-10.1	17.6	-7.8	.0	12.8
78	628.4	29.1	-10.2	-4.6	3.7	.0	10.8
79	513.9	29.1	-10.1	15.5	-6.7	.0	12.1
80	393.2	29.1	-10.1	14.3	-6.1	.0	11.8
81	296.1	29.1	-10.2	3.4	-.4	.0	10.2
82	179.6	29.1	-10.1	12.2	-5.0	.0	11.3
83	83.8	29.1	-10.2	8.4	-3.1	.0	10.6
84	-34.1	29.1	-10.1	10.0	-3.9	.0	10.8
85	944.0	-1.8	6.0	19.6	-8.9	.0	10.7
86	-86.7	27.4	-9.2	10.2	-4.0	.0	10.1
87	898.5	30.7	-10.9	19.7	-8.9	.0	14.1
88	-76.8	30.7	-10.9	10.0	-3.9	.0	11.6
89	897.6	1.6	4.2	19.6	-8.9	.0	9.8
90	-136.4	27.6	-9.3	10.2	-4.0	.0	10.2

91	849.6	32.5	-11.9	19.7	-8.9	.0	14.9
92	-125.6	32.5	-11.9	10.0	-3.9	.0	12.5
93	851.1	5.1	2.4	19.6	-8.9	.0	9.2
94	-186.2	27.7	-9.4	10.2	-4.0	.0	10.2
95	800.8	34.3	-12.8	19.7	-8.9	.0	15.6
96	-174.4	34.3	-12.8	10.0	-3.9	.0	13.4
97	804.7	8.5	.6	19.6	-8.9	.0	8.9
98	-235.9	27.9	-9.5	10.2	-4.0	.0	10.3
99	752.0	36.2	-13.8	19.7	-8.9	.0	16.4
100	-223.3	36.2	-13.8	10.0	-3.9	.0	14.3
101	758.3	12.0	-1.2	19.6	-8.9	.0	9.0
102	-285.7	28.1	-9.6	10.2	-4.0	.0	10.4
103	703.2	38.0	-14.8	19.7	-8.9	.0	17.3
104	-272.1	38.0	-14.8	10.0	-3.9	.0	15.3
105	711.8	15.4	-3.0	19.6	-8.9	.0	9.4
106	-335.4	28.3	-9.7	10.2	-4.0	.0	10.5
107	654.3	39.9	-15.7	19.7	-8.9	.0	18.1
108	-320.9	39.9	-15.7	10.0	-3.9	.0	16.2
109	665.4	18.9	-4.8	19.6	-8.9	.0	10.1
110	-385.1	28.4	-9.8	10.2	-4.0	.0	10.6
111	611.6	41.5	-16.6	19.7	-8.9	.0	18.8
112	478.2	41.7	-16.8	35.2	-17.0	.0	23.9
113	398.0	41.5	-16.6	17.6	-7.8	.0	18.3
114	269.7	41.7	-16.8	26.0	-12.2	.0	20.8
115	184.4	41.5	-16.6	15.5	-6.7	.0	17.9
116	63.6	41.5	-16.6	14.3	-6.1	.0	17.6
117	-56.6	41.7	-16.8	11.5	-4.7	.0	17.4
118	-150.0	41.5	-16.6	12.2	-5.0	.0	17.3
119	-265.1	41.7	-16.8	2.3	.1	.0	16.8
120	-363.6	41.5	-16.6	10.0	-3.9	.0	17.0

Mris = (Mxp^2 + Myp^2)^0.5

LINEA FS FERRANDINA MATERA
VI08 Pile P17-P20 - Analisi SLV

CONDIZIONE DI CARICO 14
VI08 - P20 - SLV_x

Coordinate Centri di Carico (c.c.)

c.c.	Xc m	Yc m	Zc m	Alfc deg
1	.000	.000	.000	.00
2	.000	.000	.000	.00

Componenti di Azioni Esterne riferite ai Centri di Carico

c.c.	Fzc kN	Fxc kN	Mxc kN*m	Fyc kN	Myc kN*m	Mzc kN*m
1	15084.0	-5255.0	-125997.6	-1983.9	-48846.6	-3402.8
2	13395.0	.0	.0	.0	.0	.0

Componenti di Carico Risultanti (riferimento globale)

Fz kN	Fx kN	Mx kN*m	Fy kN	My kN*m	Mz kN*m
28479.0	-5255.0	-125997.6	-1983.9	-48846.6	-3402.8

Punto di applic. carico verticale: Xv = -4.424 m Yv = -1.715 m

Componenti di Spostamento del Plinto (riferimento globale)

dz mm	dx mm	rx mRad	dy mm	ry mRad	rz mRad
2.177	-1.847	-.743	-.717	-.195	-.038

Sollecitazioni in Sommita' ai Singoli Pali (riferimento locale)

palo	Fzp kN	Fxp kN	Mxp kN*m	Fyp kN	Myp kN*m	Mzp kN*m	Mris kN*m
1	-179.5	-30.2	10.7	-18.5	8.3	.0	13.5
2	-82.9	-30.2	10.7	-17.3	7.7	.0	13.2
3	13.7	-30.2	10.7	-16.1	7.0	.0	12.8
4	110.3	-30.2	10.7	-14.9	6.4	.0	12.5
5	206.9	-30.2	10.7	-13.7	5.8	.0	12.2
6	303.5	-30.2	10.7	-12.5	5.2	.0	11.9
7	400.1	-30.2	10.7	-11.3	4.5	.0	11.6
8	-158.0	-31.2	11.2	-18.5	8.3	.0	13.9
9	-61.4	-31.2	11.2	-17.3	7.7	.0	13.6
10	35.2	-31.2	11.2	-16.1	7.0	.0	13.2
11	131.8	-31.2	11.2	-14.9	6.4	.0	12.9
12	228.3	-31.2	11.2	-13.7	5.8	.0	12.6
13	324.9	-31.2	11.2	-12.5	5.2	.0	12.4
14	421.5	-31.2	11.2	-11.3	4.5	.0	12.1

15	-136.6	-32.2	11.7	-18.5	8.3	.0	14.4
16	-40.0	-32.2	11.7	-17.3	7.7	.0	14.0
17	56.6	-32.2	11.7	-16.1	7.0	.0	13.7
18	153.2	-32.2	11.7	-14.9	6.4	.0	13.4
19	249.8	-32.2	11.7	-13.7	5.8	.0	13.1
20	346.4	-32.2	11.7	-12.5	5.2	.0	12.8
21	443.0	-32.2	11.7	-11.3	4.5	.0	12.6
22	-115.1	-33.2	12.3	-18.5	8.3	.0	14.8
23	-18.5	-33.2	12.3	-17.3	7.7	.0	14.5
24	78.1	-33.2	12.3	-16.1	7.0	.0	14.1
25	174.7	-33.2	12.3	-14.9	6.4	.0	13.8
26	271.3	-33.2	12.3	-13.7	5.8	.0	13.6
27	367.9	-33.2	12.3	-12.5	5.2	.0	13.3
28	464.5	-33.2	12.3	-11.3	4.5	.0	13.1
29	-93.6	-34.2	12.8	-18.5	8.3	.0	15.2
30	3.0	-34.2	12.8	-17.3	7.7	.0	14.9
31	389.4	-34.2	12.8	-12.5	5.2	.0	13.8
32	486.0	-34.2	12.8	-11.3	4.5	.0	13.6
33	106.4	-34.6	13.0	-16.1	7.0	.0	14.8
34	203.0	-34.6	13.0	-14.9	6.4	.0	14.5
35	299.6	-34.6	13.0	-13.7	5.8	.0	14.2
36	-72.1	-35.3	13.3	-18.5	8.3	.0	15.7
37	24.5	-35.3	13.3	-17.3	7.7	.0	15.4
38	410.9	-35.3	13.3	-12.5	5.2	.0	14.3
39	507.5	-35.3	13.3	-11.3	4.5	.0	14.1
40	135.7	-36.0	13.7	-16.1	7.0	.0	15.4
41	232.3	-36.0	13.7	-14.9	6.4	.0	15.1
42	328.9	-36.0	13.7	-13.7	5.8	.0	14.9
43	-50.6	-36.3	13.9	-18.5	8.3	.0	16.1
44	46.0	-36.3	13.9	-17.3	7.7	.0	15.8
45	432.3	-36.3	13.9	-12.5	5.2	.0	14.8
46	528.9	-36.3	13.9	-11.3	4.5	.0	14.6
47	-29.1	-37.3	14.4	-18.5	8.3	.0	16.6
48	67.5	-37.3	14.4	-17.3	7.7	.0	16.3
49	164.0	-37.3	14.4	-16.1	7.0	.0	16.0
50	260.6	-37.3	14.4	-14.9	6.4	.0	15.7
51	357.2	-37.3	14.4	-13.7	5.8	.0	15.5
52	453.8	-37.3	14.4	-12.5	5.2	.0	15.3
53	550.4	-37.3	14.4	-11.3	4.5	.0	15.1
54	-7.7	-38.3	14.9	-18.5	8.3	.0	17.1
55	88.9	-38.3	14.9	-17.3	7.7	.0	16.8
56	185.5	-38.3	14.9	-16.1	7.0	.0	16.5
57	282.1	-38.3	14.9	-14.9	6.4	.0	16.2
58	378.7	-38.3	14.9	-13.7	5.8	.0	16.0
59	475.3	-38.3	14.9	-12.5	5.2	.0	15.8
60	571.9	-38.3	14.9	-11.3	4.5	.0	15.6
61	13.8	-39.3	15.4	-18.5	8.3	.0	17.5
62	110.4	-39.3	15.4	-17.3	7.7	.0	17.2
63	207.0	-39.3	15.4	-16.1	7.0	.0	17.0
64	303.6	-39.3	15.4	-14.9	6.4	.0	16.7
65	400.2	-39.3	15.4	-13.7	5.8	.0	16.5
66	496.8	-39.3	15.4	-12.5	5.2	.0	16.3
67	593.4	-39.3	15.4	-11.3	4.5	.0	16.1
68	35.3	-40.3	16.0	-18.5	8.3	.0	18.0
69	131.9	-40.3	16.0	-17.3	7.7	.0	17.7
70	228.5	-40.3	16.0	-16.1	7.0	.0	17.4
71	325.1	-40.3	16.0	-14.9	6.4	.0	17.2
72	421.7	-40.3	16.0	-13.7	5.8	.0	17.0
73	518.3	-40.3	16.0	-12.5	5.2	.0	16.8
74	614.9	-40.3	16.0	-11.3	4.5	.0	16.6
75	-380.3	-29.1	10.1	-19.7	8.9	.0	13.5
76	-288.3	-29.1	10.2	-9.1	3.4	.0	10.7
77	-166.7	-29.1	10.1	-17.6	7.8	.0	12.8
78	-76.0	-29.1	10.2	-14.2	6.1	.0	11.8
79	46.9	-29.1	10.1	-15.5	6.7	.0	12.1
80	167.7	-29.1	10.1	-14.3	6.1	.0	11.8
81	256.3	-29.1	10.2	-22.2	10.2	.0	14.4
82	381.3	-29.1	10.1	-12.2	5.0	.0	11.3
83	468.5	-29.1	10.2	-27.3	12.9	.0	16.4
84	594.9	-29.1	10.1	-10.0	3.9	.0	10.8
85	-391.6	-17.0	3.8	-19.6	8.9	.0	9.7
86	639.1	-8.6	-.6	-10.2	4.0	.0	4.1
87	-337.6	-30.7	10.9	-19.7	8.9	.0	14.1
88	637.7	-30.7	10.9	-10.0	3.9	.0	11.6
89	-345.2	-20.5	5.6	-19.6	8.9	.0	10.5
90	688.8	-8.8	-.5	-10.2	4.0	.0	4.1

91	-288.8	-32.5	11.9	-19.7	8.9	.0	14.9
92	686.5	-32.5	11.9	-10.0	3.9	.0	12.5
93	-298.8	-23.9	7.4	-19.6	8.9	.0	11.6
94	738.5	-8.9	-.4	-10.2	4.0	.0	4.0
95	-239.9	-34.3	12.8	-19.7	8.9	.0	15.6
96	735.3	-34.3	12.8	-10.0	3.9	.0	13.4
97	-252.3	-27.4	9.2	-19.6	8.9	.0	12.8
98	788.3	-9.1	-.3	-10.2	4.0	.0	4.0
99	-191.1	-36.2	13.8	-19.7	8.9	.0	16.4
100	784.1	-36.2	13.8	-10.0	3.9	.0	14.3
101	-205.9	-30.8	11.0	-19.6	8.9	.0	14.1
102	838.0	-9.3	-.2	-10.2	4.0	.0	4.0
103	-142.3	-38.0	14.8	-19.7	8.9	.0	17.3
104	833.0	-38.0	14.8	-10.0	3.9	.0	15.3
105	-159.5	-34.3	12.8	-19.6	8.9	.0	15.6
106	887.7	-9.5	-.1	-10.2	4.0	.0	4.0
107	-93.5	-39.9	15.7	-19.7	8.9	.0	18.1
108	881.8	-39.9	15.7	-10.0	3.9	.0	16.2
109	-113.1	-37.7	14.6	-19.6	8.9	.0	17.1
110	937.5	-9.6	.0	-10.2	4.0	.0	4.0
111	-50.7	-41.5	16.6	-19.7	8.9	.0	18.8
112	74.2	-41.7	16.8	-16.4	7.2	.0	18.3
113	162.9	-41.5	16.6	-17.6	7.8	.0	18.3
114	282.7	-41.7	16.8	-7.2	2.4	.0	17.0
115	376.5	-41.5	16.6	-15.5	6.7	.0	17.9
116	497.2	-41.5	16.6	-14.3	6.1	.0	17.6
117	609.0	-41.7	16.8	7.3	-5.1	.0	17.6
118	710.9	-41.5	16.6	-12.2	5.0	.0	17.3
119	817.4	-41.7	16.8	16.5	-9.9	.0	19.5
120	924.5	-41.5	16.6	-10.0	3.9	.0	17.0

Mris = (Mxp^2 + Myp^2)^0.5

LINEA FS FERRANDINA MATERA
VI08 Pile P17-P20 - Analisi SLV

CONDIZIONE DI CARICO 15
VI08 - P20 - SLV_y

Coordinate Centri di Carico (c.c.)

c.c.	Xc m	Yc m	Zc m	Alfc deg
1	.000	.000	.000	.00
2	.000	.000	.000	.00

Componenti di Azioni Esterne riferite ai Centri di Carico

c.c.	Fzc kN	Fxc kN	Mxc kN*m	Fyc kN	Myc kN*m	Mzc kN*m
1	16782.8	1577.1	37802.1	6613.1	162821.3	11342.6
2	13395.0	.0	.0	.0	.0	.0

Componenti di Carico Risultanti (riferimento globale)

Fz kN	Fx kN	Mx kN*m	Fy kN	My kN*m	Mz kN*m
30177.8	1577.1	37802.1	6613.1	162821.3	11342.6

Punto di applic. carico verticale: Xv = 1.253 m Yv = 5.395 m

Componenti di Spostamento del Plinto (riferimento globale)

dz mm	dx mm	rx mRad	dy mm	ry mRad	rz mRad
2.307	.554	.223	2.391	.651	.127

Sollecitazioni in Sommita' ai Singoli Pali (riferimento locale)

palo	Fzp kN	Fxp kN	Mxp kN*m	Fyp kN	Myp kN*m	Mzp kN*m	Mris kN*m
1	675.6	-6.3	4.8	61.5	-27.6	.0	28.0
2	646.7	-6.3	4.8	57.5	-25.5	.0	26.0
3	617.7	-6.3	4.8	53.5	-23.5	.0	23.9
4	588.7	-6.3	4.8	49.5	-21.4	.0	21.9
5	559.7	-6.3	4.8	45.6	-19.3	.0	19.9
6	530.7	-6.3	4.8	41.6	-17.2	.0	17.9
7	501.8	-6.3	4.8	37.6	-15.2	.0	15.9
8	604.0	-2.9	3.0	61.5	-27.6	.0	27.8
9	575.0	-2.9	3.0	57.5	-25.5	.0	25.7
10	546.1	-2.9	3.0	53.5	-23.5	.0	23.7
11	517.1	-2.9	3.0	49.5	-21.4	.0	21.6
12	488.1	-2.9	3.0	45.6	-19.3	.0	19.5
13	459.1	-2.9	3.0	41.6	-17.2	.0	17.5
14	430.1	-2.9	3.0	37.6	-15.2	.0	15.5

15	532.4	.5	1.3	61.5	-27.6	.0	27.6
16	503.4	.5	1.3	57.5	-25.5	.0	25.6
17	474.5	.5	1.3	53.5	-23.5	.0	23.5
18	445.5	.5	1.3	49.5	-21.4	.0	21.4
19	416.5	.5	1.3	45.6	-19.3	.0	19.4
20	387.5	.5	1.3	41.6	-17.2	.0	17.3
21	358.5	.5	1.3	37.6	-15.2	.0	15.2
22	460.8	3.8	-.5	61.5	-27.6	.0	27.6
23	431.8	3.8	-.5	57.5	-25.5	.0	25.5
24	402.9	3.8	-.5	53.5	-23.5	.0	23.5
25	373.9	3.8	-.5	49.5	-21.4	.0	21.4
26	344.9	3.8	-.5	45.6	-19.3	.0	19.3
27	315.9	3.8	-.5	41.6	-17.2	.0	17.2
28	286.9	3.8	-.5	37.6	-15.2	.0	15.2
29	389.2	7.2	-2.2	61.5	-27.6	.0	27.7
30	360.2	7.2	-2.2	57.5	-25.5	.0	25.6
31	244.3	7.2	-2.2	41.6	-17.2	.0	17.4
32	215.3	7.2	-2.2	37.6	-15.2	.0	15.3
33	308.5	8.3	-2.8	53.5	-23.5	.0	23.6
34	279.5	8.3	-2.8	49.5	-21.4	.0	21.6
35	250.5	8.3	-2.8	45.6	-19.3	.0	19.5
36	317.6	10.6	-4.0	61.5	-27.6	.0	27.9
37	288.6	10.6	-4.0	57.5	-25.5	.0	25.8
38	172.7	10.6	-4.0	41.6	-17.2	.0	17.7
39	143.7	10.6	-4.0	37.6	-15.2	.0	15.7
40	210.8	12.9	-5.2	53.5	-23.5	.0	24.0
41	181.8	12.9	-5.2	49.5	-21.4	.0	22.0
42	152.9	12.9	-5.2	45.6	-19.3	.0	20.0
43	246.0	14.0	-5.8	61.5	-27.6	.0	28.2
44	217.0	14.0	-5.8	57.5	-25.5	.0	26.2
45	101.1	14.0	-5.8	41.6	-17.2	.0	18.2
46	72.1	14.0	-5.8	37.6	-15.2	.0	16.2
47	174.4	17.3	-7.5	61.5	-27.6	.0	28.6
48	145.4	17.3	-7.5	57.5	-25.5	.0	26.6
49	116.4	17.3	-7.5	53.5	-23.5	.0	24.6
50	87.5	17.3	-7.5	49.5	-21.4	.0	22.7
51	58.5	17.3	-7.5	45.6	-19.3	.0	20.7
52	29.5	17.3	-7.5	41.6	-17.2	.0	18.8
53	.5	17.3	-7.5	37.6	-15.2	.0	16.9
54	102.8	20.7	-9.3	61.5	-27.6	.0	29.1
55	73.8	20.7	-9.3	57.5	-25.5	.0	27.2
56	44.8	20.7	-9.3	53.5	-23.5	.0	25.2
57	15.8	20.7	-9.3	49.5	-21.4	.0	23.3
58	-13.1	20.7	-9.3	45.6	-19.3	.0	21.4
59	-42.1	20.7	-9.3	41.6	-17.2	.0	19.6
60	-71.1	20.7	-9.3	37.6	-15.2	.0	17.8
61	31.2	24.1	-11.0	61.5	-27.6	.0	29.7
62	2.2	24.1	-11.0	57.5	-25.5	.0	27.8
63	-26.8	24.1	-11.0	53.5	-23.5	.0	25.9
64	-55.8	24.1	-11.0	49.5	-21.4	.0	24.1
65	-84.7	24.1	-11.0	45.6	-19.3	.0	22.2
66	-113.7	24.1	-11.0	41.6	-17.2	.0	20.5
67	-142.7	24.1	-11.0	37.6	-15.2	.0	18.7
68	-40.4	27.4	-12.8	61.5	-27.6	.0	30.4
69	-69.4	27.4	-12.8	57.5	-25.5	.0	28.6
70	-98.4	27.4	-12.8	53.5	-23.5	.0	26.7
71	-127.4	27.4	-12.8	49.5	-21.4	.0	24.9
72	-156.3	27.4	-12.8	45.6	-19.3	.0	23.2
73	-185.3	27.4	-12.8	41.6	-17.2	.0	21.5
74	-214.3	27.4	-12.8	37.6	-15.2	.0	19.8
75	983.9	-10.1	6.8	65.6	-29.8	.0	30.5
76	1000.6	-10.4	7.0	29.1	-10.8	.0	12.8
77	919.8	-10.1	6.8	58.6	-26.1	.0	27.0
78	931.1	-10.4	7.0	24.3	-8.3	.0	10.8
79	855.7	-10.1	6.8	51.5	-22.4	.0	23.4
80	819.5	-10.1	6.8	47.6	-20.3	.0	21.4
81	822.4	-10.4	7.0	16.8	-4.4	.0	8.3
82	755.4	-10.1	6.8	40.5	-16.7	.0	18.0
83	752.9	-10.4	7.0	12.0	-1.9	.0	7.3
84	691.3	-10.1	6.8	33.5	-13.0	.0	14.7
85	904.3	-38.7	21.6	65.5	-29.6	.0	36.7
86	625.2	13.4	-5.5	33.9	-13.4	.0	14.5
87	841.5	-4.7	4.0	65.6	-29.8	.0	30.0
88	548.9	-4.7	4.0	33.5	-13.0	.0	13.6
89	749.6	-27.2	15.7	65.5	-29.6	.0	33.5
90	459.4	14.0	-5.8	33.9	-13.4	.0	14.6

91	678.7	1.4	.8	65.6	-29.8	.0	29.8
92	386.1	1.4	.8	33.5	-13.0	.0	13.0
93	594.8	-15.7	9.7	65.5	-29.6	.0	31.1
94	293.6	14.6	-6.1	33.9	-13.4	.0	14.7
95	516.0	7.5	-2.4	65.6	-29.8	.0	29.9
96	223.4	7.5	-2.4	33.5	-13.0	.0	13.2
97	440.1	-4.2	3.7	65.5	-29.6	.0	29.8
98	127.8	15.1	-6.4	33.9	-13.4	.0	14.9
99	353.3	13.6	-5.6	65.6	-29.8	.0	30.3
100	60.7	13.6	-5.6	33.5	-13.0	.0	14.2
101	285.3	7.3	-2.3	65.5	-29.6	.0	29.7
102	-37.9	15.7	-6.7	33.9	-13.4	.0	15.0
103	190.5	19.8	-8.8	65.6	-29.8	.0	31.0
104	-102.1	19.8	-8.8	33.5	-13.0	.0	15.7
105	130.5	18.8	-8.3	65.5	-29.6	.0	30.7
106	-203.7	16.3	-7.0	33.9	-13.4	.0	15.1
107	27.8	25.9	-12.0	65.6	-29.8	.0	32.1
108	-264.8	25.9	-12.0	33.5	-13.0	.0	17.7
109	-24.2	30.3	-14.3	65.5	-29.6	.0	32.9
110	-369.5	16.9	-7.3	33.9	-13.4	.0	15.3
111	-114.6	31.3	-14.8	65.6	-29.8	.0	33.2
112	-207.7	31.6	-15.1	56.1	-24.8	.0	29.0
113	-178.7	31.3	-14.8	58.6	-26.1	.0	30.0
114	-264.4	31.6	-15.1	47.0	-20.1	.0	25.1
115	-242.8	31.3	-14.8	51.5	-22.4	.0	26.8
116	-279.0	31.3	-14.8	47.6	-20.3	.0	25.1
117	-353.3	31.6	-15.1	32.8	-12.7	.0	19.7
118	-343.1	31.3	-14.8	40.5	-16.7	.0	22.3
119	-410.1	31.6	-15.1	23.7	-7.9	.0	17.1
120	-407.2	31.3	-14.8	33.5	-13.0	.0	19.7

Mris = (Mxp^2 + Myp^2)^0.5

LINEA FS FERRANDINA MATERA
VI08 Pile P17-P20 - Analisi SLV

CONDIZIONE DI CARICO 16
VI08 - P20 - SLV_y

Coordinate Centri di Carico (c.c.)

c.c.	Xc m	Yc m	Zc m	Alfc deg
1	.000	.000	.000	.00
2	.000	.000	.000	.00

Componenti di Azioni Esterne riferite ai Centri di Carico

c.c.	Fzc kN	Fxc kN	Mxc kN*m	Fyc kN	Myc kN*m	Mzc kN*m
1	15131.0	-1577.1	-37802.1	-6613.1	-162821.3	-11342.6
2	13395.0	.0	.0	.0	.0	.0

Componenti di Carico Risultanti (riferimento globale)

Fz kN	Fx kN	Mx kN*m	Fy kN	My kN*m	Mz kN*m
28526.0	-1577.1	-37802.1	-6613.1	-162821.3	-11342.6

Punto di applic. carico verticale: Xv = -1.325 m Yv = -5.708 m

Componenti di Spostamento del Plinto (riferimento globale)

dz mm	dx mm	rx mRad	dy mm	ry mRad	rz mRad
2.180	-.554	-.223	-2.391	-.651	-.127

Sollecitazioni in Sommita' ai Singoli Pali (riferimento locale)

palo	Fzp kN	Fxp kN	Mxp kN*m	Fyp kN	Myp kN*m	Mzp kN*m	Mris kN*m
1	-226.9	6.3	-4.8	-61.5	27.6	.0	28.0
2	-198.0	6.3	-4.8	-57.5	25.5	.0	26.0
3	-169.0	6.3	-4.8	-53.5	23.5	.0	23.9
4	-140.0	6.3	-4.8	-49.5	21.4	.0	21.9
5	-111.0	6.3	-4.8	-45.6	19.3	.0	19.9
6	-82.0	6.3	-4.8	-41.6	17.2	.0	17.9
7	-53.1	6.3	-4.8	-37.6	15.2	.0	15.9
8	-155.3	2.9	-3.0	-61.5	27.6	.0	27.8
9	-126.3	2.9	-3.0	-57.5	25.5	.0	25.7
10	-97.4	2.9	-3.0	-53.5	23.5	.0	23.7
11	-68.4	2.9	-3.0	-49.5	21.4	.0	21.6
12	-39.4	2.9	-3.0	-45.6	19.3	.0	19.5
13	-10.4	2.9	-3.0	-41.6	17.2	.0	17.5
14	18.6	2.9	-3.0	-37.6	15.2	.0	15.5

15	-83.7	-.5	-1.3	-61.5	27.6	.0	27.6
16	-54.7	-.5	-1.3	-57.5	25.5	.0	25.6
17	-25.8	-.5	-1.3	-53.5	23.5	.0	23.5
18	3.2	-.5	-1.3	-49.5	21.4	.0	21.4
19	32.2	-.5	-1.3	-45.6	19.3	.0	19.4
20	61.2	-.5	-1.3	-41.6	17.2	.0	17.3
21	90.2	-.5	-1.3	-37.6	15.2	.0	15.2
22	-12.1	-3.8	.5	-61.5	27.6	.0	27.6
23	16.9	-3.8	.5	-57.5	25.5	.0	25.5
24	45.8	-3.8	.5	-53.5	23.5	.0	23.5
25	74.8	-3.8	.5	-49.5	21.4	.0	21.4
26	103.8	-3.8	.5	-45.6	19.3	.0	19.3
27	132.8	-3.8	.5	-41.6	17.2	.0	17.2
28	161.8	-3.8	.5	-37.6	15.2	.0	15.2
29	59.5	-7.2	2.2	-61.5	27.6	.0	27.7
30	88.5	-7.2	2.2	-57.5	25.5	.0	25.6
31	204.4	-7.2	2.2	-41.6	17.2	.0	17.4
32	233.4	-7.2	2.2	-37.6	15.2	.0	15.3
33	140.2	-8.3	2.8	-53.5	23.5	.0	23.6
34	169.2	-8.3	2.8	-49.5	21.4	.0	21.6
35	198.2	-8.3	2.8	-45.6	19.3	.0	19.5
36	131.1	-10.6	4.0	-61.5	27.6	.0	27.9
37	160.1	-10.6	4.0	-57.5	25.5	.0	25.8
38	276.0	-10.6	4.0	-41.6	17.2	.0	17.7
39	305.0	-10.6	4.0	-37.6	15.2	.0	15.7
40	237.9	-12.9	5.2	-53.5	23.5	.0	24.0
41	266.9	-12.9	5.2	-49.5	21.4	.0	22.0
42	295.8	-12.9	5.2	-45.6	19.3	.0	20.0
43	202.7	-14.0	5.8	-61.5	27.6	.0	28.2
44	231.7	-14.0	5.8	-57.5	25.5	.0	26.2
45	347.6	-14.0	5.8	-41.6	17.2	.0	18.2
46	376.6	-14.0	5.8	-37.6	15.2	.0	16.2
47	274.3	-17.3	7.5	-61.5	27.6	.0	28.6
48	303.3	-17.3	7.5	-57.5	25.5	.0	26.6
49	332.3	-17.3	7.5	-53.5	23.5	.0	24.6
50	361.2	-17.3	7.5	-49.5	21.4	.0	22.7
51	390.2	-17.3	7.5	-45.6	19.3	.0	20.7
52	419.2	-17.3	7.5	-41.6	17.2	.0	18.8
53	448.2	-17.3	7.5	-37.6	15.2	.0	16.9
54	345.9	-20.7	9.3	-61.5	27.6	.0	29.1
55	374.9	-20.7	9.3	-57.5	25.5	.0	27.2
56	403.9	-20.7	9.3	-53.5	23.5	.0	25.2
57	432.9	-20.7	9.3	-49.5	21.4	.0	23.3
58	461.8	-20.7	9.3	-45.6	19.3	.0	21.4
59	490.8	-20.7	9.3	-41.6	17.2	.0	19.6
60	519.8	-20.7	9.3	-37.6	15.2	.0	17.8
61	417.5	-24.1	11.0	-61.5	27.6	.0	29.7
62	446.5	-24.1	11.0	-57.5	25.5	.0	27.8
63	475.5	-24.1	11.0	-53.5	23.5	.0	25.9
64	504.5	-24.1	11.0	-49.5	21.4	.0	24.1
65	533.4	-24.1	11.0	-45.6	19.3	.0	22.2
66	562.4	-24.1	11.0	-41.6	17.2	.0	20.5
67	591.4	-24.1	11.0	-37.6	15.2	.0	18.7
68	489.1	-27.4	12.8	-61.5	27.6	.0	30.4
69	518.1	-27.4	12.8	-57.5	25.5	.0	28.6
70	547.1	-27.4	12.8	-53.5	23.5	.0	26.7
71	576.1	-27.4	12.8	-49.5	21.4	.0	24.9
72	605.0	-27.4	12.8	-45.6	19.3	.0	23.2
73	634.0	-27.4	12.8	-41.6	17.2	.0	21.5
74	663.0	-27.4	12.8	-37.6	15.2	.0	19.8
75	-423.0	10.1	-6.8	-65.6	29.8	.0	30.5
76	-448.2	10.4	-7.0	-47.9	20.5	.0	21.7
77	-358.9	10.1	-6.8	-58.6	26.1	.0	27.0
78	-378.8	10.4	-7.0	-43.1	18.1	.0	19.4
79	-294.8	10.1	-6.8	-51.5	22.4	.0	23.4
80	-258.6	10.1	-6.8	-47.6	20.3	.0	21.4
81	-270.0	10.4	-7.0	-35.6	14.1	.0	15.8
82	-194.5	10.1	-6.8	-40.5	16.7	.0	18.0
83	-200.6	10.4	-7.0	-30.8	11.7	.0	13.6
84	-130.4	10.1	-6.8	-33.5	13.0	.0	14.7
85	-352.0	19.9	-11.8	-65.5	29.6	.0	31.9
86	-72.8	5.4	-4.3	-33.9	13.4	.0	14.1
87	-280.6	4.7	-4.0	-65.6	29.8	.0	30.0
88	12.0	4.7	-4.0	-33.5	13.0	.0	13.6
89	-197.2	8.4	-5.9	-65.5	29.6	.0	30.2
90	92.9	4.8	-4.0	-33.9	13.4	.0	14.0

91	-117.9	-1.4	-.8	-65.6	29.8	.0	29.8
92	174.7	-1.4	-.8	-33.5	13.0	.0	13.0
93	-42.5	-3.1	.1	-65.5	29.6	.0	29.6
94	258.7	4.2	-3.7	-33.9	13.4	.0	13.9
95	44.9	-7.5	2.4	-65.6	29.8	.0	29.9
96	337.5	-7.5	2.4	-33.5	13.0	.0	13.2
97	112.3	-14.6	6.1	-65.5	29.6	.0	30.2
98	424.5	3.7	-3.4	-33.9	13.4	.0	13.9
99	207.6	-13.6	5.6	-65.6	29.8	.0	30.3
100	500.2	-13.6	5.6	-33.5	13.0	.0	14.2
101	267.1	-26.1	12.1	-65.5	29.6	.0	32.0
102	590.3	3.1	-3.1	-33.9	13.4	.0	13.8
103	370.4	-19.8	8.8	-65.6	29.8	.0	31.0
104	663.0	-19.8	8.8	-33.5	13.0	.0	15.7
105	421.8	-37.6	18.1	-65.5	29.6	.0	34.7
106	756.1	2.5	-2.8	-33.9	13.4	.0	13.7
107	533.1	-25.9	12.0	-65.6	29.8	.0	32.1
108	825.7	-25.9	12.0	-33.5	13.0	.0	17.7
109	576.6	-49.1	24.0	-65.5	29.6	.0	38.1
110	921.9	1.9	-2.5	-33.9	13.4	.0	13.7
111	675.5	-31.3	14.8	-65.6	29.8	.0	33.2
112	760.0	-31.6	15.1	-37.3	15.0	.0	21.3
113	739.6	-31.3	14.8	-58.6	26.1	.0	30.0
114	816.8	-31.6	15.1	-28.2	10.3	.0	18.3
115	803.7	-31.3	14.8	-51.5	22.4	.0	26.8
116	839.9	-31.3	14.8	-47.6	20.3	.0	25.1
117	905.7	-31.6	15.1	-14.0	2.9	.0	15.4
118	904.0	-31.3	14.8	-40.5	16.7	.0	22.3
119	962.4	-31.6	15.1	-4.9	-1.8	.0	15.2
120	968.1	-31.3	14.8	-33.5	13.0	.0	19.7

Mris = (Mxp^2 + Myp^2)^0.5