

COMMITTENTE:



ALTA SORVEGLIANZA:



GENERAL CONTRACTOR:



**INFRASTRUTTURE FERROVIARIE STRATEGICHE DEFINITE DALLA LEGGE  
OBIETTIVO N. 443/01**

**LINEA AV/AC TORINO – VENEZIA      Tratta VERONA – PADOVA**

**Lotto funzionale Verona – Bivio Vicenza**

**PROGETTO ESECUTIVO**

**OPERE CIVILI**

**IMPIANTI T.E. LINEA DI CONTATTO 3kVc.c. – 540mm<sup>2</sup>**

**PREDISPOSIZIONI OO.CC. PER OO.TT. SU INNESTO VERONA EST (LC21B) - TRACCIATO AV**

**Relazione di calcolo pali di alimentazione**

GENERAL CONTRACTOR		DIRETTORE LAVORI		SCALA -
IL PROGETTISTA INTEGRATORE	Conorzio Iricav Due ing. Paolo CARMONA Data: Febbraio 2023			
Ing. Claudio DE GIUDICI Iscritto all'ordine degli ingegneri di Udine n. 1875 Data: Febbraio 2023				

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

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	VISTO CONSORZIO IRICAV DUE	
	Firma ing. Alberto LEVORATO	Data Febbraio 2023

Progettazione:

Rev.	Descrizione	Redatto	Data	Verificato	Data	Approvato	Data		
A	EMISSIONE	Bellini <i>[Signature]</i>	02/2023	Guilarte <i>[Signature]</i>	02/2023	Aiello <i>[Signature]</i>	02/2023		Il responsabile (Dot. Ing. V. Aiello) ALBO PROVINCIALE INGEGNERI VERONA Sezione N° 1555 Data: Febbraio 2023

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## 1 DESCRIZIONE GENERALE

La presente relazione riguarda l'intervento di realizzazione dei basamenti in c.a. previsti sull'innesto di Verona EST per i pali della trazione elettrica in carpenteria metallica che compongono la Linea di Contatto della Linea AV/AC Torino – Venezia - Tratta Verona - Padova - Lotto funzionale Verona-Bivio Vicenza.

In particolare, il presente documento si riferisce ai pali di alimentazione previsti dal Piano di Elettrificazione di LC21-Innesto Verona nella **Fase 2** [elaborato: IN1712EI23PLC21B0N06C], ubicati sulla Linea AV/AC in uscita dalla Stazione di Verona Porta Vescovo verso Vicenza.

Si riportano di seguito le caratteristiche dei basamenti in esame:

*(Nota: nella colonna Fase è indicata tra parentesi la corrispondente fase delle OCCC di SF18)*



N°	FASE	PK	WBS	LATO BIN	TIPO PALO TE	TIRANTE A TERRA	TIPOLOGIA PALO	CASO DI CARICO	BLOCCO DI FONDAZIONE PALO	BLOCCO DI FONDAZIONE TIRANTE
0-9/1	2 (A2)	224,5	RI02	BD	LSU20c	-	Palo attraversamento da Cabina TE	7	LC21-BS.04	-
0-10/2	2 (A2)	224,5	RI02	BP	LSU20c	-	Palo attraversamento da Cabina TE	7	LC21-BS.04	-
0-10/4	2 (A2)	234,5	RI02	BP	LSU20c	-	Palo di ormeggio conduttura	6	LC21-BS.07	-
0-9/3	2 (A2)	239,5	RI02	BD	LSU22c	TTA1	Palo di ormeggio conduttura	5	LC21-BS.04	TTA54
0-14/2	2 (A2)	264,5	RI02	BP	LSU22c	TTA1	Palo attraversamento da Cabina TE	5	LC21-BS.04	TTA54
0-17/1	2 (A2)	281	RI02	BD	LSU22c	-	Palo normale	2	LC21-BS.04	-
0-19/1	2 (A2)	314	RI02	BD	LSU22c	-	Palo normale	2	LC21-BS.04	-
0-20/2	2 (A2)	314	RI02	BP	LSU22c	-	Palo normale	2	LC21-BS.04	-
0-21/1	2 (A2)	353	RI02	BD	LSU22c	-	Palo normale	2	LC21-BS.04	-
0-22/2	2 (A2)	353	RI02	BP	LSU22c	-	Palo normale	2	LC21-BS.04	-
0-23/1	2 (A2)	393	RI02	BD	LSU22c	-	Palo normale	2	LC21-BS.04	-
0-24/2	2 (A2)	393	RI02	BP	LSU22c	-	Palo normale	2	LC21-BS.04	-
0-25/1	2 (A2)	433	RI02	BD	LSU22c	-	Palo normale	2	LC21-BS.04	-
0-26/2	2 (A2)	433	RI02	BP	LSU22c	-	Palo normale	2	LC21-BS.04	-
0-27/1	2 (A2)	482	RI03	BD	LSU22c	-	Palo normale	2	LC21-BS.04	-
0-28/2	2 (A2)	482	RI03	BP	LSU22c	-	Palo normale	2	LC21-BS.04	-
0-29/1	2 (A2)	538	RI03	BD	LSU20c	-	Palo normale	3	LC21-BS.05	-
0-30/2	2 (A2)	538	RI03	BP	LSU20c	-	Palo normale	3	LC21-BS.05	-
0-34/2	2 (A2)	586,5	RI03	BP	LSU18c	-	Palo normale	1	LC21-BS.04	-
0-33/1	2 (A2)	586,5	RI03	BD	LSU20c	TTA		3	LC21-BS.05	TTA44
0-36/2	2 (A2)	652	RI03	BP	LSU18c	-	Palo normale	1	LC21-BS.04	-
0-35/1	2 (A2)	652	RI03	BD	LSU22c	TTA	Palo con doppio ormeggio trefolo	10	LC21-BS.04	TTA44



N°	FASE	PK	WBS	LATO BIN	TIPO PALO TE	TIRANTE A TERRA	TIPOLOGIA PALO	CASO DI CARICO	BLOCCO DI FONDAZIONE PALO	BLOCCO DI FONDAZIONE TIRANTE
0-37/1	2 (A2)	697	RI03	BD	LSU24c	-	Palo normale	4	LC21-BS.06a	-
0-38/2	2 (A2)	699	RI03	BP	LSU18c	-	Palo normale	1	LC21-BS.04	-
0-41/1	2 (A2)	745	RI03	BD	LSU22c	-	Palo normale	2	LC21-BS.04	-
0-42/2	2 (A2)	745	RI03	BP	LSU18c	-	Palo normale	1	LC21-BS.04	-
0-43/1	2 (A2)	790	RI04	BD	LSU22c	TTA1	Palo normale	2	LC21-BS.04	TTA32
0-44/2	2 (A2)	792	RI04	BP	LSU18c	-	Palo normale	1	LC21-BS.04	-
0-47/1	2 (A2)	835,5	RI04	BD	LSU24c	TTA1	Palo normale	4	LC21-BS.06a	TTA32
0-48/2	2 (A2)	840	RI04	BP	LSU18c	-	Palo normale	1	LC21-BS.04	-
0-51/1	2 (A2)	878,5	RI04	BD	LSU22c	-	Palo normale	2	LC21-BS.04	-
0-52/2	2 (A2)	897,5	RI04	BP	LSU18c	-	Palo normale	1	LC21-BS.04	-
0-53/1	2 (A2)	912	RI04	BD	LSU18c	-	Palo normale	1	LC21-BS.04	-
0-54/2	2 (A2)	955	RI04	BP	LSU20c	-	Palo normale	3	LC21-BS.05	-
0-55/1	2 (A2)	955	RI04	BD	LSU20c	-	Palo normale	3	LC21-BS.05	-
0-57/1	2 (A2)	1006	RI04	BD	LSU20c	-	Palo normale	3	LC21-BS.05	-
0-56/2	2 (A2)	1006	RI04	BP	LSU20c	-	Palo normale	3	LC21-BS.05	-
1-1/1	2 (A2)	1055,5	RI04	BD	LSU20c	-	Palo normale	3	LC21-BS.05	-
1-2/2	2 (A2)	1055,5	RI04	BP	LSU20c	-	Palo normale	3	LC21-BS.05	-
1-3/1	2 (A2)	1110	RI04	BD	LSU20c	-	Palo normale	3	LC21-BS.05	-
1-4/2	2 (A2)	1110	RI04	BP	LSU20c	-	Palo normale	3	LC21-BS.05	-
1-5/1	2 (A2)	1165,5	RI05	BD	LSU22c	-	Palo con attraversamento aereo P/D in esterno curva	8	LC21-BS.06	-
1-6/2	2 (A2)	1165,5	RI05	BP	LSU20c	-	Palo con attraversamento aereo P/D in interno curva	9	LC21-BS.04	-
1-7/1	2 (A2)	1223	RI05	BD	LSU22c	TTA1	Palo di ormeggio conduttura	5	LC21-BS.04	TTA54
1-8/2	2 (A2)	1223	RI05	BP	LSU22c	TTA1	Palo di ormeggio conduttura	5	LC21-BS.04	TTA54

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Oltre ai suddetti pali, il presente documento prende in esame i seguenti pali di contatto previsti dal Piano di Elettrificazione di LC21-Innesto Verona nella **Fase 2** [elaborato: IN1712EI23PLC21B0N06C], ubicati sulla Linea Storica esistente:

97/3	4 (B5b)		RI02	BD	LSU18c	-	Palo con sezionatore	6	LC21-BS.07	-
98/2	4 (B5b)		RI02	BP	LSU18c	-	Palo con sezionatore	6	LC21-BS.07	-
155/1	4 (B5b)		RI05	BD	LSU18c	-	Palo con sezionatore	6	LC21-BS.07	-
156/2	4 (B5b)		RI05	BP	LSU18c	-	Palo con sezionatore	6	LC21-BS.07	-

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## 2 NORMATIVA DI RIFERIMENTO

- UNI EN 197-1 giugno 2001 – “Cemento: composizione, specificazioni e criteri di conformità per cementi comuni”;
- UNI EN 11104 luglio 2016 – “Calcestruzzo: specificazione, prestazione, produzione e conformità”, Istruzioni complementari per l’applicazione delle EN 206-1;
- UNI EN 206-1 ottobre 2006 – “Calcestruzzo: specificazione, prestazione, produzione e conformità”.
- UNI EN 1998-5 (Eurocodice 8) – Gennaio 2005: “Progettazione delle strutture per la resistenza sismica – Parte 5: Fondazioni, strutture di contenimento ed aspetti geotecnici”;
- UNI EN 1992-1-1 (Eurocodice 2) – Novembre 2005: “Progettazione delle strutture di calcestruzzo – Parte 1: Regole generali e regole per edifici”;
- D. M. Min. Il. TT. del 14 gennaio 2008 – Norme tecniche per le costruzioni;
- CIRCOLARE 2 febbraio 2009, n.617 Istruzione per l’applicazione delle «Nuove norme tecniche per le costruzioni» di cui al decreto ministeriale 14 gennaio 2008;
- Linee guida sul calcestruzzo strutturale - Presidenza del Consiglio Superiore dei Lavori Pubblici - Servizio Tecnico Centrale;
- RFI DTC SI PS MA IFS 001 B Manuale di progettazione delle Opere Civili Parte II sezione 2 Ponti e Strutture;
- RFI DTC SI CS MA IFS 001 B Manuale di progettazione delle Opere Civili Parte II Sezione 3 Corpo Stradale.



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### 3 DOCUMENTI DI RIFERIMENTO

#### 3.1 Elaborati progettuali

- IN1712EI2CLLC21B0N02B Relazione di calcolo Pali LSU di Linea di Alimentazione

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#### 4 METODO DI CALCOLO

Il metodo di calcolo e di verifica utilizzato è quello degli stati limite (SLU-SLE). I risultati dell'analisi strutturale condotta per le singole condizioni di carico, moltiplicati da opportuni coefficienti e combinati in casi di carico, definiscono le sollecitazioni di calcolo delle membrature da verificare.

Le opere oggetto della presente relazione sono state progettate e calcolate secondo i metodi della scienza delle costruzioni, adottando per le verifiche il criterio degli stati limite (S.L.).

I criteri generali di sicurezza sono stati assunti in conformità con il D.M. 14.01.2008 – “Norme tecniche per le costruzioni” e relativa circolare esplicativa (Circolare 02.02.2009 n. 617/C.S.LL.PP.), nonché alle Istruzioni RFI/DTC/INC/PO/SP/IFS/001/A.

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## 5 CARATTERISTICHE DEI MATERIALI

### 5.1 Calcestruzzo

Per il magrone di sottofondazione si prevede l'utilizzo di calcestruzzo di classe Rck 15.

Per la realizzazione dei basamenti si prevede l'utilizzo di calcestruzzo avente classe di resistenza 25/30 ( $R_{ck} \geq 30$  N/mm<sup>2</sup>) che presenta le seguenti caratteristiche:

Resistenza caratteristica a compressione (cilindrica)	$f_{ck} = 0.83 \times R_{ck} = 24.90$ N/mm <sup>2</sup>
Resistenza media a compressione	$f_{cm} = f_{ck} + 8 = 32.90$ N/mm <sup>2</sup>
Modulo elastico	$E_{cm} = 5700 \cdot \sqrt{R_{ck}} = 31220$ N/mm <sup>2</sup>
Resistenza di calcolo a compressione	$f_{cd} = \alpha_{cc} \cdot f_{ck} / \gamma_c = 0.85 \cdot f_{ck} / 1.6 = 13.28$ N/mm <sup>2</sup>
Resistenza a trazione media	$f_{ctm} = 0.27 \cdot R_{ck}^{2/3} = 2.60$ N/mm <sup>2</sup>
Resistenza a trazione	$f_{ctk} = 0.7 \cdot f_{ctm} = 1.79$ N/mm <sup>2</sup>
Resistenza a trazione di calcolo	$f_{ctd} = f_{ctk} / \gamma_c = 1.12$ N/mm <sup>2</sup>

### 5.2 Acciaio per cemento armato

Per le armature metalliche si adottano tondini in acciaio del tipo B450C saldabile, controllato in stabilimento e che presentano le seguenti caratteristiche:

Proprietà	Requisito
Limite di snervamento $f_y$	$\geq 450$ MPa
Limite di rottura $f_t$	$\geq 540$ MPa
Allungamento totale al carico massimo $A_{gt}$	$\geq 7.5\%$
Rapporto $f_t/f_y$	$1,15 \leq R_m/R_e \leq 1,35$
Rapporto $f_{y \text{ misurato}}/f_{y \text{ nom}}$	$\leq 1,25$

Tensione di snervamento caratteristica  $f_{yk} \geq 450$  N/mm<sup>2</sup>

Tensione caratteristica a rottura  $f_{tk} \geq 540$  N/mm<sup>2</sup>

### 5.3 Durabilità e prescrizioni sui materiali

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

Al fine di ottenere la prestazione richiesta in funzione delle condizioni ambientali, nonché per la definizione della relativa classe, si fa riferimento alle indicazioni contenute nelle Linee Guida sul calcestruzzo strutturale edite dal Servizio Tecnico Centrale del Consiglio Superiore dei Lavori Pubblici ovvero alle norme UNI EN 206-1:2006 ed UNI 11104:2004.

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Per le opere della presente relazione si adotta quanto segue:

Fondazione                      CLASSE DI ESPOSIZIONE      XC2

**Copriferro minimo:**

cm 4 per le superfici verticali a contatto con il terreno

cm. 4 (minimo) per le altre superfici (verso l'esterno)

(rif. DITCTE STC/TE 671 foglio 14 di 22 - II 2.2.2. Ricoprimento ferro per fondazioni armate)

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## 6 PARAMETRI SISMICI

Si fa riferimento a quanto riportato sulla relazione di calcolo "IN1712EI2CLLC21B0N02B".

Si assumono:

Vita nominale  $V_N = 50$  anni

Classe d'uso della costruzione: II

I corrispondenti valori delle caratteristiche sismiche per lo SLV ( $P_{VR} = 10\%$ ) sono i seguenti:

$$a_g = 0.157g$$

$$F_0 = 2.431;$$

$$T^*_c = 0.276 s;$$

Per quanto riguarda il sottosuolo su cui insiste l'opera, si assume che ricada in categoria sismica "C" e categoria topografica "T1". I coefficienti di amplificazione stratigrafica e topografica risultano quindi:

$$S_S = 1.470$$

$$S_T = 1.0$$

L'accelerazione massima orizzontale viene valutata pari a:

$$a_{max} (SLV) = S a_g = 1.470 \times 1.00 \times 0.157 g = 0.231 g$$

da cui si ottiene:

$$k_h = 0.231 g$$

$$k_v = \pm 0.1154 g$$

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## 7 PARAMETRI GEOTECNICI

Le fondazioni sono posate su rilevati per il quale, in accordo al MdP, si assumono i seguenti parametri di resistenza:

$$\phi'_k = 38^\circ$$

$$\gamma = 20 \text{ kN/m}^3$$

Il livello di falda non interferisce con le opere in oggetto.

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## 8 CRITERI DI VERIFICA GLOBALE

### 8.1 Verifica a ribaltamento

La verifica a ribaltamento consiste nel determinare il momento risultante di tutte le forze che tendono a fare ribaltare il muro (momento ribaltante  $E_d$ ) ed il momento risultante di tutte le forze che tendono a stabilizzare il muro (momento stabilizzante  $R_d$ ) rispetto al punto di rotazione e verificare che il rapporto  $R_d/E_d$  sia maggiore di 1.

$$R_d/E_d \geq 1$$

L'azione ribaltante è dovuta ai carichi derivanti dalla struttura metallica e dall'azione inerziale in presenza di sisma, mentre il contributo stabilizzante dal peso del basamento e dall'azione verticale della sovrastruttura. Si trascura il contributo stabilizzante del terreno laterale, considerando pertanto l'opera a gravità.

### 8.2 Verifica a scorrimento

Per la verifica a scorrimento deve risultare che la somma di tutte le forze parallele al piano di posa che tendono a fare scorrere il muro deve essere minore di tutte le forze, parallele al piano di scorrimento, che si oppongono allo scivolamento, ridotte globalmente di un certo coefficiente di sicurezza  $\gamma_R$  funzione dell'approccio utilizzato. La verifica a scorrimento risulta soddisfatta se il rapporto fra la risultante delle forze resistenti allo scivolamento  $R_d$  e la risultante delle forze che tendono a fare scorrere il muro  $E_d$  risulta maggiore di 1.

Deve quindi essere verificata la seguente disequaglianza

$$R_d/E_d \geq 1$$

L'azione agente è dovuta ai carichi derivanti dalla struttura metallica e dall'azione inerziale in presenza di sisma, mentre il contributo resistente dall'attrito alla base del basamento funzione del proprio peso e dell'azione verticale della sovrastruttura.

Si trascura il contributo stabilizzante del terreno laterale, considerando pertanto l'opera a gravità.

L'adesione alla base è sempre posta pari a zero.

Nella definizione di  $E_d$  ed  $R_d$  concorrono inoltre i fattori parziali di sicurezza sulle azioni e sui parametri geotecnici funzione dell'approccio utilizzato.

In particolare si assume l'approccio 2 ( $A1+M1+R3$ ) secondo i coefficienti riportati in NTC2008.

### 8.3 Verifica a carico limite

Il rapporto fra il carico ultimo in fondazione e la risultante dei carichi indotta dal muro sul terreno di fondazione deve essere superiore ad 1. Detto  $E_d$  il carico gravante in fondazione e  $R_d$  il carico ultimo in fondazione, ridotto globalmente di un certo coefficiente di sicurezza  $\gamma_R$  funzione dell'approccio utilizzato, deve risultare:

$$R_d/E_d \geq 1$$

Nella definizione di  $E_d$  ed  $R_d$  concorrono inoltre i fattori parziali di sicurezza sulle azioni e sui parametri geotecnici funzione dell'approccio utilizzato.

In particolare si assume l'approccio 2 ( $A1+M1+R3$ ) secondo i coefficienti riportati in NTC2008.

Si trascura il contributo stabilizzante del terreno laterale, considerando pertanto l'opera a gravità.

Per quanto riguarda la determinazione del carico ultimo in fondazione  $R_d$  si fa riferimento alla formula di Brinch-Hansen secondo le formulazioni riportate nell' Eurocodice 7 EB 1997-1:2003 App.D.

$$q_{ult} = c \cdot N_c \cdot s_c \cdot d_c \cdot i_c \cdot g_c \cdot b_c + q \cdot N_q \cdot s_q \cdot d_q \cdot i_q \cdot g_q \cdot b_q + 0.5 \cdot B \cdot \gamma \cdot N_\gamma \cdot s_\gamma \cdot d_\gamma \cdot i_\gamma \cdot g_\gamma \cdot b_\gamma$$

in cui  $N_c$ ,  $N_q$ ,  $N_\gamma$  sono i fattori di capacità portante,  $d_c$ ,  $d_q$  e  $d_\gamma$  sono i fattori di profondità,  $s_c$ ,  $s_q$  e  $s_\gamma$  sono i fattori di forma,  $i_c$ ,  $i_q$  e  $i_\gamma$  sono i fattori di inclinazione del carico,  $b_c$ ,  $b_q$  e  $b_\gamma$ , sono i fattori di inclinazione del piano di posa e  $g_c$ ,  $g_q$  e  $g_\gamma$  sono fattori che tengono conto del fatto che la fondazione poggia su un terreno in pendenza. Di seguito si riportano le formulazioni assunte (stralcio di EC7).

the bearing resistance:

$$N_q = e^{\pi \tan \phi} \tan^2 (45 + \phi/2)$$

$$N_c = (N_q - 1) \cot \phi$$

$$N_\gamma = 2 (N_q - 1) \tan \phi, \text{ where } \delta \geq \phi/2 \text{ (rough base)}$$

the inclination of the foundation base:

$$b_c = b_q - (1 - b_q) N_c \times \tan \phi'$$

$$b_q = b_\gamma = (1 - \alpha \cdot \tan \phi')^2$$

the shape of foundation:

$$s_q = 1 + (B'/L') \sin \phi', \text{ for a rectangular shape;}$$

$$s_q = 1 + \sin \phi', \text{ for a square or circular shape;}$$

$$s_\gamma = 1 - 0.3 (B'/L'), \text{ for a rectangular shape;}$$

$$s_\gamma = 0.7, \text{ for a square or circular shape}$$

$$s_c = (s_q N_q - 1) / (N_q - 1) \text{ for rectangular, square or circular shape;}$$

the inclination of the load, caused by a horizontal load  $H$ :

$$i_c = i_q - (1 - i_q) N_c \cdot \tan \phi';$$

$$i_q = [1 - H/(V + A'c' \cot \phi')]^m;$$

$$i_\gamma = [1 - H/(V + A'c' \cot \phi')]^{m+1}.$$

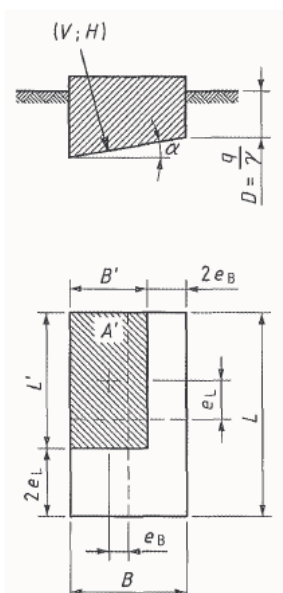
where:

$$m = m_B = [2 + (B'/L')]/[1 + (B'/L')] \text{ when } H \text{ acts in the direction of } B';$$

$$m = m_L = [2 + (L'/B')]/[1 + (L'/B')] \text{ when } H \text{ acts in the direction of } L'.$$

In cases where the horizontal load component acts in a direction forming an angle  $\theta$  with the direction of  $L'$ ,  $m$  may be calculated by:

$$m = m_\theta = m_L \cos^2 \theta + m_B \sin^2 \theta.$$





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## 9 CRITERI DI VERIFICA STRUTTURALE

Le verifiche sono condotte secondo il metodo agli stati limite in accordo alle formulazioni riportate nel capitolo 4 di NTC 2008.

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## 10 CRITERI DI CALCOLO DELLE SPINTE

Di seguito si riportano i criteri generali per il calcolo delle spinte laterali.

### Spinte attive in condizioni statiche

Ad una generica profondità  $z$ , nel caso di terreno puramente granulare, lo sforzo orizzontale totale sulla parete è dato da:

$$\sigma_A(z) = K_A \cdot [\sigma_v(z) - u(z)] + u(z)$$

in cui

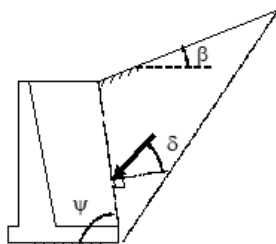
$\sigma_v(z)$  = sforzo verticale totale alla generica profondità, ossia il peso della colonna di terreno e di acqua soprastante la quota  $z$ .

$u(z)$  = pressione dell'acqua alla generica profondità

Il coefficiente di spinta attiva  $K_A$  viene valutato con le note formule derivate dalla teoria di Coulomb e sviluppate da Muller-Breslau.

#### CONDIZIONI DI SPINTA ATTIVA Teoria di Coulomb

$$K_A = \frac{\sin^2(\psi + \phi)}{\sin^2\psi \sin(\psi - \delta) \left[ 1 + \frac{\sin(\phi + \delta)\sin(\phi - \beta)}{\sin(\psi - \delta)\sin(\psi + \beta)} \right]^2}$$



### Spinte passive in condizioni statiche

Ad una generica profondità  $z$ , nel caso di terreno puramente granulare, lo sforzo orizzontale totale sulla parete è dato da:

$$\sigma_p(z) = K_p \cdot [\sigma_v(z) - u(z)] + u(z)$$

in cui

$\sigma_v(z)$  = sforzo verticale totale alla generica profondità, ossia il peso della colonna di terreno e di acqua soprastante la quota  $z$ .

$u(z)$  = pressione dell'acqua alla generica profondità

Il coefficiente di spinta passiva  $K_p$  viene valutato con la formula di Lancellotta (2006) considerando  $\tan\theta$  pari a 0.

$$K_{p,E} = \left[ \frac{\cos \delta}{\cos(\beta - \theta) - \sqrt{\sin^2 \phi - \sin^2(\beta - \theta)}} \times \left( \cos \delta + \sqrt{\sin^2 \phi - \sin^2 \delta} \right) \right] \cdot e^{2\alpha \tan(\phi)}$$

$$2\alpha = \arcsin\left(\frac{\sin \delta}{\sin \phi}\right) + \arcsin\left(\frac{\sin(\beta - \theta)}{\sin \phi}\right) + \delta + (\beta - \theta) + 2\theta$$

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### Spinte attive in condizioni sismiche

Nell'ambito dell'approccio pseudo-statico, il sistema è pensato soggetto ad un'accelerazione sismica uniforme avente le seguenti componenti

Orizzontale =  $k_h \cdot g$  - Verticale =  $\pm k_v \cdot g$

La spinta totale attiva su un paramento di altezza pari ad H è data da:

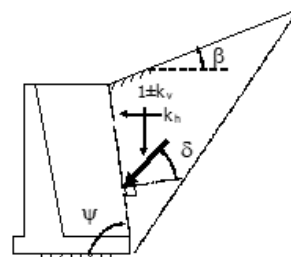
$$E_d = \frac{1}{2} \gamma^* (1 \pm k_v) K_{A,E} H^2 + E_{ws} + E_{wd}$$

Il primo termine è la spinta attiva dovuta allo scheletro solido, il secondo termine  $E_{ws}$  è la risultante delle pressioni idrostatiche ed il terzo  $E_{wd}$  è la risultante delle sovrappressioni interstiziali.

I coefficienti di spinta attiva sono dati dalle seguenti espressioni (Mononobe & Okabe, nel seguito M-O):

#### CONDIZIONI DI SPINTA ATTIVA – Teoria di M-O

$$\beta \leq \phi - \theta: \quad K_{A,E} = \frac{\text{sen}^2(\psi + \phi - \theta)}{\cos \theta \text{sen}^2 \psi \text{sen}(\psi - \theta - \delta) \left[ 1 + \sqrt{\frac{\text{sen}(\phi + \delta) \text{sen}(\phi - \beta - \theta)}{\text{sen}(\psi - \theta - \delta) \text{sen}(\psi + \beta)}} \right]^2}$$



$$\beta > \phi - \theta: \quad K_{A,E} = \frac{\text{sen}^2(\psi + \phi - \theta)}{\cos \theta \text{sen}^2 \psi \text{sen}(\psi - \theta - \delta)}$$

A seconda della definizione del peso specifico  $\gamma^*$  del cuneo e dell'angolo  $\theta$  definito come l'angolo, rispetto alla verticale, fra le azioni esterne orizzontali e quelle verticali agenti sul cuneo di spinta di volume V, l'espressione generale può essere utilizzata per tre diverse condizioni nelle quali può trovarsi il rilevato.

#### Rilevato asciutto

Non c'è alcuna azione dovuta all'acqua: corrisponde alla configurazione originale ipotizzata da M-O. Come peso specifico  $\gamma^*$  si deve assumere il peso secco  $\gamma_d$ ; la forza orizzontale  $F_h$  è pari alla massa del terreno moltiplicata per l'accelerazione orizzontale mentre la forza verticale  $F_v$  è il peso del cuneo incrementato o decrementato dall'accelerazione sismica verticale; quindi:

$$\gamma^* = \gamma_d$$

$$\tan \theta = \frac{k_h}{1 \pm k_v}$$

$$E_{ws} = E_{wd} = 0$$

#### Rilevato saturo a grana fine (dinamicamente impervio: $k < 5 \cdot 10^{-4} \text{ m/s}$ )

In sostanza si assume che l'acqua, imprigionata negli interstizi, si muova insieme con il terreno: l'accelerazione sismica agirà quindi sulla massa complessiva (terreno+acqua) del cuneo, pari a  $V \cdot \gamma_{sat}$ . Si ammette che le pressioni interstiziali non subiscano variazioni ai fini del calcolo delle azioni sulla parete. In questo caso l'equilibrio limite del cuneo è fatto al netto della risultante delle azioni idrostatiche e quindi, nelle formule generali, si assumerà:

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$$\gamma^* = \gamma'$$

$$\tan\theta = \frac{\gamma_{sat}}{\gamma} \frac{k_h}{1 \pm k_v}$$

Alla spinta efficace dovrà essere aggiunta la spinta idrostatica dell'acqua, mentre, per ipotesi, la componente idrodinamica non può svilupparsi. Quindi:

$$E_{ws} = E_{wd} = 0$$

*Rilevato saturo a grana grossa (dinamicamente permeabile:  $k > 5 \cdot 10^{-4}$  m/s)*

Si ammette che l'acqua negli interstizi possa muoversi liberamente, indipendentemente dalle deformazioni subite dal terreno: l'accelerazione sismica agirà quindi sulla massa della sola parte solida del cuneo, pari a  $V \cdot \gamma_d$ . L'equilibrio limite del cuneo è fatto al netto della risultante delle pressioni interstiziali e quindi, nelle formule generali, si assumerà:

$$\gamma^* = \gamma'$$

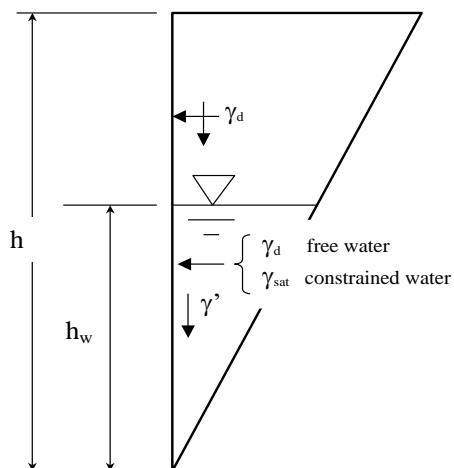
$$\tan\theta = \frac{\gamma_d}{\gamma'} \frac{k_h}{1 \pm k_v}$$

In questo caso dovranno essere aggiunte sia la spinta idrostatica sia la sovraspinta idrodinamica della stessa acqua di falda.

$$E_{ws} = \frac{1}{2} \gamma_w H^2$$

$$E_{wd} = \frac{7}{12} k_h \gamma_w H'^2 \quad \text{con } H' = \text{altezza della freatica dal piede del muro.}$$

*Rilevato parzialmente immerso*



Ebeling e Morrison (1992) indicano il modo per utilizzare, anche in questo caso, le equazioni di M-O: sostanzialmente questo caso può essere assimilato a quello di un terrapieno completamente immerso omogeneo, avente un peso specifico equivalente. Per calcolare la risultante delle spinte, si potrà operare come segue. Si definiscono i pesi specifici medi da associare rispettivamente alla componente efficace verticale ed alla componente laterale

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$$\gamma_v^* = \left(\frac{h_w}{h}\right)^2 \cdot \gamma' + \left[1 - \left(\frac{h_w}{h}\right)^2\right] \cdot \gamma_d$$

$$\gamma_H^* = \begin{cases} \gamma_d & \text{se terreno din. permeabile} \\ \left(\frac{h_w}{h}\right)^2 \cdot \gamma_{\text{sat}} + \left[1 - \left(\frac{h_w}{h}\right)^2\right] \cdot \gamma_d & \text{se terreno din. impervio} \end{cases}$$

Definendo

$$\tan \theta = \frac{\gamma_H^* \cdot k_h}{\gamma_v^* \cdot 1 - k_v}$$

si applicheranno poi le relazioni precedentemente descritte.

Punto di applicazione delle spinte attive sismiche

Considerato che la spinta attiva complessiva è in generale composta da tre termini, occorre calcolare il punto di applicazione di ognuno di essi

1. Componente associata allo scheletro solido: è applicata come nel caso statico
2. Componente idrostatica: è applicata come nel caso statico
3. Componente idrodinamica (Ewd): se esiste, è applicata considerando la seguente distribuzione di pressioni:

$$qwd(z) = \pm \frac{7}{8} k_h \gamma_w \sqrt{H' \cdot z} \quad \text{con } z \text{ quota del generico punto rispetto la base della parete.}$$

### Spinte passive in condizioni sismiche

Si applicano in analogia le formulazioni descritte nel caso di spinta attiva.

Il coefficiente di spinta passiva è con la formula di Lancellotta (2006).

$$K_{p,E} = \left[ \frac{\cos \delta}{\cos(\beta - \theta) - \sqrt{\sin^2 \phi - \sin^2(\beta - \theta)}} \times \left( \cos \delta + \sqrt{\sin^2 \phi - \sin^2 \delta} \right) \right] \cdot e^{2\alpha \tan(\phi)}$$

$$2\alpha = \arcsin\left(\frac{\sin \delta}{\sin \phi}\right) + \arcsin\left(\frac{\sin(\beta - \theta)}{\sin \phi}\right) + \delta + (\beta - \theta) + 2\theta$$

NOTE:

- Nell'ambito dell'approccio 2 la spinta passiva è ridotta del coefficiente parziale  $\gamma_R = 1.4$  (R3)

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## 11 SCARICHI A TESTA BASAMENTO

Gli scarichi a testa basamento sono desunti dal documento "IN1712E12CLLC21B0N02B" citato tra i riferimenti.

### LC1

Unità di misura: [kN], [m]

### Combinazioni statiche STR

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
A	11.84	0.00	1.54	0.00	4.90
A	11.84	0.00	1.54	0.00	4.86
A	11.84	0.00	1.54	0.00	4.90
A	11.84	0.00	1.54	0.00	4.86
A	15.39	0.00	1.54	0.00	4.90
A	15.39	0.00	1.54	0.00	4.86
A	15.39	0.00	1.54	0.00	4.90
A	15.39	0.00	1.54	0.00	4.86
A	11.84	0.00	1.54	0.00	5.14
A	11.84	0.00	1.54	0.00	5.17
A	11.84	0.00	1.54	0.00	5.14
A	11.84	0.00	1.54	0.00	5.17
A	15.39	0.00	1.54	0.00	5.14
A	15.39	0.00	1.54	0.00	5.17
A	15.39	0.00	1.54	0.00	5.14
A	15.39	0.00	1.54	0.00	5.17
B AA	11.84	0.00	9.92	0.00	69.42
B AA	11.84	0.00	9.92	0.00	69.39
B AA	11.84	0.00	9.92	0.00	69.42
B AA	11.84	0.00	9.92	0.00	69.39
B AA	15.39	0.00	9.92	0.00	69.42
B AA	15.39	0.00	9.92	0.00	69.39
B AA	15.39	0.00	9.92	0.00	69.42
B AA	15.39	0.00	9.92	0.00	69.39
B AA	11.84	0.00	9.92	0.00	69.66
B AA	11.84	0.00	9.92	0.00	69.69
B AA	11.84	0.00	9.92	0.00	69.66
B AA	11.84	0.00	9.92	0.00	69.69
B AA	15.39	0.00	9.92	0.00	69.66
B AA	15.39	0.00	9.92	0.00	69.69
B AA	15.39	0.00	9.92	0.00	69.66
B AA	15.39	0.00	9.92	0.00	69.69



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WX	11.84	7.22	1.24	45.76	3.90
B WX	11.84	7.22	1.24	45.76	3.86
B WX	11.84	7.22	1.24	45.76	3.90
B WX	11.84	7.22	1.24	45.76	3.86
B WX	15.39	7.22	1.24	45.76	3.90
B WX	15.39	7.22	1.24	45.76	3.86
B WX	15.39	7.22	1.24	45.76	3.90
B WX	15.39	7.22	1.24	45.76	3.86
B WX	11.84	7.22	1.24	45.76	4.13
B WX	11.84	7.22	1.24	45.76	4.17
B WX	11.84	7.22	1.24	45.76	4.13
B WX	11.84	7.22	1.24	45.76	4.17
B WX	15.39	7.22	1.24	45.76	4.13
B WX	15.39	7.22	1.24	45.76	4.17
B WX	15.39	7.22	1.24	45.76	4.13
B WX	15.39	7.22	1.24	45.76	4.17
B WXY	11.84	5.06	11.01	32.04	79.17
B WXY	11.84	5.06	11.01	32.04	79.14
B WXY	11.84	5.06	11.01	32.04	79.17
B WXY	11.84	5.06	11.01	32.04	79.14
B WXY	15.39	5.06	11.01	32.04	79.17
B WXY	15.39	5.06	11.01	32.04	79.14
B WXY	15.39	5.06	11.01	32.04	79.17
B WXY	15.39	5.06	11.01	32.04	79.14
B WXY	11.84	5.06	11.01	32.04	79.41
B WXY	11.84	5.06	11.01	32.04	79.44
B WXY	11.84	5.06	11.01	32.04	79.41
B WXY	11.84	5.06	11.01	32.04	79.44
B WXY	15.39	5.06	11.01	32.04	79.41
B WXY	15.39	5.06	11.01	32.04	79.44
B WXY	15.39	5.06	11.01	32.04	79.41
B WXY	15.39	5.06	11.01	32.04	79.44
B WY	11.84	0.00	15.20	0.00	111.43
B WY	11.84	0.00	15.20	0.00	111.40
B WY	11.84	0.00	15.20	0.00	111.43
B WY	11.84	0.00	15.20	0.00	111.40
B WY	15.39	0.00	15.20	0.00	111.43
B WY	15.39	0.00	15.20	0.00	111.40
B WY	15.39	0.00	15.20	0.00	111.43
B WY	15.39	0.00	15.20	0.00	111.40
B WY	11.84	0.00	15.20	0.00	111.67
B WY	11.84	0.00	15.20	0.00	111.71
B WY	11.84	0.00	15.20	0.00	111.67



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WY	11.84	0.00	15.20	0.00	111.71
B WY	15.39	0.00	15.20	0.00	111.67
B WY	15.39	0.00	15.20	0.00	111.71
B WY	15.39	0.00	15.20	0.00	111.67
B WY	15.39	0.00	15.20	0.00	111.71
D I	11.84	0.00	13.37	0.00	108.06
D I	15.62	0.00	13.37	0.00	107.76
D I	14.36	0.00	13.37	0.00	108.06
D I	18.14	0.00	13.37	0.00	107.76
D I	15.39	0.00	13.37	0.00	108.06
D I	19.17	0.00	13.37	0.00	107.76
D I	17.91	0.00	13.37	0.00	108.06
D I	21.69	0.00	13.37	0.00	107.76
D I	11.84	0.00	13.37	0.00	108.30
D I	15.62	0.00	13.37	0.00	108.60
D I	14.36	0.00	13.37	0.00	108.30
D I	18.14	0.00	13.37	0.00	108.60
D I	15.39	0.00	13.37	0.00	108.30
D I	19.17	0.00	13.37	0.00	108.60
D I	17.91	0.00	13.37	0.00	108.30
D I	21.69	0.00	13.37	0.00	108.60
D W	11.84	0.00	21.47	0.00	177.51
D W	13.73	0.00	21.47	0.00	177.34
D W	13.10	0.00	21.47	0.00	177.51
D W	14.99	0.00	21.47	0.00	177.34
D W	15.39	0.00	21.47	0.00	177.51
D W	17.28	0.00	21.47	0.00	177.34
D W	16.65	0.00	21.47	0.00	177.51
D W	18.54	0.00	21.47	0.00	177.34
D W	11.84	0.00	21.47	0.00	177.74
D W	13.73	0.00	21.47	0.00	177.91
D W	13.10	0.00	21.47	0.00	177.74
D W	14.99	0.00	21.47	0.00	177.91
D W	15.39	0.00	21.47	0.00	177.74
D W	17.28	0.00	21.47	0.00	177.91
D W	16.65	0.00	21.47	0.00	177.74
D W	18.54	0.00	21.47	0.00	177.91
DAA	13.73	0.00	13.68	0.00	108.93
DAA	13.73	0.00	13.68	0.00	108.90
DAA	14.99	0.00	13.68	0.00	108.93
DAA	14.99	0.00	13.68	0.00	108.90
DAA	17.28	0.00	13.68	0.00	108.93
DAA	17.28	0.00	13.68	0.00	108.90



GENERAL CONTRACTOR  <b>IRICAV2</b>		ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione		Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 25 di 336

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
DAA	18.54	0.00	13.68	0.00	108.93
DAA	18.54	0.00	13.68	0.00	108.90
DAA	13.73	0.00	13.68	0.00	109.43
DAA	13.73	0.00	13.68	0.00	109.47
DAA	14.99	0.00	13.68	0.00	109.43
DAA	14.99	0.00	13.68	0.00	109.47
DAA	17.28	0.00	13.68	0.00	109.43
DAA	17.28	0.00	13.68	0.00	109.47
DAA	18.54	0.00	13.68	0.00	109.43
DAA	18.54	0.00	13.68	0.00	109.47

### Combinazioni statiche EQU

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
A	10.65	0.00	1.54	0.00	4.91
A	10.65	0.00	1.54	0.00	4.89
A	10.65	0.00	1.54	0.00	4.91
A	10.65	0.00	1.54	0.00	4.89
A	13.02	0.00	1.54	0.00	4.91
A	13.02	0.00	1.54	0.00	4.89
A	13.02	0.00	1.54	0.00	4.91
A	13.02	0.00	1.54	0.00	4.89
A	10.65	0.00	1.54	0.00	5.12
A	10.65	0.00	1.54	0.00	5.15
A	10.65	0.00	1.54	0.00	5.12
A	10.65	0.00	1.54	0.00	5.15
A	13.02	0.00	1.54	0.00	5.12
A	13.02	0.00	1.54	0.00	5.15
A	13.02	0.00	1.54	0.00	5.12
A	13.02	0.00	1.54	0.00	5.15
B AA	10.65	0.00	9.92	0.00	69.43
B AA	10.65	0.00	9.92	0.00	69.41
B AA	10.65	0.00	9.92	0.00	69.43
B AA	10.65	0.00	9.92	0.00	69.41
B AA	13.02	0.00	9.92	0.00	69.43
B AA	13.02	0.00	9.92	0.00	69.41
B AA	13.02	0.00	9.92	0.00	69.43
B AA	13.02	0.00	9.92	0.00	69.41
B AA	10.65	0.00	9.92	0.00	69.65
B AA	10.65	0.00	9.92	0.00	69.67
B AA	10.65	0.00	9.92	0.00	69.65



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B AA	10.65	0.00	9.92	0.00	69.67
B AA	13.02	0.00	9.92	0.00	69.65
B AA	13.02	0.00	9.92	0.00	69.67
B AA	13.02	0.00	9.92	0.00	69.65
B AA	13.02	0.00	9.92	0.00	69.67
B WX	10.65	7.22	1.24	45.76	3.91
B WX	10.65	7.22	1.24	45.76	3.88
B WX	10.65	7.22	1.24	45.76	3.91
B WX	10.65	7.22	1.24	45.76	3.88
B WX	13.02	7.22	1.24	45.76	3.91
B WX	13.02	7.22	1.24	45.76	3.88
B WX	13.02	7.22	1.24	45.76	3.91
B WX	13.02	7.22	1.24	45.76	3.88
B WX	13.02	7.22	1.24	45.76	3.91
B WX	13.02	7.22	1.24	45.76	3.88
B WX	10.65	7.22	1.24	45.76	4.12
B WX	10.65	7.22	1.24	45.76	4.14
B WX	10.65	7.22	1.24	45.76	4.12
B WX	10.65	7.22	1.24	45.76	4.14
B WX	13.02	7.22	1.24	45.76	4.12
B WX	13.02	7.22	1.24	45.76	4.14
B WX	13.02	7.22	1.24	45.76	4.12
B WX	13.02	7.22	1.24	45.76	4.14
B WXY	10.65	5.06	11.01	32.04	79.18
B WXY	10.65	5.06	11.01	32.04	79.16
B WXY	10.65	5.06	11.01	32.04	79.18
B WXY	10.65	5.06	11.01	32.04	79.16
B WXY	13.02	5.06	11.01	32.04	79.18
B WXY	13.02	5.06	11.01	32.04	79.16
B WXY	13.02	5.06	11.01	32.04	79.18
B WXY	13.02	5.06	11.01	32.04	79.16
B WXY	10.65	5.06	11.01	32.04	79.40
B WXY	10.65	5.06	11.01	32.04	79.42
B WXY	10.65	5.06	11.01	32.04	79.40
B WXY	10.65	5.06	11.01	32.04	79.42
B WXY	13.02	5.06	11.01	32.04	79.40
B WXY	13.02	5.06	11.01	32.04	79.42
B WXY	13.02	5.06	11.01	32.04	79.40
B WXY	13.02	5.06	11.01	32.04	79.42
B WY	10.65	0.00	15.20	0.00	111.45
B WY	10.65	0.00	15.20	0.00	111.42
B WY	10.65	0.00	15.20	0.00	111.45
B WY	10.65	0.00	15.20	0.00	111.42
B WY	13.02	0.00	15.20	0.00	111.45
B WY	13.02	0.00	15.20	0.00	111.42



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WY	13.02	0.00	15.20	0.00	111.45
B WY	13.02	0.00	15.20	0.00	111.42
B WY	10.65	0.00	15.20	0.00	111.66
B WY	10.65	0.00	15.20	0.00	111.68
B WY	10.65	0.00	15.20	0.00	111.66
B WY	10.65	0.00	15.20	0.00	111.68
B WY	13.02	0.00	15.20	0.00	111.66
B WY	13.02	0.00	15.20	0.00	111.68
B WY	13.02	0.00	15.20	0.00	111.66
B WY	13.02	0.00	15.20	0.00	111.68
D I	10.65	0.00	13.37	0.00	108.07
D I	14.43	0.00	13.37	0.00	107.79
D I	13.17	0.00	13.37	0.00	108.07
D I	16.95	0.00	13.37	0.00	107.79
D I	13.02	0.00	13.37	0.00	108.07
D I	16.80	0.00	13.37	0.00	107.79
D I	15.54	0.00	13.37	0.00	108.07
D I	19.32	0.00	13.37	0.00	107.79
D I	10.65	0.00	13.37	0.00	108.29
D I	14.43	0.00	13.37	0.00	108.57
D I	13.17	0.00	13.37	0.00	108.29
D I	16.95	0.00	13.37	0.00	108.57
D I	13.02	0.00	13.37	0.00	108.29
D I	16.80	0.00	13.37	0.00	108.57
D I	15.54	0.00	13.37	0.00	108.29
D I	19.32	0.00	13.37	0.00	108.57
D W	10.65	0.00	21.47	0.00	177.52
D W	12.54	0.00	21.47	0.00	177.36
D W	11.91	0.00	21.47	0.00	177.52
D W	13.80	0.00	21.47	0.00	177.36
D W	13.02	0.00	21.47	0.00	177.52
D W	14.91	0.00	21.47	0.00	177.36
D W	14.28	0.00	21.47	0.00	177.52
D W	16.17	0.00	21.47	0.00	177.36
D W	10.65	0.00	21.47	0.00	177.73
D W	12.54	0.00	21.47	0.00	177.89
D W	11.91	0.00	21.47	0.00	177.73
D W	13.80	0.00	21.47	0.00	177.89
D W	13.02	0.00	21.47	0.00	177.73
D W	14.91	0.00	21.47	0.00	177.89
D W	14.28	0.00	21.47	0.00	177.73
D W	16.17	0.00	21.47	0.00	177.89
DAA	12.54	0.00	13.68	0.00	108.94

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
DAA	12.54	0.00	13.68	0.00	108.92
DAA	13.80	0.00	13.68	0.00	108.94
DAA	13.80	0.00	13.68	0.00	108.92
DAA	14.91	0.00	13.68	0.00	108.94
DAA	14.91	0.00	13.68	0.00	108.92
DAA	16.17	0.00	13.68	0.00	108.94
DAA	16.17	0.00	13.68	0.00	108.92
DAA	12.54	0.00	13.68	0.00	109.42
DAA	12.54	0.00	13.68	0.00	109.45
DAA	13.80	0.00	13.68	0.00	109.42
DAA	13.80	0.00	13.68	0.00	109.45
DAA	14.91	0.00	13.68	0.00	109.42
DAA	14.91	0.00	13.68	0.00	109.45
DAA	16.17	0.00	13.68	0.00	109.42
DAA	16.17	0.00	13.68	0.00	109.45

### Combinazioni sismiche

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
Comb1	11.84	1.99	6.64	16.00	53.22
Comb2	11.84	1.99	6.64	16.00	53.22
Comb3	11.84	1.99	6.64	16.00	53.45
Comb4	11.84	1.99	6.64	16.00	53.45
Comb5	11.84	6.64	1.99	53.34	15.88
Comb6	11.84	6.64	1.99	53.34	15.88
Comb7	11.84	6.64	1.99	53.34	16.12
Comb8	11.84	6.64	1.99	53.34	16.12

Con

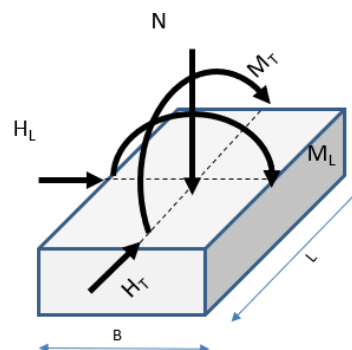
N = azione verticale

H<sub>L</sub> = taglio agente in direzione longitudinale

H<sub>T</sub> = taglio agente in direzione trasversale

M<sub>L</sub> = momento agente in direzione longitudinale

M<sub>T</sub> = momento agente in direzione trasversale



GENERAL CONTRACTOR  <b>IRICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione	Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 29 di 336

## LC2

Unità di misura: [kN], [m]

### Combinazioni statiche STR

COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
A	13.63	0.00	9.09	0.00	85.02
A	13.63	0.00	9.09	0.00	85.02
A	13.63	0.00	11.25	0.00	108.69
A	13.63	0.00	11.25	0.00	108.69
A	17.71	0.00	9.09	0.00	85.02
A	17.71	0.00	9.09	0.00	85.02
A	17.71	0.00	11.25	0.00	108.69
A	17.71	0.00	11.25	0.00	108.69
A	13.63	0.00	5.32	0.00	72.75
A	13.63	0.00	5.32	0.00	72.75
A	13.63	0.00	7.48	0.00	96.42
A	13.63	0.00	7.48	0.00	96.42
A	17.71	0.00	5.32	0.00	72.75
A	17.71	0.00	5.32	0.00	72.75
A	17.71	0.00	7.48	0.00	96.42
A	17.71	0.00	7.48	0.00	96.42
B AA	13.63	0.00	15.42	0.00	122.17
B AA	13.63	0.00	15.42	0.00	122.17
B AA	13.63	0.00	16.69	0.00	136.35
B AA	13.63	0.00	16.69	0.00	136.35
B AA	17.71	0.00	15.42	0.00	122.17
B AA	17.71	0.00	15.42	0.00	122.17
B AA	17.71	0.00	16.69	0.00	136.35
B AA	17.71	0.00	16.69	0.00	136.35
B AA	13.63	0.00	6.93	0.00	27.66
B AA	13.63	0.00	6.93	0.00	27.66
B AA	13.63	0.00	5.65	0.00	13.49
B AA	13.63	0.00	5.65	0.00	13.49
B AA	17.71	0.00	6.93	0.00	27.66
B AA	17.71	0.00	6.93	0.00	27.66
B AA	17.71	0.00	5.65	0.00	13.49
B AA	17.71	0.00	5.65	0.00	13.49
B WX	13.63	8.20	5.76	51.61	52.16
B WX	13.63	8.20	5.76	51.61	52.16
B WX	13.63	8.20	7.03	51.61	66.34
B WX	13.63	8.20	7.03	51.61	66.34



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WX	17.71	8.20	5.76	51.61	52.16
B WX	17.71	8.20	5.76	51.61	52.16
B WX	17.71	8.20	7.03	51.61	66.34
B WX	17.71	8.20	7.03	51.61	66.34
B WX	13.63	8.20	2.74	51.61	42.35
B WX	13.63	8.20	2.74	51.61	42.35
B WX	13.63	8.20	4.01	51.61	56.52
B WX	13.63	8.20	4.01	51.61	56.52
B WX	17.71	8.20	2.74	51.61	42.35
B WX	17.71	8.20	2.74	51.61	42.35
B WX	17.71	8.20	4.01	51.61	56.52
B WX	17.71	8.20	4.01	51.61	56.52
B WXY	13.63	5.74	16.59	36.12	132.41
B WXY	13.63	5.74	16.59	36.12	132.41
B WXY	13.63	5.74	17.86	36.12	146.59
B WXY	13.63	5.74	17.86	36.12	146.59
B WXY	17.71	5.74	16.59	36.12	132.41
B WXY	17.71	5.74	16.59	36.12	132.41
B WXY	17.71	5.74	17.86	36.12	146.59
B WXY	17.71	5.74	17.86	36.12	146.59
B WXY	13.63	5.74	8.10	36.12	37.90
B WXY	13.63	5.74	8.10	36.12	37.90
B WXY	13.63	5.74	6.82	36.12	23.73
B WXY	13.63	5.74	6.82	36.12	23.73
B WXY	17.71	5.74	8.10	36.12	37.90
B WXY	17.71	5.74	8.10	36.12	37.90
B WXY	17.71	5.74	6.82	36.12	23.73
B WXY	17.71	5.74	6.82	36.12	23.73
B WY	13.63	0.00	21.23	0.00	166.80
B WY	13.63	0.00	21.23	0.00	166.80
B WY	13.63	0.00	22.51	0.00	180.98
B WY	13.63	0.00	22.51	0.00	180.98
B WY	17.71	0.00	21.23	0.00	166.80
B WY	17.71	0.00	21.23	0.00	166.80
B WY	17.71	0.00	22.51	0.00	180.98
B WY	17.71	0.00	22.51	0.00	180.98
B WY	13.63	0.00	12.74	0.00	72.29
B WY	13.63	0.00	12.74	0.00	72.29
B WY	13.63	0.00	11.47	0.00	58.12
B WY	13.63	0.00	11.47	0.00	58.12
B WY	17.71	0.00	12.74	0.00	72.29
B WY	17.71	0.00	12.74	0.00	72.29
B WY	17.71	0.00	11.47	0.00	58.12



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WY	17.71	0.00	11.47	0.00	58.12
D I	13.63	0.00	20.04	0.00	173.54
D I	17.09	0.00	20.04	0.00	173.54
D I	15.94	0.00	21.77	0.00	192.84
D I	19.40	0.00	21.77	0.00	192.84
D I	17.71	0.00	20.04	0.00	173.54
D I	21.18	0.00	20.04	0.00	173.54
D I	20.02	0.00	21.77	0.00	192.84
D I	23.49	0.00	21.77	0.00	192.84
D I	13.63	0.00	8.45	0.00	46.52
D I	17.09	0.00	8.45	0.00	46.52
D I	15.94	0.00	6.71	0.00	27.23
D I	19.40	0.00	6.71	0.00	27.23
D I	17.71	0.00	8.45	0.00	46.52
D I	21.18	0.00	8.45	0.00	46.52
D I	20.02	0.00	6.71	0.00	27.23
D I	23.49	0.00	6.71	0.00	27.23
D W	13.63	0.00	28.52	0.00	243.62
D W	15.36	0.00	28.52	0.00	243.62
D W	14.78	0.00	30.26	0.00	262.80
D W	16.51	0.00	30.26	0.00	262.80
D W	17.71	0.00	28.52	0.00	243.62
D W	19.45	0.00	28.52	0.00	243.62
D W	18.87	0.00	30.26	0.00	262.80
D W	20.60	0.00	30.26	0.00	262.80
D W	13.63	0.00	16.94	0.00	116.60
D W	15.36	0.00	16.94	0.00	116.60
D W	14.78	0.00	15.20	0.00	97.43
D W	16.51	0.00	15.20	0.00	97.43
D W	17.71	0.00	16.94	0.00	116.60
D W	19.45	0.00	16.94	0.00	116.60
D W	18.87	0.00	15.20	0.00	97.43
D W	20.60	0.00	15.20	0.00	97.43
DAA	15.36	0.00	20.41	0.00	174.77
DAA	15.36	0.00	20.41	0.00	174.77
DAA	16.51	0.00	22.15	0.00	193.94
DAA	16.51	0.00	22.15	0.00	193.94
DAA	19.45	0.00	20.41	0.00	174.77
DAA	19.45	0.00	20.41	0.00	174.77
DAA	20.60	0.00	22.15	0.00	193.94
DAA	20.60	0.00	22.15	0.00	193.94
DAA	15.36	0.00	8.83	0.00	47.75
DAA	15.36	0.00	8.83	0.00	47.75



COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
DAA	16.51	0.00	7.09	0.00	28.57
DAA	16.51	0.00	7.09	0.00	28.57
DAA	19.45	0.00	8.83	0.00	47.75
DAA	19.45	0.00	8.83	0.00	47.75
DAA	20.60	0.00	7.09	0.00	28.57
DAA	20.60	0.00	7.09	0.00	28.57

### Combinazioni statiche EQU

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
A	12.26	0.00	8.37	0.00	77.13
A	12.26	0.00	8.37	0.00	77.13
A	12.26	0.00	9.81	0.00	92.91
A	12.26	0.00	9.81	0.00	92.91
A	14.99	0.00	8.37	0.00	77.13
A	14.99	0.00	8.37	0.00	77.13
A	14.99	0.00	9.81	0.00	92.91
A	14.99	0.00	9.81	0.00	92.91
A	12.26	0.00	4.60	0.00	64.87
A	12.26	0.00	4.60	0.00	64.87
A	12.26	0.00	6.04	0.00	80.64
A	12.26	0.00	6.04	0.00	80.64
A	14.99	0.00	4.60	0.00	64.87
A	14.99	0.00	4.60	0.00	64.87
A	14.99	0.00	6.04	0.00	80.64
A	14.99	0.00	6.04	0.00	80.64
B AA	12.26	0.00	14.99	0.00	117.45
B AA	12.26	0.00	14.99	0.00	117.45
B AA	12.26	0.00	15.84	0.00	126.90
B AA	12.26	0.00	15.84	0.00	126.90
B AA	14.99	0.00	14.99	0.00	117.45
B AA	14.99	0.00	14.99	0.00	117.45
B AA	14.99	0.00	15.84	0.00	126.90
B AA	14.99	0.00	15.84	0.00	126.90
B AA	12.26	0.00	7.35	0.00	32.39
B AA	12.26	0.00	7.35	0.00	32.39
B AA	12.26	0.00	6.50	0.00	22.94
B AA	12.26	0.00	6.50	0.00	22.94
B AA	14.99	0.00	7.35	0.00	32.39
B AA	14.99	0.00	7.35	0.00	32.39
B AA	14.99	0.00	6.50	0.00	22.94





COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B AA	14.99	0.00	6.50	0.00	22.94
B WX	12.26	8.20	5.33	51.61	47.44
B WX	12.26	8.20	5.33	51.61	47.44
B WX	12.26	8.20	6.18	51.61	56.89
B WX	12.26	8.20	6.18	51.61	56.89
B WX	14.99	8.20	5.33	51.61	47.44
B WX	14.99	8.20	5.33	51.61	47.44
B WX	14.99	8.20	6.18	51.61	56.89
B WX	14.99	8.20	6.18	51.61	56.89
B WX	12.26	8.20	2.31	51.61	37.62
B WX	12.26	8.20	2.31	51.61	37.62
B WX	12.26	8.20	3.16	51.61	47.07
B WX	12.26	8.20	3.16	51.61	47.07
B WX	14.99	8.20	2.31	51.61	37.62
B WX	14.99	8.20	2.31	51.61	37.62
B WX	14.99	8.20	3.16	51.61	47.07
B WX	14.99	8.20	3.16	51.61	47.07
B WXY	12.26	5.74	16.17	36.12	127.69
B WXY	12.26	5.74	16.17	36.12	127.69
B WXY	12.26	5.74	17.01	36.12	137.14
B WXY	12.26	5.74	17.01	36.12	137.14
B WXY	14.99	5.74	16.17	36.12	127.69
B WXY	14.99	5.74	16.17	36.12	127.69
B WXY	14.99	5.74	17.01	36.12	137.14
B WXY	14.99	5.74	17.01	36.12	137.14
B WXY	12.26	5.74	8.52	36.12	42.63
B WXY	12.26	5.74	8.52	36.12	42.63
B WXY	12.26	5.74	7.67	36.12	33.18
B WXY	12.26	5.74	7.67	36.12	33.18
B WXY	14.99	5.74	8.52	36.12	42.63
B WXY	14.99	5.74	8.52	36.12	42.63
B WXY	14.99	5.74	7.67	36.12	33.18
B WXY	14.99	5.74	7.67	36.12	33.18
B WY	12.26	0.00	20.81	0.00	162.08
B WY	12.26	0.00	20.81	0.00	162.08
B WY	12.26	0.00	21.66	0.00	171.53
B WY	12.26	0.00	21.66	0.00	171.53
B WY	14.99	0.00	20.81	0.00	162.08
B WY	14.99	0.00	20.81	0.00	162.08
B WY	14.99	0.00	21.66	0.00	171.53
B WY	14.99	0.00	21.66	0.00	171.53
B WY	12.26	0.00	13.16	0.00	77.02
B WY	12.26	0.00	13.16	0.00	77.02



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WY	12.26	0.00	12.32	0.00	67.57
B WY	12.26	0.00	12.32	0.00	67.57
B WY	14.99	0.00	13.16	0.00	77.02
B WY	14.99	0.00	13.16	0.00	77.02
B WY	14.99	0.00	12.32	0.00	67.57
B WY	14.99	0.00	12.32	0.00	67.57
D I	12.26	0.00	19.46	0.00	167.19
D I	15.73	0.00	19.46	0.00	167.19
D I	14.57	0.00	20.61	0.00	180.14
D I	18.04	0.00	20.61	0.00	180.14
D I	14.99	0.00	19.46	0.00	167.19
D I	18.45	0.00	19.46	0.00	167.19
D I	17.30	0.00	20.61	0.00	180.14
D I	20.76	0.00	20.61	0.00	180.14
D I	12.26	0.00	9.03	0.00	52.87
D I	15.73	0.00	9.03	0.00	52.87
D I	14.57	0.00	7.87	0.00	39.93
D I	18.04	0.00	7.87	0.00	39.93
D I	14.99	0.00	9.03	0.00	52.87
D I	18.45	0.00	9.03	0.00	52.87
D I	17.30	0.00	7.87	0.00	39.93
D I	20.76	0.00	7.87	0.00	39.93
D W	12.26	0.00	27.95	0.00	237.27
D W	14.00	0.00	27.95	0.00	237.27
D W	13.42	0.00	29.10	0.00	250.10
D W	15.15	0.00	29.10	0.00	250.10
D W	14.99	0.00	27.95	0.00	237.27
D W	16.72	0.00	27.95	0.00	237.27
D W	16.14	0.00	29.10	0.00	250.10
D W	17.88	0.00	29.10	0.00	250.10
D W	12.26	0.00	17.52	0.00	122.95
D W	14.00	0.00	17.52	0.00	122.95
D W	13.42	0.00	16.36	0.00	110.13
D W	15.15	0.00	16.36	0.00	110.13
D W	14.99	0.00	17.52	0.00	122.95
D W	16.72	0.00	17.52	0.00	122.95
D W	16.14	0.00	16.36	0.00	110.13
D W	17.88	0.00	16.36	0.00	110.13
DAA	14.00	0.00	19.83	0.00	168.42
DAA	14.00	0.00	19.83	0.00	168.42
DAA	15.15	0.00	20.99	0.00	181.24
DAA	15.15	0.00	20.99	0.00	181.24
DAA	16.72	0.00	19.83	0.00	168.42

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
DAA	16.72	0.00	19.83	0.00	168.42
DAA	17.88	0.00	20.99	0.00	181.24
DAA	17.88	0.00	20.99	0.00	181.24
DAA	14.00	0.00	9.41	0.00	54.10
DAA	14.00	0.00	9.41	0.00	54.10
DAA	15.15	0.00	8.25	0.00	41.27
DAA	15.15	0.00	8.25	0.00	41.27
DAA	16.72	0.00	9.41	0.00	54.10
DAA	16.72	0.00	9.41	0.00	54.10
DAA	17.88	0.00	8.25	0.00	41.27
DAA	17.88	0.00	8.25	0.00	41.27

### Combinazioni sismiche

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
Comb1	13.63	2.29	10.90	17.51	95.50
Comb2	13.63	2.29	10.90	17.51	95.50
Comb3	13.63	2.29	4.39	17.51	21.20
Comb4	13.63	2.29	4.39	17.51	21.20
Comb5	13.63	7.64	5.55	58.35	54.66
Comb6	13.63	7.64	5.55	58.35	54.66
Comb7	13.63	7.64	0.96	58.35	19.65
Comb8	13.63	7.64	0.96	58.35	19.65

Con

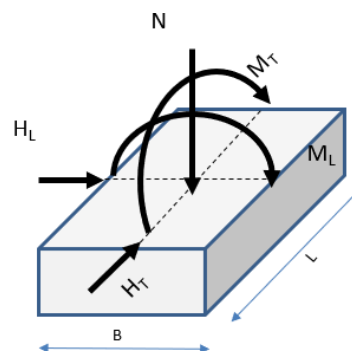
N = azione verticale

H<sub>L</sub> = taglio agente in direzione longitudinale

H<sub>T</sub> = taglio agente in direzione trasversale

M<sub>L</sub> = momento agente in direzione longitudinale

M<sub>T</sub> = momento agente in direzione trasversale



GENERAL CONTRACTOR  <b>IRICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione	Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 36 di 336

### LC3

Unità di misura: [kN], [m]

### Combinazioni statiche STR

COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
A	12.69	0.00	6.58	0.00	58.90
A	12.69	0.00	6.58	0.00	58.90
A	12.69	0.00	8.04	0.00	74.90
A	12.69	0.00	8.04	0.00	74.90
A	16.50	0.00	6.58	0.00	58.90
A	16.50	0.00	6.58	0.00	58.90
A	16.50	0.00	8.04	0.00	74.90
A	16.50	0.00	8.04	0.00	74.90
A	12.69	0.00	3.15	0.00	47.75
A	12.69	0.00	3.15	0.00	47.75
A	12.69	0.00	4.61	0.00	63.75
A	12.69	0.00	4.61	0.00	63.75
A	16.50	0.00	3.15	0.00	47.75
A	16.50	0.00	3.15	0.00	47.75
A	16.50	0.00	4.61	0.00	63.75
A	16.50	0.00	4.61	0.00	63.75
B AA	12.69	0.00	13.42	0.00	104.19
B AA	12.69	0.00	13.42	0.00	104.19
B AA	12.69	0.00	14.28	0.00	113.77
B AA	12.69	0.00	14.28	0.00	113.77
B AA	16.50	0.00	13.42	0.00	104.19
B AA	16.50	0.00	13.42	0.00	104.19
B AA	16.50	0.00	14.28	0.00	113.77
B AA	16.50	0.00	14.28	0.00	113.77
B AA	12.69	0.00	7.68	0.00	40.27
B AA	12.69	0.00	7.68	0.00	40.27
B AA	12.69	0.00	6.82	0.00	30.68
B AA	12.69	0.00	6.82	0.00	30.68
B AA	16.50	0.00	7.68	0.00	40.27
B AA	16.50	0.00	7.68	0.00	40.27
B AA	16.50	0.00	6.82	0.00	30.68
B AA	16.50	0.00	6.82	0.00	30.68
B WX	12.69	7.71	4.24	48.69	36.42
B WX	12.69	7.71	4.24	48.69	36.42
B WX	12.69	7.71	5.10	48.69	46.01
B WX	12.69	7.71	5.10	48.69	46.01



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WX	16.50	7.71	4.24	48.69	36.42
B WX	16.50	7.71	4.24	48.69	36.42
B WX	16.50	7.71	5.10	48.69	46.01
B WX	16.50	7.71	5.10	48.69	46.01
B WX	12.69	7.71	1.50	48.69	27.50
B WX	12.69	7.71	1.50	48.69	27.50
B WX	12.69	7.71	2.36	48.69	37.09
B WX	12.69	7.71	2.36	48.69	37.09
B WX	16.50	7.71	1.50	48.69	27.50
B WX	16.50	7.71	1.50	48.69	27.50
B WX	16.50	7.71	2.36	48.69	37.09
B WX	16.50	7.71	2.36	48.69	37.09
B WXY	12.69	5.40	14.54	34.08	114.18
B WXY	12.69	5.40	14.54	34.08	114.18
B WXY	12.69	5.40	15.40	34.08	123.77
B WXY	12.69	5.40	15.40	34.08	123.77
B WXY	16.50	5.40	14.54	34.08	114.18
B WXY	16.50	5.40	14.54	34.08	114.18
B WXY	16.50	5.40	15.40	34.08	123.77
B WXY	16.50	5.40	15.40	34.08	123.77
B WXY	12.69	5.40	8.81	34.08	50.27
B WXY	12.69	5.40	8.81	34.08	50.27
B WXY	12.69	5.40	7.95	34.08	40.68
B WXY	12.69	5.40	7.95	34.08	40.68
B WXY	16.50	5.40	8.81	34.08	50.27
B WXY	16.50	5.40	8.81	34.08	50.27
B WXY	16.50	5.40	7.95	34.08	40.68
B WXY	16.50	5.40	7.95	34.08	40.68
B WY	12.69	0.00	18.96	0.00	147.51
B WY	12.69	0.00	18.96	0.00	147.51
B WY	12.69	0.00	19.82	0.00	157.10
B WY	12.69	0.00	19.82	0.00	157.10
B WY	16.50	0.00	18.96	0.00	147.51
B WY	16.50	0.00	18.96	0.00	147.51
B WY	16.50	0.00	19.82	0.00	157.10
B WY	16.50	0.00	19.82	0.00	157.10
B WY	12.69	0.00	13.22	0.00	83.59
B WY	12.69	0.00	13.22	0.00	83.59
B WY	12.69	0.00	12.36	0.00	74.01
B WY	12.69	0.00	12.36	0.00	74.01
B WY	16.50	0.00	13.22	0.00	83.59
B WY	16.50	0.00	13.22	0.00	83.59
B WY	16.50	0.00	12.36	0.00	74.01



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WY	16.50	0.00	12.36	0.00	74.01
D I	12.69	0.00	17.72	0.00	152.04
D I	16.31	0.00	17.72	0.00	152.04
D I	15.11	0.00	18.89	0.00	165.18
D I	18.73	0.00	18.89	0.00	165.18
D I	16.50	0.00	17.72	0.00	152.04
D I	20.12	0.00	17.72	0.00	152.04
D I	18.91	0.00	18.89	0.00	165.18
D I	22.54	0.00	18.89	0.00	165.18
D I	12.69	0.00	9.90	0.00	66.17
D I	16.31	0.00	9.90	0.00	66.17
D I	15.11	0.00	8.72	0.00	53.03
D I	18.73	0.00	8.72	0.00	53.03
D I	16.50	0.00	9.90	0.00	66.17
D I	20.12	0.00	9.90	0.00	66.17
D I	18.91	0.00	8.72	0.00	53.03
D I	22.54	0.00	8.72	0.00	53.03
D W	12.69	0.00	26.01	0.00	221.81
D W	14.50	0.00	26.01	0.00	221.81
D W	13.90	0.00	27.18	0.00	234.81
D W	15.71	0.00	27.18	0.00	234.81
D W	16.50	0.00	26.01	0.00	221.81
D W	18.31	0.00	26.01	0.00	221.81
D W	17.71	0.00	27.18	0.00	234.81
D W	19.52	0.00	27.18	0.00	234.81
D W	12.69	0.00	18.19	0.00	135.93
D W	14.50	0.00	18.19	0.00	135.93
D W	13.90	0.00	17.01	0.00	122.92
D W	15.71	0.00	17.01	0.00	122.92
D W	16.50	0.00	18.19	0.00	135.93
D W	18.31	0.00	18.19	0.00	135.93
D W	17.71	0.00	17.01	0.00	122.92
D W	19.52	0.00	17.01	0.00	122.92
DAA	14.50	0.00	18.06	0.00	153.16
DAA	14.50	0.00	18.06	0.00	153.16
DAA	15.71	0.00	19.24	0.00	166.17
DAA	15.71	0.00	19.24	0.00	166.17
DAA	18.31	0.00	18.06	0.00	153.16
DAA	18.31	0.00	18.06	0.00	153.16
DAA	19.52	0.00	19.24	0.00	166.17
DAA	19.52	0.00	19.24	0.00	166.17
DAA	14.50	0.00	10.24	0.00	67.28
DAA	14.50	0.00	10.24	0.00	67.28



COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
DAA	15.71	0.00	9.07	0.00	54.27
DAA	15.71	0.00	9.07	0.00	54.27
DAA	18.31	0.00	10.24	0.00	67.28
DAA	18.31	0.00	10.24	0.00	67.28
DAA	19.52	0.00	9.07	0.00	54.27
DAA	19.52	0.00	9.07	0.00	54.27

### Combinazioni statiche EQU

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
A	11.42	0.00	6.10	0.00	53.57
A	11.42	0.00	6.10	0.00	53.57
A	11.42	0.00	7.07	0.00	64.23
A	11.42	0.00	7.07	0.00	64.23
A	13.96	0.00	6.10	0.00	53.57
A	13.96	0.00	6.10	0.00	53.57
A	13.96	0.00	7.07	0.00	64.23
A	13.96	0.00	7.07	0.00	64.23
A	11.42	0.00	2.67	0.00	42.42
A	11.42	0.00	2.67	0.00	42.42
A	11.42	0.00	3.64	0.00	53.08
A	11.42	0.00	3.64	0.00	53.08
A	13.96	0.00	2.67	0.00	42.42
A	13.96	0.00	2.67	0.00	42.42
A	13.96	0.00	3.64	0.00	53.08
A	13.96	0.00	3.64	0.00	53.08
B AA	11.42	0.00	13.13	0.00	100.99
B AA	11.42	0.00	13.13	0.00	100.99
B AA	11.42	0.00	13.70	0.00	107.38
B AA	11.42	0.00	13.70	0.00	107.38
B AA	13.96	0.00	13.13	0.00	100.99
B AA	13.96	0.00	13.13	0.00	100.99
B AA	13.96	0.00	13.70	0.00	107.38
B AA	13.96	0.00	13.70	0.00	107.38
B AA	11.42	0.00	7.97	0.00	43.47
B AA	11.42	0.00	7.97	0.00	43.47
B AA	11.42	0.00	7.39	0.00	37.08
B AA	11.42	0.00	7.39	0.00	37.08
B AA	13.96	0.00	7.97	0.00	43.47
B AA	13.96	0.00	7.97	0.00	43.47
B AA	13.96	0.00	7.39	0.00	37.08



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B AA	13.96	0.00	7.39	0.00	37.08
B WX	11.42	7.71	3.95	48.69	33.22
B WX	11.42	7.71	3.95	48.69	33.22
B WX	11.42	7.71	4.53	48.69	39.61
B WX	11.42	7.71	4.53	48.69	39.61
B WX	13.96	7.71	3.95	48.69	33.22
B WX	13.96	7.71	3.95	48.69	33.22
B WX	13.96	7.71	4.53	48.69	39.61
B WX	13.96	7.71	4.53	48.69	39.61
B WX	11.42	7.71	1.21	48.69	24.30
B WX	11.42	7.71	1.21	48.69	24.30
B WX	11.42	7.71	1.78	48.69	30.69
B WX	11.42	7.71	1.78	48.69	30.69
B WX	13.96	7.71	1.21	48.69	24.30
B WX	13.96	7.71	1.21	48.69	24.30
B WX	13.96	7.71	1.78	48.69	30.69
B WX	13.96	7.71	1.78	48.69	30.69
B WXY	11.42	5.40	14.26	34.08	110.99
B WXY	11.42	5.40	14.26	34.08	110.99
B WXY	11.42	5.40	14.83	34.08	117.38
B WXY	11.42	5.40	14.83	34.08	117.38
B WXY	13.96	5.40	14.26	34.08	110.99
B WXY	13.96	5.40	14.26	34.08	110.99
B WXY	13.96	5.40	14.83	34.08	117.38
B WXY	13.96	5.40	14.83	34.08	117.38
B WXY	11.42	5.40	9.09	34.08	53.46
B WXY	11.42	5.40	9.09	34.08	53.46
B WXY	11.42	5.40	8.52	34.08	47.07
B WXY	11.42	5.40	8.52	34.08	47.07
B WXY	13.96	5.40	9.09	34.08	53.46
B WXY	13.96	5.40	9.09	34.08	53.46
B WXY	13.96	5.40	8.52	34.08	47.07
B WXY	13.96	5.40	8.52	34.08	47.07
B WY	11.42	0.00	18.67	0.00	144.31
B WY	11.42	0.00	18.67	0.00	144.31
B WY	11.42	0.00	19.25	0.00	150.70
B WY	11.42	0.00	19.25	0.00	150.70
B WY	13.96	0.00	18.67	0.00	144.31
B WY	13.96	0.00	18.67	0.00	144.31
B WY	13.96	0.00	19.25	0.00	150.70
B WY	13.96	0.00	19.25	0.00	150.70
B WY	11.42	0.00	13.51	0.00	86.79
B WY	11.42	0.00	13.51	0.00	86.79





COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WY	11.42	0.00	12.94	0.00	80.40
B WY	11.42	0.00	12.94	0.00	80.40
B WY	13.96	0.00	13.51	0.00	86.79
B WY	13.96	0.00	13.51	0.00	86.79
B WY	13.96	0.00	12.94	0.00	80.40
B WY	13.96	0.00	12.94	0.00	80.40
D I	11.42	0.00	17.33	0.00	147.75
D I	15.04	0.00	17.33	0.00	147.75
D I	13.84	0.00	18.11	0.00	156.59
D I	17.46	0.00	18.11	0.00	156.59
D I	13.96	0.00	17.33	0.00	147.75
D I	17.58	0.00	17.33	0.00	147.75
D I	16.37	0.00	18.11	0.00	156.59
D I	20.00	0.00	18.11	0.00	156.59
D I	11.42	0.00	10.29	0.00	70.46
D I	15.04	0.00	10.29	0.00	70.46
D I	13.84	0.00	9.50	0.00	61.62
D I	17.46	0.00	9.50	0.00	61.62
D I	13.96	0.00	10.29	0.00	70.46
D I	17.58	0.00	10.29	0.00	70.46
D I	16.37	0.00	9.50	0.00	61.62
D I	20.00	0.00	9.50	0.00	61.62
D W	11.42	0.00	25.62	0.00	217.51
D W	13.23	0.00	25.62	0.00	217.51
D W	12.63	0.00	26.40	0.00	226.23
D W	14.44	0.00	26.40	0.00	226.23
D W	13.96	0.00	25.62	0.00	217.51
D W	15.77	0.00	25.62	0.00	217.51
D W	15.17	0.00	26.40	0.00	226.23
D W	16.98	0.00	26.40	0.00	226.23
D W	11.42	0.00	18.58	0.00	140.22
D W	13.23	0.00	18.58	0.00	140.22
D W	12.63	0.00	17.80	0.00	131.51
D W	14.44	0.00	17.80	0.00	131.51
D W	13.96	0.00	18.58	0.00	140.22
D W	15.77	0.00	18.58	0.00	140.22
D W	15.17	0.00	17.80	0.00	131.51
D W	16.98	0.00	17.80	0.00	131.51
DAA	13.23	0.00	17.67	0.00	148.86
DAA	13.23	0.00	17.67	0.00	148.86
DAA	14.44	0.00	18.45	0.00	157.58
DAA	14.44	0.00	18.45	0.00	157.58
DAA	15.77	0.00	17.67	0.00	148.86

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
DAA	15.77	0.00	17.67	0.00	148.86
DAA	16.98	0.00	18.45	0.00	157.58
DAA	16.98	0.00	18.45	0.00	157.58
DAA	13.23	0.00	10.63	0.00	71.58
DAA	13.23	0.00	10.63	0.00	71.58
DAA	14.44	0.00	9.85	0.00	62.86
DAA	14.44	0.00	9.85	0.00	62.86
DAA	15.77	0.00	10.63	0.00	71.58
DAA	15.77	0.00	10.63	0.00	71.58
DAA	16.98	0.00	9.85	0.00	62.86
DAA	16.98	0.00	9.85	0.00	62.86

### Combinazioni sismiche

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
Comb1	12.69	2.14	9.32	16.71	80.84
Comb2	12.69	2.14	9.32	16.71	80.84
Comb3	12.69	2.14	4.92	16.71	30.57
Comb4	12.69	2.14	4.92	16.71	30.57
Comb5	12.69	7.12	4.33	55.71	41.85
Comb6	12.69	7.12	4.33	55.71	41.85
Comb7	12.69	7.12	0.06	55.71	8.42
Comb8	12.69	7.12	0.06	55.71	8.42

Con

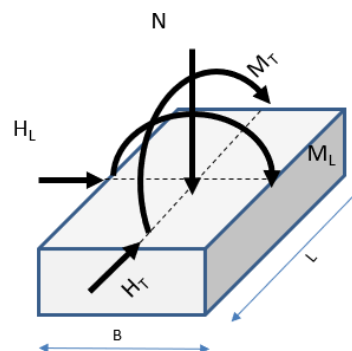
N = azione verticale

H<sub>L</sub> = taglio agente in direzione longitudinale

H<sub>T</sub> = taglio agente in direzione trasversale

M<sub>L</sub> = momento agente in direzione longitudinale

M<sub>T</sub> = momento agente in direzione trasversale



GENERAL CONTRACTOR  IRICAV2		ALTA SORVEGLIANZA  GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione	Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 43 di 336	

## LC4

Unità di misura: [kN], [m]

### Combinazioni statiche STR

COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
A	9.76	0.00	14.50	0.00	143.91
A	9.76	0.00	14.50	0.00	143.91
A	9.76	0.00	18.38	0.00	185.58
A	9.76	0.00	18.38	0.00	185.58
A	12.69	0.00	14.50	0.00	143.91
A	12.69	0.00	14.50	0.00	143.91
A	12.69	0.00	18.38	0.00	185.58
A	12.69	0.00	18.38	0.00	185.58
A	9.76	0.00	11.41	0.00	133.87
A	9.76	0.00	11.41	0.00	133.87
A	9.76	0.00	15.29	0.00	175.54
A	9.76	0.00	15.29	0.00	175.54
A	12.69	0.00	11.41	0.00	133.87
A	12.69	0.00	11.41	0.00	133.87
A	12.69	0.00	15.29	0.00	175.54
A	12.69	0.00	15.29	0.00	175.54
B AA	9.76	0.00	16.93	0.00	145.60
B AA	9.76	0.00	16.93	0.00	145.60
B AA	9.76	0.00	19.22	0.00	170.54
B AA	9.76	0.00	19.22	0.00	170.54
B AA	12.69	0.00	16.93	0.00	145.60
B AA	12.69	0.00	16.93	0.00	145.60
B AA	12.69	0.00	19.22	0.00	170.54
B AA	12.69	0.00	19.22	0.00	170.54
B AA	9.76	0.00	1.67	0.00	20.65
B AA	9.76	0.00	1.67	0.00	20.65
B AA	9.76	0.00	0.62	0.00	45.59
B AA	9.76	0.00	0.62	0.00	45.59
B AA	12.69	0.00	1.67	0.00	20.65
B AA	12.69	0.00	1.67	0.00	20.65
B AA	12.69	0.00	0.62	0.00	45.59
B AA	12.69	0.00	0.62	0.00	45.59
B WX	9.76	8.68	8.87	54.53	87.14
B WX	9.76	8.68	8.87	54.53	87.14
B WX	9.76	8.68	11.16	54.53	112.08
B WX	9.76	8.68	11.16	54.53	112.08



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WX	12.69	8.68	8.87	54.53	87.14
B WX	12.69	8.68	8.87	54.53	87.14
B WX	12.69	8.68	11.16	54.53	112.08
B WX	12.69	8.68	11.16	54.53	112.08
B WX	9.76	8.68	6.40	54.53	79.11
B WX	9.76	8.68	6.40	54.53	79.11
B WX	9.76	8.68	8.69	54.53	104.05
B WX	9.76	8.68	8.69	54.53	104.05
B WX	12.69	8.68	6.40	54.53	79.11
B WX	12.69	8.68	6.40	54.53	79.11
B WX	12.69	8.68	8.69	54.53	104.05
B WX	12.69	8.68	8.69	54.53	104.05
B WXY	9.76	6.08	17.91	38.17	154.18
B WXY	9.76	6.08	17.91	38.17	154.18
B WXY	9.76	6.08	20.20	38.17	179.11
B WXY	9.76	6.08	20.20	38.17	179.11
B WXY	12.69	6.08	17.91	38.17	154.18
B WXY	12.69	6.08	17.91	38.17	154.18
B WXY	12.69	6.08	20.20	38.17	179.11
B WXY	12.69	6.08	20.20	38.17	179.11
B WXY	9.76	6.08	2.65	38.17	12.08
B WXY	9.76	6.08	2.65	38.17	12.08
B WXY	9.76	6.08	0.36	38.17	37.01
B WXY	9.76	6.08	0.36	38.17	37.01
B WXY	12.69	6.08	2.65	38.17	12.08
B WXY	12.69	6.08	2.65	38.17	12.08
B WXY	12.69	6.08	0.36	38.17	37.01
B WXY	12.69	6.08	0.36	38.17	37.01
B WY	9.76	0.00	21.79	0.00	182.91
B WY	9.76	0.00	21.79	0.00	182.91
B WY	9.76	0.00	24.08	0.00	207.84
B WY	9.76	0.00	24.08	0.00	207.84
B WY	12.69	0.00	21.79	0.00	182.91
B WY	12.69	0.00	21.79	0.00	182.91
B WY	12.69	0.00	24.08	0.00	207.84
B WY	12.69	0.00	24.08	0.00	207.84
B WY	9.76	0.00	6.53	0.00	16.65
B WY	9.76	0.00	6.53	0.00	16.65
B WY	9.76	0.00	4.24	0.00	8.28
B WY	9.76	0.00	4.24	0.00	8.28
B WY	12.69	0.00	6.53	0.00	16.65
B WY	12.69	0.00	6.53	0.00	16.65
B WY	12.69	0.00	4.24	0.00	8.28



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WY	12.69	0.00	4.24	0.00	8.28
D I	9.76	0.00	22.41	0.00	231.52
D I	12.79	0.00	22.41	0.00	231.31
D I	11.78	0.00	25.53	0.00	273.19
D I	14.80	0.00	25.53	0.00	272.97
D I	12.69	0.00	22.41	0.00	231.52
D I	15.72	0.00	22.41	0.00	231.31
D I	14.71	0.00	25.53	0.00	273.19
D I	17.73	0.00	25.53	0.00	272.97
D I	9.76	0.00	1.59	0.00	46.26
D I	12.79	0.00	1.59	0.00	46.05
D I	11.78	0.00	1.54	0.00	87.93
D I	14.80	0.00	1.54	0.00	87.72
D I	12.69	0.00	1.59	0.00	46.26
D I	15.72	0.00	1.59	0.00	46.05
D I	14.71	0.00	1.54	0.00	87.93
D I	17.73	0.00	1.54	0.00	87.72
D W	9.76	0.00	29.58	0.00	290.59
D W	11.28	0.00	29.58	0.00	290.49
D W	10.77	0.00	32.71	0.00	332.26
D W	12.28	0.00	32.71	0.00	332.16
D W	12.69	0.00	29.58	0.00	290.59
D W	14.21	0.00	29.58	0.00	290.49
D W	13.70	0.00	32.71	0.00	332.26
D W	15.21	0.00	32.71	0.00	332.16
D W	9.76	0.00	8.76	0.00	12.81
D W	11.28	0.00	8.76	0.00	12.92
D W	10.77	0.00	5.64	0.00	28.86
D W	12.28	0.00	5.64	0.00	28.75
D W	12.69	0.00	8.76	0.00	12.81
D W	14.21	0.00	8.76	0.00	12.92
D W	13.70	0.00	5.64	0.00	28.86
D W	15.21	0.00	5.64	0.00	28.75
DAA	11.28	0.00	22.72	0.00	232.42
DAA	11.28	0.00	22.72	0.00	232.42
DAA	12.28	0.00	25.84	0.00	274.08
DAA	12.28	0.00	25.84	0.00	274.08
DAA	14.21	0.00	22.72	0.00	232.42
DAA	14.21	0.00	22.72	0.00	232.42
DAA	15.21	0.00	25.84	0.00	274.08
DAA	15.21	0.00	25.84	0.00	274.08
DAA	11.28	0.00	1.90	0.00	45.15
DAA	11.28	0.00	1.90	0.00	45.15



COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
DAA	12.28	0.00	1.23	0.00	86.82
DAA	12.28	0.00	1.23	0.00	86.82
DAA	14.21	0.00	1.90	0.00	45.15
DAA	14.21	0.00	1.90	0.00	45.15
DAA	15.21	0.00	1.23	0.00	86.82
DAA	15.21	0.00	1.23	0.00	86.82

### Combinazioni statiche EQU

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
A	8.79	0.00	13.20	0.00	130.02
A	8.79	0.00	13.20	0.00	130.02
A	8.79	0.00	15.79	0.00	157.80
A	8.79	0.00	15.79	0.00	157.80
A	10.74	0.00	13.20	0.00	130.02
A	10.74	0.00	13.20	0.00	130.02
A	10.74	0.00	15.79	0.00	157.80
A	10.74	0.00	15.79	0.00	157.80
A	8.79	0.00	10.11	0.00	119.98
A	8.79	0.00	10.11	0.00	119.98
A	8.79	0.00	12.70	0.00	147.76
A	8.79	0.00	12.70	0.00	147.76
A	10.74	0.00	10.11	0.00	119.98
A	10.74	0.00	10.11	0.00	119.98
A	10.74	0.00	12.70	0.00	147.76
A	10.74	0.00	12.70	0.00	147.76
B AA	8.79	0.00	16.17	0.00	137.29
B AA	8.79	0.00	16.17	0.00	137.29
B AA	8.79	0.00	17.69	0.00	153.92
B AA	8.79	0.00	17.69	0.00	153.92
B AA	10.74	0.00	16.17	0.00	137.29
B AA	10.74	0.00	16.17	0.00	137.29
B AA	10.74	0.00	17.69	0.00	153.92
B AA	10.74	0.00	17.69	0.00	153.92
B AA	8.79	0.00	2.43	0.00	12.34
B AA	8.79	0.00	2.43	0.00	12.34
B AA	8.79	0.00	0.90	0.00	28.96
B AA	8.79	0.00	0.90	0.00	28.96
B AA	10.74	0.00	2.43	0.00	12.34
B AA	10.74	0.00	2.43	0.00	12.34
B AA	10.74	0.00	0.90	0.00	28.96



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B AA	10.74	0.00	0.90	0.00	28.96
B WX	8.79	8.68	8.10	54.53	78.83
B WX	8.79	8.68	8.10	54.53	78.83
B WX	8.79	8.68	9.63	54.53	95.45
B WX	8.79	8.68	9.63	54.53	95.45
B WX	10.74	8.68	8.10	54.53	78.83
B WX	10.74	8.68	8.10	54.53	78.83
B WX	10.74	8.68	9.63	54.53	95.45
B WX	10.74	8.68	9.63	54.53	95.45
B WX	8.79	8.68	5.63	54.53	70.80
B WX	8.79	8.68	5.63	54.53	70.80
B WX	8.79	8.68	7.16	54.53	87.42
B WX	8.79	8.68	7.16	54.53	87.42
B WX	10.74	8.68	5.63	54.53	70.80
B WX	10.74	8.68	5.63	54.53	70.80
B WX	10.74	8.68	7.16	54.53	87.42
B WX	10.74	8.68	7.16	54.53	87.42
B WXY	8.79	6.08	17.15	38.17	145.86
B WXY	8.79	6.08	17.15	38.17	145.86
B WXY	8.79	6.08	18.68	38.17	162.49
B WXY	8.79	6.08	18.68	38.17	162.49
B WXY	10.74	6.08	17.15	38.17	145.86
B WXY	10.74	6.08	17.15	38.17	145.86
B WXY	10.74	6.08	18.68	38.17	162.49
B WXY	10.74	6.08	18.68	38.17	162.49
B WXY	8.79	6.08	3.41	38.17	3.76
B WXY	8.79	6.08	3.41	38.17	3.76
B WXY	8.79	6.08	1.89	38.17	20.39
B WXY	8.79	6.08	1.89	38.17	20.39
B WXY	10.74	6.08	3.41	38.17	3.76
B WXY	10.74	6.08	3.41	38.17	3.76
B WXY	10.74	6.08	1.89	38.17	20.39
B WXY	10.74	6.08	1.89	38.17	20.39
B WY	8.79	0.00	21.03	0.00	174.59
B WY	8.79	0.00	21.03	0.00	174.59
B WY	8.79	0.00	22.55	0.00	191.22
B WY	8.79	0.00	22.55	0.00	191.22
B WY	10.74	0.00	21.03	0.00	174.59
B WY	10.74	0.00	21.03	0.00	174.59
B WY	10.74	0.00	22.55	0.00	191.22
B WY	10.74	0.00	22.55	0.00	191.22
B WY	8.79	0.00	7.29	0.00	24.97
B WY	8.79	0.00	7.29	0.00	24.97



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WY	8.79	0.00	5.76	0.00	8.34
B WY	8.79	0.00	5.76	0.00	8.34
B WY	10.74	0.00	7.29	0.00	24.97
B WY	10.74	0.00	7.29	0.00	24.97
B WY	10.74	0.00	5.76	0.00	8.34
B WY	10.74	0.00	5.76	0.00	8.34
D I	8.79	0.00	21.37	0.00	217.63
D I	11.81	0.00	21.37	0.00	217.42
D I	10.80	0.00	23.45	0.00	245.41
D I	13.83	0.00	23.45	0.00	245.20
D I	10.74	0.00	21.37	0.00	217.63
D I	13.76	0.00	21.37	0.00	217.42
D I	12.76	0.00	23.45	0.00	245.41
D I	15.78	0.00	23.45	0.00	245.20
D I	8.79	0.00	2.63	0.00	32.37
D I	11.81	0.00	2.63	0.00	32.16
D I	10.80	0.00	0.55	0.00	60.15
D I	13.83	0.00	0.55	0.00	59.94
D I	10.74	0.00	2.63	0.00	32.37
D I	13.76	0.00	2.63	0.00	32.16
D I	12.76	0.00	0.55	0.00	60.15
D I	15.78	0.00	0.55	0.00	59.94
D W	8.79	0.00	28.54	0.00	276.70
D W	10.30	0.00	28.54	0.00	276.60
D W	9.80	0.00	30.62	0.00	304.48
D W	11.31	0.00	30.62	0.00	304.38
D W	10.74	0.00	28.54	0.00	276.70
D W	12.25	0.00	28.54	0.00	276.60
D W	11.75	0.00	30.62	0.00	304.48
D W	13.26	0.00	30.62	0.00	304.38
D W	8.79	0.00	9.80	0.00	26.70
D W	10.30	0.00	9.80	0.00	26.81
D W	9.80	0.00	7.72	0.00	1.08
D W	11.31	0.00	7.72	0.00	0.97
D W	10.74	0.00	9.80	0.00	26.70
D W	12.25	0.00	9.80	0.00	26.81
D W	11.75	0.00	7.72	0.00	1.08
D W	13.26	0.00	7.72	0.00	0.97
DAA	10.30	0.00	21.68	0.00	218.53
DAA	10.30	0.00	21.68	0.00	218.53
DAA	11.31	0.00	23.76	0.00	246.31
DAA	11.31	0.00	23.76	0.00	246.31
DAA	12.25	0.00	21.68	0.00	218.53



COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
DAA	12.25	0.00	21.68	0.00	218.53
DAA	13.26	0.00	23.76	0.00	246.31
DAA	13.26	0.00	23.76	0.00	246.31
DAA	10.30	0.00	2.94	0.00	31.27
DAA	10.30	0.00	2.94	0.00	31.27
DAA	11.31	0.00	0.86	0.00	59.04
DAA	11.31	0.00	0.86	0.00	59.04
DAA	12.25	0.00	2.94	0.00	31.27
DAA	12.25	0.00	2.94	0.00	31.27
DAA	13.26	0.00	0.86	0.00	59.04
DAA	13.26	0.00	0.86	0.00	59.04

### Combinazioni sismiche

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
Comb1	9.76	1.64	11.33	13.01	108.68
Comb2	9.76	1.64	11.33	13.01	108.68
Comb3	9.76	1.64	0.37	13.01	21.98
Comb4	9.76	1.64	0.37	13.01	21.98
Comb5	9.76	5.48	7.49	43.35	78.33
Comb6	9.76	5.48	7.49	43.35	78.33
Comb7	9.76	5.48	4.21	43.35	52.32
Comb8	9.76	5.48	4.21	43.35	52.32

Con

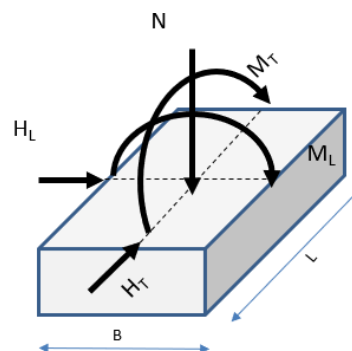
N = azione verticale

H<sub>L</sub> = taglio agente in direzione longitudinale

H<sub>T</sub> = taglio agente in direzione trasversale

M<sub>L</sub> = momento agente in direzione longitudinale

M<sub>T</sub> = momento agente in direzione trasversale



GENERAL CONTRACTOR  <b>IRICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE					
Relazione di calcolo pali di alimentazione	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Progetto IN17</td> <td style="width: 15%;">Lotto 10</td> <td style="width: 40%;">Codifica Documento E I2 CL OC 00 0 0 010</td> <td style="width: 10%;">Rev. A</td> <td style="width: 10%;">Foglio 50 di 336</td> </tr> </table>	Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 50 di 336
Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 50 di 336		

## LC5

Unità di misura: [kN], [m]

### Combinazioni statiche STR

COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
A	78.40	0.00	8.70	0.00	82.81
A	78.40	0.00	8.70	0.00	82.81
A	78.40	0.00	10.74	0.00	105.82
A	78.40	0.00	10.74	0.00	105.82
A	101.92	0.00	8.70	0.00	82.81
A	101.92	0.00	8.70	0.00	82.81
A	101.92	0.00	10.74	0.00	105.82
A	101.92	0.00	10.74	0.00	105.82
A	78.40	0.00	4.93	0.00	70.55
A	78.40	0.00	4.93	0.00	70.55
A	78.40	0.00	6.97	0.00	93.55
A	78.40	0.00	6.97	0.00	93.55
A	101.92	0.00	4.93	0.00	70.55
A	101.92	0.00	4.93	0.00	70.55
A	101.92	0.00	6.97	0.00	93.55
A	101.92	0.00	6.97	0.00	93.55
B AA	52.52	0.00	15.03	0.00	108.40
B AA	52.52	0.00	15.03	0.00	108.40
B AA	52.52	0.00	16.24	0.00	122.18
B AA	52.52	0.00	16.24	0.00	122.18
B AA	68.27	0.00	15.03	0.00	108.40
B AA	68.27	0.00	15.03	0.00	108.40
B AA	68.27	0.00	16.24	0.00	122.18
B AA	68.27	0.00	16.24	0.00	122.18
B AA	52.52	0.00	7.00	0.00	16.48
B AA	52.52	0.00	7.00	0.00	16.48
B AA	52.52	0.00	5.80	0.00	2.69
B AA	52.52	0.00	5.80	0.00	2.69
B AA	68.27	0.00	7.00	0.00	16.48
B AA	68.27	0.00	7.00	0.00	16.48
B AA	68.27	0.00	5.80	0.00	2.69
B AA	68.27	0.00	5.80	0.00	2.69
B WX	52.52	8.20	5.52	51.61	50.86
B WX	52.52	8.20	5.52	51.61	50.86
B WX	52.52	8.20	6.73	51.61	64.65
B WX	52.52	8.20	6.73	51.61	64.65



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WX	68.27	8.20	5.52	51.61	50.86
B WX	68.27	8.20	5.52	51.61	50.86
B WX	68.27	8.20	6.73	51.61	64.65
B WX	68.27	8.20	6.73	51.61	64.65
B WX	52.52	8.20	2.51	51.61	41.05
B WX	52.52	8.20	2.51	51.61	41.05
B WX	52.52	8.20	3.71	51.61	54.84
B WX	52.52	8.20	3.71	51.61	54.84
B WX	68.27	8.20	2.51	51.61	41.05
B WX	68.27	8.20	2.51	51.61	41.05
B WX	68.27	8.20	3.71	51.61	54.84
B WX	68.27	8.20	3.71	51.61	54.84
B WXY	52.52	5.74	16.18	36.12	116.55
B WXY	52.52	5.74	16.18	36.12	116.55
B WXY	52.52	5.74	17.38	36.12	130.34
B WXY	52.52	5.74	17.38	36.12	130.34
B WXY	68.27	5.74	16.18	36.12	116.55
B WXY	68.27	5.74	16.18	36.12	116.55
B WXY	68.27	5.74	17.38	36.12	130.34
B WXY	68.27	5.74	17.38	36.12	130.34
B WXY	52.52	5.74	8.15	36.12	24.64
B WXY	52.52	5.74	8.15	36.12	24.64
B WXY	52.52	5.74	6.94	36.12	10.85
B WXY	52.52	5.74	6.94	36.12	10.85
B WXY	68.27	5.74	8.15	36.12	24.64
B WXY	68.27	5.74	8.15	36.12	24.64
B WXY	68.27	5.74	6.94	36.12	10.85
B WXY	68.27	5.74	6.94	36.12	10.85
B WY	52.52	0.00	20.74	0.00	144.71
B WY	52.52	0.00	20.74	0.00	144.71
B WY	52.52	0.00	21.95	0.00	158.49
B WY	52.52	0.00	21.95	0.00	158.49
B WY	68.27	0.00	20.74	0.00	144.71
B WY	68.27	0.00	20.74	0.00	144.71
B WY	68.27	0.00	21.95	0.00	158.49
B WY	68.27	0.00	21.95	0.00	158.49
B WY	52.52	0.00	12.71	0.00	52.79
B WY	52.52	0.00	12.71	0.00	52.79
B WY	52.52	0.00	11.51	0.00	39.00
B WY	52.52	0.00	11.51	0.00	39.00
B WY	68.27	0.00	12.71	0.00	52.79
B WY	68.27	0.00	12.71	0.00	52.79
B WY	68.27	0.00	11.51	0.00	39.00



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WY	68.27	0.00	11.51	0.00	39.00
D I	65.52	0.00	19.38	0.00	144.36
D I	66.61	0.00	19.38	0.00	144.36
D I	67.70	0.00	21.02	0.00	163.11
D I	68.79	0.00	21.02	0.00	163.11
D I	85.17	0.00	19.38	0.00	144.36
D I	86.26	0.00	19.38	0.00	144.36
D I	87.36	0.00	21.02	0.00	163.11
D I	88.45	0.00	21.02	0.00	163.11
D I	65.52	0.00	8.42	0.00	20.88
D I	66.61	0.00	8.42	0.00	20.88
D I	67.70	0.00	6.78	0.00	2.13
D I	68.79	0.00	6.78	0.00	2.13
D I	85.17	0.00	8.42	0.00	20.88
D I	86.26	0.00	8.42	0.00	20.88
D I	87.36	0.00	6.78	0.00	2.13
D I	88.45	0.00	6.78	0.00	2.13
D W	65.52	0.00	27.63	0.00	196.16
D W	66.06	0.00	27.63	0.00	196.16
D W	66.61	0.00	29.28	0.00	214.80
D W	67.16	0.00	29.28	0.00	214.80
D W	85.17	0.00	27.63	0.00	196.16
D W	85.72	0.00	27.63	0.00	196.16
D W	86.26	0.00	29.28	0.00	214.80
D W	86.81	0.00	29.28	0.00	214.80
D W	65.52	0.00	16.68	0.00	72.69
D W	66.06	0.00	16.68	0.00	72.69
D W	66.61	0.00	15.04	0.00	54.06
D W	67.16	0.00	15.04	0.00	54.06
D W	85.17	0.00	16.68	0.00	72.69
D W	85.72	0.00	16.68	0.00	72.69
D W	86.26	0.00	15.04	0.00	54.06
D W	86.81	0.00	15.04	0.00	54.06
DAA	66.06	0.00	19.75	0.00	145.58
DAA	66.06	0.00	19.75	0.00	145.58
DAA	67.16	0.00	21.40	0.00	164.22
DAA	67.16	0.00	21.40	0.00	164.22
DAA	85.72	0.00	19.75	0.00	145.58
DAA	85.72	0.00	19.75	0.00	145.58
DAA	86.81	0.00	21.40	0.00	164.22
DAA	86.81	0.00	21.40	0.00	164.22
DAA	66.06	0.00	8.80	0.00	22.11
DAA	66.06	0.00	8.80	0.00	22.11



COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
DAA	67.16	0.00	7.16	0.00	3.47
DAA	67.16	0.00	7.16	0.00	3.47
DAA	85.72	0.00	8.80	0.00	22.11
DAA	85.72	0.00	8.80	0.00	22.11
DAA	86.81	0.00	7.16	0.00	3.47
DAA	86.81	0.00	7.16	0.00	3.47

### Combinazioni statiche EQU

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
A	70.56	0.00	8.02	0.00	75.15
A	70.56	0.00	8.02	0.00	75.15
A	70.56	0.00	9.38	0.00	90.48
A	70.56	0.00	9.38	0.00	90.48
A	86.24	0.00	8.02	0.00	75.15
A	86.24	0.00	8.02	0.00	75.15
A	86.24	0.00	9.38	0.00	90.48
A	86.24	0.00	9.38	0.00	90.48
A	70.56	0.00	4.24	0.00	62.88
A	70.56	0.00	4.24	0.00	62.88
A	70.56	0.00	5.61	0.00	78.22
A	70.56	0.00	5.61	0.00	78.22
A	86.24	0.00	4.24	0.00	62.88
A	86.24	0.00	4.24	0.00	62.88
A	86.24	0.00	5.61	0.00	78.22
A	86.24	0.00	5.61	0.00	78.22
B AA	47.27	0.00	14.63	0.00	103.80
B AA	47.27	0.00	14.63	0.00	103.80
B AA	47.27	0.00	15.43	0.00	112.99
B AA	47.27	0.00	15.43	0.00	112.99
B AA	57.77	0.00	14.63	0.00	103.80
B AA	57.77	0.00	14.63	0.00	103.80
B AA	57.77	0.00	15.43	0.00	112.99
B AA	57.77	0.00	15.43	0.00	112.99
B AA	47.27	0.00	7.40	0.00	21.08
B AA	47.27	0.00	7.40	0.00	21.08
B AA	47.27	0.00	6.60	0.00	11.89
B AA	47.27	0.00	6.60	0.00	11.89
B AA	57.77	0.00	7.40	0.00	21.08
B AA	57.77	0.00	7.40	0.00	21.08
B AA	57.77	0.00	6.60	0.00	11.89



COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B AA	57.77	0.00	6.60	0.00	11.89
B WX	47.27	8.20	5.12	51.61	46.27
B WX	47.27	8.20	5.12	51.61	46.27
B WX	47.27	8.20	5.93	51.61	55.46
B WX	47.27	8.20	5.93	51.61	55.46
B WX	57.77	8.20	5.12	51.61	46.27
B WX	57.77	8.20	5.12	51.61	46.27
B WX	57.77	8.20	5.93	51.61	55.46
B WX	57.77	8.20	5.93	51.61	55.46
B WX	47.27	8.20	2.10	51.61	36.46
B WX	47.27	8.20	2.10	51.61	36.46
B WX	47.27	8.20	2.91	51.61	45.65
B WX	47.27	8.20	2.91	51.61	45.65
B WX	57.77	8.20	2.10	51.61	36.46
B WX	57.77	8.20	2.10	51.61	36.46
B WX	57.77	8.20	2.91	51.61	45.65
B WX	57.77	8.20	2.91	51.61	45.65
B WXY	47.27	5.74	15.77	36.12	111.96
B WXY	47.27	5.74	15.77	36.12	111.96
B WXY	47.27	5.74	16.58	36.12	121.15
B WXY	47.27	5.74	16.58	36.12	121.15
B WXY	57.77	5.74	15.77	36.12	111.96
B WXY	57.77	5.74	15.77	36.12	111.96
B WXY	57.77	5.74	16.58	36.12	121.15
B WXY	57.77	5.74	16.58	36.12	121.15
B WXY	47.27	5.74	8.55	36.12	29.23
B WXY	47.27	5.74	8.55	36.12	29.23
B WXY	47.27	5.74	7.74	36.12	20.04
B WXY	47.27	5.74	7.74	36.12	20.04
B WXY	57.77	5.74	8.55	36.12	29.23
B WXY	57.77	5.74	8.55	36.12	29.23
B WXY	57.77	5.74	7.74	36.12	20.04
B WXY	57.77	5.74	7.74	36.12	20.04
B WY	47.27	0.00	20.34	0.00	140.11
B WY	47.27	0.00	20.34	0.00	140.11
B WY	47.27	0.00	21.14	0.00	149.30
B WY	47.27	0.00	21.14	0.00	149.30
B WY	57.77	0.00	20.34	0.00	140.11
B WY	57.77	0.00	20.34	0.00	140.11
B WY	57.77	0.00	21.14	0.00	149.30
B WY	57.77	0.00	21.14	0.00	149.30
B WY	47.27	0.00	13.11	0.00	57.39
B WY	47.27	0.00	13.11	0.00	57.39



COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WY	47.27	0.00	12.31	0.00	48.20
B WY	47.27	0.00	12.31	0.00	48.20
B WY	57.77	0.00	13.11	0.00	57.39
B WY	57.77	0.00	13.11	0.00	57.39
B WY	57.77	0.00	12.31	0.00	48.20
B WY	57.77	0.00	12.31	0.00	48.20
D I	58.97	0.00	18.83	0.00	138.18
D I	60.06	0.00	18.83	0.00	138.18
D I	61.15	0.00	19.92	0.00	150.76
D I	62.24	0.00	19.92	0.00	150.76
D I	72.07	0.00	18.83	0.00	138.18
D I	73.16	0.00	18.83	0.00	138.18
D I	74.25	0.00	19.92	0.00	150.76
D I	75.35	0.00	19.92	0.00	150.76
D I	58.97	0.00	8.97	0.00	27.06
D I	60.06	0.00	8.97	0.00	27.06
D I	61.15	0.00	7.88	0.00	14.48
D I	62.24	0.00	7.88	0.00	14.48
D I	72.07	0.00	8.97	0.00	27.06
D I	73.16	0.00	8.97	0.00	27.06
D I	74.25	0.00	7.88	0.00	14.48
D I	75.35	0.00	7.88	0.00	14.48
D W	58.97	0.00	27.09	0.00	189.99
D W	59.51	0.00	27.09	0.00	189.99
D W	60.06	0.00	28.18	0.00	202.45
D W	60.60	0.00	28.18	0.00	202.45
D W	72.07	0.00	27.09	0.00	189.99
D W	72.62	0.00	27.09	0.00	189.99
D W	73.16	0.00	28.18	0.00	202.45
D W	73.71	0.00	28.18	0.00	202.45
D W	58.97	0.00	17.23	0.00	78.87
D W	59.51	0.00	17.23	0.00	78.87
D W	60.06	0.00	16.14	0.00	66.40
D W	60.60	0.00	16.14	0.00	66.40
D W	72.07	0.00	17.23	0.00	78.87
D W	72.62	0.00	17.23	0.00	78.87
D W	73.16	0.00	16.14	0.00	66.40
D W	73.71	0.00	16.14	0.00	66.40
DAA	59.51	0.00	19.21	0.00	139.41
DAA	59.51	0.00	19.21	0.00	139.41
DAA	60.60	0.00	20.30	0.00	151.87
DAA	60.60	0.00	20.30	0.00	151.87
DAA	72.62	0.00	19.21	0.00	139.41

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
DAA	72.62	0.00	19.21	0.00	139.41
DAA	73.71	0.00	20.30	0.00	151.87
DAA	73.71	0.00	20.30	0.00	151.87
DAA	59.51	0.00	9.35	0.00	28.28
DAA	59.51	0.00	9.35	0.00	28.28
DAA	60.60	0.00	8.25	0.00	15.82
DAA	60.60	0.00	8.25	0.00	15.82
DAA	72.62	0.00	9.35	0.00	28.28
DAA	72.62	0.00	9.35	0.00	28.28
DAA	73.71	0.00	8.25	0.00	15.82
DAA	73.71	0.00	8.25	0.00	15.82

### Combinazioni sismiche

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
Comb1	43.96	2.01	9.79	14.07	83.02
Comb2	43.96	2.01	9.79	14.07	83.02
Comb3	43.96	2.01	3.63	14.07	10.75
Comb4	43.96	2.01	3.63	14.07	10.75
Comb5	43.96	6.71	5.09	46.89	50.20
Comb6	43.96	6.71	5.09	46.89	50.20
Comb7	43.96	6.71	1.06	46.89	22.07
Comb8	43.96	6.71	1.06	46.89	22.07

Con

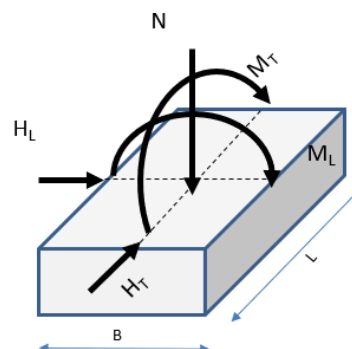
N = azione verticale

H<sub>L</sub> = taglio agente in direzione longitudinale

H<sub>T</sub> = taglio agente in direzione trasversale

M<sub>L</sub> = momento agente in direzione longitudinale

M<sub>T</sub> = momento agente in direzione trasversale





GENERAL CONTRACTOR  IRICAV2		ALTA SORVEGLIANZA  ITALFERR GRUPPO FERROVIE DELLO STATO ITALIANE			
Relazione di calcolo pali di alimentazione	Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 57 di 336

## LC6

Unità di misura: [kN], [m]

### Combinazioni statiche STR

COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
A	10.67	19.77	3.81	0.00	0.00
A	10.67	19.77	3.81	0.00	0.00
A	10.67	24.19	4.49	0.00	0.00
A	10.67	24.19	4.49	0.00	0.00
A	13.88	19.77	3.81	0.00	0.00
A	13.88	19.77	3.81	0.00	0.00
A	13.88	24.19	4.49	0.00	0.00
A	13.88	24.19	4.49	0.00	0.00
A	10.67	9.73	0.72	0.00	0.00
A	10.67	9.73	0.72	0.00	0.00
A	10.67	14.15	1.40	0.00	0.00
A	10.67	14.15	1.40	0.00	0.00
A	13.88	9.73	0.72	0.00	0.00
A	13.88	9.73	0.72	0.00	0.00
A	13.88	14.15	1.40	0.00	0.00
A	13.88	14.15	1.40	0.00	0.00
B AA	10.67	57.13	9.78	0.00	0.00
B AA	10.67	57.13	9.78	0.00	0.00
B AA	10.67	59.94	10.20	0.00	0.00
B AA	10.67	59.94	10.20	0.00	0.00
B AA	13.88	57.13	9.78	0.00	0.00
B AA	13.88	57.13	9.78	0.00	0.00
B AA	13.88	59.94	10.20	0.00	0.00
B AA	13.88	59.94	10.20	0.00	0.00
B AA	10.67	38.45	6.99	0.00	0.00
B AA	10.67	38.45	6.99	0.00	0.00
B AA	10.67	35.65	6.57	0.00	0.00
B AA	10.67	35.65	6.57	0.00	0.00
B AA	13.88	38.45	6.99	0.00	0.00
B AA	13.88	38.45	6.99	0.00	0.00
B AA	13.88	35.65	6.57	0.00	0.00
B AA	13.88	35.65	6.57	0.00	0.00
B WX	10.67	13.35	2.63	45.76	7.22
B WX	10.67	13.35	2.63	45.76	7.22
B WX	10.67	16.16	3.05	45.76	7.22
B WX	10.67	16.16	3.05	45.76	7.22



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WX	13.88	13.35	2.63	45.76	7.22
B WX	13.88	13.35	2.63	45.76	7.22
B WX	13.88	16.16	3.05	45.76	7.22
B WX	13.88	16.16	3.05	45.76	7.22
B WX	10.67	5.33	0.16	45.76	7.22
B WX	10.67	5.33	0.16	45.76	7.22
B WX	10.67	8.13	0.58	45.76	7.22
B WX	10.67	8.13	0.58	45.76	7.22
B WX	13.88	5.33	0.16	45.76	7.22
B WX	13.88	5.33	0.16	45.76	7.22
B WX	13.88	8.13	0.58	45.76	7.22
B WX	13.88	8.13	0.58	45.76	7.22
B WXY	10.67	63.26	10.61	32.04	5.06
B WXY	10.67	63.26	10.61	32.04	5.06
B WXY	10.67	66.06	11.03	32.04	5.06
B WXY	10.67	66.06	11.03	32.04	5.06
B WXY	13.88	63.26	10.61	32.04	5.06
B WXY	13.88	63.26	10.61	32.04	5.06
B WXY	13.88	66.06	11.03	32.04	5.06
B WXY	13.88	66.06	11.03	32.04	5.06
B WXY	10.67	44.58	7.82	32.04	5.06
B WXY	10.67	44.58	7.82	32.04	5.06
B WXY	10.67	41.78	7.40	32.04	5.06
B WXY	10.67	41.78	7.40	32.04	5.06
B WXY	13.88	44.58	7.82	32.04	5.06
B WXY	13.88	44.58	7.82	32.04	5.06
B WXY	13.88	41.78	7.40	32.04	5.06
B WXY	13.88	41.78	7.40	32.04	5.06
B WY	10.67	84.65	14.03	0.00	0.00
B WY	10.67	84.65	14.03	0.00	0.00
B WY	10.67	87.45	14.44	0.00	0.00
B WY	10.67	87.45	14.44	0.00	0.00
B WY	13.88	84.65	14.03	0.00	0.00
B WY	13.88	84.65	14.03	0.00	0.00
B WY	13.88	87.45	14.44	0.00	0.00
B WY	13.88	87.45	14.44	0.00	0.00
B WY	10.67	65.97	11.24	0.00	0.00
B WY	10.67	65.97	11.24	0.00	0.00
B WY	10.67	63.17	10.82	0.00	0.00
B WY	10.67	63.17	10.82	0.00	0.00
B WY	13.88	65.97	11.24	0.00	0.00
B WY	13.88	65.97	11.24	0.00	0.00
B WY	13.88	63.17	10.82	0.00	0.00



COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WY	13.88	63.17	10.82	0.00	0.00
D I	10.67	72.52	11.84	0.00	0.00
D I	11.93	72.12	11.84	0.00	0.00
D I	10.67	76.25	12.41	0.00	0.00
D I	11.93	75.86	12.41	0.00	0.00
D I	13.88	72.52	11.84	0.00	0.00
D I	15.14	72.12	11.84	0.00	0.00
D I	13.88	76.25	12.41	0.00	0.00
D I	15.14	75.86	12.41	0.00	0.00
D I	10.67	47.60	8.05	0.00	0.00
D I	11.93	48.00	8.05	0.00	0.00
D I	10.67	43.87	7.48	0.00	0.00
D I	11.93	44.27	7.48	0.00	0.00
D I	13.88	47.60	8.05	0.00	0.00
D I	15.14	48.00	8.05	0.00	0.00
D I	13.88	43.87	7.48	0.00	0.00
D I	15.14	44.27	7.48	0.00	0.00
D W	10.67	109.88	17.65	0.00	0.00
D W	11.30	109.68	17.65	0.00	0.00
D W	10.67	113.62	18.21	0.00	0.00
D W	11.30	113.42	18.21	0.00	0.00
D W	13.88	109.88	17.65	0.00	0.00
D W	14.51	109.68	17.65	0.00	0.00
D W	13.88	113.62	18.21	0.00	0.00
D W	14.51	113.42	18.21	0.00	0.00
D W	10.67	84.97	13.85	0.00	0.00
D W	11.30	85.17	13.85	0.00	0.00
D W	10.67	81.23	13.28	0.00	0.00
D W	11.30	81.43	13.28	0.00	0.00
D W	13.88	84.97	13.85	0.00	0.00
D W	14.51	85.17	13.85	0.00	0.00
D W	13.88	81.23	13.28	0.00	0.00
D W	14.51	81.43	13.28	0.00	0.00
DAA	11.30	73.32	12.15	0.00	0.00
DAA	11.30	73.32	12.15	0.00	0.00
DAA	11.30	77.06	12.72	0.00	0.00
DAA	11.30	77.06	12.72	0.00	0.00
DAA	14.51	73.32	12.15	0.00	0.00
DAA	14.51	73.32	12.15	0.00	0.00
DAA	14.51	77.06	12.72	0.00	0.00
DAA	14.51	77.06	12.72	0.00	0.00
DAA	11.30	48.81	8.35	0.00	0.00
DAA	11.30	48.81	8.35	0.00	0.00



COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
DAA	11.30	45.07	7.79	0.00	0.00
DAA	11.30	45.07	7.79	0.00	0.00
DAA	14.51	48.81	8.35	0.00	0.00
DAA	14.51	48.81	8.35	0.00	0.00
DAA	14.51	45.07	7.79	0.00	0.00
DAA	14.51	45.07	7.79	0.00	0.00

### Combinazioni statiche EQU

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
A	9.61	18.29	3.58	0.00	0.00
A	9.61	18.29	3.58	0.00	0.00
A	9.61	21.24	4.04	0.00	0.00
A	9.61	21.24	4.04	0.00	0.00
A	11.74	18.29	3.58	0.00	0.00
A	11.74	18.29	3.58	0.00	0.00
A	11.74	21.24	4.04	0.00	0.00
A	11.74	21.24	4.04	0.00	0.00
A	9.61	8.26	0.50	0.00	0.00
A	9.61	8.26	0.50	0.00	0.00
A	9.61	11.21	0.95	0.00	0.00
A	9.61	11.21	0.95	0.00	0.00
A	11.74	8.26	0.50	0.00	0.00
A	11.74	8.26	0.50	0.00	0.00
A	11.74	11.21	0.95	0.00	0.00
A	11.74	11.21	0.95	0.00	0.00
B AA	9.61	56.20	9.64	0.00	0.00
B AA	9.61	56.20	9.64	0.00	0.00
B AA	9.61	58.07	9.92	0.00	0.00
B AA	9.61	58.07	9.92	0.00	0.00
B AA	11.74	56.20	9.64	0.00	0.00
B AA	11.74	56.20	9.64	0.00	0.00
B AA	11.74	58.07	9.92	0.00	0.00
B AA	11.74	58.07	9.92	0.00	0.00
B AA	9.61	39.39	7.13	0.00	0.00
B AA	9.61	39.39	7.13	0.00	0.00
B AA	9.61	37.52	6.85	0.00	0.00
B AA	9.61	37.52	6.85	0.00	0.00
B AA	11.74	39.39	7.13	0.00	0.00
B AA	11.74	39.39	7.13	0.00	0.00
B AA	11.74	37.52	6.85	0.00	0.00



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B AA	11.74	37.52	6.85	0.00	0.00
B WX	9.61	12.42	2.49	45.76	7.22
B WX	9.61	12.42	2.49	45.76	7.22
B WX	9.61	14.29	2.77	45.76	7.22
B WX	9.61	14.29	2.77	45.76	7.22
B WX	11.74	12.42	2.49	45.76	7.22
B WX	11.74	12.42	2.49	45.76	7.22
B WX	11.74	14.29	2.77	45.76	7.22
B WX	11.74	14.29	2.77	45.76	7.22
B WX	9.61	4.39	0.02	45.76	7.22
B WX	9.61	4.39	0.02	45.76	7.22
B WX	9.61	6.26	0.30	45.76	7.22
B WX	9.61	6.26	0.30	45.76	7.22
B WX	11.74	4.39	0.02	45.76	7.22
B WX	11.74	4.39	0.02	45.76	7.22
B WX	11.74	6.26	0.30	45.76	7.22
B WX	11.74	6.26	0.30	45.76	7.22
B WXY	9.61	62.33	10.47	32.04	5.06
B WXY	9.61	62.33	10.47	32.04	5.06
B WXY	9.61	64.19	10.75	32.04	5.06
B WXY	9.61	64.19	10.75	32.04	5.06
B WXY	11.74	62.33	10.47	32.04	5.06
B WXY	11.74	62.33	10.47	32.04	5.06
B WXY	11.74	64.19	10.75	32.04	5.06
B WXY	11.74	64.19	10.75	32.04	5.06
B WXY	9.61	45.51	7.96	32.04	5.06
B WXY	9.61	45.51	7.96	32.04	5.06
B WXY	9.61	43.65	7.68	32.04	5.06
B WXY	9.61	43.65	7.68	32.04	5.06
B WXY	11.74	45.51	7.96	32.04	5.06
B WXY	11.74	45.51	7.96	32.04	5.06
B WXY	11.74	43.65	7.68	32.04	5.06
B WXY	11.74	43.65	7.68	32.04	5.06
B WY	9.61	83.71	13.89	0.00	0.00
B WY	9.61	83.71	13.89	0.00	0.00
B WY	9.61	85.58	14.17	0.00	0.00
B WY	9.61	85.58	14.17	0.00	0.00
B WY	11.74	83.71	13.89	0.00	0.00
B WY	11.74	83.71	13.89	0.00	0.00
B WY	11.74	85.58	14.17	0.00	0.00
B WY	11.74	85.58	14.17	0.00	0.00
B WY	9.61	66.90	11.38	0.00	0.00
B WY	9.61	66.90	11.38	0.00	0.00



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WY	9.61	65.03	11.10	0.00	0.00
B WY	9.61	65.03	11.10	0.00	0.00
B WY	11.74	66.90	11.38	0.00	0.00
B WY	11.74	66.90	11.38	0.00	0.00
B WY	11.74	65.03	11.10	0.00	0.00
B WY	11.74	65.03	11.10	0.00	0.00
D I	9.61	71.27	11.65	0.00	0.00
D I	10.87	70.87	11.65	0.00	0.00
D I	9.61	73.76	12.03	0.00	0.00
D I	10.87	73.36	12.03	0.00	0.00
D I	11.74	71.27	11.65	0.00	0.00
D I	13.00	70.87	11.65	0.00	0.00
D I	11.74	73.76	12.03	0.00	0.00
D I	13.00	73.36	12.03	0.00	0.00
D I	9.61	48.85	8.24	0.00	0.00
D I	10.87	49.25	8.24	0.00	0.00
D I	9.61	46.36	7.86	0.00	0.00
D I	10.87	46.76	7.86	0.00	0.00
D I	11.74	48.85	8.24	0.00	0.00
D I	13.00	49.25	8.24	0.00	0.00
D I	11.74	46.36	7.86	0.00	0.00
D I	13.00	46.76	7.86	0.00	0.00
D W	9.61	108.64	17.46	0.00	0.00
D W	10.24	108.44	17.46	0.00	0.00
D W	9.61	111.13	17.84	0.00	0.00
D W	10.24	110.93	17.84	0.00	0.00
D W	11.74	108.64	17.46	0.00	0.00
D W	12.37	108.44	17.46	0.00	0.00
D W	11.74	111.13	17.84	0.00	0.00
D W	12.37	110.93	17.84	0.00	0.00
D W	9.61	86.21	14.04	0.00	0.00
D W	10.24	86.41	14.04	0.00	0.00
D W	9.61	83.72	13.66	0.00	0.00
D W	10.24	83.92	13.66	0.00	0.00
D W	11.74	86.21	14.04	0.00	0.00
D W	12.37	86.41	14.04	0.00	0.00
D W	11.74	83.72	13.66	0.00	0.00
D W	12.37	83.92	13.66	0.00	0.00
DAA	10.24	72.08	11.96	0.00	0.00
DAA	10.24	72.08	11.96	0.00	0.00
DAA	10.24	74.57	12.34	0.00	0.00
DAA	10.24	74.57	12.34	0.00	0.00
DAA	12.37	72.08	11.96	0.00	0.00

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
DAA	12.37	72.08	11.96	0.00	0.00
DAA	12.37	74.57	12.34	0.00	0.00
DAA	12.37	74.57	12.34	0.00	0.00
DAA	10.24	50.05	8.54	0.00	0.00
DAA	10.24	50.05	8.54	0.00	0.00
DAA	10.24	47.56	8.16	0.00	0.00
DAA	10.24	47.56	8.16	0.00	0.00
DAA	12.37	50.05	8.54	0.00	0.00
DAA	12.37	50.05	8.54	0.00	0.00
DAA	12.37	47.56	8.16	0.00	0.00
DAA	12.37	47.56	8.16	0.00	0.00

### Combinazioni sismiche

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
Comb1	10.67	51.91	7.08	13.19	1.80
Comb2	10.67	51.91	7.08	13.19	1.80
Comb3	10.67	36.02	4.90	13.19	1.80
Comb4	10.67	36.02	4.90	13.19	1.80
Comb5	10.67	21.13	2.89	43.96	5.99
Comb6	10.67	21.13	2.89	43.96	5.99
Comb7	10.67	5.24	0.70	43.96	5.99
Comb8	10.67	5.24	0.70	43.96	5.99

Con

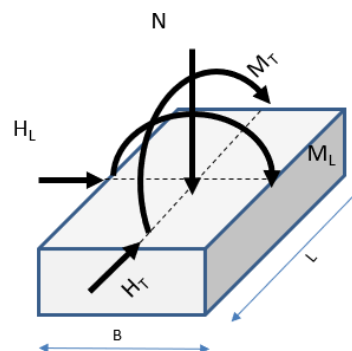
N = azione verticale

H<sub>L</sub> = taglio agente in direzione longitudinale

H<sub>T</sub> = taglio agente in direzione trasversale

M<sub>L</sub> = momento agente in direzione longitudinale

M<sub>T</sub> = momento agente in direzione trasversale



GENERAL CONTRACTOR  <b>IRICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione	Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 64 di 336

## LC7

Unità di misura: [kN], [m]

### Combinazioni statiche STR

COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
A	9.75	0.00	9.46	0.00	90.98
A	9.75	0.00	9.46	0.00	90.98
A	9.75	0.00	11.79	0.00	116.60
A	9.75	0.00	11.79	0.00	116.60
A	12.67	0.00	9.46	0.00	90.98
A	12.67	0.00	9.46	0.00	90.98
A	12.67	0.00	11.79	0.00	116.60
A	12.67	0.00	11.79	0.00	116.60
A	9.75	0.00	6.03	0.00	79.82
A	9.75	0.00	6.03	0.00	79.82
A	9.75	0.00	8.35	0.00	105.45
A	9.75	0.00	8.35	0.00	105.45
A	12.67	0.00	6.03	0.00	79.82
A	12.67	0.00	6.03	0.00	79.82
A	12.67	0.00	8.35	0.00	105.45
A	12.67	0.00	8.35	0.00	105.45
B AA	9.75	0.00	12.98	0.00	97.89
B AA	9.75	0.00	12.98	0.00	97.89
B AA	9.75	0.00	14.45	0.00	114.40
B AA	9.75	0.00	14.45	0.00	114.40
B AA	12.67	0.00	12.98	0.00	97.89
B AA	12.67	0.00	12.98	0.00	97.89
B AA	12.67	0.00	14.45	0.00	114.40
B AA	12.67	0.00	14.45	0.00	114.40
B AA	9.75	0.00	3.16	0.00	12.17
B AA	9.75	0.00	3.16	0.00	12.17
B AA	9.75	0.00	1.69	0.00	28.68
B AA	9.75	0.00	1.69	0.00	28.68
B AA	12.67	0.00	3.16	0.00	12.17
B AA	12.67	0.00	3.16	0.00	12.17
B AA	12.67	0.00	1.69	0.00	28.68
B AA	12.67	0.00	1.69	0.00	28.68
B WX	9.75	8.29	6.28	55.66	59.49
B WX	9.75	8.29	6.28	55.66	59.49
B WX	9.75	8.29	7.76	55.66	76.00
B WX	9.75	8.29	7.76	55.66	76.00





COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WX	12.67	8.29	6.28	55.66	59.49
B WX	12.67	8.29	6.28	55.66	59.49
B WX	12.67	8.29	7.76	55.66	76.00
B WX	12.67	8.29	7.76	55.66	76.00
B WX	9.75	8.29	3.54	55.66	50.57
B WX	9.75	8.29	3.54	55.66	50.57
B WX	9.75	8.29	5.01	55.66	67.08
B WX	9.75	8.29	5.01	55.66	67.08
B WX	12.67	8.29	3.54	55.66	50.57
B WX	12.67	8.29	3.54	55.66	50.57
B WX	12.67	8.29	5.01	55.66	67.08
B WX	12.67	8.29	5.01	55.66	67.08
B WXY	9.75	5.80	13.70	38.96	102.99
B WXY	9.75	5.80	13.70	38.96	102.99
B WXY	9.75	5.80	15.17	38.96	119.50
B WXY	9.75	5.80	15.17	38.96	119.50
B WXY	12.67	5.80	13.70	38.96	102.99
B WXY	12.67	5.80	13.70	38.96	102.99
B WXY	12.67	5.80	15.17	38.96	119.50
B WXY	12.67	5.80	15.17	38.96	119.50
B WXY	9.75	5.80	3.88	38.96	7.07
B WXY	9.75	5.80	3.88	38.96	7.07
B WXY	9.75	5.80	2.41	38.96	23.58
B WXY	9.75	5.80	2.41	38.96	23.58
B WXY	12.67	5.80	3.88	38.96	7.07
B WXY	12.67	5.80	3.88	38.96	7.07
B WXY	12.67	5.80	2.41	38.96	23.58
B WXY	12.67	5.80	2.41	38.96	23.58
B WY	9.75	0.00	16.88	0.00	121.64
B WY	9.75	0.00	16.88	0.00	121.64
B WY	9.75	0.00	18.35	0.00	138.15
B WY	9.75	0.00	18.35	0.00	138.15
B WY	12.67	0.00	16.88	0.00	121.64
B WY	12.67	0.00	16.88	0.00	121.64
B WY	12.67	0.00	18.35	0.00	138.15
B WY	12.67	0.00	18.35	0.00	138.15
B WY	9.75	0.00	7.06	0.00	11.58
B WY	9.75	0.00	7.06	0.00	11.58
B WY	9.75	0.00	5.58	0.00	4.93
B WY	9.75	0.00	5.58	0.00	4.93
B WY	12.67	0.00	7.06	0.00	11.58
B WY	12.67	0.00	7.06	0.00	11.58
B WY	12.67	0.00	5.58	0.00	4.93



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WY	12.67	0.00	5.58	0.00	4.93
D I	9.75	0.00	16.44	0.00	135.47
D I	10.38	0.00	16.44	0.00	135.47
D I	10.17	0.00	18.86	0.00	162.89
D I	10.80	0.00	18.86	0.00	162.89
D I	12.67	0.00	16.44	0.00	135.47
D I	13.30	0.00	16.44	0.00	135.47
D I	13.09	0.00	18.86	0.00	162.89
D I	13.72	0.00	18.86	0.00	162.89
D I	9.75	0.00	0.28	0.00	46.48
D I	10.38	0.00	0.28	0.00	46.48
D I	10.17	0.00	2.15	0.00	73.91
D I	10.80	0.00	2.15	0.00	73.91
D I	12.67	0.00	0.28	0.00	46.48
D I	13.30	0.00	0.28	0.00	46.48
D I	13.09	0.00	2.15	0.00	73.91
D I	13.72	0.00	2.15	0.00	73.91
D W	9.75	0.00	21.10	0.00	162.15
D W	10.06	0.00	21.10	0.00	162.15
D W	9.96	0.00	23.52	0.00	189.51
D W	10.27	0.00	23.52	0.00	189.51
D W	12.67	0.00	21.10	0.00	162.15
D W	12.99	0.00	21.10	0.00	162.15
D W	12.88	0.00	23.52	0.00	189.51
D W	13.20	0.00	23.52	0.00	189.51
D W	9.75	0.00	4.94	0.00	19.80
D W	10.06	0.00	4.94	0.00	19.80
D W	9.96	0.00	2.51	0.00	47.16
D W	10.27	0.00	2.51	0.00	47.16
D W	12.67	0.00	4.94	0.00	19.80
D W	12.99	0.00	4.94	0.00	19.80
D W	12.88	0.00	2.51	0.00	47.16
D W	13.20	0.00	2.51	0.00	47.16
DAA	10.06	0.00	16.78	0.00	136.58
DAA	10.06	0.00	16.78	0.00	136.58
DAA	10.27	0.00	19.21	0.00	163.94
DAA	10.27	0.00	19.21	0.00	163.94
DAA	12.99	0.00	16.78	0.00	136.58
DAA	12.99	0.00	16.78	0.00	136.58
DAA	13.20	0.00	19.21	0.00	163.94
DAA	13.20	0.00	19.21	0.00	163.94
DAA	10.06	0.00	0.62	0.00	45.37
DAA	10.06	0.00	0.62	0.00	45.37



COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
DAA	10.27	0.00	1.80	0.00	72.73
DAA	10.27	0.00	1.80	0.00	72.73
DAA	12.99	0.00	0.62	0.00	45.37
DAA	12.99	0.00	0.62	0.00	45.37
DAA	13.20	0.00	1.80	0.00	72.73
DAA	13.20	0.00	1.80	0.00	72.73

### Combinazioni statiche EQU

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
A	8.77	0.00	8.69	0.00	82.44
A	8.77	0.00	8.69	0.00	82.44
A	8.77	0.00	10.24	0.00	99.52
A	8.77	0.00	10.24	0.00	99.52
A	10.72	0.00	8.69	0.00	82.44
A	10.72	0.00	8.69	0.00	82.44
A	10.72	0.00	10.24	0.00	99.52
A	10.72	0.00	10.24	0.00	99.52
A	8.77	0.00	5.26	0.00	71.28
A	8.77	0.00	5.26	0.00	71.28
A	8.77	0.00	6.81	0.00	88.36
A	8.77	0.00	6.81	0.00	88.36
A	10.72	0.00	5.26	0.00	71.28
A	10.72	0.00	5.26	0.00	71.28
A	10.72	0.00	6.81	0.00	88.36
A	10.72	0.00	6.81	0.00	88.36
B AA	8.77	0.00	12.49	0.00	92.39
B AA	8.77	0.00	12.49	0.00	92.39
B AA	8.77	0.00	13.47	0.00	103.40
B AA	8.77	0.00	13.47	0.00	103.40
B AA	10.72	0.00	12.49	0.00	92.39
B AA	10.72	0.00	12.49	0.00	92.39
B AA	10.72	0.00	13.47	0.00	103.40
B AA	10.72	0.00	13.47	0.00	103.40
B AA	8.77	0.00	3.65	0.00	6.66
B AA	8.77	0.00	3.65	0.00	6.66
B AA	8.77	0.00	2.67	0.00	17.67
B AA	8.77	0.00	2.67	0.00	17.67
B AA	10.72	0.00	3.65	0.00	6.66
B AA	10.72	0.00	3.65	0.00	6.66
B AA	10.72	0.00	2.67	0.00	17.67



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B AA	10.72	0.00	2.67	0.00	17.67
B WX	8.77	8.29	5.79	55.66	53.99
B WX	8.77	8.29	5.79	55.66	53.99
B WX	8.77	8.29	6.77	55.66	64.99
B WX	8.77	8.29	6.77	55.66	64.99
B WX	10.72	8.29	5.79	55.66	53.99
B WX	10.72	8.29	5.79	55.66	53.99
B WX	10.72	8.29	6.77	55.66	64.99
B WX	10.72	8.29	6.77	55.66	64.99
B WX	8.77	8.29	3.05	55.66	45.07
B WX	8.77	8.29	3.05	55.66	45.07
B WX	8.77	8.29	4.03	55.66	56.07
B WX	8.77	8.29	4.03	55.66	56.07
B WX	10.72	8.29	3.05	55.66	45.07
B WX	10.72	8.29	3.05	55.66	45.07
B WX	10.72	8.29	4.03	55.66	56.07
B WX	10.72	8.29	4.03	55.66	56.07
B WXY	8.77	5.80	13.21	38.96	97.49
B WXY	8.77	5.80	13.21	38.96	97.49
B WXY	8.77	5.80	14.19	38.96	108.50
B WXY	8.77	5.80	14.19	38.96	108.50
B WXY	10.72	5.80	13.21	38.96	97.49
B WXY	10.72	5.80	13.21	38.96	97.49
B WXY	10.72	5.80	14.19	38.96	108.50
B WXY	10.72	5.80	14.19	38.96	108.50
B WXY	8.77	5.80	4.37	38.96	1.56
B WXY	8.77	5.80	4.37	38.96	1.56
B WXY	8.77	5.80	3.39	38.96	12.57
B WXY	8.77	5.80	3.39	38.96	12.57
B WXY	10.72	5.80	4.37	38.96	1.56
B WXY	10.72	5.80	4.37	38.96	1.56
B WXY	10.72	5.80	3.39	38.96	12.57
B WXY	10.72	5.80	3.39	38.96	12.57
B WY	8.77	0.00	16.38	0.00	116.14
B WY	8.77	0.00	16.38	0.00	116.14
B WY	8.77	0.00	17.37	0.00	127.14
B WY	8.77	0.00	17.37	0.00	127.14
B WY	10.72	0.00	16.38	0.00	116.14
B WY	10.72	0.00	16.38	0.00	116.14
B WY	10.72	0.00	17.37	0.00	127.14
B WY	10.72	0.00	17.37	0.00	127.14
B WY	10.72	0.00	17.37	0.00	127.14
B WY	8.77	0.00	7.55	0.00	17.08
B WY	8.77	0.00	7.55	0.00	17.08



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WY	8.77	0.00	6.57	0.00	6.08
B WY	8.77	0.00	6.57	0.00	6.08
B WY	10.72	0.00	7.55	0.00	17.08
B WY	10.72	0.00	7.55	0.00	17.08
B WY	10.72	0.00	6.57	0.00	6.08
B WY	10.72	0.00	6.57	0.00	6.08
D I	8.77	0.00	15.63	0.00	126.37
D I	9.40	0.00	15.63	0.00	126.37
D I	9.19	0.00	17.25	0.00	144.70
D I	9.82	0.00	17.25	0.00	144.70
D I	10.72	0.00	15.63	0.00	126.37
D I	11.35	0.00	15.63	0.00	126.37
D I	11.14	0.00	17.25	0.00	144.70
D I	11.77	0.00	17.25	0.00	144.70
D I	8.77	0.00	1.09	0.00	37.39
D I	9.40	0.00	1.09	0.00	37.39
D I	9.19	0.00	0.53	0.00	55.71
D I	9.82	0.00	0.53	0.00	55.71
D I	10.72	0.00	1.09	0.00	37.39
D I	11.35	0.00	1.09	0.00	37.39
D I	11.14	0.00	0.53	0.00	55.71
D I	11.77	0.00	0.53	0.00	55.71
D W	8.77	0.00	20.29	0.00	153.05
D W	9.09	0.00	20.29	0.00	153.05
D W	8.98	0.00	21.91	0.00	171.32
D W	9.30	0.00	21.91	0.00	171.32
D W	10.72	0.00	20.29	0.00	153.05
D W	11.04	0.00	20.29	0.00	153.05
D W	10.93	0.00	21.91	0.00	171.32
D W	11.25	0.00	21.91	0.00	171.32
D W	8.77	0.00	5.74	0.00	10.70
D W	9.09	0.00	5.74	0.00	10.70
D W	8.98	0.00	4.13	0.00	28.96
D W	9.30	0.00	4.13	0.00	28.96
D W	10.72	0.00	5.74	0.00	10.70
D W	11.04	0.00	5.74	0.00	10.70
D W	10.93	0.00	4.13	0.00	28.96
D W	11.25	0.00	4.13	0.00	28.96
DAA	9.09	0.00	15.97	0.00	127.48
DAA	9.09	0.00	15.97	0.00	127.48
DAA	9.30	0.00	17.59	0.00	145.74
DAA	9.30	0.00	17.59	0.00	145.74
DAA	11.04	0.00	15.97	0.00	127.48

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
DAA	11.04	0.00	15.97	0.00	127.48
DAA	11.25	0.00	17.59	0.00	145.74
DAA	11.25	0.00	17.59	0.00	145.74
DAA	9.09	0.00	1.43	0.00	36.27
DAA	9.09	0.00	1.43	0.00	36.27
DAA	9.30	0.00	0.19	0.00	54.53
DAA	9.30	0.00	0.19	0.00	54.53
DAA	11.04	0.00	1.43	0.00	36.27
DAA	11.04	0.00	1.43	0.00	36.27
DAA	11.25	0.00	0.19	0.00	54.53
DAA	11.25	0.00	0.19	0.00	54.53

### Combinazioni sismiche

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
Comb1	9.75	1.64	9.79	9.68	81.73
Comb2	9.75	1.64	9.79	9.68	81.73
Comb3	9.75	1.64	1.15	9.68	17.16
Comb4	9.75	1.64	1.15	9.68	17.16
Comb5	9.75	5.47	5.96	32.28	59.13
Comb6	9.75	5.47	5.96	32.28	59.13
Comb7	9.75	5.47	2.68	32.28	39.76
Comb8	9.75	5.47	2.68	32.28	39.76

Con

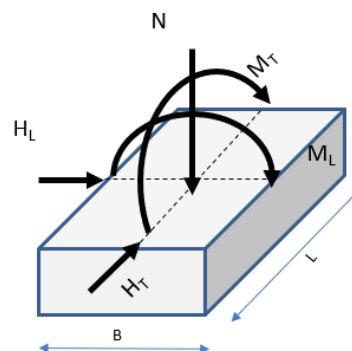
N = azione verticale

H<sub>L</sub> = taglio agente in direzione longitudinale

H<sub>T</sub> = taglio agente in direzione trasversale

M<sub>L</sub> = momento agente in direzione longitudinale

M<sub>T</sub> = momento agente in direzione trasversale



GENERAL CONTRACTOR  <b>IRICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE					
Relazione di calcolo pali di alimentazione	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Progetto IN17</td> <td style="width: 15%;">Lotto 10</td> <td style="width: 35%;">Codifica Documento E I2 CL OC 00 0 0 010</td> <td style="width: 10%;">Rev. A</td> <td style="width: 25%;">Foglio 71 di 336</td> </tr> </table>	Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 71 di 336
Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 71 di 336		

## LC8

Unità di misura: [kN], [m]

### Combinazioni statiche STR

COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
A	13.99	0.00	13.24	0.00	136.94
A	13.99	0.00	13.24	0.00	136.90
A	13.99	0.00	16.65	0.00	176.21
A	13.99	0.00	16.65	0.00	176.18
A	18.19	0.00	13.24	0.00	136.94
A	18.19	0.00	13.24	0.00	136.90
A	18.19	0.00	16.65	0.00	176.21
A	18.19	0.00	16.65	0.00	176.18
A	13.99	0.00	9.47	0.00	124.67
A	13.99	0.00	9.47	0.00	124.64
A	13.99	0.00	12.87	0.00	163.95
A	13.99	0.00	12.87	0.00	163.91
A	18.19	0.00	9.47	0.00	124.67
A	18.19	0.00	9.47	0.00	124.64
A	18.19	0.00	12.87	0.00	163.95
A	18.19	0.00	12.87	0.00	163.91
B AA	13.99	0.00	16.74	0.00	138.72
B AA	13.99	0.00	16.74	0.00	138.68
B AA	13.99	0.00	18.35	0.00	157.23
B AA	13.99	0.00	18.35	0.00	157.20
B AA	18.19	0.00	16.74	0.00	138.72
B AA	18.19	0.00	16.74	0.00	138.68
B AA	18.19	0.00	18.35	0.00	157.23
B AA	18.19	0.00	18.35	0.00	157.20
B AA	13.99	0.00	6.02	0.00	15.52
B AA	13.99	0.00	6.02	0.00	15.55
B AA	13.99	0.00	4.41	0.00	3.00
B AA	13.99	0.00	4.41	0.00	2.96
B AA	18.19	0.00	6.02	0.00	15.52
B AA	18.19	0.00	6.02	0.00	15.55
B AA	18.19	0.00	4.41	0.00	3.00
B AA	18.19	0.00	4.41	0.00	2.96
B WX	13.99	8.26	6.87	51.61	66.51
B WX	13.99	8.26	6.87	51.61	66.47
B WX	13.99	8.26	8.48	51.61	85.02
B WX	13.99	8.26	8.48	51.61	84.99



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WX	18.19	8.26	6.87	51.61	66.51
B WX	18.19	8.26	6.87	51.61	66.47
B WX	18.19	8.26	8.48	51.61	85.02
B WX	18.19	8.26	8.48	51.61	84.99
B WX	13.99	8.26	3.85	51.61	56.69
B WX	13.99	8.26	3.85	51.61	56.66
B WX	13.99	8.26	5.46	51.61	75.21
B WX	13.99	8.26	5.46	51.61	75.17
B WX	18.19	8.26	3.85	51.61	56.69
B WX	18.19	8.26	3.85	51.61	56.66
B WX	18.19	8.26	5.46	51.61	75.21
B WX	18.19	8.26	5.46	51.61	75.17
B WXY	13.99	5.78	17.95	36.12	149.32
B WXY	13.99	5.78	17.95	36.12	149.29
B WXY	13.99	5.78	19.56	36.12	167.84
B WXY	13.99	5.78	19.56	36.12	167.80
B WXY	18.19	5.78	17.95	36.12	149.32
B WXY	18.19	5.78	17.95	36.12	149.29
B WXY	18.19	5.78	19.56	36.12	167.84
B WXY	18.19	5.78	19.56	36.12	167.80
B WXY	13.99	5.78	7.22	36.12	26.12
B WXY	13.99	5.78	7.22	36.12	26.16
B WXY	13.99	5.78	5.61	36.12	7.61
B WXY	13.99	5.78	5.61	36.12	7.64
B WXY	18.19	5.78	7.22	36.12	26.12
B WXY	18.19	5.78	7.22	36.12	26.16
B WXY	18.19	5.78	5.61	36.12	7.61
B WXY	18.19	5.78	5.61	36.12	7.64
B WY	13.99	0.00	22.70	0.00	184.81
B WY	13.99	0.00	22.70	0.00	184.78
B WY	13.99	0.00	24.30	0.00	203.33
B WY	13.99	0.00	24.30	0.00	203.29
B WY	18.19	0.00	22.70	0.00	184.81
B WY	18.19	0.00	22.70	0.00	184.78
B WY	18.19	0.00	24.30	0.00	203.33
B WY	18.19	0.00	24.30	0.00	203.29
B WY	13.99	0.00	11.97	0.00	61.61
B WY	13.99	0.00	11.97	0.00	61.65
B WY	13.99	0.00	10.36	0.00	43.10
B WY	13.99	0.00	10.36	0.00	43.13
B WY	18.19	0.00	11.97	0.00	61.61
B WY	18.19	0.00	11.97	0.00	61.65
B WY	18.19	0.00	10.36	0.00	43.10





COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WY	18.19	0.00	10.36	0.00	43.13
D I	13.99	0.00	23.40	0.00	214.86
D I	17.71	0.00	23.40	0.00	214.56
D I	16.58	0.00	26.00	0.00	244.89
D I	20.29	0.00	26.00	0.00	244.59
D I	18.19	0.00	23.40	0.00	214.86
D I	21.91	0.00	23.40	0.00	214.56
D I	20.77	0.00	26.00	0.00	244.89
D I	24.49	0.00	26.00	0.00	244.59
D I	13.99	0.00	6.01	0.00	14.89
D I	17.71	0.00	6.01	0.00	15.18
D I	16.58	0.00	3.40	0.00	15.14
D I	20.29	0.00	3.40	0.00	14.85
D I	18.19	0.00	6.01	0.00	14.89
D I	21.91	0.00	6.01	0.00	15.18
D I	20.77	0.00	3.40	0.00	15.14
D I	24.49	0.00	3.40	0.00	14.85
D W	13.99	0.00	32.19	0.00	288.17
D W	15.85	0.00	32.19	0.00	288.00
D W	15.29	0.00	34.80	0.00	318.20
D W	17.14	0.00	34.80	0.00	318.03
D W	18.19	0.00	32.19	0.00	288.17
D W	20.05	0.00	32.19	0.00	288.00
D W	19.48	0.00	34.80	0.00	318.20
D W	21.34	0.00	34.80	0.00	318.03
D W	13.99	0.00	14.80	0.00	88.20
D W	15.85	0.00	14.80	0.00	88.36
D W	15.29	0.00	12.19	0.00	58.17
D W	17.14	0.00	12.19	0.00	58.33
D W	18.19	0.00	14.80	0.00	88.20
D W	20.05	0.00	14.80	0.00	88.36
D W	19.48	0.00	12.19	0.00	58.17
D W	21.34	0.00	12.19	0.00	58.33
DAA	15.85	0.00	23.77	0.00	215.95
DAA	15.85	0.00	23.77	0.00	215.92
DAA	17.14	0.00	26.38	0.00	245.99
DAA	17.14	0.00	26.38	0.00	245.95
DAA	20.05	0.00	23.77	0.00	215.95
DAA	20.05	0.00	23.77	0.00	215.92
DAA	21.34	0.00	26.38	0.00	245.99
DAA	21.34	0.00	26.38	0.00	245.95
DAA	15.85	0.00	6.38	0.00	16.24
DAA	15.85	0.00	6.38	0.00	16.28



COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
DAA	17.14	0.00	3.78	0.00	13.79
DAA	17.14	0.00	3.78	0.00	13.75
DAA	20.05	0.00	6.38	0.00	16.24
DAA	20.05	0.00	6.38	0.00	16.28
DAA	21.34	0.00	3.78	0.00	13.79
DAA	21.34	0.00	3.78	0.00	13.75

### Combinazioni statiche EQU

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
A	12.59	0.00	12.11	0.00	123.86
A	12.59	0.00	12.11	0.00	123.83
A	12.59	0.00	14.38	0.00	150.04
A	12.59	0.00	14.38	0.00	150.02
A	15.39	0.00	12.11	0.00	123.86
A	15.39	0.00	12.11	0.00	123.83
A	15.39	0.00	14.38	0.00	150.04
A	15.39	0.00	14.38	0.00	150.02
A	12.59	0.00	8.33	0.00	111.59
A	12.59	0.00	8.33	0.00	111.57
A	12.59	0.00	10.60	0.00	137.77
A	12.59	0.00	10.60	0.00	137.75
A	15.39	0.00	8.33	0.00	111.59
A	15.39	0.00	8.33	0.00	111.57
A	15.39	0.00	10.60	0.00	137.77
A	15.39	0.00	10.60	0.00	137.75
B AA	12.59	0.00	16.21	0.00	132.56
B AA	12.59	0.00	16.21	0.00	132.53
B AA	12.59	0.00	17.28	0.00	144.90
B AA	12.59	0.00	17.28	0.00	144.88
B AA	15.39	0.00	16.21	0.00	132.56
B AA	15.39	0.00	16.21	0.00	132.53
B AA	15.39	0.00	17.28	0.00	144.90
B AA	15.39	0.00	17.28	0.00	144.88
B AA	12.59	0.00	6.55	0.00	21.68
B AA	12.59	0.00	6.55	0.00	21.70
B AA	12.59	0.00	5.48	0.00	9.33
B AA	12.59	0.00	5.48	0.00	9.36
B AA	15.39	0.00	6.55	0.00	21.68
B AA	15.39	0.00	6.55	0.00	21.70
B AA	15.39	0.00	5.48	0.00	9.33



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B AA	15.39	0.00	5.48	0.00	9.36
B WX	12.59	8.26	6.34	51.61	60.35
B WX	12.59	8.26	6.34	51.61	60.32
B WX	12.59	8.26	7.41	51.61	72.69
B WX	12.59	8.26	7.41	51.61	72.67
B WX	15.39	8.26	6.34	51.61	60.35
B WX	15.39	8.26	6.34	51.61	60.32
B WX	15.39	8.26	7.41	51.61	72.69
B WX	15.39	8.26	7.41	51.61	72.67
B WX	12.59	8.26	3.32	51.61	50.53
B WX	12.59	8.26	3.32	51.61	50.51
B WX	12.59	8.26	4.39	51.61	62.88
B WX	12.59	8.26	4.39	51.61	62.85
B WX	15.39	8.26	3.32	51.61	50.53
B WX	15.39	8.26	3.32	51.61	50.51
B WX	15.39	8.26	4.39	51.61	62.88
B WX	15.39	8.26	4.39	51.61	62.85
B WXY	12.59	5.78	17.41	36.12	143.16
B WXY	12.59	5.78	17.41	36.12	143.14
B WXY	12.59	5.78	18.49	36.12	155.50
B WXY	12.59	5.78	18.49	36.12	155.48
B WXY	15.39	5.78	17.41	36.12	143.16
B WXY	15.39	5.78	17.41	36.12	143.14
B WXY	15.39	5.78	18.49	36.12	155.50
B WXY	15.39	5.78	18.49	36.12	155.48
B WXY	12.59	5.78	7.76	36.12	32.28
B WXY	12.59	5.78	7.76	36.12	32.30
B WXY	12.59	5.78	6.69	36.12	19.94
B WXY	12.59	5.78	6.69	36.12	19.96
B WXY	15.39	5.78	7.76	36.12	32.28
B WXY	15.39	5.78	7.76	36.12	32.30
B WXY	15.39	5.78	6.69	36.12	19.94
B WXY	15.39	5.78	6.69	36.12	19.96
B WY	12.59	0.00	22.16	0.00	178.65
B WY	12.59	0.00	22.16	0.00	178.63
B WY	12.59	0.00	23.23	0.00	191.00
B WY	12.59	0.00	23.23	0.00	190.97
B WY	15.39	0.00	22.16	0.00	178.65
B WY	15.39	0.00	22.16	0.00	178.63
B WY	15.39	0.00	23.23	0.00	191.00
B WY	15.39	0.00	23.23	0.00	190.97
B WY	12.59	0.00	12.51	0.00	67.77
B WY	12.59	0.00	12.51	0.00	67.80



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WY	12.59	0.00	11.43	0.00	55.43
B WY	12.59	0.00	11.43	0.00	55.45
B WY	15.39	0.00	12.51	0.00	67.77
B WY	15.39	0.00	12.51	0.00	67.80
B WY	15.39	0.00	11.43	0.00	55.43
B WY	15.39	0.00	11.43	0.00	55.45
D I	12.59	0.00	22.53	0.00	204.86
D I	16.31	0.00	22.53	0.00	204.58
D I	15.18	0.00	24.27	0.00	224.88
D I	18.89	0.00	24.27	0.00	224.60
D I	15.39	0.00	22.53	0.00	204.86
D I	19.11	0.00	22.53	0.00	204.58
D I	17.98	0.00	24.27	0.00	224.88
D I	21.69	0.00	24.27	0.00	224.60
D I	12.59	0.00	6.88	0.00	24.88
D I	16.31	0.00	6.88	0.00	25.17
D I	15.18	0.00	5.14	0.00	4.86
D I	18.89	0.00	5.14	0.00	5.15
D I	15.39	0.00	6.88	0.00	24.88
D I	19.11	0.00	6.88	0.00	25.17
D I	17.98	0.00	5.14	0.00	4.86
D I	21.69	0.00	5.14	0.00	5.15
D W	12.59	0.00	31.32	0.00	278.17
D W	14.45	0.00	31.32	0.00	278.02
D W	13.89	0.00	33.06	0.00	298.19
D W	15.74	0.00	33.06	0.00	298.04
D W	15.39	0.00	31.32	0.00	278.17
D W	17.25	0.00	31.32	0.00	278.02
D W	16.68	0.00	33.06	0.00	298.19
D W	18.54	0.00	33.06	0.00	298.04
D W	12.59	0.00	15.67	0.00	98.20
D W	14.45	0.00	15.67	0.00	98.35
D W	13.89	0.00	13.93	0.00	78.17
D W	15.74	0.00	13.93	0.00	78.33
D W	15.39	0.00	15.67	0.00	98.20
D W	17.25	0.00	15.67	0.00	98.35
D W	16.68	0.00	13.93	0.00	78.17
D W	18.54	0.00	13.93	0.00	78.33
DAA	14.45	0.00	22.90	0.00	205.96
DAA	14.45	0.00	22.90	0.00	205.93
DAA	15.74	0.00	24.64	0.00	225.98
DAA	15.74	0.00	24.64	0.00	225.95
DAA	17.25	0.00	22.90	0.00	205.96

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
DAA	17.25	0.00	22.90	0.00	205.93
DAA	18.54	0.00	24.64	0.00	225.98
DAA	18.54	0.00	24.64	0.00	225.95
DAA	14.45	0.00	7.25	0.00	26.24
DAA	14.45	0.00	7.25	0.00	26.26
DAA	15.74	0.00	5.52	0.00	6.22
DAA	15.74	0.00	5.52	0.00	6.24
DAA	17.25	0.00	7.25	0.00	26.24
DAA	17.25	0.00	7.25	0.00	26.26
DAA	18.54	0.00	5.52	0.00	6.22
DAA	18.54	0.00	5.52	0.00	6.24

### Combinazioni sismiche

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
Comb1	13.99	2.36	12.11	18.01	109.61
Comb2	13.99	2.36	12.11	18.01	109.61
Comb3	13.99	2.36	3.59	18.01	10.49
Comb4	13.99	2.36	3.59	18.01	10.49
Comb5	13.99	7.85	6.61	60.05	67.57
Comb6	13.99	7.85	6.61	60.05	67.57
Comb7	13.99	7.85	1.90	60.05	31.54
Comb8	13.99	7.85	1.90	60.05	31.54

Con

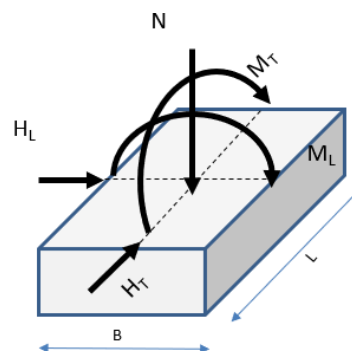
N = azione verticale

H<sub>L</sub> = taglio agente in direzione longitudinale

H<sub>T</sub> = taglio agente in direzione trasversale

M<sub>L</sub> = momento agente in direzione longitudinale

M<sub>T</sub> = momento agente in direzione trasversale



GENERAL CONTRACTOR  IRICAV2		ALTA SORVEGLIANZA  GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione	Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 78 di 336	

## LC9

Unità di misura: [kN], [m]

### Combinazioni statiche STR

COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
A	12.89	0.00	3.08	0.00	27.18
A	12.89	0.00	1.58	0.00	10.77
A	12.89	0.00	4.99	0.00	50.08
A	12.89	0.00	3.49	0.00	33.66
A	16.76	0.00	3.08	0.00	27.18
A	16.76	0.00	1.58	0.00	10.77
A	16.76	0.00	4.99	0.00	50.08
A	16.76	0.00	3.49	0.00	33.66
A	12.89	0.00	0.35	0.00	16.03
A	12.89	0.00	1.85	0.00	0.38
A	12.89	0.00	1.56	0.00	38.93
A	12.89	0.00	0.06	0.00	22.51
A	16.76	0.00	0.35	0.00	16.03
A	16.76	0.00	1.85	0.00	0.38
A	16.76	0.00	1.56	0.00	38.93
A	16.76	0.00	0.06	0.00	22.51
B AA	12.89	0.00	10.10	0.00	69.30
B AA	12.89	0.00	9.22	0.00	59.46
B AA	12.89	0.00	10.83	0.00	78.01
B AA	12.89	0.00	9.95	0.00	68.18
B AA	16.76	0.00	10.10	0.00	69.30
B AA	16.76	0.00	9.22	0.00	59.46
B AA	16.76	0.00	10.83	0.00	78.01
B AA	16.76	0.00	9.95	0.00	68.18
B AA	12.89	0.00	11.15	0.00	76.81
B AA	12.89	0.00	12.03	0.00	86.64
B AA	12.89	0.00	10.42	0.00	68.09
B AA	12.89	0.00	11.31	0.00	77.93
B AA	16.76	0.00	11.15	0.00	76.81
B AA	16.76	0.00	12.03	0.00	86.64
B AA	16.76	0.00	10.42	0.00	68.09
B AA	16.76	0.00	11.31	0.00	77.93
B WX	12.89	7.77	0.85	48.69	0.71
B WX	12.89	7.77	0.03	48.69	9.13
B WX	12.89	7.77	1.58	48.69	9.42
B WX	12.89	7.77	0.69	48.69	0.42



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WX	16.76	7.77	0.85	48.69	0.71
B WX	16.76	7.77	0.03	48.69	9.13
B WX	16.76	7.77	1.58	48.69	9.42
B WX	16.76	7.77	0.69	48.69	0.42
B WX	12.89	7.77	1.90	48.69	8.21
B WX	12.89	7.77	2.78	48.69	18.05
B WX	12.89	7.77	1.17	48.69	0.50
B WX	12.89	7.77	2.05	48.69	9.34
B WX	16.76	7.77	1.90	48.69	8.21
B WX	16.76	7.77	2.78	48.69	18.05
B WX	16.76	7.77	1.17	48.69	0.50
B WX	16.76	7.77	2.05	48.69	9.34
B WXY	12.89	5.44	11.24	34.08	79.43
B WXY	12.89	5.44	10.36	34.08	69.60
B WXY	12.89	5.44	11.97	34.08	88.15
B WXY	12.89	5.44	11.09	34.08	78.31
B WXY	16.76	5.44	11.24	34.08	79.43
B WXY	16.76	5.44	10.36	34.08	69.60
B WXY	16.76	5.44	11.97	34.08	88.15
B WXY	16.76	5.44	11.09	34.08	78.31
B WXY	12.89	5.44	12.29	34.08	86.94
B WXY	12.89	5.44	13.17	34.08	96.77
B WXY	12.89	5.44	11.56	34.08	78.22
B WXY	12.89	5.44	12.45	34.08	88.06
B WXY	16.76	5.44	12.29	34.08	86.94
B WXY	16.76	5.44	13.17	34.08	96.77
B WXY	16.76	5.44	11.56	34.08	78.22
B WXY	16.76	5.44	12.45	34.08	88.06
B WY	12.89	0.00	15.70	0.00	113.17
B WY	12.89	0.00	14.82	0.00	103.34
B WY	12.89	0.00	16.42	0.00	121.88
B WY	12.89	0.00	15.54	0.00	112.05
B WY	16.76	0.00	15.70	0.00	113.17
B WY	16.76	0.00	14.82	0.00	103.34
B WY	16.76	0.00	16.42	0.00	121.88
B WY	16.76	0.00	15.54	0.00	112.05
B WY	12.89	0.00	16.74	0.00	120.68
B WY	12.89	0.00	17.63	0.00	130.51
B WY	12.89	0.00	16.02	0.00	111.96
B WY	12.89	0.00	16.90	0.00	121.80
B WY	16.76	0.00	16.74	0.00	120.68
B WY	16.76	0.00	17.63	0.00	130.51
B WY	16.76	0.00	16.02	0.00	111.96



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WY	16.76	0.00	16.90	0.00	121.80
D I	12.89	0.00	14.65	0.00	123.02
D I	16.61	0.00	13.44	0.00	109.55
D I	15.48	0.00	16.05	0.00	139.87
D I	19.19	0.00	14.85	0.00	126.39
D I	16.76	0.00	14.65	0.00	123.02
D I	20.48	0.00	13.44	0.00	109.55
D I	19.34	0.00	16.05	0.00	139.87
D I	23.06	0.00	14.85	0.00	126.39
D I	12.89	0.00	13.31	0.00	98.82
D I	16.61	0.00	14.52	0.00	112.30
D I	15.48	0.00	11.91	0.00	81.97
D I	19.19	0.00	13.12	0.00	95.45
D I	16.76	0.00	13.31	0.00	98.82
D I	20.48	0.00	14.52	0.00	112.30
D I	19.34	0.00	11.91	0.00	81.97
D I	23.06	0.00	13.12	0.00	95.45
D W	12.89	0.00	23.05	0.00	194.00
D W	14.75	0.00	21.85	0.00	180.65
D W	14.19	0.00	24.46	0.00	210.84
D W	16.04	0.00	23.25	0.00	197.50
D W	16.76	0.00	23.05	0.00	194.00
D W	18.62	0.00	21.85	0.00	180.65
D W	18.05	0.00	24.46	0.00	210.84
D W	19.91	0.00	23.25	0.00	197.50
D W	12.89	0.00	21.72	0.00	169.79
D W	14.75	0.00	22.92	0.00	183.14
D W	14.19	0.00	20.32	0.00	152.94
D W	16.04	0.00	21.52	0.00	166.29
D W	16.76	0.00	21.72	0.00	169.79
D W	18.62	0.00	22.92	0.00	183.14
D W	18.05	0.00	20.32	0.00	152.94
D W	19.91	0.00	21.52	0.00	166.29
DAA	14.75	0.00	14.99	0.00	124.01
DAA	14.75	0.00	13.78	0.00	110.79
DAA	16.04	0.00	16.39	0.00	140.86
DAA	16.04	0.00	15.19	0.00	127.64
DAA	18.62	0.00	14.99	0.00	124.01
DAA	18.62	0.00	13.78	0.00	110.79
DAA	19.91	0.00	16.39	0.00	140.86
DAA	19.91	0.00	15.19	0.00	127.64
DAA	14.75	0.00	13.66	0.00	100.06
DAA	14.75	0.00	14.86	0.00	113.28





COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
DAA	16.04	0.00	12.25	0.00	83.22
DAA	16.04	0.00	13.46	0.00	96.43
DAA	18.62	0.00	13.66	0.00	100.06
DAA	18.62	0.00	14.86	0.00	113.28
DAA	19.91	0.00	12.25	0.00	83.22
DAA	19.91	0.00	13.46	0.00	96.43

### Combinazioni statiche EQU

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
A	11.60	0.00	2.94	0.00	25.02
A	11.60	0.00	1.95	0.00	14.08
A	11.60	0.00	4.22	0.00	40.28
A	11.60	0.00	3.22	0.00	29.34
A	14.18	0.00	2.94	0.00	25.02
A	14.18	0.00	1.95	0.00	14.08
A	14.18	0.00	4.22	0.00	40.28
A	14.18	0.00	3.22	0.00	29.34
A	11.60	0.00	0.49	0.00	13.87
A	11.60	0.00	1.49	0.00	2.93
A	11.60	0.00	0.79	0.00	29.13
A	11.60	0.00	0.21	0.00	18.19
A	14.18	0.00	0.49	0.00	13.87
A	14.18	0.00	1.49	0.00	2.93
A	14.18	0.00	0.79	0.00	29.13
A	14.18	0.00	0.21	0.00	18.19
B AA	11.60	0.00	10.15	0.00	69.68
B AA	11.60	0.00	9.57	0.00	63.12
B AA	11.60	0.00	10.64	0.00	75.49
B AA	11.60	0.00	10.05	0.00	68.93
B AA	14.18	0.00	10.15	0.00	69.68
B AA	14.18	0.00	9.57	0.00	63.12
B AA	14.18	0.00	10.64	0.00	75.49
B AA	14.18	0.00	10.05	0.00	68.93
B AA	11.60	0.00	11.10	0.00	76.43
B AA	11.60	0.00	11.68	0.00	82.99
B AA	11.60	0.00	10.61	0.00	70.62
B AA	11.60	0.00	11.20	0.00	77.18
B AA	14.18	0.00	11.10	0.00	76.43
B AA	14.18	0.00	11.68	0.00	82.99
B AA	14.18	0.00	10.61	0.00	70.62



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B AA	14.18	0.00	11.20	0.00	77.18
B WX	11.60	7.77	0.90	48.69	1.08
B WX	11.60	7.77	0.31	48.69	5.47
B WX	11.60	7.77	1.39	48.69	6.89
B WX	11.60	7.77	0.80	48.69	0.33
B WX	14.18	7.77	0.90	48.69	1.08
B WX	14.18	7.77	0.31	48.69	5.47
B WX	14.18	7.77	1.39	48.69	6.89
B WX	14.18	7.77	0.80	48.69	0.33
B WX	11.60	7.77	1.84	48.69	7.84
B WX	11.60	7.77	2.43	48.69	14.40
B WX	11.60	7.77	1.36	48.69	2.03
B WX	11.60	7.77	1.95	48.69	8.59
B WX	14.18	7.77	1.84	48.69	7.84
B WX	14.18	7.77	2.43	48.69	14.40
B WX	14.18	7.77	1.36	48.69	2.03
B WX	14.18	7.77	1.95	48.69	8.59
B WXY	11.60	5.44	11.30	34.08	79.81
B WXY	11.60	5.44	10.71	34.08	73.25
B WXY	11.60	5.44	11.78	34.08	85.62
B WXY	11.60	5.44	11.19	34.08	79.06
B WXY	14.18	5.44	11.30	34.08	79.81
B WXY	14.18	5.44	10.71	34.08	73.25
B WXY	14.18	5.44	11.78	34.08	85.62
B WXY	14.18	5.44	11.19	34.08	79.06
B WXY	11.60	5.44	12.24	34.08	86.56
B WXY	11.60	5.44	12.83	34.08	93.12
B WXY	11.60	5.44	11.75	34.08	80.75
B WXY	11.60	5.44	12.34	34.08	87.31
B WXY	14.18	5.44	12.24	34.08	86.56
B WXY	14.18	5.44	12.83	34.08	93.12
B WXY	14.18	5.44	11.75	34.08	80.75
B WXY	14.18	5.44	12.34	34.08	87.31
B WY	11.60	0.00	15.75	0.00	113.55
B WY	11.60	0.00	15.16	0.00	106.99
B WY	11.60	0.00	16.24	0.00	119.36
B WY	11.60	0.00	15.65	0.00	112.80
B WY	14.18	0.00	15.75	0.00	113.55
B WY	14.18	0.00	15.16	0.00	106.99
B WY	14.18	0.00	16.24	0.00	119.36
B WY	14.18	0.00	15.65	0.00	112.80
B WY	11.60	0.00	16.69	0.00	120.30
B WY	11.60	0.00	17.28	0.00	126.86



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WY	11.60	0.00	16.21	0.00	114.49
B WY	11.60	0.00	16.80	0.00	121.05
B WY	14.18	0.00	16.69	0.00	120.30
B WY	14.18	0.00	17.28	0.00	126.86
B WY	14.18	0.00	16.21	0.00	114.49
B WY	14.18	0.00	16.80	0.00	121.05
D I	11.60	0.00	14.58	0.00	121.81
D I	15.32	0.00	13.78	0.00	112.74
D I	14.19	0.00	15.52	0.00	133.04
D I	17.90	0.00	14.71	0.00	123.97
D I	14.18	0.00	14.58	0.00	121.81
D I	17.90	0.00	13.78	0.00	112.74
D I	16.77	0.00	15.52	0.00	133.04
D I	20.48	0.00	14.71	0.00	123.97
D I	11.60	0.00	13.38	0.00	100.03
D I	15.32	0.00	14.18	0.00	109.10
D I	14.19	0.00	12.45	0.00	88.80
D I	17.90	0.00	13.25	0.00	97.87
D I	14.18	0.00	13.38	0.00	100.03
D I	17.90	0.00	14.18	0.00	109.10
D I	16.77	0.00	12.45	0.00	88.80
D I	20.48	0.00	13.25	0.00	97.87
D W	11.60	0.00	22.98	0.00	192.79
D W	13.46	0.00	22.18	0.00	183.84
D W	12.90	0.00	23.92	0.00	204.02
D W	14.75	0.00	23.12	0.00	195.08
D W	14.18	0.00	22.98	0.00	192.79
D W	16.04	0.00	22.18	0.00	183.84
D W	15.47	0.00	23.92	0.00	204.02
D W	17.33	0.00	23.12	0.00	195.08
D W	11.60	0.00	21.79	0.00	171.00
D W	13.46	0.00	22.59	0.00	179.94
D W	12.90	0.00	20.85	0.00	159.77
D W	14.75	0.00	21.65	0.00	168.71
D W	14.18	0.00	21.79	0.00	171.00
D W	16.04	0.00	22.59	0.00	179.94
D W	15.47	0.00	20.85	0.00	159.77
D W	17.33	0.00	21.65	0.00	168.71
DAA	13.46	0.00	14.92	0.00	122.80
DAA	13.46	0.00	14.12	0.00	113.99
DAA	14.75	0.00	15.86	0.00	134.03
DAA	14.75	0.00	15.06	0.00	125.22
DAA	16.04	0.00	14.92	0.00	122.80

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
DAA	16.04	0.00	14.12	0.00	113.99
DAA	17.33	0.00	15.86	0.00	134.03
DAA	17.33	0.00	15.06	0.00	125.22
DAA	13.46	0.00	13.72	0.00	101.27
DAA	13.46	0.00	14.53	0.00	110.09
DAA	14.75	0.00	12.79	0.00	90.04
DAA	14.75	0.00	13.59	0.00	98.85
DAA	16.04	0.00	13.72	0.00	101.27
DAA	16.04	0.00	14.53	0.00	110.09
DAA	17.33	0.00	12.79	0.00	90.04
DAA	17.33	0.00	13.59	0.00	98.85

### Combinazioni sismiche

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
Comb1	12.89	2.17	6.98	16.90	54.56
Comb2	12.89	2.17	6.98	16.90	54.56
Comb3	12.89	2.17	7.49	16.90	58.14
Comb4	12.89	2.17	7.49	16.90	58.14
Comb5	12.89	7.23	1.91	56.35	15.11
Comb6	12.89	7.23	1.91	56.35	15.11
Comb7	12.89	7.23	2.43	56.35	18.69
Comb8	12.89	7.23	2.43	56.35	18.69

Con

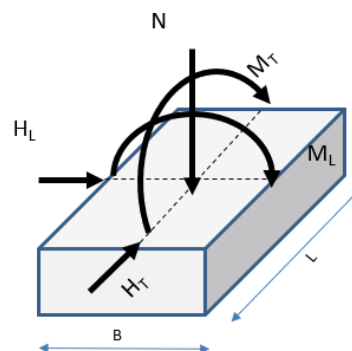
N = azione verticale

H<sub>L</sub> = taglio agente in direzione longitudinale

H<sub>T</sub> = taglio agente in direzione trasversale

M<sub>L</sub> = momento agente in direzione longitudinale

M<sub>T</sub> = momento agente in direzione trasversale



GENERAL CONTRACTOR  IRICAV2	ALTA SORVEGLIANZA  GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione	Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 85 di 336

## LC10

Unità di misura: [kN], [m]

### Combinazioni statiche STR

COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
A	52.89	0.00	7.48	0.00	94.77
A	52.89	0.00	10.29	0.00	125.04
A	52.89	0.00	7.48	0.00	94.77
A	52.89	0.00	10.29	0.00	125.04
A	68.76	0.00	7.48	0.00	94.77
A	68.76	0.00	10.29	0.00	125.04
A	68.76	0.00	7.48	0.00	94.77
A	68.76	0.00	10.29	0.00	125.04
A	52.89	0.00	11.26	0.00	107.03
A	52.89	0.00	14.07	0.00	137.30
A	52.89	0.00	11.26	0.00	107.03
A	52.89	0.00	14.07	0.00	137.30
A	68.76	0.00	11.26	0.00	107.03
A	68.76	0.00	14.07	0.00	137.30
A	68.76	0.00	11.26	0.00	107.03
A	68.76	0.00	14.07	0.00	137.30
B AA	33.73	0.00	5.07	0.00	10.76
B AA	33.73	0.00	3.45	0.00	6.92
B AA	33.73	0.00	5.07	0.00	10.76
B AA	33.73	0.00	3.45	0.00	6.92
B AA	43.85	0.00	5.07	0.00	10.76
B AA	43.85	0.00	3.45	0.00	6.92
B AA	43.85	0.00	5.07	0.00	10.76
B AA	43.85	0.00	3.45	0.00	6.92
B AA	33.73	0.00	15.86	0.00	128.68
B AA	33.73	0.00	17.48	0.00	146.36
B AA	33.73	0.00	15.86	0.00	128.68
B AA	33.73	0.00	17.48	0.00	146.36
B AA	43.85	0.00	15.86	0.00	128.68
B AA	43.85	0.00	17.48	0.00	146.36
B AA	43.85	0.00	15.86	0.00	128.68
B AA	43.85	0.00	17.48	0.00	146.36
B WX	33.73	8.20	3.89	51.61	54.05
B WX	33.73	8.20	5.51	51.61	71.74
B WX	33.73	8.20	3.89	51.61	54.05
B WX	33.73	8.20	5.51	51.61	71.74



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WX	43.85	8.20	3.89	51.61	54.05
B WX	43.85	8.20	5.51	51.61	71.74
B WX	43.85	8.20	3.89	51.61	54.05
B WX	43.85	8.20	5.51	51.61	71.74
B WX	33.73	8.20	6.91	51.61	63.86
B WX	33.73	8.20	8.52	51.61	81.55
B WX	33.73	8.20	6.91	51.61	63.86
B WX	33.73	8.20	8.52	51.61	81.55
B WX	43.85	8.20	6.91	51.61	63.86
B WX	43.85	8.20	8.52	51.61	81.55
B WX	43.85	8.20	6.91	51.61	63.86
B WX	43.85	8.20	8.52	51.61	81.55
B WXY	33.73	5.74	6.13	36.12	20.14
B WXY	33.73	5.74	4.51	36.12	2.45
B WXY	33.73	5.74	6.13	36.12	20.14
B WXY	33.73	5.74	4.51	36.12	2.45
B WXY	43.85	5.74	6.13	36.12	20.14
B WXY	43.85	5.74	4.51	36.12	2.45
B WXY	43.85	5.74	6.13	36.12	20.14
B WXY	43.85	5.74	4.51	36.12	2.45
B WXY	33.73	5.74	16.92	36.12	138.05
B WXY	33.73	5.74	18.54	36.12	155.73
B WXY	33.73	5.74	16.92	36.12	138.05
B WXY	33.73	5.74	18.54	36.12	155.73
B WXY	43.85	5.74	16.92	36.12	138.05
B WXY	43.85	5.74	18.54	36.12	155.73
B WXY	43.85	5.74	16.92	36.12	138.05
B WXY	43.85	5.74	18.54	36.12	155.73
B WY	33.73	0.00	10.42	0.00	51.93
B WY	33.73	0.00	8.80	0.00	34.24
B WY	33.73	0.00	10.42	0.00	51.93
B WY	33.73	0.00	8.80	0.00	34.24
B WY	43.85	0.00	10.42	0.00	51.93
B WY	43.85	0.00	8.80	0.00	34.24
B WY	43.85	0.00	10.42	0.00	51.93
B WY	43.85	0.00	8.80	0.00	34.24
B WY	33.73	0.00	21.21	0.00	169.84
B WY	33.73	0.00	22.83	0.00	187.53
B WY	33.73	0.00	21.21	0.00	169.84
B WY	33.73	0.00	22.83	0.00	187.53
B WY	43.85	0.00	21.21	0.00	169.84
B WY	43.85	0.00	22.83	0.00	187.53
B WY	43.85	0.00	21.21	0.00	169.84



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WY	43.85	0.00	22.83	0.00	187.53
D I	44.77	0.00	5.16	0.00	17.46
D I	46.91	0.00	2.91	0.00	6.85
D I	47.84	0.00	5.16	0.00	17.46
D I	49.98	0.00	2.91	0.00	6.85
D I	58.20	0.00	5.16	0.00	17.46
D I	60.34	0.00	2.91	0.00	6.85
D I	61.27	0.00	5.16	0.00	17.46
D I	63.41	0.00	2.91	0.00	6.85
D I	44.77	0.00	20.20	0.00	179.56
D I	46.91	0.00	22.45	0.00	203.87
D I	47.84	0.00	20.20	0.00	179.56
D I	49.98	0.00	22.45	0.00	203.87
D I	58.20	0.00	20.20	0.00	179.56
D I	60.34	0.00	22.45	0.00	203.87
D I	61.27	0.00	20.20	0.00	179.56
D I	63.41	0.00	22.45	0.00	203.87
D W	44.77	0.00	12.61	0.00	79.87
D W	45.84	0.00	10.35	0.00	55.55
D W	46.30	0.00	12.61	0.00	79.87
D W	47.37	0.00	10.35	0.00	55.55
D W	58.20	0.00	12.61	0.00	79.87
D W	59.27	0.00	10.35	0.00	55.55
D W	59.73	0.00	12.61	0.00	79.87
D W	60.81	0.00	10.35	0.00	55.55
D W	44.77	0.00	27.64	0.00	241.96
D W	45.84	0.00	29.90	0.00	266.28
D W	46.30	0.00	27.64	0.00	241.96
D W	47.37	0.00	29.90	0.00	266.28
D W	58.20	0.00	27.64	0.00	241.96
D W	59.27	0.00	29.90	0.00	266.28
D W	59.73	0.00	27.64	0.00	241.96
D W	60.81	0.00	29.90	0.00	266.28
DAA	45.84	0.00	5.54	0.00	18.69
DAA	45.84	0.00	3.28	0.00	5.63
DAA	47.37	0.00	5.54	0.00	18.69
DAA	47.37	0.00	3.28	0.00	5.63
DAA	59.27	0.00	5.54	0.00	18.69
DAA	59.27	0.00	3.28	0.00	5.63
DAA	60.81	0.00	5.54	0.00	18.69
DAA	60.81	0.00	3.28	0.00	5.63
DAA	45.84	0.00	20.57	0.00	180.79
DAA	45.84	0.00	22.83	0.00	205.10

GENERAL CONTRACTOR  <b>IRICAV2</b>		ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione		Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 88 di 336

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
DAA	47.37	0.00	20.57	0.00	180.79
DAA	47.37	0.00	22.83	0.00	205.10
DAA	59.27	0.00	20.57	0.00	180.79
DAA	59.27	0.00	22.83	0.00	205.10
DAA	60.81	0.00	20.57	0.00	180.79
DAA	60.81	0.00	22.83	0.00	205.10

### Combinazioni statiche EQU

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
A	47.60	0.00	6.55	0.00	84.68
A	47.60	0.00	8.42	0.00	104.86
A	47.60	0.00	6.55	0.00	84.68
A	47.60	0.00	8.42	0.00	104.86
A	58.18	0.00	6.55	0.00	84.68
A	58.18	0.00	8.42	0.00	104.86
A	58.18	0.00	6.55	0.00	84.68
A	58.18	0.00	8.42	0.00	104.86
A	47.60	0.00	10.32	0.00	96.94
A	47.60	0.00	12.19	0.00	117.12
A	47.60	0.00	10.32	0.00	96.94
A	47.60	0.00	12.19	0.00	117.12
A	58.18	0.00	10.32	0.00	96.94
A	58.18	0.00	12.19	0.00	117.12
A	58.18	0.00	10.32	0.00	96.94
A	58.18	0.00	12.19	0.00	117.12
B AA	30.36	0.00	5.61	0.00	16.66
B AA	30.36	0.00	4.53	0.00	4.87
B AA	30.36	0.00	5.61	0.00	16.66
B AA	30.36	0.00	4.53	0.00	4.87
B AA	37.10	0.00	5.61	0.00	16.66
B AA	37.10	0.00	4.53	0.00	4.87
B AA	37.10	0.00	5.61	0.00	16.66
B AA	37.10	0.00	4.53	0.00	4.87
B AA	30.36	0.00	15.32	0.00	122.78
B AA	30.36	0.00	16.40	0.00	134.57
B AA	30.36	0.00	15.32	0.00	122.78
B AA	30.36	0.00	16.40	0.00	134.57
B AA	37.10	0.00	15.32	0.00	122.78
B AA	37.10	0.00	16.40	0.00	134.57
B AA	37.10	0.00	15.32	0.00	122.78





COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B AA	37.10	0.00	16.40	0.00	134.57
B WX	30.36	8.20	3.35	51.61	48.15
B WX	30.36	8.20	4.43	51.61	59.95
B WX	30.36	8.20	3.35	51.61	48.15
B WX	30.36	8.20	4.43	51.61	59.95
B WX	37.10	8.20	3.35	51.61	48.15
B WX	37.10	8.20	4.43	51.61	59.95
B WX	37.10	8.20	3.35	51.61	48.15
B WX	37.10	8.20	4.43	51.61	59.95
B WX	30.36	8.20	6.37	51.61	57.97
B WX	30.36	8.20	7.45	51.61	69.76
B WX	30.36	8.20	6.37	51.61	57.97
B WX	30.36	8.20	7.45	51.61	69.76
B WX	37.10	8.20	6.37	51.61	57.97
B WX	37.10	8.20	7.45	51.61	69.76
B WX	37.10	8.20	6.37	51.61	57.97
B WX	37.10	8.20	7.45	51.61	69.76
B WXY	30.36	5.74	6.66	36.12	26.03
B WXY	30.36	5.74	5.59	36.12	14.24
B WXY	30.36	5.74	6.66	36.12	26.03
B WXY	30.36	5.74	5.59	36.12	14.24
B WXY	37.10	5.74	6.66	36.12	26.03
B WXY	37.10	5.74	5.59	36.12	14.24
B WXY	37.10	5.74	6.66	36.12	26.03
B WXY	37.10	5.74	5.59	36.12	14.24
B WXY	30.36	5.74	16.38	36.12	132.15
B WXY	30.36	5.74	17.46	36.12	143.94
B WXY	30.36	5.74	16.38	36.12	132.15
B WXY	30.36	5.74	17.46	36.12	143.94
B WXY	37.10	5.74	16.38	36.12	132.15
B WXY	37.10	5.74	17.46	36.12	143.94
B WXY	37.10	5.74	16.38	36.12	132.15
B WXY	37.10	5.74	17.46	36.12	143.94
B WY	30.36	0.00	10.96	0.00	57.82
B WY	30.36	0.00	9.88	0.00	46.03
B WY	30.36	0.00	10.96	0.00	57.82
B WY	30.36	0.00	9.88	0.00	46.03
B WY	37.10	0.00	10.96	0.00	57.82
B WY	37.10	0.00	9.88	0.00	46.03
B WY	37.10	0.00	10.96	0.00	57.82
B WY	37.10	0.00	9.88	0.00	46.03
B WY	30.36	0.00	20.67	0.00	163.95
B WY	30.36	0.00	21.75	0.00	175.74



COMB	N	HL	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
B WY	30.36	0.00	20.67	0.00	163.95
B WY	30.36	0.00	21.75	0.00	175.74
B WY	37.10	0.00	20.67	0.00	163.95
B WY	37.10	0.00	21.75	0.00	175.74
B WY	37.10	0.00	20.67	0.00	163.95
B WY	37.10	0.00	21.75	0.00	175.74
D I	40.29	0.00	5.91	0.00	25.57
D I	42.44	0.00	4.41	0.00	9.36
D I	43.36	0.00	5.91	0.00	25.57
D I	45.50	0.00	4.41	0.00	9.36
D I	49.25	0.00	5.91	0.00	25.57
D I	51.39	0.00	4.41	0.00	9.36
D I	52.31	0.00	5.91	0.00	25.57
D I	54.46	0.00	4.41	0.00	9.36
D I	40.29	0.00	19.44	0.00	171.45
D I	42.44	0.00	20.95	0.00	187.66
D I	43.36	0.00	19.44	0.00	171.45
D I	45.50	0.00	20.95	0.00	187.66
D I	49.25	0.00	19.44	0.00	171.45
D I	51.39	0.00	20.95	0.00	187.66
D I	52.31	0.00	19.44	0.00	171.45
D I	54.46	0.00	20.95	0.00	187.66
D W	40.29	0.00	13.36	0.00	87.97
D W	41.36	0.00	11.86	0.00	71.76
D W	41.83	0.00	13.36	0.00	87.97
D W	42.90	0.00	11.86	0.00	71.76
D W	49.25	0.00	13.36	0.00	87.97
D W	50.32	0.00	11.86	0.00	71.76
D W	50.78	0.00	13.36	0.00	87.97
D W	51.85	0.00	11.86	0.00	71.76
D W	40.29	0.00	26.89	0.00	233.86
D W	41.36	0.00	28.39	0.00	250.07
D W	41.83	0.00	26.89	0.00	233.86
D W	42.90	0.00	28.39	0.00	250.07
D W	49.25	0.00	26.89	0.00	233.86
D W	50.32	0.00	28.39	0.00	250.07
D W	50.78	0.00	26.89	0.00	233.86
D W	51.85	0.00	28.39	0.00	250.07
DAA	41.36	0.00	6.29	0.00	26.79
DAA	41.36	0.00	4.79	0.00	10.58
DAA	42.90	0.00	6.29	0.00	26.79
DAA	42.90	0.00	4.79	0.00	10.58
DAA	50.32	0.00	6.29	0.00	26.79

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
DAA	50.32	0.00	4.79	0.00	10.58
DAA	51.85	0.00	6.29	0.00	26.79
DAA	51.85	0.00	4.79	0.00	10.58
DAA	41.36	0.00	19.82	0.00	172.68
DAA	41.36	0.00	21.33	0.00	188.89
DAA	42.90	0.00	19.82	0.00	172.68
DAA	42.90	0.00	21.33	0.00	188.89
DAA	50.32	0.00	19.82	0.00	172.68
DAA	50.32	0.00	21.33	0.00	188.89
DAA	51.85	0.00	19.82	0.00	172.68
DAA	51.85	0.00	21.33	0.00	188.89

### Combinazioni sismiche

COMB	N	H <sub>L</sub>	H <sub>T</sub>	M <sub>L</sub>	M <sub>T</sub>
	kN	kN	kN	kNm	kNm
Comb1	27.09	2.20	3.29	16.50	10.13
Comb2	27.09	2.20	3.29	16.50	10.13
Comb3	27.09	2.20	11.40	16.50	99.86
Comb4	27.09	2.20	11.40	16.50	99.86
Comb5	27.09	7.34	1.85	54.99	28.37
Comb6	27.09	7.34	1.85	54.99	28.37
Comb7	27.09	7.34	6.26	54.99	61.36
Comb8	27.09	7.34	6.26	54.99	61.36

Con

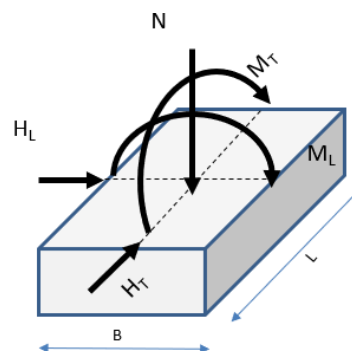
N = azione verticale

H<sub>L</sub> = taglio agente in direzione longitudinale

H<sub>T</sub> = taglio agente in direzione trasversale

M<sub>L</sub> = momento agente in direzione longitudinale

M<sub>T</sub> = momento agente in direzione trasversale



GENERAL CONTRACTOR  IRICAV2		ALTA SORVEGLIANZA  ITALFERR GRUPPO FERROVIE DELLO STATO ITALIANE			
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A partire dagli scarichi a testa basamento, le azioni ad intradosso plinto vengono calcolate come segue:

- all'azione verticale si somma il peso del plinto (e della terra sovrastante se considerato) e la relativa azione inerziale verticale in presenza di sisma (con segno meno in quanto maggiormente gravosa)
- al taglio trasversale si sottrae la differenza tra spinta passiva mobilitata e la spinta attiva e si somma l'azione inerziale orizzontale in presenza di sisma
- al momento flettente trasversale si somma il momento di trasporto dovuto al taglio trasversale come sopra definito e quello dovuto all'eccentricità trasversale del carico della sovrastruttura
- al taglio longitudinale si sottrae la differenza tra spinta passiva mobilitata e la spinta attiva e si somma l'azione inerziale orizzontale in presenza di sisma
- al momento flettente longitudinale si somma il momento di trasporto dovuto al taglio longitudinale come sopra definito e quello dovuto all'eccentricità longitudinale del carico della sovrastruttura.



## 12 VERIFICHE GLOBALI FONDAZIONI DIRETTE

### 12.1 Sintesi risultati LC1

**FONDAZIONI A PLINTO**

**DESIGN ASSUMPTION**

piano campagna sostanzialmente orizzontale

angolo d'attrito caratteristico  $\phi'_s$

coesione  $c'$

angolo d'attrito caratteristico  $\phi'_s$ , alla base

coesione alla base  $c'$

coefficiente  $\gamma_a$

coefficiente  $\gamma_c$

coefficiente  $\gamma_b$  capacità portante

coefficiente  $\gamma_b$  scorrimento

coefficiente  $\gamma_b$  spinta passiva

angolo d'attrito di design  $\phi'_d$

coesione di design  $c'_d$

coeff. attrito di design  $\phi'_d$

coesione alla base di design

Dimensione fondazione B [m] (LONGITUDINALE)

Dimensione fondazione L [m] (TRASVERSALE)

Profondità da piano campagna D [m]

Altezza plinto [m] Hp

Dimensione baggioio b [m] (LONGITUDINALE)

Dimensione maggiore baggioio l [m] (TRASVERSALE)

Altezza baggioio [m] Hb

Altezza terreno sopraplinto [m] Ht

$q'$  = carico permanente ai lati

$\gamma$  = peso specifico medio sopra la fondazione

$\gamma_f$  = peso specifico medio sotto la fondazione

opzione calcolo coeff.  $S_{\gamma}$  e  $S_{\gamma}$

opzione calcolo per tenere in conto peso terreno di ricoprimento

Peso specifico medio c.a.

Peso proprio plinto + baggioio + terreno sovrastante [kN]

Quota baricentro plinto + baggioio + terreno sovrastante vs p.f. [kN]

Coefficiente sismico kh

Coefficiente sismico kv

Azione inerziale orizzontale plinto

Azione inerziale verticale plinto

DA2

38 °

0.663 rad

0 kPa

38 °

0.663 rad

0 kPa

1.00

1.00

2.30

1.10

1.40

38.00 °

0.663 rad  $\tan(\phi'_d) = 0.78$

0.00 kPa

0.78

0.00 kPa

2.2 m

2.2 m

2.2 m

2.2 m

0.8 m

0.8 m

0.5 m

0.25 m

44 kPa

20 kN/m<sup>3</sup>

20 kN/m<sup>3</sup>

1

0 (1 si - 0 no)

25 kN/m<sup>3</sup>

274 kN

1.30 m

0.000 g

0.000 g

0.00 kN

0.00 kN

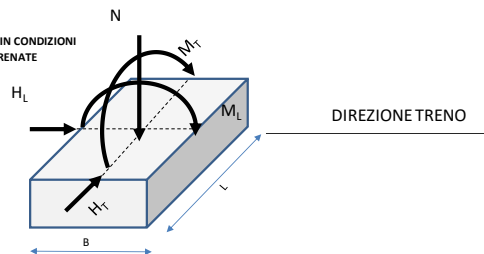
(NB: coefficiente correttivo per rapporto D/B non considerato)

(valore da stabilirsi in base alla profondità di falda)

(0 = Lancellotta ecc., 1 = originale EC7)

si useranno le formule originarie di EC7

VERIFICA IN CONDIZIONI DRENATE



**Eccentricità degli scarichi rispetto a baricentro fondazione**

eccentricità longitudinale eL

0 m + se concorde con i momenti del traliccio

eccentricità trasversale eT

0.1 m + se concorde con i momenti del traliccio

**Coefficienti di spinta di progetto**

coefficiente di spinta attiva statico Ka

0.228

-

coefficiente di spinta attiva sismico Ka,E

0.483

-

coefficiente di spinta passiva statico Kp

4.395

-

coefficiente di spinta passiva sismico Kp,E

3.251

-

coeff. parziale riduttivo della spinta passiva

1.40

-

moltiplicatore della spinta passiva  $\alpha$

0.00

long

0.00 trasv

contributo delle spinte frontali long - taglio

0 kN

statico

0 kN sismico

contributo delle spinte frontali long - momer

0 kNm

statico

0 kNm sismico

contributo delle spinte frontali trasv - taglio

0 kN

statico

0 kN sismico

contributo delle spinte frontali trasv - mome

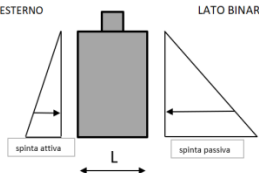
0 kNm

statico

0 kNm sismico

LATO ESTERNO

LATO BINARIO



CALCOLI PRELIMINARI: coefficienti di capacità portante indipendenti dai carichi

$N_{q1} = 48.93$   $B_{q1} = 1$

$N_{q2} = 74.90$   $B_{q2} = 1$

$N_{q3} = 61.35$   $B_{q3} = 1$

**SINTESI RISULTATI**

Capacità portante	$F_{s \text{ min}} =$	4.34	n. Verif. Neg.	0
Scorrimento	$F_{s \text{ min}} =$	8.5	n. Verif. Neg.	0
Ribaltamento	$F_{s \text{ min}} =$	1.20	n. Verif. Neg.	0



TITOLO: **Caso di carico 1 - combinazioni sismiche**

FONDAZIONI A PLINTO

DESIGN ASSUMPTION

piano campagna sostanzialmente orizzontale

angolo d'attrito caratteristico  $\phi'_s$

coesione  $c'$

angolo d'attrito caratteristico  $\phi'_s$  alla base

coesione alla base  $c'$

coefficiente  $\gamma_s$

coefficiente  $\gamma_c$

coefficiente  $\gamma_s$  capacità portante

coefficiente  $\gamma_s$  scorrimento

coefficiente  $\gamma_s$  spinta passiva

angolo d'attrito di design  $\phi'_d$

coesione di design  $c'_d$

coeff. attrito di design  $\mu'_d$

coesione alla base di design

Dimensione fondazione B[m] (LONGITUDINALE)

Dimensione fondazione L[m] (TRASVERSALE)

Profondità da piano campagna D [m]

Altezza plinto [m] Hp

Dimensione baggio b[m] (LONGITUDINALE)

Dimensione maggiore baggio l [m] (TRASVERSALE)

Altezza baggio [m] Hb

Altezza terreno sopra plinto [m] Ht

$q'$  = carico permanente ai lati

$\gamma_s$  = peso specifico medio sopra la fondazione

$\gamma_f$  = peso specifico medio sotto la fondazione

opzione calcolo coeff.  $S_u$  e  $S_v$

opzione calcolo per tenere in conto peso terreno di ricoprimento

Peso specifico medio c.a.

Peso proprio plinto + baggio + terreno sovrastante [kN]

Quota baricentro plinto + baggio + terreno sovrastante vs p.f. [kN]

Coefficiente sismico kh

Coefficiente sismico kv

Azione inerziale orizzontale plinto

Azione inerziale verticale plinto

DA2

38 ° 0.663 rad

0 kPa +

38 ° 0.663 rad

0 kPa +

1.00

2.30

1.10

1.40

38.00 ° 0.663 rad  $\tan(\phi'_d) = 0.78$

0.00 kPa

0.78 kPa

0.00 kPa

2.2 m

2.2 m

2.2 m

2.2 m

0.8 m

0.8 m

0.5 m

0.25 m

44 kPa

20 kN/m<sup>2</sup>

20 kN/m<sup>2</sup>

1

0 (1 si - 0 no)

25 kN/m<sup>2</sup>

274 kN

1.30 m

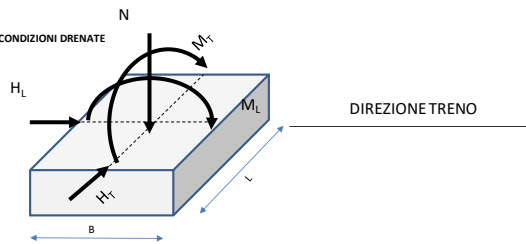
0.231 g

-0.116 g + downward

63.34 kN

-31.67 kN

VERIFICA IN CONDIZIONI DRENATE



(NB: coefficiente correttivo per rapporto D/B non considerato)

(valore da stabilirsi in base alla profondità di falda)

(0 = Lancellotta ecc. 1 = originale EC7)

si useranno le formule originarie di EC7

Eccentricità degli scarichi rispetto a baricentro fondazione

eccentricità longitudinale eL 0 m + se concorde con i momenti del traliccio

eccentricità trasversale eT 0.1 m + se concorde con i momenti del traliccio

Coefficienti di spinta di progetto

coefficiente di spinta attiva statico Ka 0.228 -

coefficiente di spinta attiva sismico Ka,E 0.483 -

coefficiente di spinta passiva statico Kp 4.395 -

coefficiente di spinta passiva sismico Kp,E 3.251 -

coeff. parziale riduttivo della spinta passiva  $\gamma_{re}$  1.40 -

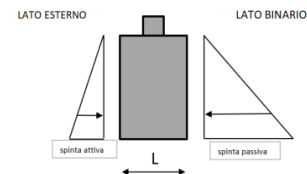
moltiplicatore della spinta passiva  $\alpha$  0.00 long 0.00 trasv

contributo delle spinte frontali long - taglio 0 kN statico 0 kN sismico

contributo delle spinte frontali long - momento 0 kNm statico 0 kNm sismico

contributo delle spinte frontali trasv - taglio 0 kN statico 0 kN sismico

contributo delle spinte frontali trasv - momento 0 kNm statico 0 kNm sismico



CALCOLI PRELIMINARI: coefficienti di capacità portante indipendenti dai carichi

$N_u = 48.93$   $B_{\phi} = 1$

$N_s = 74.90$   $B_{\phi} = 1$

$N_c = 61.35$   $B_{\phi} = 1$

SINTESI RISULTATI

Capacità portante	$F_{s, min} = 12.52$	n. Verif. Neg.	0
Scorrimento	$F_{s, min} = 2.69$	n. Verif. Neg.	0
Ribaltamento	$F_{s, min} = 4.81$	n. Verif. Neg.	0

Le verifiche sono soddisfatte.

GENERAL CONTRACTOR  IRICAV2		ALTA SORVEGLIANZA  ITALFERR GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione		Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 95 di 336

## 12.2 Verifiche di dettaglio

Ribaltamento – verifiche statiche

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
A	314.64	314.64	0.00	10.25	30.69	OK
A	314.64	314.64	0.00	10.22	30.80	OK
A	314.64	314.64	0.00	10.25	30.69	OK
A	314.64	314.64	0.00	10.22	30.80	OK
A	318.54	318.54	0.00	10.61	30.03	OK
A	318.54	318.54	0.00	10.57	30.13	OK
A	318.54	318.54	0.00	10.61	30.03	OK
A	318.54	318.54	0.00	10.57	30.13	OK
A	314.64	314.64	0.00	10.49	30.00	OK
A	314.64	314.64	0.00	10.52	29.90	OK
A	314.64	314.64	0.00	10.49	30.00	OK
A	314.64	314.64	0.00	10.52	29.90	OK
A	318.54	318.54	0.00	10.84	29.38	OK
A	318.54	318.54	0.00	10.88	29.28	OK
A	318.54	318.54	0.00	10.84	29.38	OK
A	318.54	318.54	0.00	10.88	29.28	OK
B AA	314.64	314.64	0.00	97.39	3.23	OK
B AA	314.64	314.64	0.00	97.36	3.23	OK
B AA	314.64	314.64	0.00	97.39	3.23	OK
B AA	314.64	314.64	0.00	97.36	3.23	OK
B AA	318.54	318.54	0.00	97.75	3.26	OK
B AA	318.54	318.54	0.00	97.71	3.26	OK
B AA	318.54	318.54	0.00	97.75	3.26	OK
B AA	318.54	318.54	0.00	97.71	3.26	OK
B AA	314.64	314.64	0.00	97.63	3.22	OK
B AA	314.64	314.64	0.00	97.66	3.22	OK
B AA	314.64	314.64	0.00	97.63	3.22	OK
B AA	314.64	314.64	0.00	97.66	3.22	OK
B AA	318.54	318.54	0.00	97.98	3.25	OK
B AA	318.54	318.54	0.00	98.02	3.25	OK
B AA	318.54	318.54	0.00	97.98	3.25	OK
B AA	318.54	318.54	0.00	98.02	3.25	OK
B WX	314.64	314.64	65.26	8.41	4.82	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WX	314.64	314.64	65.26	8.38	4.82	OK
B WX	314.64	314.64	65.26	8.41	4.82	OK
B WX	314.64	314.64	65.26	8.38	4.82	OK
B WX	318.54	318.54	65.26	8.77	4.88	OK
B WX	318.54	318.54	65.26	8.73	4.88	OK
B WX	318.54	318.54	65.26	8.77	4.88	OK
B WX	318.54	318.54	65.26	8.73	4.88	OK
B WX	314.64	314.64	65.26	8.65	4.82	OK
B WX	314.64	314.64	65.26	8.69	4.82	OK
B WX	314.64	314.64	65.26	8.65	4.82	OK
B WX	314.64	314.64	65.26	8.69	4.82	OK
B WX	318.54	318.54	65.26	9.01	4.88	OK
B WX	318.54	318.54	65.26	9.04	4.88	OK
B WX	318.54	318.54	65.26	9.01	4.88	OK
B WX	318.54	318.54	65.26	9.04	4.88	OK
B WXY	314.64	314.64	45.69	110.08	2.86	OK
B WXY	314.64	314.64	45.69	110.04	2.86	OK
B WXY	314.64	314.64	45.69	110.08	2.86	OK
B WXY	314.64	314.64	45.69	110.04	2.86	OK
B WXY	318.54	318.54	45.69	110.44	2.88	OK
B WXY	318.54	318.54	45.69	110.40	2.89	OK
B WXY	318.54	318.54	45.69	110.44	2.88	OK
B WXY	318.54	318.54	45.69	110.40	2.89	OK
B WXY	314.64	314.64	45.69	110.32	2.85	OK
B WXY	314.64	314.64	45.69	110.35	2.85	OK
B WXY	314.64	314.64	45.69	110.32	2.85	OK
B WXY	314.64	314.64	45.69	110.35	2.85	OK
B WXY	318.54	318.54	45.69	110.67	2.88	OK
B WXY	318.54	318.54	45.69	110.71	2.88	OK
B WXY	318.54	318.54	45.69	110.67	2.88	OK
B WXY	318.54	318.54	45.69	110.71	2.88	OK
B WY	314.64	314.64	0.00	153.65	2.05	OK
B WY	314.64	314.64	0.00	153.62	2.05	OK
B WY	314.64	314.64	0.00	153.65	2.05	OK
B WY	314.64	314.64	0.00	153.62	2.05	OK
B WY	318.54	318.54	0.00	154.01	2.07	OK
B WY	318.54	318.54	0.00	153.97	2.07	OK
B WY	318.54	318.54	0.00	154.01	2.07	OK
B WY	318.54	318.54	0.00	153.97	2.07	OK





Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WY	314.64	314.64	0.00	153.89	2.04	OK
B WY	314.64	314.64	0.00	153.92	2.04	OK
B WY	314.64	314.64	0.00	153.89	2.04	OK
B WY	314.64	314.64	0.00	153.92	2.04	OK
B WY	318.54	318.54	0.00	154.24	2.07	OK
B WY	318.54	318.54	0.00	154.28	2.06	OK
B WY	318.54	318.54	0.00	154.24	2.07	OK
B WY	318.54	318.54	0.00	154.28	2.06	OK
D I	314.64	314.64	0.00	145.35	2.16	OK
D I	318.80	318.80	0.00	145.43	2.19	OK
D I	317.41	317.41	0.00	145.61	2.18	OK
D I	321.57	321.57	0.00	145.68	2.21	OK
D I	318.54	318.54	0.00	145.71	2.19	OK
D I	322.70	322.70	0.00	145.79	2.21	OK
D I	321.32	321.32	0.00	145.96	2.20	OK
D I	325.47	325.47	0.00	146.04	2.23	OK
D I	314.64	314.64	0.00	145.59	2.16	OK
D I	318.80	318.80	0.00	146.27	2.18	OK
D I	317.41	317.41	0.00	145.84	2.18	OK
D I	321.57	321.57	0.00	146.52	2.19	OK
D I	318.54	318.54	0.00	145.94	2.18	OK
D I	322.70	322.70	0.00	146.62	2.20	OK
D I	321.32	321.32	0.00	146.20	2.20	OK
D I	325.47	325.47	0.00	146.87	2.22	OK
D W	314.64	314.64	0.00	236.65	1.33	OK
D W	316.72	316.72	0.00	236.67	1.34	OK
D W	316.02	316.02	0.00	236.77	1.33	OK
D W	318.10	318.10	0.00	236.79	1.34	OK
D W	318.54	318.54	0.00	237.00	1.34	OK
D W	320.62	320.62	0.00	237.02	1.35	OK
D W	319.93	319.93	0.00	237.13	1.35	OK
D W	322.01	322.01	0.00	237.15	1.36	OK
D W	314.64	314.64	0.00	236.88	1.33	OK
D W	316.72	316.72	0.00	237.24	1.34	OK
D W	316.02	316.02	0.00	237.01	1.33	OK
D W	318.10	318.10	0.00	237.37	1.34	OK
D W	318.54	318.54	0.00	237.24	1.34	OK
D W	320.62	320.62	0.00	237.59	1.35	OK
D W	319.93	319.93	0.00	237.36	1.35	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
D W	322.01	322.01	0.00	237.72	1.35	OK
DAA	316.72	316.72	0.00	147.25	2.15	OK
DAA	316.72	316.72	0.00	147.21	2.15	OK
DAA	318.10	318.10	0.00	147.37	2.16	OK
DAA	318.10	318.10	0.00	147.34	2.16	OK
DAA	320.62	320.62	0.00	147.60	2.17	OK
DAA	320.62	320.62	0.00	147.57	2.17	OK
DAA	322.01	322.01	0.00	147.73	2.18	OK
DAA	322.01	322.01	0.00	147.69	2.18	OK
DAA	316.72	316.72	0.00	147.75	2.14	OK
DAA	316.72	316.72	0.00	147.78	2.14	OK
DAA	318.10	318.10	0.00	147.87	2.15	OK
DAA	318.10	318.10	0.00	147.91	2.15	OK
DAA	320.62	320.62	0.00	148.10	2.16	OK
DAA	320.62	320.62	0.00	148.14	2.16	OK
DAA	322.01	322.01	0.00	148.23	2.17	OK
DAA	322.01	322.01	0.00	148.26	2.17	OK
A	283.18	283.18	0.00	10.15	27.91	OK
A	283.18	283.18	0.00	10.12	27.98	OK
A	283.18	283.18	0.00	10.15	27.91	OK
A	283.18	283.18	0.00	10.12	27.98	OK
A	285.78	285.78	0.00	10.38	27.53	OK
A	285.78	285.78	0.00	10.36	27.59	OK
A	285.78	285.78	0.00	10.38	27.53	OK
A	285.78	285.78	0.00	10.36	27.59	OK
A	283.18	283.18	0.00	10.36	27.34	OK
A	283.18	283.18	0.00	10.38	27.28	OK
A	283.18	283.18	0.00	10.36	27.34	OK
A	283.18	283.18	0.00	10.38	27.28	OK
A	285.78	285.78	0.00	10.59	26.97	OK
A	285.78	285.78	0.00	10.62	26.91	OK
A	285.78	285.78	0.00	10.59	26.97	OK
A	285.78	285.78	0.00	10.62	26.91	OK
B AA	283.18	283.18	0.00	97.29	2.91	OK
B AA	283.18	283.18	0.00	97.26	2.91	OK
B AA	283.18	283.18	0.00	97.29	2.91	OK
B AA	283.18	283.18	0.00	97.26	2.91	OK
B AA	285.78	285.78	0.00	97.52	2.93	OK
B AA	285.78	285.78	0.00	97.50	2.93	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B AA	285.78	285.78	0.00	97.52	2.93	OK
B AA	285.78	285.78	0.00	97.50	2.93	OK
B AA	283.18	283.18	0.00	97.50	2.90	OK
B AA	283.18	283.18	0.00	97.52	2.90	OK
B AA	283.18	283.18	0.00	97.50	2.90	OK
B AA	283.18	283.18	0.00	97.52	2.90	OK
B AA	285.78	285.78	0.00	97.74	2.92	OK
B AA	285.78	285.78	0.00	97.76	2.92	OK
B AA	285.78	285.78	0.00	97.74	2.92	OK
B AA	285.78	285.78	0.00	97.76	2.92	OK
B WX	283.18	283.18	65.26	8.31	4.34	OK
B WX	283.18	283.18	65.26	8.28	4.34	OK
B WX	283.18	283.18	65.26	8.31	4.34	OK
B WX	283.18	283.18	65.26	8.28	4.34	OK
B WX	285.78	285.78	65.26	8.55	4.38	OK
B WX	285.78	285.78	65.26	8.52	4.38	OK
B WX	285.78	285.78	65.26	8.55	4.38	OK
B WX	285.78	285.78	65.26	8.52	4.38	OK
B WX	283.18	283.18	65.26	8.52	4.34	OK
B WX	283.18	283.18	65.26	8.54	4.34	OK
B WX	283.18	283.18	65.26	8.52	4.34	OK
B WX	283.18	283.18	65.26	8.54	4.34	OK
B WX	285.78	285.78	65.26	8.76	4.38	OK
B WX	285.78	285.78	65.26	8.78	4.38	OK
B WX	285.78	285.78	65.26	8.76	4.38	OK
B WX	285.78	285.78	65.26	8.78	4.38	OK
B WXY	283.18	283.18	45.69	109.97	2.57	OK
B WXY	283.18	283.18	45.69	109.95	2.58	OK
B WXY	283.18	283.18	45.69	109.97	2.57	OK
B WXY	283.18	283.18	45.69	109.95	2.58	OK
B WXY	285.78	285.78	45.69	110.21	2.59	OK
B WXY	285.78	285.78	45.69	110.19	2.59	OK
B WXY	285.78	285.78	45.69	110.21	2.59	OK
B WXY	285.78	285.78	45.69	110.19	2.59	OK
B WXY	283.18	283.18	45.69	110.19	2.57	OK
B WXY	283.18	283.18	45.69	110.21	2.57	OK
B WXY	283.18	283.18	45.69	110.19	2.57	OK
B WXY	283.18	283.18	45.69	110.19	2.57	OK
B WXY	283.18	283.18	45.69	110.21	2.57	OK
B WXY	285.78	285.78	45.69	110.42	2.59	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WXY	285.78	285.78	45.69	110.45	2.59	OK
B WXY	285.78	285.78	45.69	110.42	2.59	OK
B WXY	285.78	285.78	45.69	110.45	2.59	OK
B WY	283.18	283.18	0.00	153.54	1.84	OK
B WY	283.18	283.18	0.00	153.52	1.84	OK
B WY	283.18	283.18	0.00	153.54	1.84	OK
B WY	283.18	283.18	0.00	153.52	1.84	OK
B WY	285.78	285.78	0.00	153.78	1.86	OK
B WY	285.78	285.78	0.00	153.76	1.86	OK
B WY	285.78	285.78	0.00	153.78	1.86	OK
B WY	285.78	285.78	0.00	153.76	1.86	OK
B WY	283.18	283.18	0.00	153.76	1.84	OK
B WY	283.18	283.18	0.00	153.78	1.84	OK
B WY	283.18	283.18	0.00	153.76	1.84	OK
B WY	283.18	283.18	0.00	153.78	1.84	OK
B WY	285.78	285.78	0.00	153.99	1.86	OK
B WY	285.78	285.78	0.00	154.02	1.86	OK
B WY	285.78	285.78	0.00	153.99	1.86	OK
B WY	285.78	285.78	0.00	154.02	1.86	OK
D I	283.18	283.18	0.00	145.25	1.95	OK
D I	287.33	287.33	0.00	145.34	1.98	OK
D I	285.95	285.95	0.00	145.50	1.97	OK
D I	290.11	290.11	0.00	145.59	1.99	OK
D I	285.78	285.78	0.00	145.48	1.96	OK
D I	289.94	289.94	0.00	145.57	1.99	OK
D I	288.55	288.55	0.00	145.74	1.98	OK
D I	292.71	292.71	0.00	145.83	2.01	OK
D I	283.18	283.18	0.00	145.46	1.95	OK
D I	287.33	287.33	0.00	146.13	1.97	OK
D I	285.95	285.95	0.00	145.71	1.96	OK
D I	290.11	290.11	0.00	146.38	1.98	OK
D I	285.78	285.78	0.00	145.70	1.96	OK
D I	289.94	289.94	0.00	146.36	1.98	OK
D I	288.55	288.55	0.00	145.95	1.98	OK
D I	292.71	292.71	0.00	146.61	2.00	OK
D W	283.18	283.18	0.00	236.54	1.20	OK
D W	285.25	285.25	0.00	236.57	1.21	OK
D W	284.56	284.56	0.00	236.67	1.20	OK
D W	286.64	286.64	0.00	236.70	1.21	OK

GENERAL CONTRACTOR  <b>IRICAV2</b>		ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione		Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 101 di 336

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
D W	285.78	285.78	0.00	236.78	1.21	OK
D W	287.86	287.86	0.00	236.81	1.22	OK
D W	287.16	287.16	0.00	236.90	1.21	OK
D W	289.24	289.24	0.00	236.94	1.22	OK
D W	283.18	283.18	0.00	236.75	1.20	OK
D W	285.25	285.25	0.00	237.10	1.20	OK
D W	284.56	284.56	0.00	236.88	1.20	OK
D W	286.64	286.64	0.00	237.22	1.21	OK
D W	285.78	285.78	0.00	236.99	1.21	OK
D W	287.86	287.86	0.00	237.33	1.21	OK
D W	287.16	287.16	0.00	237.11	1.21	OK
D W	289.24	289.24	0.00	237.46	1.22	OK
DAA	285.25	285.25	0.00	147.14	1.94	OK
DAA	285.25	285.25	0.00	147.12	1.94	OK
DAA	286.64	286.64	0.00	147.27	1.95	OK
DAA	286.64	286.64	0.00	147.24	1.95	OK
DAA	287.86	287.86	0.00	147.38	1.95	OK
DAA	287.86	287.86	0.00	147.35	1.95	OK
DAA	289.24	289.24	0.00	147.50	1.96	OK
DAA	289.24	289.24	0.00	147.48	1.96	OK
DAA	285.25	285.25	0.00	147.62	1.93	OK
DAA	285.25	285.25	0.00	147.64	1.93	OK
DAA	286.64	286.64	0.00	147.74	1.94	OK
DAA	286.64	286.64	0.00	147.77	1.94	OK
DAA	287.86	287.86	0.00	147.85	1.95	OK
DAA	287.86	287.86	0.00	147.88	1.95	OK
DAA	289.24	289.24	0.00	147.98	1.95	OK

Scorrimento – verifiche statiche

Azioni a base plinto	VERIFICA A SCORRIMENTO			
	COMB	$R_d = (N \cdot m_d + (B \cdot L) \cdot C'_{dbase}) / \gamma_R$	$E_d$	Rd/Ed
		kN	kN	
A	203.2	1.5	131.58	OK
A	203.2	1.5	131.58	OK



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
A	203.2	1.5	131.58	OK	
A	203.2	1.5	131.58	OK	
A	205.7	1.5	133.21	OK	
A	205.7	1.5	133.21	OK	
A	205.7	1.5	133.21	OK	
A	205.7	1.5	133.21	OK	
A	203.2	1.5	131.58	OK	
A	203.2	1.5	131.58	OK	
A	203.2	1.5	131.58	OK	
A	203.2	1.5	131.58	OK	
A	205.7	1.5	133.21	OK	
A	205.7	1.5	133.21	OK	
A	205.7	1.5	133.21	OK	
A	205.7	1.5	133.21	OK	
B AA	203.2	9.9	20.48	OK	
B AA	203.2	9.9	20.48	OK	
B AA	203.2	9.9	20.48	OK	
B AA	203.2	9.9	20.48	OK	
B AA	205.7	9.9	20.73	OK	
B AA	205.7	9.9	20.73	OK	
B AA	205.7	9.9	20.73	OK	
B AA	205.7	9.9	20.73	OK	
B AA	203.2	9.9	20.48	OK	
B AA	203.2	9.9	20.48	OK	
B AA	203.2	9.9	20.48	OK	
B AA	203.2	9.9	20.48	OK	
B AA	205.7	9.9	20.73	OK	
B AA	205.7	9.9	20.73	OK	
B AA	205.7	9.9	20.73	OK	
B AA	205.7	9.9	20.73	OK	
B WX	203.2	7.3	27.73	OK	
B WX	203.2	7.3	27.73	OK	
B WX	203.2	7.3	27.73	OK	
B WX	203.2	7.3	27.73	OK	
B WX	205.7	7.3	28.07	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
B WX	205.7	7.3	28.07	OK	
B WX	205.7	7.3	28.07	OK	
B WX	205.7	7.3	28.07	OK	
B WX	203.2	7.3	27.73	OK	
B WX	203.2	7.3	27.73	OK	
B WX	203.2	7.3	27.73	OK	
B WX	203.2	7.3	27.73	OK	
B WX	205.7	7.3	28.07	OK	
B WX	205.7	7.3	28.07	OK	
B WX	205.7	7.3	28.07	OK	
B WXY	203.2	12.1	16.77	OK	
B WXY	203.2	12.1	16.77	OK	
B WXY	203.2	12.1	16.77	OK	
B WXY	205.7	12.1	16.98	OK	
B WXY	205.7	12.1	16.98	OK	
B WXY	205.7	12.1	16.98	OK	
B WXY	205.7	12.1	16.98	OK	
B WXY	203.2	12.1	16.77	OK	
B WXY	203.2	12.1	16.77	OK	
B WXY	203.2	12.1	16.77	OK	
B WXY	205.7	12.1	16.98	OK	
B WXY	205.7	12.1	16.98	OK	
B WXY	205.7	12.1	16.98	OK	
B WXY	205.7	12.1	16.98	OK	
B WY	203.2	15.2	13.37	OK	
B WY	203.2	15.2	13.37	OK	
B WY	203.2	15.2	13.37	OK	
B WY	203.2	15.2	13.37	OK	
B WY	205.7	15.2	13.53	OK	
B WY	205.7	15.2	13.53	OK	
B WY	205.7	15.2	13.53	OK	
B WY	205.7	15.2	13.53	OK	
B WY	203.2	15.2	13.37	OK	
B WY	203.2	15.2	13.37	OK	
B WY	203.2	15.2	13.37	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
B WY	203.2	15.2	13.37	OK	
B WY	205.7	15.2	13.53	OK	
B WY	205.7	15.2	13.53	OK	
B WY	205.7	15.2	13.53	OK	
B WY	205.7	15.2	13.53	OK	
D I	203.2	13.4	15.19	OK	
D I	205.8	13.4	15.39	OK	
D I	204.9	13.4	15.33	OK	
D I	207.6	13.4	15.53	OK	
D I	205.7	13.4	15.38	OK	
D I	208.4	13.4	15.58	OK	
D I	207.5	13.4	15.51	OK	
D I	210.2	13.4	15.71	OK	
D I	203.2	13.4	15.19	OK	
D I	205.8	13.4	15.39	OK	
D I	204.9	13.4	15.33	OK	
D I	207.6	13.4	15.53	OK	
D I	205.7	13.4	15.38	OK	
D I	208.4	13.4	15.58	OK	
D I	207.5	13.4	15.51	OK	
D I	210.2	13.4	15.71	OK	
D W	203.2	21.5	9.46	OK	
D W	204.5	21.5	9.53	OK	
D W	204.1	21.5	9.51	OK	
D W	205.4	21.5	9.57	OK	
D W	205.7	21.5	9.58	OK	
D W	207.0	21.5	9.64	OK	
D W	206.6	21.5	9.62	OK	
D W	207.9	21.5	9.69	OK	
D W	203.2	21.5	9.46	OK	
D W	204.5	21.5	9.53	OK	
D W	204.1	21.5	9.51	OK	
D W	205.4	21.5	9.57	OK	
D W	205.7	21.5	9.58	OK	
D W	207.0	21.5	9.64	OK	
D W	206.6	21.5	9.62	OK	
D W	207.9	21.5	9.69	OK	
DAA	204.5	13.7	14.95	OK	





Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
DAA	204.5	13.7	14.95	OK	
DAA	205.4	13.7	15.01	OK	
DAA	205.4	13.7	15.01	OK	
DAA	207.0	13.7	15.13	OK	
DAA	207.0	13.7	15.13	OK	
DAA	207.9	13.7	15.20	OK	
DAA	207.9	13.7	15.20	OK	
DAA	204.5	13.7	14.95	OK	
DAA	204.5	13.7	14.95	OK	
DAA	205.4	13.7	15.01	OK	
DAA	205.4	13.7	15.01	OK	
DAA	207.0	13.7	15.13	OK	
DAA	207.0	13.7	15.13	OK	
DAA	207.9	13.7	15.20	OK	
DAA	207.9	13.7	15.20	OK	
A	182.8	1.5	118.42	OK	
A	182.8	1.5	118.42	OK	
A	182.8	1.5	118.42	OK	
A	182.8	1.5	118.42	OK	
A	184.5	1.5	119.51	OK	
A	184.5	1.5	119.51	OK	
A	184.5	1.5	119.51	OK	
A	184.5	1.5	119.51	OK	
A	182.8	1.5	118.42	OK	
A	182.8	1.5	118.42	OK	
A	182.8	1.5	118.42	OK	
A	182.8	1.5	118.42	OK	
A	184.5	1.5	119.51	OK	
A	184.5	1.5	119.51	OK	
A	184.5	1.5	119.51	OK	
A	184.5	1.5	119.51	OK	
B AA	182.8	9.9	18.43	OK	
B AA	182.8	9.9	18.43	OK	
B AA	182.8	9.9	18.43	OK	
B AA	182.8	9.9	18.43	OK	
B AA	184.5	9.9	18.60	OK	
B AA	184.5	9.9	18.60	OK	
B AA	184.5	9.9	18.60	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
B AA	184.5	9.9	18.60	OK	
B AA	182.8	9.9	18.43	OK	
B AA	182.8	9.9	18.43	OK	
B AA	182.8	9.9	18.43	OK	
B AA	182.8	9.9	18.43	OK	
B AA	184.5	9.9	18.60	OK	
B AA	184.5	9.9	18.60	OK	
B AA	184.5	9.9	18.60	OK	
B AA	184.5	9.9	18.60	OK	
B WX	182.8	7.3	24.96	OK	
B WX	182.8	7.3	24.96	OK	
B WX	182.8	7.3	24.96	OK	
B WX	182.8	7.3	24.96	OK	
B WX	184.5	7.3	25.19	OK	
B WX	184.5	7.3	25.19	OK	
B WX	184.5	7.3	25.19	OK	
B WX	184.5	7.3	25.19	OK	
B WX	182.8	7.3	24.96	OK	
B WX	182.8	7.3	24.96	OK	
B WX	182.8	7.3	24.96	OK	
B WX	182.8	7.3	24.96	OK	
B WX	184.5	7.3	25.19	OK	
B WX	184.5	7.3	25.19	OK	
B WX	184.5	7.3	25.19	OK	
B WXY	182.8	12.1	15.09	OK	
B WXY	182.8	12.1	15.09	OK	
B WXY	182.8	12.1	15.09	OK	
B WXY	182.8	12.1	15.09	OK	
B WXY	184.5	12.1	15.23	OK	
B WXY	184.5	12.1	15.23	OK	
B WXY	184.5	12.1	15.23	OK	
B WXY	184.5	12.1	15.23	OK	
B WXY	182.8	12.1	15.09	OK	
B WXY	182.8	12.1	15.09	OK	
B WXY	182.8	12.1	15.09	OK	
B WXY	182.8	12.1	15.09	OK	
B WXY	184.5	12.1	15.23	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
B WXY	184.5	12.1	15.23	OK	
B WXY	184.5	12.1	15.23	OK	
B WXY	184.5	12.1	15.23	OK	
B WY	182.8	15.2	12.03	OK	
B WY	182.8	15.2	12.03	OK	
B WY	182.8	15.2	12.03	OK	
B WY	182.8	15.2	12.03	OK	
B WY	184.5	15.2	12.14	OK	
B WY	184.5	15.2	12.14	OK	
B WY	184.5	15.2	12.14	OK	
B WY	184.5	15.2	12.14	OK	
B WY	182.8	15.2	12.03	OK	
B WY	182.8	15.2	12.03	OK	
B WY	182.8	15.2	12.03	OK	
B WY	184.5	15.2	12.14	OK	
B WY	184.5	15.2	12.14	OK	
B WY	184.5	15.2	12.14	OK	
B WY	184.5	15.2	12.14	OK	
D I	182.8	13.4	13.67	OK	
D I	185.5	13.4	13.87	OK	
D I	184.6	13.4	13.81	OK	
D I	187.3	13.4	14.01	OK	
D I	184.5	13.4	13.80	OK	
D I	187.2	13.4	14.00	OK	
D I	186.3	13.4	13.93	OK	
D I	189.0	13.4	14.13	OK	
D I	182.8	13.4	13.67	OK	
D I	185.5	13.4	13.87	OK	
D I	184.6	13.4	13.81	OK	
D I	187.3	13.4	14.01	OK	
D I	184.5	13.4	13.80	OK	
D I	187.2	13.4	14.00	OK	
D I	186.3	13.4	13.93	OK	
D I	189.0	13.4	14.13	OK	
D W	182.8	21.5	8.52	OK	
D W	184.2	21.5	8.58	OK	
D W	183.7	21.5	8.56	OK	

GENERAL CONTRACTOR  IRICAV2	ALTA SORVEGLIANZA  GRUPPO FERROVIE DELLO STATO ITALIANE
Relazione di calcolo pali di alimentazione	Progetto IN17    Lotto 10    Codifica Documento E I2 CL OC 00 0 0 010    Rev. A    Foglio 108 di 336

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
D W	185.1	21.5	8.62	OK	
D W	184.5	21.5	8.60	OK	
D W	185.9	21.5	8.66	OK	
D W	185.4	21.5	8.64	OK	
D W	186.8	21.5	8.70	OK	
D W	182.8	21.5	8.52	OK	
D W	184.2	21.5	8.58	OK	
D W	183.7	21.5	8.56	OK	
D W	185.1	21.5	8.62	OK	
D W	184.5	21.5	8.60	OK	
D W	185.9	21.5	8.66	OK	
D W	185.4	21.5	8.64	OK	
D W	186.8	21.5	8.70	OK	
DAA	184.2	13.7	13.46	OK	
DAA	184.2	13.7	13.46	OK	
DAA	185.1	13.7	13.53	OK	
DAA	185.1	13.7	13.53	OK	
DAA	185.9	13.7	13.58	OK	
DAA	185.9	13.7	13.58	OK	
DAA	186.8	13.7	13.65	OK	
DAA	186.8	13.7	13.65	OK	
DAA	184.2	13.7	13.46	OK	
DAA	184.2	13.7	13.46	OK	
DAA	185.1	13.7	13.53	OK	
DAA	185.1	13.7	13.53	OK	
DAA	185.9	13.7	13.58	OK	
DAA	185.9	13.7	13.58	OK	
DAA	186.8	13.7	13.65	OK	

Capacità portante – verifiche statiche

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	COMB	$R_d$	$E_d$	$R_d/E_d$	
		$q_{u,d}$ kPa	$q_{E,d} = N / (B' \cdot L')$		
A	$(3408. + 1154. +) / 2.3 =$	1983.2	61.09	32.46	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	COMB	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>
		q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')	
			kPa		
A	(3408. + 1154. +) / 2.3 =	1983.2	61.08	32.47	OK
A	(3408. + 1154. +) / 2.3 =	1983.2	61.09	32.46	OK
A	(3408. + 1154. +) / 2.3 =	1983.2	61.08	32.47	OK
A	(3407. + 1154. +) / 2.3 =	1983.1	61.89	32.04	OK
A	(3407. + 1154. +) / 2.3 =	1983.2	61.89	32.05	OK
A	(3407. + 1154. +) / 2.3 =	1983.1	61.89	32.04	OK
A	(3407. + 1154. +) / 2.3 =	1983.2	61.89	32.05	OK
A	(3407. + 1154. +) / 2.3 =	1982.9	61.14	32.43	OK
A	(3406. + 1154. +) / 2.3 =	1982.9	61.14	32.43	OK
A	(3407. + 1154. +) / 2.3 =	1982.9	61.14	32.43	OK
A	(3406. + 1154. +) / 2.3 =	1982.9	61.14	32.43	OK
A	(3406. + 1155. +) / 2.3 =	1982.9	61.94	32.01	OK
A	(3406. + 1155. +) / 2.3 =	1982.8	61.95	32.01	OK
A	(3406. + 1155. +) / 2.3 =	1982.9	61.94	32.01	OK
A	(3406. + 1155. +) / 2.3 =	1982.8	61.95	32.01	OK
B AA	(2901. + 1192. +) / 2.3 =	1779.5	85.59	20.79	OK
B AA	(2901. + 1192. +) / 2.3 =	1779.6	85.58	20.79	OK
B AA	(2901. + 1192. +) / 2.3 =	1779.5	85.59	20.79	OK
B AA	(2901. + 1192. +) / 2.3 =	1779.6	85.58	20.79	OK
B AA	(2906. + 1192. +) / 2.3 =	1782.0	86.32	20.64	OK
B AA	(2906. + 1192. +) / 2.3 =	1782.0	86.31	20.65	OK
B AA	(2906. + 1192. +) / 2.3 =	1782.0	86.32	20.64	OK
B AA	(2906. + 1192. +) / 2.3 =	1782.0	86.31	20.65	OK
B AA	(2900. + 1193. +) / 2.3 =	1779.2	85.69	20.76	OK
B AA	(2900. + 1193. +) / 2.3 =	1779.2	85.70	20.76	OK
B AA	(2900. + 1193. +) / 2.3 =	1779.2	85.69	20.76	OK
B AA	(2900. + 1193. +) / 2.3 =	1779.2	85.70	20.76	OK
B AA	(2905. + 1193. +) / 2.3 =	1781.7	86.41	20.62	OK
B AA	(2905. + 1193. +) / 2.3 =	1781.7	86.43	20.61	OK
B AA	(2905. + 1193. +) / 2.3 =	1781.7	86.41	20.62	OK
B AA	(2905. + 1193. +) / 2.3 =	1781.7	86.43	20.61	OK
B WX	(3105. + 924. +) / 2.3 =	1751.8	76.61	22.86	OK
B WX	(3105. + 924. +) / 2.3 =	1751.7	76.61	22.87	OK
B WX	(3105. + 924. +) / 2.3 =	1751.8	76.61	22.86	OK
B WX	(3105. + 924. +) / 2.3 =	1751.7	76.61	22.87	OK
B WX	(3111. + 926. +) / 2.3 =	1755.4	77.38	22.69	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
B WX	(3111. + 926. +) / 2.3 =	1755.3	77.37	22.69	OK
B WX	(3111. + 926. +) / 2.3 =	1755.4	77.38	22.69	OK
B WX	(3111. + 926. +) / 2.3 =	1755.3	77.37	22.69	OK
B WX	(3106. + 924. +) / 2.3 =	1752.0	76.67	22.85	OK
B WX	(3106. + 924. +) / 2.3 =	1752.0	76.68	22.85	OK
B WX	(3106. + 924. +) / 2.3 =	1752.0	76.67	22.85	OK
B WX	(3106. + 924. +) / 2.3 =	1752.0	76.68	22.85	OK
B WX	(3112. + 926. +) / 2.3 =	1755.6	77.44	22.67	OK
B WX	(3112. + 926. +) / 2.3 =	1755.7	77.45	22.67	OK
B WX	(3112. + 926. +) / 2.3 =	1755.6	77.44	22.67	OK
B WX	(3112. + 926. +) / 2.3 =	1755.7	77.45	22.67	OK
B WXY	(2957. + 974. +) / 2.3 =	1709.0	106.34	16.07	OK
B WXY	(2957. + 974. +) / 2.3 =	1709.0	106.32	16.07	OK
B WXY	(2957. + 974. +) / 2.3 =	1709.0	106.34	16.07	OK
B WXY	(2957. + 974. +) / 2.3 =	1709.0	106.32	16.07	OK
B WXY	(2962. + 976. +) / 2.3 =	1712.4	106.92	16.02	OK
B WXY	(2962. + 976. +) / 2.3 =	1712.4	106.90	16.02	OK
B WXY	(2962. + 976. +) / 2.3 =	1712.4	106.92	16.02	OK
B WXY	(2962. + 976. +) / 2.3 =	1712.4	106.90	16.02	OK
B WXY	(2956. + 974. +) / 2.3 =	1708.7	106.46	16.05	OK
B WXY	(2956. + 974. +) / 2.3 =	1708.6	106.48	16.05	OK
B WXY	(2956. + 974. +) / 2.3 =	1708.7	106.46	16.05	OK
B WXY	(2956. + 974. +) / 2.3 =	1708.6	106.48	16.05	OK
B WXY	(2961. + 977. +) / 2.3 =	1712.0	107.04	15.99	OK
B WXY	(2961. + 977. +) / 2.3 =	1712.0	107.06	15.99	OK
B WXY	(2961. + 977. +) / 2.3 =	1712.0	107.04	15.99	OK
B WXY	(2961. + 977. +) / 2.3 =	1712.0	107.06	15.99	OK
B WY	(2586. + 1206. +) / 2.3 =	1648.7	115.50	14.27	OK
B WY	(2586. + 1206. +) / 2.3 =	1648.7	115.48	14.28	OK
B WY	(2586. + 1206. +) / 2.3 =	1648.7	115.50	14.27	OK
B WY	(2586. + 1206. +) / 2.3 =	1648.7	115.48	14.28	OK
B WY	(2595. + 1206. +) / 2.3 =	1652.8	115.83	14.27	OK
B WY	(2595. + 1206. +) / 2.3 =	1652.8	115.81	14.27	OK
B WY	(2595. + 1206. +) / 2.3 =	1652.8	115.83	14.27	OK
B WY	(2595. + 1206. +) / 2.3 =	1652.8	115.81	14.27	OK
B WY	(2585. + 1207. +) / 2.3 =	1648.4	115.67	14.25	OK
B WY	(2585. + 1207. +) / 2.3 =	1648.4	115.70	14.25	OK
B WY	(2585. + 1207. +) / 2.3 =	1648.4	115.67	14.25	OK
B WY	(2585. + 1207. +) / 2.3 =	1648.4	115.70	14.25	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
B WY	(2594. + 1207. +) / 2.3 =	1652.5	116.00	14.25	OK
B WY	(2594. + 1207. +) / 2.3 =	1652.5	116.03	14.24	OK
B WY	(2594. + 1207. +) / 2.3 =	1652.5	116.00	14.25	OK
B WY	(2594. + 1207. +) / 2.3 =	1652.5	116.03	14.24	OK
D I	(2648. + 1217. +) / 2.3 =	1680.7	109.84	15.30	OK
D I	(2659. + 1217. +) / 2.3 =	1685.0	110.11	15.30	OK
D I	(2655. + 1217. +) / 2.3 =	1683.3	110.15	15.28	OK
D I	(2665. + 1217. +) / 2.3 =	1687.6	110.43	15.28	OK
D I	(2657. + 1217. +) / 2.3 =	1684.4	110.27	15.27	OK
D I	(2667. + 1217. +) / 2.3 =	1688.6	110.56	15.27	OK
D I	(2663. + 1217. +) / 2.3 =	1687.0	110.59	15.25	OK
D I	(2673. + 1217. +) / 2.3 =	1691.1	110.89	15.25	OK
D I	(2648. + 1217. +) / 2.3 =	1680.4	110.00	15.28	OK
D I	(2655. + 1218. +) / 2.3 =	1684.0	110.64	15.22	OK
D I	(2654. + 1217. +) / 2.3 =	1683.1	110.30	15.26	OK
D I	(2661. + 1218. +) / 2.3 =	1686.6	110.96	15.20	OK
D I	(2656. + 1218. +) / 2.3 =	1684.1	110.42	15.25	OK
D I	(2664. + 1218. +) / 2.3 =	1687.6	111.09	15.19	OK
D I	(2662. + 1218. +) / 2.3 =	1686.7	110.74	15.23	OK
D I	(2669. + 1218. +) / 2.3 =	1690.1	111.41	15.17	OK
D W	(2156. + 1226. +) / 2.3 =	1470.5	238.42	6.17	OK
D W	(2165. + 1226. +) / 2.3 =	1474.1	235.37	6.26	OK
D W	(2161. + 1226. +) / 2.3 =	1472.8	236.70	6.22	OK
D W	(2169. + 1226. +) / 2.3 =	1476.4	233.75	6.32	OK
D W	(2170. + 1227. +) / 2.3 =	1476.9	233.73	6.32	OK
D W	(2178. + 1227. +) / 2.3 =	1480.5	230.96	6.41	OK
D W	(2175. + 1227. +) / 2.3 =	1479.1	232.18	6.37	OK
D W	(2183. + 1227. +) / 2.3 =	1482.7	229.51	6.46	OK
D W	(2155. + 1226. +) / 2.3 =	1470.2	239.14	6.15	OK
D W	(2162. + 1227. +) / 2.3 =	1473.4	237.06	6.22	OK
D W	(2160. + 1226. +) / 2.3 =	1472.5	237.40	6.20	OK
D W	(2167. + 1227. +) / 2.3 =	1475.7	235.41	6.27	OK
D W	(2169. + 1227. +) / 2.3 =	1476.6	234.41	6.30	OK
D W	(2176. + 1227. +) / 2.3 =	1479.8	232.55	6.36	OK
D W	(2174. + 1227. +) / 2.3 =	1478.9	232.84	6.35	OK
D W	(2181. + 1227. +) / 2.3 =	1482.0	231.06	6.41	OK
DAA	(2641. + 1216. +) / 2.3 =	1676.9	111.18	15.08	OK
DAA	(2641. + 1216. +) / 2.3 =	1677.0	111.15	15.09	OK
DAA	(2644. + 1216. +) / 2.3 =	1678.3	111.32	15.08	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	COMB	q <sub>u,d</sub> kPa	q <sub>E,d</sub> = N / (B'·L')		
		kPa			
DAA	(2644. + 1216. +) / 2.3 =	1678.3	111.30	15.08	OK
DAA	(2650. + 1216. +) / 2.3 =	1680.7	111.60	15.06	OK
DAA	(2650. + 1216. +) / 2.3 =	1680.7	111.58	15.06	OK
DAA	(2653. + 1216. +) / 2.3 =	1682.0	111.75	15.05	OK
DAA	(2653. + 1216. +) / 2.3 =	1682.0	111.73	15.05	OK
DAA	(2639. + 1216. +) / 2.3 =	1676.3	111.51	15.03	OK
DAA	(2639. + 1216. +) / 2.3 =	1676.3	111.53	15.03	OK
DAA	(2642. + 1216. +) / 2.3 =	1677.7	111.65	15.03	OK
DAA	(2642. + 1216. +) / 2.3 =	1677.6	111.68	15.02	OK
DAA	(2648. + 1216. +) / 2.3 =	1680.1	111.92	15.01	OK
DAA	(2648. + 1217. +) / 2.3 =	1680.0	111.94	15.01	OK
DAA	(2651. + 1217. +) / 2.3 =	1681.4	112.07	15.00	OK
DAA	(2651. + 1217. +) / 2.3 =	1681.3	112.10	15.00	OK
A	(3400. + 1154. +) / 2.3 =	1979.9	55.17	35.89	OK
A	(3400. + 1154. +) / 2.3 =	1979.9	55.16	35.89	OK
A	(3400. + 1154. +) / 2.3 =	1979.9	55.17	35.89	OK
A	(3400. + 1154. +) / 2.3 =	1979.9	55.16	35.89	OK
A	(3400. + 1154. +) / 2.3 =	1979.9	55.70	35.54	OK
A	(3400. + 1154. +) / 2.3 =	1979.9	55.70	35.55	OK
A	(3400. + 1154. +) / 2.3 =	1979.9	55.70	35.54	OK
A	(3400. + 1154. +) / 2.3 =	1979.9	55.70	35.55	OK
A	(3399. + 1154. +) / 2.3 =	1979.6	55.21	35.86	OK
A	(3399. + 1154. +) / 2.3 =	1979.6	55.21	35.85	OK
A	(3399. + 1154. +) / 2.3 =	1979.6	55.21	35.86	OK
A	(3399. + 1154. +) / 2.3 =	1979.6	55.21	35.85	OK
A	(3399. + 1154. +) / 2.3 =	1979.6	55.74	35.51	OK
A	(3399. + 1154. +) / 2.3 =	1979.6	55.75	35.51	OK
A	(3399. + 1154. +) / 2.3 =	1979.6	55.74	35.51	OK
A	(3399. + 1154. +) / 2.3 =	1979.6	55.75	35.51	OK
B AA	(2839. + 1195. +) / 2.3 =	1753.5	81.03	21.64	OK
B AA	(2839. + 1195. +) / 2.3 =	1753.6	81.02	21.64	OK
B AA	(2839. + 1195. +) / 2.3 =	1753.5	81.03	21.64	OK
B AA	(2839. + 1195. +) / 2.3 =	1753.6	81.02	21.64	OK
B AA	(2843. + 1195. +) / 2.3 =	1755.6	81.48	21.55	OK
B AA	(2843. + 1195. +) / 2.3 =	1755.6	81.47	21.55	OK
B AA	(2843. + 1195. +) / 2.3 =	1755.6	81.48	21.55	OK
B AA	(2843. + 1195. +) / 2.3 =	1755.6	81.47	21.55	OK
B AA	(2838. + 1195. +) / 2.3 =	1753.2	81.12	21.61	OK
B AA	(2837. + 1195. +) / 2.3 =	1753.2	81.13	21.61	OK





Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
B AA	(2838. + 1195. +) / 2.3 =	1753.2	81.12	21.61	OK
B AA	(2837. + 1195. +) / 2.3 =	1753.2	81.13	21.61	OK
B AA	(2842. + 1195. +) / 2.3 =	1755.3	81.58	21.52	OK
B AA	(2842. + 1195. +) / 2.3 =	1755.3	81.59	21.51	OK
B AA	(2842. + 1195. +) / 2.3 =	1755.3	81.58	21.52	OK
B AA	(2842. + 1195. +) / 2.3 =	1755.3	81.59	21.51	OK
B WX	(3063. + 898. +) / 2.3 =	1722.2	71.21	24.19	OK
B WX	(3063. + 898. +) / 2.3 =	1722.2	71.20	24.19	OK
B WX	(3063. + 898. +) / 2.3 =	1722.2	71.21	24.19	OK
B WX	(3063. + 898. +) / 2.3 =	1722.2	71.20	24.19	OK
B WX	(3068. + 900. +) / 2.3 =	1725.2	71.71	24.06	OK
B WX	(3068. + 900. +) / 2.3 =	1725.1	71.70	24.06	OK
B WX	(3068. + 900. +) / 2.3 =	1725.2	71.71	24.06	OK
B WX	(3068. + 900. +) / 2.3 =	1725.1	71.70	24.06	OK
B WX	(3064. + 898. +) / 2.3 =	1722.4	71.26	24.17	OK
B WX	(3064. + 897. +) / 2.3 =	1722.5	71.27	24.17	OK
B WX	(3064. + 898. +) / 2.3 =	1722.4	71.26	24.17	OK
B WX	(3064. + 897. +) / 2.3 =	1722.5	71.27	24.17	OK
B WX	(3069. + 900. +) / 2.3 =	1725.4	71.76	24.04	OK
B WX	(3069. + 900. +) / 2.3 =	1725.4	71.77	24.04	OK
B WX	(3069. + 900. +) / 2.3 =	1725.4	71.76	24.04	OK
B WX	(3069. + 900. +) / 2.3 =	1725.4	71.77	24.04	OK
B WXY	(2895. + 955. +) / 2.3 =	1673.8	103.69	16.14	OK
B WXY	(2895. + 955. +) / 2.3 =	1673.8	103.67	16.15	OK
B WXY	(2895. + 955. +) / 2.3 =	1673.8	103.69	16.14	OK
B WXY	(2895. + 955. +) / 2.3 =	1673.8	103.67	16.15	OK
B WXY	(2900. + 957. +) / 2.3 =	1676.7	104.00	16.12	OK
B WXY	(2900. + 957. +) / 2.3 =	1676.7	103.98	16.12	OK
B WXY	(2900. + 957. +) / 2.3 =	1676.7	104.00	16.12	OK
B WXY	(2900. + 957. +) / 2.3 =	1676.7	103.98	16.12	OK
B WXY	(2894. + 955. +) / 2.3 =	1673.4	103.82	16.12	OK
B WXY	(2894. + 955. +) / 2.3 =	1673.4	103.83	16.12	OK
B WXY	(2894. + 955. +) / 2.3 =	1673.4	103.82	16.12	OK
B WXY	(2894. + 955. +) / 2.3 =	1673.4	103.83	16.12	OK
B WXY	(2898. + 957. +) / 2.3 =	1676.3	104.12	16.10	OK
B WXY	(2898. + 957. +) / 2.3 =	1676.3	104.14	16.10	OK
B WXY	(2898. + 957. +) / 2.3 =	1676.3	104.12	16.10	OK
B WXY	(2898. + 957. +) / 2.3 =	1676.3	104.14	16.10	OK
B WY	(2491. + 1207. +) / 2.3 =	1607.8	116.19	13.84	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	COMB	q <sub>u,d</sub> kPa	q <sub>E,d</sub> = N / (B'·L')		
			kPa		
B WY	(2491. + 1207. +) / 2.3 =	1607.8	116.17	13.84	OK
B WY	(2491. + 1207. +) / 2.3 =	1607.8	116.19	13.84	OK
B WY	(2491. + 1207. +) / 2.3 =	1607.8	116.17	13.84	OK
B WY	(2498. + 1207. +) / 2.3 =	1611.2	116.21	13.86	OK
B WY	(2498. + 1207. +) / 2.3 =	1611.3	116.19	13.87	OK
B WY	(2498. + 1207. +) / 2.3 =	1611.2	116.21	13.86	OK
B WY	(2498. + 1207. +) / 2.3 =	1611.3	116.19	13.87	OK
B WY	(2490. + 1207. +) / 2.3 =	1607.5	116.38	13.81	OK
B WY	(2490. + 1207. +) / 2.3 =	1607.5	116.40	13.81	OK
B WY	(2490. + 1207. +) / 2.3 =	1607.5	116.38	13.81	OK
B WY	(2490. + 1207. +) / 2.3 =	1607.5	116.40	13.81	OK
B WY	(2497. + 1208. +) / 2.3 =	1610.9	116.40	13.84	OK
B WY	(2497. + 1208. +) / 2.3 =	1610.9	116.42	13.84	OK
B WY	(2497. + 1208. +) / 2.3 =	1610.9	116.40	13.84	OK
B WY	(2497. + 1208. +) / 2.3 =	1610.9	116.42	13.84	OK
D I	(2560. + 1220. +) / 2.3 =	1643.4	109.20	15.05	OK
D I	(2572. + 1220. +) / 2.3 =	1648.7	109.21	15.10	OK
D I	(2567. + 1220. +) / 2.3 =	1646.7	109.35	15.06	OK
D I	(2580. + 1220. +) / 2.3 =	1651.9	109.38	15.10	OK
D I	(2567. + 1220. +) / 2.3 =	1646.5	109.34	15.06	OK
D I	(2579. + 1220. +) / 2.3 =	1651.7	109.37	15.10	OK
D I	(2574. + 1220. +) / 2.3 =	1649.8	109.51	15.07	OK
D I	(2586. + 1220. +) / 2.3 =	1654.9	109.56	15.10	OK
D I	(2559. + 1220. +) / 2.3 =	1643.1	109.37	15.02	OK
D I	(2569. + 1221. +) / 2.3 =	1647.7	109.82	15.00	OK
D I	(2566. + 1220. +) / 2.3 =	1646.4	109.52	15.03	OK
D I	(2576. + 1221. +) / 2.3 =	1650.9	109.99	15.01	OK
D I	(2566. + 1220. +) / 2.3 =	1646.2	109.51	15.03	OK
D I	(2576. + 1221. +) / 2.3 =	1650.7	109.97	15.01	OK
D I	(2573. + 1221. +) / 2.3 =	1649.5	109.67	15.04	OK
D I	(2583. + 1221. +) / 2.3 =	1653.8	110.15	15.01	OK
D W	(2017. + 1221. +) / 2.3 =	1408.0	322.97	4.36	OK
D W	(2027. + 1222. +) / 2.3 =	1412.5	313.95	4.50	OK
D W	(2023. + 1222. +) / 2.3 =	1410.9	317.56	4.44	OK
D W	(2033. + 1222. +) / 2.3 =	1415.4	309.01	4.58	OK
D W	(2029. + 1222. +) / 2.3 =	1413.4	313.04	4.51	OK
D W	(2039. + 1222. +) / 2.3 =	1417.8	304.89	4.65	OK
D W	(2035. + 1222. +) / 2.3 =	1416.2	308.16	4.60	OK
D W	(2045. + 1223. +) / 2.3 =	1420.6	300.41	4.73	OK

GENERAL CONTRACTOR  <b>IRICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione	Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 115 di 336

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
D W	(2016. + 1221. +) / 2.3 =	1407.6	324.44	4.34	OK
D W	(2025. + 1222. +) / 2.3 =	1411.8	317.37	4.45	OK
D W	(2022. + 1222. +) / 2.3 =	1410.5	318.97	4.42	OK
D W	(2031. + 1223. +) / 2.3 =	1414.6	312.29	4.53	OK
D W	(2028. + 1222. +) / 2.3 =	1413.1	314.41	4.49	OK
D W	(2036. + 1223. +) / 2.3 =	1417.1	308.05	4.60	OK
D W	(2034. + 1223. +) / 2.3 =	1415.9	309.47	4.58	OK
D W	(2042. + 1223. +) / 2.3 =	1419.9	303.46	4.68	OK
DAA	(2552. + 1218. +) / 2.3 =	1639.5	110.66	14.82	OK
DAA	(2553. + 1218. +) / 2.3 =	1639.5	110.64	14.82	OK
DAA	(2556. + 1218. +) / 2.3 =	1641.2	110.73	14.82	OK
DAA	(2556. + 1218. +) / 2.3 =	1641.2	110.71	14.82	OK
DAA	(2560. + 1219. +) / 2.3 =	1642.6	110.79	14.83	OK
DAA	(2560. + 1218. +) / 2.3 =	1642.7	110.77	14.83	OK
DAA	(2563. + 1219. +) / 2.3 =	1644.3	110.87	14.83	OK
DAA	(2563. + 1219. +) / 2.3 =	1644.3	110.85	14.83	OK
DAA	(2550. + 1219. +) / 2.3 =	1638.9	111.04	14.76	OK
DAA	(2550. + 1219. +) / 2.3 =	1638.8	111.06	14.76	OK
DAA	(2554. + 1219. +) / 2.3 =	1640.5	111.11	14.77	OK
DAA	(2554. + 1219. +) / 2.3 =	1640.5	111.13	14.76	OK
DAA	(2557. + 1219. +) / 2.3 =	1642.0	111.17	14.77	OK
DAA	(2557. + 1219. +) / 2.3 =	1642.0	111.19	14.77	OK
DAA	(2561. + 1219. +) / 2.3 =	1643.6	111.24	14.78	OK

#### Ribaltamento – verifiche sismiche

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
Comb1	304.19	304.19	18.59	63.03	4.83	OK
Comb2	304.19	304.19	18.59	63.03	4.83	OK
Comb3	304.19	304.19	18.59	63.27	4.81	OK
Comb4	304.19	304.19	18.59	63.27	4.81	OK
Comb5	304.19	304.19	61.97	19.66	4.91	OK
Comb6	304.19	304.19	61.97	19.66	4.91	OK

GENERAL CONTRACTOR  <b>IRICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE
Relazione di calcolo pali di alimentazione	Progetto IN17    Lotto 10    Codifica Documento E I2 CL OC 00 0 0 010    Rev. A    Foglio 116 di 336

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
Comb7	304.19	304.19	61.97	19.89	4.91	OK
Comb8	304.19	304.19	61.97	19.89	4.91	OK

#### Scorrimento – verifiche sismiche

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$		Ed	Rd/Ed	
	kN		kN		
COMB					
Comb1	196.4		73.1	2.69	OK
Comb2	196.4		73.1	2.69	OK
Comb3	196.4		73.1	2.69	OK
Comb4	196.4		73.1	2.69	OK
Comb5	196.4		73.1	2.69	OK
Comb6	196.4		73.1	2.69	OK
Comb7	196.4		73.1	2.69	OK
Comb8	196.4		73.1	2.69	OK

#### Capacità portante – verifiche sismiche

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	Rd		Ed	Rd/Ed	
	$q_{u,d} \text{ kPa}$		$q_{E,d} = N / (B' \cdot L')$		
COMB			kPa		
Comb1	$(1807. + 469. +) / 2.3 =$	989.9	76.76	12.90	OK
Comb2	$(1807. + 469. +) / 2.3 =$	989.9	76.76	12.90	OK
Comb3	$(1807. + 470. +) / 2.3 =$	989.6	76.84	12.88	OK
Comb4	$(1807. + 470. +) / 2.3 =$	989.6	76.84	12.88	OK
Comb5	$(1813. + 397. +) / 2.3 =$	961.1	76.71	12.53	OK
Comb6	$(1813. + 397. +) / 2.3 =$	961.1	76.71	12.53	OK
Comb7	$(1814. + 397. +) / 2.3 =$	961.3	76.77	12.52	OK
Comb8	$(1814. + 397. +) / 2.3 =$	961.3	76.77	12.52	OK

Le verifiche sono soddisfatte.



### 12.3 Sintesi risultati LC2

TITOLO: **Caso di carico 2 - combinazioni statiche**

FONDAZIONI A PLINTO  
DESIGN ASSUMPTION

piano campagna sostanzialmente orizzontale

angolo d'attrito caratteristico  $\phi'_k$

coesione  $c'$

angolo d'attrito caratteristico  $\phi'_k$  alla base

coesione alla base  $c'$

coefficiente  $\gamma_a$

coefficiente  $\gamma_c'$

coefficiente  $\gamma_a$  capacità portante

coefficiente  $\gamma_a$  scorrimento

coefficiente  $\gamma_a$  spinta passiva

angolo d'attrito di design  $\phi'_{d}$

coesione di design  $c'_{d}$

coeff. attrito di design  $\mu'_{d}$

coesione alla base di design

Dimensione fondazione B[m] (LONGITUDINALE)

Dimensione fondazione L [m] (TRASVERSALE)

Profondità da piano campagna D [m]

Altezza plinto [m]  $H_p$

Dimensione baggio  $b$ [m] (LONGITUDINALE)

Dimensione maggiore baggio  $l$  [m] (TRASVERSALE)

Altezza baggio [m]  $H_b$

Altezza terreno sopraplinto [m]  $H_t$

$q'$  = carico permanente ai lati

$\gamma$  = peso specifico medio sopra la fondazione

$\gamma_f$  = peso specifico medio sotto la fondazione

opzione calcolo coeff.  $S_{\alpha}$  e  $S_{\gamma}$

opzione calcolo per tenere in conto peso terreno di ricoprimento

Peso specifico medio c.a.

Peso proprio plinto + baggio + terreno sovrastante [kN]

Quota baricentro plinto + baggio + terreno sovrastante vs p.f. [kN]

Coefficiente sismico  $k_h$

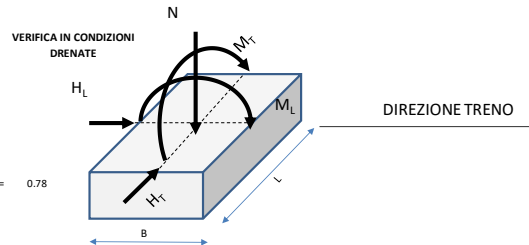
Coefficiente sismico  $k_v$

Azione inerziale orizzontale plinto

Azione inerziale verticale plinto

DA2

38	+	0.663	rad	
0				kPa
38	+	0.663	rad	
0				kPa
1.00				
1.00				
2.30				
1.10				
1.40				
38.00	+	0.663	rad	$\tan(\phi'_{d}) = 0.78$
0.00				kPa
0.78				
0.00				kPa
2.2				m
2.2				m
2.2				m
2.2				m
0.8				m
0.8				m
0.5				m
0.25				m
44				kPa
20				kN/m <sup>3</sup>
20				kN/m <sup>3</sup>
1				
0				(1 si - 0 no)
25				kN/m <sup>3</sup>
274				kN
1.30				m
0.000				g
0.000				g
0.00				kN
0.00				kN



(NB: coefficiente correttivo per rapporto D/B non considerato)

(valore da stabilirsi in base alla profondità di falda)

(0 = Lancillotta ecc., 1 = originale EC7)

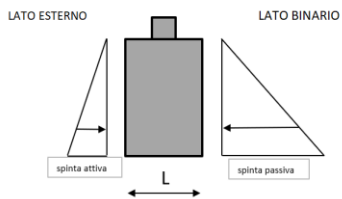
si useranno le formule originarie di EC7

#### Eccentricità degli scarichi rispetto a baricentro fondazione

eL	0	m	+ se concorde con i momenti del traliccio
eT	0.1	m	+ se concorde con i momenti del traliccio

#### Coefficienti di spinta di progetto

coefficiente di spinta attiva statico $K_a$	0.228	-
coefficiente di spinta attiva sismico $K_{a,E}$	0.483	-
coefficiente di spinta passiva statico $K_p$	4.395	-
coefficiente di spinta passiva sismico $K_{p,E}$	3.251	-
coeff. parziale riduttivo della spinta passiva	1.40	-
moltiplicatore della spinta passiva $\alpha$	0.00	long 0.49 trasv
contributo delle spinte frontali long - taglio	0	kN statico 0 kN sismico
contributo delle spinte frontali long - momer	0	kNm statico 0 kNm sismico
contributo delle spinte frontali trasv - taglio	-139.5	kN statico 0 kN sismico
contributo delle spinte frontali trasv - mome	-37.2	kNm statico 0 kNm sismico



CALCOLI PRELIMINARI: coefficienti di capacità portante indipendenti dai carichi

$N_a = 48.93$	$g_a = 1$
$N_b = 74.90$	$g_b = 1$
$N_c = 61.35$	$g_c = 1$

SINTESI RISULTATI			
Capacità portante	$F_{s \min} = 1.99$	n. Verif. Neg.	0
Scorrimento	$F_{s \min} = 1.6$	n. Verif. Neg.	0
Ribaltamento	$F_{s \min} = 1.20$	n. Verif. Neg.	0



**TITOLO:** Caso di carico 2 - combinazioni sismiche

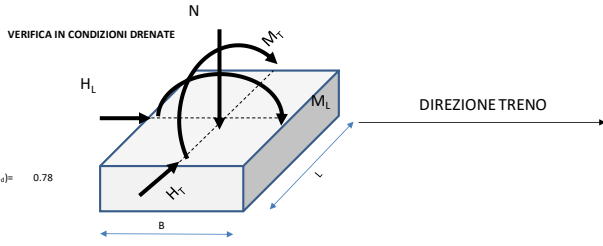
**FONDAZIONI A PLINTO**  
**DESIGN ASSUMPTION**

**piano campagna sostanzialmente orizzontale**

angolo d'attrito caratteristico $\phi'_s$	38	*	0.663	rad
coesione $c'$	0	kPa		
angolo d'attrito caratteristico $\phi'_s$ alla base	38	*	0.663	rad
coesione alla base $c'$	0	kPa		
coefficiente $\gamma_s$	1.00			
coefficiente $\gamma'_s$	1.00			
coefficiente $\gamma_s$ capacità portante	2.30			
coefficiente $\gamma_s$ scorrimento	1.10			
coefficiente $\gamma_s$ spinta passiva	1.40			
angolo d'attrito di design $\phi'_d$	38.00	*	0.663	rad
coesione di design $c'_d$	0.00	kPa		
coeff. attrito di design $\mu'_d$	0.78			
coesione alla base di design	0.00	kPa		
Dimensione fondazione B[m] (LONGITUDINALE)	2.2	m		
Dimensione fondazione L[m] (TRASVERSALE)	2.2	m		
Profondità da piano campagna D [m]	2.2	m		
Altezza plinto [m] Hp	2.2	m		
Dimensione baggiolo b[m] (LONGITUDINALE)	0.8	m		
Dimensione maggiore baggiolo l [m] (TRASVERSALE)	0.8	m		
Altezza baggiolo [m] Hb	0.5	m		
Altezza terreno sopra plinto [m] Ht	0.25	m		
$q'$ = carico permanente ai lati	44	kPa		
$\gamma$ = peso specifico medio sopra la fondazione	20	kN/m <sup>3</sup>		
$\gamma'$ = peso specifico medio sotto la fondazione	20	kN/m <sup>3</sup>		
opzione calcolo coeff. $S_u$ e $S_v$	1			
opzione calcolo per tenere in conto peso terreno di ricoprimento	0	(1 si - 0 no)		
Peso specifico medio c.a.	25	kN/m <sup>3</sup>		
Peso proprio plinto + baggiolo + terreno sovrastante [kN]	274	kN		
Quota baricentro plinto + baggiolo + terreno sovrastante vs p.f. [kN]	1.30	m		
Coefficiente sismico kh	0.231	g		
Coefficiente sismico kv	-0.116	g		+ downward
Azione inerziale orizzontale plinto	63.34	kN		
Azione inerziale verticale plinto	-31.67	kN		

(NB: coefficiente correttivo per rapporto D/B non considerato)

(valore da stabilirsi in base alla profondità di falda)  
(0 = Lancellotta ecc, 1 = originale EC7)  
si useranno le formule originarie di EC7

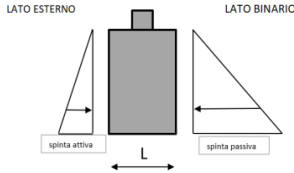


**Eccentricità degli scarichi rispetto a baricentro fondazione**

eccentricità longitudinale eL	0	m	+ se concorde con i momenti del traliccio
eccentricità trasversale eT	0.1	m	+ se concorde con i momenti del traliccio

**Coefficienti di spinta di progetto**

coefficiente di spinta attiva statico Ka	0.228	-	
coefficiente di spinta attiva sismico Ka,E	0.483	-	
coefficiente di spinta passiva statico Kp	4.395	-	
coefficiente di spinta passiva sismico Kp,E	3.251	-	
coeff. parziale riduttivo della spinta passiva $\gamma_{re}$	1.40	-	
moltiplicatore della spinta passiva $\alpha$	0.00	long	0.00 trasv
contributo delle spinte frontali long - taglio	0	kN	statico 0 kN sismico
contributo delle spinte frontali long - momento	0	kNm	statico 0 kNm sismico
contributo delle spinte frontali trasv - taglio	0	kN	statico 0 kN sismico
contributo delle spinte frontali trasv - momento	0	kNm	statico 0 kNm sismico



**CALCOLI PRELIMINARI:** coefficienti di capacità portante indipendenti dai carichi

$N_u = 48.93$	$B_{\phi} = 1$
$N_v = 74.90$	$B_{\gamma} = 1$
$N_c = 61.35$	$B_c = 1$

SINTESI RISULTATI			
Capacità portante	$F_{s, min} = 8.61$	n. Verif. Neg.	0
Scorrimento	$F_{s, min} = 2.00$	n. Verif. Neg.	0
Ribaltamento	$F_{s, min} = 2.76$	n. Verif. Neg.	0

Le verifiche sono soddisfatte.

GENERAL CONTRACTOR  <b>IFICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE
Relazione di calcolo pali di alimentazione	Progetto IN17    Lotto 10    Codifica Documento E I2 CL OC 00 0 0 010    Rev. A    Foglio 119 di 336

## 12.4 Verifiche di dettaglio

Ribaltamento – verifiche statiche

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
A	316.61	316.61	0.00	110.93	2.85	OK
A	316.61	316.61	0.00	110.93	2.85	OK
A	316.61	316.61	0.00	140.44	2.25	OK
A	316.61	316.61	0.00	140.44	2.25	OK
A	321.10	321.10	0.00	111.34	2.88	OK
A	321.10	321.10	0.00	111.34	2.88	OK
A	321.10	321.10	0.00	140.85	2.28	OK
A	321.10	321.10	0.00	140.85	2.28	OK
A	316.61	316.61	0.00	88.48	3.58	OK
A	316.61	316.61	0.00	88.48	3.58	OK
A	316.61	316.61	0.00	117.98	2.68	OK
A	316.61	316.61	0.00	117.98	2.68	OK
A	321.10	321.10	0.00	88.89	3.61	OK
A	321.10	321.10	0.00	88.89	3.61	OK
A	321.10	321.10	0.00	118.39	2.71	OK
A	321.10	321.10	0.00	118.39	2.71	OK
B AA	316.61	316.61	0.00	165.17	1.92	OK
B AA	316.61	316.61	0.00	165.17	1.92	OK
B AA	316.61	316.61	0.00	182.78	1.73	OK
B AA	316.61	316.61	0.00	182.78	1.73	OK
B AA	321.10	321.10	0.00	165.58	1.94	OK
B AA	321.10	321.10	0.00	165.58	1.94	OK
B AA	321.10	321.10	0.00	183.19	1.75	OK
B AA	321.10	321.10	0.00	183.19	1.75	OK
B AA	316.61	316.61	0.00	47.73	6.63	OK
B AA	316.61	316.61	0.00	47.73	6.63	OK
B AA	316.61	316.61	0.00	30.11	10.51	OK
B AA	316.61	316.61	0.00	30.11	10.51	OK
B AA	321.10	321.10	0.00	48.14	6.67	OK
B AA	321.10	321.10	0.00	48.14	6.67	OK
B AA	321.10	321.10	0.00	30.52	10.52	OK
B AA	321.10	321.10	0.00	30.52	10.52	OK
B WX	316.61	316.61	73.74	69.07	4.29	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WX	316.61	316.61	73.74	69.07	4.29	OK
B WX	316.61	316.61	73.74	86.68	3.65	OK
B WX	316.61	316.61	73.74	86.68	3.65	OK
B WX	321.10	321.10	73.74	69.47	4.35	OK
B WX	321.10	321.10	73.74	69.47	4.35	OK
B WX	321.10	321.10	73.74	87.09	3.69	OK
B WX	321.10	321.10	73.74	87.09	3.69	OK
B WX	316.61	316.61	73.74	51.10	4.29	OK
B WX	316.61	316.61	73.74	51.10	4.29	OK
B WX	316.61	316.61	73.74	68.72	4.29	OK
B WX	316.61	316.61	73.74	68.72	4.29	OK
B WX	321.10	321.10	73.74	51.51	4.35	OK
B WX	321.10	321.10	73.74	51.51	4.35	OK
B WX	321.10	321.10	73.74	69.12	4.35	OK
B WX	321.10	321.10	73.74	69.12	4.35	OK
B WXY	316.61	316.61	51.62	178.57	1.77	OK
B WXY	316.61	316.61	51.62	178.57	1.77	OK
B WXY	316.61	316.61	51.62	196.18	1.61	OK
B WXY	316.61	316.61	51.62	196.18	1.61	OK
B WXY	321.10	321.10	51.62	178.97	1.79	OK
B WXY	321.10	321.10	51.62	178.97	1.79	OK
B WXY	321.10	321.10	51.62	196.59	1.63	OK
B WXY	321.10	321.10	51.62	196.59	1.63	OK
B WXY	316.61	316.61	51.62	61.13	5.18	OK
B WXY	316.61	316.61	51.62	61.13	5.18	OK
B WXY	316.61	316.61	51.62	43.51	6.13	OK
B WXY	316.61	316.61	51.62	43.51	6.13	OK
B WXY	321.10	321.10	51.62	61.53	5.22	OK
B WXY	321.10	321.10	51.62	61.53	5.22	OK
B WXY	321.10	321.10	51.62	43.92	6.22	OK
B WXY	321.10	321.10	51.62	43.92	6.22	OK
B WY	316.61	316.61	0.00	225.49	1.40	OK
B WY	316.61	316.61	0.00	225.49	1.40	OK
B WY	316.61	316.61	0.00	243.11	1.30	OK
B WY	316.61	316.61	0.00	243.11	1.30	OK
B WY	321.10	321.10	0.00	225.90	1.42	OK
B WY	321.10	321.10	0.00	225.90	1.42	OK
B WY	321.10	321.10	0.00	243.52	1.32	OK
B WY	321.10	321.10	0.00	243.52	1.32	OK





Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WY	316.61	316.61	0.00	108.05	2.93	OK
B WY	316.61	316.61	0.00	108.05	2.93	OK
B WY	316.61	316.61	0.00	90.44	3.50	OK
B WY	316.61	316.61	0.00	90.44	3.50	OK
B WY	321.10	321.10	0.00	108.46	2.96	OK
B WY	321.10	321.10	0.00	108.46	2.96	OK
B WY	321.10	321.10	0.00	90.85	3.53	OK
B WY	321.10	321.10	0.00	90.85	3.53	OK
D I	316.61	316.61	0.00	229.00	1.38	OK
D I	320.42	320.42	0.00	229.35	1.40	OK
D I	319.15	319.15	0.00	253.22	1.26	OK
D I	322.96	322.96	0.00	253.56	1.27	OK
D I	321.10	321.10	0.00	229.41	1.40	OK
D I	324.92	324.92	0.00	229.75	1.41	OK
D I	323.65	323.65	0.00	253.63	1.28	OK
D I	327.46	327.46	0.00	253.97	1.29	OK
D I	316.61	316.61	0.00	70.70	4.48	OK
D I	320.42	320.42	0.00	71.05	4.51	OK
D I	319.15	319.15	0.00	46.94	6.80	OK
D I	322.96	322.96	0.00	47.29	6.83	OK
D I	321.10	321.10	0.00	71.11	4.52	OK
D I	324.92	324.92	0.00	71.46	4.55	OK
D I	323.65	323.65	0.00	47.35	6.83	OK
D I	327.46	327.46	0.00	47.70	6.86	OK
D W	316.61	316.61	0.00	219.69	1.44	OK
D W	318.51	318.51	0.00	219.86	1.45	OK
D W	317.88	317.88	0.00	243.67	1.30	OK
D W	319.78	319.78	0.00	243.85	1.31	OK
D W	321.10	321.10	0.00	220.10	1.46	OK
D W	323.01	323.01	0.00	220.27	1.47	OK
D W	322.38	322.38	0.00	244.08	1.32	OK
D W	324.28	324.28	0.00	244.25	1.33	OK
D W	316.61	316.61	0.00	163.70	1.93	OK
D W	318.51	318.51	0.00	163.88	1.94	OK
D W	317.88	317.88	0.00	139.95	2.27	OK
D W	319.78	319.78	0.00	140.13	2.28	OK
D W	321.10	321.10	0.00	164.11	1.96	OK
D W	323.01	323.01	0.00	164.29	1.97	OK
D W	322.38	322.38	0.00	140.36	2.30	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
D W	324.28	324.28	0.00	140.54	2.31	OK
DAA	318.51	318.51	0.00	231.42	1.38	OK
DAA	318.51	318.51	0.00	231.42	1.38	OK
DAA	319.78	319.78	0.00	255.40	1.25	OK
DAA	319.78	319.78	0.00	255.40	1.25	OK
DAA	323.01	323.01	0.00	231.83	1.39	OK
DAA	323.01	323.01	0.00	231.83	1.39	OK
DAA	324.28	324.28	0.00	255.81	1.27	OK
DAA	324.28	324.28	0.00	255.81	1.27	OK
DAA	318.51	318.51	0.00	73.12	4.36	OK
DAA	318.51	318.51	0.00	73.12	4.36	OK
DAA	319.78	319.78	0.00	49.37	6.48	OK
DAA	319.78	319.78	0.00	49.37	6.48	OK
DAA	323.01	323.01	0.00	73.53	4.39	OK
DAA	323.01	323.01	0.00	73.53	4.39	OK
DAA	324.28	324.28	0.00	49.78	6.51	OK
DAA	324.28	324.28	0.00	49.78	6.51	OK
A	284.95	284.95	0.00	100.96	2.82	OK
A	284.95	284.95	0.00	100.96	2.82	OK
A	284.95	284.95	0.00	120.63	2.36	OK
A	284.95	284.95	0.00	120.63	2.36	OK
A	287.95	287.95	0.00	101.24	2.84	OK
A	287.95	287.95	0.00	101.24	2.84	OK
A	287.95	287.95	0.00	120.90	2.38	OK
A	287.95	287.95	0.00	120.90	2.38	OK
A	284.95	284.95	0.00	78.51	3.63	OK
A	284.95	284.95	0.00	78.51	3.63	OK
A	284.95	284.95	0.00	98.18	2.90	OK
A	284.95	284.95	0.00	98.18	2.90	OK
A	287.95	287.95	0.00	78.78	3.66	OK
A	287.95	287.95	0.00	78.78	3.66	OK
A	287.95	287.95	0.00	98.45	2.92	OK
A	287.95	287.95	0.00	98.45	2.92	OK
B AA	284.95	284.95	0.00	159.16	1.79	OK
B AA	284.95	284.95	0.00	159.16	1.79	OK
B AA	284.95	284.95	0.00	170.90	1.67	OK
B AA	284.95	284.95	0.00	170.90	1.67	OK
B AA	287.95	287.95	0.00	159.43	1.81	OK
B AA	287.95	287.95	0.00	159.43	1.81	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B AA	287.95	287.95	0.00	171.18	1.68	OK
B AA	287.95	287.95	0.00	171.18	1.68	OK
B AA	284.95	284.95	0.00	53.46	5.33	OK
B AA	284.95	284.95	0.00	53.46	5.33	OK
B AA	284.95	284.95	0.00	41.72	6.83	OK
B AA	284.95	284.95	0.00	41.72	6.83	OK
B AA	287.95	287.95	0.00	53.74	5.36	OK
B AA	287.95	287.95	0.00	53.74	5.36	OK
B AA	287.95	287.95	0.00	41.99	6.86	OK
B AA	287.95	287.95	0.00	41.99	6.86	OK
B WX	284.95	284.95	73.74	63.06	3.86	OK
B WX	284.95	284.95	73.74	63.06	3.86	OK
B WX	284.95	284.95	73.74	74.80	3.81	OK
B WX	284.95	284.95	73.74	74.80	3.81	OK
B WX	287.95	287.95	73.74	63.33	3.91	OK
B WX	287.95	287.95	73.74	63.33	3.91	OK
B WX	287.95	287.95	73.74	75.07	3.84	OK
B WX	287.95	287.95	73.74	75.07	3.84	OK
B WX	284.95	284.95	73.74	45.09	3.86	OK
B WX	284.95	284.95	73.74	45.09	3.86	OK
B WX	284.95	284.95	73.74	56.84	3.86	OK
B WX	284.95	284.95	73.74	56.84	3.86	OK
B WX	287.95	287.95	73.74	45.36	3.91	OK
B WX	287.95	287.95	73.74	45.36	3.91	OK
B WX	287.95	287.95	73.74	57.11	3.91	OK
B WX	287.95	287.95	73.74	57.11	3.91	OK
B WXY	284.95	284.95	51.62	172.56	1.65	OK
B WXY	284.95	284.95	51.62	172.56	1.65	OK
B WXY	284.95	284.95	51.62	184.30	1.55	OK
B WXY	284.95	284.95	51.62	184.30	1.55	OK
B WXY	287.95	287.95	51.62	172.83	1.67	OK
B WXY	287.95	287.95	51.62	172.83	1.67	OK
B WXY	287.95	287.95	51.62	184.57	1.56	OK
B WXY	287.95	287.95	51.62	184.57	1.56	OK
B WXY	284.95	284.95	51.62	66.86	4.26	OK
B WXY	284.95	284.95	51.62	66.86	4.26	OK
B WXY	284.95	284.95	51.62	55.12	5.17	OK
B WXY	284.95	284.95	51.62	55.12	5.17	OK
B WXY	287.95	287.95	51.62	67.13	4.29	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WXY	287.95	287.95	51.62	67.13	4.29	OK
B WXY	287.95	287.95	51.62	55.39	5.20	OK
B WXY	287.95	287.95	51.62	55.39	5.20	OK
B WY	284.95	284.95	0.00	219.49	1.30	OK
B WY	284.95	284.95	0.00	219.49	1.30	OK
B WY	284.95	284.95	0.00	231.23	1.23	OK
B WY	284.95	284.95	0.00	231.23	1.23	OK
B WY	287.95	287.95	0.00	219.76	1.31	OK
B WY	287.95	287.95	0.00	219.76	1.31	OK
B WY	287.95	287.95	0.00	231.50	1.24	OK
B WY	287.95	287.95	0.00	231.50	1.24	OK
B WY	284.95	284.95	0.00	113.79	2.50	OK
B WY	284.95	284.95	0.00	113.79	2.50	OK
B WY	284.95	284.95	0.00	102.05	2.79	OK
B WY	284.95	284.95	0.00	102.05	2.79	OK
B WY	287.95	287.95	0.00	114.06	2.52	OK
B WY	287.95	287.95	0.00	114.06	2.52	OK
B WY	287.95	287.95	0.00	102.32	2.81	OK
B WY	287.95	287.95	0.00	102.32	2.81	OK
D I	284.95	284.95	0.00	220.95	1.29	OK
D I	288.76	288.76	0.00	221.29	1.30	OK
D I	287.49	287.49	0.00	237.25	1.21	OK
D I	291.30	291.30	0.00	237.60	1.23	OK
D I	287.95	287.95	0.00	221.22	1.30	OK
D I	291.76	291.76	0.00	221.57	1.32	OK
D I	290.49	290.49	0.00	237.52	1.22	OK
D I	294.30	294.30	0.00	237.87	1.24	OK
D I	284.95	284.95	0.00	78.48	3.63	OK
D I	288.76	288.76	0.00	78.83	3.66	OK
D I	287.49	287.49	0.00	62.64	4.59	OK
D I	291.30	291.30	0.00	62.98	4.62	OK
D I	287.95	287.95	0.00	78.75	3.66	OK
D I	291.76	291.76	0.00	79.10	3.69	OK
D I	290.49	290.49	0.00	62.91	4.62	OK
D I	294.30	294.30	0.00	63.26	4.65	OK
D W	284.95	284.95	0.00	211.64	1.35	OK
D W	286.85	286.85	0.00	211.81	1.35	OK
D W	286.22	286.22	0.00	227.71	1.26	OK
D W	288.12	288.12	0.00	227.88	1.26	OK

GENERAL CONTRACTOR  <b>IRICAV2</b>		ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione		Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 125 di 336

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
D W	287.95	287.95	0.00	211.91	1.36	OK
D W	289.85	289.85	0.00	212.09	1.37	OK
D W	289.22	289.22	0.00	227.98	1.27	OK
D W	291.12	291.12	0.00	228.15	1.28	OK
D W	284.95	284.95	0.00	171.48	1.66	OK
D W	286.85	286.85	0.00	171.66	1.67	OK
D W	286.22	286.22	0.00	155.65	1.84	OK
D W	288.12	288.12	0.00	155.82	1.85	OK
D W	287.95	287.95	0.00	171.76	1.68	OK
D W	289.85	289.85	0.00	171.93	1.69	OK
D W	289.22	289.22	0.00	155.92	1.85	OK
D W	291.12	291.12	0.00	156.09	1.87	OK
DAA	286.85	286.85	0.00	223.37	1.28	OK
DAA	286.85	286.85	0.00	223.37	1.28	OK
DAA	288.12	288.12	0.00	239.43	1.20	OK
DAA	288.12	288.12	0.00	239.43	1.20	OK
DAA	289.85	289.85	0.00	223.64	1.30	OK
DAA	289.85	289.85	0.00	223.64	1.30	OK
DAA	291.12	291.12	0.00	239.71	1.21	OK
DAA	291.12	291.12	0.00	239.71	1.21	OK
DAA	286.85	286.85	0.00	80.90	3.55	OK
DAA	286.85	286.85	0.00	80.90	3.55	OK
DAA	288.12	288.12	0.00	65.06	4.43	OK
DAA	288.12	288.12	0.00	65.06	4.43	OK
DAA	289.85	289.85	0.00	81.17	3.57	OK
DAA	289.85	289.85	0.00	81.17	3.57	OK
DAA	291.12	291.12	0.00	65.34	4.46	OK

Scorrimento – verifiche statiche

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	$R_d = (N \cdot m_d + (B \cdot L) \cdot C'_{dbase}) / \gamma_R$		Ed	Rd/Ed	
	kN				
COMB					
A	204.4		9.1	22.48	OK
A	204.4		9.1	22.48	OK



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
A	204.4	11.3	18.16	OK	
A	204.4	11.3	18.16	OK	
A	207.3	9.1	22.80	OK	
A	207.3	9.1	22.80	OK	
A	207.3	11.3	18.42	OK	
A	207.3	11.3	18.42	OK	
A	204.4	5.3	38.43	OK	
A	204.4	5.3	38.43	OK	
A	204.4	7.5	27.33	OK	
A	204.4	7.5	27.33	OK	
A	207.3	5.3	38.98	OK	
A	207.3	5.3	38.98	OK	
A	207.3	7.5	27.72	OK	
A	207.3	7.5	27.72	OK	
B AA	204.4	15.4	13.26	OK	
B AA	204.4	15.4	13.26	OK	
B AA	204.4	16.7	12.25	OK	
B AA	204.4	16.7	12.25	OK	
B AA	207.3	15.4	13.45	OK	
B AA	207.3	15.4	13.45	OK	
B AA	207.3	16.7	12.42	OK	
B AA	207.3	16.7	12.42	OK	
B AA	204.4	6.9	29.51	OK	
B AA	204.4	6.9	29.51	OK	
B AA	204.4	5.7	36.17	OK	
B AA	204.4	5.7	36.17	OK	
B AA	207.3	6.9	29.93	OK	
B AA	207.3	6.9	29.93	OK	
B AA	207.3	5.7	36.68	OK	
B AA	207.3	5.7	36.68	OK	
B WX	204.4	10.0	20.41	OK	
B WX	204.4	10.0	20.41	OK	
B WX	204.4	10.8	18.93	OK	
B WX	204.4	10.8	18.93	OK	
B WX	207.3	10.0	20.70	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d / E_d$	
		kN	kN		
B WX	207.3	10.0	20.70	OK	
B WX	207.3	10.8	19.20	OK	
B WX	207.3	10.8	19.20	OK	
B WX	204.4	8.6	23.66	OK	
B WX	204.4	8.6	23.66	OK	
B WX	204.4	9.1	22.41	OK	
B WX	204.4	9.1	22.41	OK	
B WX	207.3	8.6	24.00	OK	
B WX	207.3	8.6	24.00	OK	
B WX	207.3	9.1	22.72	OK	
B WX	207.3	9.1	22.72	OK	
B WXY	204.4	17.6	11.65	OK	
B WXY	204.4	17.6	11.65	OK	
B WXY	204.4	18.8	10.90	OK	
B WXY	204.4	18.8	10.90	OK	
B WXY	207.3	17.6	11.81	OK	
B WXY	207.3	17.6	11.81	OK	
B WXY	207.3	18.8	11.05	OK	
B WXY	207.3	18.8	11.05	OK	
B WXY	204.4	9.9	20.60	OK	
B WXY	204.4	9.9	20.60	OK	
B WXY	204.4	8.9	22.93	OK	
B WXY	204.4	8.9	22.93	OK	
B WXY	207.3	9.9	20.89	OK	
B WXY	207.3	9.9	20.89	OK	
B WXY	207.3	8.9	23.26	OK	
B WXY	207.3	8.9	23.26	OK	
B WY	204.4	21.2	9.63	OK	
B WY	204.4	21.2	9.63	OK	
B WY	204.4	22.5	9.08	OK	
B WY	204.4	22.5	9.08	OK	
B WY	207.3	21.2	9.76	OK	
B WY	207.3	21.2	9.76	OK	
B WY	207.3	22.5	9.21	OK	
B WY	207.3	22.5	9.21	OK	
B WY	204.4	12.7	16.05	OK	
B WY	204.4	12.7	16.05	OK	
B WY	204.4	11.5	17.83	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
B WY	204.4	11.5	17.83	OK	
B WY	207.3	12.7	16.27	OK	
B WY	207.3	12.7	16.27	OK	
B WY	207.3	11.5	18.08	OK	
B WY	207.3	11.5	18.08	OK	
D I	204.4	20.0	10.20	OK	
D I	206.9	20.0	10.33	OK	
D I	206.1	21.8	9.46	OK	
D I	208.5	21.8	9.58	OK	
D I	207.3	20.0	10.35	OK	
D I	209.8	20.0	10.47	OK	
D I	209.0	21.8	9.60	OK	
D I	211.4	21.8	9.71	OK	
D I	204.4	8.5	24.19	OK	
D I	206.9	8.5	24.48	OK	
D I	206.1	6.7	30.70	OK	
D I	208.5	6.7	31.06	OK	
D I	207.3	8.5	24.53	OK	
D I	209.8	8.5	24.82	OK	
D I	209.0	6.7	31.13	OK	
D I	211.4	6.7	31.49	OK	
D W	204.4	111.0	1.84	OK	
D W	205.7	111.0	1.85	OK	
D W	205.3	109.3	1.88	OK	
D W	206.5	109.3	1.89	OK	
D W	207.3	111.0	1.87	OK	
D W	208.6	111.0	1.88	OK	
D W	208.2	109.3	1.91	OK	
D W	209.4	109.3	1.92	OK	
D W	204.4	16.9	12.07	OK	
D W	205.7	16.9	12.14	OK	
D W	205.3	15.2	13.50	OK	
D W	206.5	15.2	13.58	OK	
D W	207.3	16.9	12.24	OK	
D W	208.6	16.9	12.31	OK	
D W	208.2	15.2	13.69	OK	
D W	209.4	15.2	13.77	OK	
DAA	205.7	20.4	10.08	OK	





Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
DAA	205.7	20.4	10.08	OK	
DAA	206.5	22.2	9.32	OK	
DAA	206.5	22.2	9.32	OK	
DAA	208.6	20.4	10.22	OK	
DAA	208.6	20.4	10.22	OK	
DAA	209.4	22.2	9.45	OK	
DAA	209.4	22.2	9.45	OK	
DAA	205.7	8.8	23.30	OK	
DAA	205.7	8.8	23.30	OK	
DAA	206.5	7.1	29.12	OK	
DAA	206.5	7.1	29.12	OK	
DAA	208.6	8.8	23.62	OK	
DAA	208.6	8.8	23.62	OK	
DAA	209.4	7.1	29.53	OK	
DAA	209.4	7.1	29.53	OK	
A	184.0	8.4	21.98	OK	
A	184.0	8.4	21.98	OK	
A	184.0	9.8	18.75	OK	
A	184.0	9.8	18.75	OK	
A	185.9	8.4	22.21	OK	
A	185.9	8.4	22.21	OK	
A	185.9	9.8	18.95	OK	
A	185.9	9.8	18.95	OK	
A	184.0	4.6	40.01	OK	
A	184.0	4.6	40.01	OK	
A	184.0	6.0	30.46	OK	
A	184.0	6.0	30.46	OK	
A	185.9	4.6	40.43	OK	
A	185.9	4.6	40.43	OK	
A	185.9	6.0	30.79	OK	
A	185.9	6.0	30.79	OK	
B AA	184.0	15.0	12.27	OK	
B AA	184.0	15.0	12.27	OK	
B AA	184.0	15.8	11.61	OK	
B AA	184.0	15.8	11.61	OK	
B AA	185.9	15.0	12.40	OK	
B AA	185.9	15.0	12.40	OK	
B AA	185.9	15.8	11.73	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d / E_d$	
		kN	kN		
B AA	185.9	15.8	11.73	OK	
B AA	184.0	7.4	25.03	OK	
B AA	184.0	7.4	25.03	OK	
B AA	184.0	6.5	28.30	OK	
B AA	184.0	6.5	28.30	OK	
B AA	185.9	7.4	25.29	OK	
B AA	185.9	7.4	25.29	OK	
B AA	185.9	6.5	28.60	OK	
B AA	185.9	6.5	28.60	OK	
B WX	184.0	9.8	18.82	OK	
B WX	184.0	9.8	18.82	OK	
B WX	184.0	10.3	17.92	OK	
B WX	184.0	10.3	17.92	OK	
B WX	185.9	9.8	19.02	OK	
B WX	185.9	9.8	19.02	OK	
B WX	185.9	10.3	18.11	OK	
B WX	185.9	10.3	18.11	OK	
B WX	184.0	8.5	21.61	OK	
B WX	184.0	8.5	21.61	OK	
B WX	184.0	8.8	20.95	OK	
B WX	184.0	8.8	20.95	OK	
B WX	185.9	8.5	21.83	OK	
B WX	185.9	8.5	21.83	OK	
B WX	185.9	8.8	21.17	OK	
B WX	185.9	8.8	21.17	OK	
B WXY	184.0	17.2	10.73	OK	
B WXY	184.0	17.2	10.73	OK	
B WXY	184.0	18.0	10.25	OK	
B WXY	184.0	18.0	10.25	OK	
B WXY	185.9	17.2	10.84	OK	
B WXY	185.9	17.2	10.84	OK	
B WXY	185.9	18.0	10.35	OK	
B WXY	185.9	18.0	10.35	OK	
B WXY	184.0	10.3	17.91	OK	
B WXY	184.0	10.3	17.91	OK	
B WXY	184.0	9.6	19.21	OK	
B WXY	184.0	9.6	19.21	OK	
B WXY	185.9	10.3	18.10	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
B WXY	185.9	10.3	18.10	OK	
B WXY	185.9	9.6	19.41	OK	
B WXY	185.9	9.6	19.41	OK	
B WY	184.0	20.8	8.84	OK	
B WY	184.0	20.8	8.84	OK	
B WY	184.0	21.7	8.50	OK	
B WY	184.0	21.7	8.50	OK	
B WY	185.9	20.8	8.94	OK	
B WY	185.9	20.8	8.94	OK	
B WY	185.9	21.7	8.58	OK	
B WY	185.9	21.7	8.58	OK	
B WY	184.0	13.2	13.98	OK	
B WY	184.0	13.2	13.98	OK	
B WY	184.0	12.3	14.94	OK	
B WY	184.0	12.3	14.94	OK	
B WY	185.9	13.2	14.12	OK	
B WY	185.9	13.2	14.12	OK	
B WY	185.9	12.3	15.10	OK	
B WY	185.9	12.3	15.10	OK	
D I	184.0	19.5	9.46	OK	
D I	186.4	19.5	9.58	OK	
D I	185.6	20.6	9.00	OK	
D I	188.1	20.6	9.12	OK	
D I	185.9	19.5	9.56	OK	
D I	188.4	19.5	9.68	OK	
D I	187.6	20.6	9.10	OK	
D I	190.0	20.6	9.22	OK	
D I	184.0	9.0	20.37	OK	
D I	186.4	9.0	20.65	OK	
D I	185.6	7.9	23.58	OK	
D I	188.1	7.9	23.89	OK	
D I	185.9	9.0	20.59	OK	
D I	188.4	9.0	20.86	OK	
D I	187.6	7.9	23.83	OK	
D I	190.0	7.9	24.14	OK	
D W	184.0	111.6	1.65	OK	
D W	185.2	111.6	1.66	OK	
D W	184.8	110.4	1.67	OK	

GENERAL CONTRACTOR  IRICAV2	ALTA SORVEGLIANZA  GRUPPO FERROVIE DELLO STATO ITALIANE
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Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d / E_d$	
		kN	kN		
D W	186.0	110.4	1.68	OK	
D W	185.9	111.6	1.67	OK	
D W	187.2	111.6	1.68	OK	
D W	186.7	110.4	1.69	OK	
D W	188.0	110.4	1.70	OK	
D W	184.0	17.5	10.50	OK	
D W	185.2	17.5	10.57	OK	
D W	184.8	16.4	11.30	OK	
D W	186.0	16.4	11.37	OK	
D W	185.9	17.5	10.61	OK	
D W	187.2	17.5	10.68	OK	
D W	186.7	16.4	11.41	OK	
D W	188.0	16.4	11.49	OK	
DAA	185.2	19.8	9.34	OK	
DAA	185.2	19.8	9.34	OK	
DAA	186.0	21.0	8.86	OK	
DAA	186.0	21.0	8.86	OK	
DAA	187.2	19.8	9.44	OK	
DAA	187.2	19.8	9.44	OK	
DAA	188.0	21.0	8.95	OK	
DAA	188.0	21.0	8.95	OK	
DAA	185.2	9.4	19.69	OK	
DAA	185.2	9.4	19.69	OK	
DAA	186.0	8.2	22.55	OK	
DAA	186.0	8.2	22.55	OK	
DAA	187.2	9.4	19.89	OK	
DAA	187.2	9.4	19.89	OK	
DAA	188.0	8.2	22.79	OK	

Capacità portante – verifiche statiche

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	COMB	$R_d$	$E_d$	$R_d / E_d$	
		$q_{u,d}$ kPa	$q_{E,d} = N / (B' \cdot L')$		
A	$(2863. + 1220. +) / 2.3 =$	1775.2	91.54	19.39	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	COMB	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>
		q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')	
			kPa		
A	(2863. + 1220. +) / 2.3 =	1775.2	91.54	19.39	OK
A	(2707. + 1235. +) / 2.3 =	1714.2	106.87	16.04	OK
A	(2707. + 1235. +) / 2.3 =	1714.2	106.87	16.04	OK
A	(2869. + 1220. +) / 2.3 =	1778.1	92.33	19.26	OK
A	(2869. + 1220. +) / 2.3 =	1778.1	92.33	19.26	OK
A	(2716. + 1235. +) / 2.3 =	1718.0	107.44	15.99	OK
A	(2716. + 1235. +) / 2.3 =	1718.0	107.44	15.99	OK
A	(3018. + 1231. +) / 2.3 =	1847.3	82.53	22.38	OK
A	(3018. + 1231. +) / 2.3 =	1847.3	82.53	22.38	OK
A	(2860. + 1249. +) / 2.3 =	1786.6	94.79	18.85	OK
A	(2860. + 1249. +) / 2.3 =	1786.6	94.79	18.85	OK
A	(3023. + 1230. +) / 2.3 =	1849.2	83.40	22.17	OK
A	(3023. + 1230. +) / 2.3 =	1849.2	83.40	22.17	OK
A	(2867. + 1248. +) / 2.3 =	1789.3	95.54	18.73	OK
A	(2867. + 1248. +) / 2.3 =	1789.3	95.54	18.73	OK
B AA	(2541. + 1218. +) / 2.3 =	1634.5	124.33	13.15	OK
B AA	(2541. + 1218. +) / 2.3 =	1634.5	124.33	13.15	OK
B AA	(2451. + 1224. +) / 2.3 =	1597.9	140.69	11.36	OK
B AA	(2451. + 1224. +) / 2.3 =	1597.9	140.69	11.36	OK
B AA	(2552. + 1218. +) / 2.3 =	1639.4	124.52	13.17	OK
B AA	(2552. + 1218. +) / 2.3 =	1639.4	124.52	13.17	OK
B AA	(2463. + 1224. +) / 2.3 =	1603.3	140.43	11.42	OK
B AA	(2463. + 1224. +) / 2.3 =	1603.3	140.43	11.42	OK
B AA	(3158. + 1154. +) / 2.3 =	1874.9	70.02	26.78	OK
B AA	(3158. + 1154. +) / 2.3 =	1874.9	70.02	26.78	OK
B AA	(3253. + 1142. +) / 2.3 =	1910.6	65.72	29.07	OK
B AA	(3253. + 1142. +) / 2.3 =	1910.6	65.72	29.07	OK
B AA	(3161. + 1155. +) / 2.3 =	1876.4	70.95	26.45	OK
B AA	(3161. + 1155. +) / 2.3 =	1876.4	70.95	26.45	OK
B AA	(3254. + 1143. +) / 2.3 =	1911.6	66.65	28.68	OK
B AA	(3254. + 1143. +) / 2.3 =	1911.6	66.65	28.68	OK
B WX	(3275. + 816. +) / 2.3 =	1778.7	99.15	17.94	OK
B WX	(3275. + 816. +) / 2.3 =	1778.7	99.15	17.94	OK
B WX	(3218. + 823. +) / 2.3 =	1756.9	106.75	16.46	OK
B WX	(3218. + 823. +) / 2.3 =	1756.9	106.75	16.46	OK
B WX	(3280. + 820. +) / 2.3 =	1782.5	99.91	17.84	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
B WX	(3280. + 820. +) / 2.3 =	1782.5	99.91	17.84	OK
B WX	(3220. + 827. +) / 2.3 =	1759.8	107.43	16.38	OK
B WX	(3220. + 827. +) / 2.3 =	1759.8	107.43	16.38	OK
B WX	(3213. + 849. +) / 2.3 =	1766.5	92.44	19.11	OK
B WX	(3213. + 849. +) / 2.3 =	1766.5	92.44	19.11	OK
B WX	(3289. + 823. +) / 2.3 =	1787.8	99.01	18.06	OK
B WX	(3289. + 823. +) / 2.3 =	1787.8	99.01	18.06	OK
B WX	(3219. + 853. +) / 2.3 =	1770.5	93.25	18.99	OK
B WX	(3219. + 853. +) / 2.3 =	1770.5	93.25	18.99	OK
B WX	(3293. + 827. +) / 2.3 =	1791.5	99.77	17.96	OK
B WX	(3293. + 827. +) / 2.3 =	1791.5	99.77	17.96	OK
B WXY	(2567. + 987. +) / 2.3 =	1545.2	162.96	9.48	OK
B WXY	(2567. + 987. +) / 2.3 =	1545.2	162.96	9.48	OK
B WXY	(2465. + 996. +) / 2.3 =	1504.8	186.80	8.06	OK
B WXY	(2465. + 996. +) / 2.3 =	1504.8	186.80	8.06	OK
B WXY	(2579. + 989. +) / 2.3 =	1551.6	162.36	9.56	OK
B WXY	(2579. + 989. +) / 2.3 =	1551.6	162.36	9.56	OK
B WXY	(2478. + 999. +) / 2.3 =	1511.9	185.33	8.16	OK
B WXY	(2478. + 999. +) / 2.3 =	1511.9	185.33	8.16	OK
B WXY	(3255. + 898. +) / 2.3 =	1805.5	88.05	20.51	OK
B WXY	(3255. + 898. +) / 2.3 =	1805.5	88.05	20.51	OK
B WXY	(3281. + 904. +) / 2.3 =	1819.4	82.37	22.09	OK
B WXY	(3281. + 904. +) / 2.3 =	1819.4	82.37	22.09	OK
B WXY	(3256. + 902. +) / 2.3 =	1807.8	88.90	20.33	OK
B WXY	(3256. + 902. +) / 2.3 =	1807.8	88.90	20.33	OK
B WXY	(3285. + 907. +) / 2.3 =	1822.6	83.25	21.89	OK
B WXY	(3285. + 907. +) / 2.3 =	1822.6	83.25	21.89	OK
B WY	(2212. + 1217. +) / 2.3 =	1490.8	206.64	7.21	OK
B WY	(2212. + 1217. +) / 2.3 =	1490.8	206.64	7.21	OK
B WY	(2123. + 1219. +) / 2.3 =	1453.3	256.17	5.67	OK
B WY	(2123. + 1219. +) / 2.3 =	1453.3	256.17	5.67	OK
B WY	(2227. + 1218. +) / 2.3 =	1497.8	203.43	7.36	OK
B WY	(2227. + 1218. +) / 2.3 =	1497.8	203.43	7.36	OK
B WY	(2140. + 1220. +) / 2.3 =	1460.9	249.62	5.85	OK
B WY	(2140. + 1220. +) / 2.3 =	1460.9	249.62	5.85	OK
B WY	(2814. + 1175. +) / 2.3 =	1734.6	90.28	19.21	OK
B WY	(2814. + 1175. +) / 2.3 =	1734.6	90.28	19.21	OK
B WY	(2907. + 1166. +) / 2.3 =	1770.6	83.25	21.27	OK
B WY	(2907. + 1166. +) / 2.3 =	1770.6	83.25	21.27	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	COMB	q <sub>u,d</sub> kPa	q <sub>E,d</sub> = N / (B'·L')		
		kPa			
B WY	(2822. + 1176. +) / 2.3 =	1738.1	91.08	19.08	OK
B WY	(2822. + 1176. +) / 2.3 =	1738.1	91.08	19.08	OK
B WY	(2913. + 1166. +) / 2.3 =	1773.5	84.11	21.09	OK
B WY	(2913. + 1166. +) / 2.3 =	1773.5	84.11	21.09	OK
D I	(2216. + 1236. +) / 2.3 =	1500.8	214.91	6.98	OK
D I	(2229. + 1237. +) / 2.3 =	1506.6	211.74	7.12	OK
D I	(2104. + 1240. +) / 2.3 =	1453.8	290.17	5.01	OK
D I	(2118. + 1240. +) / 2.3 =	1460.3	282.31	5.17	OK
D I	(2231. + 1237. +) / 2.3 =	1507.6	211.20	7.14	OK
D I	(2244. + 1237. +) / 2.3 =	1513.3	208.37	7.26	OK
D I	(2121. + 1240. +) / 2.3 =	1461.4	280.99	5.20	OK
D I	(2135. + 1241. +) / 2.3 =	1467.6	274.08	5.35	OK
D I	(3038. + 1171. +) / 2.3 =	1829.9	76.57	23.90	OK
D I	(3042. + 1171. +) / 2.3 =	1831.7	77.33	23.69	OK
D I	(3167. + 1155. +) / 2.3 =	1879.5	70.28	26.74	OK
D I	(3170. + 1156. +) / 2.3 =	1880.7	71.07	26.46	OK
D I	(3042. + 1171. +) / 2.3 =	1832.0	77.47	23.65	OK
D I	(3046. + 1172. +) / 2.3 =	1833.7	78.23	23.44	OK
D I	(3170. + 1156. +) / 2.3 =	1880.9	71.21	26.41	OK
D I	(3172. + 1156. +) / 2.3 =	1882.0	71.99	26.14	OK
D W	(1083. + 389. +) / 2.3 =	639.9	194.27	3.29	OK
D W	(1093. + 393. +) / 2.3 =	646.1	193.16	3.34	OK
D W	(1042. + 403. +) / 2.3 =	628.4	255.77	2.46	OK
D W	(1053. + 407. +) / 2.3 =	634.7	252.94	2.51	OK
D W	(1107. + 398. +) / 2.3 =	654.5	191.74	3.41	OK
D W	(1117. + 402. +) / 2.3 =	660.6	190.75	3.46	OK
D W	(1067. + 413. +) / 2.3 =	643.3	249.32	2.58	OK
D W	(1077. + 417. +) / 2.3 =	649.5	246.82	2.63	OK
D W	(2523. + 1198. +) / 2.3 =	1618.1	123.14	13.14	OK
D W	(2528. + 1198. +) / 2.3 =	1620.2	123.23	13.15	OK
D W	(2649. + 1189. +) / 2.3 =	1668.7	106.67	15.64	OK
D W	(2653. + 1189. +) / 2.3 =	1670.6	106.91	15.63	OK
D W	(2535. + 1199. +) / 2.3 =	1623.2	123.36	13.16	OK
D W	(2539. + 1199. +) / 2.3 =	1625.3	123.47	13.16	OK
D W	(2659. + 1189. +) / 2.3 =	1673.1	107.25	15.60	OK
D W	(2663. + 1189. +) / 2.3 =	1674.9	107.50	15.58	OK
DAA	(2208. + 1234. +) / 2.3 =	1496.4	218.79	6.84	OK
DAA	(2208. + 1234. +) / 2.3 =	1496.4	218.79	6.84	OK
DAA	(2093. + 1237. +) / 2.3 =	1447.7	298.33	4.85	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
DAA	(2093. + 1237. +) / 2.3 =	1447.7	298.33	4.85	OK
DAA	(2223. + 1234. +) / 2.3 =	1503.3	214.92	6.99	OK
DAA	(2223. + 1234. +) / 2.3 =	1503.3	214.92	6.99	OK
DAA	(2110. + 1238. +) / 2.3 =	1455.4	288.46	5.05	OK
DAA	(2110. + 1238. +) / 2.3 =	1455.4	288.46	5.05	OK
DAA	(3024. + 1170. +) / 2.3 =	1823.6	77.65	23.48	OK
DAA	(3024. + 1170. +) / 2.3 =	1823.6	77.65	23.48	OK
DAA	(3152. + 1155. +) / 2.3 =	1872.4	71.03	26.36	OK
DAA	(3152. + 1155. +) / 2.3 =	1872.4	71.03	26.36	OK
DAA	(3029. + 1171. +) / 2.3 =	1825.8	78.55	23.24	OK
DAA	(3029. + 1171. +) / 2.3 =	1825.8	78.55	23.24	OK
DAA	(3155. + 1156. +) / 2.3 =	1873.9	71.95	26.04	OK
DAA	(3155. + 1156. +) / 2.3 =	1873.9	71.95	26.04	OK
A	(2854. + 1220. +) / 2.3 =	1771.2	82.89	21.37	OK
A	(2854. + 1220. +) / 2.3 =	1771.2	82.89	21.37	OK
A	(2739. + 1231. +) / 2.3 =	1726.0	92.81	18.60	OK
A	(2739. + 1231. +) / 2.3 =	1726.0	92.81	18.60	OK
A	(2859. + 1219. +) / 2.3 =	1773.3	83.41	21.26	OK
A	(2859. + 1219. +) / 2.3 =	1773.3	83.41	21.26	OK
A	(2745. + 1231. +) / 2.3 =	1728.7	93.23	18.54	OK
A	(2745. + 1231. +) / 2.3 =	1728.7	93.23	18.54	OK
A	(3027. + 1231. +) / 2.3 =	1851.3	73.88	25.06	OK
A	(3027. + 1231. +) / 2.3 =	1851.3	73.88	25.06	OK
A	(2910. + 1245. +) / 2.3 =	1806.3	81.65	22.12	OK
A	(2910. + 1245. +) / 2.3 =	1806.3	81.65	22.12	OK
A	(3030. + 1231. +) / 2.3 =	1852.6	74.45	24.88	OK
A	(3030. + 1231. +) / 2.3 =	1852.6	74.45	24.88	OK
A	(2914. + 1244. +) / 2.3 =	1808.2	82.18	22.00	OK
A	(2914. + 1244. +) / 2.3 =	1808.2	82.18	22.00	OK
B AA	(2475. + 1217. +) / 2.3 =	1605.5	121.24	13.24	OK
B AA	(2475. + 1217. +) / 2.3 =	1605.5	121.24	13.24	OK
B AA	(2408. + 1222. +) / 2.3 =	1578.3	133.73	11.80	OK
B AA	(2408. + 1222. +) / 2.3 =	1578.3	133.73	11.80	OK
B AA	(2484. + 1218. +) / 2.3 =	1609.4	121.18	13.28	OK
B AA	(2484. + 1218. +) / 2.3 =	1609.4	121.18	13.28	OK
B AA	(2418. + 1222. +) / 2.3 =	1582.5	133.37	11.87	OK
B AA	(2418. + 1222. +) / 2.3 =	1582.5	133.37	11.87	OK
B AA	(3089. + 1158. +) / 2.3 =	1846.4	65.88	28.03	OK
B AA	(3089. + 1158. +) / 2.3 =	1846.4	65.88	28.03	OK





Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
B AA	(3158. + 1149. +) / 2.3 =	1872.9	62.70	29.87	OK
B AA	(3158. + 1149. +) / 2.3 =	1872.9	62.70	29.87	OK
B AA	(3092. + 1158. +) / 2.3 =	1847.8	66.49	27.79	OK
B AA	(3092. + 1158. +) / 2.3 =	1847.8	66.49	27.79	OK
B AA	(3161. + 1150. +) / 2.3 =	1874.0	63.32	29.60	OK
B AA	(3161. + 1150. +) / 2.3 =	1874.0	63.32	29.60	OK
B WX	(3223. + 792. +) / 2.3 =	1745.7	92.73	18.83	OK
B WX	(3223. + 792. +) / 2.3 =	1745.7	92.73	18.83	OK
B WX	(3268. + 774. +) / 2.3 =	1757.4	97.91	17.95	OK
B WX	(3268. + 774. +) / 2.3 =	1757.4	97.91	17.95	OK
B WX	(3227. + 796. +) / 2.3 =	1748.9	93.20	18.77	OK
B WX	(3227. + 796. +) / 2.3 =	1748.9	93.20	18.77	OK
B WX	(3268. + 779. +) / 2.3 =	1759.5	98.34	17.89	OK
B WX	(3268. + 779. +) / 2.3 =	1759.5	98.34	17.89	OK
B WX	(3155. + 826. +) / 2.3 =	1730.9	85.78	20.18	OK
B WX	(3155. + 826. +) / 2.3 =	1730.9	85.78	20.18	OK
B WX	(3208. + 809. +) / 2.3 =	1746.6	90.20	19.36	OK
B WX	(3208. + 809. +) / 2.3 =	1746.6	90.20	19.36	OK
B WX	(3160. + 829. +) / 2.3 =	1734.3	86.30	20.10	OK
B WX	(3160. + 829. +) / 2.3 =	1734.3	86.30	20.10	OK
B WX	(3213. + 812. +) / 2.3 =	1749.8	90.69	19.30	OK
B WX	(3213. + 812. +) / 2.3 =	1749.8	90.69	19.30	OK
B WXY	(2496. + 964. +) / 2.3 =	1504.0	165.71	9.08	OK
B WXY	(2496. + 964. +) / 2.3 =	1504.0	165.71	9.08	OK
B WXY	(2419. + 971. +) / 2.3 =	1473.6	185.05	7.96	OK
B WXY	(2419. + 971. +) / 2.3 =	1473.6	185.05	7.96	OK
B WXY	(2505. + 966. +) / 2.3 =	1509.3	164.83	9.16	OK
B WXY	(2505. + 966. +) / 2.3 =	1509.3	164.83	9.16	OK
B WXY	(2430. + 973. +) / 2.3 =	1479.3	183.56	8.06	OK
B WXY	(2430. + 973. +) / 2.3 =	1479.3	183.56	8.06	OK
B WXY	(3191. + 877. +) / 2.3 =	1769.0	85.40	20.71	OK
B WXY	(3191. + 877. +) / 2.3 =	1769.0	85.40	20.71	OK
B WXY	(3269. + 865. +) / 2.3 =	1797.2	81.04	22.18	OK
B WXY	(3269. + 865. +) / 2.3 =	1797.2	81.04	22.18	OK
B WXY	(3193. + 880. +) / 2.3 =	1771.1	85.93	20.61	OK
B WXY	(3193. + 880. +) / 2.3 =	1771.1	85.93	20.61	OK
B WXY	(3269. + 868. +) / 2.3 =	1798.9	81.59	22.05	OK
B WXY	(3269. + 868. +) / 2.3 =	1798.9	81.59	22.05	OK
B WY	(2111. + 1212. +) / 2.3 =	1445.1	232.97	6.20	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	COMB	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>
		q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')	
			kPa		
B WY	(2111. + 1212. +) / 2.3 =	1445.1	232.97	6.20	OK
B WY	(2046. + 1213. +) / 2.3 =	1417.0	283.91	4.99	OK
B WY	(2046. + 1213. +) / 2.3 =	1417.0	283.91	4.99	OK
B WY	(2124. + 1213. +) / 2.3 =	1450.8	228.39	6.35	OK
B WY	(2124. + 1213. +) / 2.3 =	1450.8	228.39	6.35	OK
B WY	(2059. + 1214. +) / 2.3 =	1423.1	275.91	5.16	OK
B WY	(2059. + 1214. +) / 2.3 =	1423.1	275.91	5.16	OK
B WY	(2710. + 1178. +) / 2.3 =	1690.3	89.10	18.97	OK
B WY	(2710. + 1178. +) / 2.3 =	1690.3	89.10	18.97	OK
B WY	(2777. + 1172. +) / 2.3 =	1717.0	83.38	20.59	OK
B WY	(2777. + 1172. +) / 2.3 =	1717.0	83.38	20.59	OK
B WY	(2716. + 1178. +) / 2.3 =	1693.3	89.56	18.91	OK
B WY	(2716. + 1178. +) / 2.3 =	1693.3	89.56	18.91	OK
B WY	(2783. + 1172. +) / 2.3 =	1719.8	83.90	20.50	OK
B WY	(2783. + 1172. +) / 2.3 =	1719.8	83.90	20.50	OK
D I	(2127. + 1233. +) / 2.3 =	1460.9	238.30	6.13	OK
D I	(2142. + 1234. +) / 2.3 =	1468.0	232.14	6.32	OK
D I	(2048. + 1235. +) / 2.3 =	1427.6	309.02	4.62	OK
D I	(2065. + 1236. +) / 2.3 =	1435.1	296.79	4.84	OK
D I	(2139. + 1234. +) / 2.3 =	1466.5	233.40	6.28	OK
D I	(2154. + 1235. +) / 2.3 =	1473.4	227.79	6.47	OK
D I	(2061. + 1236. +) / 2.3 =	1433.5	299.26	4.79	OK
D I	(2077. + 1237. +) / 2.3 =	1440.9	288.30	5.00	OK
D I	(2944. + 1177. +) / 2.3 =	1791.6	73.87	24.25	OK
D I	(2949. + 1177. +) / 2.3 =	1794.1	74.60	24.05	OK
D I	(3041. + 1166. +) / 2.3 =	1829.2	69.04	26.49	OK
D I	(3045. + 1167. +) / 2.3 =	1831.2	69.81	26.23	OK
D I	(2948. + 1177. +) / 2.3 =	1793.5	74.45	24.09	OK
D I	(2953. + 1177. +) / 2.3 =	1796.0	75.18	23.89	OK
D I	(3044. + 1167. +) / 2.3 =	1830.8	69.64	26.29	OK
D I	(3048. + 1167. +) / 2.3 =	1832.7	70.41	26.03	OK
D W	(907. + 315. +) / 2.3 =	531.3	208.04	2.55	OK
D W	(919. + 319. +) / 2.3 =	538.3	205.96	2.61	OK
D W	(882. + 324. +) / 2.3 =	524.5	262.98	1.99	OK
D W	(894. + 329. +) / 2.3 =	531.6	258.83	2.05	OK
D W	(925. + 322. +) / 2.3 =	542.3	204.82	2.65	OK
D W	(937. + 326. +) / 2.3 =	549.3	202.92	2.71	OK
D W	(901. + 331. +) / 2.3 =	535.6	256.56	2.09	OK
D W	(912. + 336. +) / 2.3 =	542.6	252.80	2.15	OK

GENERAL CONTRACTOR  <b>IRICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE
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Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')			
COMB			kPa			
D W	(2377. + 1200. +) / 2.3 =	1555.3	134.41	11.57	OK	
D W	(2384. + 1200. +) / 2.3 =	1558.2	134.17	11.61	OK	
D W	(2472. + 1195. +) / 2.3 =	1594.0	117.85	13.53	OK	
D W	(2477. + 1195. +) / 2.3 =	1596.6	117.86	13.55	OK	
D W	(2387. + 1200. +) / 2.3 =	1559.8	134.03	11.64	OK	
D W	(2393. + 1201. +) / 2.3 =	1562.6	133.82	11.68	OK	
D W	(2480. + 1195. +) / 2.3 =	1598.0	117.87	13.56	OK	
D W	(2486. + 1195. +) / 2.3 =	1600.6	117.89	13.58	OK	
DAA	(2119. + 1231. +) / 2.3 =	1456.3	243.45	5.98	OK	
DAA	(2119. + 1231. +) / 2.3 =	1456.3	243.45	5.98	OK	
DAA	(2036. + 1232. +) / 2.3 =	1420.9	320.24	4.44	OK	
DAA	(2036. + 1232. +) / 2.3 =	1420.9	320.24	4.44	OK	
DAA	(2131. + 1231. +) / 2.3 =	1461.9	238.33	6.13	OK	
DAA	(2131. + 1231. +) / 2.3 =	1461.9	238.33	6.13	OK	
DAA	(2049. + 1233. +) / 2.3 =	1426.9	309.61	4.61	OK	
DAA	(2049. + 1233. +) / 2.3 =	1426.9	309.61	4.61	OK	
DAA	(2929. + 1176. +) / 2.3 =	1784.9	75.04	23.79	OK	
DAA	(2929. + 1176. +) / 2.3 =	1784.9	75.04	23.79	OK	
DAA	(3024. + 1165. +) / 2.3 =	1821.5	69.90	26.06	OK	
DAA	(3024. + 1165. +) / 2.3 =	1821.5	69.90	26.06	OK	
DAA	(2934. + 1176. +) / 2.3 =	1786.9	75.62	23.63	OK	
DAA	(2934. + 1176. +) / 2.3 =	1786.9	75.62	23.63	OK	
DAA	(3028. + 1166. +) / 2.3 =	1823.2	70.50	25.86	OK	

Ribaltamento – verifiche sismiche

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	dir. L	dir. T	dir. L	dir. T		
COMB	kNm	kNm	kNm	kNm		
Comb1	306.16	306.16	20.49	111.03	2.76	OK
Comb2	306.16	306.16	20.49	111.03	2.76	OK
Comb3	306.16	306.16	20.49	28.27	10.83	OK
Comb4	306.16	306.16	20.49	28.27	10.83	OK
Comb5	306.16	306.16	68.29	63.23	4.48	OK
Comb6	306.16	306.16	68.29	63.23	4.48	OK

GENERAL CONTRACTOR  <b>IRICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE
Relazione di calcolo pali di alimentazione	Progetto IN17    Lotto 10    Codifica Documento E I2 CL OC 00 0 0 010    Rev. A    Foglio 140 di 336

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
Comb7	306.16	306.16	68.29	22.26	4.48	OK
Comb8	306.16	306.16	68.29	22.26	4.48	OK

Scorrimento – verifiche sismiche

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$		Ed	Rd/Ed	
	kN		kN		
COMB					
Comb1	197.7		77.2	2.56	OK
Comb2	197.7		77.2	2.56	OK
Comb3	197.7		71.0	2.78	OK
Comb4	197.7		71.0	2.78	OK
Comb5	197.7		98.9	2.00	OK
Comb6	197.7		98.9	2.00	OK
Comb7	197.7		95.8	2.06	OK
Comb8	197.7		95.8	2.06	OK

Capacità portante – verifiche sismiche

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	Rd		Ed	Rd/Ed	
	$q_{u,d} \text{ kPa}$		$q_{E,d} = N / (B' \cdot L')$		
COMB			kPa		
Comb1	$(1619. + 468. +) / 2.3 =$		907.1	96.70	9.38 OK
Comb2	$(1619. + 468. +) / 2.3 =$		907.1	96.70	9.38 OK
Comb3	$(1954. + 460. +) / 2.3 =$		1050.0	67.90	15.46 OK
Comb4	$(1954. + 460. +) / 2.3 =$		1050.0	67.90	15.46 OK
Comb5	$(1580. + 267. +) / 2.3 =$		802.8	93.28	8.61 OK
Comb6	$(1580. + 267. +) / 2.3 =$		802.8	93.28	8.61 OK
Comb7	$(1531. + 295. +) / 2.3 =$		793.7	79.82	9.94 OK
Comb8	$(1531. + 295. +) / 2.3 =$		793.7	79.82	9.94 OK

Le verifiche sono soddisfatte.



12.5 Sintesi risultati LC3

TITOLO: **Caso di carico 3 - combinazioni statiche**

FONDAZIONI A PLINTO  
DESIGN ASSUMPTION

piano campagna sostanzialmente orizzontale

angolo d'attrito caratteristico  $\phi'_s$

coesione  $c'$

angolo d'attrito caratteristico  $\phi'_s$  alla base

coesione alla base  $c'$

coefficiente  $\gamma_a$

coefficiente  $\gamma_c'$

coefficiente  $\gamma_a$  capacità portante

coefficiente  $\gamma_a$  scorrimento

coefficiente  $\gamma_a$  spinta passiva

angolo d'attrito di design  $\phi'_{sd}$

coesione di design  $c'_{sd}$

coeff. attrito di design  $\mu'_{sd}$

coesione alla base di design

Dimensione fondazione B[m] (LONGITUDINALE)

Dimensione fondazione L [m] (TRASVERSALE)

Profondità da piano campagna D [m]

Altezza plinto [m]  $H_p$

Dimensione baggio  $b$ [m] (LONGITUDINALE)

Dimensione maggiore baggio  $l$  [m] (TRASVERSALE)

Altezza baggio [m]  $H_b$

Altezza terreno sopraplinto [m]  $H_t$

$q'$  = carico permanente ai lati

$\gamma$  = peso specifico medio sopra la fondazione

$\gamma_f$  = peso specifico medio sotto la fondazione

opzione calcolo coeff.  $S_{\alpha}$  e  $S_{\gamma}$

opzione calcolo per tenere in conto peso terreno di ricoprimento

Peso specifico medio c.a.

Peso proprio plinto + baggio + terreno sovrastante [kN]

Quota baricentro plinto + baggio + terreno sovrastante vs p.f. [kN]

Coefficiente sismico  $k_h$

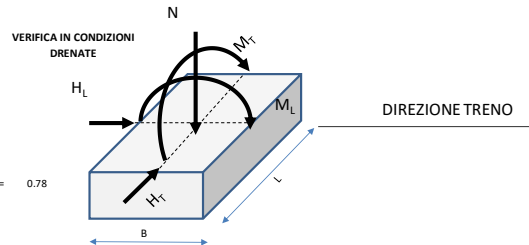
Coefficiente sismico  $k_v$

Azione inerziale orizzontale plinto

Azione inerziale verticale plinto

DA2

38	+	0.663	rad
0			
38	+	0.663	rad
0			
1.00			
1.00			
2.30			
1.10			
1.40			
38.00	+	0.663	rad
0.00			
0.78			
0.00			
2.2			
2.2			
2			
2			
0.8			
0.8			
0.5			
0.25			
40			
20			
20			
1			
0			
25			
250			
1.30			
0.000			
0.000			
0.00			
0.00			



(NB: coefficiente correttivo per rapporto D/B non considerato)

(valore da stabilirsi in base alla profondità di falda)

(0 = Lancellotta ecc., 1 = originale EC7)

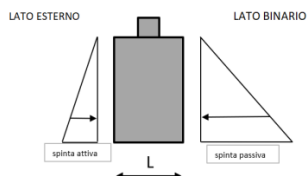
si useranno le formule originarie di EC7

Eccentricità degli scarichi rispetto a baricentro fondazione

eL	0	m	+ se concorde con i momenti del traliccio
eT	0.1	m	+ se concorde con i momenti del traliccio

Coefficienti di spinta di progetto

coefficiente di spinta attiva statico $K_a$	0.228	-
coefficiente di spinta attiva sismico $K_{a,E}$	0.483	-
coefficiente di spinta passiva statico $K_p$	4.395	-
coefficiente di spinta passiva sismico $K_{p,E}$	3.251	-
coeff. parziale riduttivo della spinta passiva	1.40	-
moltiplicatore della spinta passiva $\alpha$	0.00	long 0.49 trasv
contributo delle spinte frontali long - taglio	0	kN statico 0 kN sismico
contributo delle spinte frontali long - momer	0	kNm statico 0 kNm sismico
contributo delle spinte frontali trasv - taglio	-115.3	kN statico 0 kN sismico
contributo delle spinte frontali trasv - mome	-76.87	kNm statico 0 kNm sismico



CALCOLI PRELIMINARI: coefficienti di capacità portante indipendenti dai carichi

$N_{\alpha}$	=	48.93	$B_{\alpha}$	=	1
$N_{\gamma}$	=	74.90	$B_{\gamma}$	=	1
$N_t$	=	61.35	$B_t$	=	1

SINTESI RISULTATI					
Capacità portante	$F_s$	$m_{in}$	2.00	n. Verif. Neg.	0
Scorrimento	$F_s$	$m_{in}$	1.9	n. Verif. Neg.	0
Ribaltamento	$F_s$	$m_{in}$	1.21	n. Verif. Neg.	0



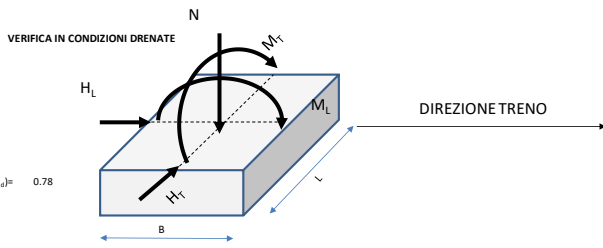
TITOLO: **Caso di carico 3 - combinazioni sismiche**

FONDAZIONI A PLINTO

DESIGN ASSUMPTION

piano campagna sostanzialmente orizzontale

angolo d'attrito caratteristico $\phi'_v$	38	°	0.663	rad
coesione $c'$	0	kPa	+	
angolo d'attrito caratteristico $\phi'_v$ alla base	38	°	0.663	rad
coesione alla base $c'$	0	kPa	+	
coefficiente $\gamma_v$	1.00			
coefficiente $\gamma_c$	1.00			
coefficiente $\gamma_u$ capacità portante	2.30			
coefficiente $\gamma_u$ scorrimento	2.30			
coefficiente $\gamma_u$ spinta passiva	1.10			
angolo d'attrito di design $\phi'_{dv}$	1.40			
coesione di design $c'_{dv}$	38.00	°	0.663	rad $\tan(\phi'_{dv}) = 0.78$
coeff. attrito di design $\mu'_{dv}$	0.00	kPa		
coesione alla base di design	0.78	kPa		
Dimensione fondazione B[m] (LONGITUDINALE)	0.00	m		
Dimensione fondazione L [m] (TRASVERSALE)	2.2	m		
Profondità da piano campagna D [m]	2.2	m		
Altezza plinto [m] H <sub>p</sub>	2	m		(NB: coefficiente correttivo per rapporto D/B non considerato)
Dimensione baggiolo b[m] (LONGITUDINALE)	2	m		
Dimensione maggiore baggiolo l [m] (TRASVERSALE)	0.8	m		
Altezza baggiolo [m] H <sub>b</sub>	0.8	m		
Altezza terreno sopra plinto [m] H <sub>t</sub>	0.5	m		
q' = carico permanente ai lati	0.25	m		
$\gamma_s$ = peso specifico medio sopra la fondazione	40	kPa		
$\gamma_f$ = peso specifico medio sotto la fondazione	20	kN/m <sup>3</sup>		(valore da stabilirsi in base alla profondità di falda)
opzione calcolo coeff. S <sub>u</sub> e S <sub>v</sub>	20	kN/m <sup>3</sup>		(0 = Lancellotta ecc, 1 = originale EC7)
	1			si useranno le formule originarie di EC7
opzione calcolo per tenere in conto peso terreno di ricoprimento	0	(1 si - 0 no)		
Peso specifico medio c.a.	25	kN/m <sup>3</sup>		
Peso proprio plinto + baggiolo + terreno sovrastante [kN]	250	kN		
Quota baricentro plinto + baggiolo + terreno sovrastante vs p.f. [m]	1.30	m		
Coefficiente sismico k <sub>h</sub>	0.231	g		
Coefficiente sismico k <sub>v</sub>	-0.116	g		+ downward
Azione inerziale orizzontale plinto	57.75	kN		
Azione inerziale verticale plinto	-28.88	kN		

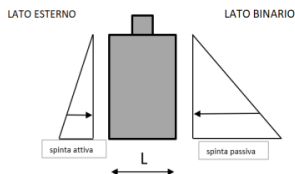


Eccentricità degli scarichi rispetto a baricentro fondazione

eccentricità longitudinale e <sub>L</sub>	0	m	+ se concorde con i momenti del traliccio
eccentricità trasversale e <sub>T</sub>	0.1	m	+ se concorde con i momenti del traliccio

Coefficienti di spinta di progetto

coefficiente di spinta attiva statico K <sub>a</sub>	0.228	-	
coefficiente di spinta attiva sismico K <sub>a,E</sub>	0.483	-	
coefficiente di spinta passiva statico K <sub>p</sub>	4.395	-	
coefficiente di spinta passiva sismico K <sub>p,E</sub>	3.251	-	
coeff. parziale riduttivo della spinta passiva $\gamma_{re}$	1.40	-	
moltiplicatore della spinta passiva $\alpha$	0.00	long 0.00	trasv
contributo delle spinte frontali long - taglio	0	kN	statico 0 kN sismico
contributo delle spinte frontali long - momento	0	kNm	statico 0 kNm sismico
contributo delle spinte frontali trasv - taglio	0	kN	statico 0 kN sismico
contributo delle spinte frontali trasv - momento	0	kNm	statico 0 kNm sismico



CALCOLI PRELIMINARI: coefficienti di capacità portante indipendenti dai carichi

N <sub>u</sub> = 48.93	B <sub>0</sub> = 1
N <sub>i</sub> = 74.90	B <sub>i</sub> = 1
N <sub>c</sub> = 61.35	B <sub>c</sub> = 1

SINTESI RISULTATI			
Capacità portante	F <sub>u, min</sub> = 10.06	n. Verif. Neg.	0
Scorrimento	F <sub>s, min</sub> = 2.58	n. Verif. Neg.	0
Ribaltamento	F <sub>r, min</sub> = 2.97	n. Verif. Neg.	0

Le verifiche sono soddisfatte.

GENERAL CONTRACTOR  IRICAV2		ALTA SORVEGLIANZA  ITALFERR GRUPPO FERROVIE DELLO STATO ITALIANE				
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## 12.6 Verifiche di dettaglio

Ribaltamento – verifiche statiche

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
A	288.96	288.96	0.00	76.63	3.77	OK
A	288.96	288.96	0.00	76.63	3.77	OK
A	288.96	288.96	0.00	96.27	3.00	OK
A	288.96	288.96	0.00	96.27	3.00	OK
A	293.15	293.15	0.00	77.01	3.81	OK
A	293.15	293.15	0.00	77.01	3.81	OK
A	293.15	293.15	0.00	96.65	3.03	OK
A	293.15	293.15	0.00	96.65	3.03	OK
A	288.96	288.96	0.00	56.90	5.08	OK
A	288.96	288.96	0.00	56.90	5.08	OK
A	288.96	288.96	0.00	76.54	3.78	OK
A	288.96	288.96	0.00	76.54	3.78	OK
A	293.15	293.15	0.00	57.28	5.12	OK
A	293.15	293.15	0.00	57.28	5.12	OK
A	293.15	293.15	0.00	76.93	3.81	OK
A	293.15	293.15	0.00	76.93	3.81	OK
B AA	288.96	288.96	0.00	138.99	2.08	OK
B AA	288.96	288.96	0.00	138.99	2.08	OK
B AA	288.96	288.96	0.00	150.73	1.92	OK
B AA	288.96	288.96	0.00	150.73	1.92	OK
B AA	293.15	293.15	0.00	139.38	2.10	OK
B AA	293.15	293.15	0.00	139.38	2.10	OK
B AA	293.15	293.15	0.00	151.11	1.94	OK
B AA	293.15	293.15	0.00	151.11	1.94	OK
B AA	288.96	288.96	0.00	60.74	4.76	OK
B AA	288.96	288.96	0.00	60.74	4.76	OK
B AA	288.96	288.96	0.00	49.00	5.90	OK
B AA	288.96	288.96	0.00	49.00	5.90	OK
B AA	293.15	293.15	0.00	61.12	4.80	OK
B AA	293.15	293.15	0.00	61.12	4.80	OK
B AA	293.15	293.15	0.00	49.38	5.94	OK
B AA	293.15	293.15	0.00	49.38	5.94	OK
B WX	288.96	288.96	67.96	48.29	4.25	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WX	288.96	288.96	67.96	48.29	4.25	OK
B WX	288.96	288.96	67.96	60.03	4.25	OK
B WX	288.96	288.96	67.96	60.03	4.25	OK
B WX	293.15	293.15	67.96	48.67	4.31	OK
B WX	293.15	293.15	67.96	48.67	4.31	OK
B WX	293.15	293.15	67.96	60.41	4.31	OK
B WX	293.15	293.15	67.96	60.41	4.31	OK
B WX	288.96	288.96	67.96	32.51	4.25	OK
B WX	288.96	288.96	67.96	32.51	4.25	OK
B WX	288.96	288.96	67.96	44.24	4.25	OK
B WX	288.96	288.96	67.96	44.24	4.25	OK
B WX	293.15	293.15	67.96	32.89	4.31	OK
B WX	293.15	293.15	67.96	32.89	4.31	OK
B WX	293.15	293.15	67.96	44.63	4.31	OK
B WX	293.15	293.15	67.96	44.63	4.31	OK
B WXY	288.96	288.96	47.57	151.81	1.90	OK
B WXY	288.96	288.96	47.57	151.81	1.90	OK
B WXY	288.96	288.96	47.57	163.55	1.77	OK
B WXY	288.96	288.96	47.57	163.55	1.77	OK
B WXY	293.15	293.15	47.57	152.19	1.93	OK
B WXY	293.15	293.15	47.57	152.19	1.93	OK
B WXY	293.15	293.15	47.57	163.93	1.79	OK
B WXY	293.15	293.15	47.57	163.93	1.79	OK
B WXY	288.96	288.96	47.57	73.55	3.93	OK
B WXY	288.96	288.96	47.57	73.55	3.93	OK
B WXY	288.96	288.96	47.57	61.82	4.67	OK
B WXY	288.96	288.96	47.57	61.82	4.67	OK
B WXY	293.15	293.15	47.57	73.93	3.96	OK
B WXY	293.15	293.15	47.57	73.93	3.96	OK
B WXY	293.15	293.15	47.57	62.20	4.71	OK
B WXY	293.15	293.15	47.57	62.20	4.71	OK
B WY	288.96	288.96	0.00	196.18	1.47	OK
B WY	288.96	288.96	0.00	196.18	1.47	OK
B WY	288.96	288.96	0.00	207.92	1.39	OK
B WY	288.96	288.96	0.00	207.92	1.39	OK
B WY	293.15	293.15	0.00	196.56	1.49	OK
B WY	293.15	293.15	0.00	196.56	1.49	OK
B WY	293.15	293.15	0.00	208.30	1.41	OK
B WY	293.15	293.15	0.00	208.30	1.41	OK





Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WY	288.96	288.96	0.00	117.92	2.45	OK
B WY	288.96	288.96	0.00	117.92	2.45	OK
B WY	288.96	288.96	0.00	106.18	2.72	OK
B WY	288.96	288.96	0.00	106.18	2.72	OK
B WY	293.15	293.15	0.00	118.30	2.48	OK
B WY	293.15	293.15	0.00	118.30	2.48	OK
B WY	293.15	293.15	0.00	106.56	2.75	OK
B WY	293.15	293.15	0.00	106.56	2.75	OK
D I	288.96	288.96	0.00	197.61	1.46	OK
D I	292.94	292.94	0.00	197.98	1.48	OK
D I	291.62	291.62	0.00	213.92	1.36	OK
D I	295.60	295.60	0.00	214.29	1.38	OK
D I	293.15	293.15	0.00	197.99	1.48	OK
D I	297.13	297.13	0.00	198.36	1.50	OK
D I	295.80	295.80	0.00	214.31	1.38	OK
D I	299.79	299.79	0.00	214.67	1.40	OK
D I	288.96	288.96	0.00	92.18	3.13	OK
D I	292.94	292.94	0.00	92.54	3.17	OK
D I	291.62	291.62	0.00	76.35	3.82	OK
D I	295.60	295.60	0.00	76.71	3.85	OK
D I	293.15	293.15	0.00	92.56	3.17	OK
D I	297.13	297.13	0.00	92.92	3.20	OK
D I	295.80	295.80	0.00	76.73	3.86	OK
D I	299.79	299.79	0.00	77.09	3.89	OK
D W	288.96	288.96	0.00	211.24	1.37	OK
D W	290.95	290.95	0.00	211.42	1.38	OK
D W	290.29	290.29	0.00	227.30	1.28	OK
D W	292.28	292.28	0.00	227.48	1.28	OK
D W	293.15	293.15	0.00	211.62	1.39	OK
D W	295.14	295.14	0.00	211.80	1.39	OK
D W	294.48	294.48	0.00	227.68	1.29	OK
D W	296.47	296.47	0.00	227.86	1.30	OK
D W	288.96	288.96	0.00	182.67	1.58	OK
D W	290.95	290.95	0.00	182.85	1.59	OK
D W	290.29	290.29	0.00	166.84	1.74	OK
D W	292.28	292.28	0.00	167.03	1.75	OK
D W	293.15	293.15	0.00	183.05	1.60	OK
D W	295.14	295.14	0.00	183.23	1.61	OK
D W	294.48	294.48	0.00	167.23	1.76	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
D W	296.47	296.47	0.00	167.41	1.77	OK
DAA	290.95	290.95	0.00	199.77	1.46	OK
DAA	290.95	290.95	0.00	199.77	1.46	OK
DAA	292.28	292.28	0.00	215.83	1.35	OK
DAA	292.28	292.28	0.00	215.83	1.35	OK
DAA	295.14	295.14	0.00	200.15	1.47	OK
DAA	295.14	295.14	0.00	200.15	1.47	OK
DAA	296.47	296.47	0.00	216.21	1.37	OK
DAA	296.47	296.47	0.00	216.21	1.37	OK
DAA	290.95	290.95	0.00	94.33	3.08	OK
DAA	290.95	290.95	0.00	94.33	3.08	OK
DAA	292.28	292.28	0.00	78.51	3.72	OK
DAA	292.28	292.28	0.00	78.51	3.72	OK
DAA	295.14	295.14	0.00	94.71	3.12	OK
DAA	295.14	295.14	0.00	94.71	3.12	OK
DAA	296.47	296.47	0.00	78.89	3.76	OK
DAA	296.47	296.47	0.00	78.89	3.76	OK
A	260.06	260.06	0.00	69.95	3.72	OK
A	260.06	260.06	0.00	69.95	3.72	OK
A	260.06	260.06	0.00	83.05	3.13	OK
A	260.06	260.06	0.00	83.05	3.13	OK
A	262.86	262.86	0.00	70.20	3.74	OK
A	262.86	262.86	0.00	70.20	3.74	OK
A	262.86	262.86	0.00	83.30	3.16	OK
A	262.86	262.86	0.00	83.30	3.16	OK
A	260.06	260.06	0.00	50.22	5.18	OK
A	260.06	260.06	0.00	50.22	5.18	OK
A	260.06	260.06	0.00	63.32	4.11	OK
A	260.06	260.06	0.00	63.32	4.11	OK
A	262.86	262.86	0.00	50.47	5.21	OK
A	262.86	262.86	0.00	50.47	5.21	OK
A	262.86	262.86	0.00	63.57	4.13	OK
A	262.86	262.86	0.00	63.57	4.13	OK
B AA	260.06	260.06	0.00	134.96	1.93	OK
B AA	260.06	260.06	0.00	134.96	1.93	OK
B AA	260.06	260.06	0.00	142.78	1.82	OK
B AA	260.06	260.06	0.00	142.78	1.82	OK
B AA	262.86	262.86	0.00	135.21	1.94	OK
B AA	262.86	262.86	0.00	135.21	1.94	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B AA	262.86	262.86	0.00	143.03	1.84	OK
B AA	262.86	262.86	0.00	143.03	1.84	OK
B AA	260.06	260.06	0.00	64.52	4.03	OK
B AA	260.06	260.06	0.00	64.52	4.03	OK
B AA	260.06	260.06	0.00	56.70	4.59	OK
B AA	260.06	260.06	0.00	56.70	4.59	OK
B AA	262.86	262.86	0.00	64.78	4.06	OK
B AA	262.86	262.86	0.00	64.78	4.06	OK
B AA	262.86	262.86	0.00	56.95	4.62	OK
B AA	262.86	262.86	0.00	56.95	4.62	OK
B WX	260.06	260.06	67.96	44.25	3.83	OK
B WX	260.06	260.06	67.96	44.25	3.83	OK
B WX	260.06	260.06	67.96	52.07	3.83	OK
B WX	260.06	260.06	67.96	52.07	3.83	OK
B WX	262.86	262.86	67.96	44.50	3.87	OK
B WX	262.86	262.86	67.96	44.50	3.87	OK
B WX	262.86	262.86	67.96	52.33	3.87	OK
B WX	262.86	262.86	67.96	52.33	3.87	OK
B WX	260.06	260.06	67.96	28.47	3.83	OK
B WX	260.06	260.06	67.96	28.47	3.83	OK
B WX	260.06	260.06	67.96	36.29	3.83	OK
B WX	260.06	260.06	67.96	36.29	3.83	OK
B WX	262.86	262.86	67.96	28.72	3.87	OK
B WX	262.86	262.86	67.96	28.72	3.87	OK
B WX	262.86	262.86	67.96	36.55	3.87	OK
B WX	262.86	262.86	67.96	36.55	3.87	OK
B WXY	260.06	260.06	47.57	147.77	1.76	OK
B WXY	260.06	260.06	47.57	147.77	1.76	OK
B WXY	260.06	260.06	47.57	155.60	1.67	OK
B WXY	260.06	260.06	47.57	155.60	1.67	OK
B WXY	262.86	262.86	47.57	148.02	1.78	OK
B WXY	262.86	262.86	47.57	148.02	1.78	OK
B WXY	262.86	262.86	47.57	155.85	1.69	OK
B WXY	262.86	262.86	47.57	155.85	1.69	OK
B WXY	260.06	260.06	47.57	77.34	3.36	OK
B WXY	260.06	260.06	47.57	77.34	3.36	OK
B WXY	260.06	260.06	47.57	69.51	3.74	OK
B WXY	260.06	260.06	47.57	69.51	3.74	OK
B WXY	262.86	262.86	47.57	77.59	3.39	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WXY	262.86	262.86	47.57	77.59	3.39	OK
B WXY	262.86	262.86	47.57	69.77	3.77	OK
B WXY	262.86	262.86	47.57	69.77	3.77	OK
B WY	260.06	260.06	0.00	192.14	1.35	OK
B WY	260.06	260.06	0.00	192.14	1.35	OK
B WY	260.06	260.06	0.00	199.96	1.30	OK
B WY	260.06	260.06	0.00	199.96	1.30	OK
B WY	262.86	262.86	0.00	192.39	1.37	OK
B WY	262.86	262.86	0.00	192.39	1.37	OK
B WY	262.86	262.86	0.00	200.22	1.31	OK
B WY	262.86	262.86	0.00	200.22	1.31	OK
B WY	260.06	260.06	0.00	121.71	2.14	OK
B WY	260.06	260.06	0.00	121.71	2.14	OK
B WY	260.06	260.06	0.00	113.88	2.28	OK
B WY	260.06	260.06	0.00	113.88	2.28	OK
B WY	262.86	262.86	0.00	121.96	2.16	OK
B WY	262.86	262.86	0.00	121.96	2.16	OK
B WY	262.86	262.86	0.00	114.13	2.30	OK
B WY	262.86	262.86	0.00	114.13	2.30	OK
D I	260.06	260.06	0.00	192.21	1.35	OK
D I	264.05	264.05	0.00	192.58	1.37	OK
D I	262.72	262.72	0.00	203.25	1.29	OK
D I	266.71	266.71	0.00	203.62	1.31	OK
D I	262.86	262.86	0.00	192.47	1.37	OK
D I	266.84	266.84	0.00	192.83	1.38	OK
D I	265.51	265.51	0.00	203.51	1.30	OK
D I	269.50	269.50	0.00	203.87	1.32	OK
D I	260.06	260.06	0.00	97.32	2.67	OK
D I	264.05	264.05	0.00	97.68	2.70	OK
D I	262.72	262.72	0.00	86.77	3.03	OK
D I	266.71	266.71	0.00	87.13	3.06	OK
D I	262.86	262.86	0.00	97.58	2.69	OK
D I	266.84	266.84	0.00	97.94	2.72	OK
D I	265.51	265.51	0.00	87.02	3.05	OK
D I	269.50	269.50	0.00	87.38	3.08	OK
D W	260.06	260.06	0.00	205.84	1.26	OK
D W	262.06	262.06	0.00	206.02	1.27	OK
D W	261.39	261.39	0.00	216.63	1.21	OK
D W	263.38	263.38	0.00	216.81	1.21	OK

GENERAL CONTRACTOR  IRICAV2	ALTA SORVEGLIANZA  GRUPPO FERROVIE DELLO STATO ITALIANE	Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 149 di 336
Relazione di calcolo pali di alimentazione						

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
D W	262.86	262.86	0.00	206.09	1.28	OK
D W	264.85	264.85	0.00	206.27	1.28	OK
D W	264.18	264.18	0.00	216.88	1.22	OK
D W	266.18	266.18	0.00	217.06	1.23	OK
D W	260.06	260.06	0.00	187.81	1.38	OK
D W	262.06	262.06	0.00	187.99	1.39	OK
D W	261.39	261.39	0.00	177.26	1.47	OK
D W	263.38	263.38	0.00	177.44	1.48	OK
D W	262.86	262.86	0.00	188.07	1.40	OK
D W	264.85	264.85	0.00	188.25	1.41	OK
D W	264.18	264.18	0.00	177.52	1.49	OK
D W	266.18	266.18	0.00	177.70	1.50	OK
DAA	262.06	262.06	0.00	194.37	1.35	OK
DAA	262.06	262.06	0.00	194.37	1.35	OK
DAA	263.38	263.38	0.00	205.16	1.28	OK
DAA	263.38	263.38	0.00	205.16	1.28	OK
DAA	264.85	264.85	0.00	194.62	1.36	OK
DAA	264.85	264.85	0.00	194.62	1.36	OK
DAA	266.18	266.18	0.00	205.41	1.30	OK
DAA	266.18	266.18	0.00	205.41	1.30	OK
DAA	262.06	262.06	0.00	99.48	2.63	OK
DAA	262.06	262.06	0.00	99.48	2.63	OK
DAA	263.38	263.38	0.00	88.93	2.96	OK
DAA	263.38	263.38	0.00	88.93	2.96	OK
DAA	264.85	264.85	0.00	99.73	2.66	OK
DAA	264.85	264.85	0.00	99.73	2.66	OK
DAA	266.18	266.18	0.00	89.18	2.98	OK

Scorrimento – verifiche statiche

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	$R_d = (N \cdot m_d + (B' \cdot L) \cdot c'_{dbase}) / g_R$		$E_d$	$R_d/E_d$	
	kN		kN		
COMB					
A	186.6		6.6	28.34	OK
A	186.6		6.6	28.34	OK



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / g_R$	$E_d$	$R_d / E_d$	
		kN	kN		
A	186.6	8.0	23.20	OK	
A	186.6	8.0	23.20	OK	
A	189.3	6.6	28.75	OK	
A	189.3	6.6	28.75	OK	
A	189.3	8.0	23.53	OK	
A	189.3	8.0	23.53	OK	
A	186.6	3.2	59.20	OK	
A	186.6	3.2	59.20	OK	
A	186.6	4.6	40.46	OK	
A	186.6	4.6	40.46	OK	
A	189.3	3.2	60.06	OK	
A	189.3	3.2	60.06	OK	
A	189.3	4.6	41.04	OK	
A	189.3	4.6	41.04	OK	
B AA	186.6	13.4	13.91	OK	
B AA	186.6	13.4	13.91	OK	
B AA	186.6	14.3	13.07	OK	
B AA	186.6	14.3	13.07	OK	
B AA	189.3	13.4	14.11	OK	
B AA	189.3	13.4	14.11	OK	
B AA	189.3	14.3	13.26	OK	
B AA	189.3	14.3	13.26	OK	
B AA	186.6	7.7	24.30	OK	
B AA	186.6	7.7	24.30	OK	
B AA	186.6	6.8	27.36	OK	
B AA	186.6	6.8	27.36	OK	
B AA	189.3	7.7	24.65	OK	
B AA	189.3	7.7	24.65	OK	
B AA	189.3	6.8	27.76	OK	
B AA	189.3	6.8	27.76	OK	
B WX	186.6	8.8	21.21	OK	
B WX	186.6	8.8	21.21	OK	
B WX	186.6	9.2	20.18	OK	
B WX	186.6	9.2	20.18	OK	
B WX	189.3	8.8	21.51	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / g_R$	$E_d$	$R_d / E_d$	
		kN	kN		
B WX	189.3	8.8	21.51	OK	
B WX	189.3	9.2	20.48	OK	
B WX	189.3	9.2	20.48	OK	
B WX	186.6	7.9	23.76	OK	
B WX	186.6	7.9	23.76	OK	
B WX	186.6	8.1	23.15	OK	
B WX	186.6	8.1	23.15	OK	
B WX	189.3	7.9	24.11	OK	
B WX	189.3	7.9	24.11	OK	
B WX	189.3	8.1	23.48	OK	
B WX	189.3	8.1	23.48	OK	
B WXY	186.6	15.5	12.03	OK	
B WXY	186.6	15.5	12.03	OK	
B WXY	186.6	16.3	11.43	OK	
B WXY	186.6	16.3	11.43	OK	
B WXY	189.3	15.5	12.20	OK	
B WXY	189.3	15.5	12.20	OK	
B WXY	189.3	16.3	11.60	OK	
B WXY	189.3	16.3	11.60	OK	
B WXY	186.6	10.3	18.06	OK	
B WXY	186.6	10.3	18.06	OK	
B WXY	186.6	9.6	19.42	OK	
B WXY	186.6	9.6	19.42	OK	
B WXY	189.3	10.3	18.32	OK	
B WXY	189.3	10.3	18.32	OK	
B WXY	189.3	9.6	19.70	OK	
B WXY	189.3	9.6	19.70	OK	
B WY	186.6	19.0	9.84	OK	
B WY	186.6	19.0	9.84	OK	
B WY	186.6	19.8	9.41	OK	
B WY	186.6	19.8	9.41	OK	
B WY	189.3	19.0	9.98	OK	
B WY	189.3	19.0	9.98	OK	
B WY	189.3	19.8	9.55	OK	
B WY	189.3	19.8	9.55	OK	
B WY	186.6	13.2	14.11	OK	
B WY	186.6	13.2	14.11	OK	
B WY	186.6	12.4	15.09	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / g_R$	$E_d$	$R_d / E_d$	
		kN	kN		
B WY	186.6	12.4	15.09	OK	
B WY	189.3	13.2	14.31	OK	
B WY	189.3	13.2	14.31	OK	
B WY	189.3	12.4	15.31	OK	
B WY	189.3	12.4	15.31	OK	
D I	186.6	17.7	10.53	OK	
D I	189.2	17.7	10.67	OK	
D I	188.3	18.9	9.97	OK	
D I	190.9	18.9	10.10	OK	
D I	189.3	17.7	10.68	OK	
D I	191.9	17.7	10.83	OK	
D I	191.0	18.9	10.11	OK	
D I	193.6	18.9	10.24	OK	
D I	186.6	9.9	18.85	OK	
D I	189.2	9.9	19.11	OK	
D I	188.3	8.7	21.59	OK	
D I	190.9	8.7	21.88	OK	
D I	189.3	9.9	19.13	OK	
D I	191.9	9.9	19.39	OK	
D I	191.0	8.7	21.90	OK	
D I	193.6	8.7	22.19	OK	
D W	186.6	89.3	2.09	OK	
D W	187.9	89.3	2.10	OK	
D W	187.4	88.1	2.13	OK	
D W	188.7	88.1	2.14	OK	
D W	189.3	89.3	2.12	OK	
D W	190.6	89.3	2.13	OK	
D W	190.1	88.1	2.16	OK	
D W	191.4	88.1	2.17	OK	
D W	186.6	18.2	10.26	OK	
D W	187.9	18.2	10.33	OK	
D W	187.4	17.0	11.02	OK	
D W	188.7	17.0	11.09	OK	
D W	189.3	18.2	10.41	OK	
D W	190.6	18.2	10.48	OK	
D W	190.1	17.0	11.18	OK	
D W	191.4	17.0	11.25	OK	
DAA	187.9	18.1	10.40	OK	





Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / g_R$	$E_d$	$R_d / E_d$	
		kN	kN		
DAA	187.9	18.1	10.40	OK	
DAA	188.7	19.2	9.81	OK	
DAA	188.7	19.2	9.81	OK	
DAA	190.6	18.1	10.55	OK	
DAA	190.6	18.1	10.55	OK	
DAA	191.4	19.2	9.95	OK	
DAA	191.4	19.2	9.95	OK	
DAA	187.9	10.2	18.35	OK	
DAA	187.9	10.2	18.35	OK	
DAA	188.7	9.1	20.82	OK	
DAA	188.7	9.1	20.82	OK	
DAA	190.6	10.2	18.61	OK	
DAA	190.6	10.2	18.61	OK	
DAA	191.4	9.1	21.12	OK	
DAA	191.4	9.1	21.12	OK	
A	167.9	6.1	27.55	OK	
A	167.9	6.1	27.55	OK	
A	167.9	7.1	23.75	OK	
A	167.9	7.1	23.75	OK	
A	169.7	6.1	27.84	OK	
A	169.7	6.1	27.84	OK	
A	169.7	7.1	24.01	OK	
A	169.7	7.1	24.01	OK	
A	167.9	2.7	63.01	OK	
A	167.9	2.7	63.01	OK	
A	167.9	3.6	46.15	OK	
A	167.9	3.6	46.15	OK	
A	169.7	2.7	63.69	OK	
A	169.7	2.7	63.69	OK	
A	169.7	3.6	46.65	OK	
A	169.7	3.6	46.65	OK	
B AA	167.9	13.1	12.79	OK	
B AA	167.9	13.1	12.79	OK	
B AA	167.9	13.7	12.26	OK	
B AA	167.9	13.7	12.26	OK	
B AA	169.7	13.1	12.93	OK	
B AA	169.7	13.1	12.93	OK	
B AA	169.7	13.7	12.39	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / g_R$	$E_d$	$R_d / E_d$	
		kN	kN		
B AA	169.7	13.7	12.39	OK	
B AA	167.9	8.0	21.08	OK	
B AA	167.9	8.0	21.08	OK	
B AA	167.9	7.4	22.72	OK	
B AA	167.9	7.4	22.72	OK	
B AA	169.7	8.0	21.31	OK	
B AA	169.7	8.0	21.31	OK	
B AA	169.7	7.4	22.96	OK	
B AA	169.7	7.4	22.96	OK	
B WX	167.9	8.7	19.38	OK	
B WX	167.9	8.7	19.38	OK	
B WX	167.9	8.9	18.78	OK	
B WX	167.9	8.9	18.78	OK	
B WX	169.7	8.7	19.59	OK	
B WX	169.7	8.7	19.59	OK	
B WX	169.7	8.9	18.99	OK	
B WX	169.7	8.9	18.99	OK	
B WX	167.9	7.8	21.52	OK	
B WX	167.9	7.8	21.52	OK	
B WX	167.9	7.9	21.22	OK	
B WX	167.9	7.9	21.22	OK	
B WX	169.7	7.8	21.75	OK	
B WX	169.7	7.8	21.75	OK	
B WX	169.7	7.9	21.45	OK	
B WX	169.7	7.9	21.45	OK	
B WXY	167.9	15.2	11.02	OK	
B WXY	167.9	15.2	11.02	OK	
B WXY	167.9	15.8	10.64	OK	
B WXY	167.9	15.8	10.64	OK	
B WXY	169.7	15.2	11.13	OK	
B WXY	169.7	15.2	11.13	OK	
B WXY	169.7	15.8	10.75	OK	
B WXY	169.7	15.8	10.75	OK	
B WXY	167.9	10.6	15.88	OK	
B WXY	167.9	10.6	15.88	OK	
B WXY	167.9	10.1	16.65	OK	
B WXY	167.9	10.1	16.65	OK	
B WXY	169.7	10.6	16.05	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / g_R$	$E_d$	$R_d / E_d$	
		kN	kN		
B WXY	169.7	10.6	16.05	OK	
B WXY	169.7	10.1	16.83	OK	
B WXY	169.7	10.1	16.83	OK	
B WY	167.9	18.7	8.99	OK	
B WY	167.9	18.7	8.99	OK	
B WY	167.9	19.2	8.72	OK	
B WY	167.9	19.2	8.72	OK	
B WY	169.7	18.7	9.09	OK	
B WY	169.7	18.7	9.09	OK	
B WY	169.7	19.2	8.82	OK	
B WY	169.7	19.2	8.82	OK	
B WY	167.9	13.5	12.43	OK	
B WY	167.9	13.5	12.43	OK	
B WY	167.9	12.9	12.98	OK	
B WY	167.9	12.9	12.98	OK	
B WY	169.7	13.5	12.56	OK	
B WY	169.7	13.5	12.56	OK	
B WY	169.7	12.9	13.12	OK	
B WY	169.7	12.9	13.12	OK	
D I	167.9	17.3	9.69	OK	
D I	170.5	17.3	9.84	OK	
D I	169.6	18.1	9.37	OK	
D I	172.2	18.1	9.51	OK	
D I	169.7	17.3	9.79	OK	
D I	172.3	17.3	9.94	OK	
D I	171.4	18.1	9.47	OK	
D I	174.0	18.1	9.61	OK	
D I	167.9	10.3	16.32	OK	
D I	170.5	10.3	16.57	OK	
D I	169.6	9.5	17.85	OK	
D I	172.2	9.5	18.12	OK	
D I	169.7	10.3	16.50	OK	
D I	172.3	10.3	16.75	OK	
D I	171.4	9.5	18.04	OK	
D I	174.0	9.5	18.31	OK	
D W	167.9	89.7	1.87	OK	
D W	169.2	89.7	1.89	OK	
D W	168.8	88.9	1.90	OK	

GENERAL CONTRACTOR  <b>IRICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione	Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 156 di 336

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / g_R$	$E_d$	$R_d / E_d$	
		kN	kN		
D W	170.1	88.9	1.91	OK	
D W	169.7	89.7	1.89	OK	
D W	171.0	89.7	1.91	OK	
D W	170.6	88.9	1.92	OK	
D W	171.9	88.9	1.93	OK	
D W	167.9	18.6	9.04	OK	
D W	169.2	18.6	9.11	OK	
D W	168.8	17.8	9.48	OK	
D W	170.1	17.8	9.56	OK	
D W	169.7	18.6	9.14	OK	
D W	171.0	18.6	9.21	OK	
D W	170.6	17.8	9.59	OK	
D W	171.9	17.8	9.66	OK	
DAA	169.2	17.7	9.57	OK	
DAA	169.2	17.7	9.57	OK	
DAA	170.1	18.5	9.22	OK	
DAA	170.1	18.5	9.22	OK	
DAA	171.0	17.7	9.68	OK	
DAA	171.0	17.7	9.68	OK	
DAA	171.9	18.5	9.31	OK	
DAA	171.9	18.5	9.31	OK	
DAA	169.2	10.6	15.92	OK	
DAA	169.2	10.6	15.92	OK	
DAA	170.1	9.8	17.27	OK	
DAA	170.1	9.8	17.27	OK	
DAA	171.0	10.6	16.09	OK	
DAA	171.0	10.6	16.09	OK	
DAA	171.9	9.8	17.45	OK	

Capacità portante – verifiche statiche

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	COMB	$R_d$	$E_d$	$R_d / E_d$	
		$q_{u,d}$ kPa	$q_{E,d} = N / (B' \cdot L')$		
A	$(2731. + 1203. +) / 2.3 =$	1710.7	73.86	23.16	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	$R_d$		$E_d$	$R_d/E_d$	
COMB	$q_{u,d}$ kPa		$q_{E,d} = N / (B \cdot L')$		
			kPa		
A	$(2731. + 1203. +) / 2.3 =$	1710.7	73.86	23.16	OK
A	$(2627. + 1216. +) / 2.3 =$	1670.7	81.39	20.53	OK
A	$(2627. + 1216. +) / 2.3 =$	1670.7	81.39	20.53	OK
A	$(2736. + 1203. +) / 2.3 =$	1712.7	74.68	22.93	OK
A	$(2736. + 1203. +) / 2.3 =$	1712.7	74.68	22.93	OK
A	$(2633. + 1216. +) / 2.3 =$	1673.3	82.15	20.37	OK
A	$(2633. + 1216. +) / 2.3 =$	1673.3	82.15	20.37	OK
A	$(2871. + 1213. +) / 2.3 =$	1775.4	67.58	26.27	OK
A	$(2871. + 1213. +) / 2.3 =$	1775.4	67.58	26.27	OK
A	$(2765. + 1227. +) / 2.3 =$	1735.6	73.83	23.51	OK
A	$(2765. + 1227. +) / 2.3 =$	1735.6	73.83	23.51	OK
A	$(2873. + 1213. +) / 2.3 =$	1776.5	68.43	25.96	OK
A	$(2873. + 1213. +) / 2.3 =$	1776.5	68.43	25.96	OK
A	$(2769. + 1227. +) / 2.3 =$	1737.3	74.65	23.27	OK
A	$(2769. + 1227. +) / 2.3 =$	1737.3	74.65	23.27	OK
B AA	$(2368. + 1210. +) / 2.3 =$	1555.6	104.58	14.88	OK
B AA	$(2368. + 1210. +) / 2.3 =$	1555.6	104.58	14.88	OK
B AA	$(2307. + 1215. +) / 2.3 =$	1531.5	113.46	13.50	OK
B AA	$(2307. + 1215. +) / 2.3 =$	1531.5	113.46	13.50	OK
B AA	$(2377. + 1210. +) / 2.3 =$	1559.9	104.97	14.86	OK
B AA	$(2377. + 1210. +) / 2.3 =$	1559.9	104.97	14.86	OK
B AA	$(2318. + 1216. +) / 2.3 =$	1536.1	113.64	13.52	OK
B AA	$(2318. + 1216. +) / 2.3 =$	1536.1	113.64	13.52	OK
B AA	$(2778. + 1165. +) / 2.3 =$	1714.4	68.72	24.95	OK
B AA	$(2778. + 1165. +) / 2.3 =$	1714.4	68.72	24.95	OK
B AA	$(2840. + 1157. +) / 2.3 =$	1738.0	65.36	26.59	OK
B AA	$(2840. + 1157. +) / 2.3 =$	1738.0	65.36	26.59	OK
B AA	$(2781. + 1166. +) / 2.3 =$	1716.3	69.57	24.67	OK
B AA	$(2781. + 1166. +) / 2.3 =$	1716.3	69.57	24.67	OK
B AA	$(2843. + 1158. +) / 2.3 =$	1739.5	66.22	26.27	OK
B AA	$(2843. + 1158. +) / 2.3 =$	1739.5	66.22	26.27	OK
B WX	$(2910. + 838. +) / 2.3 =$	1629.7	85.20	19.13	OK
B WX	$(2910. + 838. +) / 2.3 =$	1629.7	85.20	19.13	OK
B WX	$(2957. + 818. +) / 2.3 =$	1641.5	89.57	18.33	OK
B WX	$(2957. + 818. +) / 2.3 =$	1641.5	89.57	18.33	OK
B WX	$(2916. + 842. +) / 2.3 =$	1633.7	85.95	19.01	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
COMB	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
			kPa		
B WX	(2916. + 842. +) / 2.3 =	1633.7	85.95	19.01	OK
B WX	(2962. + 822. +) / 2.3 =	1645.3	90.28	18.22	OK
B WX	(2962. + 822. +) / 2.3 =	1645.3	90.28	18.22	OK
B WX	(2859. + 865. +) / 2.3 =	1619.5	79.96	20.25	OK
B WX	(2859. + 865. +) / 2.3 =	1619.5	79.96	20.25	OK
B WX	(2905. + 849. +) / 2.3 =	1632.2	83.80	19.48	OK
B WX	(2905. + 849. +) / 2.3 =	1632.2	83.80	19.48	OK
B WX	(2866. + 869. +) / 2.3 =	1623.6	80.74	20.11	OK
B WX	(2866. + 869. +) / 2.3 =	1623.6	80.74	20.11	OK
B WX	(2910. + 853. +) / 2.3 =	1636.2	84.55	19.35	OK
B WX	(2910. + 853. +) / 2.3 =	1636.2	84.55	19.35	OK
B WXY	(2396. + 974. +) / 2.3 =	1465.5	136.89	10.71	OK
B WXY	(2396. + 974. +) / 2.3 =	1465.5	136.89	10.71	OK
B WXY	(2328. + 982. +) / 2.3 =	1439.1	149.70	9.61	OK
B WXY	(2328. + 982. +) / 2.3 =	1439.1	149.70	9.61	OK
B WXY	(2406. + 978. +) / 2.3 =	1471.2	136.69	10.76	OK
B WXY	(2406. + 978. +) / 2.3 =	1471.2	136.69	10.76	OK
B WXY	(2339. + 985. +) / 2.3 =	1445.2	149.11	9.69	OK
B WXY	(2339. + 985. +) / 2.3 =	1445.2	149.11	9.69	OK
B WXY	(2854. + 911. +) / 2.3 =	1637.1	87.16	18.78	OK
B WXY	(2854. + 911. +) / 2.3 =	1637.1	87.16	18.78	OK
B WXY	(2923. + 900. +) / 2.3 =	1662.0	82.65	20.11	OK
B WXY	(2923. + 900. +) / 2.3 =	1662.0	82.65	20.11	OK
B WXY	(2857. + 915. +) / 2.3 =	1640.0	87.90	18.66	OK
B WXY	(2857. + 915. +) / 2.3 =	1640.0	87.90	18.66	OK
B WXY	(2924. + 904. +) / 2.3 =	1664.5	83.43	19.95	OK
B WXY	(2924. + 904. +) / 2.3 =	1664.5	83.43	19.95	OK
B WY	(2055. + 1211. +) / 2.3 =	1420.2	169.03	8.40	OK
B WY	(2055. + 1211. +) / 2.3 =	1420.2	169.03	8.40	OK
B WY	(1996. + 1213. +) / 2.3 =	1395.4	193.52	7.21	OK
B WY	(1996. + 1213. +) / 2.3 =	1395.4	193.52	7.21	OK
B WY	(2069. + 1212. +) / 2.3 =	1426.4	167.11	8.54	OK
B WY	(2069. + 1212. +) / 2.3 =	1426.4	167.11	8.54	OK
B WY	(2010. + 1214. +) / 2.3 =	1402.0	190.23	7.37	OK
B WY	(2010. + 1214. +) / 2.3 =	1402.0	190.23	7.37	OK
B WY	(2455. + 1183. +) / 2.3 =	1581.9	91.69	17.25	OK
B WY	(2455. + 1183. +) / 2.3 =	1581.9	91.69	17.25	OK
B WY	(2516. + 1177. +) / 2.3 =	1605.8	85.81	18.71	OK
B WY	(2516. + 1177. +) / 2.3 =	1605.8	85.81	18.71	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
COMB	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
			kPa		
B WY	(2463. + 1184. +) / 2.3 =	1585.7	92.32	17.18	OK
B WY	(2463. + 1184. +) / 2.3 =	1585.7	92.32	17.18	OK
B WY	(2524. + 1178. +) / 2.3 =	1609.2	86.51	18.60	OK
B WY	(2524. + 1178. +) / 2.3 =	1609.2	86.51	18.60	OK
D I	(2068. + 1230. +) / 2.3 =	1433.9	171.69	8.35	OK
D I	(2081. + 1230. +) / 2.3 =	1439.6	169.73	8.48	OK
D I	(1996. + 1234. +) / 2.3 =	1404.1	205.59	6.83	OK
D I	(2010. + 1234. +) / 2.3 =	1410.3	201.84	6.99	OK
D I	(2081. + 1230. +) / 2.3 =	1439.9	169.63	8.49	OK
D I	(2094. + 1231. +) / 2.3 =	1445.5	167.89	8.61	OK
D I	(2010. + 1234. +) / 2.3 =	1410.6	201.66	7.00	OK
D I	(2024. + 1235. +) / 2.3 =	1416.6	198.31	7.14	OK
D I	(2613. + 1187. +) / 2.3 =	1652.1	79.70	20.73	OK
D I	(2619. + 1187. +) / 2.3 =	1654.7	80.43	20.57	OK
D I	(2701. + 1177. +) / 2.3 =	1686.0	74.20	22.72	OK
D I	(2705. + 1177. +) / 2.3 =	1688.1	74.98	22.51	OK
D I	(2619. + 1187. +) / 2.3 =	1654.9	80.47	20.57	OK
D I	(2625. + 1187. +) / 2.3 =	1657.5	81.20	20.41	OK
D I	(2706. + 1177. +) / 2.3 =	1688.3	75.02	22.50	OK
D I	(2710. + 1178. +) / 2.3 =	1690.4	75.80	22.30	OK
D W	(1086. + 476. +) / 2.3 =	678.9	201.78	3.36	OK
D W	(1096. + 480. +) / 2.3 =	685.4	199.92	3.43	OK
D W	(1058. + 489. +) / 2.3 =	673.0	251.28	2.68	OK
D W	(1069. + 494. +) / 2.3 =	679.7	247.62	2.74	OK
D W	(1108. + 485. +) / 2.3 =	692.6	197.98	3.50	OK
D W	(1118. + 490. +) / 2.3 =	699.1	196.31	3.56	OK
D W	(1081. + 499. +) / 2.3 =	686.9	243.84	2.82	OK
D W	(1091. + 504. +) / 2.3 =	693.4	240.63	2.88	OK
D W	(2120. + 1205. +) / 2.3 =	1445.8	147.55	9.80	OK
D W	(2126. + 1205. +) / 2.3 =	1448.6	147.08	9.85	OK
D W	(2205. + 1201. +) / 2.3 =	1480.7	128.22	11.55	OK
D W	(2211. + 1201. +) / 2.3 =	1483.3	128.11	11.58	OK
D W	(2133. + 1206. +) / 2.3 =	1451.6	146.60	9.90	OK
D W	(2139. + 1206. +) / 2.3 =	1454.4	146.20	9.95	OK
D W	(2217. + 1201. +) / 2.3 =	1486.0	128.00	11.61	OK
D W	(2222. + 1202. +) / 2.3 =	1488.5	127.92	11.64	OK
DAA	(2061. + 1228. +) / 2.3 =	1430.2	174.38	8.20	OK
DAA	(2061. + 1228. +) / 2.3 =	1430.2	174.38	8.20	OK
DAA	(1986. + 1231. +) / 2.3 =	1398.7	209.89	6.66	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
DAA	(1986. + 1231. +) / 2.3 =	1398.7	209.89	6.66	OK
DAA	(2075. + 1228. +) / 2.3 =	1436.3	172.24	8.34	OK
DAA	(2075. + 1228. +) / 2.3 =	1436.3	172.24	8.34	OK
DAA	(2001. + 1232. +) / 2.3 =	1405.3	205.70	6.83	OK
DAA	(2001. + 1232. +) / 2.3 =	1405.3	205.70	6.83	OK
DAA	(2602. + 1186. +) / 2.3 =	1647.0	80.87	20.37	OK
DAA	(2602. + 1186. +) / 2.3 =	1647.0	80.87	20.37	OK
DAA	(2687. + 1176. +) / 2.3 =	1679.8	75.06	22.38	OK
DAA	(2687. + 1176. +) / 2.3 =	1679.8	75.06	22.38	OK
DAA	(2609. + 1186. +) / 2.3 =	1649.8	81.63	20.21	OK
DAA	(2609. + 1186. +) / 2.3 =	1649.8	81.63	20.21	OK
DAA	(2692. + 1177. +) / 2.3 =	1682.2	75.88	22.17	OK
DAA	(2692. + 1177. +) / 2.3 =	1682.2	75.88	22.17	OK
A	(2724. + 1203. +) / 2.3 =	1707.1	66.82	25.55	OK
A	(2724. + 1203. +) / 2.3 =	1707.1	66.82	25.55	OK
A	(2646. + 1212. +) / 2.3 =	1677.5	71.76	23.38	OK
A	(2646. + 1212. +) / 2.3 =	1677.5	71.76	23.38	OK
A	(2727. + 1203. +) / 2.3 =	1708.6	67.36	25.36	OK
A	(2727. + 1203. +) / 2.3 =	1708.6	67.36	25.36	OK
A	(2651. + 1212. +) / 2.3 =	1679.3	72.28	23.23	OK
A	(2651. + 1212. +) / 2.3 =	1679.3	72.28	23.23	OK
A	(2879. + 1213. +) / 2.3 =	1779.0	60.54	29.39	OK
A	(2879. + 1213. +) / 2.3 =	1779.0	60.54	29.39	OK
A	(2800. + 1224. +) / 2.3 =	1749.6	64.57	27.10	OK
A	(2800. + 1224. +) / 2.3 =	1749.6	64.57	27.10	OK
A	(2880. + 1213. +) / 2.3 =	1779.8	61.11	29.13	OK
A	(2880. + 1213. +) / 2.3 =	1779.8	61.11	29.13	OK
A	(2803. + 1224. +) / 2.3 =	1750.6	65.12	26.88	OK
A	(2803. + 1224. +) / 2.3 =	1750.6	65.12	26.88	OK
B AA	(2305. + 1210. +) / 2.3 =	1528.5	101.54	15.05	OK
B AA	(2305. + 1210. +) / 2.3 =	1528.5	101.54	15.05	OK
B AA	(2261. + 1213. +) / 2.3 =	1510.6	108.31	13.95	OK
B AA	(2261. + 1213. +) / 2.3 =	1510.6	108.31	13.95	OK
B AA	(2313. + 1210. +) / 2.3 =	1532.0	101.67	15.07	OK
B AA	(2313. + 1210. +) / 2.3 =	1532.0	101.67	15.07	OK
B AA	(2269. + 1214. +) / 2.3 =	1514.2	108.31	13.98	OK
B AA	(2269. + 1214. +) / 2.3 =	1514.2	108.31	13.98	OK
B AA	(2713. + 1168. +) / 2.3 =	1687.7	64.97	25.98	OK
B AA	(2713. + 1168. +) / 2.3 =	1687.7	64.97	25.98	OK





Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	$R_d$		$E_d$	$R_d/E_d$	
COMB	$q_{u,d}$ kPa		$q_{E,d} = N / (B \cdot L)$		
			kPa		
B AA	$(2759. + 1163. +) / 2.3 =$	1705.2	62.47	27.30	OK
B AA	$(2759. + 1163. +) / 2.3 =$	1705.2	62.47	27.30	OK
B AA	$(2717. + 1169. +) / 2.3 =$	1689.4	65.52	25.79	OK
B AA	$(2717. + 1169. +) / 2.3 =$	1689.4	65.52	25.79	OK
B AA	$(2762. + 1163. +) / 2.3 =$	1706.7	63.03	27.08	OK
B AA	$(2762. + 1163. +) / 2.3 =$	1706.7	63.03	27.08	OK
B WX	$(2863. + 812. +) / 2.3 =$	1598.0	79.69	20.05	OK
B WX	$(2863. + 812. +) / 2.3 =$	1598.0	79.69	20.05	OK
B WX	$(2897. + 799. +) / 2.3 =$	1606.8	82.68	19.43	OK
B WX	$(2897. + 799. +) / 2.3 =$	1606.8	82.68	19.43	OK
B WX	$(2868. + 815. +) / 2.3 =$	1601.3	80.16	19.98	OK
B WX	$(2868. + 815. +) / 2.3 =$	1601.3	80.16	19.98	OK
B WX	$(2901. + 802. +) / 2.3 =$	1610.0	83.14	19.37	OK
B WX	$(2901. + 802. +) / 2.3 =$	1610.0	83.14	19.37	OK
B WX	$(2808. + 839. +) / 2.3 =$	1585.7	74.26	21.35	OK
B WX	$(2808. + 839. +) / 2.3 =$	1585.7	74.26	21.35	OK
B WX	$(2840. + 829. +) / 2.3 =$	1595.1	76.85	20.75	OK
B WX	$(2840. + 829. +) / 2.3 =$	1595.1	76.85	20.75	OK
B WX	$(2813. + 842. +) / 2.3 =$	1589.1	74.76	21.26	OK
B WX	$(2813. + 842. +) / 2.3 =$	1589.1	74.76	21.26	OK
B WX	$(2844. + 832. +) / 2.3 =$	1598.4	77.34	20.67	OK
B WX	$(2844. + 832. +) / 2.3 =$	1598.4	77.34	20.67	OK
B WXY	$(2329. + 952. +) / 2.3 =$	1426.5	138.45	10.30	OK
B WXY	$(2329. + 952. +) / 2.3 =$	1426.5	138.45	10.30	OK
B WXY	$(2278. + 957. +) / 2.3 =$	1406.6	148.83	9.45	OK
B WXY	$(2278. + 957. +) / 2.3 =$	1406.6	148.83	9.45	OK
B WXY	$(2338. + 954. +) / 2.3 =$	1431.2	137.99	10.37	OK
B WXY	$(2338. + 954. +) / 2.3 =$	1431.2	137.99	10.37	OK
B WXY	$(2287. + 960. +) / 2.3 =$	1411.6	148.08	9.53	OK
B WXY	$(2287. + 960. +) / 2.3 =$	1411.6	148.08	9.53	OK
B WXY	$(2793. + 890. +) / 2.3 =$	1601.3	85.09	18.82	OK
B WXY	$(2793. + 890. +) / 2.3 =$	1601.3	85.09	18.82	OK
B WXY	$(2844. + 882. +) / 2.3 =$	1620.1	81.59	19.86	OK
B WXY	$(2844. + 882. +) / 2.3 =$	1620.1	81.59	19.86	OK
B WXY	$(2796. + 893. +) / 2.3 =$	1603.8	85.53	18.75	OK
B WXY	$(2796. + 893. +) / 2.3 =$	1603.8	85.53	18.75	OK
B WXY	$(2846. + 885. +) / 2.3 =$	1622.4	82.06	19.77	OK
B WXY	$(2846. + 885. +) / 2.3 =$	1622.4	82.06	19.77	OK
B WY	$(1960. + 1207. +) / 2.3 =$	1377.1	187.02	7.36	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
COMB	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
			kPa		
B WY	(1960. + 1207. +) / 2.3 =	1377.1	187.02	7.36	OK
B WY	(1917. + 1208. +) / 2.3 =	1358.6	211.37	6.43	OK
B WY	(1917. + 1208. +) / 2.3 =	1358.6	211.37	6.43	OK
B WY	(1972. + 1208. +) / 2.3 =	1382.3	184.17	7.51	OK
B WY	(1972. + 1208. +) / 2.3 =	1382.3	184.17	7.51	OK
B WY	(1928. + 1209. +) / 2.3 =	1363.9	207.19	6.58	OK
B WY	(1928. + 1209. +) / 2.3 =	1363.9	207.19	6.58	OK
B WY	(2358. + 1185. +) / 2.3 =	1540.1	91.82	16.77	OK
B WY	(2358. + 1185. +) / 2.3 =	1540.1	91.82	16.77	OK
B WY	(2402. + 1181. +) / 2.3 =	1557.9	86.90	17.93	OK
B WY	(2402. + 1181. +) / 2.3 =	1557.9	86.90	17.93	OK
B WY	(2365. + 1185. +) / 2.3 =	1543.4	92.11	16.76	OK
B WY	(2365. + 1185. +) / 2.3 =	1543.4	92.11	16.76	OK
B WY	(2409. + 1181. +) / 2.3 =	1561.0	87.26	17.89	OK
B WY	(2409. + 1181. +) / 2.3 =	1561.0	87.26	17.89	OK
D I	(1982. + 1228. +) / 2.3 =	1395.6	187.23	7.45	OK
D I	(1997. + 1229. +) / 2.3 =	1402.6	183.23	7.65	OK
D I	(1933. + 1230. +) / 2.3 =	1375.1	218.01	6.31	OK
D I	(1949. + 1231. +) / 2.3 =	1382.4	211.77	6.53	OK
D I	(1993. + 1228. +) / 2.3 =	1400.5	184.38	7.60	OK
D I	(2008. + 1229. +) / 2.3 =	1407.4	180.71	7.79	OK
D I	(1944. + 1231. +) / 2.3 =	1380.2	213.55	6.46	OK
D I	(1960. + 1231. +) / 2.3 =	1387.4	207.87	6.67	OK
D I	(2523. + 1191. +) / 2.3 =	1615.2	78.06	20.69	OK
D I	(2531. + 1192. +) / 2.3 =	1618.7	78.72	20.56	OK
D I	(2591. + 1185. +) / 2.3 =	1641.5	73.68	22.28	OK
D I	(2597. + 1185. +) / 2.3 =	1644.6	74.40	22.10	OK
D I	(2529. + 1192. +) / 2.3 =	1617.6	78.52	20.60	OK
D I	(2537. + 1192. +) / 2.3 =	1621.1	79.18	20.47	OK
D I	(2595. + 1185. +) / 2.3 =	1643.7	74.18	22.16	OK
D I	(2602. + 1185. +) / 2.3 =	1646.7	74.91	21.98	OK
D W	(924. + 401. +) / 2.3 =	576.0	234.27	2.46	OK
D W	(936. + 406. +) / 2.3 =	583.6	230.18	2.54	OK
D W	(908. + 410. +) / 2.3 =	573.1	286.69	2.00	OK
D W	(920. + 416. +) / 2.3 =	580.7	279.76	2.08	OK
D W	(941. + 408. +) / 2.3 =	586.6	228.62	2.57	OK
D W	(953. + 414. +) / 2.3 =	594.1	224.92	2.64	OK
D W	(925. + 418. +) / 2.3 =	583.8	277.14	2.11	OK
D W	(937. + 423. +) / 2.3 =	591.3	270.96	2.18	OK

GENERAL CONTRACTOR  IRICAV2	ALTA SORVEGLIANZA  GRUPPO FERROVIE DELLO STATO ITALIANE	Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 163 di 336
Relazione di calcolo pali di alimentazione						

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	COMB	q <sub>u,d</sub> kPa	q <sub>E,d</sub> = N / (B'·L')			
kPa						
D W	(1981. + 1203. +) / 2.3 =	1384.3	175.82		7.87	OK
D W	(1989. + 1203. +) / 2.3 =	1387.9	174.16		7.97	OK
D W	(2045. + 1201. +) / 2.3 =	1411.6	152.54		9.25	OK
D W	(2053. + 1202. +) / 2.3 =	1415.0	151.61		9.33	OK
D W	(1992. + 1204. +) / 2.3 =	1389.3	173.52		8.01	OK
D W	(1999. + 1204. +) / 2.3 =	1392.9	172.00		8.10	OK
D W	(2056. + 1202. +) / 2.3 =	1416.3	151.26		9.36	OK
D W	(2063. + 1202. +) / 2.3 =	1419.6	150.40		9.44	OK
DAA	(1976. + 1226. +) / 2.3 =	1391.7	190.57		7.30	OK
DAA	(1976. + 1226. +) / 2.3 =	1391.7	190.57		7.30	OK
DAA	(1922. + 1227. +) / 2.3 =	1369.1	223.79		6.12	OK
DAA	(1922. + 1227. +) / 2.3 =	1369.1	223.79		6.12	OK
DAA	(1986. + 1226. +) / 2.3 =	1396.7	187.61		7.44	OK
DAA	(1986. + 1226. +) / 2.3 =	1396.7	187.61		7.44	OK
DAA	(1933. + 1228. +) / 2.3 =	1374.3	219.01		6.28	OK
DAA	(1933. + 1228. +) / 2.3 =	1374.3	219.01		6.28	OK
DAA	(2512. + 1190. +) / 2.3 =	1609.8	79.34		20.29	OK
DAA	(2512. + 1190. +) / 2.3 =	1609.8	79.34		20.29	OK
DAA	(2576. + 1184. +) / 2.3 =	1634.8	74.69		21.89	OK
DAA	(2576. + 1184. +) / 2.3 =	1634.8	74.69		21.89	OK
DAA	(2518. + 1190. +) / 2.3 =	1612.3	79.79		20.21	OK
DAA	(2518. + 1190. +) / 2.3 =	1612.3	79.79		20.21	OK
DAA	(2581. + 1184. +) / 2.3 =	1637.0	75.19		21.77	OK

#### Ribaltamento – verifiche sismiche

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	COMB	dir. L	dir. T	dir. L		dir. T
kNm		kNm	kNm	kNm		
Comb1	279.43	279.43	19.49	94.23	2.97	OK
Comb2	279.43	279.43	19.49	94.23	2.97	OK
Comb3	279.43	279.43	19.49	38.24	7.31	OK
Comb4	279.43	279.43	19.49	38.24	7.31	OK
Comb5	279.43	279.43	64.96	48.75	4.30	OK
Comb6	279.43	279.43	64.96	48.75	4.30	OK

GENERAL CONTRACTOR  <b>IFICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE
Relazione di calcolo pali di alimentazione	Progetto IN17    Lotto 10    Codifica Documento E I2 CL OC 00 0 0 010    Rev. A    Foglio 164 di 336

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
Comb7	279.43	279.43	64.96	9.77	4.30	OK
Comb8	279.43	279.43	64.96	9.77	4.30	OK

#### Scorrimento – verifiche sismiche

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$		Ed	Rd/Ed	
	kN		kN		
COMB					
Comb1	180.4		69.8	2.58	OK
Comb2	180.4		69.8	2.58	OK
Comb3	180.4		65.6	2.75	OK
Comb4	180.4		65.6	2.75	OK
Comb5	180.4		68.4	2.64	OK
Comb6	180.4		68.4	2.64	OK
Comb7	180.4		67.2	2.69	OK
Comb8	180.4		67.2	2.69	OK

#### Capacità portante – verifiche sismiche

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	Rd		Ed	Rd/Ed	
	$q_{u,d}$ kPa		$q_{E,d} = N / (B' \cdot L')$		
COMB			kPa		
Comb1	$(1503. + 467. +) / 2.3 =$	856.4	85.12	10.06	OK
Comb2	$(1503. + 467. +) / 2.3 =$	856.4	85.12	10.06	OK
Comb3	$(1730. + 461. +) / 2.3 =$	952.6	65.37	14.57	OK
Comb4	$(1730. + 461. +) / 2.3 =$	952.6	65.37	14.57	OK
Comb5	$(1693. + 367. +) / 2.3 =$	895.4	82.84	10.81	OK
Comb6	$(1693. + 367. +) / 2.3 =$	895.4	82.84	10.81	OK
Comb7	$(1603. + 389. +) / 2.3 =$	866.2	70.86	12.22	OK
Comb8	$(1603. + 389. +) / 2.3 =$	866.2	70.86	12.22	OK

Le verifiche sono soddisfatte.



### 12.7 Sintesi risultati LC4

TITOLO: **Caso di carico 4 - combinazioni statiche**

FONDAZIONI A PLINTO

DESIGN ASSUMPTION

piano campagna sostanzialmente orizzontale

angolo d'attrito caratteristico  $\phi'_k$

coesione  $c'$

angolo d'attrito caratteristico  $\phi'_k$  alla base

coesione alla base  $c'$

coefficiente  $\gamma_p$

coefficiente  $\gamma_c'$

coefficiente  $\gamma_k$  capacità portante

coefficiente  $\gamma_k$  scorrimento

coefficiente  $\gamma_k$  spinta passiva

angolo d'attrito di design  $\phi'_d$

coesione di design  $c'_d$

coeff. attrito di design  $\mu'_d$

coesione alla base di design

Dimensione fondazione B[m] (LONGITUDINALE)

Dimensione fondazione L [m] (TRASVERSALE)

Profondità da piano campagna D [m]

Altezza plinto [m] Hp

Dimensione bagegiolo b[m] (LONGITUDINALE)

Dimensione maggiore bagegiolo l [m] (TRASVERSALE)

Altezza bagegiolo [m] Hb

Altezza terreno sopraplinto [m] Ht

$q'$  = carico permanente ai lati

$\gamma$  = peso specifico medio sopra la fondazione

$\gamma_f$  = peso specifico medio sotto la fondazione

opzione calcolo coeff.  $S_{\phi}$  e  $S_{\gamma}$

opzione calcolo per tenere in conto peso terreno di ricoprimento

Peso specifico medio c.a.

Peso proprio plinto + bagegiolo + terreno sovrastante [kN]

Quota baricentro plinto + bagegiolo + terreno sovrastante vs p.f. [kN]

Coefficiente sismico kh

Coefficiente sismico kv

Azione inerziale orizzontale plinto

Azione inerziale verticale plinto

**Eccentricità degli scarichi rispetto a baricentro fondazione**

eccentricità longitudinale eL 0 m + se concorde con i momenti del traliccio

eccentricità trasversale eT 0.1 m + se concorde con i momenti del traliccio

**Coefficienti di spinta di progetto**

coefficiente di spinta attiva statico Ka 0.228 -

coefficiente di spinta attiva sismico Ka,E 0.483 -

coefficiente di spinta passiva statico Kp 4.395 -

coefficiente di spinta passiva sismico Kp,E 3.251 -

coeff. parziale riduttivo della spinta passiva 1.40 -

moltiplicatore della spinta passiva  $\alpha$  0.00 long 0.49 trasv

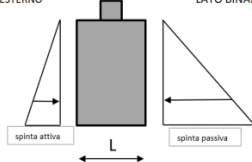
contributo delle spinte frontali long - taglio 0 kN statico 0 kN sismico

contributo delle spinte frontali long - momer 0 kNm statico 0 kNm sismico

contributo delle spinte frontali trasv - taglio -190.2 kN statico 0 kN sismico

contributo delle spinte frontali trasv - mome -139.5 kNm statico 0 kNm sismico

LATO ESTERNO LATO BINARIO



CALCOLI PRELIMINARI: coefficienti di capacità portante indipendenti dai carichi

$N_{\phi} = 48.93$   $B_{\phi} = 1$

$N_{\gamma} = 74.90$   $B_{\gamma} = 1$

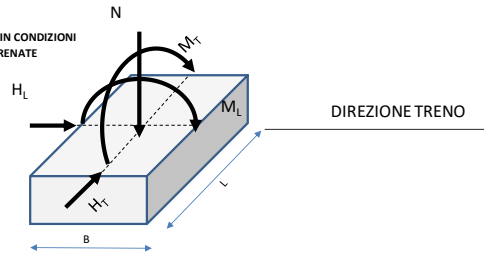
$N_c = 61.35$   $B_c = 1$

SINTESI RISULTATI			
Capacità portante	$F_s \min = 3.40$	n. Verif. Neg.	0
Scorrimento	$F_s \min = 1.5$	n. Verif. Neg.	0
Ribaltamento	$F_s \min = 1.23$	n. Verif. Neg.	0

DA2

38	*	0.663	rad	
0	kPa			
38	*	0.663	rad	
0	kPa			
1.00				
1.00				
2.30				
1.10				
1.40				
38.00	*	0.663	rad	$\tan(\phi'_d) = 0.78$
0.00	kPa			
0.78				
0.00	kPa			
3	m			
2.2	m			
2.2	m			
0.9	m			
0.9	m			
0.5	m			
0.25	m			
44	kPa			
20	kN/m <sup>3</sup>			
20	kN/m <sup>3</sup>			
1				
0	(1 si - 0 no)			
25	kN/m <sup>3</sup>			
373	kN			
1.30	m			
0.000	g			
0.000	g			+ downward
0.00	kN			
0.00	kN			

VERIFICA IN CONDIZIONI DRENATE



(NB: coefficiente correttivo per rapporto D/B non considerato)

(valore da stabilirsi in base alla profondità di falda)  
**(0= Lancellotta ecc., 1 = originale EC7)**  
si useranno le formule originarie di EC7



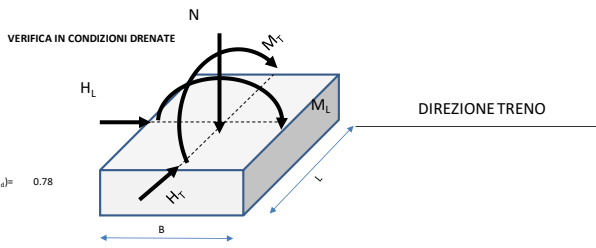
TITOLO: **Caso di carico 4 - combinazioni sismiche**

**FONDAZIONI A PLINTO**

**DESIGN ASSUMPTION**

**piano campagna sostanzialmente orizzontale**

angolo d'attrito caratteristico $\phi'_s$	38	°	0.663	rad
coesione $c'$	0	kPa	+	
angolo d'attrito caratteristico $\phi'_s$ alla base	38	°	0.663	rad
coesione alla base $c'$	0	kPa	+	
coefficiente $\gamma_s$	1.00			
coefficiente $\gamma_c$	1.00			
coefficiente $\gamma_s$ capacità portante	2.30			
coefficiente $\gamma_s$ scorrimento	2.30			
coefficiente $\gamma_s$ spinta passiva	1.10			
angolo d'attrito di design $\phi'_d$	1.40			
coesione di design $c'_d$	38.00	kPa	+	$\tan(\phi'_d) = 0.78$
coeff. attrito di design $\mu'_d$	0.00			
coesione alla base di design	0.78	kPa	+	
Dimensione fondazione B[m] (LONGITUDINALE)	0.00	m		
Dimensione fondazione L[m] (TRASVERSALE)	3	m		
Profondità da piano campagna D [m]	2.2	m		(NB: coefficiente correttivo per rapporto D/B non considerato)
Altezza plinto [m] H <sub>p</sub>	2.2	m		
Dimensione baggiolo b[m] (LONGITUDINALE)	0.9	m		
Dimensione maggiore baggiolo l [m] (TRASVERSALE)	0.9	m		
Altezza baggiolo [m] H <sub>b</sub>	0.5	m		
Altezza terreno sopra plinto [m] H <sub>t</sub>	0.25	m		
q' = carico permanente ai lati	44	kPa		
$\gamma_s$ = peso specifico medio sopra la fondazione	20	kN/m <sup>3</sup>		(valore da stabilirsi in base alla profondità di falda)
$\gamma_f$ = peso specifico medio sotto la fondazione	20	kN/m <sup>3</sup>		(0 = Lancellotta ecc. 1 = originale EC7)
opzione calcolo coeff. S <sub>u</sub> e S <sub>v</sub>	1			si useranno le formule originarie di EC7
opzione calcolo per tenere in conto peso terreno di ricoprimento	0	(1 si - 0 no)		
Peso specifico medio c.a.	25	kN/m <sup>3</sup>		
Peso proprio plinto + baggiolo + terreno sovrastante [kN]	373	kN		
Quota baricentro plinto + baggiolo + terreno sovrastante vs p.f. [kN]	1.30	m		
Coefficiente sismico k <sub>h</sub>	0.231	g		
Coefficiente sismico k <sub>v</sub>	-0.116	g		+ downward
Azione inerziale orizzontale plinto	86.19	kN		
Azione inerziale verticale plinto	-43.10	kN		

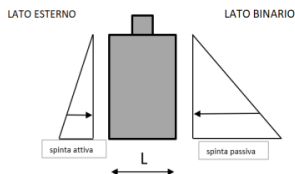


**Eccentricità degli scarichi rispetto a baricentro fondazione**

eccentricità longitudinale e <sub>L</sub>	0	m	+ se concorde con i momenti del traliccio
eccentricità trasversale e <sub>T</sub>	0.1	m	+ se concorde con i momenti del traliccio

**Coefficienti di spinta di progetto**

coefficiente di spinta attiva statico K <sub>a</sub>	0.228	-	
coefficiente di spinta attiva sismico K <sub>a,E</sub>	0.483	-	
coefficiente di spinta passiva statico K <sub>p</sub>	4.395	-	
coefficiente di spinta passiva sismico K <sub>p,E</sub>	3.251	-	
coeff. parziale riduttivo della spinta passiva $\gamma_{re}$	1.40	-	
moltiplicatore della spinta passiva $\alpha$	0.00	long 0.00	trasv
contributo delle spinte frontali long - taglio	0	kN	statico 0 kN sismico
contributo delle spinte frontali long - momento	0	kNm	statico 0 kNm sismico
contributo delle spinte frontali trasv - taglio	0	kN	statico 0 kN sismico
contributo delle spinte frontali trasv - momento	0	kNm	statico 0 kNm sismico



CALCOLI PRELIMINARI: coefficienti di capacità portante indipendenti dai carichi

N <sub>u</sub> = 48.93	B <sub>0</sub> = 1
N <sub>i</sub> = 74.90	B <sub>i</sub> = 1
N <sub>c</sub> = 61.35	B <sub>c</sub> = 1

SINTESI RISULTATI			
Capacità portante	F <sub>s, min</sub> = 11.44	n. Verif. Neg.	0
Scorrimento	F <sub>s, min</sub> = 2.59	n. Verif. Neg.	0
Ribaltamento	F <sub>s, min</sub> = 3.24	n. Verif. Neg.	0

Le verifiche sono soddisfatte.

GENERAL CONTRACTOR  IRICAV2	ALTA SORVEGLIANZA  GRUPPO FERROVIE DELLO STATO ITALIANE
Relazione di calcolo pali di alimentazione	Progetto IN17    Lotto 10    Codifica Documento E I2 CL OC 00 0 0 010    Rev. A    Foglio 167 di 336

## 12.8 Verifiche di dettaglio

Ribaltamento – verifiche statiche

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
A	574.33	421.18	0.00	184.02	2.29	OK
A	574.33	421.18	0.00	184.02	2.29	OK
A	574.33	421.18	0.00	236.18	1.78	OK
A	574.33	421.18	0.00	236.18	1.78	OK
A	578.73	424.40	0.00	184.31	2.30	OK
A	578.73	424.40	0.00	184.31	2.30	OK
A	578.73	424.40	0.00	236.47	1.79	OK
A	578.73	424.40	0.00	236.47	1.79	OK
A	574.33	421.18	0.00	165.65	2.54	OK
A	574.33	421.18	0.00	165.65	2.54	OK
A	574.33	421.18	0.00	217.81	1.93	OK
A	574.33	421.18	0.00	217.81	1.93	OK
A	578.73	424.40	0.00	165.94	2.56	OK
A	578.73	424.40	0.00	165.94	2.56	OK
A	578.73	424.40	0.00	218.10	1.95	OK
A	578.73	424.40	0.00	218.10	1.95	OK
B AA	574.33	421.18	0.00	192.29	2.19	OK
B AA	574.33	421.18	0.00	192.29	2.19	OK
B AA	574.33	421.18	0.00	223.41	1.89	OK
B AA	574.33	421.18	0.00	223.41	1.89	OK
B AA	578.73	424.40	0.00	192.58	2.20	OK
B AA	578.73	424.40	0.00	192.58	2.20	OK
B AA	578.73	424.40	0.00	223.70	1.90	OK
B AA	578.73	424.40	0.00	223.70	1.90	OK
B AA	574.33	421.18	0.00	26.12	16.12	OK
B AA	574.33	421.18	0.00	26.12	16.12	OK
B AA	574.33	421.18	0.00	48.25	8.73	OK
B AA	574.33	421.18	0.00	48.25	8.73	OK
B AA	578.73	424.40	0.00	26.41	16.07	OK
B AA	578.73	424.40	0.00	26.41	16.07	OK
B AA	578.73	424.40	0.00	48.54	8.74	OK
B AA	578.73	424.40	0.00	48.54	8.74	OK
B WX	574.33	421.18	77.97	112.06	3.76	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WX	574.33	421.18	77.97	112.06	3.76	OK
B WX	574.33	421.18	77.97	143.18	2.94	OK
B WX	574.33	421.18	77.97	143.18	2.94	OK
B WX	578.73	424.40	77.97	112.35	3.78	OK
B WX	578.73	424.40	77.97	112.35	3.78	OK
B WX	578.73	424.40	77.97	143.47	2.96	OK
B WX	578.73	424.40	77.97	143.47	2.96	OK
B WX	574.33	421.18	77.97	97.36	4.33	OK
B WX	574.33	421.18	77.97	97.36	4.33	OK
B WX	574.33	421.18	77.97	128.48	3.28	OK
B WX	574.33	421.18	77.97	128.48	3.28	OK
B WX	578.73	424.40	77.97	97.65	4.35	OK
B WX	578.73	424.40	77.97	97.65	4.35	OK
B WX	578.73	424.40	77.97	128.77	3.30	OK
B WX	578.73	424.40	77.97	128.77	3.30	OK
B WXY	574.33	421.18	54.58	203.52	2.07	OK
B WXY	574.33	421.18	54.58	203.52	2.07	OK
B WXY	574.33	421.18	54.58	234.64	1.80	OK
B WXY	574.33	421.18	54.58	234.64	1.80	OK
B WXY	578.73	424.40	54.58	203.81	2.08	OK
B WXY	578.73	424.40	54.58	203.81	2.08	OK
B WXY	578.73	424.40	54.58	234.93	1.81	OK
B WXY	578.73	424.40	54.58	234.93	1.81	OK
B WXY	574.33	421.18	54.58	20.20	10.52	OK
B WXY	574.33	421.18	54.58	20.20	10.52	OK
B WXY	574.33	421.18	54.58	38.96	10.52	OK
B WXY	574.33	421.18	54.58	38.96	10.52	OK
B WXY	578.73	424.40	54.58	20.50	10.60	OK
B WXY	578.73	424.40	54.58	20.50	10.60	OK
B WXY	578.73	424.40	54.58	39.25	10.60	OK
B WXY	578.73	424.40	54.58	39.25	10.60	OK
B WY	574.33	421.18	0.00	242.71	1.74	OK
B WY	574.33	421.18	0.00	242.71	1.74	OK
B WY	574.33	421.18	0.00	273.83	1.54	OK
B WY	574.33	421.18	0.00	273.83	1.54	OK
B WY	578.73	424.40	0.00	243.01	1.75	OK
B WY	578.73	424.40	0.00	243.01	1.75	OK
B WY	578.73	424.40	0.00	274.13	1.55	OK
B WY	578.73	424.40	0.00	274.13	1.55	OK





Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WY	574.33	421.18	0.00	35.25	11.95	OK
B WY	574.33	421.18	0.00	35.25	11.95	OK
B WY	574.33	421.18	0.00	20.70	20.35	OK
B WY	574.33	421.18	0.00	20.70	20.35	OK
B WY	578.73	424.40	0.00	35.54	11.94	OK
B WY	578.73	424.40	0.00	35.54	11.94	OK
B WY	578.73	424.40	0.00	20.99	20.22	OK
B WY	578.73	424.40	0.00	20.99	20.22	OK
D I	574.33	421.18	0.00	293.00	1.44	OK
D I	578.87	424.50	0.00	293.09	1.45	OK
D I	577.36	423.40	0.00	343.30	1.23	OK
D I	581.89	426.72	0.00	343.39	1.24	OK
D I	578.73	424.40	0.00	293.29	1.45	OK
D I	583.26	427.73	0.00	293.38	1.46	OK
D I	581.75	426.62	0.00	343.59	1.24	OK
D I	586.29	429.94	0.00	343.68	1.25	OK
D I	574.33	421.18	0.00	51.53	8.17	OK
D I	578.87	424.50	0.00	51.62	8.22	OK
D I	577.36	423.40	0.00	93.25	4.54	OK
D I	581.89	426.72	0.00	93.35	4.57	OK
D I	578.73	424.40	0.00	51.82	8.19	OK
D I	583.26	427.73	0.00	51.91	8.24	OK
D I	581.75	426.62	0.00	93.55	4.56	OK
D I	586.29	429.94	0.00	93.64	4.59	OK
D W	574.33	421.18	0.00	231.93	1.82	OK
D W	576.60	422.84	0.00	231.97	1.82	OK
D W	575.85	422.29	0.00	282.13	1.50	OK
D W	578.11	423.95	0.00	282.17	1.50	OK
D W	578.73	424.40	0.00	232.22	1.83	OK
D W	581.00	426.06	0.00	232.27	1.83	OK
D W	580.24	425.51	0.00	282.42	1.51	OK
D W	582.51	427.17	0.00	282.47	1.51	OK
D W	574.33	421.18	0.00	37.45	11.25	OK
D W	576.60	422.84	0.00	37.70	11.21	OK
D W	575.85	422.29	0.00	45.16	9.35	OK
D W	578.11	423.95	0.00	45.20	9.38	OK
D W	578.73	424.40	0.00	37.74	11.25	OK
D W	581.00	426.06	0.00	38.00	11.21	OK
D W	580.24	425.51	0.00	45.45	9.36	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
D W	582.51	427.17	0.00	45.50	9.39	OK
DAA	576.60	422.84	0.00	294.88	1.43	OK
DAA	576.60	422.84	0.00	294.88	1.43	OK
DAA	578.11	423.95	0.00	345.08	1.23	OK
DAA	578.11	423.95	0.00	345.08	1.23	OK
DAA	581.00	426.06	0.00	295.17	1.44	OK
DAA	581.00	426.06	0.00	295.17	1.44	OK
DAA	582.51	427.17	0.00	345.37	1.24	OK
DAA	582.51	427.17	0.00	345.37	1.24	OK
DAA	576.60	422.84	0.00	51.40	8.23	OK
DAA	576.60	422.84	0.00	51.40	8.23	OK
DAA	578.11	423.95	0.00	91.36	4.64	OK
DAA	578.11	423.95	0.00	91.36	4.64	OK
DAA	581.00	426.06	0.00	51.69	8.24	OK
DAA	581.00	426.06	0.00	51.69	8.24	OK
DAA	582.51	427.17	0.00	91.65	4.66	OK
DAA	582.51	427.17	0.00	91.65	4.66	OK
A	516.90	379.06	0.00	166.54	2.28	OK
A	516.90	379.06	0.00	166.54	2.28	OK
A	516.90	379.06	0.00	201.31	1.88	OK
A	516.90	379.06	0.00	201.31	1.88	OK
A	519.83	381.21	0.00	166.73	2.29	OK
A	519.83	381.21	0.00	166.73	2.29	OK
A	519.83	381.21	0.00	201.51	1.89	OK
A	519.83	381.21	0.00	201.51	1.89	OK
A	516.90	379.06	0.00	148.16	2.56	OK
A	516.90	379.06	0.00	148.16	2.56	OK
A	516.90	379.06	0.00	182.94	2.07	OK
A	516.90	379.06	0.00	182.94	2.07	OK
A	519.83	381.21	0.00	148.36	2.57	OK
A	519.83	381.21	0.00	148.36	2.57	OK
A	519.83	381.21	0.00	183.13	2.08	OK
A	519.83	381.21	0.00	183.13	2.08	OK
B AA	516.90	379.06	0.00	181.82	2.08	OK
B AA	516.90	379.06	0.00	181.82	2.08	OK
B AA	516.90	379.06	0.00	202.56	1.87	OK
B AA	516.90	379.06	0.00	202.56	1.87	OK
B AA	519.83	381.21	0.00	182.01	2.09	OK
B AA	519.83	381.21	0.00	182.01	2.09	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B AA	519.83	381.21	0.00	202.76	1.88	OK
B AA	519.83	381.21	0.00	202.76	1.88	OK
B AA	516.90	379.06	0.00	19.77	19.17	OK
B AA	516.90	379.06	0.00	19.77	19.17	OK
B AA	516.90	379.06	0.00	32.28	11.74	OK
B AA	516.90	379.06	0.00	32.28	11.74	OK
B AA	519.83	381.21	0.00	19.97	19.09	OK
B AA	519.83	381.21	0.00	19.97	19.09	OK
B AA	519.83	381.21	0.00	32.47	11.74	OK
B AA	519.83	381.21	0.00	32.47	11.74	OK
B WX	516.90	379.06	77.97	101.59	3.73	OK
B WX	516.90	379.06	77.97	101.59	3.73	OK
B WX	516.90	379.06	77.97	122.33	3.10	OK
B WX	516.90	379.06	77.97	122.33	3.10	OK
B WX	519.83	381.21	77.97	101.78	3.75	OK
B WX	519.83	381.21	77.97	101.78	3.75	OK
B WX	519.83	381.21	77.97	122.53	3.11	OK
B WX	519.83	381.21	77.97	122.53	3.11	OK
B WX	516.90	379.06	77.97	86.89	4.36	OK
B WX	516.90	379.06	77.97	86.89	4.36	OK
B WX	516.90	379.06	77.97	107.63	3.52	OK
B WX	516.90	379.06	77.97	107.63	3.52	OK
B WX	519.83	381.21	77.97	87.08	4.38	OK
B WX	519.83	381.21	77.97	87.08	4.38	OK
B WX	519.83	381.21	77.97	107.83	3.54	OK
B WX	519.83	381.21	77.97	107.83	3.54	OK
B WXY	516.90	379.06	54.58	193.05	1.96	OK
B WXY	516.90	379.06	54.58	193.05	1.96	OK
B WXY	516.90	379.06	54.58	213.79	1.77	OK
B WXY	516.90	379.06	54.58	213.79	1.77	OK
B WXY	519.83	381.21	54.58	193.24	1.97	OK
B WXY	519.83	381.21	54.58	193.24	1.97	OK
B WXY	519.83	381.21	54.58	213.99	1.78	OK
B WXY	519.83	381.21	54.58	213.99	1.78	OK
B WXY	516.90	379.06	54.58	13.85	9.47	OK
B WXY	516.90	379.06	54.58	13.85	9.47	OK
B WXY	516.90	379.06	54.58	26.36	9.47	OK
B WXY	516.90	379.06	54.58	26.36	9.47	OK
B WXY	519.83	381.21	54.58	14.05	9.52	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WXY	519.83	381.21	54.58	14.05	9.52	OK
B WXY	519.83	381.21	54.58	26.55	9.52	OK
B WXY	519.83	381.21	54.58	26.55	9.52	OK
B WY	516.90	379.06	0.00	232.24	1.63	OK
B WY	516.90	379.06	0.00	232.24	1.63	OK
B WY	516.90	379.06	0.00	252.99	1.50	OK
B WY	516.90	379.06	0.00	252.99	1.50	OK
B WY	519.83	381.21	0.00	232.44	1.64	OK
B WY	519.83	381.21	0.00	232.44	1.64	OK
B WY	519.83	381.21	0.00	253.19	1.51	OK
B WY	519.83	381.21	0.00	253.19	1.51	OK
B WY	516.90	379.06	0.00	45.53	8.33	OK
B WY	516.90	379.06	0.00	45.53	8.33	OK
B WY	516.90	379.06	0.00	24.78	15.30	OK
B WY	516.90	379.06	0.00	24.78	15.30	OK
B WY	519.83	381.21	0.00	45.72	8.34	OK
B WY	519.83	381.21	0.00	45.72	8.34	OK
B WY	519.83	381.21	0.00	24.97	15.26	OK
B WY	519.83	381.21	0.00	24.97	15.26	OK
D I	516.90	379.06	0.00	276.20	1.37	OK
D I	521.44	382.39	0.00	276.29	1.38	OK
D I	519.92	381.28	0.00	309.80	1.23	OK
D I	524.46	384.60	0.00	309.89	1.24	OK
D I	519.83	381.21	0.00	276.39	1.38	OK
D I	524.37	384.54	0.00	276.48	1.39	OK
D I	522.85	383.43	0.00	309.99	1.24	OK
D I	527.39	386.75	0.00	310.09	1.25	OK
D I	516.90	379.06	0.00	40.35	9.39	OK
D I	521.44	382.39	0.00	40.44	9.46	OK
D I	519.92	381.28	0.00	62.71	6.08	OK
D I	524.46	384.60	0.00	62.80	6.12	OK
D I	519.83	381.21	0.00	40.55	9.40	OK
D I	524.37	384.54	0.00	40.64	9.46	OK
D I	522.85	383.43	0.00	62.90	6.10	OK
D I	527.39	386.75	0.00	62.99	6.14	OK
D W	516.90	379.06	0.00	215.13	1.76	OK
D W	519.17	380.72	0.00	215.18	1.77	OK
D W	518.41	380.17	0.00	248.63	1.53	OK
D W	520.68	381.83	0.00	248.68	1.54	OK

GENERAL CONTRACTOR  IRICAV2	ALTA SORVEGLIANZA  GRUPPO FERROVIE DELLO STATO ITALIANE	Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 173 di 336
Relazione di calcolo pali di alimentazione						

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
D W	519.83	381.21	0.00	215.33	1.77	OK
D W	522.10	382.87	0.00	215.37	1.78	OK
D W	521.34	382.32	0.00	248.83	1.54	OK
D W	523.61	383.98	0.00	248.87	1.54	OK
D W	516.90	379.06	0.00	54.05	7.01	OK
D W	519.17	380.72	0.00	54.31	7.01	OK
D W	518.41	380.17	0.00	22.90	16.60	OK
D W	520.68	381.83	0.00	22.95	16.64	OK
D W	519.83	381.21	0.00	54.24	7.03	OK
D W	522.10	382.87	0.00	54.50	7.02	OK
D W	521.34	382.32	0.00	23.10	16.55	OK
D W	523.61	383.98	0.00	23.15	16.59	OK
DAA	519.17	380.72	0.00	278.08	1.37	OK
DAA	519.17	380.72	0.00	278.08	1.37	OK
DAA	520.68	381.83	0.00	311.58	1.23	OK
DAA	520.68	381.83	0.00	311.58	1.23	OK
DAA	522.10	382.87	0.00	278.28	1.38	OK
DAA	522.10	382.87	0.00	278.28	1.38	OK
DAA	523.61	383.98	0.00	311.78	1.23	OK
DAA	523.61	383.98	0.00	311.78	1.23	OK
DAA	519.17	380.72	0.00	40.23	9.46	OK
DAA	519.17	380.72	0.00	40.23	9.46	OK
DAA	520.68	381.83	0.00	62.48	6.11	OK
DAA	520.68	381.83	0.00	62.48	6.11	OK
DAA	522.10	382.87	0.00	40.42	9.47	OK
DAA	522.10	382.87	0.00	40.42	9.47	OK
DAA	523.61	383.98	0.00	62.68	6.13	OK

Scorrimento – verifiche statiche

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / g_R$		Ed	Rd/Ed	
	kN		kN		
COMB					
A	272.0		14.5	18.76	OK
A	272.0		14.5	18.76	OK



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / g_R$	$E_d$	$R_d / E_d$	
		kN	kN		
A	272.0	18.4	14.80	OK	
A	272.0	18.4	14.80	OK	
A	274.0	14.5	18.91	OK	
A	274.0	14.5	18.91	OK	
A	274.0	18.4	14.91	OK	
A	274.0	18.4	14.91	OK	
A	272.0	11.4	23.84	OK	
A	272.0	11.4	23.84	OK	
A	272.0	15.3	17.78	OK	
A	272.0	15.3	17.78	OK	
A	274.0	11.4	24.02	OK	
A	274.0	11.4	24.02	OK	
A	274.0	15.3	17.92	OK	
A	274.0	15.3	17.92	OK	
B AA	272.0	16.9	16.06	OK	
B AA	272.0	16.9	16.06	OK	
B AA	272.0	19.2	14.15	OK	
B AA	272.0	19.2	14.15	OK	
B AA	274.0	16.9	16.19	OK	
B AA	274.0	16.9	16.19	OK	
B AA	274.0	19.2	14.26	OK	
B AA	274.0	19.2	14.26	OK	
B AA	272.0	1.7	163.28	OK	
B AA	272.0	1.7	163.28	OK	
B AA	272.0	0.6	435.75	OK	
B AA	272.0	0.6	435.75	OK	
B AA	274.0	1.7	164.53	OK	
B AA	274.0	1.7	164.53	OK	
B AA	274.0	0.6	439.08	OK	
B AA	274.0	0.6	439.08	OK	
B WX	272.0	12.4	21.91	OK	
B WX	272.0	12.4	21.91	OK	
B WX	272.0	14.1	19.24	OK	
B WX	272.0	14.1	19.24	OK	
B WX	274.0	12.4	22.08	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / g_R$	$E_d$	$R_d / E_d$	
		kN	kN		
B WX	274.0	12.4	22.08	OK	
B WX	274.0	14.1	19.38	OK	
B WX	274.0	14.1	19.38	OK	
B WX	272.0	10.8	25.22	OK	
B WX	272.0	10.8	25.22	OK	
B WX	272.0	12.3	22.14	OK	
B WX	272.0	12.3	22.14	OK	
B WX	274.0	10.8	25.41	OK	
B WX	274.0	10.8	25.41	OK	
B WX	274.0	12.3	22.31	OK	
B WX	274.0	12.3	22.31	OK	
B WXY	272.0	18.9	14.38	OK	
B WXY	272.0	18.9	14.38	OK	
B WXY	272.0	21.1	12.89	OK	
B WXY	272.0	21.1	12.89	OK	
B WXY	274.0	18.9	14.49	OK	
B WXY	274.0	18.9	14.49	OK	
B WXY	274.0	21.1	12.99	OK	
B WXY	274.0	21.1	12.99	OK	
B WXY	272.0	6.6	41.02	OK	
B WXY	272.0	6.6	41.02	OK	
B WXY	272.0	6.1	44.67	OK	
B WXY	272.0	6.1	44.67	OK	
B WXY	274.0	6.6	41.33	OK	
B WXY	274.0	6.6	41.33	OK	
B WXY	274.0	6.1	45.01	OK	
B WXY	274.0	6.1	45.01	OK	
B WY	272.0	21.8	12.48	OK	
B WY	272.0	21.8	12.48	OK	
B WY	272.0	24.1	11.29	OK	
B WY	272.0	24.1	11.29	OK	
B WY	274.0	21.8	12.58	OK	
B WY	274.0	21.8	12.58	OK	
B WY	274.0	24.1	11.38	OK	
B WY	274.0	24.1	11.38	OK	
B WY	272.0	6.5	41.67	OK	
B WY	272.0	6.5	41.67	OK	
B WY	272.0	4.2	64.20	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / g_R$	$E_d$	$R_d / E_d$	
		kN	kN		
B WY	272.0	4.2	64.20	OK	
B WY	274.0	6.5	41.99	OK	
B WY	274.0	6.5	41.99	OK	
B WY	274.0	4.2	64.69	OK	
B WY	274.0	4.2	64.69	OK	
D I	272.0	22.4	12.14	OK	
D I	274.1	22.4	12.23	OK	
D I	273.4	25.5	10.71	OK	
D I	275.5	25.5	10.79	OK	
D I	274.0	22.4	12.23	OK	
D I	276.2	22.4	12.33	OK	
D I	275.5	25.5	10.79	OK	
D I	277.6	25.5	10.87	OK	
D I	272.0	1.6	171.31	OK	
D I	274.1	1.6	172.66	OK	
D I	273.4	1.5	178.04	OK	
D I	275.5	1.5	179.44	OK	
D I	274.0	1.6	172.62	OK	
D I	276.2	1.6	173.97	OK	
D I	275.5	1.5	179.40	OK	
D I	277.6	1.5	180.80	OK	
D W	272.0	160.7	1.69	OK	
D W	273.0	160.7	1.70	OK	
D W	272.7	157.5	1.73	OK	
D W	273.7	157.5	1.74	OK	
D W	274.0	160.7	1.71	OK	
D W	275.1	160.7	1.71	OK	
D W	274.7	157.5	1.74	OK	
D W	275.8	157.5	1.75	OK	
D W	272.0	8.8	31.04	OK	
D W	273.0	8.8	31.16	OK	
D W	272.7	5.6	48.35	OK	
D W	273.7	5.6	48.54	OK	
D W	274.0	8.8	31.27	OK	
D W	275.1	8.8	31.40	OK	
D W	274.7	5.6	48.72	OK	
D W	275.8	5.6	48.91	OK	
DAA	273.0	22.7	12.02	OK	





Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / g_R$	$E_d$	$R_d / E_d$	
		kN	kN		
DAA	273.0	22.7	12.02	OK	
DAA	273.7	25.8	10.59	OK	
DAA	273.7	25.8	10.59	OK	
DAA	275.1	22.7	12.11	OK	
DAA	275.1	22.7	12.11	OK	
DAA	275.8	25.8	10.67	OK	
DAA	275.8	25.8	10.67	OK	
DAA	273.0	1.9	143.98	OK	
DAA	273.0	1.9	143.98	OK	
DAA	273.7	1.2	223.15	OK	
DAA	273.7	1.2	223.15	OK	
DAA	275.1	1.9	145.07	OK	
DAA	275.1	1.9	145.07	OK	
DAA	275.8	1.2	224.85	OK	
DAA	275.8	1.2	224.85	OK	
A	244.8	13.2	18.54	OK	
A	244.8	13.2	18.54	OK	
A	244.8	15.8	15.50	OK	
A	244.8	15.8	15.50	OK	
A	246.1	13.2	18.65	OK	
A	246.1	13.2	18.65	OK	
A	246.1	15.8	15.59	OK	
A	246.1	15.8	15.59	OK	
A	244.8	10.1	24.20	OK	
A	244.8	10.1	24.20	OK	
A	244.8	12.7	19.27	OK	
A	244.8	12.7	19.27	OK	
A	246.1	10.1	24.34	OK	
A	246.1	10.1	24.34	OK	
A	246.1	12.7	19.38	OK	
A	246.1	12.7	19.38	OK	
B AA	244.8	16.2	15.14	OK	
B AA	244.8	16.2	15.14	OK	
B AA	244.8	17.7	13.83	OK	
B AA	244.8	17.7	13.83	OK	
B AA	246.1	16.2	15.23	OK	
B AA	246.1	16.2	15.23	OK	
B AA	246.1	17.7	13.91	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / g_R$	$E_d$	$R_d / E_d$	
		kN	kN		
B AA	246.1	17.7	13.91	OK	
B AA	244.8	2.4	100.78	OK	
B AA	244.8	2.4	100.78	OK	
B AA	244.8	0.9	271.26	OK	
B AA	244.8	0.9	271.26	OK	
B AA	246.1	2.4	101.35	OK	
B AA	246.1	2.4	101.35	OK	
B AA	246.1	0.9	272.79	OK	
B AA	246.1	0.9	272.79	OK	
B WX	244.8	11.9	20.61	OK	
B WX	244.8	11.9	20.61	OK	
B WX	244.8	13.0	18.88	OK	
B WX	244.8	13.0	18.88	OK	
B WX	246.1	11.9	20.72	OK	
B WX	246.1	11.9	20.72	OK	
B WX	246.1	13.0	18.98	OK	
B WX	246.1	13.0	18.98	OK	
B WX	244.8	10.3	23.65	OK	
B WX	244.8	10.3	23.65	OK	
B WX	244.8	11.3	21.75	OK	
B WX	244.8	11.3	21.75	OK	
B WX	246.1	10.3	23.78	OK	
B WX	246.1	10.3	23.78	OK	
B WX	246.1	11.3	21.87	OK	
B WX	246.1	11.3	21.87	OK	
B WXY	244.8	18.2	13.45	OK	
B WXY	244.8	18.2	13.45	OK	
B WXY	244.8	19.6	12.46	OK	
B WXY	244.8	19.6	12.46	OK	
B WXY	246.1	18.2	13.53	OK	
B WXY	246.1	18.2	13.53	OK	
B WXY	246.1	19.6	12.53	OK	
B WXY	246.1	19.6	12.53	OK	
B WXY	244.8	7.0	35.12	OK	
B WXY	244.8	7.0	35.12	OK	
B WXY	244.8	6.4	38.46	OK	
B WXY	244.8	6.4	38.46	OK	
B WXY	246.1	7.0	35.32	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / g_R$	$E_d$	$R_d / E_d$	
		kN	kN		
B WXY	246.1	7.0	35.32	OK	
B WXY	246.1	6.4	38.68	OK	
B WXY	246.1	6.4	38.68	OK	
B WY	244.8	21.0	11.64	OK	
B WY	244.8	21.0	11.64	OK	
B WY	244.8	22.6	10.85	OK	
B WY	244.8	22.6	10.85	OK	
B WY	246.1	21.0	11.71	OK	
B WY	246.1	21.0	11.71	OK	
B WY	246.1	22.6	10.91	OK	
B WY	246.1	22.6	10.91	OK	
B WY	244.8	7.3	33.58	OK	
B WY	244.8	7.3	33.58	OK	
B WY	244.8	5.8	42.47	OK	
B WY	244.8	5.8	42.47	OK	
B WY	246.1	7.3	33.77	OK	
B WY	246.1	7.3	33.77	OK	
B WY	246.1	5.8	42.71	OK	
B WY	246.1	5.8	42.71	OK	
D I	244.8	21.4	11.46	OK	
D I	246.9	21.4	11.56	OK	
D I	246.2	23.4	10.50	OK	
D I	248.3	23.4	10.59	OK	
D I	246.1	21.4	11.52	OK	
D I	248.3	21.4	11.62	OK	
D I	247.6	23.4	10.56	OK	
D I	249.7	23.4	10.65	OK	
D I	244.8	2.6	93.12	OK	
D I	246.9	2.6	93.93	OK	
D I	246.2	0.5	450.48	OK	
D I	248.3	0.5	454.41	OK	
D I	246.1	2.6	93.64	OK	
D I	248.3	2.6	94.46	OK	
D I	247.6	0.5	453.02	OK	
D I	249.7	0.5	456.95	OK	
D W	244.8	161.7	1.51	OK	
D W	245.8	161.7	1.52	OK	
D W	245.5	159.6	1.54	OK	

GENERAL CONTRACTOR  <b>IFICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione	Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 180 di 336

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / g_R$	$E_d$	$R_d / E_d$	
		kN	kN		
D W	246.5	159.6	1.54	OK	
D W	246.1	161.7	1.52	OK	
D W	247.2	161.7	1.53	OK	
D W	246.9	159.6	1.55	OK	
D W	247.9	159.6	1.55	OK	
D W	244.8	9.8	24.97	OK	
D W	245.8	9.8	25.08	OK	
D W	245.5	7.7	31.79	OK	
D W	246.5	7.7	31.93	OK	
D W	246.1	9.8	25.11	OK	
D W	247.2	9.8	25.22	OK	
D W	246.9	7.7	31.97	OK	
D W	247.9	7.7	32.11	OK	
DAA	245.8	21.7	11.34	OK	
DAA	245.8	21.7	11.34	OK	
DAA	246.5	23.8	10.38	OK	
DAA	246.5	23.8	10.38	OK	
DAA	247.2	21.7	11.41	OK	
DAA	247.2	21.7	11.41	OK	
DAA	247.9	23.8	10.44	OK	
DAA	247.9	23.8	10.44	OK	
DAA	245.8	2.9	83.69	OK	
DAA	245.8	2.9	83.69	OK	
DAA	246.5	0.9	288.26	OK	
DAA	246.5	0.9	288.26	OK	
DAA	247.2	2.9	84.16	OK	
DAA	247.2	2.9	84.16	OK	
DAA	247.9	0.9	289.88	OK	

Capacità portante – verifiche statiche

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	COMB	$R_d$	$E_d$	$R_d / E_d$	
		$q_{u,d}$ kPa	$q_{E,d} = N / (B' \cdot L')$		
A	$(2528. + 1773. +) / 2.3 =$	1870.2	103.03	18.15	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	COMB	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>
		q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')	
			kPa		
A	(2528. + 1773. +) / 2.3 =	1870.2	103.03	18.15	OK
A	(2366. + 1772. +) / 2.3 =	1799.5	132.08	13.62	OK
A	(2366. + 1772. +) / 2.3 =	1799.5	132.08	13.62	OK
A	(2532. + 1774. +) / 2.3 =	1872.0	103.34	18.12	OK
A	(2532. + 1774. +) / 2.3 =	1872.0	103.34	18.12	OK
A	(2371. + 1773. +) / 2.3 =	1801.9	132.02	13.65	OK
A	(2371. + 1773. +) / 2.3 =	1801.9	132.02	13.65	OK
A	(2606. + 1795. +) / 2.3 =	1913.4	95.62	20.01	OK
A	(2606. + 1795. +) / 2.3 =	1913.4	95.62	20.01	OK
A	(2443. + 1796. +) / 2.3 =	1843.1	120.14	15.34	OK
A	(2443. + 1796. +) / 2.3 =	1843.1	120.14	15.34	OK
A	(2609. + 1795. +) / 2.3 =	1914.8	95.99	19.95	OK
A	(2609. + 1795. +) / 2.3 =	1914.8	95.99	19.95	OK
A	(2447. + 1796. +) / 2.3 =	1845.1	120.26	15.34	OK
A	(2447. + 1796. +) / 2.3 =	1845.1	120.26	15.34	OK
B AA	(2481. + 1750. +) / 2.3 =	1839.6	106.75	17.23	OK
B AA	(2481. + 1750. +) / 2.3 =	1839.6	106.75	17.23	OK
B AA	(2385. + 1749. +) / 2.3 =	1797.7	123.55	14.55	OK
B AA	(2385. + 1749. +) / 2.3 =	1797.7	123.55	14.55	OK
B AA	(2485. + 1750. +) / 2.3 =	1841.6	107.02	17.21	OK
B AA	(2485. + 1750. +) / 2.3 =	1841.6	107.02	17.21	OK
B AA	(2390. + 1750. +) / 2.3 =	1800.1	123.62	14.56	OK
B AA	(2390. + 1750. +) / 2.3 =	1800.1	123.62	14.56	OK
B AA	(3044. + 1763. +) / 2.3 =	2090.0	61.85	33.79	OK
B AA	(3044. + 1763. +) / 2.3 =	2090.0	61.85	33.79	OK
B AA	(3006. + 1802. +) / 2.3 =	2090.2	65.52	31.90	OK
B AA	(3006. + 1802. +) / 2.3 =	2090.2	65.52	31.90	OK
B AA	(3044. + 1764. +) / 2.3 =	2090.0	62.34	33.53	OK
B AA	(3044. + 1764. +) / 2.3 =	2090.0	62.34	33.53	OK
B AA	(3006. + 1802. +) / 2.3 =	2090.3	66.01	31.67	OK
B AA	(3006. + 1802. +) / 2.3 =	2090.3	66.01	31.67	OK
B WX	(2835. + 1454. +) / 2.3 =	1864.7	91.46	20.39	OK
B WX	(2835. + 1454. +) / 2.3 =	1864.7	91.46	20.39	OK
B WX	(2733. + 1469. +) / 2.3 =	1826.8	101.70	17.96	OK
B WX	(2733. + 1469. +) / 2.3 =	1826.8	101.70	17.96	OK
B WX	(2836. + 1457. +) / 2.3 =	1866.5	91.88	20.31	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
B WX	(2836. + 1457. +) / 2.3 =	1866.5	91.88	20.31	OK
B WX	(2735. + 1471. +) / 2.3 =	1828.9	102.06	17.92	OK
B WX	(2735. + 1471. +) / 2.3 =	1828.9	102.06	17.92	OK
B WX	(2894. + 1455. +) / 2.3 =	1891.0	87.31	21.66	OK
B WX	(2894. + 1455. +) / 2.3 =	1891.0	87.31	21.66	OK
B WX	(2795. + 1473. +) / 2.3 =	1855.6	96.59	19.21	OK
B WX	(2795. + 1473. +) / 2.3 =	1855.6	96.59	19.21	OK
B WX	(2895. + 1458. +) / 2.3 =	1892.5	87.75	21.57	OK
B WX	(2895. + 1458. +) / 2.3 =	1892.5	87.75	21.57	OK
B WX	(2797. + 1476. +) / 2.3 =	1857.5	96.99	19.15	OK
B WX	(2797. + 1476. +) / 2.3 =	1857.5	96.99	19.15	OK
B WXY	(2489. + 1554. +) / 2.3 =	1757.8	124.05	14.17	OK
B WXY	(2489. + 1554. +) / 2.3 =	1757.8	124.05	14.17	OK
B WXY	(2388. + 1557. +) / 2.3 =	1715.3	144.74	11.85	OK
B WXY	(2388. + 1557. +) / 2.3 =	1715.3	144.74	11.85	OK
B WXY	(2494. + 1555. +) / 2.3 =	1760.5	124.18	14.18	OK
B WXY	(2494. + 1555. +) / 2.3 =	1760.5	124.18	14.18	OK
B WXY	(2393. + 1559. +) / 2.3 =	1718.3	144.58	11.88	OK
B WXY	(2393. + 1559. +) / 2.3 =	1718.3	144.58	11.88	OK
B WXY	(3096. + 1497. +) / 2.3 =	1997.0	67.34	29.66	OK
B WXY	(3096. + 1497. +) / 2.3 =	1997.0	67.34	29.66	OK
B WXY	(3057. + 1524. +) / 2.3 =	1992.0	70.64	28.20	OK
B WXY	(3057. + 1524. +) / 2.3 =	1992.0	70.64	28.20	OK
B WXY	(3095. + 1499. +) / 2.3 =	1997.7	67.82	29.46	OK
B WXY	(3095. + 1499. +) / 2.3 =	1997.7	67.82	29.46	OK
B WXY	(3057. + 1526. +) / 2.3 =	1992.8	71.12	28.02	OK
B WXY	(3057. + 1526. +) / 2.3 =	1992.8	71.12	28.02	OK
B WY	(2313. + 1733. +) / 2.3 =	1759.2	136.91	12.85	OK
B WY	(2313. + 1733. +) / 2.3 =	1759.2	136.91	12.85	OK
B WY	(2219. + 1730. +) / 2.3 =	1716.6	165.83	10.35	OK
B WY	(2219. + 1730. +) / 2.3 =	1716.6	165.83	10.35	OK
B WY	(2319. + 1734. +) / 2.3 =	1761.9	136.77	12.88	OK
B WY	(2319. + 1734. +) / 2.3 =	1761.9	136.77	12.88	OK
B WY	(2225. + 1731. +) / 2.3 =	1719.6	165.09	10.42	OK
B WY	(2225. + 1731. +) / 2.3 =	1719.6	165.09	10.42	OK
B WY	(2961. + 1716. +) / 2.3 =	2033.5	63.31	32.12	OK
B WY	(2961. + 1716. +) / 2.3 =	2033.5	63.31	32.12	OK
B WY	(3023. + 1726. +) / 2.3 =	2065.2	61.01	33.85	OK
B WY	(3023. + 1726. +) / 2.3 =	2065.2	61.01	33.85	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
B WY	(2962. + 1716. +) / 2.3 =	2034.0	63.80	31.88	OK
B WY	(2962. + 1716. +) / 2.3 =	2034.0	63.80	31.88	OK
B WY	(3024. + 1727. +) / 2.3 =	2065.5	61.50	33.59	OK
B WY	(3024. + 1727. +) / 2.3 =	2065.5	61.50	33.59	OK
D I	(2195. + 1769. +) / 2.3 =	1723.3	190.62	9.04	OK
D I	(2202. + 1769. +) / 2.3 =	1726.5	188.87	9.14	OK
D I	(2054. + 1767. +) / 2.3 =	1661.6	308.27	5.39	OK
D I	(2062. + 1768. +) / 2.3 =	1665.4	300.97	5.53	OK
D I	(2201. + 1770. +) / 2.3 =	1726.3	189.22	9.12	OK
D I	(2208. + 1770. +) / 2.3 =	1729.4	187.57	9.22	OK
D I	(2061. + 1768. +) / 2.3 =	1665.1	301.93	5.51	OK
D I	(2069. + 1769. +) / 2.3 =	1668.8	295.16	5.65	OK
D I	(2986. + 1794. +) / 2.3 =	2078.2	66.10	31.44	OK
D I	(2987. + 1793. +) / 2.3 =	2078.4	66.57	31.22	OK
D I	(2892. + 1842. +) / 2.3 =	2058.3	74.79	27.52	OK
D I	(2894. + 1841. +) / 2.3 =	2058.7	75.23	27.36	OK
D I	(2987. + 1794. +) / 2.3 =	2078.3	66.59	31.21	OK
D I	(2987. + 1793. +) / 2.3 =	2078.6	67.05	31.00	OK
D I	(2893. + 1842. +) / 2.3 =	2058.6	75.27	27.35	OK
D I	(2895. + 1841. +) / 2.3 =	2059.1	75.71	27.20	OK
D W	(998. + 453. +) / 2.3 =	631.0	129.11	4.89	OK
D W	(1005. + 457. +) / 2.3 =	635.3	129.03	4.92	OK
D W	(954. + 473. +) / 2.3 =	620.8	175.25	3.54	OK
D W	(961. + 477. +) / 2.3 =	625.1	174.62	3.58	OK
D W	(1010. + 460. +) / 2.3 =	639.1	129.09	4.95	OK
D W	(1016. + 463. +) / 2.3 =	643.3	129.02	4.99	OK
D W	(966. + 481. +) / 2.3 =	629.0	174.29	3.61	OK
D W	(972. + 484. +) / 2.3 =	633.3	173.69	3.65	OK
D W	(2928. + 1692. +) / 2.3 =	2008.7	63.67	31.55	OK
D W	(2928. + 1692. +) / 2.3 =	2009.0	63.94	31.42	OK
D W	(2950. + 1737. +) / 2.3 =	2038.1	65.13	31.29	OK
D W	(2951. + 1737. +) / 2.3 =	2038.4	65.37	31.18	OK
D W	(2929. + 1692. +) / 2.3 =	2009.4	64.16	31.32	OK
D W	(2929. + 1693. +) / 2.3 =	2009.7	64.43	31.19	OK
D W	(2951. + 1738. +) / 2.3 =	2038.5	65.62	31.07	OK
D W	(2952. + 1738. +) / 2.3 =	2038.8	65.85	30.96	OK
DAA	(2191. + 1767. +) / 2.3 =	1720.5	192.46	8.94	OK
DAA	(2191. + 1767. +) / 2.3 =	1720.5	192.46	8.94	OK
DAA	(2048. + 1765. +) / 2.3 =	1657.9	313.88	5.28	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
DAA	(2048. + 1765. +) / 2.3 =	1657.9	313.88	5.28	OK
DAA	(2197. + 1767. +) / 2.3 =	1723.5	191.03	9.02	OK
DAA	(2197. + 1767. +) / 2.3 =	1723.5	191.03	9.02	OK
DAA	(2056. + 1766. +) / 2.3 =	1661.4	307.26	5.41	OK
DAA	(2056. + 1766. +) / 2.3 =	1661.4	307.26	5.41	OK
DAA	(2983. + 1789. +) / 2.3 =	2075.1	66.30	31.30	OK
DAA	(2983. + 1789. +) / 2.3 =	2075.1	66.30	31.30	OK
DAA	(2901. + 1844. +) / 2.3 =	2062.7	74.44	27.71	OK
DAA	(2901. + 1844. +) / 2.3 =	2062.7	74.44	27.71	OK
DAA	(2984. + 1790. +) / 2.3 =	2075.3	66.79	31.07	OK
DAA	(2984. + 1790. +) / 2.3 =	2075.3	66.79	31.07	OK
DAA	(2902. + 1843. +) / 2.3 =	2063.0	74.91	27.54	OK
DAA	(2902. + 1843. +) / 2.3 =	2063.0	74.91	27.54	OK
A	(2524. + 1772. +) / 2.3 =	1867.8	93.13	20.06	OK
A	(2524. + 1772. +) / 2.3 =	1867.8	93.13	20.06	OK
A	(2404. + 1772. +) / 2.3 =	1815.5	111.34	16.31	OK
A	(2404. + 1772. +) / 2.3 =	1815.5	111.34	16.31	OK
A	(2527. + 1772. +) / 2.3 =	1869.1	93.33	20.03	OK
A	(2527. + 1772. +) / 2.3 =	1869.1	93.33	20.03	OK
A	(2407. + 1772. +) / 2.3 =	1817.2	111.39	16.31	OK
A	(2407. + 1772. +) / 2.3 =	1817.2	111.39	16.31	OK
A	(2610. + 1796. +) / 2.3 =	1915.8	85.72	22.35	OK
A	(2610. + 1796. +) / 2.3 =	1915.8	85.72	22.35	OK
A	(2489. + 1798. +) / 2.3 =	1863.9	100.91	18.47	OK
A	(2489. + 1798. +) / 2.3 =	1863.9	100.91	18.47	OK
A	(2613. + 1796. +) / 2.3 =	1916.8	85.96	22.30	OK
A	(2613. + 1796. +) / 2.3 =	1916.8	85.96	22.30	OK
A	(2492. + 1798. +) / 2.3 =	1865.2	101.05	18.46	OK
A	(2492. + 1798. +) / 2.3 =	1865.2	101.05	18.46	OK
B AA	(2448. + 1746. +) / 2.3 =	1823.1	100.34	18.17	OK
B AA	(2448. + 1746. +) / 2.3 =	1823.1	100.34	18.17	OK
B AA	(2377. + 1745. +) / 2.3 =	1792.1	112.14	15.98	OK
B AA	(2377. + 1745. +) / 2.3 =	1792.1	112.14	15.98	OK
B AA	(2451. + 1746. +) / 2.3 =	1824.7	100.49	18.16	OK
B AA	(2451. + 1746. +) / 2.3 =	1824.7	100.49	18.16	OK
B AA	(2380. + 1746. +) / 2.3 =	1793.8	112.17	15.99	OK
B AA	(2380. + 1746. +) / 2.3 =	1793.8	112.17	15.99	OK
B AA	(3040. + 1746. +) / 2.3 =	2081.0	55.09	37.78	OK
B AA	(3040. + 1746. +) / 2.3 =	2081.0	55.09	37.78	OK





Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
B AA	(3030. + 1783. +) / 2.3 =	2092.3	57.07	36.66	OK
B AA	(3030. + 1783. +) / 2.3 =	2092.3	57.07	36.66	OK
B AA	(3040. + 1746. +) / 2.3 =	2081.1	55.41	37.56	OK
B AA	(3040. + 1746. +) / 2.3 =	2081.1	55.41	37.56	OK
B AA	(3030. + 1783. +) / 2.3 =	2092.3	57.40	36.45	OK
B AA	(3030. + 1783. +) / 2.3 =	2092.3	57.40	36.45	OK
B WX	(2839. + 1417. +) / 2.3 =	1850.1	84.00	22.03	OK
B WX	(2839. + 1417. +) / 2.3 =	1850.1	84.00	22.03	OK
B WX	(2763. + 1429. +) / 2.3 =	1822.6	90.79	20.08	OK
B WX	(2763. + 1429. +) / 2.3 =	1822.6	90.79	20.08	OK
B WX	(2840. + 1419. +) / 2.3 =	1851.5	84.28	21.97	OK
B WX	(2840. + 1419. +) / 2.3 =	1851.5	84.28	21.97	OK
B WX	(2765. + 1431. +) / 2.3 =	1824.1	91.03	20.04	OK
B WX	(2765. + 1431. +) / 2.3 =	1824.1	91.03	20.04	OK
B WX	(2903. + 1417. +) / 2.3 =	1878.3	79.77	23.55	OK
B WX	(2903. + 1417. +) / 2.3 =	1878.3	79.77	23.55	OK
B WX	(2830. + 1431. +) / 2.3 =	1852.9	85.87	21.58	OK
B WX	(2830. + 1431. +) / 2.3 =	1852.9	85.87	21.58	OK
B WX	(2904. + 1419. +) / 2.3 =	1879.5	80.06	23.47	OK
B WX	(2904. + 1419. +) / 2.3 =	1879.5	80.06	23.47	OK
B WX	(2832. + 1433. +) / 2.3 =	1854.3	86.14	21.53	OK
B WX	(2832. + 1433. +) / 2.3 =	1854.3	86.14	21.53	OK
B WXY	(2454. + 1529. +) / 2.3 =	1732.0	118.96	14.56	OK
B WXY	(2454. + 1529. +) / 2.3 =	1732.0	118.96	14.56	OK
B WXY	(2379. + 1532. +) / 2.3 =	1700.3	133.89	12.70	OK
B WXY	(2379. + 1532. +) / 2.3 =	1700.3	133.89	12.70	OK
B WXY	(2458. + 1531. +) / 2.3 =	1734.1	118.98	14.57	OK
B WXY	(2458. + 1531. +) / 2.3 =	1734.1	118.98	14.57	OK
B WXY	(2383. + 1534. +) / 2.3 =	1702.7	133.74	12.73	OK
B WXY	(2383. + 1534. +) / 2.3 =	1702.7	133.74	12.73	OK
B WXY	(3106. + 1458. +) / 2.3 =	1984.1	60.59	32.75	OK
B WXY	(3106. + 1458. +) / 2.3 =	1984.1	60.59	32.75	OK
B WXY	(3080. + 1481. +) / 2.3 =	1983.0	62.74	31.61	OK
B WXY	(3080. + 1481. +) / 2.3 =	1983.0	62.74	31.61	OK
B WXY	(3105. + 1460. +) / 2.3 =	1984.7	60.91	32.58	OK
B WXY	(3105. + 1460. +) / 2.3 =	1984.7	60.91	32.58	OK
B WXY	(3080. + 1482. +) / 2.3 =	1983.7	63.06	31.46	OK
B WXY	(3080. + 1482. +) / 2.3 =	1983.7	63.06	31.46	OK
B WY	(2262. + 1726. +) / 2.3 =	1733.6	134.80	12.86	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	COMB	q <sub>u,d</sub> kPa	q <sub>E,d</sub> = N / (B'·L')		
			kPa		
B WY	(2262. + 1726. +) / 2.3 =	1733.6	134.80	12.86	OK
B WY	(2192. + 1723. +) / 2.3 =	1701.9	156.99	10.84	OK
B WY	(2192. + 1723. +) / 2.3 =	1701.9	156.99	10.84	OK
B WY	(2266. + 1726. +) / 2.3 =	1735.7	134.55	12.90	OK
B WY	(2266. + 1726. +) / 2.3 =	1735.7	134.55	12.90	OK
B WY	(2196. + 1723. +) / 2.3 =	1704.2	156.35	10.90	OK
B WY	(2196. + 1723. +) / 2.3 =	1704.2	156.35	10.90	OK
B WY	(2907. + 1714. +) / 2.3 =	2008.9	59.34	33.85	OK
B WY	(2907. + 1714. +) / 2.3 =	2008.9	59.34	33.85	OK
B WY	(2980. + 1709. +) / 2.3 =	2038.7	55.86	36.49	OK
B WY	(2980. + 1709. +) / 2.3 =	2038.7	55.86	36.49	OK
B WY	(2907. + 1714. +) / 2.3 =	2009.4	59.66	33.68	OK
B WY	(2907. + 1714. +) / 2.3 =	2009.4	59.66	33.68	OK
B WY	(2981. + 1709. +) / 2.3 =	2039.0	56.19	36.29	OK
B WY	(2981. + 1709. +) / 2.3 =	2039.0	56.19	36.29	OK
D I	(2149. + 1762. +) / 2.3 =	1700.6	192.41	8.84	OK
D I	(2157. + 1763. +) / 2.3 =	1704.4	189.83	8.98	OK
D I	(2047. + 1761. +) / 2.3 =	1655.7	280.14	5.91	OK
D I	(2056. + 1762. +) / 2.3 =	1659.9	272.70	6.09	OK
D I	(2154. + 1763. +) / 2.3 =	1703.0	190.97	8.92	OK
D I	(2162. + 1764. +) / 2.3 =	1706.7	188.50	9.05	OK
D I	(2053. + 1762. +) / 2.3 =	1658.3	275.77	6.01	OK
D I	(2061. + 1762. +) / 2.3 =	1662.5	268.73	6.19	OK
D I	(2985. + 1770. +) / 2.3 =	2067.1	58.43	35.38	OK
D I	(2986. + 1770. +) / 2.3 =	2067.5	58.90	35.10	OK
D I	(2958. + 1826. +) / 2.3 =	2080.0	62.86	33.09	OK
D I	(2959. + 1826. +) / 2.3 =	2080.3	63.31	32.86	OK
D I	(2985. + 1770. +) / 2.3 =	2067.3	58.76	35.18	OK
D I	(2986. + 1770. +) / 2.3 =	2067.7	59.23	34.91	OK
D I	(2958. + 1826. +) / 2.3 =	2080.2	63.18	32.92	OK
D I	(2959. + 1826. +) / 2.3 =	2080.5	63.64	32.69	OK
D W	(844. + 354. +) / 2.3 =	521.0	120.73	4.32	OK
D W	(851. + 358. +) / 2.3 =	525.8	120.60	4.36	OK
D W	(817. + 367. +) / 2.3 =	514.8	151.34	3.40	OK
D W	(824. + 371. +) / 2.3 =	519.5	150.82	3.44	OK
D W	(853. + 359. +) / 2.3 =	527.0	120.67	4.37	OK
D W	(860. + 363. +) / 2.3 =	531.7	120.55	4.41	OK
D W	(826. + 372. +) / 2.3 =	520.8	150.82	3.45	OK
D W	(833. + 376. +) / 2.3 =	525.5	150.31	3.50	OK

GENERAL CONTRACTOR  IRICAV2	ALTA SORVEGLIANZA  GRUPPO FERROVIE DELLO STATO ITALIANE	Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 187 di 336
Relazione di calcolo pali di alimentazione						

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')			
COMB			kPa			
D W	(2851. + 1691. +) /2.3 =	1974.5	60.90	32.42	OK	
D W	(2851. + 1691. +) /2.3 =	1974.9	61.17	32.29	OK	
D W	(2958. + 1681. +) /2.3 =	2017.1	55.72	36.20	OK	
D W	(2959. + 1681. +) /2.3 =	2017.5	55.96	36.05	OK	
D W	(2852. + 1691. +) /2.3 =	1975.2	61.22	32.26	OK	
D W	(2852. + 1692. +) /2.3 =	1975.7	61.49	32.13	OK	
D W	(2959. + 1682. +) /2.3 =	2017.5	56.05	36.00	OK	
D W	(2959. + 1682. +) /2.3 =	2018.0	56.28	35.85	OK	
DAA	(2145. + 1760. +) /2.3 =	1697.6	194.52	8.73	OK	
DAA	(2145. + 1760. +) /2.3 =	1697.6	194.52	8.73	OK	
DAA	(2041. + 1758. +) /2.3 =	1651.5	285.86	5.78	OK	
DAA	(2041. + 1758. +) /2.3 =	1651.5	285.86	5.78	OK	
DAA	(2150. + 1760. +) /2.3 =	1700.0	193.04	8.81	OK	
DAA	(2150. + 1760. +) /2.3 =	1700.0	193.04	8.81	OK	
DAA	(2046. + 1758. +) /2.3 =	1654.2	281.27	5.88	OK	
DAA	(2046. + 1758. +) /2.3 =	1654.2	281.27	5.88	OK	
DAA	(2981. + 1765. +) /2.3 =	2063.8	58.64	35.20	OK	
DAA	(2981. + 1765. +) /2.3 =	2063.8	58.64	35.20	OK	
DAA	(2954. + 1822. +) /2.3 =	2076.5	62.88	33.02	OK	
DAA	(2954. + 1822. +) /2.3 =	2076.5	62.88	33.02	OK	
DAA	(2982. + 1765. +) /2.3 =	2064.0	58.96	35.01	OK	
DAA	(2982. + 1765. +) /2.3 =	2064.0	58.96	35.01	OK	
DAA	(2955. + 1822. +) /2.3 =	2076.6	63.21	32.85	OK	

#### Ribaltamento – verifiche sismiche

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	dir. L	dir. T	dir. L	dir. T		
COMB	kNm	kNm	kNm	kNm		
Comb1	554.94	406.96	15.31	125.51	3.24	OK
Comb2	554.94	406.96	15.31	125.51	3.24	OK
Comb3	554.94	406.96	15.31	23.47	17.34	OK
Comb4	554.94	406.96	15.31	23.47	17.34	OK
Comb5	554.94	406.96	51.02	89.80	4.53	OK
Comb6	554.94	406.96	51.02	89.80	4.53	OK

GENERAL CONTRACTOR  <b>IRICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE
Relazione di calcolo pali di alimentazione	Progetto IN17    Lotto 10    Codifica Documento E I2 CL OC 00 0 0 010    Rev. A    Foglio 188 di 336

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
Comb7	554.94	406.96	51.02	59.19	6.88	OK
Comb8	554.94	406.96	51.02	59.19	6.88	OK

#### Scorrimento – verifiche sismiche

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$		$E_d$	Rd/Ed	
	kN		kN		
COMB					
Comb1	262.8		101.3	2.59	OK
Comb2	262.8		101.3	2.59	OK
Comb3	262.8		90.8	2.89	OK
Comb4	262.8		90.8	2.89	OK
Comb5	262.8		97.5	2.69	OK
Comb6	262.8		97.5	2.69	OK
Comb7	262.8		96.5	2.72	OK
Comb8	262.8		96.5	2.72	OK

#### Capacità portante – verifiche sismiche

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	Rd		$E_d$	Rd/Ed	
	$q_{u,d}$ kPa		$q_{E,d} = N / (B' \cdot L')$		
COMB			kPa		
Comb1	(1491. + 702. +) / 2.3 =		953.5	83.35	11.44 OK
Comb2	(1491. + 702. +) / 2.3 =		953.5	83.35	11.44 OK
Comb3	(1760. + 737. +) / 2.3 =		1085.7	61.17	17.75 OK
Comb4	(1760. + 737. +) / 2.3 =		1085.7	61.17	17.75 OK
Comb5	(1715. + 700. +) / 2.3 =		1049.7	79.21	13.25 OK
Comb6	(1715. + 700. +) / 2.3 =		1049.7	79.21	13.25 OK
Comb7	(1764. + 688. +) / 2.3 =		1065.8	72.24	14.75 OK
Comb8	(1764. + 688. +) / 2.3 =		1065.8	72.24	14.75 OK

Le verifiche sono soddisfatte.



### 12.9 Sintesi risultati LC5

TITOLO: **Caso di carico 5 - combinazioni statiche**

FONDAZIONI A PLINTO

DESIGN ASSUMPTION

piano campagna sostanzialmente orizzontale

angolo d'attrito caratteristico  $\phi'_k$

coesione  $c'$

angolo d'attrito caratteristico  $\phi'_k$  alla base

coesione alla base  $c'$

coefficiente  $\gamma_p$

coefficiente  $\gamma_c'$

coefficiente  $\gamma_k$  capacità portante

coefficiente  $\gamma_k$  scorrimento

coefficiente  $\gamma_k$  spinta passiva

angolo d'attrito di design  $\phi'_d$

coesione di design  $c'_d$

coeff. attrito di design  $\mu'_d$

coesione alla base di design

Dimensione fondazione B[m] (LONGITUDINALE)

Dimensione fondazione L [m] (TRASVERSALE)

Profondità da piano campagna D [m]

Altezza plinto [m]  $H_p$

Dimensione baggiolo b[m] (LONGITUDINALE)

Dimensione maggiore baggiolo l [m] (TRASVERSALE)

Altezza baggiolo [m]  $H_b$

Altezza terreno sopraplinto [m]  $H_t$

$q'$  = carico permanente ai lati

$\gamma$  = peso specifico medio sopra la fondazione

$\gamma_f$  = peso specifico medio sotto la fondazione

opzione calcolo coeff.  $S_{\phi}$  e  $S_{\gamma}$

opzione calcolo per tenere in conto peso terreno di ricoprimento

Peso specifico medio c.a.

Peso proprio plinto + baggiolo + terreno sovrastante [kN]

Quota baricentro plinto + baggiolo + terreno sovrastante vs p.f. [kN]

Coefficiente sismico kh

Coefficiente sismico kv

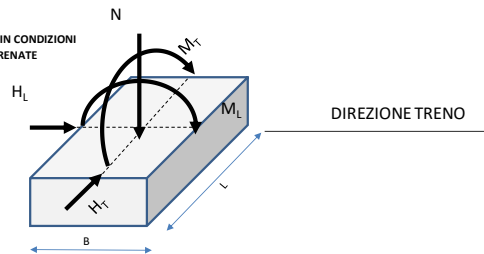
Azione inerziale orizzontale plinto

Azione inerziale verticale plinto

DA2

38	°	0.663	rad
0	kPa		
38	°	0.663	rad
0	kPa		
1.00			
1.00			
2.30			
1.10			
1.40			
38.00	°	0.663	rad
0.00	kPa		
0.78			
0.00	kPa		
2.2	m		
2.2	m		
2.2	m		
2.2	m		
0.8	m		
0.8	m		
0.5	m		
0.25	m		
44	kPa		
20	kN/m <sup>3</sup>		
20	kN/m <sup>3</sup>		
1			
0	(1 si - 0 no)		
25	kN/m <sup>3</sup>		
274	kN		
1.30	m		
0.000	g		
0.000	g		+ downward
0.00	kN		
0.00	kN		

VERIFICA IN CONDIZIONI DRENATE



(NB: coefficiente correttivo per rapporto D/B non considerato)

(valore da stabilirsi in base alla profondità di falda)  
**(0= Lancellotta ecc., 1 = originale EC7)**  
si useranno le formule originarie di EC7

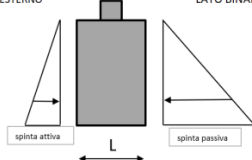
**Eccentricità degli scarichi rispetto a baricentro fondazione**

eccentricità longitudinale eL	0	m	+ se concorde con i momenti del traliccio
eccentricità trasversale eT	0.1	m	+ se concorde con i momenti del traliccio

**Coefficienti di spinta di progetto**

coefficiente di spinta attiva statico $K_a$	0.228	-
coefficiente di spinta attiva sismico $K_{a,E}$	0.483	-
coefficiente di spinta passiva statico $K_p$	4.395	-
coefficiente di spinta passiva sismico $K_{p,E}$	3.251	-
coeff. parziale riduttivo della spinta passiva	1.40	-
moltiplicatore della spinta passiva $\alpha$	0.00	long 0.00 trasv
contributo delle spinte frontali long - taglio	0	kN statico 0 kN sismico
contributo delle spinte frontali long - momer	0	kNm statico 0 kNm sismico
contributo delle spinte frontali trasv - taglio	0	kN statico 0 kN sismico
contributo delle spinte frontali trasv - momer	0	kNm statico 0 kNm sismico

LATO ESTERNO LATO BINARIO



CALCOLI PRELIMINARI: coefficienti di capacità portante indipendenti dai carichi

$N_{\phi} = 48.93$	$B_{\phi} = 1$
$N_{\gamma} = 74.90$	$B_{\gamma} = 1$
$N_c = 61.35$	$B_c = 1$

**SINTESI RISULTATI**

Capacità portante	$F_s \min = 3.41$	n. Verif. Neg.	0
Scorrimento	$F_s \min = 7.7$	n. Verif. Neg.	0
Ribaltamento	$F_s \min = 1.19$	n. Verif. Neg.	0



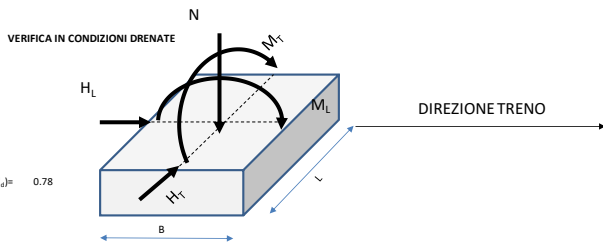
TITOLO: **Caso di carico 5 - combinazioni sismiche**

FONDAZIONI A PLINTO

DESIGN ASSUMPTION

piano campagna sostanzialmente orizzontale

angolo d'attrito caratteristico $\phi'_s$	38	*	0.663	rad	
coesione $c'$	0	kPa			
angolo d'attrito caratteristico $\phi'_s$ alla base	38	*	0.663	rad	
coesione alla base $c'$	0	kPa			
coefficiente $\gamma_s$	1.00				
coefficiente $\gamma_s'$	1.00				
coefficiente $\gamma_s$ capacità portante	2.30				
coefficiente $\gamma_s$ scorrimento	2.30				
coefficiente $\gamma_s$ spinta passiva	1.10				
angolo d'attrito di design $\phi'_d$	1.40				
coesione di design $c'_d$	38.00	*	0.663	rad	$\tan(\phi'_d) = 0.78$
coeff. attrito di design $\mu'_d$	0.00	kPa			
coesione alla base di design	0.78	kPa			
Dimensione fondazione B[m] (LONGITUDINALE)	0.00	kPa			
Dimensione fondazione L[m] (TRASVERSALE)	2.2	m			
Profondità da piano campagna D [m]	2.2	m			(NB: coefficiente correttivo per rapporto D/B non considerato)
Altezza plinto [m] Hp	1.6	m			
Dimensione baggio b[m] (LONGITUDINALE)	1.6	m			
Dimensione maggiore baggio l [m] (TRASVERSALE)	0.8	m			
Altezza baggio [m] Hb	0.8	m			
Altezza terreno sopra plinto [m] Ht	0.5	m			
q' = carico permanente ai lati	0.25	m			
$\gamma$ = peso specifico medio sopra la fondazione	32	kN/m <sup>3</sup>			
$\gamma_f$ = peso specifico medio sotto la fondazione	20	kN/m <sup>3</sup>			(valore da stabilirsi in base alla profondità di falda)
opzione calcolo coeff. $S_u$ e $S_v$	20	kN/m <sup>3</sup>			(0 = Lancellotta ecc. 1 = originale EC7)
	1				si useranno le formule originarie di EC7
opzione calcolo per tenere in conto peso terreno di ricoprimento	0	(1 si - 0 no)			
Peso specifico medio c.a.	25	kN/m <sup>3</sup>			
Peso proprio plinto + baggio + terreno sovrastante [kN]	202	kN			
Quota baricentro plinto + baggio + terreno sovrastante vs p.f. [kN]	1.30	m			
Coefficiente sismico kh	0.231	g			
Coefficiente sismico kv	-0.116	g			+ downward
Azione inerziale orizzontale plinto	46.57	kN			
Azione inerziale verticale plinto	-23.28	kN			

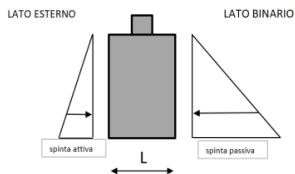


Eccentricità degli scarichi rispetto a baricentro fondazione

eccentricità longitudinale eL	0	m	+ se concorde con i momenti del traliccio
eccentricità trasversale eT	0.1	m	+ se concorde con i momenti del traliccio

Coefficienti di spinta di progetto

coefficiente di spinta attiva statico Ka	0.228	-	
coefficiente di spinta attiva sismico Ka,E	0.483	-	
coefficiente di spinta passiva statico Kp	4.395	-	
coefficiente di spinta passiva sismico Kp,E	3.251	-	
coeff. parziale riduttivo della spinta passiva $\gamma_{re}$	1.40	-	
moltiplicatore della spinta passiva $\alpha$	0.00	long	0.00 trasv
contributo delle spinte frontali long - taglio	0	kN	0 kN sismico
contributo delle spinte frontali long - momento	0	kNm	0 kNm sismico
contributo delle spinte frontali trasv - taglio	0	kN	0 kN sismico
contributo delle spinte frontali trasv - momento	0	kNm	0 kNm sismico



CALCOLI PRELIMINARI: coefficienti di capacità portante indipendenti dai carichi

$N_{q0}$ =	48.93	$B_{q0}$ =	1
$N_{q1}$ =	74.90	$B_{q1}$ =	1
$N_{q2}$ =	61.35	$B_{q2}$ =	1

SINTESI RISULTATI			
Capacità portante	$F_{s, min} =$	9.06	n. Verif. Neg. 0
Scorrimento	$F_{s, min} =$	2.89	n. Verif. Neg. 0
Ribaltamento	$F_{s, min} =$	2.62	n. Verif. Neg. 0

Le verifiche sono soddisfatte.

GENERAL CONTRACTOR  IRICAV2		ALTA SORVEGLIANZA  ITALFERR GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione		Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 191 di 336

## 12.10 Verifiche di dettaglio

Ribaltamento – verifiche statiche

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
A	387.86	387.86	0.00	114.14	3.40	OK
A	387.86	387.86	0.00	114.14	3.40	OK
A	387.86	387.86	0.00	142.67	2.72	OK
A	387.86	387.86	0.00	142.67	2.72	OK
A	413.73	413.73	0.00	116.50	3.55	OK
A	413.73	413.73	0.00	116.50	3.55	OK
A	413.73	413.73	0.00	145.02	2.85	OK
A	413.73	413.73	0.00	145.02	2.85	OK
A	387.86	387.86	0.00	91.69	4.23	OK
A	387.86	387.86	0.00	91.69	4.23	OK
A	387.86	387.86	0.00	120.21	3.23	OK
A	387.86	387.86	0.00	120.21	3.23	OK
A	413.73	413.73	0.00	94.04	4.40	OK
A	413.73	413.73	0.00	94.04	4.40	OK
A	413.73	413.73	0.00	122.56	3.38	OK
A	413.73	413.73	0.00	122.56	3.38	OK
B AA	359.39	359.39	0.00	154.23	2.33	OK
B AA	359.39	359.39	0.00	154.23	2.33	OK
B AA	359.39	359.39	0.00	171.27	2.10	OK
B AA	359.39	359.39	0.00	171.27	2.10	OK
B AA	376.72	376.72	0.00	155.81	2.42	OK
B AA	376.72	376.72	0.00	155.81	2.42	OK
B AA	376.72	376.72	0.00	172.85	2.18	OK
B AA	376.72	376.72	0.00	172.85	2.18	OK
B AA	359.39	359.39	0.00	40.64	8.84	OK
B AA	359.39	359.39	0.00	40.64	8.84	OK
B AA	359.39	359.39	0.00	23.60	15.23	OK
B AA	359.39	359.39	0.00	23.60	15.23	OK
B AA	376.72	376.72	0.00	42.21	8.92	OK
B AA	376.72	376.72	0.00	42.21	8.92	OK
B AA	376.72	376.72	0.00	25.18	14.96	OK
B AA	376.72	376.72	0.00	25.18	14.96	OK
B WX	359.39	359.39	73.74	71.03	4.87	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WX	359.39	359.39	73.74	71.03	4.87	OK
B WX	359.39	359.39	73.74	88.07	4.08	OK
B WX	359.39	359.39	73.74	88.07	4.08	OK
B WX	376.72	376.72	73.74	72.61	5.11	OK
B WX	376.72	376.72	73.74	72.61	5.11	OK
B WX	376.72	376.72	73.74	89.65	4.20	OK
B WX	376.72	376.72	73.74	89.65	4.20	OK
B WX	359.39	359.39	73.74	53.07	4.87	OK
B WX	359.39	359.39	73.74	53.07	4.87	OK
B WX	359.39	359.39	73.74	70.11	4.87	OK
B WX	359.39	359.39	73.74	70.11	4.87	OK
B WX	376.72	376.72	73.74	54.64	5.11	OK
B WX	376.72	376.72	73.74	54.64	5.11	OK
B WX	376.72	376.72	73.74	71.68	5.11	OK
B WX	376.72	376.72	73.74	71.68	5.11	OK
B WXY	359.39	359.39	51.62	165.48	2.17	OK
B WXY	359.39	359.39	51.62	165.48	2.17	OK
B WXY	359.39	359.39	51.62	182.52	1.97	OK
B WXY	359.39	359.39	51.62	182.52	1.97	OK
B WXY	376.72	376.72	51.62	167.06	2.26	OK
B WXY	376.72	376.72	51.62	167.06	2.26	OK
B WXY	376.72	376.72	51.62	184.10	2.05	OK
B WXY	376.72	376.72	51.62	184.10	2.05	OK
B WXY	359.39	359.39	51.62	51.89	6.93	OK
B WXY	359.39	359.39	51.62	51.89	6.93	OK
B WXY	359.39	359.39	51.62	34.85	6.96	OK
B WXY	359.39	359.39	51.62	34.85	6.96	OK
B WXY	376.72	376.72	51.62	53.46	7.05	OK
B WXY	376.72	376.72	51.62	53.46	7.05	OK
B WXY	376.72	376.72	51.62	36.42	7.30	OK
B WXY	376.72	376.72	51.62	36.42	7.30	OK
B WY	359.39	359.39	0.00	205.96	1.74	OK
B WY	359.39	359.39	0.00	205.96	1.74	OK
B WY	359.39	359.39	0.00	223.00	1.61	OK
B WY	359.39	359.39	0.00	223.00	1.61	OK
B WY	376.72	376.72	0.00	207.53	1.82	OK
B WY	376.72	376.72	0.00	207.53	1.82	OK
B WY	376.72	376.72	0.00	224.57	1.68	OK
B WY	376.72	376.72	0.00	224.57	1.68	OK





Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WY	359.39	359.39	0.00	92.36	3.89	OK
B WY	359.39	359.39	0.00	92.36	3.89	OK
B WY	359.39	359.39	0.00	75.33	4.77	OK
B WY	359.39	359.39	0.00	75.33	4.77	OK
B WY	376.72	376.72	0.00	93.94	4.01	OK
B WY	376.72	376.72	0.00	93.94	4.01	OK
B WY	376.72	376.72	0.00	76.90	4.90	OK
B WY	376.72	376.72	0.00	76.90	4.90	OK
D I	373.69	373.69	0.00	203.22	1.84	OK
D I	374.89	374.89	0.00	203.33	1.84	OK
D I	376.09	376.09	0.00	226.63	1.66	OK
D I	377.29	377.29	0.00	226.73	1.66	OK
D I	395.31	395.31	0.00	205.19	1.93	OK
D I	396.51	396.51	0.00	205.30	1.93	OK
D I	397.71	397.71	0.00	228.59	1.74	OK
D I	398.91	398.91	0.00	228.70	1.74	OK
D I	373.69	373.69	0.00	50.18	7.45	OK
D I	374.89	374.89	0.00	50.29	7.46	OK
D I	376.09	376.09	0.00	27.21	13.82	OK
D I	377.29	377.29	0.00	27.32	13.81	OK
D I	395.31	395.31	0.00	52.14	7.58	OK
D I	396.51	396.51	0.00	52.25	7.59	OK
D I	397.71	397.71	0.00	29.17	13.63	OK
D I	398.91	398.91	0.00	29.28	13.62	OK
D W	373.69	373.69	0.00	277.33	1.35	OK
D W	374.29	374.29	0.00	277.39	1.35	OK
D W	374.89	374.89	0.00	300.51	1.25	OK
D W	375.49	375.49	0.00	300.57	1.25	OK
D W	395.31	395.31	0.00	279.30	1.42	OK
D W	395.91	395.91	0.00	279.35	1.42	OK
D W	396.51	396.51	0.00	302.48	1.31	OK
D W	397.11	397.11	0.00	302.53	1.31	OK
D W	373.69	373.69	0.00	124.29	3.01	OK
D W	374.29	374.29	0.00	124.34	3.01	OK
D W	374.89	374.89	0.00	101.32	3.70	OK
D W	375.49	375.49	0.00	101.38	3.70	OK
D W	395.31	395.31	0.00	126.25	3.13	OK
D W	395.91	395.91	0.00	126.31	3.13	OK
D W	396.51	396.51	0.00	103.29	3.84	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
D W	397.11	397.11	0.00	103.34	3.84	OK
DAA	374.29	374.29	0.00	205.52	1.82	OK
DAA	374.29	374.29	0.00	205.52	1.82	OK
DAA	375.49	375.49	0.00	228.70	1.64	OK
DAA	375.49	375.49	0.00	228.70	1.64	OK
DAA	395.91	395.91	0.00	207.49	1.91	OK
DAA	395.91	395.91	0.00	207.49	1.91	OK
DAA	397.11	397.11	0.00	230.67	1.72	OK
DAA	397.11	397.11	0.00	230.67	1.72	OK
DAA	374.29	374.29	0.00	52.48	7.13	OK
DAA	374.29	374.29	0.00	52.48	7.13	OK
DAA	375.49	375.49	0.00	29.51	12.72	OK
DAA	375.49	375.49	0.00	29.51	12.72	OK
DAA	395.91	395.91	0.00	54.44	7.27	OK
DAA	395.91	395.91	0.00	54.44	7.27	OK
DAA	397.11	397.11	0.00	31.48	12.61	OK
DAA	397.11	397.11	0.00	31.48	12.61	OK
A	349.07	349.07	0.00	103.85	3.36	OK
A	349.07	349.07	0.00	103.85	3.36	OK
A	349.07	349.07	0.00	122.87	2.84	OK
A	349.07	349.07	0.00	122.87	2.84	OK
A	366.32	366.32	0.00	105.42	3.47	OK
A	366.32	366.32	0.00	105.42	3.47	OK
A	366.32	366.32	0.00	124.44	2.94	OK
A	366.32	366.32	0.00	124.44	2.94	OK
A	349.07	349.07	0.00	81.40	4.29	OK
A	349.07	349.07	0.00	81.40	4.29	OK
A	349.07	349.07	0.00	100.41	3.48	OK
A	349.07	349.07	0.00	100.41	3.48	OK
A	366.32	366.32	0.00	82.96	4.42	OK
A	366.32	366.32	0.00	82.96	4.42	OK
A	366.32	366.32	0.00	101.98	3.59	OK
A	366.32	366.32	0.00	101.98	3.59	OK
B AA	323.45	323.45	0.00	148.03	2.19	OK
B AA	323.45	323.45	0.00	148.03	2.19	OK
B AA	323.45	323.45	0.00	159.39	2.03	OK
B AA	323.45	323.45	0.00	159.39	2.03	OK
B AA	335.00	335.00	0.00	149.08	2.25	OK
B AA	335.00	335.00	0.00	149.08	2.25	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B AA	335.00	335.00	0.00	160.44	2.09	OK
B AA	335.00	335.00	0.00	160.44	2.09	OK
B AA	323.45	323.45	0.00	45.79	7.06	OK
B AA	323.45	323.45	0.00	45.79	7.06	OK
B AA	323.45	323.45	0.00	34.43	9.39	OK
B AA	323.45	323.45	0.00	34.43	9.39	OK
B AA	335.00	335.00	0.00	46.84	7.15	OK
B AA	335.00	335.00	0.00	46.84	7.15	OK
B AA	335.00	335.00	0.00	35.48	9.44	OK
B AA	335.00	335.00	0.00	35.48	9.44	OK
B WX	323.45	323.45	73.74	64.83	4.39	OK
B WX	323.45	323.45	73.74	64.83	4.39	OK
B WX	323.45	323.45	73.74	76.19	4.25	OK
B WX	323.45	323.45	73.74	76.19	4.25	OK
B WX	335.00	335.00	73.74	65.88	4.54	OK
B WX	335.00	335.00	73.74	65.88	4.54	OK
B WX	335.00	335.00	73.74	77.24	4.34	OK
B WX	335.00	335.00	73.74	77.24	4.34	OK
B WX	323.45	323.45	73.74	46.86	4.39	OK
B WX	323.45	323.45	73.74	46.86	4.39	OK
B WX	323.45	323.45	73.74	58.22	4.39	OK
B WX	323.45	323.45	73.74	58.22	4.39	OK
B WX	335.00	335.00	73.74	47.91	4.54	OK
B WX	335.00	335.00	73.74	47.91	4.54	OK
B WX	335.00	335.00	73.74	59.27	4.54	OK
B WX	335.00	335.00	73.74	59.27	4.54	OK
B WXY	323.45	323.45	51.62	159.28	2.03	OK
B WXY	323.45	323.45	51.62	159.28	2.03	OK
B WXY	323.45	323.45	51.62	170.63	1.90	OK
B WXY	323.45	323.45	51.62	170.63	1.90	OK
B WXY	335.00	335.00	51.62	160.33	2.09	OK
B WXY	335.00	335.00	51.62	160.33	2.09	OK
B WXY	335.00	335.00	51.62	171.69	1.95	OK
B WXY	335.00	335.00	51.62	171.69	1.95	OK
B WXY	323.45	323.45	51.62	57.04	5.67	OK
B WXY	323.45	323.45	51.62	57.04	5.67	OK
B WXY	323.45	323.45	51.62	45.68	6.27	OK
B WXY	323.45	323.45	51.62	45.68	6.27	OK
B WXY	335.00	335.00	51.62	58.09	5.77	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WXY	335.00	335.00	51.62	58.09	5.77	OK
B WXY	335.00	335.00	51.62	46.73	6.49	OK
B WXY	335.00	335.00	51.62	46.73	6.49	OK
B WY	323.45	323.45	0.00	199.75	1.62	OK
B WY	323.45	323.45	0.00	199.75	1.62	OK
B WY	323.45	323.45	0.00	211.11	1.53	OK
B WY	323.45	323.45	0.00	211.11	1.53	OK
B WY	335.00	335.00	0.00	200.80	1.67	OK
B WY	335.00	335.00	0.00	200.80	1.67	OK
B WY	335.00	335.00	0.00	212.16	1.58	OK
B WY	335.00	335.00	0.00	212.16	1.58	OK
B WY	323.45	323.45	0.00	97.52	3.32	OK
B WY	323.45	323.45	0.00	97.52	3.32	OK
B WY	323.45	323.45	0.00	86.16	3.75	OK
B WY	323.45	323.45	0.00	86.16	3.75	OK
B WY	335.00	335.00	0.00	98.57	3.40	OK
B WY	335.00	335.00	0.00	98.57	3.40	OK
B WY	335.00	335.00	0.00	87.21	3.84	OK
B WY	335.00	335.00	0.00	87.21	3.84	OK
D I	336.32	336.32	0.00	194.91	1.73	OK
D I	337.52	337.52	0.00	195.02	1.73	OK
D I	338.72	338.72	0.00	210.67	1.61	OK
D I	339.92	339.92	0.00	210.78	1.61	OK
D I	350.73	350.73	0.00	196.22	1.79	OK
D I	351.94	351.94	0.00	196.33	1.79	OK
D I	353.14	353.14	0.00	211.98	1.67	OK
D I	354.34	354.34	0.00	212.09	1.67	OK
D I	336.32	336.32	0.00	57.17	5.88	OK
D I	337.52	337.52	0.00	57.28	5.89	OK
D I	338.72	338.72	0.00	41.86	8.09	OK
D I	339.92	339.92	0.00	41.97	8.10	OK
D I	350.73	350.73	0.00	58.48	6.00	OK
D I	351.94	351.94	0.00	58.59	6.01	OK
D I	353.14	353.14	0.00	43.17	8.18	OK
D I	354.34	354.34	0.00	43.28	8.19	OK
D W	336.32	336.32	0.00	269.02	1.25	OK
D W	336.92	336.92	0.00	269.08	1.25	OK
D W	337.52	337.52	0.00	284.55	1.19	OK
D W	338.12	338.12	0.00	284.61	1.19	OK

GENERAL CONTRACTOR  <b>IRICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE	Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 197 di 336
Relazione di calcolo pali di alimentazione						

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
D W	350.73	350.73	0.00	270.33	1.30	OK
D W	351.33	351.33	0.00	270.39	1.30	OK
D W	351.94	351.94	0.00	285.86	1.23	OK
D W	352.54	352.54	0.00	285.92	1.23	OK
D W	336.32	336.32	0.00	131.28	2.56	OK
D W	336.92	336.92	0.00	131.34	2.57	OK
D W	337.52	337.52	0.00	115.97	2.91	OK
D W	338.12	338.12	0.00	116.03	2.91	OK
D W	350.73	350.73	0.00	132.59	2.65	OK
D W	351.33	351.33	0.00	132.65	2.65	OK
D W	351.94	351.94	0.00	117.28	3.00	OK
D W	352.54	352.54	0.00	117.34	3.00	OK
DAA	336.92	336.92	0.00	197.21	1.71	OK
DAA	336.92	336.92	0.00	197.21	1.71	OK
DAA	338.12	338.12	0.00	212.74	1.59	OK
DAA	338.12	338.12	0.00	212.74	1.59	OK
DAA	351.33	351.33	0.00	198.52	1.77	OK
DAA	351.33	351.33	0.00	198.52	1.77	OK
DAA	352.54	352.54	0.00	214.05	1.65	OK
DAA	352.54	352.54	0.00	214.05	1.65	OK
DAA	336.92	336.92	0.00	59.47	5.67	OK
DAA	336.92	336.92	0.00	59.47	5.67	OK
DAA	338.12	338.12	0.00	44.16	7.66	OK
DAA	338.12	338.12	0.00	44.16	7.66	OK
DAA	351.33	351.33	0.00	60.78	5.78	OK
DAA	351.33	351.33	0.00	60.78	5.78	OK
DAA	352.54	352.54	0.00	45.47	7.75	OK

Scorrimento – verifiche statiche

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$		$E_d$	Rd/Ed	
	kN		kN		
COMB					
A	250.4		8.7	28.79	OK
A	250.4		8.7	28.79	OK



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$	$E_d$	$R_d / E_d$	
		kN	kN		
A	250.4	10.7	23.31	OK	
A	250.4	10.7	23.31	OK	
A	267.1	8.7	30.71	OK	
A	267.1	8.7	30.71	OK	
A	267.1	10.7	24.86	OK	
A	267.1	10.7	24.86	OK	
A	250.4	4.9	50.84	OK	
A	250.4	4.9	50.84	OK	
A	250.4	7.0	35.93	OK	
A	250.4	7.0	35.93	OK	
A	267.1	4.9	54.23	OK	
A	267.1	4.9	54.23	OK	
A	267.1	7.0	38.33	OK	
A	267.1	7.0	38.33	OK	
B AA	232.1	15.0	15.44	OK	
B AA	232.1	15.0	15.44	OK	
B AA	232.1	16.2	14.29	OK	
B AA	232.1	16.2	14.29	OK	
B AA	243.2	15.0	16.18	OK	
B AA	243.2	15.0	16.18	OK	
B AA	243.2	16.2	14.98	OK	
B AA	243.2	16.2	14.98	OK	
B AA	232.1	7.0	33.14	OK	
B AA	232.1	7.0	33.14	OK	
B AA	232.1	5.8	40.03	OK	
B AA	232.1	5.8	40.03	OK	
B AA	243.2	7.0	34.74	OK	
B AA	243.2	7.0	34.74	OK	
B AA	243.2	5.8	41.96	OK	
B AA	243.2	5.8	41.96	OK	
B WX	232.1	9.9	23.48	OK	
B WX	232.1	9.9	23.48	OK	
B WX	232.1	10.6	21.88	OK	
B WX	232.1	10.6	21.88	OK	
B WX	243.2	9.9	24.61	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
B WX	243.2	9.9	24.61	OK	
B WX	243.2	10.6	22.94	OK	
B WX	243.2	10.6	22.94	OK	
B WX	232.1	8.6	27.08	OK	
B WX	232.1	8.6	27.08	OK	
B WX	232.1	9.0	25.80	OK	
B WX	232.1	9.0	25.80	OK	
B WX	243.2	8.6	28.38	OK	
B WX	243.2	8.6	28.38	OK	
B WX	243.2	9.0	27.04	OK	
B WX	243.2	9.0	27.04	OK	
B WXY	232.1	17.2	13.52	OK	
B WXY	232.1	17.2	13.52	OK	
B WXY	232.1	18.3	12.68	OK	
B WXY	232.1	18.3	12.68	OK	
B WXY	243.2	17.2	14.17	OK	
B WXY	243.2	17.2	14.17	OK	
B WXY	243.2	18.3	13.29	OK	
B WXY	243.2	18.3	13.29	OK	
B WXY	232.1	10.0	23.29	OK	
B WXY	232.1	10.0	23.29	OK	
B WXY	232.1	9.0	25.77	OK	
B WXY	232.1	9.0	25.77	OK	
B WXY	243.2	10.0	24.41	OK	
B WXY	243.2	10.0	24.41	OK	
B WXY	243.2	9.0	27.01	OK	
B WXY	243.2	9.0	27.01	OK	
B WY	232.1	20.7	11.19	OK	
B WY	232.1	20.7	11.19	OK	
B WY	232.1	21.9	10.57	OK	
B WY	232.1	21.9	10.57	OK	
B WY	243.2	20.7	11.73	OK	
B WY	243.2	20.7	11.73	OK	
B WY	243.2	21.9	11.08	OK	
B WY	243.2	21.9	11.08	OK	
B WY	232.1	12.7	18.26	OK	
B WY	232.1	12.7	18.26	OK	
B WY	232.1	11.5	20.17	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$	$E_d$	$R_d / E_d$	
		kN	kN		
B WY	232.1	11.5	20.17	OK	
B WY	243.2	12.7	19.14	OK	
B WY	243.2	12.7	19.14	OK	
B WY	243.2	11.5	21.14	OK	
B WY	243.2	11.5	21.14	OK	
D I	241.3	19.4	12.45	OK	
D I	242.1	19.4	12.49	OK	
D I	242.8	21.0	11.55	OK	
D I	243.6	21.0	11.59	OK	
D I	255.2	19.4	13.17	OK	
D I	256.0	19.4	13.21	OK	
D I	256.8	21.0	12.22	OK	
D I	257.6	21.0	12.25	OK	
D I	241.3	8.4	28.65	OK	
D I	242.1	8.4	28.74	OK	
D I	242.8	6.8	35.82	OK	
D I	243.6	6.8	35.93	OK	
D I	255.2	8.4	30.30	OK	
D I	256.0	8.4	30.40	OK	
D I	256.8	6.8	37.88	OK	
D I	257.6	6.8	37.99	OK	
D W	241.3	27.6	8.73	OK	
D W	241.7	27.6	8.75	OK	
D W	242.1	29.3	8.27	OK	
D W	242.5	29.3	8.28	OK	
D W	255.2	27.6	9.24	OK	
D W	255.6	27.6	9.25	OK	
D W	256.0	29.3	8.74	OK	
D W	256.4	29.3	8.76	OK	
D W	241.3	16.7	14.46	OK	
D W	241.7	16.7	14.49	OK	
D W	242.1	15.0	16.09	OK	
D W	242.5	15.0	16.12	OK	
D W	255.2	16.7	15.30	OK	
D W	255.6	16.7	15.32	OK	
D W	256.0	15.0	17.02	OK	
D W	256.4	15.0	17.05	OK	
DAA	241.7	19.8	12.24	OK	





Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$	$E_d$	$R_d / E_d$	
		kN	kN		
DAA	241.7	19.8	12.24	OK	
DAA	242.5	21.4	11.33	OK	
DAA	242.5	21.4	11.33	OK	
DAA	255.6	19.8	12.94	OK	
DAA	255.6	19.8	12.94	OK	
DAA	256.4	21.4	11.98	OK	
DAA	256.4	21.4	11.98	OK	
DAA	241.7	8.8	27.46	OK	
DAA	241.7	8.8	27.46	OK	
DAA	242.5	7.2	33.87	OK	
DAA	242.5	7.2	33.87	OK	
DAA	255.6	8.8	29.05	OK	
DAA	255.6	8.8	29.05	OK	
DAA	256.4	7.2	35.82	OK	
DAA	256.4	7.2	35.82	OK	
A	225.4	8.0	28.11	OK	
A	225.4	8.0	28.11	OK	
A	225.4	9.4	24.03	OK	
A	225.4	9.4	24.03	OK	
A	236.5	8.0	29.50	OK	
A	236.5	8.0	29.50	OK	
A	236.5	9.4	25.21	OK	
A	236.5	9.4	25.21	OK	
A	225.4	4.2	53.10	OK	
A	225.4	4.2	53.10	OK	
A	225.4	5.6	40.20	OK	
A	225.4	5.6	40.20	OK	
A	236.5	4.2	55.73	OK	
A	236.5	4.2	55.73	OK	
A	236.5	5.6	42.18	OK	
A	236.5	5.6	42.18	OK	
B AA	208.8	14.6	14.28	OK	
B AA	208.8	14.6	14.28	OK	
B AA	208.8	15.4	13.53	OK	
B AA	208.8	15.4	13.53	OK	
B AA	216.3	14.6	14.79	OK	
B AA	216.3	14.6	14.79	OK	
B AA	216.3	15.4	14.02	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
B AA	216.3	15.4	14.02	OK	
B AA	208.8	7.4	28.21	OK	
B AA	208.8	7.4	28.21	OK	
B AA	208.8	6.6	31.64	OK	
B AA	208.8	6.6	31.64	OK	
B AA	216.3	7.4	29.22	OK	
B AA	216.3	7.4	29.22	OK	
B AA	216.3	6.6	32.77	OK	
B AA	216.3	6.6	32.77	OK	
B WX	208.8	9.7	21.61	OK	
B WX	208.8	9.7	21.61	OK	
B WX	208.8	10.1	20.65	OK	
B WX	208.8	10.1	20.65	OK	
B WX	216.3	9.7	22.38	OK	
B WX	216.3	9.7	22.38	OK	
B WX	216.3	10.1	21.39	OK	
B WX	216.3	10.1	21.39	OK	
B WX	208.8	8.5	24.68	OK	
B WX	208.8	8.5	24.68	OK	
B WX	208.8	8.7	24.02	OK	
B WX	208.8	8.7	24.02	OK	
B WX	216.3	8.5	25.56	OK	
B WX	216.3	8.5	25.56	OK	
B WX	216.3	8.7	24.88	OK	
B WX	216.3	8.7	24.88	OK	
B WXY	208.8	16.8	12.44	OK	
B WXY	208.8	16.8	12.44	OK	
B WXY	208.8	17.5	11.91	OK	
B WXY	208.8	17.5	11.91	OK	
B WXY	216.3	16.8	12.89	OK	
B WXY	216.3	16.8	12.89	OK	
B WXY	216.3	17.5	12.33	OK	
B WXY	216.3	17.5	12.33	OK	
B WXY	208.8	10.3	20.29	OK	
B WXY	208.8	10.3	20.29	OK	
B WXY	208.8	9.6	21.67	OK	
B WXY	208.8	9.6	21.67	OK	
B WXY	216.3	10.3	21.01	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
B WXY	216.3	10.3	21.01	OK	
B WXY	216.3	9.6	22.44	OK	
B WXY	216.3	9.6	22.44	OK	
B WY	208.8	20.3	10.27	OK	
B WY	208.8	20.3	10.27	OK	
B WY	208.8	21.1	9.88	OK	
B WY	208.8	21.1	9.88	OK	
B WY	216.3	20.3	10.63	OK	
B WY	216.3	20.3	10.63	OK	
B WY	216.3	21.1	10.23	OK	
B WY	216.3	21.1	10.23	OK	
B WY	208.8	13.1	15.93	OK	
B WY	208.8	13.1	15.93	OK	
B WY	208.8	12.3	16.97	OK	
B WY	208.8	12.3	16.97	OK	
B WY	216.3	13.1	16.50	OK	
B WY	216.3	13.1	16.50	OK	
B WY	216.3	12.3	17.57	OK	
B WY	216.3	12.3	17.57	OK	
D I	217.2	18.8	11.53	OK	
D I	217.9	18.8	11.58	OK	
D I	218.7	19.9	10.98	OK	
D I	219.5	19.9	11.02	OK	
D I	226.5	18.8	12.03	OK	
D I	227.2	18.8	12.07	OK	
D I	228.0	19.9	11.44	OK	
D I	228.8	19.9	11.48	OK	
D I	217.2	9.0	24.21	OK	
D I	217.9	9.0	24.29	OK	
D I	218.7	7.9	27.77	OK	
D I	219.5	7.9	27.87	OK	
D I	226.5	9.0	25.25	OK	
D I	227.2	9.0	25.33	OK	
D I	228.0	7.9	28.95	OK	
D I	228.8	7.9	29.05	OK	
D W	217.2	27.1	8.02	OK	
D W	217.5	27.1	8.03	OK	
D W	217.9	28.2	7.73	OK	

GENERAL CONTRACTOR  <b>IRICAV2</b>		ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione		Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 204 di 336

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$	$E_d$	$R_d / E_d$	
		kN	kN		
D W	218.3	28.2	7.75	OK	
D W	226.5	27.1	8.36	OK	
D W	226.9	27.1	8.37	OK	
D W	227.2	28.2	8.06	OK	
D W	227.6	28.2	8.08	OK	
D W	217.2	17.2	12.60	OK	
D W	217.5	17.2	12.63	OK	
D W	217.9	16.1	13.51	OK	
D W	218.3	16.1	13.53	OK	
D W	226.5	17.2	13.14	OK	
D W	226.9	17.2	13.17	OK	
D W	227.2	16.1	14.08	OK	
D W	227.6	16.1	14.11	OK	
DAA	217.5	19.2	11.33	OK	
DAA	217.5	19.2	11.33	OK	
DAA	218.3	20.3	10.75	OK	
DAA	218.3	20.3	10.75	OK	
DAA	226.9	19.2	11.81	OK	
DAA	226.9	19.2	11.81	OK	
DAA	227.6	20.3	11.21	OK	
DAA	227.6	20.3	11.21	OK	
DAA	217.5	9.3	23.27	OK	
DAA	217.5	9.3	23.27	OK	
DAA	218.3	8.3	26.45	OK	
DAA	218.3	8.3	26.45	OK	
DAA	226.9	9.3	24.27	OK	
DAA	226.9	9.3	24.27	OK	
DAA	227.6	8.3	27.58	OK	

Capacità portante – verifiche statiche

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	COMB	$R_d$	$E_d$	$R_d / E_d$	
		$q_{u,d}$ kPa	$q_{E,d} = N / (B' \cdot L')$		
A	$(2969. + 1218. +) / 2.3 =$	1820.1	103.23	17.63	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	COMB	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>
		q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')	
			kPa		
A	(2969. + 1218. +) / 2.3 =	1820.1	103.23	17.63	OK
A	(2845. + 1232. +) / 2.3 =	1772.6	115.24	15.38	OK
A	(2845. + 1232. +) / 2.3 =	1772.6	115.24	15.38	OK
A	(2993. + 1217. +) / 2.3 =	1830.2	108.17	16.92	OK
A	(2993. + 1217. +) / 2.3 =	1830.2	108.17	16.92	OK
A	(2877. + 1230. +) / 2.3 =	1785.7	119.65	14.92	OK
A	(2877. + 1230. +) / 2.3 =	1785.7	119.65	14.92	OK
A	(3096. + 1225. +) / 2.3 =	1878.9	95.40	19.69	OK
A	(3096. + 1225. +) / 2.3 =	1878.9	95.40	19.69	OK
A	(2972. + 1241. +) / 2.3 =	1831.6	105.57	17.35	OK
A	(2972. + 1241. +) / 2.3 =	1831.6	105.57	17.35	OK
A	(3112. + 1224. +) / 2.3 =	1885.3	100.57	18.75	OK
A	(3112. + 1224. +) / 2.3 =	1885.3	100.57	18.75	OK
A	(2996. + 1238. +) / 2.3 =	1840.9	110.42	16.67	OK
A	(2996. + 1238. +) / 2.3 =	1840.9	110.42	16.67	OK
B AA	(2694. + 1206. +) / 2.3 =	1695.6	118.25	14.34	OK
B AA	(2694. + 1206. +) / 2.3 =	1695.6	118.25	14.34	OK
B AA	(2616. + 1213. +) / 2.3 =	1665.0	128.96	12.91	OK
B AA	(2616. + 1213. +) / 2.3 =	1665.0	128.96	12.91	OK
B AA	(2724. + 1207. +) / 2.3 =	1708.8	120.67	14.16	OK
B AA	(2724. + 1207. +) / 2.3 =	1708.8	120.67	14.16	OK
B AA	(2650. + 1214. +) / 2.3 =	1679.6	130.75	12.85	OK
B AA	(2650. + 1214. +) / 2.3 =	1679.6	130.75	12.85	OK
B AA	(3220. + 1145. +) / 2.3 =	1897.8	76.11	24.94	OK
B AA	(3220. + 1145. +) / 2.3 =	1897.8	76.11	24.94	OK
B AA	(3301. + 1134. +) / 2.3 =	1928.0	72.25	26.69	OK
B AA	(3301. + 1134. +) / 2.3 =	1928.0	72.25	26.69	OK
B AA	(3226. + 1147. +) / 2.3 =	1901.6	79.69	23.86	OK
B AA	(3226. + 1147. +) / 2.3 =	1901.6	79.69	23.86	OK
B AA	(3303. + 1137. +) / 2.3 =	1930.4	75.83	25.46	OK
B AA	(3303. + 1137. +) / 2.3 =	1930.4	75.83	25.46	OK
B WX	(3310. + 852. +) / 2.3 =	1809.7	105.85	17.10	OK
B WX	(3310. + 852. +) / 2.3 =	1809.7	105.85	17.10	OK
B WX	(3248. + 862. +) / 2.3 =	1787.0	112.50	15.88	OK
B WX	(3248. + 862. +) / 2.3 =	1787.0	112.50	15.88	OK
B WX	(3324. + 864. +) / 2.3 =	1820.8	108.98	16.71	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
B WX	(3324. + 864. +) / 2.3 =	1820.8	108.98	16.71	OK
B WX	(3252. + 877. +) / 2.3 =	1795.3	115.45	15.55	OK
B WX	(3252. + 877. +) / 2.3 =	1795.3	115.45	15.55	OK
B WX	(3255. + 882. +) / 2.3 =	1799.0	99.64	18.06	OK
B WX	(3255. + 882. +) / 2.3 =	1799.0	99.64	18.06	OK
B WX	(3320. + 860. +) / 2.3 =	1817.1	105.51	17.22	OK
B WX	(3320. + 860. +) / 2.3 =	1817.1	105.51	17.22	OK
B WX	(3272. + 893. +) / 2.3 =	1810.8	102.91	17.60	OK
B WX	(3272. + 893. +) / 2.3 =	1810.8	102.91	17.60	OK
B WX	(3334. + 870. +) / 2.3 =	1827.9	108.65	16.82	OK
B WX	(3334. + 870. +) / 2.3 =	1827.9	108.65	16.82	OK
B WXY	(2743. + 995. +) / 2.3 =	1625.2	146.09	11.12	OK
B WXY	(2743. + 995. +) / 2.3 =	1625.2	146.09	11.12	OK
B WXY	(2657. + 1005. +) / 2.3 =	1591.9	160.17	9.94	OK
B WXY	(2657. + 1005. +) / 2.3 =	1591.9	160.17	9.94	OK
B WXY	(2773. + 1004. +) / 2.3 =	1642.1	147.32	11.15	OK
B WXY	(2773. + 1004. +) / 2.3 =	1642.1	147.32	11.15	OK
B WXY	(2691. + 1013. +) / 2.3 =	1610.6	160.35	10.04	OK
B WXY	(2691. + 1013. +) / 2.3 =	1610.6	160.35	10.04	OK
B WXY	(3320. + 915. +) / 2.3 =	1840.9	92.12	19.98	OK
B WXY	(3320. + 915. +) / 2.3 =	1840.9	92.12	19.98	OK
B WXY	(3270. + 942. +) / 2.3 =	1831.3	87.29	20.98	OK
B WXY	(3270. + 942. +) / 2.3 =	1831.3	87.29	20.98	OK
B WXY	(3321. + 927. +) / 2.3 =	1846.7	95.55	19.33	OK
B WXY	(3321. + 927. +) / 2.3 =	1846.7	95.55	19.33	OK
B WXY	(3286. + 949. +) / 2.3 =	1841.2	90.77	20.28	OK
B WXY	(3286. + 949. +) / 2.3 =	1841.2	90.77	20.28	OK
B WY	(2432. + 1203. +) / 2.3 =	1580.6	158.12	10.00	OK
B WY	(2432. + 1203. +) / 2.3 =	1580.6	158.12	10.00	OK
B WY	(2356. + 1208. +) / 2.3 =	1549.6	177.87	8.71	OK
B WY	(2356. + 1208. +) / 2.3 =	1549.6	177.87	8.71	OK
B WY	(2473. + 1205. +) / 2.3 =	1599.2	157.56	10.15	OK
B WY	(2473. + 1205. +) / 2.3 =	1599.2	157.56	10.15	OK
B WY	(2400. + 1210. +) / 2.3 =	1569.7	175.20	8.96	OK
B WY	(2400. + 1210. +) / 2.3 =	1569.7	175.20	8.96	OK
B WY	(2948. + 1156. +) / 2.3 =	1784.4	90.85	19.64	OK
B WY	(2948. + 1156. +) / 2.3 =	1784.4	90.85	19.64	OK
B WY	(3027. + 1147. +) / 2.3 =	1814.7	85.40	21.25	OK
B WY	(3027. + 1147. +) / 2.3 =	1814.7	85.40	21.25	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
B WY	(2966. + 1158. +) / 2.3 =	1793.4	94.27	19.03	OK
B WY	(2966. + 1158. +) / 2.3 =	1793.4	94.27	19.03	OK
B WY	(3042. + 1149. +) / 2.3 =	1822.3	88.91	20.50	OK
B WY	(3042. + 1149. +) / 2.3 =	1822.3	88.91	20.50	OK
D I	(2498. + 1215. +) / 2.3 =	1614.1	153.87	10.49	OK
D I	(2500. + 1215. +) / 2.3 =	1615.3	153.87	10.50	OK
D I	(2403. + 1222. +) / 2.3 =	1576.1	177.75	8.87	OK
D I	(2406. + 1222. +) / 2.3 =	1577.4	177.59	8.88	OK
D I	(2543. + 1216. +) / 2.3 =	1634.3	154.38	10.59	OK
D I	(2546. + 1216. +) / 2.3 =	1635.4	154.44	10.59	OK
D I	(2454. + 1223. +) / 2.3 =	1598.4	175.67	9.10	OK
D I	(2456. + 1223. +) / 2.3 =	1599.6	175.60	9.11	OK
D I	(3176. + 1145. +) / 2.3 =	1878.4	81.08	23.17	OK
D I	(3176. + 1145. +) / 2.3 =	1878.7	81.32	23.10	OK
D I	(3281. + 1131. +) / 2.3 =	1918.3	76.15	25.19	OK
D I	(3282. + 1131. +) / 2.3 =	1918.5	76.40	25.11	OK
D I	(3186. + 1148. +) / 2.3 =	1884.0	85.53	22.03	OK
D I	(3186. + 1148. +) / 2.3 =	1884.3	85.78	21.97	OK
D I	(3286. + 1134. +) / 2.3 =	1921.7	80.62	23.84	OK
D I	(3286. + 1134. +) / 2.3 =	1921.8	80.86	23.77	OK
D W	(2142. + 1199. +) / 2.3 =	1452.9	272.20	5.34	OK
D W	(2144. + 1199. +) / 2.3 =	1453.8	271.54	5.35	OK
D W	(2049. + 1201. +) / 2.3 =	1413.2	354.91	3.98	OK
D W	(2051. + 1202. +) / 2.3 =	1414.1	353.46	4.00	OK
D W	(2206. + 1204. +) / 2.3 =	1482.4	253.01	5.86	OK
D W	(2208. + 1204. +) / 2.3 =	1483.2	252.59	5.87	OK
D W	(2117. + 1207. +) / 2.3 =	1445.0	314.04	4.60	OK
D W	(2119. + 1207. +) / 2.3 =	1445.8	313.18	4.62	OK
D W	(2803. + 1156. +) / 2.3 =	1721.2	105.17	16.37	OK
D W	(2804. + 1156. +) / 2.3 =	1721.6	105.28	16.35	OK
D W	(2906. + 1146. +) / 2.3 =	1761.5	96.50	18.25	OK
D W	(2907. + 1146. +) / 2.3 =	1761.9	96.61	18.24	OK
D W	(2832. + 1159. +) / 2.3 =	1735.4	109.09	15.91	OK
D W	(2833. + 1159. +) / 2.3 =	1735.7	109.20	15.89	OK
D W	(2930. + 1149. +) / 2.3 =	1773.4	100.71	17.61	OK
D W	(2931. + 1149. +) / 2.3 =	1773.7	100.83	17.59	OK
DAA	(2486. + 1213. +) / 2.3 =	1608.5	155.91	10.32	OK
DAA	(2486. + 1213. +) / 2.3 =	1608.5	155.91	10.32	OK
DAA	(2390. + 1220. +) / 2.3 =	1569.5	180.41	8.70	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
DAA	(2390. + 1220. +) / 2.3 =	1569.5	180.41	8.70	OK
DAA	(2532. + 1214. +) / 2.3 =	1629.0	156.25	10.43	OK
DAA	(2532. + 1214. +) / 2.3 =	1629.0	156.25	10.43	OK
DAA	(2441. + 1221. +) / 2.3 =	1592.1	177.96	8.95	OK
DAA	(2441. + 1221. +) / 2.3 =	1592.1	177.96	8.95	OK
DAA	(3163. + 1144. +) / 2.3 =	1872.5	81.77	22.90	OK
DAA	(3163. + 1144. +) / 2.3 =	1872.5	81.77	22.90	OK
DAA	(3267. + 1130. +) / 2.3 =	1912.1	76.54	24.98	OK
DAA	(3267. + 1130. +) / 2.3 =	1912.1	76.54	24.98	OK
DAA	(3173. + 1147. +) / 2.3 =	1878.4	86.22	21.79	OK
DAA	(3173. + 1147. +) / 2.3 =	1878.4	86.22	21.79	OK
DAA	(3272. + 1134. +) / 2.3 =	1915.8	81.01	23.65	OK
DAA	(3272. + 1134. +) / 2.3 =	1915.8	81.01	23.65	OK
A	(2961. + 1217. +) / 2.3 =	1816.8	93.33	19.47	OK
A	(2961. + 1217. +) / 2.3 =	1816.8	93.33	19.47	OK
A	(2870. + 1228. +) / 2.3 =	1781.7	101.18	17.61	OK
A	(2870. + 1228. +) / 2.3 =	1781.7	101.18	17.61	OK
A	(2980. + 1217. +) / 2.3 =	1824.6	96.61	18.89	OK
A	(2980. + 1217. +) / 2.3 =	1824.6	96.61	18.89	OK
A	(2893. + 1227. +) / 2.3 =	1791.1	104.20	17.19	OK
A	(2893. + 1227. +) / 2.3 =	1791.1	104.20	17.19	OK
A	(3103. + 1226. +) / 2.3 =	1882.2	85.50	22.01	OK
A	(3103. + 1226. +) / 2.3 =	1882.2	85.50	22.01	OK
A	(3011. + 1237. +) / 2.3 =	1847.1	92.04	20.07	OK
A	(3011. + 1237. +) / 2.3 =	1847.1	92.04	20.07	OK
A	(3115. + 1224. +) / 2.3 =	1886.8	88.95	21.21	OK
A	(3115. + 1224. +) / 2.3 =	1886.8	88.95	21.21	OK
A	(3027. + 1236. +) / 2.3 =	1853.5	95.35	19.44	OK
A	(3027. + 1236. +) / 2.3 =	1853.5	95.35	19.44	OK
B AA	(2640. + 1205. +) / 2.3 =	1672.0	112.02	14.93	OK
B AA	(2640. + 1205. +) / 2.3 =	1672.0	112.02	14.93	OK
B AA	(2583. + 1210. +) / 2.3 =	1649.2	119.78	13.77	OK
B AA	(2583. + 1210. +) / 2.3 =	1649.2	119.78	13.77	OK
B AA	(2664. + 1206. +) / 2.3 =	1682.7	113.38	14.84	OK
B AA	(2664. + 1206. +) / 2.3 =	1682.7	113.38	14.84	OK
B AA	(2609. + 1211. +) / 2.3 =	1660.7	120.75	13.75	OK
B AA	(2609. + 1211. +) / 2.3 =	1660.7	120.75	13.75	OK
B AA	(3164. + 1147. +) / 2.3 =	1874.4	70.77	26.48	OK
B AA	(3164. + 1147. +) / 2.3 =	1874.4	70.77	26.48	OK





Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
B AA	(3224. + 1139. +) / 2.3 =	1896.7	67.99	27.90	OK
B AA	(3224. + 1139. +) / 2.3 =	1896.7	67.99	27.90	OK
B AA	(3171. + 1149. +) / 2.3 =	1878.1	73.15	25.67	OK
B AA	(3171. + 1149. +) / 2.3 =	1878.1	73.15	25.67	OK
B AA	(3228. + 1141. +) / 2.3 =	1899.6	70.38	26.99	OK
B AA	(3228. + 1141. +) / 2.3 =	1899.6	70.38	26.99	OK
B WX	(3265. + 831. +) / 2.3 =	1780.8	98.42	18.09	OK
B WX	(3265. + 831. +) / 2.3 =	1780.8	98.42	18.09	OK
B WX	(3288. + 819. +) / 2.3 =	1786.0	102.94	17.35	OK
B WX	(3288. + 819. +) / 2.3 =	1786.0	102.94	17.35	OK
B WX	(3277. + 840. +) / 2.3 =	1790.1	100.43	17.82	OK
B WX	(3277. + 840. +) / 2.3 =	1790.1	100.43	17.82	OK
B WX	(3290. + 832. +) / 2.3 =	1792.0	104.86	17.09	OK
B WX	(3290. + 832. +) / 2.3 =	1792.0	104.86	17.09	OK
B WX	(3204. + 862. +) / 2.3 =	1767.8	92.03	19.21	OK
B WX	(3204. + 862. +) / 2.3 =	1767.8	92.03	19.21	OK
B WX	(3250. + 847. +) / 2.3 =	1781.2	95.97	18.56	OK
B WX	(3250. + 847. +) / 2.3 =	1781.2	95.97	18.56	OK
B WX	(3218. + 870. +) / 2.3 =	1777.7	94.15	18.88	OK
B WX	(3218. + 870. +) / 2.3 =	1777.7	94.15	18.88	OK
B WX	(3263. + 855. +) / 2.3 =	1790.6	98.03	18.27	OK
B WX	(3263. + 855. +) / 2.3 =	1790.6	98.03	18.27	OK
B WXY	(2689. + 974. +) / 2.3 =	1592.6	142.42	11.18	OK
B WXY	(2689. + 974. +) / 2.3 =	1592.6	142.42	11.18	OK
B WXY	(2625. + 981. +) / 2.3 =	1567.6	153.01	10.25	OK
B WXY	(2625. + 981. +) / 2.3 =	1567.6	153.01	10.25	OK
B WXY	(2714. + 981. +) / 2.3 =	1606.5	142.66	11.26	OK
B WXY	(2714. + 981. +) / 2.3 =	1606.5	142.66	11.26	OK
B WXY	(2652. + 988. +) / 2.3 =	1582.5	152.58	10.37	OK
B WXY	(2652. + 988. +) / 2.3 =	1582.5	152.58	10.37	OK
B WXY	(3272. + 894. +) / 2.3 =	1811.5	87.77	20.64	OK
B WXY	(3272. + 894. +) / 2.3 =	1811.5	87.77	20.64	OK
B WXY	(3282. + 900. +) / 2.3 =	1818.4	84.18	21.60	OK
B WXY	(3282. + 900. +) / 2.3 =	1818.4	84.18	21.60	OK
B WXY	(3275. + 904. +) / 2.3 =	1816.9	89.99	20.19	OK
B WXY	(3275. + 904. +) / 2.3 =	1816.9	89.99	20.19	OK
B WXY	(3294. + 907. +) / 2.3 =	1826.3	86.44	21.13	OK
B WXY	(3294. + 907. +) / 2.3 =	1826.3	86.44	21.13	OK
B WY	(2351. + 1200. +) / 2.3 =	1543.9	158.86	9.72	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
B WY	(2351. + 1200. +) / 2.3 =	1543.9	158.86	9.72	OK
B WY	(2295. + 1203. +) / 2.3 =	1520.8	174.93	8.69	OK
B WY	(2295. + 1203. +) / 2.3 =	1520.8	174.93	8.69	OK
B WY	(2384. + 1202. +) / 2.3 =	1559.1	157.08	9.93	OK
B WY	(2384. + 1202. +) / 2.3 =	1559.1	157.08	9.93	OK
B WY	(2330. + 1205. +) / 2.3 =	1536.9	171.60	8.96	OK
B WY	(2330. + 1205. +) / 2.3 =	1536.9	171.60	8.96	OK
B WY	(2864. + 1157. +) / 2.3 =	1748.3	86.98	20.10	OK
B WY	(2864. + 1157. +) / 2.3 =	1748.3	86.98	20.10	OK
B WY	(2922. + 1151. +) / 2.3 =	1770.8	82.81	21.38	OK
B WY	(2922. + 1151. +) / 2.3 =	1770.8	82.81	21.38	OK
B WY	(2880. + 1159. +) / 2.3 =	1756.3	89.16	19.70	OK
B WY	(2880. + 1159. +) / 2.3 =	1756.3	89.16	19.70	OK
B WY	(2936. + 1153. +) / 2.3 =	1778.0	85.07	20.90	OK
B WY	(2936. + 1153. +) / 2.3 =	1778.0	85.07	20.90	OK
D I	(2432. + 1213. +) / 2.3 =	1584.7	150.24	10.55	OK
D I	(2435. + 1213. +) / 2.3 =	1586.1	150.16	10.56	OK
D I	(2365. + 1217. +) / 2.3 =	1557.5	168.29	9.26	OK
D I	(2368. + 1218. +) / 2.3 =	1559.0	168.05	9.28	OK
D I	(2469. + 1214. +) / 2.3 =	1601.1	149.54	10.71	OK
D I	(2472. + 1214. +) / 2.3 =	1602.4	149.51	10.72	OK
D I	(2404. + 1219. +) / 2.3 =	1575.0	165.93	9.49	OK
D I	(2407. + 1219. +) / 2.3 =	1576.4	165.78	9.51	OK
D I	(3107. + 1147. +) / 2.3 =	1849.6	76.11	24.30	OK
D I	(3108. + 1147. +) / 2.3 =	1850.0	76.36	24.23	OK
D I	(3186. + 1137. +) / 2.3 =	1879.6	72.59	25.89	OK
D I	(3186. + 1138. +) / 2.3 =	1880.0	72.84	25.81	OK
D I	(3117. + 1149. +) / 2.3 =	1854.9	79.06	23.46	OK
D I	(3118. + 1149. +) / 2.3 =	1855.3	79.31	23.39	OK
D I	(3193. + 1140. +) / 2.3 =	1883.7	75.57	24.93	OK
D I	(3193. + 1140. +) / 2.3 =	1884.1	75.81	24.85	OK
D W	(2040. + 1191. +) / 2.3 =	1404.8	315.70	4.45	OK
D W	(2042. + 1191. +) / 2.3 =	1405.8	314.28	4.47	OK
D W	(1973. + 1192. +) / 2.3 =	1375.8	403.96	3.41	OK
D W	(1975. + 1192. +) / 2.3 =	1377.0	401.26	3.43	OK
D W	(2092. + 1195. +) / 2.3 =	1429.1	287.38	4.97	OK
D W	(2094. + 1195. +) / 2.3 =	1430.0	286.42	4.99	OK
D W	(2027. + 1196. +) / 2.3 =	1401.4	352.10	3.98	OK
D W	(2029. + 1197. +) / 2.3 =	1402.4	350.41	4.00	OK

GENERAL CONTRACTOR  IRICAV2		ALTA SORVEGLIANZA  ITALFERR GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione		Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 211 di 336

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')			
COMB			kPa			
D W	(2695. + 1156. +) /2.3 =	1674.7	103.62		16.16	OK
D W	(2697. + 1157. +) /2.3 =	1675.3	103.71		16.15	OK
D W	(2772. + 1150. +) /2.3 =	1705.2	96.58		17.66	OK
D W	(2773. + 1150. +) /2.3 =	1705.7	96.69		17.64	OK
D W	(2722. + 1159. +) /2.3 =	1687.3	105.92		15.93	OK
D W	(2723. + 1159. +) /2.3 =	1687.8	106.02		15.92	OK
D W	(2796. + 1152. +) /2.3 =	1716.4	99.14		17.31	OK
D W	(2796. + 1152. +) /2.3 =	1716.9	99.25		17.30	OK
DAA	(2420. + 1211. +) /2.3 =	1578.6	152.62		10.34	OK
DAA	(2420. + 1211. +) /2.3 =	1578.6	152.62		10.34	OK
DAA	(2350. + 1215. +) /2.3 =	1550.1	171.27		9.05	OK
DAA	(2350. + 1215. +) /2.3 =	1550.1	171.27		9.05	OK
DAA	(2457. + 1212. +) /2.3 =	1595.3	151.72		10.51	OK
DAA	(2457. + 1212. +) /2.3 =	1595.3	151.72		10.51	OK
DAA	(2389. + 1217. +) /2.3 =	1567.9	168.57		9.30	OK
DAA	(2389. + 1217. +) /2.3 =	1567.9	168.57		9.30	OK
DAA	(3093. + 1146. +) /2.3 =	1843.1	76.85		23.98	OK
DAA	(3093. + 1146. +) /2.3 =	1843.1	76.85		23.98	OK
DAA	(3170. + 1137. +) /2.3 =	1872.6	73.05		25.63	OK
DAA	(3170. + 1137. +) /2.3 =	1872.6	73.05		25.63	OK
DAA	(3103. + 1149. +) /2.3 =	1848.7	79.80		23.17	OK
DAA	(3103. + 1149. +) /2.3 =	1848.7	79.80		23.17	OK
DAA	(3178. + 1139. +) /2.3 =	1877.0	76.02		24.69	OK

#### Ribaltamento – verifiche sismiche

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
Comb1	262.43	262.43	16.68	100.14	2.62	OK
Comb2	262.43	262.43	16.68	100.14	2.62	OK
Comb3	262.43	262.43	16.68	19.87	13.21	OK
Comb4	262.43	262.43	16.68	19.87	13.21	OK
Comb5	262.43	262.43	55.61	61.21	4.29	OK
Comb6	262.43	262.43	55.61	61.21	4.29	OK

GENERAL CONTRACTOR  <b>IFICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE
Relazione di calcolo pali di alimentazione	Progetto IN17    Lotto 10    Codifica Documento E I2 CL OC 00 0 0 010    Rev. A    Foglio 212 di 336

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
Comb7	262.43	262.43	55.61	27.85	4.72	OK
Comb8	262.43	262.43	55.61	27.85	4.72	OK

Scorrimento – verifiche sismiche

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$		$E_d$	Rd/Ed	
	kN		kN		
COMB					
Comb1	169.4		58.6	<b>2.89</b>	OK
Comb2	169.4		58.6	<b>2.89</b>	OK
Comb3	169.4		52.7	<b>3.22</b>	OK
Comb4	169.4		52.7	<b>3.22</b>	OK
Comb5	169.4		56.6	<b>2.99</b>	OK
Comb6	169.4		56.6	<b>2.99</b>	OK
Comb7	169.4		55.4	<b>3.06</b>	OK
Comb8	169.4		55.4	<b>3.06</b>	OK

Capacità portante – verifiche sismiche

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	Rd		$E_d$	Rd/Ed	
	$q_{u,d}$ kPa		$q_{E,d} = N / (B' \cdot L')$		
COMB			kPa		
Comb1	(1246. + 528. +) / 2.3 =	771.2	85.12	9.06	OK
Comb2	(1246. + 528. +) / 2.3 =	771.2	85.12	9.06	OK
Comb3	(1531. + 515. +) / 2.3 =	889.1	56.95	15.61	OK
Comb4	(1531. + 515. +) / 2.3 =	889.1	56.95	15.61	OK
Comb5	(1478. + 414. +) / 2.3 =	822.5	81.57	10.08	OK
Comb6	(1478. + 414. +) / 2.3 =	822.5	81.57	10.08	OK
Comb7	(1428. + 434. +) / 2.3 =	809.4	69.97	11.57	OK
Comb8	(1428. + 434. +) / 2.3 =	809.4	69.97	11.57	OK

Le verifiche sono soddisfatte.



12.11 Sintesi risultati LC6

TITOLO: **Caso di carico 6 - combinazioni statiche**

FONDAZIONI A PLINTO

DESIGN ASSUMPTION

piano campagna sostanzialmente orizzontale

angolo d'attrito caratteristico  $\phi'_k$

coesione  $c'$

angolo d'attrito caratteristico  $\phi'_k$  alla base

coesione alla base  $c'$

coefficiente  $\gamma_p$

coefficiente  $\gamma_c'$

coefficiente  $\gamma_k$  capacità portante

coefficiente  $\gamma_k$  scorrimento

coefficiente  $\gamma_k$  spinta passiva

angolo d'attrito di design  $\phi'_d$

coesione di design  $c'_d$

coeff. attrito di design  $\mu'_d$

coesione alla base di design

Dimensione fondazione B[m] (LONGITUDINALE)

Dimensione fondazione L [m] (TRASVERSALE)

Profondità da piano campagna D [m]

Altezza plinto [m] H<sub>p</sub>

Dimensione baggio b[m] (LONGITUDINALE)

Dimensione maggiore baggio l [m] (TRASVERSALE)

Altezza baggio [m] H<sub>b</sub>

Altezza terreno sopra plinto [m] H<sub>t</sub>

q' = carico permanente ai lati

$\gamma$  = peso specifico medio sopra la fondazione

$\gamma_f$  = peso specifico medio sotto la fondazione

opzione calcolo coeff.  $S_{\phi}$  e  $S_{\gamma}$

opzione calcolo per tenere in conto peso terreno di ricoprimento

Peso specifico medio c.a.

Peso proprio plinto + baggio + terreno sovrastante [kN]

Quota baricentro plinto + baggio + terreno sovrastante vs p.f. [kN]

Coefficiente sismico k<sub>h</sub>

Coefficiente sismico k<sub>v</sub>

Azione inerziale orizzontale plinto

Azione inerziale verticale plinto

**Eccentricità degli scarichi rispetto a baricentro fondazione**

eccentricità longitudinale e<sub>L</sub> 0 m + se concorde con i momenti del traliccio

eccentricità trasversale e<sub>T</sub> 0.1 m + se concorde con i momenti del traliccio

**Coefficienti di spinta di progetto**

coefficiente di spinta attiva statico K<sub>a</sub> 0.228 -

coefficiente di spinta attiva sismico K<sub>a,E</sub> 0.483 -

coefficiente di spinta passiva statico K<sub>p</sub> 4.395 -

coefficiente di spinta passiva sismico K<sub>p,E</sub> 3.251 -

coeff. parziale riduttivo della spinta passiva 1.40 -

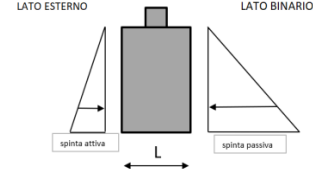
moltiplicatore della spinta passiva  $\alpha$  0.00 long 0.00 trasv

contributo delle spinte frontali long - taglio 0 kN statico 0 kN sismico

contributo delle spinte frontali long - momer 0 kNm statico 0 kNm sismico

contributo delle spinte frontali trasv - taglio 0 kN statico 0 kN sismico

contributo delle spinte frontali trasv - momer 0 kNm statico 0 kNm sismico



CALCOLI PRELIMINARI: coefficienti di capacità portante indipendenti dai carichi

N<sub>q</sub> = 48.93 B<sub>q</sub> = 1

N<sub>p</sub> = 74.90 B<sub>p</sub> = 1

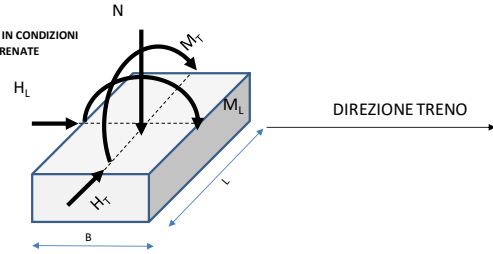
N<sub>c</sub> = 61.35 B<sub>c</sub> = 1

SINTESI RISULTATI			
Capacità portante	F <sub>s min</sub> = 2.03	n. Verif. Neg.	0
Scorrimento	F <sub>s min</sub> = 1.9	n. Verif. Neg.	0
Ribaltamento	F <sub>s min</sub> = 1.30	n. Verif. Neg.	0

DA2

38	*	0.663	rad	
0	kPa			
38	*	0.663	rad	
0	kPa			
1.00				
1.00				
2.30				
1.10				
1.40				
38.00	*	0.663	rad	tan( $\phi'_d$ )= 0.78
0.00	kPa			
0.78				
0.00	kPa			
2.6	m			
2.2	m			
2.2	m			
2.2	m			
0.8	m			
0.8	m			
0.8	m			
0.5	m			
0.25	m			
44	kPa			
20	kN/m <sup>3</sup>			
20	kN/m <sup>3</sup>			
1				(valore da stabilirsi in base alla profondità di falda)
				<b>(0= Lancellotta ecc., 1 = originale EC7)</b>
				si useranno le formule originarie di EC7
0	(1 si - 0 no)			
25	kN/m <sup>3</sup>			
323	kN			
1.30	m			
0.000	g			
0.000	g			+ downward
0.00	kN			
0.00	kN			

VERIFICA IN CONDIZIONI DRENATE



(NB: coefficiente correttivo per rapporto D/B non considerato)



TITOLO: **Caso di carico 6 - combinazioni sismiche**

FONDAZIONI A PLINTO

DESIGN ASSUMPTION

piano campagna sostanzialmente orizzontale

angolo d'attrito caratteristico  $\phi'_k$

coesione  $c'$

angolo d'attrito caratteristico  $\phi'_k$  alla base

coesione alla base  $c'$

coefficiente  $\gamma_s$

coefficiente  $\gamma_c'$

coefficiente  $\gamma_k$  capacità portante

coefficiente  $\gamma_k$  scorrimento

coefficiente  $\gamma_k$  spinta passiva

angolo d'attrito di design  $\phi'_d$

coesione di design  $c'_d$

coeff. attrito di design  $\mu'_d$

coesione alla base di design

Dimensione fondazione B[m] (LONGITUDINALE)

Dimensione fondazione L [m] (TRASVERSALE)

Profondità da piano campagna D [m]

Altezza plinto [m] H<sub>p</sub>

Dimensione baggiolo b[m] (LONGITUDINALE)

Dimensione maggiore baggiolo l [m] (TRASVERSALE)

Altezza baggiolo [m] H<sub>b</sub>

Altezza terreno sopraplinto [m] H<sub>t</sub>

q' = carico permanente ai lati

$\gamma$  = peso specifico medio sopra la fondazione

$\gamma_f$  = peso specifico medio sotto la fondazione

opzione calcolo coeff.  $S_x$  e  $S_y$

opzione calcolo per tenere in conto peso terreno di ricoprimento

Peso specifico medio c.a.

Peso proprio plinto + baggiolo + terreno sovrastante [kN]

Quota baricentro plinto + baggiolo + terreno sovrastante vs p.f. [kN]

Coefficiente sismico kh

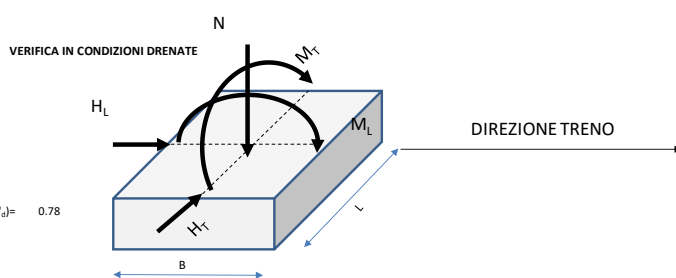
Coefficiente sismico kv

Azione inerziale orizzontale plinto

Azione inerziale verticale plinto

DAZ

0.663	rad		
0	kPa		
0.663	rad		
0	kPa		
1.00			
1.00			
2.30			
1.10			
1.40			
38.00	°	0.663	rad
0.00	kPa		
0.78			
0.00	kPa		
2.6	m		
2.2	m		
2.2	m		
2.2	m		
0.8	m		
0.8	m		
0.5	m		
0.25	m		
44	kPa		
20	kN/m <sup>3</sup>		
20	kN/m <sup>3</sup>		
1			
0	(1 si - 0 no)		
25	kN/m <sup>3</sup>		
323	kN		
1.30	m		
0.231	g		
-0.116	g		+ downward
74.52	kN		
-37.26	kN		



(NB: coefficiente correttivo per rapporto D/B non considerato)

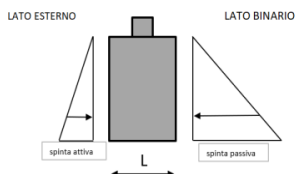
(valore da stabilirsi in base alla profondità di falda)  
(0= Lancellotta ecc., 1 = originale EC7)  
si useranno le formule originarie di EC7

Eccentricità degli scarichi rispetto a baricentro fondazione

eccentricità longitudinale e <sub>L</sub>	0	m	+ se concorde con i momenti del traliccio
eccentricità trasversale e <sub>T</sub>	0.1	m	+ se concorde con i momenti del traliccio

Coefficienti di spinta di progetto

coefficiente di spinta attiva statico K <sub>a</sub>	0.228	-
coefficiente di spinta attiva sismico K <sub>a,E</sub>	0.483	-
coefficiente di spinta passiva statico K <sub>p</sub>	4.395	-
coefficiente di spinta passiva sismico K <sub>p,E</sub>	3.251	-
coeff. parziale riduttivo della spinta passiva $\gamma_s$	1.40	-
moltiplicatore della spinta passiva $\alpha$	0.00	long 0.00 trasv
contributo delle spinte frontali long - taglio	0	kN statico 0 kN sismico
contributo delle spinte frontali long - momento	0	kNm statico 0 kNm sismico
contributo delle spinte frontali trasv - taglio	0	kN statico 0 kN sismico
contributo delle spinte frontali trasv - momento	0	kNm statico 0 kNm sismico



CALCOLI PRELIMINARI: coefficienti di capacità portante indipendenti dai carichi

N <sub>q</sub> = 48.93	B <sub>q</sub> = 1
N <sub>c</sub> = 74.90	B <sub>c</sub> = 1
N <sub>k</sub> = 61.35	B <sub>k</sub> = 1

SINTESI RISULTATI		
Capacità portante	F <sub>s, min</sub> = 14.91	n. Verif. Neg. 0
Scorrimento	F <sub>s, min</sub> = 2.86	n. Verif. Neg. 0
Ribaltamento	F <sub>s, min</sub> = 5.19	n. Verif. Neg. 0

Le verifiche sono soddisfatte.

GENERAL CONTRACTOR  IRICAV2		ALTA SORVEGLIANZA  ITALFERR GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione		Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 215 di 336

## 12.12 Verifiche di dettaglio

Ribaltamento – verifiche statiche

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
A	433.26	366.60	53.37	11.36	8.12	OK
A	433.26	366.60	53.37	11.36	8.12	OK
A	433.26	366.60	65.32	13.19	6.63	OK
A	433.26	366.60	65.32	13.19	6.63	OK
A	437.42	370.12	53.37	11.68	8.20	OK
A	437.42	370.12	53.37	11.68	8.20	OK
A	437.42	370.12	65.32	13.51	6.70	OK
A	437.42	370.12	65.32	13.51	6.70	OK
A	433.26	366.60	26.27	3.02	16.49	OK
A	433.26	366.60	26.27	3.02	16.49	OK
A	433.26	366.60	38.22	4.86	11.34	OK
A	433.26	366.60	38.22	4.86	11.34	OK
A	437.42	370.12	26.27	3.34	16.65	OK
A	437.42	370.12	26.27	3.34	16.65	OK
A	437.42	370.12	38.22	5.18	11.45	OK
A	437.42	370.12	38.22	5.18	11.45	OK
B AA	433.26	366.60	154.26	27.46	2.81	OK
B AA	433.26	366.60	154.26	27.46	2.81	OK
B AA	433.26	366.60	161.83	28.59	2.68	OK
B AA	433.26	366.60	161.83	28.59	2.68	OK
B AA	437.42	370.12	154.26	27.78	2.84	OK
B AA	437.42	370.12	154.26	27.78	2.84	OK
B AA	437.42	370.12	161.83	28.91	2.70	OK
B AA	437.42	370.12	161.83	28.91	2.70	OK
B AA	433.26	366.60	103.83	19.93	4.17	OK
B AA	433.26	366.60	103.83	19.93	4.17	OK
B AA	433.26	366.60	96.26	18.80	4.50	OK
B AA	433.26	366.60	96.26	18.80	4.50	OK
B AA	437.42	370.12	103.83	20.25	4.21	OK
B AA	437.42	370.12	103.83	20.25	4.21	OK
B AA	437.42	370.12	96.26	19.12	4.54	OK
B AA	437.42	370.12	96.26	19.12	4.54	OK
B WX	433.26	366.60	81.82	15.39	5.30	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WX	433.26	366.60	81.82	15.39	5.30	OK
B WX	433.26	366.60	89.39	16.52	4.85	OK
B WX	433.26	366.60	89.39	16.52	4.85	OK
B WX	437.42	370.12	81.82	15.71	5.35	OK
B WX	437.42	370.12	81.82	15.71	5.35	OK
B WX	437.42	370.12	89.39	16.84	4.89	OK
B WX	437.42	370.12	89.39	16.84	4.89	OK
B WX	433.26	366.60	60.15	8.72	7.20	OK
B WX	433.26	366.60	60.15	8.72	7.20	OK
B WX	433.26	366.60	67.71	9.85	6.40	OK
B WX	433.26	366.60	67.71	9.85	6.40	OK
B WX	437.42	370.12	60.15	9.04	7.27	OK
B WX	437.42	370.12	60.15	9.04	7.27	OK
B WX	437.42	370.12	67.71	10.17	6.46	OK
B WX	437.42	370.12	67.71	10.17	6.46	OK
B WXY	433.26	366.60	202.84	34.76	2.14	OK
B WXY	433.26	366.60	202.84	34.76	2.14	OK
B WXY	433.26	366.60	210.41	35.89	2.06	OK
B WXY	433.26	366.60	210.41	35.89	2.06	OK
B WXY	437.42	370.12	202.84	35.08	2.16	OK
B WXY	437.42	370.12	202.84	35.08	2.16	OK
B WXY	437.42	370.12	210.41	36.21	2.08	OK
B WXY	437.42	370.12	210.41	36.21	2.08	OK
B WXY	433.26	366.60	152.40	27.23	2.84	OK
B WXY	433.26	366.60	152.40	27.23	2.84	OK
B WXY	433.26	366.60	144.84	26.10	2.99	OK
B WXY	433.26	366.60	144.84	26.10	2.99	OK
B WXY	437.42	370.12	152.40	27.55	2.87	OK
B WXY	437.42	370.12	152.40	27.55	2.87	OK
B WXY	437.42	370.12	144.84	26.42	3.02	OK
B WXY	437.42	370.12	144.84	26.42	3.02	OK
B WY	433.26	366.60	228.55	38.94	1.90	OK
B WY	433.26	366.60	228.55	38.94	1.90	OK
B WY	433.26	366.60	236.12	40.07	1.83	OK
B WY	433.26	366.60	236.12	40.07	1.83	OK
B WY	437.42	370.12	228.55	39.26	1.91	OK
B WY	437.42	370.12	228.55	39.26	1.91	OK
B WY	437.42	370.12	236.12	40.39	1.85	OK
B WY	437.42	370.12	236.12	40.39	1.85	OK





Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WY	433.26	366.60	178.11	31.41	2.43	OK
B WY	433.26	366.60	178.11	31.41	2.43	OK
B WY	433.26	366.60	170.55	30.28	2.54	OK
B WY	433.26	366.60	170.55	30.28	2.54	OK
B WY	437.42	370.12	178.11	31.73	2.46	OK
B WY	437.42	370.12	178.11	31.73	2.46	OK
B WY	437.42	370.12	170.55	30.60	2.56	OK
B WY	437.42	370.12	170.55	30.60	2.56	OK
D I	433.26	366.60	195.80	33.04	2.21	OK
D I	434.89	367.99	194.72	33.16	2.23	OK
D I	433.26	366.60	205.89	34.57	2.10	OK
D I	434.89	367.99	204.81	34.70	2.12	OK
D I	437.42	370.12	195.80	33.36	2.23	OK
D I	439.06	371.51	194.72	33.48	2.25	OK
D I	437.42	370.12	205.89	34.89	2.12	OK
D I	439.06	371.51	204.81	35.02	2.14	OK
D I	433.26	366.60	128.53	22.79	3.37	OK
D I	434.89	367.99	129.61	22.92	3.36	OK
D I	433.26	366.60	118.44	21.25	3.66	OK
D I	434.89	367.99	119.52	21.38	3.64	OK
D I	437.42	370.12	128.53	23.11	3.40	OK
D I	439.06	371.51	129.61	23.24	3.39	OK
D I	437.42	370.12	118.44	21.57	3.69	OK
D I	439.06	371.51	119.52	21.70	3.67	OK
D W	433.26	366.60	296.68	48.71	1.46	OK
D W	434.07	367.29	296.14	48.77	1.47	OK
D W	433.26	366.60	306.77	50.25	1.41	OK
D W	434.07	367.29	306.23	50.31	1.42	OK
D W	437.42	370.12	296.68	49.03	1.47	OK
D W	438.24	370.82	296.14	49.09	1.48	OK
D W	437.42	370.12	306.77	50.57	1.43	OK
D W	438.24	370.82	306.23	50.63	1.43	OK
D W	433.26	366.60	229.42	38.46	1.89	OK
D W	434.07	367.29	229.95	38.53	1.89	OK
D W	433.26	366.60	219.33	36.93	1.98	OK
D W	434.07	367.29	219.86	36.99	1.97	OK
D W	437.42	370.12	229.42	38.78	1.91	OK
D W	438.24	370.82	229.95	38.85	1.91	OK
D W	437.42	370.12	219.33	37.25	1.99	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
D W	438.24	370.82	219.86	37.31	1.99	OK
DAA	434.07	367.29	197.97	33.93	2.19	OK
DAA	434.07	367.29	197.97	33.93	2.19	OK
DAA	434.07	367.29	208.06	35.47	2.09	OK
DAA	434.07	367.29	208.06	35.47	2.09	OK
DAA	438.24	370.82	197.97	34.25	2.21	OK
DAA	438.24	370.82	197.97	34.25	2.21	OK
DAA	438.24	370.82	208.06	35.79	2.11	OK
DAA	438.24	370.82	208.06	35.79	2.11	OK
DAA	434.07	367.29	131.78	23.69	3.29	OK
DAA	434.07	367.29	131.78	23.69	3.29	OK
DAA	434.07	367.29	121.69	22.15	3.57	OK
DAA	434.07	367.29	121.69	22.15	3.57	OK
DAA	438.24	370.82	131.78	24.01	3.33	OK
DAA	438.24	370.82	131.78	24.01	3.33	OK
DAA	438.24	370.82	121.69	22.47	3.60	OK
DAA	438.24	370.82	121.69	22.47	3.60	OK
A	389.93	329.94	49.39	10.64	7.90	OK
A	389.93	329.94	49.39	10.64	7.90	OK
A	389.93	329.94	57.35	11.86	6.80	OK
A	389.93	329.94	57.35	11.86	6.80	OK
A	392.71	332.29	49.39	10.85	7.95	OK
A	392.71	332.29	49.39	10.85	7.95	OK
A	392.71	332.29	57.35	12.08	6.85	OK
A	392.71	332.29	57.35	12.08	6.85	OK
A	389.93	329.94	22.29	2.30	17.49	OK
A	389.93	329.94	22.29	2.30	17.49	OK
A	389.93	329.94	30.25	3.53	12.89	OK
A	389.93	329.94	30.25	3.53	12.89	OK
A	392.71	332.29	22.29	2.51	17.62	OK
A	392.71	332.29	22.29	2.51	17.62	OK
A	392.71	332.29	30.25	3.74	12.98	OK
A	392.71	332.29	30.25	3.74	12.98	OK
B AA	389.93	329.94	151.74	26.98	2.57	OK
B AA	389.93	329.94	151.74	26.98	2.57	OK
B AA	389.93	329.94	156.79	27.73	2.49	OK
B AA	389.93	329.94	156.79	27.73	2.49	OK
B AA	392.71	332.29	151.74	27.19	2.59	OK
B AA	392.71	332.29	151.74	27.19	2.59	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B AA	392.71	332.29	156.79	27.95	2.50	OK
B AA	392.71	332.29	156.79	27.95	2.50	OK
B AA	389.93	329.94	106.35	20.20	3.67	OK
B AA	389.93	329.94	106.35	20.20	3.67	OK
B AA	389.93	329.94	101.31	19.45	3.85	OK
B AA	389.93	329.94	101.31	19.45	3.85	OK
B AA	392.71	332.29	106.35	20.42	3.69	OK
B AA	392.71	332.29	106.35	20.42	3.69	OK
B AA	392.71	332.29	101.31	19.66	3.88	OK
B AA	392.71	332.29	101.31	19.66	3.88	OK
B WX	389.93	329.94	79.30	14.91	4.92	OK
B WX	389.93	329.94	79.30	14.91	4.92	OK
B WX	389.93	329.94	84.35	15.66	4.62	OK
B WX	389.93	329.94	84.35	15.66	4.62	OK
B WX	392.71	332.29	79.30	15.12	4.95	OK
B WX	392.71	332.29	79.30	15.12	4.95	OK
B WX	392.71	332.29	84.35	15.87	4.66	OK
B WX	392.71	332.29	84.35	15.87	4.66	OK
B WX	389.93	329.94	57.62	8.24	6.77	OK
B WX	389.93	329.94	57.62	8.24	6.77	OK
B WX	389.93	329.94	62.67	8.99	6.22	OK
B WX	389.93	329.94	62.67	8.99	6.22	OK
B WX	392.71	332.29	57.62	8.45	6.81	OK
B WX	392.71	332.29	57.62	8.45	6.81	OK
B WX	392.71	332.29	62.67	9.20	6.27	OK
B WX	392.71	332.29	62.67	9.20	6.27	OK
B WXY	389.93	329.94	200.32	34.28	1.95	OK
B WXY	389.93	329.94	200.32	34.28	1.95	OK
B WXY	389.93	329.94	205.36	35.03	1.90	OK
B WXY	389.93	329.94	205.36	35.03	1.90	OK
B WXY	392.71	332.29	200.32	34.49	1.96	OK
B WXY	392.71	332.29	200.32	34.49	1.96	OK
B WXY	392.71	332.29	205.36	35.25	1.91	OK
B WXY	392.71	332.29	205.36	35.25	1.91	OK
B WXY	389.93	329.94	154.92	27.50	2.52	OK
B WXY	389.93	329.94	154.92	27.50	2.52	OK
B WXY	389.93	329.94	149.88	26.75	2.60	OK
B WXY	389.93	329.94	149.88	26.75	2.60	OK
B WXY	392.71	332.29	154.92	27.71	2.53	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WXY	392.71	332.29	154.92	27.71	2.53	OK
B WXY	392.71	332.29	149.88	26.96	2.62	OK
B WXY	392.71	332.29	149.88	26.96	2.62	OK
B WY	389.93	329.94	226.03	38.46	1.73	OK
B WY	389.93	329.94	226.03	38.46	1.73	OK
B WY	389.93	329.94	231.07	39.21	1.69	OK
B WY	389.93	329.94	231.07	39.21	1.69	OK
B WY	392.71	332.29	226.03	38.67	1.74	OK
B WY	392.71	332.29	226.03	38.67	1.74	OK
B WY	392.71	332.29	231.07	39.42	1.70	OK
B WY	392.71	332.29	231.07	39.42	1.70	OK
B WY	389.93	329.94	180.64	31.68	2.16	OK
B WY	389.93	329.94	180.64	31.68	2.16	OK
B WY	389.93	329.94	175.59	30.92	2.22	OK
B WY	389.93	329.94	175.59	30.92	2.22	OK
B WY	392.71	332.29	180.64	31.89	2.17	OK
B WY	392.71	332.29	180.64	31.89	2.17	OK
B WY	392.71	332.29	175.59	31.14	2.24	OK
B WY	392.71	332.29	175.59	31.14	2.24	OK
D I	389.93	329.94	192.43	32.42	2.03	OK
D I	391.57	331.33	191.36	32.54	2.05	OK
D I	389.93	329.94	199.16	33.44	1.96	OK
D I	391.57	331.33	198.08	33.57	1.98	OK
D I	392.71	332.29	192.43	32.63	2.04	OK
D I	394.34	333.68	191.36	32.76	2.06	OK
D I	392.71	332.29	199.16	33.66	1.97	OK
D I	394.34	333.68	198.08	33.78	1.99	OK
D I	389.93	329.94	131.90	23.20	2.96	OK
D I	391.57	331.33	132.97	23.32	2.94	OK
D I	389.93	329.94	125.17	22.17	3.12	OK
D I	391.57	331.33	126.25	22.30	3.10	OK
D I	392.71	332.29	131.90	23.41	2.98	OK
D I	394.34	333.68	132.97	23.54	2.97	OK
D I	392.71	332.29	125.17	22.38	3.14	OK
D I	394.34	333.68	126.25	22.51	3.12	OK
D W	389.93	329.94	293.32	48.09	1.33	OK
D W	390.75	330.63	292.78	48.15	1.33	OK
D W	389.93	329.94	300.04	49.12	1.30	OK
D W	390.75	330.63	299.50	49.18	1.30	OK

GENERAL CONTRACTOR  <b>IRICAV2</b>		ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione		Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 221 di 336

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
D W	392.71	332.29	293.32	48.30	1.34	OK
D W	393.52	332.98	292.78	48.37	1.34	OK
D W	392.71	332.29	300.04	49.33	1.31	OK
D W	393.52	332.98	299.50	49.39	1.31	OK
D W	389.93	329.94	232.78	38.87	1.68	OK
D W	390.75	330.63	233.32	38.93	1.67	OK
D W	389.93	329.94	226.05	37.85	1.72	OK
D W	390.75	330.63	226.59	37.91	1.72	OK
D W	392.71	332.29	232.78	39.08	1.69	OK
D W	393.52	332.98	233.32	39.15	1.69	OK
D W	392.71	332.29	226.05	38.06	1.74	OK
D W	393.52	332.98	226.59	38.12	1.74	OK
DAA	390.75	330.63	194.61	33.31	2.01	OK
DAA	390.75	330.63	194.61	33.31	2.01	OK
DAA	390.75	330.63	201.33	34.34	1.94	OK
DAA	390.75	330.63	201.33	34.34	1.94	OK
DAA	393.52	332.98	194.61	33.53	2.02	OK
DAA	393.52	332.98	194.61	33.53	2.02	OK
DAA	393.52	332.98	201.33	34.55	1.95	OK
DAA	393.52	332.98	201.33	34.55	1.95	OK
DAA	390.75	330.63	135.14	24.09	2.89	OK
DAA	390.75	330.63	135.14	24.09	2.89	OK
DAA	390.75	330.63	128.42	23.07	3.04	OK
DAA	390.75	330.63	128.42	23.07	3.04	OK
DAA	393.52	332.98	135.14	24.31	2.91	OK
DAA	393.52	332.98	135.14	24.31	2.91	OK
DAA	393.52	332.98	128.42	23.28	3.06	OK

Scorrimento – verifiche statiche

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	$R_d = (N \cdot m_d + (B \cdot L) \cdot C'_{dbase}) / \gamma_R$		Ed	Rd/Ed	
	kN				
COMB					
A	236.7		20.1	11.76	OK
A	236.7		20.1	11.76	OK



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
A	236.7	24.6	9.62	OK	
A	236.7	24.6	9.62	OK	
A	239.0	20.1	11.87	OK	
A	239.0	20.1	11.87	OK	
A	239.0	24.6	9.71	OK	
A	239.0	24.6	9.71	OK	
A	236.7	9.8	24.26	OK	
A	236.7	9.8	24.26	OK	
A	236.7	14.2	16.64	OK	
A	236.7	14.2	16.64	OK	
A	239.0	9.8	24.49	OK	
A	239.0	9.8	24.49	OK	
A	239.0	14.2	16.80	OK	
A	239.0	14.2	16.80	OK	
B AA	236.7	58.0	4.08	OK	
B AA	236.7	58.0	4.08	OK	
B AA	236.7	60.8	3.89	OK	
B AA	236.7	60.8	3.89	OK	
B AA	239.0	58.0	4.12	OK	
B AA	239.0	58.0	4.12	OK	
B AA	239.0	60.8	3.93	OK	
B AA	239.0	60.8	3.93	OK	
B AA	236.7	39.1	6.06	OK	
B AA	236.7	39.1	6.06	OK	
B AA	236.7	36.3	6.53	OK	
B AA	236.7	36.3	6.53	OK	
B AA	239.0	39.1	6.11	OK	
B AA	239.0	39.1	6.11	OK	
B AA	239.0	36.3	6.59	OK	
B AA	239.0	36.3	6.59	OK	
B WX	236.7	13.6	17.39	OK	
B WX	236.7	13.6	17.39	OK	
B WX	236.7	16.4	14.40	OK	
B WX	236.7	16.4	14.40	OK	
B WX	239.0	13.6	17.56	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
B WX	239.0	13.6	17.56	OK	
B WX	239.0	16.4	14.54	OK	
B WX	239.0	16.4	14.54	OK	
B WX	236.7	5.3	44.42	OK	
B WX	236.7	5.3	44.42	OK	
B WX	236.7	8.1	29.05	OK	
B WX	236.7	8.1	29.05	OK	
B WX	239.0	5.3	44.85	OK	
B WX	239.0	5.3	44.85	OK	
B WX	239.0	8.1	29.33	OK	
B WX	239.0	8.1	29.33	OK	
B WXY	236.7	64.1	3.69	OK	
B WXY	236.7	64.1	3.69	OK	
B WXY	236.7	67.0	3.53	OK	
B WXY	236.7	67.0	3.53	OK	
B WXY	239.0	64.1	3.73	OK	
B WXY	239.0	64.1	3.73	OK	
B WXY	239.0	67.0	3.57	OK	
B WXY	239.0	67.0	3.57	OK	
B WXY	236.7	45.3	5.23	OK	
B WXY	236.7	45.3	5.23	OK	
B WXY	236.7	42.4	5.58	OK	
B WXY	236.7	42.4	5.58	OK	
B WXY	239.0	45.3	5.28	OK	
B WXY	239.0	45.3	5.28	OK	
B WXY	239.0	42.4	5.63	OK	
B WXY	239.0	42.4	5.63	OK	
B WY	236.7	85.8	2.76	OK	
B WY	236.7	85.8	2.76	OK	
B WY	236.7	88.6	2.67	OK	
B WY	236.7	88.6	2.67	OK	
B WY	239.0	85.8	2.79	OK	
B WY	239.0	85.8	2.79	OK	
B WY	239.0	88.6	2.70	OK	
B WY	239.0	88.6	2.70	OK	
B WY	236.7	66.9	3.54	OK	
B WY	236.7	66.9	3.54	OK	
B WY	236.7	64.1	3.69	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
B WY	236.7	64.1	3.69	OK	
B WY	239.0	66.9	3.57	OK	
B WY	239.0	66.9	3.57	OK	
B WY	239.0	64.1	3.73	OK	
B WY	239.0	64.1	3.73	OK	
D I	236.7	73.5	3.22	OK	
D I	237.6	73.1	3.25	OK	
D I	236.7	77.3	3.06	OK	
D I	237.6	76.9	3.09	OK	
D I	239.0	73.5	3.25	OK	
D I	239.9	73.1	3.28	OK	
D I	239.0	77.3	3.09	OK	
D I	239.9	76.9	3.12	OK	
D I	236.7	48.3	4.90	OK	
D I	237.6	48.7	4.88	OK	
D I	236.7	44.5	5.32	OK	
D I	237.6	44.9	5.29	OK	
D I	239.0	48.3	4.95	OK	
D I	239.9	48.7	4.93	OK	
D I	239.0	44.5	5.37	OK	
D I	239.9	44.9	5.34	OK	
D W	236.7	111.3	2.13	OK	
D W	237.2	111.1	2.13	OK	
D W	236.7	115.1	2.06	OK	
D W	237.2	114.9	2.06	OK	
D W	239.0	111.3	2.15	OK	
D W	239.4	111.1	2.16	OK	
D W	239.0	115.1	2.08	OK	
D W	239.4	114.9	2.08	OK	
D W	236.7	86.1	2.75	OK	
D W	237.2	86.3	2.75	OK	
D W	236.7	82.3	2.88	OK	
D W	237.2	82.5	2.87	OK	
D W	239.0	86.1	2.78	OK	
D W	239.4	86.3	2.77	OK	
D W	239.0	82.3	2.90	OK	
D W	239.4	82.5	2.90	OK	
DAA	237.2	74.3	3.19	OK	





Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d / E_d$	
		kN	kN		
DAA	237.2	74.3	3.19	OK	
DAA	237.2	78.1	3.04	OK	
DAA	237.2	78.1	3.04	OK	
DAA	239.4	74.3	3.22	OK	
DAA	239.4	74.3	3.22	OK	
DAA	239.4	78.1	3.07	OK	
DAA	239.4	78.1	3.07	OK	
DAA	237.2	49.5	4.79	OK	
DAA	237.2	49.5	4.79	OK	
DAA	237.2	45.7	5.19	OK	
DAA	237.2	45.7	5.19	OK	
DAA	239.4	49.5	4.84	OK	
DAA	239.4	49.5	4.84	OK	
DAA	239.4	45.7	5.23	OK	
DAA	239.4	45.7	5.23	OK	
A	213.0	18.6	11.43	OK	
A	213.0	18.6	11.43	OK	
A	213.0	21.6	9.85	OK	
A	213.0	21.6	9.85	OK	
A	214.6	18.6	11.51	OK	
A	214.6	18.6	11.51	OK	
A	214.6	21.6	9.92	OK	
A	214.6	21.6	9.92	OK	
A	213.0	8.3	25.76	OK	
A	213.0	8.3	25.76	OK	
A	213.0	11.2	18.94	OK	
A	213.0	11.2	18.94	OK	
A	214.6	8.3	25.94	OK	
A	214.6	8.3	25.94	OK	
A	214.6	11.2	19.08	OK	
A	214.6	11.2	19.08	OK	
B AA	213.0	57.0	3.74	OK	
B AA	213.0	57.0	3.74	OK	
B AA	213.0	58.9	3.62	OK	
B AA	213.0	58.9	3.62	OK	
B AA	214.6	57.0	3.76	OK	
B AA	214.6	57.0	3.76	OK	
B AA	214.6	58.9	3.64	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
B AA	214.6	58.9	3.64	OK	
B AA	213.0	40.0	5.32	OK	
B AA	213.0	40.0	5.32	OK	
B AA	213.0	38.1	5.59	OK	
B AA	213.0	38.1	5.59	OK	
B AA	214.6	40.0	5.36	OK	
B AA	214.6	40.0	5.36	OK	
B AA	214.6	38.1	5.63	OK	
B AA	214.6	38.1	5.63	OK	
B WX	213.0	12.7	16.82	OK	
B WX	213.0	12.7	16.82	OK	
B WX	213.0	14.6	14.64	OK	
B WX	213.0	14.6	14.64	OK	
B WX	214.6	12.7	16.94	OK	
B WX	214.6	12.7	16.94	OK	
B WX	214.6	14.6	14.74	OK	
B WX	214.6	14.6	14.74	OK	
B WX	213.0	4.4	48.51	OK	
B WX	213.0	4.4	48.51	OK	
B WX	213.0	6.3	33.99	OK	
B WX	213.0	6.3	33.99	OK	
B WX	214.6	4.4	48.85	OK	
B WX	214.6	4.4	48.85	OK	
B WX	214.6	6.3	34.23	OK	
B WX	214.6	6.3	34.23	OK	
B WXY	213.0	63.2	3.37	OK	
B WXY	213.0	63.2	3.37	OK	
B WXY	213.0	65.1	3.27	OK	
B WXY	213.0	65.1	3.27	OK	
B WXY	214.6	63.2	3.39	OK	
B WXY	214.6	63.2	3.39	OK	
B WXY	214.6	65.1	3.30	OK	
B WXY	214.6	65.1	3.30	OK	
B WXY	213.0	46.2	4.61	OK	
B WXY	213.0	46.2	4.61	OK	
B WXY	213.0	44.3	4.81	OK	
B WXY	213.0	44.3	4.81	OK	
B WXY	214.6	46.2	4.64	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d / E_d$	
		kN	kN		
B WXY	214.6	46.2	4.64	OK	
B WXY	214.6	44.3	4.84	OK	
B WXY	214.6	44.3	4.84	OK	
B WY	213.0	84.9	2.51	OK	
B WY	213.0	84.9	2.51	OK	
B WY	213.0	86.7	2.46	OK	
B WY	213.0	86.7	2.46	OK	
B WY	214.6	84.9	2.53	OK	
B WY	214.6	84.9	2.53	OK	
B WY	214.6	86.7	2.47	OK	
B WY	214.6	86.7	2.47	OK	
B WY	213.0	67.9	3.14	OK	
B WY	213.0	67.9	3.14	OK	
B WY	213.0	66.0	3.23	OK	
B WY	213.0	66.0	3.23	OK	
B WY	214.6	67.9	3.16	OK	
B WY	214.6	67.9	3.16	OK	
B WY	214.6	66.0	3.25	OK	
B WY	214.6	66.0	3.25	OK	
D I	213.0	72.2	2.95	OK	
D I	213.9	71.8	2.98	OK	
D I	213.0	74.7	2.85	OK	
D I	213.9	74.3	2.88	OK	
D I	214.6	72.2	2.97	OK	
D I	215.5	71.8	3.00	OK	
D I	214.6	74.7	2.87	OK	
D I	215.5	74.3	2.90	OK	
D I	213.0	49.5	4.30	OK	
D I	213.9	49.9	4.28	OK	
D I	213.0	47.0	4.53	OK	
D I	213.9	47.4	4.51	OK	
D I	214.6	49.5	4.33	OK	
D I	215.5	49.9	4.31	OK	
D I	214.6	47.0	4.56	OK	
D I	215.5	47.4	4.54	OK	
D W	213.0	110.0	1.94	OK	
D W	213.5	109.8	1.94	OK	
D W	213.0	112.5	1.89	OK	

GENERAL CONTRACTOR  <b>IRICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE
Relazione di calcolo pali di alimentazione	Progetto IN17    Lotto 10    Codifica Documento E I2 CL OC 00 0 0 010    Rev. A    Foglio 228 di 336

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
D W	213.5	112.4	1.90	OK	
D W	214.6	110.0	1.95	OK	
D W	215.0	109.8	1.96	OK	
D W	214.6	112.5	1.91	OK	
D W	215.0	112.4	1.91	OK	
D W	213.0	87.3	2.44	OK	
D W	213.5	87.5	2.44	OK	
D W	213.0	84.8	2.51	OK	
D W	213.5	85.0	2.51	OK	
D W	214.6	87.3	2.46	OK	
D W	215.0	87.5	2.46	OK	
D W	214.6	84.8	2.53	OK	
D W	215.0	85.0	2.53	OK	
DAA	213.5	73.1	2.92	OK	
DAA	213.5	73.1	2.92	OK	
DAA	213.5	75.6	2.82	OK	
DAA	213.5	75.6	2.82	OK	
DAA	215.0	73.1	2.94	OK	
DAA	215.0	73.1	2.94	OK	
DAA	215.0	75.6	2.84	OK	
DAA	215.0	75.6	2.84	OK	
DAA	213.5	50.8	4.20	OK	
DAA	213.5	50.8	4.20	OK	
DAA	213.5	48.3	4.42	OK	
DAA	213.5	48.3	4.42	OK	
DAA	215.0	50.8	4.23	OK	
DAA	215.0	50.8	4.23	OK	
DAA	215.0	48.3	4.46	OK	

Capacità portante – verifiche statiche

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	COMB	$R_d$	$E_d$	$R_d/E_d$	
		$q_{u,d}$ kPa	$q_{E,d} = N / (B' \cdot L')$		
A	$(3093. + 1052. +) / 2.3 =$	1802.3	68.57	26.28	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	COMB	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>
		q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')	
			kPa		
A	(3093. + 1052. +) / 2.3 =	1802.3	68.57	26.28	OK
A	(3056. + 973. +) / 2.3 =	1751.6	71.17	24.61	OK
A	(3056. + 973. +) / 2.3 =	1751.6	71.17	24.61	OK
A	(3094. + 1056. +) / 2.3 =	1804.3	69.18	26.08	OK
A	(3094. + 1056. +) / 2.3 =	1804.3	69.18	26.08	OK
A	(3057. + 977. +) / 2.3 =	1754.0	71.77	24.44	OK
A	(3057. + 977. +) / 2.3 =	1754.0	71.77	24.44	OK
A	(3194. + 1244. +) / 2.3 =	1929.8	62.54	30.86	OK
A	(3194. + 1244. +) / 2.3 =	1929.8	62.54	30.86	OK
A	(3157. + 1156. +) / 2.3 =	1875.0	64.76	28.95	OK
A	(3157. + 1156. +) / 2.3 =	1875.0	64.76	28.95	OK
A	(3194. + 1246. +) / 2.3 =	1930.7	63.15	30.57	OK
A	(3194. + 1246. +) / 2.3 =	1930.7	63.15	30.57	OK
A	(3157. + 1159. +) / 2.3 =	1876.4	65.37	28.70	OK
A	(3157. + 1159. +) / 2.3 =	1876.4	65.37	28.70	OK
B AA	(2414. + 581. +) / 2.3 =	1302.0	97.81	13.31	OK
B AA	(2414. + 581. +) / 2.3 =	1302.0	97.81	13.31	OK
B AA	(2354. + 554. +) / 2.3 =	1264.3	100.87	12.53	OK
B AA	(2354. + 554. +) / 2.3 =	1264.3	100.87	12.53	OK
B AA	(2426. + 586. +) / 2.3 =	1309.7	98.25	13.33	OK
B AA	(2426. + 586. +) / 2.3 =	1309.7	98.25	13.33	OK
B AA	(2367. + 559. +) / 2.3 =	1272.2	101.28	12.56	OK
B AA	(2367. + 559. +) / 2.3 =	1272.2	101.28	12.56	OK
B AA	(2826. + 774. +) / 2.3 =	1565.2	81.03	19.32	OK
B AA	(2826. + 774. +) / 2.3 =	1565.2	81.03	19.32	OK
B AA	(2890. + 805. +) / 2.3 =	1606.4	78.96	20.34	OK
B AA	(2890. + 805. +) / 2.3 =	1606.4	78.96	20.34	OK
B AA	(2835. + 778. +) / 2.3 =	1570.9	81.60	19.25	OK
B AA	(2835. + 778. +) / 2.3 =	1570.9	81.60	19.25	OK
B AA	(2898. + 809. +) / 2.3 =	1611.7	79.53	20.26	OK
B AA	(2898. + 809. +) / 2.3 =	1611.7	79.53	20.26	OK
B WX	(3267. + 997. +) / 2.3 =	1853.7	74.98	24.72	OK
B WX	(3267. + 997. +) / 2.3 =	1853.7	74.98	24.72	OK
B WX	(3202. + 960. +) / 2.3 =	1809.7	76.87	23.54	OK
B WX	(3202. + 960. +) / 2.3 =	1809.7	76.87	23.54	OK
B WX	(3266. + 1001. +) / 2.3 =	1855.0	75.57	24.55	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')			
COMB			kPa			
B WX	(3266. + 1001. +) / 2.3 =	1855.0	75.57	24.55	OK	
B WX	(3208. + 963. +) / 2.3 =	1813.4	77.46	23.41	OK	
B WX	(3208. + 963. +) / 2.3 =	1813.4	77.46	23.41	OK	
B WX	(3343. + 1147. +) / 2.3 =	1952.5	69.31	28.17	OK	
B WX	(3343. + 1147. +) / 2.3 =	1952.5	69.31	28.17	OK	
B WX	(3322. + 1092. +) / 2.3 =	1919.1	70.96	27.04	OK	
B WX	(3322. + 1092. +) / 2.3 =	1919.1	70.96	27.04	OK	
B WX	(3341. + 1151. +) / 2.3 =	1953.1	69.91	27.94	OK	
B WX	(3341. + 1151. +) / 2.3 =	1953.1	69.91	27.94	OK	
B WX	(3320. + 1096. +) / 2.3 =	1920.0	71.56	26.83	OK	
B WX	(3320. + 1096. +) / 2.3 =	1920.0	71.56	26.83	OK	
B WXY	(2190. + 472. +) / 2.3 =	1157.3	121.03	9.56	OK	
B WXY	(2190. + 472. +) / 2.3 =	1157.3	121.03	9.56	OK	
B WXY	(2131. + 447. +) / 2.3 =	1120.9	125.57	8.93	OK	
B WXY	(2131. + 447. +) / 2.3 =	1120.9	125.57	8.93	OK	
B WXY	(2204. + 478. +) / 2.3 =	1166.1	121.18	9.62	OK	
B WXY	(2204. + 478. +) / 2.3 =	1166.1	121.18	9.62	OK	
B WXY	(2146. + 453. +) / 2.3 =	1129.9	125.64	8.99	OK	
B WXY	(2146. + 453. +) / 2.3 =	1129.9	125.64	8.99	OK	
B WXY	(2594. + 655. +) / 2.3 =	1412.5	97.09	14.55	OK	
B WXY	(2594. + 655. +) / 2.3 =	1412.5	97.09	14.55	OK	
B WXY	(2657. + 684. +) / 2.3 =	1452.6	94.23	15.41	OK	
B WXY	(2657. + 684. +) / 2.3 =	1452.6	94.23	15.41	OK	
B WXY	(2605. + 659. +) / 2.3 =	1419.4	97.54	14.55	OK	
B WXY	(2605. + 659. +) / 2.3 =	1419.4	97.54	14.55	OK	
B WXY	(2667. + 689. +) / 2.3 =	1459.2	94.70	15.41	OK	
B WXY	(2667. + 689. +) / 2.3 =	1459.2	94.70	15.41	OK	
B WY	(1846. + 344. +) / 2.3 =	952.3	137.97	6.90	OK	
B WY	(1846. + 344. +) / 2.3 =	952.3	137.97	6.90	OK	
B WY	(1791. + 323. +) / 2.3 =	919.3	143.76	6.39	OK	
B WY	(1791. + 323. +) / 2.3 =	919.3	143.76	6.39	OK	
B WY	(1863. + 350. +) / 2.3 =	962.1	137.81	6.98	OK	
B WY	(1863. + 350. +) / 2.3 =	962.1	137.81	6.98	OK	
B WY	(1808. + 329. +) / 2.3 =	929.3	143.48	6.48	OK	
B WY	(1808. + 329. +) / 2.3 =	929.3	143.48	6.48	OK	
B WY	(2227. + 498. +) / 2.3 =	1184.9	108.21	10.95	OK	
B WY	(2227. + 498. +) / 2.3 =	1184.9	108.21	10.95	OK	
B WY	(2286. + 524. +) / 2.3 =	1221.6	104.74	11.66	OK	
B WY	(2286. + 524. +) / 2.3 =	1221.6	104.74	11.66	OK	



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	COMB	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>
		q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
			kPa			
B WY	(2241. + 504. +) / 2.3 =	1193.3	108.53	10.99	OK	
B WY	(2241. + 504. +) / 2.3 =	1193.3	108.53	10.99	OK	
B WY	(2300. + 529. +) / 2.3 =	1229.8	105.11	11.70	OK	
B WY	(2300. + 529. +) / 2.3 =	1229.8	105.11	11.70	OK	
D I	(2089. + 441. +) / 2.3 =	1100.4	116.84	9.42	OK	
D I	(2104. + 447. +) / 2.3 =	1109.0	116.39	9.53	OK	
D I	(2013. + 410. +) / 2.3 =	1053.7	122.58	8.60	OK	
D I	(2028. + 416. +) / 2.3 =	1062.3	122.05	8.70	OK	
D I	(2104. + 447. +) / 2.3 =	1109.4	117.04	9.48	OK	
D I	(2118. + 453. +) / 2.3 =	1117.9	116.61	9.59	OK	
D I	(2029. + 416. +) / 2.3 =	1062.9	122.70	8.66	OK	
D I	(2043. + 422. +) / 2.3 =	1071.5	122.19	8.77	OK	
D I	(2620. + 677. +) / 2.3 =	1433.4	88.33	16.23	OK	
D I	(2615. + 675. +) / 2.3 =	1430.4	88.85	16.10	OK	
D I	(2703. + 716. +) / 2.3 =	1486.5	85.12	17.46	OK	
D I	(2698. + 714. +) / 2.3 =	1483.2	85.62	17.32	OK	
D I	(2631. + 681. +) / 2.3 =	1440.1	88.85	16.21	OK	
D I	(2626. + 679. +) / 2.3 =	1437.1	89.36	16.08	OK	
D I	(2713. + 720. +) / 2.3 =	1492.8	85.66	17.43	OK	
D I	(2708. + 718. +) / 2.3 =	1489.5	86.16	17.29	OK	
D W	(1370. + 179. +) / 2.3 =	673.7	213.15	3.16	OK	
D W	(1378. + 182. +) / 2.3 =	677.9	211.83	3.20	OK	
D W	(1304. + 159. +) / 2.3 =	636.2	231.27	2.75	OK	
D W	(1311. + 161. +) / 2.3 =	640.3	229.66	2.79	OK	
D W	(1389. + 185. +) / 2.3 =	684.6	210.74	3.25	OK	
D W	(1397. + 187. +) / 2.3 =	688.8	209.50	3.29	OK	
D W	(1323. + 165. +) / 2.3 =	647.1	228.11	2.84	OK	
D W	(1331. + 167. +) / 2.3 =	651.2	226.59	2.87	OK	
D W	(1839. + 342. +) / 2.3 =	948.3	138.36	6.85	OK	
D W	(1839. + 341. +) / 2.3 =	947.8	138.68	6.83	OK	
D W	(1913. + 370. +) / 2.3 =	992.9	131.22	7.57	OK	
D W	(1913. + 370. +) / 2.3 =	992.4	131.54	7.54	OK	
D W	(1856. + 348. +) / 2.3 =	958.1	138.18	6.93	OK	
D W	(1855. + 347. +) / 2.3 =	957.6	138.51	6.91	OK	
D W	(1929. + 376. +) / 2.3 =	1002.5	131.18	7.64	OK	
D W	(1929. + 376. +) / 2.3 =	1002.0	131.50	7.62	OK	
DAA	(2077. + 436. +) / 2.3 =	1092.3	118.24	9.24	OK	
DAA	(2077. + 436. +) / 2.3 =	1092.3	118.24	9.24	OK	
DAA	(2001. + 405. +) / 2.3 =	1045.8	124.10	8.43	OK	



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	COMB	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>
		q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
				kPa		
DAA	(2001. + 405. +) / 2.3 =	1045.8	124.10	8.43	OK	
DAA	(2092. + 441. +) / 2.3 =	1101.3	118.43	9.30	OK	
DAA	(2092. + 441. +) / 2.3 =	1101.3	118.43	9.30	OK	
DAA	(2016. + 411. +) / 2.3 =	1055.1	124.19	8.50	OK	
DAA	(2016. + 411. +) / 2.3 =	1055.1	124.19	8.50	OK	
DAA	(2596. + 665. +) / 2.3 =	1418.0	89.60	15.83	OK	
DAA	(2596. + 665. +) / 2.3 =	1418.0	89.60	15.83	OK	
DAA	(2679. + 704. +) / 2.3 =	1470.8	86.32	17.04	OK	
DAA	(2679. + 704. +) / 2.3 =	1470.8	86.32	17.04	OK	
DAA	(2607. + 670. +) / 2.3 =	1424.8	90.11	15.81	OK	
DAA	(2607. + 670. +) / 2.3 =	1424.8	90.11	15.81	OK	
DAA	(2689. + 708. +) / 2.3 =	1477.2	86.85	17.01	OK	
DAA	(2689. + 708. +) / 2.3 =	1477.2	86.85	17.01	OK	
A	(3087. + 1042. +) / 2.3 =	1795.4	62.04	28.94	OK	
A	(3087. + 1042. +) / 2.3 =	1795.4	62.04	28.94	OK	
A	(3060. + 983. +) / 2.3 =	1757.9	63.77	27.56	OK	
A	(3060. + 983. +) / 2.3 =	1757.9	63.77	27.56	OK	
A	(3088. + 1045. +) / 2.3 =	1797.0	62.45	28.78	OK	
A	(3088. + 1045. +) / 2.3 =	1797.0	62.45	28.78	OK	
A	(3061. + 986. +) / 2.3 =	1759.6	64.18	27.42	OK	
A	(3061. + 986. +) / 2.3 =	1759.6	64.18	27.42	OK	
A	(3200. + 1255. +) / 2.3 =	1937.1	56.01	34.59	OK	
A	(3200. + 1255. +) / 2.3 =	1937.1	56.01	34.59	OK	
A	(3172. + 1189. +) / 2.3 =	1896.2	57.46	33.00	OK	
A	(3172. + 1189. +) / 2.3 =	1896.2	57.46	33.00	OK	
A	(3200. + 1257. +) / 2.3 =	1937.7	56.42	34.35	OK	
A	(3200. + 1257. +) / 2.3 =	1937.7	56.42	34.35	OK	
A	(3172. + 1191. +) / 2.3 =	1897.1	57.87	32.78	OK	
A	(3172. + 1191. +) / 2.3 =	1897.1	57.87	32.78	OK	
B AA	(2301. + 530. +) / 2.3 =	1231.1	93.49	13.17	OK	
B AA	(2301. + 530. +) / 2.3 =	1231.1	93.49	13.17	OK	
B AA	(2257. + 511. +) / 2.3 =	1203.8	95.75	12.57	OK	
B AA	(2257. + 511. +) / 2.3 =	1203.8	95.75	12.57	OK	
B AA	(2311. + 534. +) / 2.3 =	1237.2	93.74	13.20	OK	
B AA	(2311. + 534. +) / 2.3 =	1237.2	93.74	13.20	OK	
B AA	(2268. + 515. +) / 2.3 =	1209.9	95.98	12.61	OK	
B AA	(2268. + 515. +) / 2.3 =	1209.9	95.98	12.61	OK	
B AA	(2708. + 716. +) / 2.3 =	1488.6	76.81	19.38	OK	
B AA	(2708. + 716. +) / 2.3 =	1488.6	76.81	19.38	OK	





Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	COMB	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>
		q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
			kPa			
B AA	(2754. + 738. +) / 2.3 =	1518.4	75.28	20.17	OK	
B AA	(2754. + 738. +) / 2.3 =	1518.4	75.28	20.17	OK	
B AA	(2715. + 719. +) / 2.3 =	1493.2	77.17	19.35	OK	
B AA	(2715. + 719. +) / 2.3 =	1493.2	77.17	19.35	OK	
B AA	(2761. + 741. +) / 2.3 =	1522.9	75.65	20.13	OK	
B AA	(2761. + 741. +) / 2.3 =	1522.9	75.65	20.13	OK	
B WX	(3243. + 981. +) / 2.3 =	1836.2	68.94	26.64	OK	
B WX	(3243. + 981. +) / 2.3 =	1836.2	68.94	26.64	OK	
B WX	(3193. + 954. +) / 2.3 =	1803.4	70.25	25.67	OK	
B WX	(3193. + 954. +) / 2.3 =	1803.4	70.25	25.67	OK	
B WX	(3247. + 982. +) / 2.3 =	1838.8	69.33	26.52	OK	
B WX	(3247. + 982. +) / 2.3 =	1838.8	69.33	26.52	OK	
B WX	(3198. + 956. +) / 2.3 =	1806.1	70.63	25.57	OK	
B WX	(3198. + 956. +) / 2.3 =	1806.1	70.63	25.57	OK	
B WX	(3362. + 1135. +) / 2.3 =	1955.1	63.11	30.98	OK	
B WX	(3362. + 1135. +) / 2.3 =	1955.1	63.11	30.98	OK	
B WX	(3346. + 1094. +) / 2.3 =	1930.5	64.23	30.06	OK	
B WX	(3346. + 1094. +) / 2.3 =	1930.5	64.23	30.06	OK	
B WX	(3360. + 1138. +) / 2.3 =	1955.4	63.51	30.79	OK	
B WX	(3360. + 1138. +) / 2.3 =	1955.4	63.51	30.79	OK	
B WX	(3344. + 1097. +) / 2.3 =	1931.0	64.63	29.88	OK	
B WX	(3344. + 1097. +) / 2.3 =	1931.0	64.63	29.88	OK	
B WXY	(2055. + 413. +) / 2.3 =	1073.1	120.34	8.92	OK	
B WXY	(2055. + 413. +) / 2.3 =	1073.1	120.34	8.92	OK	
B WXY	(2012. + 396. +) / 2.3 =	1046.9	123.94	8.45	OK	
B WXY	(2012. + 396. +) / 2.3 =	1046.9	123.94	8.45	OK	
B WXY	(2066. + 418. +) / 2.3 =	1080.0	120.29	8.98	OK	
B WXY	(2066. + 418. +) / 2.3 =	1080.0	120.29	8.98	OK	
B WXY	(2024. + 400. +) / 2.3 =	1053.9	123.84	8.51	OK	
B WXY	(2024. + 400. +) / 2.3 =	1053.9	123.84	8.51	OK	
B WXY	(2452. + 587. +) / 2.3 =	1321.3	94.92	13.92	OK	
B WXY	(2452. + 587. +) / 2.3 =	1321.3	94.92	13.92	OK	
B WXY	(2498. + 608. +) / 2.3 =	1350.2	92.69	14.57	OK	
B WXY	(2498. + 608. +) / 2.3 =	1350.2	92.69	14.57	OK	
B WXY	(2461. + 591. +) / 2.3 =	1327.0	95.16	13.95	OK	
B WXY	(2461. + 591. +) / 2.3 =	1327.0	95.16	13.95	OK	
B WXY	(2507. + 611. +) / 2.3 =	1355.7	92.95	14.59	OK	
B WXY	(2507. + 611. +) / 2.3 =	1355.7	92.95	14.59	OK	
B WY	(1684. + 284. +) / 2.3 =	855.5	141.21	6.06	OK	



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	COMB	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
		q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
			kPa			
B WY	(1684. + 284. +) / 2.3 =	855.5	141.21	6.06	OK	
B WY	(1644. + 269. +) / 2.3 =	832.1	146.07	5.70	OK	
B WY	(1644. + 269. +) / 2.3 =	832.1	146.07	5.70	OK	
B WY	(1697. + 288. +) / 2.3 =	863.1	140.82	6.13	OK	
B WY	(1697. + 288. +) / 2.3 =	863.1	140.82	6.13	OK	
B WY	(1658. + 274. +) / 2.3 =	839.8	145.58	5.77	OK	
B WY	(1658. + 274. +) / 2.3 =	839.8	145.58	5.77	OK	
B WY	(2054. + 425. +) / 2.3 =	1078.2	108.07	9.98	OK	
B WY	(2054. + 425. +) / 2.3 =	1078.2	108.07	9.98	OK	
B WY	(2097. + 443. +) / 2.3 =	1104.3	105.26	10.49	OK	
B WY	(2097. + 443. +) / 2.3 =	1104.3	105.26	10.49	OK	
B WY	(2066. + 430. +) / 2.3 =	1085.0	108.18	10.03	OK	
B WY	(2066. + 430. +) / 2.3 =	1085.0	108.18	10.03	OK	
B WY	(2108. + 447. +) / 2.3 =	1111.0	105.40	10.54	OK	
B WY	(2108. + 447. +) / 2.3 =	1111.0	105.40	10.54	OK	
D I	(1954. + 386. +) / 2.3 =	1017.7	114.81	8.86	OK	
D I	(1970. + 392. +) / 2.3 =	1027.3	114.21	9.00	OK	
D I	(1899. + 365. +) / 2.3 =	984.1	119.27	8.25	OK	
D I	(1915. + 371. +) / 2.3 =	993.8	118.58	8.38	OK	
D I	(1966. + 391. +) / 2.3 =	1024.7	114.83	8.92	OK	
D I	(1982. + 397. +) / 2.3 =	1034.3	114.24	9.05	OK	
D I	(1911. + 369. +) / 2.3 =	991.3	119.23	8.31	OK	
D I	(1927. + 375. +) / 2.3 =	1000.9	118.56	8.44	OK	
D I	(2475. + 609. +) / 2.3 =	1340.7	85.23	15.73	OK	
D I	(2470. + 607. +) / 2.3 =	1337.8	85.77	15.60	OK	
D I	(2535. + 637. +) / 2.3 =	1378.9	82.79	16.66	OK	
D I	(2530. + 635. +) / 2.3 =	1375.8	83.32	16.51	OK	
D I	(2484. + 613. +) / 2.3 =	1346.2	85.55	15.74	OK	
D I	(2479. + 611. +) / 2.3 =	1343.3	86.08	15.60	OK	
D I	(2543. + 640. +) / 2.3 =	1384.2	83.12	16.65	OK	
D I	(2538. + 638. +) / 2.3 =	1381.1	83.65	16.51	OK	
D W	(1181. + 124. +) / 2.3 =	567.6	247.75	2.29	OK	
D W	(1190. + 126. +) / 2.3 =	572.1	245.31	2.33	OK	
D W	(1134. + 112. +) / 2.3 =	541.8	267.26	2.03	OK	
D W	(1143. + 114. +) / 2.3 =	546.3	264.36	2.07	OK	
D W	(1196. + 128. +) / 2.3 =	575.8	244.16	2.36	OK	
D W	(1204. + 130. +) / 2.3 =	580.3	241.85	2.40	OK	
D W	(1149. + 115. +) / 2.3 =	549.9	262.83	2.09	OK	
D W	(1158. + 118. +) / 2.3 =	554.4	260.09	2.13	OK	

GENERAL CONTRACTOR  <b>IRICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione	Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 235 di 336

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	COMB	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>
		q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
				kPa		
D W	(1630. + 265. +) / 2.3 =	824.0	147.49	5.59	OK	
D W	(1630. + 265. +) / 2.3 =	823.8	147.83	5.57	OK	
D W	(1683. + 284. +) / 2.3 =	855.1	140.94	6.07	OK	
D W	(1683. + 283. +) / 2.3 =	854.8	141.28	6.05	OK	
D W	(1644. + 269. +) / 2.3 =	831.7	146.97	5.66	OK	
D W	(1643. + 269. +) / 2.3 =	831.5	147.31	5.64	OK	
D W	(1696. + 288. +) / 2.3 =	862.7	140.54	6.14	OK	
D W	(1696. + 288. +) / 2.3 =	862.4	140.88	6.12	OK	
DAA	(1941. + 380. +) / 2.3 =	1009.1	116.41	8.67	OK	
DAA	(1941. + 380. +) / 2.3 =	1009.1	116.41	8.67	OK	
DAA	(1885. + 359. +) / 2.3 =	975.8	120.96	8.07	OK	
DAA	(1885. + 359. +) / 2.3 =	975.8	120.96	8.07	OK	
DAA	(1952. + 385. +) / 2.3 =	1016.2	116.42	8.73	OK	
DAA	(1952. + 385. +) / 2.3 =	1016.2	116.42	8.73	OK	
DAA	(1897. + 363. +) / 2.3 =	983.0	120.91	8.13	OK	
DAA	(1897. + 363. +) / 2.3 =	983.0	120.91	8.13	OK	
DAA	(2449. + 597. +) / 2.3 =	1324.3	86.65	15.28	OK	
DAA	(2449. + 597. +) / 2.3 =	1324.3	86.65	15.28	OK	
DAA	(2509. + 624. +) / 2.3 =	1362.2	84.14	16.19	OK	
DAA	(2509. + 624. +) / 2.3 =	1362.2	84.14	16.19	OK	
DAA	(2458. + 600. +) / 2.3 =	1329.9	86.95	15.29	OK	
DAA	(2458. + 600. +) / 2.3 =	1329.9	86.95	15.29	OK	
DAA	(2518. + 628. +) / 2.3 =	1367.6	84.46	16.19	OK	

#### Ribaltamento – verifiche sismiche

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	dir. L	dir. T	dir. L	dir. T		
COMB	kNm		kNm			
Comb1	418.72	354.31	80.67	12.07	5.19	OK
Comb2	418.72	354.31	80.67	12.07	5.19	OK
Comb3	418.72	354.31	60.01	9.23	6.98	OK
Comb4	418.72	354.31	60.01	9.23	6.98	OK
Comb5	418.72	354.31	71.43	10.81	5.86	OK
Comb6	418.72	354.31	71.43	10.81	5.86	OK

GENERAL CONTRACTOR  <b>IRICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE
Relazione di calcolo pali di alimentazione	Progetto IN17    Lotto 10    Codifica Documento E I2 CL OC 00 0 0 010    Rev. A    Foglio 236 di 336

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
Comb7	418.72	354.31	50.78	7.97	8.25	OK
Comb8	418.72	354.31	50.78	7.97	8.25	OK

Scorrimento – verifiche sismiche

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$		Ed	Rd/Ed	
	kN		kN		
COMB					
Comb1	228.8		110.3	<b>2.07</b>	OK
Comb2	228.8		110.3	<b>2.07</b>	OK
Comb3	228.8		98.6	<b>2.32</b>	OK
Comb4	228.8		98.6	<b>2.32</b>	OK
Comb5	228.8		98.9	<b>2.31</b>	OK
Comb6	228.8		98.9	<b>2.31</b>	OK
Comb7	228.8		83.0	<b>2.76</b>	OK
Comb8	228.8		83.0	<b>2.76</b>	OK

Capacità portante – verifiche sismiche

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	Rd		Ed	Rd/Ed	
	$q_{u,d}$ kPa		$q_{E,d} = N / (B' \cdot L')$		
COMB			kPa		
Comb1	$(1633. + 343. +) / 2.3 =$	859.1	72.21	11.90	OK
Comb2	$(1633. + 343. +) / 2.3 =$	859.1	72.21	11.90	OK
Comb3	$(1751. + 421. +) / 2.3 =$	944.4	67.49	13.99	OK
Comb4	$(1751. + 421. +) / 2.3 =$	944.4	67.49	13.99	OK
Comb5	$(1769. + 402. +) / 2.3 =$	943.7	70.03	13.48	OK
Comb6	$(1769. + 402. +) / 2.3 =$	943.7	70.03	13.48	OK
Comb7	$(1931. + 517. +) / 2.3 =$	1064.5	65.56	16.24	OK
Comb8	$(1931. + 517. +) / 2.3 =$	1064.5	65.56	16.24	OK

Le verifiche sono soddisfatte.



### 12.13 Sintesi risultati LC7

TITOLO: **Caso di carico 7 - combinazioni statiche**

FONDAZIONI A PLINTO

DESIGN ASSUMPTION

piano campagna sostanzialmente orizzontale

angolo d'attrito caratteristico  $\phi'_k$

coesione  $c'$

angolo d'attrito caratteristico  $\phi'_k$  alla base

coesione alla base  $c'$

coefficiente  $\gamma_p$

coefficiente  $\gamma_c'$

coefficiente  $\gamma_k$  capacità portante

coefficiente  $\gamma_k$  scorrimento

coefficiente  $\gamma_k$  spinta passiva

angolo d'attrito di design  $\phi'_d$

coesione di design  $c'_d$

coeff. attrito di design  $\mu'_d$

coesione alla base di design

Dimensione fondazione B[m] (LONGITUDINALE)

Dimensione fondazione L [m] (TRASVERSALE)

Profondità da piano campagna D [m]

Altezza plinto [m] H<sub>p</sub>

Dimensione baggiolo b[m] (LONGITUDINALE)

Dimensione maggiore baggiolo l [m] (TRASVERSALE)

Altezza baggiolo [m] H<sub>b</sub>

Altezza terreno sopraplinto [m] H<sub>t</sub>

q' = carico permanente ai lati

$\gamma$  = peso specifico medio sopra la fondazione

$\gamma_f$  = peso specifico medio sotto la fondazione

opzione calcolo coeff. S<sub>y</sub> e S<sub>z</sub>

opzione calcolo per tenere in conto peso terreno di ricoprimento

Peso specifico medio c.a.

Peso proprio plinto + baggiolo + terreno sovrastante [kN]

Quota baricentro plinto + baggiolo + terreno sovrastante vs p.f. [kN]

Coefficiente sismico k<sub>h</sub>

Coefficiente sismico k<sub>v</sub>

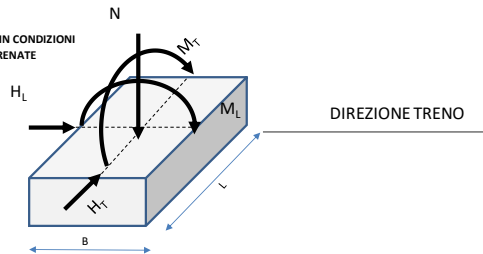
Azione inerziale orizzontale plinto

Azione inerziale verticale plinto

DA2

38	°	0.663	rad	
0	kPa			
38	°	0.663	rad	
0	kPa			
1.00				
1.00				
2.30				
1.10				
1.40				
38.00	°	0.663	rad	tan( $\phi'_d$ )= 0.78
0.00	kPa			
0.78				
0.00	kPa			
2.2	m			
2.2	m			
2.2	m			
2.2	m			
0.8	m			
0.8	m			
0.8	m			
0.5	m			
0.25	m			
44	kPa			
20	kN/m <sup>3</sup>			
20	kN/m <sup>3</sup>			
1				
0	(1 si - 0 no)			
25	kN/m <sup>3</sup>			
274	kN			
1.30	m			
0.000	g			
0.000	g			+ downward
0.00	kN			
0.00	kN			

VERIFICA IN CONDIZIONI DRENATE



(NB: coefficiente correttivo per rapporto D/B non considerato)

(valore da stabilirsi in base alla profondità di falda)  
**(0= Lancellotta ecc., 1 = originale EC7)**  
si useranno le formule originarie di EC7

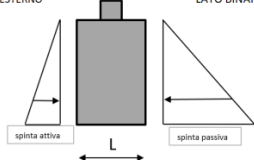
**Eccentricità degli scarichi rispetto a baricentro fondazione**

e <sub>L</sub>	0	m	+ se concorde con i momenti del traliccio
e <sub>T</sub>	0.1	m	+ se concorde con i momenti del traliccio

**Coefficienti di spinta di progetto**

coefficiente di spinta attiva statico K <sub>a</sub>	0.228	-
coefficiente di spinta attiva sismico K <sub>a,E</sub>	0.483	-
coefficiente di spinta passiva statico K <sub>p</sub>	4.395	-
coefficiente di spinta passiva sismico K <sub>p,E</sub>	3.251	-
coeff. parziale riduttivo della spinta passiva	1.40	-
moltiplicatore della spinta passiva $\alpha$	0.00	long 0.00 trasv
contributo delle spinte frontali long - taglio	0	kN statico 0 kN sismico
contributo delle spinte frontali long - momer	0	kNm statico 0 kNm sismico
contributo delle spinte frontali trasv - taglio	0	kN statico 0 kN sismico
contributo delle spinte frontali trasv - momer	0	kNm statico 0 kNm sismico

LATO ESTERNO LATO BINARIO



CALCOLI PRELIMINARI: coefficienti di capacità portante indipendenti dai carichi

N <sub>q</sub>	=	48.93	B <sub>q</sub>	=	1
N <sub>p</sub>	=	74.90	B <sub>p</sub>	=	1
N <sub>c</sub>	=	61.35	B <sub>c</sub>	=	1

**SINTESI RISULTATI**

Capacità portante	F <sub>s min</sub>	=	4.53	n. Verif. Neg.	0
Scorrimento	F <sub>s min</sub>	=	8.3	n. Verif. Neg.	0
Ribaltamento	F <sub>s min</sub>	=	1.22	n. Verif. Neg.	0



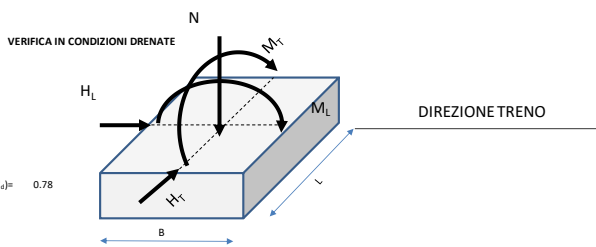
TITOLO: **Caso di carico 7 - combinazioni sismiche**

FONDAZIONI A PLINTO

DESIGN ASSUMPTION

piano campagna sostanzialmente orizzontale

angolo d'attrito caratteristico $\phi'_s$	38	°	0.663	rad	
coesione $c'$	0	kPa	+		
angolo d'attrito caratteristico $\phi'_s$ alla base	38	°	0.663	rad	
coesione alla base $c'$	0	kPa	+		
coefficiente $\gamma_s$	1.00				
coefficiente $\gamma_c$	1.00				
coefficiente $\gamma_s$ capacità portante	2.30				
coefficiente $\gamma_s$ scorrimento	1.10				
coefficiente $\gamma_s$ spinta passiva	1.40				
angolo d'attrito di design $\phi'_d$	38.00	°	0.663	rad	$\tan(\phi'_d) = 0.78$
coesione di design $c'_d$	0.00	kPa			
coeff. attrito di design $\mu'_d$	0.78				
coesione alla base di design	0.00	kPa			
Dimensione fondazione B[m] (LONGITUDINALE)	2.2	m			
Dimensione fondazione L[m] (TRASVERSALE)	2.2	m			
Profondità da piano campagna D [m]	2.2	m			(NB: coefficiente correttivo per rapporto D/B non considerato)
Altezza plinto [m] Hp	2.2	m			
Dimensione baggiolo b[m] (LONGITUDINALE)	0.8	m			
Dimensione maggiore baggiolo l [m] (TRASVERSALE)	0.8	m			
Altezza baggiolo [m] Hb	0.5	m			
Altezza terreno sopra plinto [m] Ht	0.25	m			
$q'$ = carico permanente ai lati	44	kPa			
$\gamma$ = peso specifico medio sopra la fondazione	20	kN/m <sup>3</sup>			(valore da stabilirsi in base alla profondità di falda)
$\gamma_f$ = peso specifico medio sotto la fondazione	20	kN/m <sup>3</sup>			(0 = Lancellotta ecc. 1 = originale EC7)
opzione calcolo coeff. $S_u$ e $S_v$	1				si useranno le formule originarie di EC7
opzione calcolo per tenere in conto peso terreno di ricoprimento	0	(1 si - 0 no)			
Peso specifico medio c.a.	25	kN/m <sup>3</sup>			
Peso proprio plinto + baggiolo + terreno sovrastante [kN]	274	kN			
Quota baricentro plinto + baggiolo + terreno sovrastante vs p.f. [kN]	1.30	m			
Coefficiente sismico kh	0.231	g			
Coefficiente sismico kv	-0.116	g			+ downward
Azione inerziale orizzontale plinto	63.34	kN			
Azione inerziale verticale plinto	-31.67	kN			

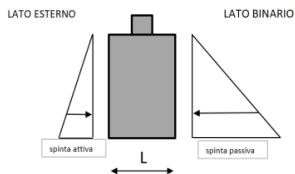


Eccentricità degli scarichi rispetto a baricentro fondazione

eccentricità longitudinale eL	0	m	+ se concorde con i momenti del traliccio
eccentricità trasversale eT	0.1	m	+ se concorde con i momenti del traliccio

Coefficienti di spinta di progetto

coefficiente di spinta attiva statico Ka	0.228	-	
coefficiente di spinta attiva sismico Ka,E	0.483	-	
coefficiente di spinta passiva statico Kp	4.395	-	
coefficiente di spinta passiva sismico Kp,E	3.251	-	
coeff. parziale riduttivo della spinta passiva $\gamma_{re}$	1.40	-	
moltiplicatore della spinta passiva $\alpha$	0.00	long 0.00	trasv
contributo delle spinte frontali long - taglio	0	kN	statico 0 kN sismico
contributo delle spinte frontali long - momento	0	kNm	statico 0 kNm sismico
contributo delle spinte frontali trasv - taglio	0	kN	statico 0 kN sismico
contributo delle spinte frontali trasv - momento	0	kNm	statico 0 kNm sismico



CALCOLI PRELIMINARI: coefficienti di capacità portante indipendenti dai carichi

$N_u = 48.93$	$B_{\phi} = 1$
$N_v = 74.90$	$B_{\gamma} = 1$
$N_c = 61.35$	$B_c = 1$

SINTESI RISULTATI			
Capacità portante	$F_{s, min} = 10.70$	n. Verif. Neg.	0
Scorrimento	$F_{s, min} = 2.57$	n. Verif. Neg.	0
Ribaltamento	$F_{s, min} = 3.16$	n. Verif. Neg.	0

Le verifiche sono soddisfatte.

GENERAL CONTRACTOR  <b>IRICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE
Relazione di calcolo pali di alimentazione	Progetto IN17    Lotto 10    Codifica Documento E I2 CL OC 00 0 0 010    Rev. A    Foglio 239 di 336

## 12.14 Verifiche di dettaglio

Ribaltamento – verifiche statiche

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
A	312.34	312.34	0.00	117.50	2.66	OK
A	312.34	312.34	0.00	117.50	2.66	OK
A	312.34	312.34	0.00	149.39	2.09	OK
A	312.34	312.34	0.00	149.39	2.09	OK
A	315.56	315.56	0.00	117.79	2.68	OK
A	315.56	315.56	0.00	117.79	2.68	OK
A	315.56	315.56	0.00	149.68	2.11	OK
A	315.56	315.56	0.00	149.68	2.11	OK
A	312.34	312.34	0.00	97.08	3.22	OK
A	312.34	312.34	0.00	97.08	3.22	OK
A	312.34	312.34	0.00	128.98	2.42	OK
A	312.34	312.34	0.00	128.98	2.42	OK
A	315.56	315.56	0.00	97.37	3.24	OK
A	315.56	315.56	0.00	97.37	3.24	OK
A	315.56	315.56	0.00	129.27	2.44	OK
A	315.56	315.56	0.00	129.27	2.44	OK
B AA	312.34	312.34	0.00	133.92	2.33	OK
B AA	312.34	312.34	0.00	133.92	2.33	OK
B AA	312.34	312.34	0.00	154.41	2.02	OK
B AA	312.34	312.34	0.00	154.41	2.02	OK
B AA	315.56	315.56	0.00	134.21	2.35	OK
B AA	315.56	315.56	0.00	134.21	2.35	OK
B AA	315.56	315.56	0.00	154.70	2.04	OK
B AA	315.56	315.56	0.00	154.70	2.04	OK
B AA	312.34	312.34	0.00	21.68	14.41	OK
B AA	312.34	312.34	0.00	21.68	14.41	OK
B AA	312.34	312.34	0.00	34.21	9.13	OK
B AA	312.34	312.34	0.00	34.21	9.13	OK
B AA	315.56	315.56	0.00	21.97	14.36	OK
B AA	315.56	315.56	0.00	21.97	14.36	OK
B AA	315.56	315.56	0.00	34.50	9.15	OK
B AA	315.56	315.56	0.00	34.50	9.15	OK
B WX	312.34	312.34	78.04	77.43	4.00	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WX	312.34	312.34	78.04	77.43	4.00	OK
B WX	312.34	312.34	78.04	97.91	3.19	OK
B WX	312.34	312.34	78.04	97.91	3.19	OK
B WX	315.56	315.56	78.04	77.72	4.04	OK
B WX	315.56	315.56	78.04	77.72	4.04	OK
B WX	315.56	315.56	78.04	98.21	3.21	OK
B WX	315.56	315.56	78.04	98.21	3.21	OK
B WX	312.34	312.34	78.04	61.10	4.00	OK
B WX	312.34	312.34	78.04	61.10	4.00	OK
B WX	312.34	312.34	78.04	81.58	3.83	OK
B WX	312.34	312.34	78.04	81.58	3.83	OK
B WX	315.56	315.56	78.04	61.39	4.04	OK
B WX	315.56	315.56	78.04	61.39	4.04	OK
B WX	315.56	315.56	78.04	81.87	3.85	OK
B WX	315.56	315.56	78.04	81.87	3.85	OK
B WXY	312.34	312.34	54.63	140.95	2.22	OK
B WXY	312.34	312.34	54.63	140.95	2.22	OK
B WXY	312.34	312.34	54.63	161.44	1.93	OK
B WXY	312.34	312.34	54.63	161.44	1.93	OK
B WXY	315.56	315.56	54.63	141.25	2.23	OK
B WXY	315.56	315.56	54.63	141.25	2.23	OK
B WXY	315.56	315.56	54.63	161.73	1.95	OK
B WXY	315.56	315.56	54.63	161.73	1.95	OK
B WXY	312.34	312.34	54.63	18.51	5.72	OK
B WXY	312.34	312.34	54.63	18.51	5.72	OK
B WXY	312.34	312.34	54.63	31.04	5.72	OK
B WXY	312.34	312.34	54.63	31.04	5.72	OK
B WXY	315.56	315.56	54.63	18.80	5.78	OK
B WXY	315.56	315.56	54.63	18.80	5.78	OK
B WXY	315.56	315.56	54.63	31.34	5.78	OK
B WXY	315.56	315.56	54.63	31.34	5.78	OK
B WY	312.34	312.34	0.00	168.18	1.86	OK
B WY	312.34	312.34	0.00	168.18	1.86	OK
B WY	312.34	312.34	0.00	188.66	1.66	OK
B WY	312.34	312.34	0.00	188.66	1.66	OK
B WY	315.56	315.56	0.00	168.47	1.87	OK
B WY	315.56	315.56	0.00	168.47	1.87	OK
B WY	315.56	315.56	0.00	188.96	1.67	OK
B WY	315.56	315.56	0.00	188.96	1.67	OK





Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WY	312.34	312.34	0.00	31.60	9.88	OK
B WY	312.34	312.34	0.00	31.60	9.88	OK
B WY	312.34	312.34	0.00	20.98	14.89	OK
B WY	312.34	312.34	0.00	20.98	14.89	OK
B WY	315.56	315.56	0.00	31.90	9.89	OK
B WY	315.56	315.56	0.00	31.90	9.89	OK
B WY	315.56	315.56	0.00	21.27	14.83	OK
B WY	315.56	315.56	0.00	21.27	14.83	OK
D I	312.34	312.34	0.00	180.83	1.73	OK
D I	313.03	313.03	0.00	180.89	1.73	OK
D I	312.80	312.80	0.00	214.84	1.46	OK
D I	313.50	313.50	0.00	214.90	1.46	OK
D I	315.56	315.56	0.00	181.12	1.74	OK
D I	316.25	316.25	0.00	181.18	1.75	OK
D I	316.02	316.02	0.00	215.13	1.47	OK
D I	316.71	316.71	0.00	215.20	1.47	OK
D I	312.34	312.34	0.00	48.21	6.48	OK
D I	313.03	313.03	0.00	48.27	6.48	OK
D I	312.80	312.80	0.00	80.72	3.88	OK
D I	313.50	313.50	0.00	80.79	3.88	OK
D I	315.56	315.56	0.00	48.50	6.51	OK
D I	316.25	316.25	0.00	48.56	6.51	OK
D I	316.02	316.02	0.00	81.01	3.90	OK
D I	316.71	316.71	0.00	81.08	3.91	OK
D W	312.34	312.34	0.00	220.09	1.42	OK
D W	312.69	312.69	0.00	220.12	1.42	OK
D W	312.57	312.57	0.00	254.01	1.23	OK
D W	312.92	312.92	0.00	254.05	1.23	OK
D W	315.56	315.56	0.00	220.38	1.43	OK
D W	315.90	315.90	0.00	220.41	1.43	OK
D W	315.79	315.79	0.00	254.31	1.24	OK
D W	316.14	316.14	0.00	254.34	1.24	OK
D W	312.34	312.34	0.00	34.10	9.16	OK
D W	312.69	312.69	0.00	34.13	9.16	OK
D W	312.57	312.57	0.00	54.93	5.69	OK
D W	312.92	312.92	0.00	54.96	5.69	OK
D W	315.56	315.56	0.00	34.39	9.18	OK
D W	315.90	315.90	0.00	34.42	9.18	OK
D W	315.79	315.79	0.00	55.22	5.72	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
D W	316.14	316.14	0.00	55.26	5.72	OK
DAA	312.69	312.69	0.00	182.90	1.71	OK
DAA	312.69	312.69	0.00	182.90	1.71	OK
DAA	312.92	312.92	0.00	216.83	1.44	OK
DAA	312.92	312.92	0.00	216.83	1.44	OK
DAA	315.90	315.90	0.00	183.19	1.72	OK
DAA	315.90	315.90	0.00	183.19	1.72	OK
DAA	316.14	316.14	0.00	217.12	1.46	OK
DAA	316.14	316.14	0.00	217.12	1.46	OK
DAA	312.69	312.69	0.00	48.05	6.51	OK
DAA	312.69	312.69	0.00	48.05	6.51	OK
DAA	312.92	312.92	0.00	78.62	3.98	OK
DAA	312.92	312.92	0.00	78.62	3.98	OK
DAA	315.90	315.90	0.00	48.34	6.53	OK
DAA	315.90	315.90	0.00	48.34	6.53	OK
DAA	316.14	316.14	0.00	78.92	4.01	OK
DAA	316.14	316.14	0.00	78.92	4.01	OK
A	281.11	281.11	0.00	106.77	2.63	OK
A	281.11	281.11	0.00	106.77	2.63	OK
A	281.11	281.11	0.00	128.03	2.20	OK
A	281.11	281.11	0.00	128.03	2.20	OK
A	283.25	283.25	0.00	106.96	2.65	OK
A	283.25	283.25	0.00	106.96	2.65	OK
A	283.25	283.25	0.00	128.23	2.21	OK
A	283.25	283.25	0.00	128.23	2.21	OK
A	281.11	281.11	0.00	86.35	3.26	OK
A	281.11	281.11	0.00	86.35	3.26	OK
A	281.11	281.11	0.00	107.62	2.61	OK
A	281.11	281.11	0.00	107.62	2.61	OK
A	283.25	283.25	0.00	86.55	3.27	OK
A	283.25	283.25	0.00	86.55	3.27	OK
A	283.25	283.25	0.00	107.81	2.63	OK
A	283.25	283.25	0.00	107.81	2.63	OK
B AA	281.11	281.11	0.00	126.99	2.21	OK
B AA	281.11	281.11	0.00	126.99	2.21	OK
B AA	281.11	281.11	0.00	140.65	2.00	OK
B AA	281.11	281.11	0.00	140.65	2.00	OK
B AA	283.25	283.25	0.00	127.19	2.23	OK
B AA	283.25	283.25	0.00	127.19	2.23	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B AA	283.25	283.25	0.00	140.85	2.01	OK
B AA	283.25	283.25	0.00	140.85	2.01	OK
B AA	281.11	281.11	0.00	17.40	16.15	OK
B AA	281.11	281.11	0.00	17.40	16.15	OK
B AA	281.11	281.11	0.00	25.76	10.91	OK
B AA	281.11	281.11	0.00	25.76	10.91	OK
B AA	283.25	283.25	0.00	17.60	16.10	OK
B AA	283.25	283.25	0.00	17.60	16.10	OK
B AA	283.25	283.25	0.00	25.95	10.91	OK
B AA	283.25	283.25	0.00	25.95	10.91	OK
B WX	281.11	281.11	78.04	70.50	3.60	OK
B WX	281.11	281.11	78.04	70.50	3.60	OK
B WX	281.11	281.11	78.04	84.16	3.34	OK
B WX	281.11	281.11	78.04	84.16	3.34	OK
B WX	283.25	283.25	78.04	70.70	3.63	OK
B WX	283.25	283.25	78.04	70.70	3.63	OK
B WX	283.25	283.25	78.04	84.35	3.36	OK
B WX	283.25	283.25	78.04	84.35	3.36	OK
B WX	281.11	281.11	78.04	54.17	3.60	OK
B WX	281.11	281.11	78.04	54.17	3.60	OK
B WX	281.11	281.11	78.04	67.83	3.60	OK
B WX	281.11	281.11	78.04	67.83	3.60	OK
B WX	283.25	283.25	78.04	54.36	3.63	OK
B WX	283.25	283.25	78.04	54.36	3.63	OK
B WX	283.25	283.25	78.04	68.02	3.63	OK
B WX	283.25	283.25	78.04	68.02	3.63	OK
B WXY	281.11	281.11	54.63	134.03	2.10	OK
B WXY	281.11	281.11	54.63	134.03	2.10	OK
B WXY	281.11	281.11	54.63	147.68	1.90	OK
B WXY	281.11	281.11	54.63	147.68	1.90	OK
B WXY	283.25	283.25	54.63	134.22	2.11	OK
B WXY	283.25	283.25	54.63	134.22	2.11	OK
B WXY	283.25	283.25	54.63	147.88	1.92	OK
B WXY	283.25	283.25	54.63	147.88	1.92	OK
B WXY	281.11	281.11	54.63	14.24	5.15	OK
B WXY	281.11	281.11	54.63	14.24	5.15	OK
B WXY	281.11	281.11	54.63	22.59	5.15	OK
B WXY	281.11	281.11	54.63	22.59	5.15	OK
B WXY	283.25	283.25	54.63	14.43	5.19	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WXY	283.25	283.25	54.63	14.43	5.19	OK
B WXY	283.25	283.25	54.63	22.79	5.19	OK
B WXY	283.25	283.25	54.63	22.79	5.19	OK
B WY	281.11	281.11	0.00	161.25	1.74	OK
B WY	281.11	281.11	0.00	161.25	1.74	OK
B WY	281.11	281.11	0.00	174.91	1.61	OK
B WY	281.11	281.11	0.00	174.91	1.61	OK
B WY	283.25	283.25	0.00	161.45	1.75	OK
B WY	283.25	283.25	0.00	161.45	1.75	OK
B WY	283.25	283.25	0.00	175.10	1.62	OK
B WY	283.25	283.25	0.00	175.10	1.62	OK
B WY	281.11	281.11	0.00	38.34	7.33	OK
B WY	281.11	281.11	0.00	38.34	7.33	OK
B WY	281.11	281.11	0.00	24.68	11.39	OK
B WY	281.11	281.11	0.00	24.68	11.39	OK
B WY	283.25	283.25	0.00	38.53	7.35	OK
B WY	283.25	283.25	0.00	38.53	7.35	OK
B WY	283.25	283.25	0.00	24.87	11.39	OK
B WY	283.25	283.25	0.00	24.87	11.39	OK
D I	281.11	281.11	0.00	169.45	1.66	OK
D I	281.80	281.80	0.00	169.51	1.66	OK
D I	281.57	281.57	0.00	192.18	1.47	OK
D I	282.26	282.26	0.00	192.25	1.47	OK
D I	283.25	283.25	0.00	169.65	1.67	OK
D I	283.94	283.94	0.00	169.71	1.67	OK
D I	283.71	283.71	0.00	192.38	1.47	OK
D I	284.41	284.41	0.00	192.44	1.48	OK
D I	281.11	281.11	0.00	41.20	6.82	OK
D I	281.80	281.80	0.00	41.26	6.83	OK
D I	281.57	281.57	0.00	58.07	4.85	OK
D I	282.26	282.26	0.00	58.13	4.86	OK
D I	283.25	283.25	0.00	41.39	6.84	OK
D I	283.94	283.94	0.00	41.45	6.85	OK
D I	283.71	283.71	0.00	58.26	4.87	OK
D I	284.41	284.41	0.00	58.32	4.88	OK
D W	281.11	281.11	0.00	208.71	1.35	OK
D W	281.45	281.45	0.00	208.74	1.35	OK
D W	281.34	281.34	0.00	231.36	1.22	OK
D W	281.68	281.68	0.00	231.39	1.22	OK

GENERAL CONTRACTOR  <b>IRICAV2</b>		ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE				
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Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
D W	283.25	283.25	0.00	208.91	1.36	OK
D W	283.60	283.60	0.00	208.94	1.36	OK
D W	283.48	283.48	0.00	231.55	1.22	OK
D W	283.83	283.83	0.00	231.59	1.23	OK
D W	281.11	281.11	0.00	27.08	10.38	OK
D W	281.45	281.45	0.00	27.12	10.38	OK
D W	281.34	281.34	0.00	41.00	6.86	OK
D W	281.68	281.68	0.00	41.03	6.86	OK
D W	283.25	283.25	0.00	27.28	10.38	OK
D W	283.60	283.60	0.00	27.31	10.38	OK
D W	283.48	283.48	0.00	41.20	6.88	OK
D W	283.83	283.83	0.00	41.23	6.88	OK
DAA	281.45	281.45	0.00	171.52	1.64	OK
DAA	281.45	281.45	0.00	171.52	1.64	OK
DAA	281.68	281.68	0.00	194.17	1.45	OK
DAA	281.68	281.68	0.00	194.17	1.45	OK
DAA	283.60	283.60	0.00	171.72	1.65	OK
DAA	283.60	283.60	0.00	171.72	1.65	OK
DAA	283.83	283.83	0.00	194.36	1.46	OK
DAA	283.83	283.83	0.00	194.36	1.46	OK
DAA	281.45	281.45	0.00	41.04	6.86	OK
DAA	281.45	281.45	0.00	41.04	6.86	OK
DAA	281.68	281.68	0.00	55.97	5.03	OK
DAA	281.68	281.68	0.00	55.97	5.03	OK
DAA	283.60	283.60	0.00	41.23	6.88	OK
DAA	283.60	283.60	0.00	41.23	6.88	OK
DAA	283.83	283.83	0.00	56.16	5.05	OK

Scorrimento – verifiche statiche

Azioni a base plinto	VERIFICA A SCORRIMENTO			
	COMB	$R_d = (N \cdot m_d + (B \cdot L) \cdot C'_{dbase}) / \gamma_R$	$E_d$	Rd/Ed
		kN	kN	
A	201.7	9.5	21.32	OK
A	201.7	9.5	21.32	OK



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
A	201.7	11.8	17.11	OK	
A	201.7	11.8	17.11	OK	
A	203.8	9.5	21.54	OK	
A	203.8	9.5	21.54	OK	
A	203.8	11.8	17.29	OK	
A	203.8	11.8	17.29	OK	
A	201.7	6.0	33.44	OK	
A	201.7	6.0	33.44	OK	
A	201.7	8.4	24.14	OK	
A	201.7	8.4	24.14	OK	
A	203.8	6.0	33.79	OK	
A	203.8	6.0	33.79	OK	
A	203.8	8.4	24.39	OK	
A	203.8	8.4	24.39	OK	
B AA	201.7	13.0	15.54	OK	
B AA	201.7	13.0	15.54	OK	
B AA	201.7	14.5	13.95	OK	
B AA	201.7	14.5	13.95	OK	
B AA	203.8	13.0	15.70	OK	
B AA	203.8	13.0	15.70	OK	
B AA	203.8	14.5	14.10	OK	
B AA	203.8	14.5	14.10	OK	
B AA	201.7	3.2	63.79	OK	
B AA	201.7	3.2	63.79	OK	
B AA	201.7	1.7	119.41	OK	
B AA	201.7	1.7	119.41	OK	
B AA	203.8	3.2	64.44	OK	
B AA	203.8	3.2	64.44	OK	
B AA	203.8	1.7	120.64	OK	
B AA	203.8	1.7	120.64	OK	
B WX	201.7	10.4	19.39	OK	
B WX	201.7	10.4	19.39	OK	
B WX	201.7	11.4	17.77	OK	
B WX	201.7	11.4	17.77	OK	
B WX	203.8	10.4	19.59	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
B WX	203.8	10.4	19.59	OK	
B WX	203.8	11.4	17.95	OK	
B WX	203.8	11.4	17.95	OK	
B WX	201.7	9.0	22.38	OK	
B WX	201.7	9.0	22.38	OK	
B WX	201.7	9.7	20.82	OK	
B WX	201.7	9.7	20.82	OK	
B WX	203.8	9.0	22.61	OK	
B WX	203.8	9.0	22.61	OK	
B WX	203.8	9.7	21.04	OK	
B WX	203.8	9.7	21.04	OK	
B WXY	201.7	14.9	13.56	OK	
B WXY	201.7	14.9	13.56	OK	
B WXY	201.7	16.2	12.42	OK	
B WXY	201.7	16.2	12.42	OK	
B WXY	203.8	14.9	13.70	OK	
B WXY	203.8	14.9	13.70	OK	
B WXY	203.8	16.2	12.54	OK	
B WXY	203.8	16.2	12.54	OK	
B WXY	201.7	7.0	28.90	OK	
B WXY	201.7	7.0	28.90	OK	
B WXY	201.7	6.3	32.11	OK	
B WXY	201.7	6.3	32.11	OK	
B WXY	203.8	7.0	29.19	OK	
B WXY	203.8	7.0	29.19	OK	
B WXY	203.8	6.3	32.44	OK	
B WXY	203.8	6.3	32.44	OK	
B WY	201.7	16.9	11.95	OK	
B WY	201.7	16.9	11.95	OK	
B WY	201.7	18.3	10.99	OK	
B WY	201.7	18.3	10.99	OK	
B WY	203.8	16.9	12.07	OK	
B WY	203.8	16.9	12.07	OK	
B WY	203.8	18.3	11.10	OK	
B WY	203.8	18.3	11.10	OK	
B WY	201.7	7.1	28.58	OK	
B WY	201.7	7.1	28.58	OK	
B WY	201.7	5.6	36.12	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
B WY	201.7	5.6	36.12	OK	
B WY	203.8	7.1	28.88	OK	
B WY	203.8	7.1	28.88	OK	
B WY	203.8	5.6	36.49	OK	
B WY	203.8	5.6	36.49	OK	
D I	201.7	16.4	12.27	OK	
D I	202.1	16.4	12.29	OK	
D I	202.0	18.9	10.71	OK	
D I	202.4	18.9	10.73	OK	
D I	203.8	16.4	12.39	OK	
D I	204.2	16.4	12.42	OK	
D I	204.1	18.9	10.82	OK	
D I	204.5	18.9	10.84	OK	
D I	201.7	0.3	726.50	OK	
D I	202.1	0.3	728.11	OK	
D I	202.0	2.1	94.09	OK	
D I	202.4	2.1	94.29	OK	
D I	203.8	0.3	733.98	OK	
D I	204.2	0.3	735.59	OK	
D I	204.1	2.1	95.05	OK	
D I	204.5	2.1	95.26	OK	
D W	201.7	21.1	9.56	OK	
D W	201.9	21.1	9.57	OK	
D W	201.8	23.5	8.58	OK	
D W	202.0	23.5	8.59	OK	
D W	203.8	21.1	9.66	OK	
D W	204.0	21.1	9.67	OK	
D W	203.9	23.5	8.67	OK	
D W	204.1	23.5	8.68	OK	
D W	201.7	4.9	40.87	OK	
D W	201.9	4.9	40.91	OK	
D W	201.8	2.5	80.38	OK	
D W	202.0	2.5	80.47	OK	
D W	203.8	4.9	41.29	OK	
D W	204.0	4.9	41.33	OK	
D W	203.9	2.5	81.21	OK	
D W	204.1	2.5	81.30	OK	
DAA	201.9	16.8	12.03	OK	





Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
DAA	201.9	16.8	12.03	OK	
DAA	202.0	19.2	10.52	OK	
DAA	202.0	19.2	10.52	OK	
DAA	204.0	16.8	12.15	OK	
DAA	204.0	16.8	12.15	OK	
DAA	204.1	19.2	10.63	OK	
DAA	204.1	19.2	10.63	OK	
DAA	201.9	0.6	325.28	OK	
DAA	201.9	0.6	325.28	OK	
DAA	202.0	1.8	112.03	OK	
DAA	202.0	1.8	112.03	OK	
DAA	204.0	0.6	328.62	OK	
DAA	204.0	0.6	328.62	OK	
DAA	204.1	1.8	113.18	OK	
DAA	204.1	1.8	113.18	OK	
A	181.5	8.7	20.89	OK	
A	181.5	8.7	20.89	OK	
A	181.5	10.2	17.73	OK	
A	181.5	10.2	17.73	OK	
A	182.9	8.7	21.05	OK	
A	182.9	8.7	21.05	OK	
A	182.9	10.2	17.87	OK	
A	182.9	10.2	17.87	OK	
A	181.5	5.3	34.53	OK	
A	181.5	5.3	34.53	OK	
A	181.5	6.8	26.67	OK	
A	181.5	6.8	26.67	OK	
A	182.9	5.3	34.80	OK	
A	182.9	5.3	34.80	OK	
A	182.9	6.8	26.88	OK	
A	182.9	6.8	26.88	OK	
B AA	181.5	12.5	14.53	OK	
B AA	181.5	12.5	14.53	OK	
B AA	181.5	13.5	13.47	OK	
B AA	181.5	13.5	13.47	OK	
B AA	182.9	12.5	14.64	OK	
B AA	182.9	12.5	14.64	OK	
B AA	182.9	13.5	13.58	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
B AA	182.9	13.5	13.58	OK	
B AA	181.5	3.7	49.69	OK	
B AA	181.5	3.7	49.69	OK	
B AA	181.5	2.7	67.96	OK	
B AA	181.5	2.7	67.96	OK	
B AA	182.9	3.7	50.07	OK	
B AA	182.9	3.7	50.07	OK	
B AA	182.9	2.7	68.48	OK	
B AA	182.9	2.7	68.48	OK	
B WX	181.5	10.1	17.95	OK	
B WX	181.5	10.1	17.95	OK	
B WX	181.5	10.7	16.96	OK	
B WX	181.5	10.7	16.96	OK	
B WX	182.9	10.1	18.09	OK	
B WX	182.9	10.1	18.09	OK	
B WX	182.9	10.7	17.09	OK	
B WX	182.9	10.7	17.09	OK	
B WX	181.5	8.8	20.55	OK	
B WX	181.5	8.8	20.55	OK	
B WX	181.5	9.2	19.69	OK	
B WX	181.5	9.2	19.69	OK	
B WX	182.9	8.8	20.71	OK	
B WX	182.9	8.8	20.71	OK	
B WX	182.9	9.2	19.84	OK	
B WX	182.9	9.2	19.84	OK	
B WXY	181.5	14.4	12.58	OK	
B WXY	181.5	14.4	12.58	OK	
B WXY	181.5	15.3	11.84	OK	
B WXY	181.5	15.3	11.84	OK	
B WXY	182.9	14.4	12.68	OK	
B WXY	182.9	14.4	12.68	OK	
B WXY	182.9	15.3	11.93	OK	
B WXY	182.9	15.3	11.93	OK	
B WXY	181.5	7.3	24.99	OK	
B WXY	181.5	7.3	24.99	OK	
B WXY	181.5	6.7	27.01	OK	
B WXY	181.5	6.7	27.01	OK	
B WXY	182.9	7.3	25.18	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
B WXY	182.9	7.3	25.18	OK	
B WXY	182.9	6.7	27.22	OK	
B WXY	182.9	6.7	27.22	OK	
B WY	181.5	16.4	11.08	OK	
B WY	181.5	16.4	11.08	OK	
B WY	181.5	17.4	10.45	OK	
B WY	181.5	17.4	10.45	OK	
B WY	182.9	16.4	11.16	OK	
B WY	182.9	16.4	11.16	OK	
B WY	182.9	17.4	10.53	OK	
B WY	182.9	17.4	10.53	OK	
B WY	181.5	7.5	24.05	OK	
B WY	181.5	7.5	24.05	OK	
B WY	181.5	6.6	27.65	OK	
B WY	181.5	6.6	27.65	OK	
B WY	182.9	7.5	24.23	OK	
B WY	182.9	7.5	24.23	OK	
B WY	182.9	6.6	27.86	OK	
B WY	182.9	6.6	27.86	OK	
D I	181.5	15.6	11.61	OK	
D I	182.0	15.6	11.64	OK	
D I	181.8	17.2	10.54	OK	
D I	182.3	17.2	10.57	OK	
D I	182.9	15.6	11.70	OK	
D I	183.3	15.6	11.73	OK	
D I	183.2	17.2	10.62	OK	
D I	183.6	17.2	10.65	OK	
D I	181.5	1.1	167.18	OK	
D I	182.0	1.1	167.59	OK	
D I	181.8	0.5	342.71	OK	
D I	182.3	0.5	343.55	OK	
D I	182.9	1.1	168.46	OK	
D I	183.3	1.1	168.87	OK	
D I	183.2	0.5	345.32	OK	
D I	183.6	0.5	346.16	OK	
D W	181.5	20.3	8.95	OK	
D W	181.7	20.3	8.96	OK	
D W	181.7	21.9	8.29	OK	

GENERAL CONTRACTOR  <b>IRICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE				
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Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
D W	181.9	21.9	8.30	OK	
D W	182.9	20.3	9.01	OK	
D W	183.1	20.3	9.03	OK	
D W	183.0	21.9	8.36	OK	
D W	183.3	21.9	8.37	OK	
D W	181.5	5.7	31.60	OK	
D W	181.7	5.7	31.64	OK	
D W	181.7	4.1	44.02	OK	
D W	181.9	4.1	44.07	OK	
D W	182.9	5.7	31.85	OK	
D W	183.1	5.7	31.88	OK	
D W	183.0	4.1	44.35	OK	
D W	183.3	4.1	44.41	OK	
DAA	181.7	16.0	11.38	OK	
DAA	181.7	16.0	11.38	OK	
DAA	181.9	17.6	10.34	OK	
DAA	181.9	17.6	10.34	OK	
DAA	183.1	16.0	11.46	OK	
DAA	183.1	16.0	11.46	OK	
DAA	183.3	17.6	10.42	OK	
DAA	183.3	17.6	10.42	OK	
DAA	181.7	1.4	127.19	OK	
DAA	181.7	1.4	127.19	OK	
DAA	181.9	0.2	970.55	OK	
DAA	181.9	0.2	970.55	OK	
DAA	183.1	1.4	128.16	OK	
DAA	183.1	1.4	128.16	OK	
DAA	183.3	0.2	977.94	OK	

Capacità portante – verifiche statiche

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	COMB	$R_d$	$E_d$	$R_d/E_d$	
		$q_{u,d}$ kPa	$q_{E,d} = N / (B' \cdot L')$		
A	$(2821. + 1226. +) / 2.3 =$	1759.5	94.04	18.71	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
COMB	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')	R <sub>d</sub> /E <sub>d</sub>	
			kPa		
A	(2821. + 1226. +) / 2.3 =	1759.5	94.04	18.71	OK
A	(2652. + 1242. +) / 2.3 =	1692.8	112.45	15.05	OK
A	(2652. + 1242. +) / 2.3 =	1692.8	112.45	15.05	OK
A	(2827. + 1226. +) / 2.3 =	1761.8	94.57	18.63	OK
A	(2827. + 1226. +) / 2.3 =	1761.8	94.57	18.63	OK
A	(2659. + 1242. +) / 2.3 =	1695.8	112.76	15.04	OK
A	(2659. + 1242. +) / 2.3 =	1695.8	112.76	15.04	OK
A	(2964. + 1236. +) / 2.3 =	1826.1	85.13	21.45	OK
A	(2964. + 1236. +) / 2.3 =	1826.1	85.13	21.45	OK
A	(2792. + 1255. +) / 2.3 =	1759.6	99.93	17.61	OK
A	(2792. + 1255. +) / 2.3 =	1759.6	99.93	17.61	OK
A	(2968. + 1236. +) / 2.3 =	1827.6	85.72	21.32	OK
A	(2968. + 1236. +) / 2.3 =	1827.6	85.72	21.32	OK
A	(2798. + 1255. +) / 2.3 =	1761.8	100.40	17.55	OK
A	(2798. + 1255. +) / 2.3 =	1761.8	100.40	17.55	OK
B AA	(2696. + 1207. +) / 2.3 =	1696.8	102.70	16.52	OK
B AA	(2696. + 1207. +) / 2.3 =	1696.8	102.70	16.52	OK
B AA	(2588. + 1216. +) / 2.3 =	1654.1	116.02	14.26	OK
B AA	(2588. + 1216. +) / 2.3 =	1654.1	116.02	14.26	OK
B AA	(2702. + 1207. +) / 2.3 =	1699.7	103.14	16.48	OK
B AA	(2702. + 1207. +) / 2.3 =	1699.7	103.14	16.48	OK
B AA	(2596. + 1216. +) / 2.3 =	1657.4	116.27	14.25	OK
B AA	(2596. + 1216. +) / 2.3 =	1657.4	116.27	14.25	OK
B AA	(3330. + 1155. +) / 2.3 =	1949.7	63.04	30.93	OK
B AA	(3330. + 1155. +) / 2.3 =	1949.7	63.04	30.93	OK
B AA	(3303. + 1190. +) / 2.3 =	1953.3	65.88	29.65	OK
B AA	(3303. + 1190. +) / 2.3 =	1953.3	65.88	29.65	OK
B AA	(3330. + 1155. +) / 2.3 =	1950.0	63.71	30.61	OK
B AA	(3330. + 1155. +) / 2.3 =	1950.0	63.71	30.61	OK
B AA	(3304. + 1190. +) / 2.3 =	1953.6	66.55	29.36	OK
B AA	(3304. + 1190. +) / 2.3 =	1953.6	66.55	29.36	OK
B WX	(3286. + 789. +) / 2.3 =	1771.7	103.98	17.04	OK
B WX	(3286. + 789. +) / 2.3 =	1771.7	103.98	17.04	OK
B WX	(3167. + 810. +) / 2.3 =	1728.8	113.92	15.18	OK
B WX	(3167. + 810. +) / 2.3 =	1728.8	113.92	15.18	OK
B WX	(3289. + 792. +) / 2.3 =	1774.6	104.48	16.99	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
COMB	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
			kPa		
B WX	(3289. + 792. +) /2.3 =	1774.6	104.48	16.99	OK
B WX	(3168. + 813. +) /2.3 =	1731.3	114.32	15.14	OK
B WX	(3168. + 813. +) /2.3 =	1731.3	114.32	15.14	OK
B WX	(3228. + 821. +) /2.3 =	1760.4	97.23	18.11	OK
B WX	(3228. + 821. +) /2.3 =	1760.4	97.23	18.11	OK
B WX	(3283. + 799. +) /2.3 =	1774.7	105.86	16.77	OK
B WX	(3283. + 799. +) /2.3 =	1774.7	105.86	16.77	OK
B WX	(3232. + 824. +) /2.3 =	1763.4	97.76	18.04	OK
B WX	(3232. + 824. +) /2.3 =	1763.4	97.76	18.04	OK
B WX	(3284. + 802. +) /2.3 =	1776.6	106.33	16.71	OK
B WX	(3284. + 802. +) /2.3 =	1776.6	106.33	16.71	OK
B WXY	(2789. + 948. +) /2.3 =	1624.6	129.58	12.54	OK
B WXY	(2789. + 948. +) /2.3 =	1624.6	129.58	12.54	OK
B WXY	(2666. + 962. +) /2.3 =	1577.4	147.17	10.72	OK
B WXY	(2666. + 962. +) /2.3 =	1577.4	147.17	10.72	OK
B WXY	(2795. + 950. +) /2.3 =	1628.3	129.76	12.55	OK
B WXY	(2795. + 950. +) /2.3 =	1628.3	129.76	12.55	OK
B WXY	(2674. + 964. +) /2.3 =	1581.7	147.04	10.76	OK
B WXY	(2674. + 964. +) /2.3 =	1581.7	147.04	10.76	OK
B WXY	(3193. + 941. +) /2.3 =	1797.5	75.58	23.78	OK
B WXY	(3193. + 941. +) /2.3 =	1797.5	75.58	23.78	OK
B WXY	(3255. + 932. +) /2.3 =	1820.5	78.95	23.06	OK
B WXY	(3255. + 932. +) /2.3 =	1820.5	78.95	23.06	OK
B WXY	(3197. + 943. +) /2.3 =	1800.1	76.22	23.62	OK
B WXY	(3197. + 943. +) /2.3 =	1800.1	76.22	23.62	OK
B WXY	(3259. + 934. +) /2.3 =	1822.9	79.58	22.91	OK
B WXY	(3259. + 934. +) /2.3 =	1822.9	79.58	22.91	OK
B WY	(2494. + 1204. +) /2.3 =	1607.9	127.11	12.65	OK
B WY	(2494. + 1204. +) /2.3 =	1607.9	127.11	12.65	OK
B WY	(2388. + 1211. +) /2.3 =	1564.7	148.16	10.56	OK
B WY	(2388. + 1211. +) /2.3 =	1564.7	148.16	10.56	OK
B WY	(2502. + 1205. +) /2.3 =	1611.7	127.16	12.67	OK
B WY	(2502. + 1205. +) /2.3 =	1611.7	127.16	12.67	OK
B WY	(2397. + 1211. +) /2.3 =	1569.0	147.73	10.62	OK
B WY	(2397. + 1211. +) /2.3 =	1569.0	147.73	10.62	OK
B WY	(3218. + 1129. +) /2.3 =	1890.3	65.27	28.96	OK
B WY	(3218. + 1129. +) /2.3 =	1890.3	65.27	28.96	OK
B WY	(3289. + 1129. +) /2.3 =	1920.8	62.89	30.54	OK
B WY	(3289. + 1129. +) /2.3 =	1920.8	62.89	30.54	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	$R_d$		$E_d$	$R_d/E_d$	
COMB	$q_{u,d}$ kPa		$q_{E,d} = N/(B \cdot L')$		
			kPa		
B WY	(3220. + 1130. +) /2.3 =	1891.3	65.94	28.68	OK
B WY	(3220. + 1130. +) /2.3 =	1891.3	65.94	28.68	OK
B WY	(3290. + 1129. +) /2.3 =	1921.4	63.56	30.23	OK
B WY	(3290. + 1129. +) /2.3 =	1921.4	63.56	30.23	OK
D I	(2449. + 1225. +) /2.3 =	1597.6	139.33	11.47	OK
D I	(2451. + 1225. +) /2.3 =	1598.5	139.28	11.48	OK
D I	(2276. + 1235. +) /2.3 =	1526.5	187.60	8.14	OK
D I	(2278. + 1235. +) /2.3 =	1527.5	187.23	8.16	OK
D I	(2458. + 1225. +) /2.3 =	1601.6	139.12	11.51	OK
D I	(2460. + 1225. +) /2.3 =	1602.4	139.08	11.52	OK
D I	(2286. + 1235. +) /2.3 =	1531.2	185.93	8.24	OK
D I	(2289. + 1236. +) /2.3 =	1532.2	185.59	8.26	OK
D I	(3269. + 1227. +) /2.3 =	1954.7	69.37	28.18	OK
D I	(3269. + 1227. +) /2.3 =	1954.7	69.52	28.12	OK
D I	(3099. + 1256. +) /2.3 =	1893.8	79.19	23.91	OK
D I	(3100. + 1256. +) /2.3 =	1893.9	79.33	23.88	OK
D I	(3270. + 1226. +) /2.3 =	1955.0	70.04	27.91	OK
D I	(3270. + 1226. +) /2.3 =	1955.0	70.18	27.86	OK
D I	(3102. + 1256. +) /2.3 =	1894.6	79.82	23.74	OK
D I	(3103. + 1256. +) /2.3 =	1894.8	79.96	23.70	OK
D W	(2219. + 1212. +) /2.3 =	1492.0	198.63	7.51	OK
D W	(2220. + 1213. +) /2.3 =	1492.6	198.39	7.52	OK
D W	(2048. + 1217. +) /2.3 =	1419.4	313.39	4.53	OK
D W	(2049. + 1217. +) /2.3 =	1420.0	312.40	4.55	OK
D W	(2230. + 1213. +) /2.3 =	1497.1	196.51	7.62	OK
D W	(2231. + 1213. +) /2.3 =	1497.6	196.30	7.63	OK
D W	(2061. + 1217. +) /2.3 =	1425.3	304.66	4.68	OK
D W	(2062. + 1217. +) /2.3 =	1425.9	303.77	4.69	OK
D W	(3246. + 1155. +) /2.3 =	1913.4	65.86	29.05	OK
D W	(3246. + 1155. +) /2.3 =	1913.5	65.93	29.02	OK
D W	(3201. + 1213. +) /2.3 =	1919.1	71.23	26.94	OK
D W	(3202. + 1213. +) /2.3 =	1919.2	71.30	26.92	OK
D W	(3247. + 1155. +) /2.3 =	1914.1	66.52	28.77	OK
D W	(3247. + 1156. +) /2.3 =	1914.1	66.59	28.74	OK
D W	(3203. + 1212. +) /2.3 =	1919.7	71.89	26.71	OK
D W	(3203. + 1212. +) /2.3 =	1919.8	71.96	26.68	OK
DAA	(2437. + 1224. +) /2.3 =	1591.3	141.50	11.25	OK
DAA	(2437. + 1224. +) /2.3 =	1591.3	141.50	11.25	OK
DAA	(2263. + 1233. +) /2.3 =	1520.0	191.40	7.94	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	COMB	q <sub>u,d</sub> kPa	q <sub>E,d</sub> = N / (B'·L')		
		kPa			
DAA	(2263. + 1233. +) / 2.3 =	1520.0	191.40	7.94	OK
DAA	(2446. + 1224. +) / 2.3 =	1595.4	141.24	11.30	OK
DAA	(2446. + 1224. +) / 2.3 =	1595.4	141.24	11.30	OK
DAA	(2274. + 1233. +) / 2.3 =	1524.8	189.58	8.04	OK
DAA	(2274. + 1233. +) / 2.3 =	1524.8	189.58	8.04	OK
DAA	(3264. + 1223. +) / 2.3 =	1950.7	69.40	28.11	OK
DAA	(3264. + 1223. +) / 2.3 =	1950.7	69.40	28.11	OK
DAA	(3114. + 1257. +) / 2.3 =	1900.5	78.50	24.21	OK
DAA	(3114. + 1257. +) / 2.3 =	1900.5	78.50	24.21	OK
DAA	(3265. + 1222. +) / 2.3 =	1951.0	70.06	27.85	OK
DAA	(3265. + 1222. +) / 2.3 =	1951.0	70.06	27.85	OK
DAA	(3117. + 1256. +) / 2.3 =	1901.3	79.13	24.03	OK
DAA	(3117. + 1256. +) / 2.3 =	1901.3	79.13	24.03	OK
A	(2813. + 1225. +) / 2.3 =	1755.9	85.14	20.62	OK
A	(2813. + 1225. +) / 2.3 =	1755.9	85.14	20.62	OK
A	(2688. + 1237. +) / 2.3 =	1706.5	96.96	17.60	OK
A	(2688. + 1237. +) / 2.3 =	1706.5	96.96	17.60	OK
A	(2817. + 1225. +) / 2.3 =	1757.6	85.48	20.56	OK
A	(2817. + 1225. +) / 2.3 =	1757.6	85.48	20.56	OK
A	(2693. + 1237. +) / 2.3 =	1708.5	97.21	17.58	OK
A	(2693. + 1237. +) / 2.3 =	1708.5	97.21	17.58	OK
A	(2972. + 1237. +) / 2.3 =	1829.8	76.21	24.01	OK
A	(2972. + 1237. +) / 2.3 =	1829.8	76.21	24.01	OK
A	(2844. + 1251. +) / 2.3 =	1780.5	85.55	20.81	OK
A	(2844. + 1251. +) / 2.3 =	1780.5	85.55	20.81	OK
A	(2974. + 1237. +) / 2.3 =	1830.9	76.61	23.90	OK
A	(2974. + 1237. +) / 2.3 =	1830.9	76.61	23.90	OK
A	(2848. + 1251. +) / 2.3 =	1782.1	85.90	20.75	OK
A	(2848. + 1251. +) / 2.3 =	1782.1	85.90	20.75	OK
B AA	(2652. + 1206. +) / 2.3 =	1677.2	96.31	17.42	OK
B AA	(2652. + 1206. +) / 2.3 =	1677.2	96.31	17.42	OK
B AA	(2572. + 1212. +) / 2.3 =	1645.5	105.67	15.57	OK
B AA	(2572. + 1212. +) / 2.3 =	1645.5	105.67	15.57	OK
B AA	(2657. + 1206. +) / 2.3 =	1679.5	96.56	17.39	OK
B AA	(2657. + 1206. +) / 2.3 =	1679.5	96.56	17.39	OK
B AA	(2578. + 1213. +) / 2.3 =	1648.1	105.82	15.57	OK
B AA	(2578. + 1213. +) / 2.3 =	1648.1	105.82	15.57	OK
B AA	(3323. + 1142. +) / 2.3 =	1941.4	56.28	34.49	OK
B AA	(3323. + 1142. +) / 2.3 =	1941.4	56.28	34.49	OK





Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>
	COMB	q <sub>u,d</sub> kPa	q <sub>E,d</sub> = N / (B'·L')	kPa	
B AA	(3304. + 1167. +) /2.3 =	1944.0	58.13	33.44	OK
B AA	(3304. + 1167. +) /2.3 =	1944.0	58.13	33.44	OK
B AA	(3324. + 1142. +) /2.3 =	1941.7	56.73	34.23	OK
B AA	(3324. + 1142. +) /2.3 =	1941.7	56.73	34.23	OK
B AA	(3304. + 1168. +) /2.3 =	1944.3	58.57	33.20	OK
B AA	(3304. + 1168. +) /2.3 =	1944.3	58.57	33.20	OK
B WX	(3229. + 765. +) /2.3 =	1736.4	97.56	17.80	OK
B WX	(3229. + 765. +) /2.3 =	1736.4	97.56	17.80	OK
B WX	(3225. + 758. +) /2.3 =	1732.0	104.32	16.60	OK
B WX	(3225. + 758. +) /2.3 =	1732.0	104.32	16.60	OK
B WX	(3232. + 767. +) /2.3 =	1738.8	97.86	17.77	OK
B WX	(3232. + 767. +) /2.3 =	1738.8	97.86	17.77	OK
B WX	(3226. + 761. +) /2.3 =	1733.6	104.58	16.58	OK
B WX	(3226. + 761. +) /2.3 =	1733.6	104.58	16.58	OK
B WX	(3165. + 797. +) /2.3 =	1722.7	90.54	19.03	OK
B WX	(3165. + 797. +) /2.3 =	1722.7	90.54	19.03	OK
B WX	(3231. + 776. +) /2.3 =	1742.0	96.34	18.08	OK
B WX	(3231. + 776. +) /2.3 =	1742.0	96.34	18.08	OK
B WX	(3169. + 799. +) /2.3 =	1725.2	90.88	18.98	OK
B WX	(3169. + 799. +) /2.3 =	1725.2	90.88	18.98	OK
B WX	(3234. + 778. +) /2.3 =	1744.4	96.64	18.05	OK
B WX	(3234. + 778. +) /2.3 =	1744.4	96.64	18.05	OK
B WXY	(2751. + 921. +) /2.3 =	1596.3	125.26	12.74	OK
B WXY	(2751. + 921. +) /2.3 =	1596.3	125.26	12.74	OK
B WXY	(2659. + 931. +) /2.3 =	1560.8	138.08	11.30	OK
B WXY	(2659. + 931. +) /2.3 =	1560.8	138.08	11.30	OK
B WXY	(2756. + 922. +) /2.3 =	1599.3	125.28	12.77	OK
B WXY	(2756. + 922. +) /2.3 =	1599.3	125.28	12.77	OK
B WXY	(2665. + 933. +) /2.3 =	1564.1	137.92	11.34	OK
B WXY	(2665. + 933. +) /2.3 =	1564.1	137.92	11.34	OK
B WXY	(3138. + 920. +) /2.3 =	1764.6	69.03	25.56	OK
B WXY	(3138. + 920. +) /2.3 =	1764.6	69.03	25.56	OK
B WXY	(3183. + 915. +) /2.3 =	1781.9	71.26	25.00	OK
B WXY	(3183. + 915. +) /2.3 =	1781.9	71.26	25.00	OK
B WXY	(3142. + 922. +) /2.3 =	1766.8	69.45	25.44	OK
B WXY	(3142. + 922. +) /2.3 =	1766.8	69.45	25.44	OK
B WXY	(3186. + 917. +) /2.3 =	1783.9	71.68	24.89	OK
B WXY	(3186. + 917. +) /2.3 =	1783.9	71.68	24.89	OK
B WY	(2428. + 1202. +) /2.3 =	1578.3	123.84	12.74	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	COMB	$R_d$	$E_d$	$R_d/E_d$	
		$q_{u,d}$ kPa	$q_{E,d} = N / (B' \cdot L')$ kPa		
B WY	$(2428. + 1202. +) / 2.3 =$	1578.3	123.84	12.74	OK
B WY	$(2350. + 1206. +) / 2.3 =$	1546.2	139.76	11.06	OK
B WY	$(2350. + 1206. +) / 2.3 =$	1546.2	139.76	11.06	OK
B WY	$(2435. + 1202. +) / 2.3 =$	1581.3	123.72	12.78	OK
B WY	$(2435. + 1202. +) / 2.3 =$	1581.3	123.72	12.78	OK
B WY	$(2358. + 1206. +) / 2.3 =$	1549.6	139.35	11.12	OK
B WY	$(2358. + 1206. +) / 2.3 =$	1549.6	139.35	11.12	OK
B WY	$(3149. + 1131. +) / 2.3 =$	1861.2	61.14	30.44	OK
B WY	$(3149. + 1131. +) / 2.3 =$	1861.2	61.14	30.44	OK
B WY	$(3232. + 1121. +) / 2.3 =$	1892.3	57.88	32.69	OK
B WY	$(3232. + 1121. +) / 2.3 =$	1892.3	57.88	32.69	OK
B WY	$(3151. + 1132. +) / 2.3 =$	1862.1	61.58	30.24	OK
B WY	$(3151. + 1132. +) / 2.3 =$	1862.1	61.58	30.24	OK
B WY	$(3233. + 1121. +) / 2.3 =$	1893.0	58.32	32.46	OK
B WY	$(3233. + 1121. +) / 2.3 =$	1893.0	58.32	32.46	OK
D I	$(2405. + 1223. +) / 2.3 =$	1577.1	132.93	11.86	OK
D I	$(2407. + 1223. +) / 2.3 =$	1578.1	132.84	11.88	OK
D I	$(2277. + 1230. +) / 2.3 =$	1524.6	166.60	9.15	OK
D I	$(2279. + 1230. +) / 2.3 =$	1525.7	166.25	9.18	OK
D I	$(2412. + 1223. +) / 2.3 =$	1580.2	132.65	11.91	OK
D I	$(2414. + 1223. +) / 2.3 =$	1581.2	132.56	11.93	OK
D I	$(2284. + 1230. +) / 2.3 =$	1528.1	165.53	9.23	OK
D I	$(2287. + 1230. +) / 2.3 =$	1529.2	165.20	9.26	OK
D I	$(3263. + 1213. +) / 2.3 =$	1945.9	61.87	31.45	OK
D I	$(3263. + 1213. +) / 2.3 =$	1946.0	62.01	31.38	OK
D I	$(3195. + 1249. +) / 2.3 =$	1932.0	66.63	29.00	OK
D I	$(3195. + 1249. +) / 2.3 =$	1932.1	66.77	28.94	OK
D I	$(3264. + 1213. +) / 2.3 =$	1946.2	62.31	31.24	OK
D I	$(3264. + 1213. +) / 2.3 =$	1946.3	62.45	31.17	OK
D I	$(3196. + 1248. +) / 2.3 =$	1932.4	67.06	28.82	OK
D I	$(3197. + 1248. +) / 2.3 =$	1932.5	67.20	28.76	OK
D W	$(2150. + 1207. +) / 2.3 =$	1459.5	205.02	7.12	OK
D W	$(2152. + 1207. +) / 2.3 =$	1460.1	204.64	7.14	OK
D W	$(2024. + 1209. +) / 2.3 =$	1405.6	297.46	4.73	OK
D W	$(2026. + 1209. +) / 2.3 =$	1406.3	296.33	4.75	OK
D W	$(2159. + 1207. +) / 2.3 =$	1463.5	202.70	7.22	OK
D W	$(2160. + 1207. +) / 2.3 =$	1464.2	202.34	7.24	OK
D W	$(2034. + 1209. +) / 2.3 =$	1410.1	290.67	4.85	OK
D W	$(2035. + 1210. +) / 2.3 =$	1410.8	289.63	4.87	OK

GENERAL CONTRACTOR  IRICAV2	ALTA SORVEGLIANZA  GRUPPO FERROVIE DELLO STATO ITALIANE	Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 259 di 336
Relazione di calcolo pali di alimentazione						

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
COMB	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')			
			kPa			
D W	(3237. + 1134. +) /2.3 =	1900.3	58.43		32.52	OK
D W	(3237. + 1134. +) /2.3 =	1900.4	58.50		32.49	OK
D W	(3204. + 1176. +) /2.3 =	1904.4	61.86		30.79	OK
D W	(3204. + 1176. +) /2.3 =	1904.5	61.93		30.75	OK
D W	(3238. + 1135. +) /2.3 =	1901.0	58.87		32.29	OK
D W	(3238. + 1135. +) /2.3 =	1901.0	58.94		32.25	OK
D W	(3205. + 1176. +) /2.3 =	1905.0	62.30		30.58	OK
D W	(3206. + 1176. +) /2.3 =	1905.1	62.37		30.54	OK
DAA	(2391. + 1221. +) /2.3 =	1570.2	135.35		11.60	OK
DAA	(2391. + 1221. +) /2.3 =	1570.2	135.35		11.60	OK
DAA	(2262. + 1227. +) /2.3 =	1517.4	170.30		8.91	OK
DAA	(2262. + 1227. +) /2.3 =	1517.4	170.30		8.91	OK
DAA	(2398. + 1221. +) /2.3 =	1573.3	135.03		11.65	OK
DAA	(2398. + 1221. +) /2.3 =	1573.3	135.03		11.65	OK
DAA	(2270. + 1228. +) /2.3 =	1520.9	169.13		8.99	OK
DAA	(2270. + 1228. +) /2.3 =	1520.9	169.13		8.99	OK
DAA	(3257. + 1208. +) /2.3 =	1941.5	61.89		31.37	OK
DAA	(3257. + 1208. +) /2.3 =	1941.5	61.89		31.37	OK
DAA	(3212. + 1249. +) /2.3 =	1939.5	66.03		29.37	OK
DAA	(3212. + 1249. +) /2.3 =	1939.5	66.03		29.37	OK
DAA	(3258. + 1208. +) /2.3 =	1941.8	62.33		31.15	OK
DAA	(3258. + 1208. +) /2.3 =	1941.8	62.33		31.15	OK
DAA	(3213. + 1249. +) /2.3 =	1939.8	66.46		29.19	OK

#### Ribaltamento – verifiche sismiche

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
COMB	dir. L	dir.T	dir. L	dir.T		
	kNm	kNm	kNm	kNm		
Comb1	301.89	301.89	11.82	95.42	3.16	OK
Comb2	301.89	301.89	11.82	95.42	3.16	OK
Comb3	301.89	301.89	11.82	19.63	15.38	OK
Comb4	301.89	301.89	11.82	19.63	15.38	OK
Comb5	301.89	301.89	39.39	67.85	4.45	OK
Comb6	301.89	301.89	39.39	67.85	4.45	OK

GENERAL CONTRACTOR  <b>IFICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE
Relazione di calcolo pali di alimentazione	Progetto IN17    Lotto 10    Codifica Documento E I2 CL OC 00 0 0 0 010    Rev. A    Foglio 260 di 336

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
Comb7	301.89	301.89	39.39	44.22	6.83	OK
Comb8	301.89	301.89	39.39	44.22	6.83	OK

#### Scorrimento – verifiche sismiche

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$		Ed	Rd/Ed	
	kN		kN		
COMB					
Comb1	194.9		76.0	2.57	OK
Comb2	194.9		76.0	2.57	OK
Comb3	194.9		67.7	2.88	OK
Comb4	194.9		67.7	2.88	OK
Comb5	194.9		73.2	2.66	OK
Comb6	194.9		73.2	2.66	OK
Comb7	194.9		72.1	2.70	OK
Comb8	194.9		72.1	2.70	OK

#### Capacità portante – verifiche sismiche

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	Rd		Ed	Rd/Ed	
	$q_{u,d} \text{ kPa}$		$q_{E,d} = N / (B' \cdot L')$		
COMB			kPa		
Comb1	$(1646. + 479. +) / 2.3 =$	923.5	86.29	10.70	OK
Comb2	$(1646. + 479. +) / 2.3 =$	923.5	86.29	10.70	OK
Comb3	$(1988. + 488. +) / 2.3 =$	1076.3	63.12	17.05	OK
Comb4	$(1988. + 488. +) / 2.3 =$	1076.3	63.12	17.05	OK
Comb5	$(1865. + 430. +) / 2.3 =$	998.0	84.12	11.86	OK
Comb6	$(1865. + 430. +) / 2.3 =$	998.0	84.12	11.86	OK
Comb7	$(1936. + 418. +) / 2.3 =$	1023.3	76.40	13.39	OK
Comb8	$(1936. + 418. +) / 2.3 =$	1023.3	76.40	13.39	OK

Le verifiche sono soddisfatte.



12.15 Sintesi risultati LC8

TITOLO: **Caso di carico 8 - combinazioni statiche**

FONDAZIONI A PLINTO  
DESIGN ASSUMPTION

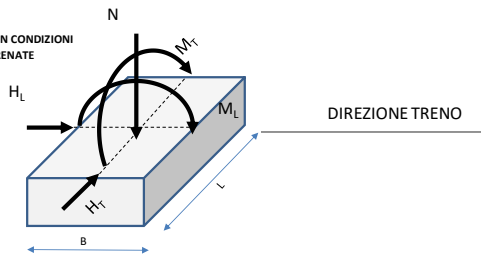
piano campagna sostanzialmente orizzontale

angolo d'attrito caratteristico  $\phi'_k$   
coesione  $c'$   
angolo d'attrito caratteristico  $\phi'_k$  alla base  
coesione alla base  $c'$   
coefficiente  $\gamma_p$   
coefficiente  $\gamma_c'$   
coefficiente  $\gamma_k$  capacità portante  
coefficiente  $\gamma_k$  scorrimento  
coefficiente  $\gamma_k$  spinta passiva  
angolo d'attrito di design  $\phi'_d$   
coesione di design  $c'_d$   
coeff. attrito di design  $\mu'_d$   
coesione alla base di design  
Dimensione fondazione B[m] (LONGITUDINALE)  
Dimensione fondazione L [m] (TRASVERSALE)  
Profondità da piano campagna D [m]  
Altezza plinto [m] H<sub>p</sub>  
Dimensione bagegiolo b[m] (LONGITUDINALE)  
Dimensione maggiore bagegiolo l [m] (TRASVERSALE)  
Altezza bagegiolo [m] H<sub>b</sub>  
Altezza terreno sopraplinto [m] H<sub>t</sub>  
q' = carico permanente ai lati  
 $\gamma$  = peso specifico medio sopra la fondazione  
 $\gamma_f$  = peso specifico medio sotto la fondazione  
opzione calcolo coeff. S<sub>q</sub> e S<sub>\gamma</sub>

DA2

38	*	0.663	rad
0	kPa		
38	*	0.663	rad
0	kPa		
1.00			
1.00			
2.30			
1.10			
1.40			
38.00	*	0.663	rad
0.00	kPa		
0.78			
0.00	kPa		
3	m		
2.2	m		
2.2	m		
0.8	m		
0.8	m		
0.5	m		
0.25	m		
44	kPa		
20	kN/m <sup>3</sup>		
20	kN/m <sup>3</sup>		
1			
0	(1 si - 0 no)		
25	kN/m <sup>3</sup>		
371	kN		
1.30	m		
0.000	g		
0.000	g		
0.00	kN		
0.00	kN		

VERIFICA IN CONDIZIONI DRENATE



(NB: coefficiente correttivo per rapporto D/B non considerato)

(valore da stabilirsi in base alla profondità di falda)  
**(0= Lancellotta ecc., 1 = originale EC7)**  
si useranno le formule originarie di EC7

opzione calcolo per tenere in conto peso terreno di ricoprimento

Peso specifico medio c.a.  
Peso proprio plinto + bagegiolo + terreno sovrastante [kN]  
Quota baricentro plinto + bagegiolo + terreno sovrastante vs p.f. [kN]  
Coefficiente sismico kh  
Coefficiente sismico kv  
Azione inerziale orizzontale plinto  
Azione inerziale verticale plinto

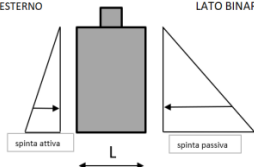
**Eccentricità degli scarichi rispetto a baricentro fondazione**

eccentricità longitudinale eL 0 m + se concorde con i momenti del traliccio  
eccentricità trasversale eT 0.1 m + se concorde con i momenti del traliccio

**Coefficienti di spinta di progetto**

coefficiente di spinta attiva statico K<sub>a</sub> 0.228 -  
coefficiente di spinta attiva sismico K<sub>a,E</sub> 0.483 -  
coefficiente di spinta passiva statico K<sub>p</sub> 4.395 -  
coefficiente di spinta passiva sismico K<sub>p,E</sub> 3.251 -  
coeff. parziale riduttivo della spinta passiva 1.40 -  
moltiplicatore della spinta passiva  $\alpha$  0.00 long 0.49 trasv  
contributo delle spinte frontali long - taglio 0 kN statico 0 kN sismico  
contributo delle spinte frontali long - momer 0 kNm statico 0 kNm sismico  
contributo delle spinte frontali trasv - taglio -190.2 kN statico 0 kN sismico  
contributo delle spinte frontali trasv - mome -139.5 kNm statico 0 kNm sismico

LATO ESTERNO LATO BINARIO



CALCOLI PRELIMINARI: coefficienti di capacità portante indipendenti dai carichi

N<sub>q</sub> = 48.93 B<sub>q</sub> = 1  
N<sub>\gamma</sub> = 74.90 B<sub>\gamma</sub> = 1  
N<sub>c</sub> = 61.35 B<sub>c</sub> = 1

**SINTESI RISULTATI**

Capacità portante	F <sub>s min</sub> = 3.54	n. Verif. Neg.	0
Scorrimento	F <sub>s min</sub> = 1.5	n. Verif. Neg.	0
Ribaltamento	F <sub>s min</sub> = 1.31	n. Verif. Neg.	0



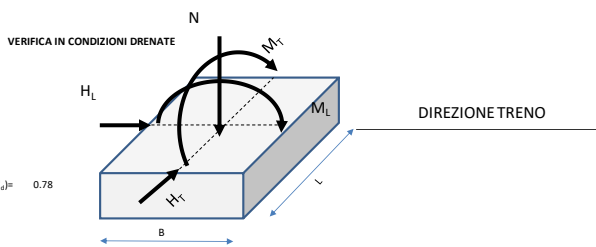
TITOLO: **Caso di carico 8 - combinazioni sismiche**

FONDAZIONI A PLINTO

DESIGN ASSUMPTION

piano campagna sostanzialmente orizzontale

angolo d'attrito caratteristico $\phi'_s$	38	°	0.663	rad
coesione $c'$	0	kPa	+	
angolo d'attrito caratteristico $\phi'_s$ alla base	38	°	0.663	rad
coesione alla base $c'$	0	kPa	+	
coefficiente $\gamma_s$	1.00			
coefficiente $\gamma_c$	1.00			
coefficiente $\gamma_s$ capacità portante	2.30			
coefficiente $\gamma_s$ scorrimento	2.30			
coefficiente $\gamma_s$ spinta passiva	1.10			
angolo d'attrito di design $\phi'_d$	1.40			
coesione di design $c'_d$	38.00	°	0.663	rad $\tan(\phi'_d) = 0.78$
coeff. attrito di design $\mu'_d$	0.00	kPa		
coesione alla base di design	0.78	kPa		
Dimensione fondazione B[m] (LONGITUDINALE)	0.00	m		
Dimensione fondazione L[m] (TRASVERSALE)	3	m		
Profondità da piano campagna D [m]	2.2	m		(NB: coefficiente correttivo per rapporto D/B non considerato)
Altezza plinto [m] Hp	2.2	m		
Dimensione baggio b[m] (LONGITUDINALE)	0.8	m		
Dimensione maggiore baggio l [m] (TRASVERSALE)	0.8	m		
Altezza baggio [m] Hb	0.5	m		
Altezza terreno sopra plinto [m] Ht	0.25	m		
$q'$ = carico permanente ai lati	44	kPa		
$\gamma$ = peso specifico medio sopra la fondazione	20	kN/m <sup>3</sup>		(valore da stabilirsi in base alla profondità di falda)
$\gamma_f$ = peso specifico medio sotto la fondazione	20	kN/m <sup>3</sup>		(0 = Lancellotta ecc. 1 = originale EC7)
opzione calcolo coeff. $S_u$ e $S_v$	1			si useranno le formule originarie di EC7
opzione calcolo per tenere in conto peso terreno di ricoprimento	0	(1 si - 0 no)		
Peso specifico medio c.a.	25	kN/m <sup>3</sup>		
Peso proprio plinto + baggio + terreno sovrastante [kN]	371	kN		
Quota baricentro plinto + baggio + terreno sovrastante vs p.f. [kN]	1.30	m		
Coefficiente sismico kh	0.231	g		
Coefficiente sismico kv	-0.116	g		+ downward
Azione inerziale orizzontale plinto	85.70	kN		
Azione inerziale verticale plinto	-42.85	kN		

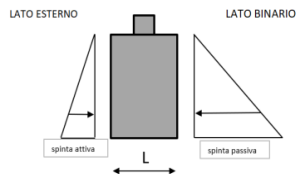


Eccentricità degli scarichi rispetto a baricentro fondazione

eccentricità longitudinale eL	0	m	+ se concorde con i momenti del traliccio
eccentricità trasversale eT	0.1	m	+ se concorde con i momenti del traliccio

Coefficienti di spinta di progetto

coefficiente di spinta attiva statico Ka	0.228	-	
coefficiente di spinta attiva sismico Ka,E	0.483	-	
coefficiente di spinta passiva statico Kp	4.395	-	
coefficiente di spinta passiva sismico Kp,E	3.251	-	
coeff. parziale riduttivo della spinta passiva $\gamma_{re}$	1.40	-	
moltiplicatore della spinta passiva $\alpha$	0.00	long	0.00 trasv
contributo delle spinte frontali long - taglio	0	kN	statico 0 kN sismico
contributo delle spinte frontali long - momento	0	kNm	statico 0 kNm sismico
contributo delle spinte frontali trasv - taglio	0	kN	statico 0 kN sismico
contributo delle spinte frontali trasv - momento	0	kNm	statico 0 kNm sismico



CALCOLI PRELIMINARI: coefficienti di capacità portante indipendenti dai carichi

$N_u = 48.93$	$B_{\phi} = 1$
$N_v = 74.90$	$B_{\gamma} = 1$
$N_c = 61.35$	$B_c = 1$

SINTESI RISULTATI			
Capacità portante	$F_{s, min} = 11.23$	n. Verif. Neg.	0
Scorrimento	$F_{s, min} = 2.60$	n. Verif. Neg.	0
Ribaltamento	$F_{s, min} = 3.23$	n. Verif. Neg.	0

Le verifiche sono soddisfatte.

GENERAL CONTRACTOR  IRICAV2	ALTA SORVEGLIANZA  GRUPPO FERROVIE DELLO STATO ITALIANE
Relazione di calcolo pali di alimentazione	Progetto IN17    Lotto 10    Codifica Documento E I2 CL OC 00 0 0 010    Rev. A    Foglio 263 di 336

## 12.16 Verifiche di dettaglio

Ribaltamento – verifiche statiche

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
A	577.49	423.49	0.00	174.09	2.43	OK
A	577.49	423.49	0.00	174.05	2.43	OK
A	577.49	423.49	0.00	222.56	1.90	OK
A	577.49	423.49	0.00	222.52	1.90	OK
A	583.79	428.11	0.00	174.51	2.45	OK
A	583.79	428.11	0.00	174.47	2.45	OK
A	583.79	428.11	0.00	222.98	1.92	OK
A	583.79	428.11	0.00	222.94	1.92	OK
A	577.49	423.49	0.00	151.63	2.79	OK
A	577.49	423.49	0.00	151.60	2.79	OK
A	577.49	423.49	0.00	200.10	2.12	OK
A	577.49	423.49	0.00	200.07	2.12	OK
A	583.79	428.11	0.00	152.05	2.82	OK
A	583.79	428.11	0.00	152.02	2.82	OK
A	583.79	428.11	0.00	200.52	2.13	OK
A	583.79	428.11	0.00	200.49	2.14	OK
B AA	577.49	423.49	0.00	185.32	2.29	OK
B AA	577.49	423.49	0.00	185.29	2.29	OK
B AA	577.49	423.49	0.00	208.18	2.03	OK
B AA	577.49	423.49	0.00	208.15	2.03	OK
B AA	583.79	428.11	0.00	185.74	2.30	OK
B AA	583.79	428.11	0.00	185.71	2.31	OK
B AA	583.79	428.11	0.00	208.60	2.05	OK
B AA	583.79	428.11	0.00	208.57	2.05	OK
B AA	577.49	423.49	0.00	33.16	12.77	OK
B AA	577.49	423.49	0.00	33.20	12.76	OK
B AA	577.49	423.49	0.00	16.30	25.98	OK
B AA	577.49	423.49	0.00	16.27	26.04	OK
B AA	583.79	428.11	0.00	33.58	12.75	OK
B AA	583.79	428.11	0.00	33.62	12.73	OK
B AA	583.79	428.11	0.00	16.72	25.60	OK
B AA	583.79	428.11	0.00	16.69	25.66	OK
B WX	577.49	423.49	73.91	86.46	4.90	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WX	577.49	423.49	73.91	86.43	4.90	OK
B WX	577.49	423.49	73.91	109.32	3.87	OK
B WX	577.49	423.49	73.91	109.29	3.88	OK
B WX	583.79	428.11	73.91	86.88	4.93	OK
B WX	583.79	428.11	73.91	86.85	4.93	OK
B WX	583.79	428.11	73.91	109.74	3.90	OK
B WX	583.79	428.11	73.91	109.71	3.90	OK
B WX	577.49	423.49	73.91	68.50	6.18	OK
B WX	577.49	423.49	73.91	68.46	6.19	OK
B WX	577.49	423.49	73.91	91.36	4.64	OK
B WX	577.49	423.49	73.91	91.32	4.64	OK
B WX	583.79	428.11	73.91	68.92	6.21	OK
B WX	583.79	428.11	73.91	68.88	6.22	OK
B WX	583.79	428.11	73.91	91.78	4.66	OK
B WX	583.79	428.11	73.91	91.74	4.67	OK
B WXY	577.49	423.49	51.73	199.18	2.13	OK
B WXY	577.49	423.49	51.73	199.15	2.13	OK
B WXY	577.49	423.49	51.73	222.04	1.91	OK
B WXY	577.49	423.49	51.73	222.01	1.91	OK
B WXY	583.79	428.11	51.73	199.60	2.14	OK
B WXY	583.79	428.11	51.73	199.57	2.15	OK
B WXY	583.79	428.11	51.73	222.46	1.92	OK
B WXY	583.79	428.11	51.73	222.43	1.92	OK
B WXY	577.49	423.49	51.73	47.02	9.01	OK
B WXY	577.49	423.49	51.73	47.06	9.00	OK
B WXY	577.49	423.49	51.73	24.16	11.16	OK
B WXY	577.49	423.49	51.73	24.20	11.16	OK
B WXY	583.79	428.11	51.73	47.44	9.02	OK
B WXY	583.79	428.11	51.73	47.48	9.02	OK
B WXY	583.79	428.11	51.73	24.58	11.28	OK
B WXY	583.79	428.11	51.73	24.62	11.28	OK
B WY	577.49	423.49	0.00	247.49	1.71	OK
B WY	577.49	423.49	0.00	247.46	1.71	OK
B WY	577.49	423.49	0.00	270.35	1.57	OK
B WY	577.49	423.49	0.00	270.31	1.57	OK
B WY	583.79	428.11	0.00	247.91	1.73	OK
B WY	583.79	428.11	0.00	247.88	1.73	OK
B WY	583.79	428.11	0.00	270.77	1.58	OK
B WY	583.79	428.11	0.00	270.73	1.58	OK





Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WY	577.49	423.49	0.00	95.33	4.44	OK
B WY	577.49	423.49	0.00	95.37	4.44	OK
B WY	577.49	423.49	0.00	72.47	5.84	OK
B WY	577.49	423.49	0.00	72.51	5.84	OK
B WY	583.79	428.11	0.00	95.75	4.47	OK
B WY	583.79	428.11	0.00	95.79	4.47	OK
B WY	583.79	428.11	0.00	72.89	5.87	OK
B WY	583.79	428.11	0.00	72.93	5.87	OK
D I	577.49	423.49	0.00	279.43	1.52	OK
D I	583.07	427.58	0.00	279.50	1.53	OK
D I	581.36	426.33	0.00	316.76	1.35	OK
D I	586.94	430.42	0.00	316.83	1.36	OK
D I	583.79	428.11	0.00	279.85	1.53	OK
D I	589.36	432.20	0.00	279.92	1.54	OK
D I	587.66	430.95	0.00	317.18	1.36	OK
D I	593.24	435.04	0.00	317.25	1.37	OK
D I	577.49	423.49	0.00	32.51	13.03	OK
D I	583.07	427.58	0.00	33.17	12.89	OK
D I	581.36	426.33	0.00	25.98	16.41	OK
D I	586.94	430.42	0.00	26.06	16.52	OK
D I	583.79	428.11	0.00	32.93	13.00	OK
D I	589.36	432.20	0.00	33.59	12.87	OK
D I	587.66	430.95	0.00	26.40	16.32	OK
D I	593.24	435.04	0.00	26.48	16.43	OK
D W	577.49	423.49	0.00	236.97	1.79	OK
D W	580.28	425.54	0.00	236.99	1.80	OK
D W	579.43	424.91	0.00	274.17	1.55	OK
D W	582.22	426.96	0.00	274.19	1.56	OK
D W	583.79	428.11	0.00	237.39	1.80	OK
D W	586.58	430.16	0.00	237.41	1.81	OK
D W	585.72	429.53	0.00	274.59	1.56	OK
D W	588.51	431.58	0.00	274.61	1.57	OK
D W	577.49	423.49	0.00	129.56	3.27	OK
D W	580.28	425.54	0.00	129.91	3.28	OK
D W	579.43	424.91	0.00	92.62	4.59	OK
D W	582.22	426.96	0.00	92.97	4.59	OK
D W	583.79	428.11	0.00	129.98	3.29	OK
D W	586.58	430.16	0.00	130.33	3.30	OK
D W	585.72	429.53	0.00	93.04	4.62	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
D W	588.51	431.58	0.00	93.39	4.62	OK
DAA	580.28	425.54	0.00	281.73	1.51	OK
DAA	580.28	425.54	0.00	281.69	1.51	OK
DAA	582.22	426.96	0.00	318.93	1.34	OK
DAA	582.22	426.96	0.00	318.90	1.34	OK
DAA	586.58	430.16	0.00	282.15	1.52	OK
DAA	586.58	430.16	0.00	282.11	1.52	OK
DAA	588.51	431.58	0.00	319.35	1.35	OK
DAA	588.51	431.58	0.00	319.32	1.35	OK
DAA	580.28	425.54	0.00	35.07	12.13	OK
DAA	580.28	425.54	0.00	35.10	12.12	OK
DAA	582.22	426.96	0.00	25.70	16.61	OK
DAA	582.22	426.96	0.00	25.66	16.64	OK
DAA	586.58	430.16	0.00	35.49	12.12	OK
DAA	586.58	430.16	0.00	35.52	12.11	OK
DAA	588.51	431.58	0.00	26.12	16.52	OK
DAA	588.51	431.58	0.00	26.08	16.55	OK
A	519.74	381.14	0.00	157.80	2.42	OK
A	519.74	381.14	0.00	157.78	2.42	OK
A	519.74	381.14	0.00	190.12	2.00	OK
A	519.74	381.14	0.00	190.09	2.01	OK
A	523.94	384.22	0.00	158.08	2.43	OK
A	523.94	384.22	0.00	158.06	2.43	OK
A	523.94	384.22	0.00	190.40	2.02	OK
A	523.94	384.22	0.00	190.37	2.02	OK
A	519.74	381.14	0.00	135.34	2.82	OK
A	519.74	381.14	0.00	135.32	2.82	OK
A	519.74	381.14	0.00	167.66	2.27	OK
A	519.74	381.14	0.00	167.64	2.27	OK
A	523.94	384.22	0.00	135.62	2.83	OK
A	523.94	384.22	0.00	135.60	2.83	OK
A	523.94	384.22	0.00	167.94	2.29	OK
A	523.94	384.22	0.00	167.92	2.29	OK
B AA	519.74	381.14	0.00	177.58	2.15	OK
B AA	519.74	381.14	0.00	177.55	2.15	OK
B AA	519.74	381.14	0.00	192.82	1.98	OK
B AA	519.74	381.14	0.00	192.79	1.98	OK
B AA	523.94	384.22	0.00	177.86	2.16	OK
B AA	523.94	384.22	0.00	177.83	2.16	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B AA	523.94	384.22	0.00	193.10	1.99	OK
B AA	523.94	384.22	0.00	193.07	1.99	OK
B AA	519.74	381.14	0.00	40.63	9.38	OK
B AA	519.74	381.14	0.00	40.66	9.37	OK
B AA	519.74	381.14	0.00	25.39	15.01	OK
B AA	519.74	381.14	0.00	25.42	15.00	OK
B AA	523.94	384.22	0.00	40.91	9.39	OK
B AA	523.94	384.22	0.00	40.94	9.39	OK
B AA	523.94	384.22	0.00	25.67	14.97	OK
B AA	523.94	384.22	0.00	25.70	14.95	OK
B WX	519.74	381.14	73.91	78.71	4.84	OK
B WX	519.74	381.14	73.91	78.69	4.84	OK
B WX	519.74	381.14	73.91	93.95	4.06	OK
B WX	519.74	381.14	73.91	93.93	4.06	OK
B WX	523.94	384.22	73.91	78.99	4.86	OK
B WX	523.94	384.22	73.91	78.97	4.87	OK
B WX	523.94	384.22	73.91	94.23	4.08	OK
B WX	523.94	384.22	73.91	94.21	4.08	OK
B WX	519.74	381.14	73.91	60.75	6.27	OK
B WX	519.74	381.14	73.91	60.73	6.28	OK
B WX	519.74	381.14	73.91	75.99	5.02	OK
B WX	519.74	381.14	73.91	75.96	5.02	OK
B WX	523.94	384.22	73.91	61.03	6.30	OK
B WX	523.94	384.22	73.91	61.01	6.30	OK
B WX	523.94	384.22	73.91	76.27	5.04	OK
B WX	523.94	384.22	73.91	76.24	5.04	OK
B WXY	519.74	381.14	51.73	191.43	1.99	OK
B WXY	519.74	381.14	51.73	191.41	1.99	OK
B WXY	519.74	381.14	51.73	206.67	1.84	OK
B WXY	519.74	381.14	51.73	206.65	1.84	OK
B WXY	523.94	384.22	51.73	191.71	2.00	OK
B WXY	523.94	384.22	51.73	191.69	2.00	OK
B WXY	523.94	384.22	51.73	206.95	1.86	OK
B WXY	523.94	384.22	51.73	206.93	1.86	OK
B WXY	519.74	381.14	51.73	54.49	6.99	OK
B WXY	519.74	381.14	51.73	54.51	6.99	OK
B WXY	519.74	381.14	51.73	39.25	9.71	OK
B WXY	519.74	381.14	51.73	39.27	9.70	OK
B WXY	523.94	384.22	51.73	54.77	7.02	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WXY	523.94	384.22	51.73	54.79	7.01	OK
B WXY	523.94	384.22	51.73	39.53	9.72	OK
B WXY	523.94	384.22	51.73	39.55	9.71	OK
B WY	519.74	381.14	0.00	239.74	1.59	OK
B WY	519.74	381.14	0.00	239.72	1.59	OK
B WY	519.74	381.14	0.00	254.98	1.49	OK
B WY	519.74	381.14	0.00	254.96	1.49	OK
B WY	523.94	384.22	0.00	240.02	1.60	OK
B WY	523.94	384.22	0.00	240.00	1.60	OK
B WY	523.94	384.22	0.00	255.26	1.51	OK
B WY	523.94	384.22	0.00	255.24	1.51	OK
B WY	519.74	381.14	0.00	102.80	3.71	OK
B WY	519.74	381.14	0.00	102.82	3.71	OK
B WY	519.74	381.14	0.00	87.56	4.35	OK
B WY	519.74	381.14	0.00	87.58	4.35	OK
B WY	523.94	384.22	0.00	103.08	3.73	OK
B WY	523.94	384.22	0.00	103.10	3.73	OK
B WY	523.94	384.22	0.00	87.84	4.37	OK
B WY	523.94	384.22	0.00	87.86	4.37	OK
D I	519.74	381.14	0.00	266.94	1.43	OK
D I	525.32	385.23	0.00	267.03	1.44	OK
D I	523.62	383.98	0.00	291.91	1.32	OK
D I	529.19	388.07	0.00	292.00	1.33	OK
D I	523.94	384.22	0.00	267.22	1.44	OK
D I	529.51	388.31	0.00	267.31	1.45	OK
D I	527.81	387.06	0.00	292.19	1.32	OK
D I	533.39	391.15	0.00	292.28	1.34	OK
D I	519.74	381.14	0.00	44.71	8.52	OK
D I	525.32	385.23	0.00	45.37	8.49	OK
D I	523.62	383.98	0.00	20.25	18.96	OK
D I	529.19	388.07	0.00	20.91	18.56	OK
D I	523.94	384.22	0.00	44.99	8.54	OK
D I	529.51	388.31	0.00	45.65	8.51	OK
D I	527.81	387.06	0.00	20.53	18.85	OK
D I	533.39	391.15	0.00	21.19	18.46	OK
D W	519.74	381.14	0.00	224.48	1.70	OK
D W	522.53	383.19	0.00	224.51	1.71	OK
D W	521.68	382.56	0.00	249.33	1.53	OK
D W	524.47	384.61	0.00	249.36	1.54	OK

GENERAL CONTRACTOR  <b>IRICAV2</b>		ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione		Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 269 di 336

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
D W	523.94	384.22	0.00	224.76	1.71	OK
D W	526.73	386.27	0.00	224.79	1.72	OK
D W	525.88	385.64	0.00	249.61	1.55	OK
D W	528.66	387.69	0.00	249.64	1.55	OK
D W	519.74	381.14	0.00	141.77	2.69	OK
D W	522.53	383.19	0.00	142.11	2.70	OK
D W	521.68	382.56	0.00	117.18	3.26	OK
D W	524.47	384.61	0.00	117.52	3.27	OK
D W	523.94	384.22	0.00	142.05	2.70	OK
D W	526.73	386.27	0.00	142.39	2.71	OK
D W	525.88	385.64	0.00	117.46	3.28	OK
D W	528.66	387.69	0.00	117.80	3.29	OK
DAA	522.53	383.19	0.00	269.24	1.42	OK
DAA	522.53	383.19	0.00	269.22	1.42	OK
DAA	524.47	384.61	0.00	294.09	1.31	OK
DAA	524.47	384.61	0.00	294.06	1.31	OK
DAA	526.73	386.27	0.00	269.52	1.43	OK
DAA	526.73	386.27	0.00	269.50	1.43	OK
DAA	528.66	387.69	0.00	294.37	1.32	OK
DAA	528.66	387.69	0.00	294.34	1.32	OK
DAA	522.53	383.19	0.00	47.27	8.11	OK
DAA	522.53	383.19	0.00	47.30	8.10	OK
DAA	524.47	384.61	0.00	22.69	16.95	OK
DAA	524.47	384.61	0.00	22.71	16.94	OK
DAA	526.73	386.27	0.00	47.55	8.12	OK
DAA	526.73	386.27	0.00	47.58	8.12	OK
DAA	528.66	387.69	0.00	22.97	16.88	OK

Scorrimento – verifiche statiche

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot \mu_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
A	273.4	13.2	20.65	OK	
A	273.4	13.2	20.65	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO			
	$R_d = (N \cdot \mu_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
COMB	kN	kN		
A	273.4	16.6	16.43	OK
A	273.4	16.6	16.43	OK
A	276.4	13.2	20.88	OK
A	276.4	13.2	20.88	OK
A	276.4	16.6	16.60	OK
A	276.4	16.6	16.60	OK
A	273.4	9.5	28.88	OK
A	273.4	9.5	28.88	OK
A	273.4	12.9	21.24	OK
A	273.4	12.9	21.24	OK
A	276.4	9.5	29.20	OK
A	276.4	9.5	29.20	OK
A	276.4	12.9	21.47	OK
A	276.4	12.9	21.47	OK
B AA	273.4	16.7	16.33	OK
B AA	273.4	16.7	16.33	OK
B AA	273.4	18.4	14.90	OK
B AA	273.4	18.4	14.90	OK
B AA	276.4	16.7	16.51	OK
B AA	276.4	16.7	16.51	OK
B AA	276.4	18.4	15.06	OK
B AA	276.4	18.4	15.06	OK
B AA	273.4	6.0	45.44	OK
B AA	273.4	6.0	45.44	OK
B AA	273.4	4.4	62.02	OK
B AA	273.4	4.4	62.02	OK
B AA	276.4	6.0	45.93	OK
B AA	276.4	6.0	45.93	OK
B AA	276.4	4.4	62.70	OK
B AA	276.4	4.4	62.70	OK
B WX	273.4	10.7	25.45	OK
B WX	273.4	10.7	25.45	OK
B WX	273.4	11.8	23.10	OK
B WX	273.4	11.8	23.10	OK
B WX	276.4	10.7	25.73	OK



Azioni a base plinto	VERIFICA A SCORRIMENTO			
	$R_d = (N \cdot \mu_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
COMB	kN	kN		
B WX	276.4	10.7	25.73	OK
B WX	276.4	11.8	23.35	OK
B WX	276.4	11.8	23.35	OK
B WX	273.4	9.1	30.00	OK
B WX	273.4	9.1	30.00	OK
B WX	273.4	9.9	27.62	OK
B WX	273.4	9.9	27.62	OK
B WX	276.4	9.1	30.33	OK
B WX	276.4	9.1	30.33	OK
B WX	276.4	9.9	27.92	OK
B WX	276.4	9.9	27.92	OK
B WXY	273.4	18.9	14.50	OK
B WXY	273.4	18.9	14.50	OK
B WXY	273.4	20.4	13.41	OK
B WXY	273.4	20.4	13.41	OK
B WXY	276.4	18.9	14.66	OK
B WXY	276.4	18.9	14.66	OK
B WXY	276.4	20.4	13.55	OK
B WXY	276.4	20.4	13.55	OK
B WXY	273.4	9.3	29.56	OK
B WXY	273.4	9.3	29.56	OK
B WXY	273.4	8.1	33.93	OK
B WXY	273.4	8.1	33.93	OK
B WXY	276.4	9.3	29.88	OK
B WXY	276.4	9.3	29.88	OK
B WXY	276.4	8.1	34.30	OK
B WXY	276.4	8.1	34.30	OK
B WY	273.4	22.7	12.05	OK
B WY	273.4	22.7	12.05	OK
B WY	273.4	24.3	11.25	OK
B WY	273.4	24.3	11.25	OK
B WY	276.4	22.7	12.18	OK
B WY	276.4	22.7	12.18	OK
B WY	276.4	24.3	11.37	OK
B WY	276.4	24.3	11.37	OK
B WY	273.4	12.0	22.84	OK
B WY	273.4	12.0	22.84	OK
B WY	273.4	10.4	26.39	OK



Azioni a base plinto	VERIFICA A SCORRIMENTO			
	$R_d = (N \cdot \mu_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
COMB	kN	kN		
B WY	273.4	10.4	26.39	OK
B WY	276.4	12.0	23.09	OK
B WY	276.4	12.0	23.09	OK
B WY	276.4	10.4	26.68	OK
B WY	276.4	10.4	26.68	OK
D I	273.4	23.4	11.69	OK
D I	276.1	23.4	11.80	OK
D I	275.3	26.0	10.59	OK
D I	277.9	26.0	10.69	OK
D I	276.4	23.4	11.82	OK
D I	279.1	23.4	11.93	OK
D I	278.3	26.0	10.70	OK
D I	280.9	26.0	10.80	OK
D I	273.4	6.0	45.52	OK
D I	276.1	6.0	45.96	OK
D I	275.3	3.4	80.98	OK
D I	277.9	3.4	81.76	OK
D I	276.4	6.0	46.01	OK
D I	279.1	6.0	46.45	OK
D I	278.3	3.4	81.86	OK
D I	280.9	3.4	82.64	OK
D W	273.4	158.1	1.73	OK
D W	274.8	158.1	1.74	OK
D W	274.4	155.4	1.76	OK
D W	275.7	155.4	1.77	OK
D W	276.4	158.1	1.75	OK
D W	277.7	158.1	1.76	OK
D W	277.3	155.4	1.78	OK
D W	278.7	155.4	1.79	OK
D W	273.4	14.8	18.47	OK
D W	274.8	14.8	18.56	OK
D W	274.4	12.2	22.50	OK
D W	275.7	12.2	22.61	OK
D W	276.4	14.8	18.67	OK
D W	277.7	14.8	18.76	OK
D W	277.3	12.2	22.74	OK
D W	278.7	12.2	22.85	OK
DAA	274.8	23.8	11.56	OK





Azioni a base plinto	VERIFICA A SCORRIMENTO			
	$R_d = (N \cdot \mu_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
COMB	kN	kN		
DAA	274.8	23.8	11.56	OK
DAA	275.7	26.4	10.45	OK
DAA	275.7	26.4	10.45	OK
DAA	277.7	23.8	11.68	OK
DAA	277.7	23.8	11.68	OK
DAA	278.7	26.4	10.56	OK
DAA	278.7	26.4	10.56	OK
DAA	274.8	6.4	43.03	OK
DAA	274.8	6.4	43.03	OK
DAA	275.7	3.8	73.00	OK
DAA	275.7	3.8	73.00	OK
DAA	277.7	6.4	43.50	OK
DAA	277.7	6.4	43.50	OK
DAA	278.7	3.8	73.79	OK
DAA	278.7	3.8	73.79	OK
A	246.1	12.1	20.33	OK
A	246.1	12.1	20.33	OK
A	246.1	14.4	17.12	OK
A	246.1	14.4	17.12	OK
A	248.1	12.1	20.49	OK
A	248.1	12.1	20.49	OK
A	248.1	14.4	17.26	OK
A	248.1	14.4	17.26	OK
A	246.1	8.3	29.54	OK
A	246.1	8.3	29.54	OK
A	246.1	10.6	23.21	OK
A	246.1	10.6	23.21	OK
A	248.1	8.3	29.78	OK
A	248.1	8.3	29.78	OK
A	248.1	10.6	23.40	OK
A	248.1	10.6	23.40	OK
B AA	246.1	16.2	15.18	OK
B AA	246.1	16.2	15.18	OK
B AA	246.1	17.3	14.24	OK
B AA	246.1	17.3	14.24	OK
B AA	248.1	16.2	15.31	OK
B AA	248.1	16.2	15.31	OK
B AA	248.1	17.3	14.36	OK



Azioni a base plinto	VERIFICA A SCORRIMENTO			
	$R_d = (N \cdot \mu_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
COMB	kN	kN		
B AA	248.1	17.3	14.36	OK
B AA	246.1	6.6	37.55	OK
B AA	246.1	6.6	37.55	OK
B AA	246.1	5.5	44.90	OK
B AA	246.1	5.5	44.90	OK
B AA	248.1	6.6	37.85	OK
B AA	248.1	6.6	37.85	OK
B AA	248.1	5.5	45.26	OK
B AA	248.1	5.5	45.26	OK
B WX	246.1	10.4	23.64	OK
B WX	246.1	10.4	23.64	OK
B WX	246.1	11.1	22.18	OK
B WX	246.1	11.1	22.18	OK
B WX	248.1	10.4	23.83	OK
B WX	248.1	10.4	23.83	OK
B WX	248.1	11.1	22.36	OK
B WX	248.1	11.1	22.36	OK
B WX	246.1	8.9	27.65	OK
B WX	246.1	8.9	27.65	OK
B WX	246.1	9.4	26.31	OK
B WX	246.1	9.4	26.31	OK
B WX	248.1	8.9	27.88	OK
B WX	248.1	8.9	27.88	OK
B WX	248.1	9.4	26.53	OK
B WX	248.1	9.4	26.53	OK
B WXY	246.1	18.3	13.41	OK
B WXY	246.1	18.3	13.41	OK
B WXY	246.1	19.4	12.71	OK
B WXY	246.1	19.4	12.71	OK
B WXY	248.1	18.3	13.52	OK
B WXY	248.1	18.3	13.52	OK
B WXY	248.1	19.4	12.81	OK
B WXY	248.1	19.4	12.81	OK
B WXY	246.1	9.7	25.43	OK
B WXY	246.1	9.7	25.43	OK
B WXY	246.1	8.8	27.84	OK
B WXY	246.1	8.8	27.84	OK
B WXY	248.1	9.7	25.64	OK



Azioni a base plinto	VERIFICA A SCORRIMENTO			
	$R_d = (N \cdot \mu_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d / E_d$	
COMB	kN	kN		
B WXY	248.1	9.7	25.64	OK
B WXY	248.1	8.8	28.07	OK
B WXY	248.1	8.8	28.07	OK
B WY	246.1	22.2	11.11	OK
B WY	246.1	22.2	11.11	OK
B WY	246.1	23.2	10.59	OK
B WY	246.1	23.2	10.59	OK
B WY	248.1	22.2	11.20	OK
B WY	248.1	22.2	11.20	OK
B WY	248.1	23.2	10.68	OK
B WY	248.1	23.2	10.68	OK
B WY	246.1	12.5	19.68	OK
B WY	246.1	12.5	19.68	OK
B WY	246.1	11.4	21.52	OK
B WY	246.1	11.4	21.52	OK
B WY	248.1	12.5	19.84	OK
B WY	248.1	12.5	19.84	OK
B WY	248.1	11.4	21.70	OK
B WY	248.1	11.4	21.70	OK
D I	246.1	22.5	10.92	OK
D I	248.7	22.5	11.04	OK
D I	247.9	24.3	10.22	OK
D I	250.6	24.3	10.33	OK
D I	248.1	22.5	11.01	OK
D I	250.7	22.5	11.13	OK
D I	249.9	24.3	10.30	OK
D I	252.6	24.3	10.41	OK
D I	246.1	6.9	35.79	OK
D I	248.7	6.9	36.17	OK
D I	247.9	5.1	48.25	OK
D I	250.6	5.1	48.77	OK
D I	248.1	6.9	36.08	OK
D I	250.7	6.9	36.46	OK
D I	249.9	5.1	48.64	OK
D I	252.6	5.1	49.15	OK
D W	246.1	158.9	1.55	OK
D W	247.4	158.9	1.56	OK
D W	247.0	157.2	1.57	OK

GENERAL CONTRACTOR  <b>IRICAV2</b>		ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione		Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 276 di 336

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot \mu_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
D W	248.3	157.2	1.58	OK	
D W	248.1	158.9	1.56	OK	
D W	249.4	158.9	1.57	OK	
D W	249.0	157.2	1.58	OK	
D W	250.3	157.2	1.59	OK	
D W	246.1	15.7	15.70	OK	
D W	247.4	15.7	15.79	OK	
D W	247.0	13.9	17.73	OK	
D W	248.3	13.9	17.82	OK	
D W	248.1	15.7	15.83	OK	
D W	249.4	15.7	15.91	OK	
D W	249.0	13.9	17.87	OK	
D W	250.3	13.9	17.97	OK	
DAA	247.4	22.9	10.80	OK	
DAA	247.4	22.9	10.80	OK	
DAA	248.3	24.6	10.08	OK	
DAA	248.3	24.6	10.08	OK	
DAA	249.4	22.9	10.89	OK	
DAA	249.4	22.9	10.89	OK	
DAA	250.3	24.6	10.16	OK	
DAA	250.3	24.6	10.16	OK	
DAA	247.4	7.3	34.11	OK	
DAA	247.4	7.3	34.11	OK	
DAA	248.3	5.5	45.03	OK	
DAA	248.3	5.5	45.03	OK	
DAA	249.4	7.3	34.38	OK	
DAA	249.4	7.3	34.38	OK	
DAA	250.3	5.5	45.39	OK	

Capacità portante – verifiche statiche

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	COMB	$R_d$	$E_d$	$R_d/E_d$	
		$q_{u,d}$ kPa	$q_{E,d} = N / (B' \cdot L')$		
		kPa			
A	$(2568. + 1780. +) / 2.3 =$	1890.4	99.05	19.09	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	COMB	R <sub>d</sub>		E <sub>d</sub>	
		q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')	
			kPa	R <sub>d</sub> /E <sub>d</sub>	
A	(2568. + 1780. +) /2.3 =	1890.4	99.03	19.09	OK
A	(2421. + 1783. +) /2.3 =	1827.5	122.94	14.86	OK
A	(2421. + 1783. +) /2.3 =	1827.5	122.92	14.87	OK
A	(2573. + 1780. +) /2.3 =	1892.7	99.55	19.01	OK
A	(2573. + 1780. +) /2.3 =	1892.7	99.53	19.02	OK
A	(2427. + 1783. +) /2.3 =	1830.5	123.07	14.87	OK
A	(2427. + 1783. +) /2.3 =	1830.5	123.05	14.88	OK
A	(2663. + 1805. +) /2.3 =	1942.8	90.87	21.38	OK
A	(2663. + 1805. +) /2.3 =	1942.8	90.86	21.38	OK
A	(2514. + 1811. +) /2.3 =	1880.4	110.58	17.00	OK
A	(2514. + 1811. +) /2.3 =	1880.4	110.57	17.01	OK
A	(2667. + 1805. +) /2.3 =	1944.5	91.45	21.26	OK
A	(2667. + 1805. +) /2.3 =	1944.5	91.44	21.27	OK
A	(2520. + 1811. +) /2.3 =	1882.8	110.92	16.97	OK
A	(2520. + 1811. +) /2.3 =	1882.9	110.91	16.98	OK
B AA	(2502. + 1746. +) /2.3 =	1846.9	103.72	17.81	OK
B AA	(2502. + 1746. +) /2.3 =	1846.9	103.71	17.81	OK
B AA	(2433. + 1747. +) /2.3 =	1817.2	114.73	15.84	OK
B AA	(2433. + 1747. +) /2.3 =	1817.2	114.72	15.84	OK
B AA	(2508. + 1746. +) /2.3 =	1849.7	104.16	17.76	OK
B AA	(2508. + 1746. +) /2.3 =	1849.7	104.15	17.76	OK
B AA	(2439. + 1747. +) /2.3 =	1820.3	115.01	15.83	OK
B AA	(2439. + 1747. +) /2.3 =	1820.4	114.99	15.83	OK
B AA	(2973. + 1720. +) /2.3 =	2040.4	63.29	32.24	OK
B AA	(2973. + 1720. +) /2.3 =	2040.3	63.29	32.24	OK
B AA	(3032. + 1720. +) /2.3 =	2065.9	60.67	34.05	OK
B AA	(3032. + 1720. +) /2.3 =	2065.9	60.66	34.06	OK
B AA	(2974. + 1720. +) /2.3 =	2041.0	63.99	31.90	OK
B AA	(2974. + 1720. +) /2.3 =	2041.0	63.99	31.89	OK
B AA	(3032. + 1720. +) /2.3 =	2066.2	61.37	33.67	OK
B AA	(3032. + 1720. +) /2.3 =	2066.3	61.36	33.67	OK
B WX	(2915. + 1460. +) /2.3 =	1902.2	84.05	22.63	OK
B WX	(2915. + 1460. +) /2.3 =	1902.2	84.05	22.63	OK
B WX	(2843. + 1473. +) /2.3 =	1876.7	90.17	20.81	OK
B WX	(2843. + 1473. +) /2.3 =	1876.7	90.16	20.82	OK
B WX	(2917. + 1463. +) /2.3 =	1904.3	84.71	22.48	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
B WX	(2917. + 1463. +) /2.3 =	1904.3	84.70	22.48	OK
B WX	(2846. + 1476. +) /2.3 =	1879.0	90.79	20.70	OK
B WX	(2846. + 1476. +) /2.3 =	1879.0	90.78	20.70	OK
B WX	(2982. + 1457. +) /2.3 =	1930.3	79.80	24.19	OK
B WX	(2983. + 1457. +) /2.3 =	1930.3	79.79	24.19	OK
B WX	(2914. + 1474. +) /2.3 =	1908.0	85.29	22.37	OK
B WX	(2914. + 1474. +) /2.3 =	1908.1	85.28	22.37	OK
B WX	(2983. + 1461. +) /2.3 =	1932.0	80.47	24.01	OK
B WX	(2983. + 1461. +) /2.3 =	1932.1	80.46	24.01	OK
B WX	(2916. + 1477. +) /2.3 =	1910.1	85.94	22.23	OK
B WX	(2916. + 1477. +) /2.3 =	1910.1	85.93	22.23	OK
B WXY	(2501. + 1561. +) /2.3 =	1765.8	120.97	14.60	OK
B WXY	(2501. + 1560. +) /2.3 =	1765.8	120.95	14.60	OK
B WXY	(2428. + 1564. +) /2.3 =	1735.5	134.69	12.89	OK
B WXY	(2428. + 1564. +) /2.3 =	1735.5	134.67	12.89	OK
B WXY	(2507. + 1563. +) /2.3 =	1769.5	121.22	14.60	OK
B WXY	(2507. + 1563. +) /2.3 =	1769.5	121.20	14.60	OK
B WXY	(2434. + 1567. +) /2.3 =	1739.5	134.69	12.91	OK
B WXY	(2434. + 1567. +) /2.3 =	1739.6	134.67	12.92	OK
B WXY	(2990. + 1511. +) /2.3 =	1956.8	72.08	27.15	OK
B WXY	(2990. + 1511. +) /2.3 =	1956.8	72.08	27.15	OK
B WXY	(3061. + 1498. +) /2.3 =	1982.4	67.95	29.18	OK
B WXY	(3061. + 1498. +) /2.3 =	1982.4	67.96	29.17	OK
B WXY	(2990. + 1514. +) /2.3 =	1958.3	72.77	26.91	OK
B WXY	(2990. + 1514. +) /2.3 =	1958.2	72.77	26.91	OK
B WXY	(3061. + 1501. +) /2.3 =	1983.6	68.64	28.90	OK
B WXY	(3061. + 1501. +) /2.3 =	1983.6	68.65	28.89	OK
B WY	(2297. + 1726. +) /2.3 =	1748.9	140.36	12.46	OK
B WY	(2297. + 1726. +) /2.3 =	1748.9	140.33	12.46	OK
B WY	(2229. + 1724. +) /2.3 =	1718.6	161.31	10.65	OK
B WY	(2229. + 1724. +) /2.3 =	1718.6	161.27	10.66	OK
B WY	(2305. + 1727. +) /2.3 =	1752.8	140.09	12.51	OK
B WY	(2305. + 1727. +) /2.3 =	1752.8	140.07	12.51	OK
B WY	(2237. + 1725. +) /2.3 =	1722.8	160.45	10.74	OK
B WY	(2237. + 1725. +) /2.3 =	1722.8	160.41	10.74	OK
B WY	(2760. + 1715. +) /2.3 =	1945.5	75.28	25.84	OK
B WY	(2760. + 1715. +) /2.3 =	1945.5	75.29	25.84	OK
B WY	(2831. + 1710. +) /2.3 =	1974.4	70.38	28.06	OK
B WY	(2831. + 1710. +) /2.3 =	1974.4	70.38	28.05	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')			
COMB			kPa			
B WY	(2763. + 1716. +) /2.3 =	1947.2	75.96	25.64	OK	
B WY	(2763. + 1716. +) /2.3 =	1947.2	75.96	25.63	OK	
B WY	(2833. + 1711. +) /2.3 =	1975.8	71.07	27.80	OK	
B WY	(2833. + 1711. +) /2.3 =	1975.8	71.08	27.80	OK	
D I	(2219. + 1744. +) /2.3 =	1722.9	171.47	10.05	OK	
D I	(2227. + 1745. +) /2.3 =	1726.8	170.06	10.15	OK	
D I	(2114. + 1740. +) /2.3 =	1676.0	228.48	7.34	OK	
D I	(2124. + 1741. +) /2.3 =	1680.3	224.66	7.48	OK	
D I	(2227. + 1745. +) /2.3 =	1727.1	170.27	10.14	OK	
D I	(2235. + 1746. +) /2.3 =	1731.0	168.97	10.24	OK	
D I	(2124. + 1742. +) /2.3 =	1680.7	224.84	7.48	OK	
D I	(2133. + 1743. +) /2.3 =	1685.0	221.32	7.61	OK	
D I	(2975. + 1719. +) /2.3 =	2040.8	63.18	32.30	OK	
D I	(2975. + 1720. +) /2.3 =	2041.2	63.85	31.97	OK	
D I	(3023. + 1743. +) /2.3 =	2072.0	62.53	33.13	OK	
D I	(3024. + 1743. +) /2.3 =	2072.5	63.11	32.84	OK	
D I	(2976. + 1720. +) /2.3 =	2041.5	63.88	31.96	OK	
D I	(2975. + 1721. +) /2.3 =	2041.9	64.55	31.63	OK	
D I	(3023. + 1743. +) /2.3 =	2072.4	63.23	32.77	OK	
D I	(3024. + 1743. +) /2.3 =	2072.8	63.81	32.49	OK	
D W	(1020. + 473. +) /2.3 =	649.2	132.44	4.90	OK	
D W	(1028. + 477. +) /2.3 =	654.4	132.29	4.95	OK	
D W	(992. + 492. +) /2.3 =	645.1	164.98	3.91	OK	
D W	(1000. + 496. +) /2.3 =	650.3	164.36	3.96	OK	
D W	(1037. + 483. +) /2.3 =	660.7	132.36	4.99	OK	
D W	(1045. + 487. +) /2.3 =	665.8	132.23	5.04	OK	
D W	(1009. + 502. +) /2.3 =	656.7	164.02	4.00	OK	
D W	(1016. + 506. +) /2.3 =	661.9	163.45	4.05	OK	
D W	(2649. + 1715. +) /2.3 =	1897.6	84.04	22.58	OK	
D W	(2651. + 1716. +) /2.3 =	1898.5	84.37	22.50	OK	
D W	(2764. + 1710. +) /2.3 =	1945.2	74.84	25.99	OK	
D W	(2765. + 1710. +) /2.3 =	1945.9	75.18	25.88	OK	
D W	(2653. + 1716. +) /2.3 =	1899.8	84.68	22.44	OK	
D W	(2655. + 1717. +) /2.3 =	1900.7	85.01	22.36	OK	
D W	(2767. + 1711. +) /2.3 =	1946.9	75.52	25.78	OK	
D W	(2768. + 1711. +) /2.3 =	1947.5	75.86	25.67	OK	
DAA	(2214. + 1741. +) /2.3 =	1719.6	173.44	9.91	OK	
DAA	(2214. + 1741. +) /2.3 =	1719.6	173.40	9.92	OK	
DAA	(2107. + 1737. +) /2.3 =	1671.3	232.43	7.19	OK	



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')			
COMB			kPa			
DAA	(2107. + 1737. +) /2.3 =	1671.4	232.36	7.19	OK	
DAA	(2222. + 1743. +) /2.3 =	1723.8	172.20	10.01	OK	
DAA	(2222. + 1743. +) /2.3 =	1723.8	172.16	10.01	OK	
DAA	(2117. + 1738. +) /2.3 =	1676.1	228.61	7.33	OK	
DAA	(2117. + 1738. +) /2.3 =	1676.1	228.53	7.33	OK	
DAA	(2965. + 1717. +) /2.3 =	2035.9	63.88	31.87	OK	
DAA	(2965. + 1718. +) /2.3 =	2035.9	63.88	31.87	OK	
DAA	(3019. + 1738. +) /2.3 =	2068.3	62.58	33.05	OK	
DAA	(3019. + 1738. +) /2.3 =	2068.3	62.57	33.06	OK	
DAA	(2966. + 1718. +) /2.3 =	2036.6	64.58	31.54	OK	
DAA	(2966. + 1718. +) /2.3 =	2036.6	64.58	31.53	OK	
DAA	(3019. + 1738. +) /2.3 =	2068.6	63.28	32.69	OK	
DAA	(3020. + 1738. +) /2.3 =	2068.7	63.27	32.70	OK	
A	(2563. + 1778. +) /2.3 =	1887.5	89.59	21.07	OK	
A	(2563. + 1778. +) /2.3 =	1887.5	89.58	21.07	OK	
A	(2453. + 1781. +) /2.3 =	1841.0	104.75	17.58	OK	
A	(2454. + 1781. +) /2.3 =	1841.0	104.74	17.58	OK	
A	(2567. + 1778. +) /2.3 =	1889.2	89.92	21.01	OK	
A	(2567. + 1778. +) /2.3 =	1889.2	89.91	21.01	OK	
A	(2458. + 1781. +) /2.3 =	1843.1	104.91	17.57	OK	
A	(2458. + 1781. +) /2.3 =	1843.1	104.90	17.57	OK	
A	(2669. + 1806. +) /2.3 =	1945.7	81.41	23.90	OK	
A	(2669. + 1806. +) /2.3 =	1945.7	81.40	23.90	OK	
A	(2558. + 1811. +) /2.3 =	1899.6	93.73	20.27	OK	
A	(2558. + 1811. +) /2.3 =	1899.6	93.72	20.27	OK	
A	(2672. + 1806. +) /2.3 =	1947.0	81.80	23.80	OK	
A	(2672. + 1806. +) /2.3 =	1947.0	81.79	23.81	OK	
A	(2562. + 1811. +) /2.3 =	1901.2	94.02	20.22	OK	
A	(2562. + 1811. +) /2.3 =	1901.2	94.01	20.22	OK	
B AA	(2461. + 1741. +) /2.3 =	1826.9	98.30	18.59	OK	
B AA	(2461. + 1741. +) /2.3 =	1826.9	98.28	18.59	OK	
B AA	(2410. + 1741. +) /2.3 =	1804.8	106.25	16.99	OK	
B AA	(2410. + 1741. +) /2.3 =	1804.9	106.24	16.99	OK	
B AA	(2466. + 1741. +) /2.3 =	1829.1	98.54	18.56	OK	
B AA	(2466. + 1741. +) /2.3 =	1829.1	98.52	18.57	OK	
B AA	(2415. + 1742. +) /2.3 =	1807.3	106.39	16.99	OK	
B AA	(2415. + 1742. +) /2.3 =	1807.3	106.38	16.99	OK	
B AA	(2930. + 1718. +) /2.3 =	2020.9	58.76	34.39	OK	
B AA	(2930. + 1718. +) /2.3 =	2020.9	58.77	34.39	OK	





Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')			
COMB			kPa			
B AA	(2984. + 1713. +) /2.3 =	2042.1	56.25	36.31	OK	
B AA	(2984. + 1713. +) /2.3 =	2042.1	56.25	36.30	OK	
B AA	(2931. + 1718. +) /2.3 =	2021.6	59.23	34.13	OK	
B AA	(2931. + 1718. +) /2.3 =	2021.5	59.23	34.13	OK	
B AA	(2984. + 1714. +) /2.3 =	2042.6	56.71	36.02	OK	
B AA	(2984. + 1714. +) /2.3 =	2042.6	56.72	36.01	OK	
B WX	(2918. + 1424. +) /2.3 =	1887.6	77.13	24.47	OK	
B WX	(2918. + 1424. +) /2.3 =	1887.6	77.13	24.47	OK	
B WX	(2865. + 1434. +) /2.3 =	1869.0	81.22	23.01	OK	
B WX	(2865. + 1434. +) /2.3 =	1869.1	81.22	23.01	OK	
B WX	(2919. + 1426. +) /2.3 =	1889.3	77.56	24.36	OK	
B WX	(2919. + 1426. +) /2.3 =	1889.3	77.55	24.36	OK	
B WX	(2866. + 1437. +) /2.3 =	1870.8	81.64	22.92	OK	
B WX	(2866. + 1437. +) /2.3 =	1870.9	81.63	22.92	OK	
B WX	(2991. + 1419. +) /2.3 =	1917.5	72.81	26.34	OK	
B WX	(2991. + 1419. +) /2.3 =	1917.5	72.80	26.34	OK	
B WX	(2941. + 1432. +) /2.3 =	1901.7	76.44	24.88	OK	
B WX	(2942. + 1432. +) /2.3 =	1901.7	76.44	24.88	OK	
B WX	(2992. + 1422. +) /2.3 =	1918.9	73.25	26.20	OK	
B WX	(2992. + 1422. +) /2.3 =	1918.9	73.24	26.20	OK	
B WX	(2942. + 1435. +) /2.3 =	1903.2	76.87	24.76	OK	
B WX	(2942. + 1435. +) /2.3 =	1903.3	76.87	24.76	OK	
B WXY	(2457. + 1537. +) /2.3 =	1736.4	117.13	14.82	OK	
B WXY	(2457. + 1537. +) /2.3 =	1736.5	117.12	14.83	OK	
B WXY	(2402. + 1540. +) /2.3 =	1713.9	127.37	13.46	OK	
B WXY	(2402. + 1540. +) /2.3 =	1713.9	127.35	13.46	OK	
B WXY	(2462. + 1539. +) /2.3 =	1739.4	117.20	14.84	OK	
B WXY	(2462. + 1539. +) /2.3 =	1739.4	117.19	14.84	OK	
B WXY	(2408. + 1542. +) /2.3 =	1717.1	127.28	13.49	OK	
B WXY	(2408. + 1542. +) /2.3 =	1717.1	127.26	13.49	OK	
B WXY	(2948. + 1489. +) /2.3 =	1929.3	68.03	28.36	OK	
B WXY	(2948. + 1489. +) /2.3 =	1929.3	68.03	28.36	OK	
B WXY	(3002. + 1481. +) /2.3 =	1948.9	65.00	29.99	OK	
B WXY	(3002. + 1481. +) /2.3 =	1948.9	65.00	29.98	OK	
B WXY	(2949. + 1492. +) /2.3 =	1930.6	68.48	28.19	OK	
B WXY	(2949. + 1492. +) /2.3 =	1930.6	68.49	28.19	OK	
B WXY	(3002. + 1483. +) /2.3 =	1950.1	65.46	29.79	OK	
B WXY	(3002. + 1483. +) /2.3 =	1950.0	65.46	29.79	OK	
B WY	(2234. + 1717. +) /2.3 =	1717.5	141.51	12.14	OK	



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
B WY	(2234. + 1717. +) /2.3 =	1717.6	141.49	12.14	OK
B WY	(2183. + 1715. +) /2.3 =	1694.9	158.60	10.69	OK
B WY	(2184. + 1715. +) /2.3 =	1694.9	158.57	10.69	OK
B WY	(2240. + 1718. +) /2.3 =	1720.7	141.01	12.20	OK
B WY	(2240. + 1718. +) /2.3 =	1720.7	140.99	12.20	OK
B WY	(2190. + 1716. +) /2.3 =	1698.3	157.68	10.77	OK
B WY	(2190. + 1716. +) /2.3 =	1698.3	157.65	10.77	OK
B WY	(2694. + 1711. +) /2.3 =	1915.3	71.89	26.64	OK
B WY	(2694. + 1711. +) /2.3 =	1915.3	71.89	26.64	OK
B WY	(2747. + 1708. +) /2.3 =	1936.8	68.16	28.42	OK
B WY	(2746. + 1708. +) /2.3 =	1936.8	68.16	28.41	OK
B WY	(2697. + 1712. +) /2.3 =	1916.8	72.33	26.50	OK
B WY	(2697. + 1712. +) /2.3 =	1916.8	72.33	26.50	OK
B WY	(2749. + 1709. +) /2.3 =	1938.1	68.61	28.25	OK
B WY	(2749. + 1709. +) /2.3 =	1938.1	68.61	28.25	OK
D I	(2163. + 1736. +) /2.3 =	1695.3	175.21	9.68	OK
D I	(2172. + 1738. +) /2.3 =	1700.0	172.93	9.83	OK
D I	(2088. + 1733. +) /2.3 =	1661.6	220.58	7.53	OK
D I	(2099. + 1735. +) /2.3 =	1666.6	215.92	7.72	OK
D I	(2170. + 1737. +) /2.3 =	1698.7	173.80	9.77	OK
D I	(2179. + 1738. +) /2.3 =	1703.3	171.65	9.92	OK
D I	(2096. + 1734. +) /2.3 =	1665.2	217.52	7.66	OK
D I	(2106. + 1736. +) /2.3 =	1670.2	213.15	7.84	OK
D I	(2916. + 1718. +) /2.3 =	2014.8	59.48	33.88	OK
D I	(2916. + 1720. +) /2.3 =	2015.6	60.15	33.51	OK
D I	(3002. + 1712. +) /2.3 =	2049.5	55.84	36.71	OK
D I	(3002. + 1713. +) /2.3 =	2049.9	56.50	36.28	OK
D I	(2917. + 1719. +) /2.3 =	2015.5	59.94	33.62	OK
D I	(2917. + 1720. +) /2.3 =	2016.3	60.61	33.27	OK
D I	(3003. + 1712. +) /2.3 =	2049.9	56.30	36.41	OK
D I	(3002. + 1714. +) /2.3 =	2050.3	56.96	35.99	OK
D W	(862. + 374. +) /2.3 =	537.4	127.73	4.21	OK
D W	(871. + 378. +) /2.3 =	543.2	127.46	4.26	OK
D W	(846. + 386. +) /2.3 =	535.5	151.30	3.54	OK
D W	(854. + 391. +) /2.3 =	541.3	150.65	3.59	OK
D W	(875. + 381. +) /2.3 =	546.0	127.52	4.28	OK
D W	(883. + 386. +) /2.3 =	551.7	127.27	4.33	OK
D W	(858. + 393. +) /2.3 =	544.1	150.58	3.61	OK
D W	(867. + 398. +) /2.3 =	549.9	149.97	3.67	OK

GENERAL CONTRACTOR  IRICAV2	ALTA SORVEGLIANZA  GRUPPO FERROVIE DELLO STATO ITALIANE	Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 283 di 336
Relazione di calcolo pali di alimentazione						

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')			
COMB			kPa			
D W	(2556. + 1710. +) /2.3 =	1855.0	83.59	22.19	OK	
D W	(2558. + 1711. +) /2.3 =	1856.2	83.89	22.13	OK	
D W	(2642. + 1708. +) /2.3 =	1891.0	75.96	24.89	OK	
D W	(2643. + 1708. +) /2.3 =	1892.0	76.29	24.80	OK	
D W	(2560. + 1711. +) /2.3 =	1857.0	83.97	22.12	OK	
D W	(2562. + 1712. +) /2.3 =	1858.2	84.27	22.05	OK	
D W	(2645. + 1708. +) /2.3 =	1892.6	76.38	24.78	OK	
D W	(2646. + 1709. +) /2.3 =	1893.7	76.71	24.69	OK	
DAA	(2158. + 1733. +) /2.3 =	1691.7	177.50	9.53	OK	
DAA	(2158. + 1733. +) /2.3 =	1691.8	177.46	9.53	OK	
DAA	(2080. + 1730. +) /2.3 =	1656.4	225.09	7.36	OK	
DAA	(2080. + 1730. +) /2.3 =	1656.5	225.03	7.36	OK	
DAA	(2164. + 1734. +) /2.3 =	1695.1	176.04	9.63	OK	
DAA	(2164. + 1734. +) /2.3 =	1695.1	176.00	9.63	OK	
DAA	(2087. + 1731. +) /2.3 =	1660.1	221.85	7.48	OK	
DAA	(2088. + 1731. +) /2.3 =	1660.1	221.79	7.49	OK	
DAA	(2905. + 1717. +) /2.3 =	2009.5	60.21	33.38	OK	
DAA	(2905. + 1717. +) /2.3 =	2009.5	60.21	33.37	OK	
DAA	(2991. + 1710. +) /2.3 =	2043.9	56.30	36.31	OK	
DAA	(2991. + 1710. +) /2.3 =	2043.9	56.30	36.30	OK	
DAA	(2906. + 1717. +) /2.3 =	2010.3	60.67	33.13	OK	
DAA	(2906. + 1717. +) /2.3 =	2010.2	60.68	33.13	OK	
DAA	(2991. + 1711. +) /2.3 =	2044.4	56.76	36.02	OK	

#### Ribaltamento – verifiche sismiche

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
Comb1	558.21	409.35	21.08	126.74	3.23	OK
Comb2	558.21	409.35	21.08	126.74	3.23	OK
Comb3	558.21	409.35	21.08	16.56	24.72	OK
Comb4	558.21	409.35	21.08	16.56	24.72	OK
Comb5	558.21	409.35	70.25	77.57	5.28	OK
Comb6	558.21	409.35	70.25	77.57	5.28	OK

GENERAL CONTRACTOR  <b>IRICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE
Relazione di calcolo pali di alimentazione	Progetto IN17    Lotto 10    Codifica Documento E I2 CL OC 00 0 0 010    Rev. A    Foglio 284 di 336

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
Comb7	558.21	409.35	70.25	35.41	7.95	OK
Comb8	558.21	409.35	70.25	35.41	7.95	OK

#### Scorrimento – verifiche sismiche

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$		$E_d$	Rd/Ed	
	kN		kN		
COMB					
Comb1	264.3		101.8	<b>2.60</b>	OK
Comb2	264.3		101.8	<b>2.60</b>	OK
Comb3	264.3		93.6	<b>2.82</b>	OK
Comb4	264.3		93.6	<b>2.82</b>	OK
Comb5	264.3		99.0	<b>2.67</b>	OK
Comb6	264.3		99.0	<b>2.67</b>	OK
Comb7	264.3		97.5	<b>2.71</b>	OK
Comb8	264.3		97.5	<b>2.71</b>	OK

#### Capacità portante – verifiche sismiche

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	Rd		$E_d$	Rd/Ed	
	$q_{u,d}$ kPa		$q_{E,d} = N / (B' \cdot L')$		
COMB			kPa		
Comb1	$(1497. + 695. +) / 2.3 =$		953.1	84.88	11.23 OK
Comb2	$(1497. + 695. +) / 2.3 =$		953.1	84.88	11.23 OK
Comb3	$(1756. + 710. +) / 2.3 =$		1072.2	61.07	17.56 OK
Comb4	$(1756. + 710. +) / 2.3 =$		1072.2	61.07	17.56 OK
Comb5	$(1739. + 653. +) / 2.3 =$		1040.1	79.58	13.07 OK
Comb6	$(1739. + 653. +) / 2.3 =$		1040.1	79.58	13.07 OK
Comb7	$(1807. + 636. +) / 2.3 =$		1062.4	70.61	15.05 OK
Comb8	$(1807. + 636. +) / 2.3 =$		1062.4	70.61	15.05 OK

Le verifiche sono soddisfatte.



12.17 Sintesi risultati LC9

TITOLO: **Caso di carico 9 - combinazioni statiche**

FONDAZIONI A PLINTO

DESIGN ASSUMPTION

piano campagna sostanzialmente orizzontale

angolo d'attrito caratteristico  $\phi'_k$

coesione  $c'$

angolo d'attrito caratteristico  $\phi'_k$  alla base

coesione alla base  $c'$

coefficiente  $\gamma_p$

coefficiente  $\gamma_c'$

coefficiente  $\gamma_k$  capacità portante

coefficiente  $\gamma_k$  scorrimento

coefficiente  $\gamma_k$  spinta passiva

angolo d'attrito di design  $\phi'_d$

coesione di design  $c'_d$

coeff. attrito di design  $\mu'_d$

coesione alla base di design

Dimensione fondazione B[m] (LONGITUDINALE)

Dimensione fondazione L [m] (TRASVERSALE)

Profondità da piano campagna D [m]

Altezza plinto [m] Hp

Dimensione bagegiolo b[m] (LONGITUDINALE)

Dimensione maggiore bagegiolo l [m] (TRASVERSALE)

Altezza bagegiolo [m] Hb

Altezza terreno sopraplinto [m] Ht

$q'$  = carico permanente ai lati

$\gamma$  = peso specifico medio sopra la fondazione

$\gamma_f$  = peso specifico medio sotto la fondazione

opzione calcolo coeff.  $S_{\phi}$  e  $S_{\gamma}$

opzione calcolo per tenere in conto peso terreno di ricoprimento

Peso specifico medio c.a.

Peso proprio plinto + bagegiolo + terreno sovrastante [kN]

Quota baricentro plinto + bagegiolo + terreno sovrastante vs p.f. [kN]

Coefficiente sismico kh

Coefficiente sismico kv

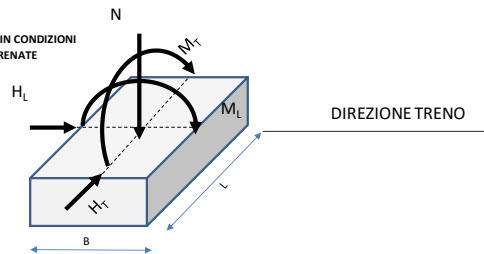
Azione inerziale orizzontale plinto

Azione inerziale verticale plinto

DA2

38	°	0.663	rad
0	kPa		
38	°	0.663	rad
0	kPa		
1.00			
1.00			
2.30			
1.10			
1.40			
38.00	°	0.663	rad
0.00	kPa		
0.78			
0.00	kPa		
2.2	m		
2.2	m		
2.2	m		
2.2	m		
0.8	m		
0.8	m		
0.8	m		
0.5	m		
0.25	m		
44	kPa		
20	kN/m <sup>3</sup>		
20	kN/m <sup>3</sup>		
1			
0	(1 si - 0 no)		
25	kN/m <sup>3</sup>		
274	kN		
1.30	m		
0.000	g		
0.000	g		+ downward
0.00	kN		
0.00	kN		

VERIFICA IN CONDIZIONI DRENATE



(NB: coefficiente correttivo per rapporto D/B non considerato)

(valore da stabilirsi in base alla profondità di falda)  
**(0= Lancellotta ecc., 1 = originale EC7)**  
si useranno le formule originarie di EC7

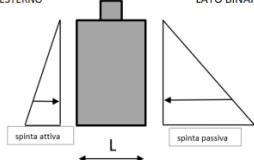
**Eccentricità degli scarichi rispetto a baricentro fondazione**

eccentricità longitudinale eL	0	m	+ se concorde con i momenti del traliccio
eccentricità trasversale eT	0.1	m	+ se concorde con i momenti del traliccio

**Coefficienti di spinta di progetto**

coefficiente di spinta attiva statico Ka	0.228	-
coefficiente di spinta attiva sismico Ka,E	0.483	-
coefficiente di spinta passiva statico Kp	4.395	-
coefficiente di spinta passiva sismico Kp,E	3.251	-
coeff. parziale riduttivo della spinta passiva	1.40	-
moltiplicatore della spinta passiva $\alpha$	0.00	long 0.49 trasv
contributo delle spinte frontali long - taglio	0	kN statico 0 kN sismico
contributo delle spinte frontali long - momer	0	kNm statico 0 kNm sismico
contributo delle spinte frontali trasv - taglio	-139.5	kN statico 0 kN sismico
contributo delle spinte frontali trasv - mome	-102.3	kNm statico 0 kNm sismico

LATO ESTERNO LATO BINARIO



CALCOLI PRELIMINARI: coefficienti di capacità portante indipendenti dai carichi

$N_{\phi}$ =	48.93	$B_{\phi}$ =	1
$N_{\gamma}$ =	74.90	$B_{\gamma}$ =	1
$N_c$ =	61.35	$B_c$ =	1

**SINTESI RISULTATI**

Capacità portante	$F_s$ min =	3.98	n. Verif. Neg.	0
Scorrimento	$F_s$ min =	1.6	n. Verif. Neg.	0
Ribaltamento	$F_s$ min =	1.18	n. Verif. Neg.	0



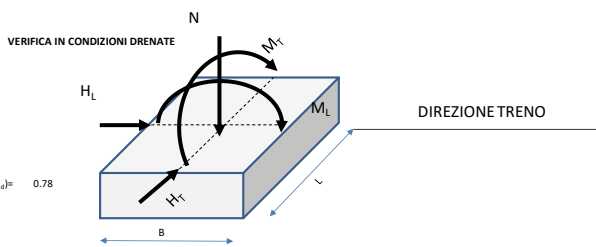
TITOLO: **Caso di carico 9 - combinazioni sismiche**

**FONDAZIONI A PLINTO**

**DESIGN ASSUMPTION**

**piano campagna sostanzialmente orizzontale**

angolo d'attrito caratteristico $\phi'_s$	38	°	0.663	rad	
coesione $c'$	0	kPa	+		
angolo d'attrito caratteristico $\phi'_s$ , alla base	38	°	0.663	rad	
coesione alla base $c'$	0	kPa	+		
coefficiente $\gamma_s$	1.00				
coefficiente $\gamma_c$	1.00				
coefficiente $\gamma_s$ , capacità portante	2.30				
coefficiente $\gamma_s$ , scorrimento	1.10				
coefficiente $\gamma_s$ , spinta passiva	1.40				
angolo d'attrito di design $\phi'_d$	38.00	°	0.663	rad	$\tan(\phi'_d) = 0.78$
coesione di design $c'_d$	0.00	kPa			
coeff. attrito di design $\mu'_d$	0.78				
coesione alla base di design	0.00	kPa			
Dimensione fondazione B[m] (LONGITUDINALE)	2.2	m			
Dimensione fondazione L [m] (TRASVERSALE)	2.2	m			
Profondità da piano campagna D [m]	2.2	m			(NB: coefficiente correttivo per rapporto D/B non considerato)
Altezza plinto [m] H <sub>p</sub>	2.2	m			
Dimensione baggio b[m] (LONGITUDINALE)	0.8	m			
Dimensione maggiore baggio l [m] (TRASVERSALE)	0.8	m			
Altezza baggio [m] H <sub>b</sub>	0.5	m			
Altezza terreno sopra plinto [m] H <sub>t</sub>	0.25	m			
$q'$ = carico permanente ai lati	44	kPa			
$\gamma$ = peso specifico medio sopra la fondazione	20	kN/m <sup>3</sup>			(valore da stabilirsi in base alla profondità di falda)
$\gamma_f$ = peso specifico medio sotto la fondazione	20	kN/m <sup>3</sup>			(0 = Lancellotta ecc., 1 = originale EC7)
opzione calcolo coeff. S <sub>x</sub> e S <sub>y</sub>	1				si useranno le formule originarie di EC7
opzione calcolo per tenere in conto peso terreno di ricoprimento	0	(1 si - 0 no)			
Peso specifico medio c.a.	25	kN/m <sup>3</sup>			
Peso proprio plinto + baggio + terreno sovrastante [kN]	274	kN			
Quota baricentro plinto + baggio + terreno sovrastante vs p.f. [kN]	1.30	m			
Coefficiente sismico k <sub>h</sub>	0.231	g			
Coefficiente sismico k <sub>v</sub>	-0.116	g			+ downward
Azione inerziale orizzontale plinto	63.34	kN			
Azione inerziale verticale plinto	-31.67	kN			

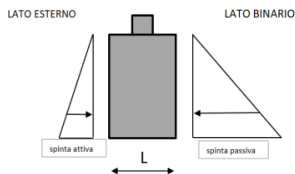


**Eccentricità degli scarichi rispetto a baricentro fondazione**

eccentricità longitudinale e <sub>L</sub>	0	m	+ se concorde con i momenti del traliccio
eccentricità trasversale e <sub>T</sub>	0.1	m	+ se concorde con i momenti del traliccio

**Coefficienti di spinta di progetto**

coefficiente di spinta attiva statico K <sub>a</sub>	0.228	-	
coefficiente di spinta attiva sismico K <sub>a,E</sub>	0.483	-	
coefficiente di spinta passiva statico K <sub>p</sub>	4.395	-	
coefficiente di spinta passiva sismico K <sub>p,E</sub>	3.251	-	
coeff. parziale riduttivo della spinta passiva $\gamma_{re}$	1.40	-	
moltiplicatore della spinta passiva $\alpha$	0.00	long 0.00	trasv
contributo delle spinte frontali long - taglio	0	kN	statico 0 kN sismico
contributo delle spinte frontali long - momento	0	kNm	statico 0 kNm sismico
contributo delle spinte frontali trasv - taglio	0	kN	statico 0 kN sismico
contributo delle spinte frontali trasv - momento	0	kNm	statico 0 kNm sismico



CALCOLI PRELIMINARI: coefficienti di capacità portante indipendenti dai carichi

N <sub>0</sub> = 48.93	B <sub>0</sub> = 1
N <sub>1</sub> = 74.90	B <sub>1</sub> = 1
N <sub>2</sub> = 61.35	B <sub>2</sub> = 1

SINTESI RISULTATI			
Capacità portante	F <sub>s, min</sub> = 12.07	n. Verif. Neg.	0
Scorrimento	F <sub>s, min</sub> = 2.67	n. Verif. Neg.	0
Ribaltamento	F <sub>s, min</sub> = 4.42	n. Verif. Neg.	0

Le verifiche sono soddisfatte.

GENERAL CONTRACTOR  <b>IRICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE
Relazione di calcolo pali di alimentazione	Progetto IN17    Lotto 10    Codifica Documento E I2 CL OC 00 0 0 010    Rev. A    Foglio 287 di 336

## 12.18 Verifiche di dettaglio

Ribaltamento – verifiche statiche

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
A	315.80	315.80	0.00	36.79	8.58	OK
A	315.80	315.80	0.00	16.33	19.34	OK
A	315.80	315.80	0.00	64.84	4.87	OK
A	315.80	315.80	0.00	44.38	7.12	OK
A	320.06	320.06	0.00	37.18	8.61	OK
A	320.06	320.06	0.00	16.72	19.15	OK
A	320.06	320.06	0.00	65.22	4.91	OK
A	320.06	320.06	0.00	44.76	7.15	OK
A	315.80	315.80	0.00	18.26	17.29	OK
A	315.80	315.80	0.00	6.66	47.39	OK
A	315.80	315.80	0.00	44.42	7.11	OK
A	315.80	315.80	0.00	23.96	13.18	OK
A	320.06	320.06	0.00	18.65	17.16	OK
A	320.06	320.06	0.00	7.05	45.40	OK
A	320.06	320.06	0.00	44.81	7.14	OK
A	320.06	320.06	0.00	24.35	13.14	OK
B AA	315.80	315.80	0.00	97.87	3.23	OK
B AA	315.80	315.80	0.00	85.65	3.69	OK
B AA	315.80	315.80	0.00	108.54	2.91	OK
B AA	315.80	315.80	0.00	96.32	3.28	OK
B AA	320.06	320.06	0.00	98.25	3.26	OK
B AA	320.06	320.06	0.00	86.03	3.72	OK
B AA	320.06	320.06	0.00	108.93	2.94	OK
B AA	320.06	320.06	0.00	96.71	3.31	OK
B AA	315.80	315.80	0.00	108.19	2.92	OK
B AA	315.80	315.80	0.00	120.42	2.62	OK
B AA	315.80	315.80	0.00	97.52	3.24	OK
B AA	315.80	315.80	0.00	109.74	2.88	OK
B AA	320.06	320.06	0.00	108.58	2.95	OK
B AA	320.06	320.06	0.00	120.80	2.65	OK
B AA	320.06	320.06	0.00	97.91	3.27	OK
B AA	320.06	320.06	0.00	110.13	2.91	OK
B WX	315.80	315.80	69.67	4.29	4.53	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WX	315.80	315.80	69.67	10.51	4.53	OK
B WX	315.80	315.80	69.67	14.96	4.53	OK
B WX	315.80	315.80	69.67	3.58	4.53	OK
B WX	320.06	320.06	69.67	4.68	4.59	OK
B WX	320.06	320.06	69.67	10.90	4.59	OK
B WX	320.06	320.06	69.67	15.35	4.59	OK
B WX	320.06	320.06	69.67	3.96	4.59	OK
B WX	315.80	315.80	69.67	14.62	4.53	OK
B WX	315.80	315.80	69.67	26.84	4.53	OK
B WX	315.80	315.80	69.67	4.95	4.53	OK
B WX	315.80	315.80	69.67	16.17	4.53	OK
B WX	320.06	320.06	69.67	15.01	4.59	OK
B WX	320.06	320.06	69.67	27.23	4.59	OK
B WX	320.06	320.06	69.67	5.33	4.59	OK
B WX	320.06	320.06	69.67	16.56	4.59	OK
B WXY	315.80	315.80	48.77	111.08	2.84	OK
B WXY	315.80	315.80	48.77	98.86	3.19	OK
B WXY	315.80	315.80	48.77	121.75	2.59	OK
B WXY	315.80	315.80	48.77	109.53	2.88	OK
B WXY	320.06	320.06	48.77	111.47	2.87	OK
B WXY	320.06	320.06	48.77	99.25	3.22	OK
B WXY	320.06	320.06	48.77	122.14	2.62	OK
B WXY	320.06	320.06	48.77	109.92	2.91	OK
B WXY	315.80	315.80	48.77	121.41	2.60	OK
B WXY	315.80	315.80	48.77	133.63	2.36	OK
B WXY	315.80	315.80	48.77	110.74	2.85	OK
B WXY	315.80	315.80	48.77	122.96	2.57	OK
B WXY	320.06	320.06	48.77	121.80	2.63	OK
B WXY	320.06	320.06	48.77	134.02	2.39	OK
B WXY	320.06	320.06	48.77	111.12	2.88	OK
B WXY	320.06	320.06	48.77	123.35	2.59	OK
B WY	315.80	315.80	0.00	156.85	2.01	OK
B WY	315.80	315.80	0.00	144.63	2.18	OK
B WY	315.80	315.80	0.00	167.52	1.89	OK
B WY	315.80	315.80	0.00	155.30	2.03	OK
B WY	320.06	320.06	0.00	157.24	2.04	OK
B WY	320.06	320.06	0.00	145.01	2.21	OK
B WY	320.06	320.06	0.00	167.91	1.91	OK
B WY	320.06	320.06	0.00	155.69	2.06	OK





Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WY	315.80	315.80	0.00	167.18	1.89	OK
B WY	315.80	315.80	0.00	179.40	1.76	OK
B WY	315.80	315.80	0.00	156.50	2.02	OK
B WY	315.80	315.80	0.00	168.73	1.87	OK
B WY	320.06	320.06	0.00	167.56	1.91	OK
B WY	320.06	320.06	0.00	179.78	1.78	OK
B WY	320.06	320.06	0.00	156.89	2.04	OK
B WY	320.06	320.06	0.00	169.11	1.89	OK
D I	315.80	315.80	0.00	163.86	1.93	OK
D I	319.89	319.89	0.00	147.50	2.17	OK
D I	318.64	318.64	0.00	184.75	1.72	OK
D I	322.73	322.73	0.00	168.40	1.92	OK
D I	320.06	320.06	0.00	164.24	1.95	OK
D I	324.15	324.15	0.00	147.89	2.19	OK
D I	322.90	322.90	0.00	185.14	1.74	OK
D I	326.99	326.99	0.00	168.78	1.94	OK
D I	315.80	315.80	0.00	136.06	2.32	OK
D I	319.89	319.89	0.00	153.16	2.09	OK
D I	318.64	318.64	0.00	115.68	2.75	OK
D I	322.73	322.73	0.00	132.78	2.43	OK
D I	320.06	320.06	0.00	136.44	2.35	OK
D I	324.15	324.15	0.00	153.55	2.11	OK
D I	322.90	322.90	0.00	116.06	2.78	OK
D I	326.99	326.99	0.00	133.16	2.46	OK
D W	315.80	315.80	0.00	155.21	2.03	OK
D W	317.85	317.85	0.00	138.80	2.29	OK
D W	317.22	317.22	0.00	175.98	1.80	OK
D W	319.27	319.27	0.00	159.57	2.00	OK
D W	320.06	320.06	0.00	155.60	2.06	OK
D W	322.10	322.10	0.00	139.19	2.31	OK
D W	321.48	321.48	0.00	176.37	1.82	OK
D W	323.52	323.52	0.00	159.95	2.02	OK
D W	315.80	315.80	0.00	229.73	1.37	OK
D W	317.85	317.85	0.00	246.51	1.29	OK
D W	317.22	317.22	0.00	209.22	1.52	OK
D W	319.27	319.27	0.00	226.00	1.41	OK
D W	320.06	320.06	0.00	230.11	1.39	OK
D W	322.10	322.10	0.00	246.90	1.30	OK
D W	321.48	321.48	0.00	209.60	1.53	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
D W	323.52	323.52	0.00	226.39	1.43	OK
DAA	317.85	317.85	0.00	165.95	1.92	OK
DAA	317.85	317.85	0.00	149.48	2.13	OK
DAA	319.27	319.27	0.00	186.72	1.71	OK
DAA	319.27	319.27	0.00	170.25	1.88	OK
DAA	322.10	322.10	0.00	166.34	1.94	OK
DAA	322.10	322.10	0.00	149.87	2.15	OK
DAA	323.52	323.52	0.00	187.11	1.73	OK
DAA	323.52	323.52	0.00	170.64	1.90	OK
DAA	317.85	317.85	0.00	138.42	2.30	OK
DAA	317.85	317.85	0.00	154.88	2.05	OK
DAA	319.27	319.27	0.00	117.91	2.71	OK
DAA	319.27	319.27	0.00	134.37	2.38	OK
DAA	322.10	322.10	0.00	138.80	2.32	OK
DAA	322.10	322.10	0.00	155.27	2.07	OK
DAA	323.52	323.52	0.00	118.29	2.73	OK
DAA	323.52	323.52	0.00	134.76	2.40	OK
A	284.22	284.22	0.00	34.13	8.33	OK
A	284.22	284.22	0.00	20.49	13.87	OK
A	284.22	284.22	0.00	52.83	5.38	OK
A	284.22	284.22	0.00	39.19	7.25	OK
A	287.06	287.06	0.00	34.39	8.35	OK
A	287.06	287.06	0.00	20.75	13.83	OK
A	287.06	287.06	0.00	53.09	5.41	OK
A	287.06	287.06	0.00	39.45	7.28	OK
A	284.22	284.22	0.00	16.34	17.39	OK
A	284.22	284.22	0.00	8.10	35.11	OK
A	284.22	284.22	0.00	32.41	8.77	OK
A	284.22	284.22	0.00	19.93	14.26	OK
A	287.06	287.06	0.00	16.60	17.29	OK
A	287.06	287.06	0.00	8.35	34.36	OK
A	287.06	287.06	0.00	32.67	8.79	OK
A	287.06	287.06	0.00	20.18	14.22	OK
B AA	284.22	284.22	0.00	98.25	2.89	OK
B AA	284.22	284.22	0.00	90.11	3.15	OK
B AA	284.22	284.22	0.00	105.37	2.70	OK
B AA	284.22	284.22	0.00	97.22	2.92	OK
B AA	287.06	287.06	0.00	98.51	2.91	OK
B AA	287.06	287.06	0.00	90.37	3.18	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B AA	287.06	287.06	0.00	105.63	2.72	OK
B AA	287.06	287.06	0.00	97.48	2.94	OK
B AA	284.22	284.22	0.00	107.55	2.64	OK
B AA	284.22	284.22	0.00	115.70	2.46	OK
B AA	284.22	284.22	0.00	100.43	2.83	OK
B AA	284.22	284.22	0.00	108.58	2.62	OK
B AA	287.06	287.06	0.00	107.81	2.66	OK
B AA	287.06	287.06	0.00	115.96	2.48	OK
B AA	287.06	287.06	0.00	100.69	2.85	OK
B AA	287.06	287.06	0.00	108.84	2.64	OK
B WX	284.22	284.22	69.67	4.68	4.08	OK
B WX	284.22	284.22	69.67	7.48	4.08	OK
B WX	284.22	284.22	69.67	11.79	4.08	OK
B WX	284.22	284.22	69.67	3.65	4.08	OK
B WX	287.06	287.06	69.67	4.94	4.12	OK
B WX	287.06	287.06	69.67	7.74	4.12	OK
B WX	287.06	287.06	69.67	12.05	4.12	OK
B WX	287.06	287.06	69.67	3.90	4.12	OK
B WX	284.22	284.22	69.67	13.97	4.08	OK
B WX	284.22	284.22	69.67	22.12	4.08	OK
B WX	284.22	284.22	69.67	6.86	4.08	OK
B WX	284.22	284.22	69.67	15.01	4.08	OK
B WX	287.06	287.06	69.67	14.23	4.12	OK
B WX	287.06	287.06	69.67	22.38	4.12	OK
B WX	287.06	287.06	69.67	7.12	4.12	OK
B WX	287.06	287.06	69.67	15.26	4.12	OK
B WXY	284.22	284.22	48.77	111.47	2.55	OK
B WXY	284.22	284.22	48.77	103.32	2.75	OK
B WXY	284.22	284.22	48.77	118.58	2.40	OK
B WXY	284.22	284.22	48.77	110.44	2.57	OK
B WXY	287.06	287.06	48.77	111.73	2.57	OK
B WXY	287.06	287.06	48.77	103.58	2.77	OK
B WXY	287.06	287.06	48.77	118.84	2.42	OK
B WXY	287.06	287.06	48.77	110.69	2.59	OK
B WXY	284.22	284.22	48.77	120.76	2.35	OK
B WXY	284.22	284.22	48.77	128.91	2.20	OK
B WXY	284.22	284.22	48.77	113.65	2.50	OK
B WXY	284.22	284.22	48.77	121.80	2.33	OK
B WXY	287.06	287.06	48.77	121.02	2.37	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WXY	287.06	287.06	48.77	129.17	2.22	OK
B WXY	287.06	287.06	48.77	113.91	2.52	OK
B WXY	287.06	287.06	48.77	122.05	2.35	OK
B WY	284.22	284.22	0.00	157.24	1.81	OK
B WY	284.22	284.22	0.00	149.09	1.91	OK
B WY	284.22	284.22	0.00	164.35	1.73	OK
B WY	284.22	284.22	0.00	156.20	1.82	OK
B WY	287.06	287.06	0.00	157.49	1.82	OK
B WY	287.06	287.06	0.00	149.35	1.92	OK
B WY	287.06	287.06	0.00	164.61	1.74	OK
B WY	287.06	287.06	0.00	156.46	1.83	OK
B WY	284.22	284.22	0.00	166.53	1.71	OK
B WY	284.22	284.22	0.00	174.68	1.63	OK
B WY	284.22	284.22	0.00	159.42	1.78	OK
B WY	284.22	284.22	0.00	167.56	1.70	OK
B WY	287.06	287.06	0.00	166.79	1.72	OK
B WY	287.06	287.06	0.00	174.94	1.64	OK
B WY	287.06	287.06	0.00	159.67	1.80	OK
B WY	287.06	287.06	0.00	167.82	1.71	OK
D I	284.22	284.22	0.00	162.34	1.75	OK
D I	288.31	288.31	0.00	151.47	1.90	OK
D I	287.06	287.06	0.00	176.36	1.63	OK
D I	291.15	291.15	0.00	165.49	1.76	OK
D I	287.06	287.06	0.00	162.60	1.77	OK
D I	291.15	291.15	0.00	151.73	1.92	OK
D I	289.90	289.90	0.00	176.61	1.64	OK
D I	293.99	293.99	0.00	165.75	1.77	OK
D I	284.22	284.22	0.00	137.32	2.07	OK
D I	288.31	288.31	0.00	148.93	1.94	OK
D I	287.06	287.06	0.00	123.82	2.32	OK
D I	291.15	291.15	0.00	135.43	2.15	OK
D I	287.06	287.06	0.00	137.58	2.09	OK
D I	291.15	291.15	0.00	149.19	1.95	OK
D I	289.90	289.90	0.00	124.08	2.34	OK
D I	293.99	293.99	0.00	135.69	2.17	OK
D W	284.22	284.22	0.00	153.69	1.85	OK
D W	286.27	286.27	0.00	142.77	2.01	OK
D W	285.64	285.64	0.00	167.58	1.70	OK
D W	287.69	287.69	0.00	156.66	1.84	OK

GENERAL CONTRACTOR  <b>IRICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE
Relazione di calcolo pali di alimentazione	Progetto IN17    Lotto 10    Codifica Documento E I2 CL OC 00 0 0 010    Rev. A    Foglio 293 di 336

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
D W	287.06	287.06	0.00	153.95	1.86	OK
D W	289.10	289.10	0.00	143.03	2.02	OK
D W	288.48	288.48	0.00	167.84	1.72	OK
D W	290.52	290.52	0.00	156.92	1.85	OK
D W	284.22	284.22	0.00	230.99	1.23	OK
D W	286.27	286.27	0.00	242.28	1.18	OK
D W	285.64	285.64	0.00	217.36	1.31	OK
D W	287.69	287.69	0.00	228.65	1.26	OK
D W	287.06	287.06	0.00	231.24	1.24	OK
D W	289.10	289.10	0.00	242.54	1.19	OK
D W	288.48	288.48	0.00	217.61	1.33	OK
D W	290.52	290.52	0.00	228.91	1.27	OK
DAA	286.27	286.27	0.00	164.43	1.74	OK
DAA	286.27	286.27	0.00	153.46	1.87	OK
DAA	287.69	287.69	0.00	178.32	1.61	OK
DAA	287.69	287.69	0.00	167.34	1.72	OK
DAA	289.10	289.10	0.00	164.69	1.76	OK
DAA	289.10	289.10	0.00	153.71	1.88	OK
DAA	290.52	290.52	0.00	178.58	1.63	OK
DAA	290.52	290.52	0.00	167.60	1.73	OK
DAA	286.27	286.27	0.00	139.68	2.05	OK
DAA	286.27	286.27	0.00	150.66	1.90	OK
DAA	287.69	287.69	0.00	126.05	2.28	OK
DAA	287.69	287.69	0.00	137.03	2.10	OK
DAA	289.10	289.10	0.00	139.93	2.07	OK
DAA	289.10	289.10	0.00	150.91	1.92	OK
DAA	290.52	290.52	0.00	126.30	2.30	OK

Scorrimento – verifiche statiche

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	kN				
COMB					
A	203.9		3.1	66.18	OK
A	203.9		1.6	128.80	OK



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$	$E_d$	$R_d / E_d$	
		kN	kN		
A	203.9	5.0	40.87	OK	
A	203.9	3.5	58.41	OK	
A	206.7	3.1	67.07	OK	
A	206.7	1.6	130.54	OK	
A	206.7	5.0	41.42	OK	
A	206.7	3.5	59.20	OK	
A	203.9	0.3	583.10	OK	
A	203.9	1.8	110.35	OK	
A	203.9	1.6	130.85	OK	
A	203.9	0.1	3392.86	OK	
A	206.7	0.3	590.96	OK	
A	206.7	1.8	111.83	OK	
A	206.7	1.6	132.62	OK	
A	206.7	0.1	3438.57	OK	
B AA	203.9	10.1	20.19	OK	
B AA	203.9	9.2	22.12	OK	
B AA	203.9	10.8	18.83	OK	
B AA	203.9	9.9	20.50	OK	
B AA	206.7	10.1	20.46	OK	
B AA	206.7	9.2	22.42	OK	
B AA	206.7	10.8	19.09	OK	
B AA	206.7	9.9	20.78	OK	
B AA	203.9	11.1	18.29	OK	
B AA	203.9	12.0	16.95	OK	
B AA	203.9	10.4	19.57	OK	
B AA	203.9	11.3	18.04	OK	
B AA	206.7	11.1	18.54	OK	
B AA	206.7	12.0	17.18	OK	
B AA	206.7	10.4	19.83	OK	
B AA	206.7	11.3	18.28	OK	
B WX	203.9	7.8	26.08	OK	
B WX	203.9	7.8	26.24	OK	
B WX	203.9	7.9	25.71	OK	
B WX	203.9	7.8	26.13	OK	
B WX	206.7	7.8	26.43	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$	$E_d$	$R_d / E_d$	
		kN	kN		
B WX	206.7	7.8	26.59	OK	
B WX	206.7	7.9	26.06	OK	
B WX	206.7	7.8	26.49	OK	
B WX	203.9	8.0	25.49	OK	
B WX	203.9	8.3	24.71	OK	
B WX	203.9	7.9	25.95	OK	
B WX	203.9	8.0	25.37	OK	
B WX	206.7	8.0	25.83	OK	
B WX	206.7	8.3	25.04	OK	
B WX	206.7	7.9	26.30	OK	
B WX	206.7	8.0	25.71	OK	
B WXY	203.9	12.5	16.32	OK	
B WXY	203.9	11.7	17.42	OK	
B WXY	203.9	13.1	15.51	OK	
B WXY	203.9	12.3	16.51	OK	
B WXY	206.7	12.5	16.54	OK	
B WXY	206.7	11.7	17.66	OK	
B WXY	206.7	13.1	15.72	OK	
B WXY	206.7	12.3	16.73	OK	
B WXY	203.9	13.4	15.17	OK	
B WXY	203.9	14.3	14.31	OK	
B WXY	203.9	12.8	15.96	OK	
B WXY	203.9	13.6	15.01	OK	
B WXY	206.7	13.4	15.38	OK	
B WXY	206.7	14.3	14.50	OK	
B WXY	206.7	12.8	16.17	OK	
B WXY	206.7	13.6	15.21	OK	
B WY	203.9	15.7	12.99	OK	
B WY	203.9	14.8	13.76	OK	
B WY	203.9	16.4	12.41	OK	
B WY	203.9	15.5	13.12	OK	
B WY	206.7	15.7	13.16	OK	
B WY	206.7	14.8	13.95	OK	
B WY	206.7	16.4	12.58	OK	
B WY	206.7	15.5	13.30	OK	
B WY	203.9	16.7	12.18	OK	
B WY	203.9	17.6	11.57	OK	
B WY	203.9	16.0	12.73	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$	$E_d$	$R_d / E_d$	
		kN	kN		
B WY	203.9	16.9	12.06	OK	
B WY	206.7	16.7	12.34	OK	
B WY	206.7	17.6	11.72	OK	
B WY	206.7	16.0	12.90	OK	
B WY	206.7	16.9	12.23	OK	
D I	203.9	14.6	13.92	OK	
D I	206.6	13.4	15.37	OK	
D I	205.7	16.1	12.82	OK	
D I	208.4	14.8	14.04	OK	
D I	206.7	14.6	14.11	OK	
D I	209.3	13.4	15.57	OK	
D I	208.5	16.1	12.99	OK	
D I	211.1	14.8	14.22	OK	
D I	203.9	13.3	15.31	OK	
D I	206.6	14.5	14.23	OK	
D I	205.7	11.9	17.27	OK	
D I	208.4	13.1	15.89	OK	
D I	206.7	13.3	15.52	OK	
D I	209.3	14.5	14.42	OK	
D I	208.5	11.9	17.50	OK	
D I	211.1	13.1	16.10	OK	
D W	203.9	116.5	1.75	OK	
D W	205.2	117.7	1.74	OK	
D W	204.8	115.1	1.78	OK	
D W	206.1	116.3	1.77	OK	
D W	206.7	116.5	1.77	OK	
D W	208.0	117.7	1.77	OK	
D W	207.6	115.1	1.80	OK	
D W	208.9	116.3	1.80	OK	
D W	203.9	21.7	9.39	OK	
D W	205.2	22.9	8.95	OK	
D W	204.8	20.3	10.08	OK	
D W	206.1	21.5	9.58	OK	
D W	206.7	21.7	9.51	OK	
D W	208.0	22.9	9.07	OK	
D W	207.6	20.3	10.22	OK	
D W	208.9	21.5	9.71	OK	
DAA	205.2	15.0	13.69	OK	





Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_{d+} + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
DAA	205.2	13.8	14.89	OK	
DAA	206.1	16.4	12.58	OK	
DAA	206.1	15.2	13.57	OK	
DAA	208.0	15.0	13.88	OK	
DAA	208.0	13.8	15.09	OK	
DAA	208.9	16.4	12.74	OK	
DAA	208.9	15.2	13.75	OK	
DAA	205.2	13.7	15.03	OK	
DAA	205.2	14.9	13.81	OK	
DAA	206.1	12.3	16.82	OK	
DAA	206.1	13.5	15.32	OK	
DAA	208.0	13.7	15.23	OK	
DAA	208.0	14.9	13.99	OK	
DAA	208.9	12.3	17.05	OK	
DAA	208.9	13.5	15.52	OK	
A	183.5	2.9	62.32	OK	
A	183.5	1.9	94.31	OK	
A	183.5	4.2	43.52	OK	
A	183.5	3.2	57.03	OK	
A	185.4	2.9	62.94	OK	
A	185.4	1.9	95.25	OK	
A	185.4	4.2	43.96	OK	
A	185.4	3.2	57.60	OK	
A	183.5	0.5	377.38	OK	
A	183.5	1.5	123.57	OK	
A	183.5	0.8	233.57	OK	
A	183.5	0.2	861.19	OK	
A	185.4	0.5	381.15	OK	
A	185.4	1.5	124.81	OK	
A	185.4	0.8	235.91	OK	
A	185.4	0.2	869.79	OK	
B AA	183.5	10.2	18.07	OK	
B AA	183.5	9.6	19.19	OK	
B AA	183.5	10.6	17.25	OK	
B AA	183.5	10.0	18.26	OK	
B AA	185.4	10.2	18.25	OK	
B AA	185.4	9.6	19.38	OK	
B AA	185.4	10.6	17.42	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$	$E_d$	$R_d / E_d$	
		kN	kN		
B AA	185.4	10.0	18.44	OK	
B AA	183.5	11.1	16.54	OK	
B AA	183.5	11.7	15.71	OK	
B AA	183.5	10.6	17.29	OK	
B AA	183.5	11.2	16.38	OK	
B AA	185.4	11.1	16.70	OK	
B AA	185.4	11.7	15.86	OK	
B AA	185.4	10.6	17.47	OK	
B AA	185.4	11.2	16.55	OK	
B WX	183.5	7.8	23.46	OK	
B WX	183.5	7.8	23.59	OK	
B WX	183.5	7.9	23.25	OK	
B WX	183.5	7.8	23.49	OK	
B WX	185.4	7.8	23.69	OK	
B WX	185.4	7.8	23.83	OK	
B WX	185.4	7.9	23.48	OK	
B WX	185.4	7.8	23.73	OK	
B WX	183.5	8.0	22.98	OK	
B WX	183.5	8.1	22.54	OK	
B WX	183.5	7.9	23.26	OK	
B WX	183.5	8.0	22.91	OK	
B WX	185.4	8.0	23.21	OK	
B WX	185.4	8.1	22.76	OK	
B WX	185.4	7.9	23.49	OK	
B WX	185.4	8.0	23.13	OK	
B WXY	183.5	12.5	14.64	OK	
B WXY	183.5	12.0	15.28	OK	
B WXY	183.5	13.0	14.14	OK	
B WXY	183.5	12.4	14.75	OK	
B WXY	185.4	12.5	14.78	OK	
B WXY	185.4	12.0	15.43	OK	
B WXY	185.4	13.0	14.28	OK	
B WXY	185.4	12.4	14.90	OK	
B WXY	183.5	13.4	13.70	OK	
B WXY	183.5	13.9	13.17	OK	
B WXY	183.5	13.0	14.17	OK	
B WXY	183.5	13.5	13.61	OK	
B WXY	185.4	13.4	13.84	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$	$E_d$	$R_d / E_d$	
		kN	kN		
B WXY	185.4	13.9	13.30	OK	
B WXY	185.4	13.0	14.31	OK	
B WXY	185.4	13.5	13.74	OK	
B WY	183.5	15.8	11.65	OK	
B WY	183.5	15.2	12.10	OK	
B WY	183.5	16.2	11.30	OK	
B WY	183.5	15.6	11.73	OK	
B WY	185.4	15.8	11.77	OK	
B WY	185.4	15.2	12.22	OK	
B WY	185.4	16.2	11.42	OK	
B WY	185.4	15.6	11.85	OK	
B WY	183.5	16.7	10.99	OK	
B WY	183.5	17.3	10.62	OK	
B WY	183.5	16.2	11.32	OK	
B WY	183.5	16.8	10.93	OK	
B WY	185.4	16.7	11.10	OK	
B WY	185.4	17.3	10.73	OK	
B WY	185.4	16.2	11.44	OK	
B WY	185.4	16.8	11.03	OK	
D I	183.5	14.6	12.59	OK	
D I	186.2	13.8	13.51	OK	
D I	185.4	15.5	11.95	OK	
D I	188.0	14.7	12.78	OK	
D I	185.4	14.6	12.71	OK	
D I	188.0	13.8	13.65	OK	
D I	187.2	15.5	12.06	OK	
D I	189.8	14.7	12.90	OK	
D I	183.5	13.4	13.71	OK	
D I	186.2	14.2	13.12	OK	
D I	185.4	12.4	14.89	OK	
D I	188.0	13.2	14.19	OK	
D I	185.4	13.4	13.85	OK	
D I	188.0	14.2	13.25	OK	
D I	187.2	12.4	15.04	OK	
D I	189.8	13.2	14.33	OK	
D W	183.5	116.5	1.57	OK	
D W	184.8	117.3	1.58	OK	
D W	184.4	115.6	1.60	OK	

GENERAL CONTRACTOR  <b>IFICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE
Relazione di calcolo pali di alimentazione	Progetto IN17    Lotto 10    Codifica Documento E I2 CL OC 00 0 0 010    Rev. A    Foglio 300 di 336

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
D W	185.8	116.4	1.60	OK	
D W	185.4	116.5	1.59	OK	
D W	186.7	117.3	1.59	OK	
D W	186.3	115.6	1.61	OK	
D W	187.6	116.4	1.61	OK	
D W	183.5	21.8	8.42	OK	
D W	184.8	22.6	8.18	OK	
D W	184.4	20.9	8.85	OK	
D W	185.8	21.7	8.58	OK	
D W	185.4	21.8	8.51	OK	
D W	186.7	22.6	8.26	OK	
D W	186.3	20.9	8.93	OK	
D W	187.6	21.7	8.66	OK	
DAA	184.8	14.9	12.39	OK	
DAA	184.8	14.1	13.09	OK	
DAA	185.8	15.9	11.71	OK	
DAA	185.8	15.1	12.34	OK	
DAA	186.7	14.9	12.51	OK	
DAA	186.7	14.1	13.22	OK	
DAA	187.6	15.9	11.83	OK	
DAA	187.6	15.1	12.46	OK	
DAA	184.8	13.7	13.47	OK	
DAA	184.8	14.5	12.72	OK	
DAA	185.8	12.8	14.53	OK	
DAA	185.8	13.6	13.67	OK	
DAA	186.7	13.7	13.60	OK	
DAA	186.7	14.5	12.85	OK	
DAA	187.6	12.8	14.67	OK	

Capacità portante – verifiche statiche

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	COMB	$R_d$	$E_d$	$R_d/E_d$	
		$q_{u,d}$ kPa	$q_{E,d} = N / (B' \cdot L')$		
A	$(3270. + 1178. +) / 2.3 =$ 1934.0	67.14	28.81	OK	



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
A	(3382. + 1163. +) /2.3 =	1975.8	62.55	31.59	OK
A	(3120. + 1200. +) /2.3 =	1878.3	74.64	25.16	OK
A	(3231. + 1186. +) /2.3 =	1920.2	69.02	27.82	OK
A	(3271. + 1179. +) /2.3 =	1934.6	68.02	28.44	OK
A	(3381. + 1163. +) /2.3 =	1975.9	63.43	31.15	OK
A	(3123. + 1200. +) /2.3 =	1879.6	75.50	24.90	OK
A	(3233. + 1186. +) /2.3 =	1921.0	69.89	27.49	OK
A	(3396. + 1178. +) /2.3 =	1988.7	62.96	31.59	OK
A	(3417. + 1145. +) /2.3 =	1983.7	60.60	32.74	OK
A	(3265. + 1206. +) /2.3 =	1943.9	69.03	28.16	OK
A	(3377. + 1190. +) /2.3 =	1985.8	64.19	30.94	OK
A	(3395. + 1179. +) /2.3 =	1988.6	63.84	31.15	OK
A	(3416. + 1146. +) /2.3 =	1983.6	61.47	32.27	OK
A	(3266. + 1206. +) /2.3 =	1944.4	69.90	27.82	OK
A	(3377. + 1190. +) /2.3 =	1985.7	65.07	30.52	OK
B AA	(2898. + 1191. +) /2.3 =	1777.7	85.95	20.68	OK
B AA	(2963. + 1184. +) /2.3 =	1802.6	81.39	22.15	OK
B AA	(2842. + 1197. +) /2.3 =	1756.3	90.38	19.43	OK
B AA	(2907. + 1190. +) /2.3 =	1781.4	85.35	20.87	OK
B AA	(2904. + 1191. +) /2.3 =	1780.4	86.75	20.52	OK
B AA	(2968. + 1184. +) /2.3 =	1805.0	82.22	21.95	OK
B AA	(2849. + 1197. +) /2.3 =	1759.3	91.13	19.31	OK
B AA	(2913. + 1191. +) /2.3 =	1784.0	86.14	20.71	OK
B AA	(2838. + 1193. +) /2.3 =	1752.9	90.23	19.43	OK
B AA	(2774. + 1200. +) /2.3 =	1727.8	95.87	18.02	OK
B AA	(2894. + 1187. +) /2.3 =	1774.2	85.82	20.67	OK
B AA	(2830. + 1194. +) /2.3 =	1749.2	90.91	19.24	OK
B AA	(2845. + 1193. +) /2.3 =	1755.9	90.98	19.30	OK
B AA	(2782. + 1200. +) /2.3 =	1731.2	96.56	17.93	OK
B AA	(2900. + 1187. +) /2.3 =	1776.9	86.61	20.52	OK
B AA	(2836. + 1194. +) /2.3 =	1752.2	91.65	19.12	OK
B WX	(3066. + 913. +) /2.3 =	1729.9	77.16	22.42	OK
B WX	(3087. + 908. +) /2.3 =	1737.0	78.73	22.06	OK
B WX	(3100. + 902. +) /2.3 =	1740.3	79.89	21.78	OK
B WX	(3064. + 914. +) /2.3 =	1729.3	76.98	22.46	OK
B WX	(3072. + 916. +) /2.3 =	1734.1	77.98	22.24	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')			
COMB			kPa			
B WX	(3094. + 911. +) /2.3 =	1741.1	79.55	21.89	OK	
B WX	(3107. + 905. +) /2.3 =	1744.4	80.71	21.61	OK	
B WX	(3070. + 917. +) /2.3 =	1733.5	77.81	22.28	OK	
B WX	(3098. + 902. +) /2.3 =	1739.2	79.80	21.79	OK	
B WX	(3139. + 888. +) /2.3 =	1750.8	83.18	21.05	OK	
B WX	(3067. + 912. +) /2.3 =	1730.2	77.32	22.38	OK	
B WX	(3103. + 900. +) /2.3 =	1740.6	80.21	21.70	OK	
B WX	(3105. + 905. +) /2.3 =	1743.4	80.62	21.62	OK	
B WX	(3145. + 891. +) /2.3 =	1754.8	83.99	20.89	OK	
B WX	(3074. + 915. +) /2.3 =	1734.4	78.15	22.19	OK	
B WX	(3109. + 903. +) /2.3 =	1744.7	81.03	21.53	OK	
B WXY	(2959. + 958. +) /2.3 =	1703.3	108.21	15.74	OK	
B WXY	(3031. + 948. +) /2.3 =	1730.1	102.12	16.94	OK	
B WXY	(2898. + 967. +) /2.3 =	1680.1	114.17	14.72	OK	
B WXY	(2969. + 957. +) /2.3 =	1707.1	107.40	15.90	OK	
B WXY	(2965. + 961. +) /2.3 =	1707.0	108.82	15.69	OK	
B WXY	(3035. + 952. +) /2.3 =	1733.4	102.80	16.86	OK	
B WXY	(2904. + 970. +) /2.3 =	1684.2	114.69	14.68	OK	
B WXY	(2975. + 960. +) /2.3 =	1710.8	108.02	15.84	OK	
B WXY	(2894. + 964. +) /2.3 =	1677.3	113.96	14.72	OK	
B WXY	(2823. + 972. +) /2.3 =	1650.1	121.61	13.57	OK	
B WXY	(2956. + 955. +) /2.3 =	1700.5	108.03	15.74	OK	
B WXY	(2885. + 964. +) /2.3 =	1673.4	114.88	14.57	OK	
B WXY	(2901. + 966. +) /2.3 =	1681.4	114.49	14.69	OK	
B WXY	(2830. + 975. +) /2.3 =	1654.6	122.01	13.56	OK	
B WXY	(2962. + 958. +) /2.3 =	1704.3	108.64	15.69	OK	
B WXY	(2891. + 967. +) /2.3 =	1677.6	115.39	14.54	OK	
B WY	(2568. + 1204. +) /2.3 =	1640.2	117.85	13.92	OK	
B WY	(2631. + 1199. +) /2.3 =	1665.5	109.43	15.22	OK	
B WY	(2514. + 1209. +) /2.3 =	1618.6	126.33	12.81	OK	
B WY	(2577. + 1204. +) /2.3 =	1643.9	116.71	14.09	OK	
B WY	(2578. + 1205. +) /2.3 =	1644.7	118.17	13.92	OK	
B WY	(2641. + 1199. +) /2.3 =	1669.7	109.92	15.19	OK	
B WY	(2525. + 1209. +) /2.3 =	1623.4	126.46	12.84	OK	
B WY	(2587. + 1204. +) /2.3 =	1648.4	117.06	14.08	OK	
B WY	(2510. + 1205. +) /2.3 =	1615.2	126.04	12.81	OK	
B WY	(2448. + 1209. +) /2.3 =	1589.7	137.33	11.58	OK	
B WY	(2565. + 1200. +) /2.3 =	1636.8	117.59	13.92	OK	
B WY	(2502. + 1205. +) /2.3 =	1611.4	127.37	12.65	OK	



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')			
COMB			kPa			
B WY	(2521. + 1205. +) /2.3 =	1620.1	126.17	12.84	OK	
B WY	(2459. + 1209. +) /2.3 =	1595.0	137.17	11.63	OK	
B WY	(2575. + 1200. +) /2.3 =	1641.4	117.92	13.92	OK	
B WY	(2513. + 1205. +) /2.3 =	1616.3	127.47	12.68	OK	
D I	(2556. + 1226. +) /2.3 =	1644.4	123.28	13.34	OK	
D I	(2652. + 1219. +) /2.3 =	1682.9	111.49	15.09	OK	
D I	(2459. + 1234. +) /2.3 =	1605.9	142.44	11.27	OK	
D I	(2555. + 1228. +) /2.3 =	1644.7	126.76	12.98	OK	
D I	(2567. + 1226. +) /2.3 =	1648.9	123.48	13.35	OK	
D I	(2661. + 1219. +) /2.3 =	1686.8	111.97	15.07	OK	
D I	(2471. + 1234. +) /2.3 =	1610.9	142.16	11.33	OK	
D I	(2565. + 1228. +) /2.3 =	1649.1	126.94	12.99	OK	
D I	(2690. + 1206. +) /2.3 =	1693.7	104.22	16.25	OK	
D I	(2613. + 1213. +) /2.3 =	1663.4	115.28	14.43	OK	
D I	(2801. + 1195. +) /2.3 =	1737.3	93.96	18.49	OK	
D I	(2723. + 1203. +) /2.3 =	1706.8	102.99	16.57	OK	
D I	(2699. + 1206. +) /2.3 =	1697.6	104.79	16.20	OK	
D I	(2622. + 1213. +) /2.3 =	1667.6	115.68	14.42	OK	
D I	(2809. + 1195. +) /2.3 =	1740.6	94.68	18.38	OK	
D I	(2731. + 1203. +) /2.3 =	1710.4	103.61	16.51	OK	
D W	(1190. + 349. +) /2.3 =	669.3	116.65	5.74	OK	
D W	(1230. + 344. +) /2.3 =	684.6	105.98	6.46	OK	
D W	(1159. + 363. +) /2.3 =	661.7	133.82	4.94	OK	
D W	(1200. + 358. +) /2.3 =	677.3	119.89	5.65	OK	
D W	(1213. + 358. +) /2.3 =	682.7	116.99	5.84	OK	
D W	(1252. + 352. +) /2.3 =	697.7	106.54	6.55	OK	
D W	(1182. + 371. +) /2.3 =	675.1	133.77	5.05	OK	
D W	(1222. + 366. +) /2.3 =	690.5	120.19	5.75	OK	
D W	(2185. + 1215. +) /2.3 =	1478.3	217.62	6.79	OK	
D W	(2109. + 1218. +) /2.3 =	1446.3	266.00	5.44	OK	
D W	(2293. + 1211. +) /2.3 =	1523.1	175.00	8.70	OK	
D W	(2216. + 1214. +) /2.3 =	1491.3	205.28	7.26	OK	
D W	(2200. + 1216. +) /2.3 =	1485.1	213.92	6.94	OK	
D W	(2125. + 1219. +) /2.3 =	1453.6	259.12	5.61	OK	
D W	(2306. + 1211. +) /2.3 =	1529.2	173.51	8.81	OK	
D W	(2230. + 1215. +) /2.3 =	1497.8	202.39	7.40	OK	
DAA	(2548. + 1224. +) /2.3 =	1640.2	124.93	13.13	OK	
DAA	(2633. + 1217. +) /2.3 =	1674.3	112.71	14.85	OK	
DAA	(2448. + 1233. +) /2.3 =	1600.2	144.45	11.08	OK	



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
DAA	(2532. + 1227. +) / 2.3 =	1634.4	128.48	12.72	OK
DAA	(2559. + 1224. +) / 2.3 =	1644.7	125.11	13.15	OK
DAA	(2643. + 1217. +) / 2.3 =	1678.3	113.15	14.83	OK
DAA	(2460. + 1233. +) / 2.3 =	1605.3	144.12	11.14	OK
DAA	(2543. + 1227. +) / 2.3 =	1639.0	128.59	12.75	OK
DAA	(2680. + 1205. +) / 2.3 =	1688.9	105.75	15.97	OK
DAA	(2595. + 1212. +) / 2.3 =	1654.9	116.44	14.21	OK
DAA	(2788. + 1194. +) / 2.3 =	1731.2	95.08	18.21	OK
DAA	(2703. + 1201. +) / 2.3 =	1697.5	103.55	16.39	OK
DAA	(2689. + 1205. +) / 2.3 =	1692.8	106.31	15.92	OK
DAA	(2605. + 1212. +) / 2.3 =	1659.3	116.81	14.21	OK
DAA	(2795. + 1194. +) / 2.3 =	1734.5	95.79	18.11	OK
DAA	(2711. + 1202. +) / 2.3 =	1701.3	104.15	16.33	OK
A	(3262. + 1178. +) / 2.3 =	1930.3	60.67	31.82	OK
A	(3344. + 1167. +) / 2.3 =	1961.3	57.53	34.09	OK
A	(3151. + 1194. +) / 2.3 =	1889.1	65.57	28.81	OK
A	(3233. + 1183. +) / 2.3 =	1920.2	61.92	31.01	OK
A	(3263. + 1178. +) / 2.3 =	1930.8	61.26	31.52	OK
A	(3345. + 1167. +) / 2.3 =	1961.5	58.12	33.75	OK
A	(3153. + 1194. +) / 2.3 =	1890.0	66.15	28.57	OK
A	(3234. + 1184. +) / 2.3 =	1920.8	62.51	30.73	OK
A	(3393. + 1176. +) / 2.3 =	1986.5	56.64	35.07	OK
A	(3411. + 1151. +) / 2.3 =	1983.4	54.95	36.09	OK
A	(3312. + 1201. +) / 2.3 =	1962.0	60.26	32.56	OK
A	(3381. + 1186. +) / 2.3 =	1985.7	57.41	34.59	OK
A	(3392. + 1176. +) / 2.3 =	1986.5	57.23	34.71	OK
A	(3411. + 1151. +) / 2.3 =	1983.4	55.53	35.71	OK
A	(3312. + 1201. +) / 2.3 =	1962.1	60.84	32.25	OK
A	(3381. + 1186. +) / 2.3 =	1985.6	58.00	34.24	OK
B AA	(2832. + 1193. +) / 2.3 =	1750.1	81.59	21.45	OK
B AA	(2880. + 1188. +) / 2.3 =	1768.6	78.17	22.63	OK
B AA	(2791. + 1198. +) / 2.3 =	1734.3	84.84	20.44	OK
B AA	(2839. + 1193. +) / 2.3 =	1752.9	81.14	21.60	OK
B AA	(2837. + 1193. +) / 2.3 =	1752.4	82.09	21.35	OK
B AA	(2884. + 1188. +) / 2.3 =	1770.7	78.69	22.50	OK
B AA	(2797. + 1198. +) / 2.3 =	1736.7	85.31	20.36	OK
B AA	(2844. + 1193. +) / 2.3 =	1755.1	81.64	21.50	OK
B AA	(2773. + 1195. +) / 2.3 =	1725.3	85.88	20.09	OK
B AA	(2726. + 1200. +) / 2.3 =	1706.7	90.04	18.96	OK





Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
B AA	(2814. + 1191. +) /2.3 =	1741.1	82.56	21.09	OK
B AA	(2767. + 1195. +) /2.3 =	1722.5	86.39	19.94	OK
B AA	(2779. + 1195. +) /2.3 =	1727.8	86.35	20.01	OK
B AA	(2732. + 1200. +) /2.3 =	1709.4	90.46	18.90	OK
B AA	(2819. + 1191. +) /2.3 =	1743.5	83.05	20.99	OK
B AA	(2772. + 1195. +) /2.3 =	1725.1	86.85	19.86	OK
B WX	(3022. + 885. +) /2.3 =	1698.5	71.90	23.62	OK
B WX	(3032. + 883. +) /2.3 =	1702.2	72.63	23.44	OK
B WX	(3046. + 878. +) /2.3 =	1706.0	73.78	23.12	OK
B WX	(3018. + 886. +) /2.3 =	1697.4	71.64	23.69	OK
B WX	(3027. + 887. +) /2.3 =	1701.9	72.44	23.49	OK
B WX	(3038. + 885. +) /2.3 =	1705.6	73.17	23.31	OK
B WX	(3052. + 880. +) /2.3 =	1709.4	74.32	23.00	OK
B WX	(3024. + 888. +) /2.3 =	1700.8	72.18	23.56	OK
B WX	(3053. + 875. +) /2.3 =	1707.7	74.38	22.96	OK
B WX	(3082. + 865. +) /2.3 =	1716.2	76.69	22.38	OK
B WX	(3028. + 882. +) /2.3 =	1700.3	72.47	23.46	OK
B WX	(3057. + 873. +) /2.3 =	1708.7	74.66	22.89	OK
B WX	(3058. + 877. +) /2.3 =	1711.1	74.91	22.84	OK
B WX	(3087. + 868. +) /2.3 =	1719.5	77.22	22.27	OK
B WX	(3034. + 885. +) /2.3 =	1703.7	73.01	23.34	OK
B WX	(3062. + 876. +) /2.3 =	1712.1	75.20	22.77	OK
B WXY	(2894. + 938. +) /2.3 =	1666.0	106.02	15.71	OK
B WXY	(2948. + 931. +) /2.3 =	1686.3	101.25	16.65	OK
B WXY	(2848. + 944. +) /2.3 =	1648.6	110.58	14.91	OK
B WXY	(2901. + 937. +) /2.3 =	1668.9	105.39	15.84	OK
B WXY	(2899. + 940. +) /2.3 =	1669.2	106.34	15.70	OK
B WXY	(2952. + 933. +) /2.3 =	1689.2	101.62	16.62	OK
B WXY	(2853. + 946. +) /2.3 =	1652.0	110.84	14.90	OK
B WXY	(2906. + 940. +) /2.3 =	1672.1	105.72	15.82	OK
B WXY	(2828. + 943. +) /2.3 =	1639.8	112.05	14.63	OK
B WXY	(2775. + 949. +) /2.3 =	1619.3	117.93	13.73	OK
B WXY	(2875. + 937. +) /2.3 =	1657.2	107.38	15.43	OK
B WXY	(2821. + 944. +) /2.3 =	1636.8	112.77	14.52	OK
B WXY	(2834. + 945. +) /2.3 =	1643.2	112.30	14.63	OK
B WXY	(2781. + 952. +) /2.3 =	1623.0	118.09	13.74	OK
B WXY	(2880. + 939. +) /2.3 =	1660.5	107.68	15.42	OK
B WXY	(2827. + 946. +) /2.3 =	1640.3	113.00	14.52	OK
B WY	(2468. + 1205. +) /2.3 =	1597.0	119.49	13.37	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')			
COMB			kPa			
B WY	(2515. + 1202. +) / 2.3 =	1615.8	112.28	14.39	OK	
B WY	(2428. + 1208. +) / 2.3 =	1580.9	126.58	12.49	OK	
B WY	(2475. + 1205. +) / 2.3 =	1599.7	118.52	13.50	OK	
B WY	(2477. + 1205. +) / 2.3 =	1600.8	119.46	13.40	OK	
B WY	(2523. + 1202. +) / 2.3 =	1619.4	112.39	14.41	OK	
B WY	(2437. + 1208. +) / 2.3 =	1584.9	126.40	12.54	OK	
B WY	(2483. + 1205. +) / 2.3 =	1603.5	118.51	13.53	OK	
B WY	(2411. + 1204. +) / 2.3 =	1571.8	128.92	12.19	OK	
B WY	(2365. + 1207. +) / 2.3 =	1552.9	138.51	11.21	OK	
B WY	(2451. + 1202. +) / 2.3 =	1587.9	121.57	13.06	OK	
B WY	(2404. + 1204. +) / 2.3 =	1569.0	130.07	12.06	OK	
B WY	(2420. + 1205. +) / 2.3 =	1575.9	128.69	12.25	OK	
B WY	(2374. + 1207. +) / 2.3 =	1557.2	138.04	11.28	OK	
B WY	(2459. + 1202. +) / 2.3 =	1591.8	121.50	13.10	OK	
B WY	(2413. + 1205. +) / 2.3 =	1573.1	129.81	12.12	OK	
D I	(2466. + 1227. +) / 2.3 =	1605.7	124.49	12.90	OK	
D I	(2541. + 1223. +) / 2.3 =	1636.6	114.10	14.34	OK	
D I	(2397. + 1233. +) / 2.3 =	1578.6	139.81	11.29	OK	
D I	(2473. + 1229. +) / 2.3 =	1609.7	126.70	12.70	OK	
D I	(2474. + 1228. +) / 2.3 =	1609.4	124.36	12.94	OK	
D I	(2549. + 1223. +) / 2.3 =	1639.9	114.20	14.36	OK	
D I	(2407. + 1233. +) / 2.3 =	1582.6	139.34	11.36	OK	
D I	(2481. + 1229. +) / 2.3 =	1613.3	126.59	12.74	OK	
D I	(2599. + 1209. +) / 2.3 =	1655.3	103.29	16.03	OK	
D I	(2545. + 1214. +) / 2.3 =	1634.5	112.02	14.59	OK	
D I	(2683. + 1201. +) / 2.3 =	1689.0	94.82	17.81	OK	
D I	(2629. + 1207. +) / 2.3 =	1668.1	102.25	16.31	OK	
D I	(2606. + 1209. +) / 2.3 =	1658.5	103.54	16.02	OK	
D I	(2553. + 1214. +) / 2.3 =	1637.9	112.16	14.60	OK	
D I	(2690. + 1202. +) / 2.3 =	1691.9	95.19	17.77	OK	
D I	(2636. + 1207. +) / 2.3 =	1671.1	102.55	16.30	OK	
D W	(1005. + 284. +) / 2.3 =	560.5	116.25	4.82	OK	
D W	(1038. + 283. +) / 2.3 =	574.4	107.27	5.35	OK	
D W	(988. + 293. +) / 2.3 =	556.8	129.81	4.29	OK	
D W	(1021. + 292. +) / 2.3 =	570.9	118.64	4.81	OK	
D W	(1023. + 290. +) / 2.3 =	570.7	116.28	4.91	OK	
D W	(1055. + 289. +) / 2.3 =	584.4	107.47	5.44	OK	
D W	(1005. + 299. +) / 2.3 =	567.0	129.57	4.38	OK	
D W	(1038. + 298. +) / 2.3 =	581.0	118.66	4.90	OK	

GENERAL CONTRACTOR  IRICAV2		ALTA SORVEGLIANZA  GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione		Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 307 di 336

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')			
COMB			kPa			
D W	(2042. + 1211. +) /2.3 =	1414.1	285.02	4.96	OK	
D W	(1989. + 1212. +) /2.3 =	1391.7	349.94	3.98	OK	
D W	(2123. + 1209. +) /2.3 =	1448.9	224.43	6.46	OK	
D W	(2070. + 1211. +) /2.3 =	1426.6	263.32	5.42	OK	
D W	(2054. + 1212. +) /2.3 =	1419.9	277.30	5.12	OK	
D W	(2002. + 1213. +) /2.3 =	1397.7	337.15	4.15	OK	
D W	(2135. + 1210. +) /2.3 =	1454.3	220.58	6.59	OK	
D W	(2082. + 1212. +) /2.3 =	1432.2	257.30	5.57	OK	
DAA	(2457. + 1225. +) /2.3 =	1601.3	126.34	12.67	OK	
DAA	(2520. + 1221. +) /2.3 =	1626.6	115.90	14.04	OK	
DAA	(2385. + 1231. +) /2.3 =	1572.3	142.14	11.06	OK	
DAA	(2447. + 1227. +) /2.3 =	1597.7	129.18	12.37	OK	
DAA	(2466. + 1226. +) /2.3 =	1605.0	126.19	12.72	OK	
DAA	(2528. + 1221. +) /2.3 =	1630.1	115.95	14.06	OK	
DAA	(2394. + 1231. +) /2.3 =	1576.4	141.62	11.13	OK	
DAA	(2456. + 1228. +) /2.3 =	1601.5	128.97	12.42	OK	
DAA	(2588. + 1207. +) /2.3 =	1650.2	105.00	15.72	OK	
DAA	(2525. + 1212. +) /2.3 =	1625.0	113.50	14.32	OK	
DAA	(2669. + 1200. +) /2.3 =	1682.3	96.17	17.49	OK	
DAA	(2606. + 1205. +) /2.3 =	1657.3	103.18	16.06	OK	
DAA	(2595. + 1208. +) /2.3 =	1653.5	105.24	15.71	OK	
DAA	(2533. + 1212. +) /2.3 =	1628.5	113.60	14.33	OK	
DAA	(2676. + 1200. +) /2.3 =	1685.2	96.54	17.46	OK	

#### Ribaltamento – verifiche sismiche

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
Comb1	305.35	305.35	19.72	64.92	4.70	OK
Comb2	305.35	305.35	19.72	64.92	4.70	OK
Comb3	305.35	305.35	19.72	69.16	4.42	OK
Comb4	305.35	305.35	19.72	69.16	4.42	OK
Comb5	305.35	305.35	65.75	18.89	4.64	OK
Comb6	305.35	305.35	65.75	18.89	4.64	OK

GENERAL CONTRACTOR  IRICAV2	ALTA SORVEGLIANZA  GRUPPO FERROVIE DELLO STATO ITALIANE
Relazione di calcolo pali di alimentazione	Progetto IN17    Lotto 10    Codifica Documento E I2 CL OC 00 0 0 010    Rev. A    Foglio 308 di 336

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
Comb7	305.35	305.35	65.75	23.14	4.64	OK
Comb8	305.35	305.35	65.75	23.14	4.64	OK

Scorrimento – verifiche sismiche

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	Rd = ( N · m <sub>d</sub> + (B'·L')·C' <sub>dbase</sub> )/γ <sub>R</sub>		Ed	Rd/Ed	
	kN		kN		
COMB					
Comb1	197.2		73.4	<b>2.68</b>	OK
Comb2	197.2		73.4	<b>2.68</b>	OK
Comb3	197.2		73.9	<b>2.67</b>	OK
Comb4	197.2		73.9	<b>2.67</b>	OK
Comb5	197.2		73.6	<b>2.68</b>	OK
Comb6	197.2		73.6	<b>2.68</b>	OK
Comb7	197.2		73.8	<b>2.67</b>	OK
Comb8	197.2		73.8	<b>2.67</b>	OK

Capacità portante – verifiche sismiche

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	Rd		Ed	Rd/Ed	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
Comb1	(1804. + 468. +) / 2.3 =	987.5	77.87	12.68	OK
Comb2	(1804. + 468. +) / 2.3 =	987.5	77.87	12.68	OK
Comb3	(1784. + 467. +) / 2.3 =	978.7	79.27	12.35	OK
Comb4	(1784. + 467. +) / 2.3 =	978.7	79.27	12.35	OK
Comb5	(1797. + 392. +) / 2.3 =	951.6	77.91	12.21	OK
Comb6	(1797. + 392. +) / 2.3 =	951.6	77.91	12.21	OK
Comb7	(1806. + 390. +) / 2.3 =	954.6	79.08	12.07	OK
Comb8	(1806. + 390. +) / 2.3 =	954.6	79.08	12.07	OK

Le verifiche sono soddisfatte.



12.19 Sintesi risultati LC10

TITOLO: **Caso di carico 10 - combinazioni statiche**

FONDAZIONI A PLINTO

DESIGN ASSUMPTION

piano campagna sostanzialmente orizzontale

angolo d'attrito caratteristico  $\phi'_k$

coesione  $c'$

angolo d'attrito caratteristico  $\phi'_k$  alla base

coesione alla base  $c'$

coefficiente  $\gamma_p$

coefficiente  $\gamma_c'$

coefficiente  $\gamma_k$  capacità portante

coefficiente  $\gamma_k$  scorrimento

coefficiente  $\gamma_k$  spinta passiva

angolo d'attrito di design  $\phi'_d$

coesione di design  $c'_d$

coeff. attrito di design  $\mu'_d$

coesione alla base di design

Dimensione fondazione B[m] (LONGITUDINALE)

Dimensione fondazione L [m] (TRASVERSALE)

Profondità da piano campagna D [m]

Altezza plinto [m] H<sub>p</sub>

Dimensione baggiolo b[m] (LONGITUDINALE)

Dimensione maggiore baggiolo l [m] (TRASVERSALE)

Altezza baggiolo [m] H<sub>b</sub>

Altezza terreno sopraplinto [m] H<sub>t</sub>

q' = carico permanente ai lati

$\gamma$  = peso specifico medio sopra la fondazione

$\gamma_f$  = peso specifico medio sotto la fondazione

opzione calcolo coeff. S<sub>y</sub> e S<sub>z</sub>

opzione calcolo per tenere in conto peso terreno di ricoprimento

Peso specifico medio c.a.

Peso proprio plinto + baggiolo + terreno sovrastante [kN]

Quota baricentro plinto + baggiolo + terreno sovrastante vs p.f. [kN]

Coefficiente sismico k<sub>h</sub>

Coefficiente sismico k<sub>v</sub>

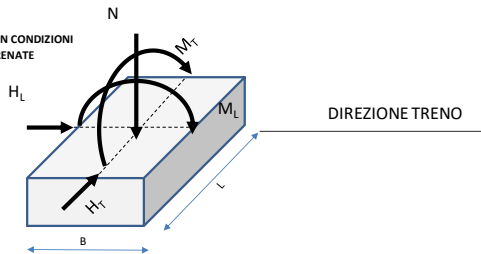
Azione inerziale orizzontale plinto

Azione inerziale verticale plinto

DA2

38	°	0.663	rad	
0	kPa			
38	°	0.663	rad	
0	kPa			
1.00				
1.00				
2.30				
1.10				
1.40				
38.00	°	0.663	rad	tan( $\phi'_d$ )= 0.78
0.00	kPa			
0.78				
0.00	kPa			
2.2	m			
2.2	m			
2.2	m			
2.2	m			
0.8	m			
0.8	m			
0.8	m			
0.5	m			
0.25	m			
44	kPa			
20	kN/m <sup>3</sup>			
20	kN/m <sup>3</sup>			
1				
0	(1 si - 0 no)			
25	kN/m <sup>3</sup>			
274	kN			
1.30	m			
0.000	g			
0.000	g			+ downward
0.00	kN			
0.00	kN			

VERIFICA IN CONDIZIONI DRENATE



(NB: coefficiente correttivo per rapporto D/B non considerato)

(valore da stabilirsi in base alla profondità di falda)  
**(0= Lancellotta ecc., 1 = originale EC7)**  
si useranno le formule originarie di EC7

**Eccentricità degli scarichi rispetto a baricentro fondazione**

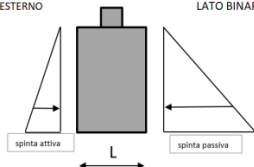
e <sub>L</sub>	0	m	+ se concorde con i momenti del traliccio
e <sub>T</sub>	0.1	m	+ se concorde con i momenti del traliccio

**Coefficienti di spinta di progetto**

coefficiente di spinta attiva statico K <sub>a</sub>	0.228	-
coefficiente di spinta attiva sismico K <sub>a,E</sub>	0.483	-
coefficiente di spinta passiva statico K <sub>p</sub>	4.395	-
coefficiente di spinta passiva sismico K <sub>p,E</sub>	3.251	-
coeff. parziale riduttivo della spinta passiva	1.40	-
moltiplicatore della spinta passiva $\alpha$	0.00	long 0.49 trasv
contributo delle spinte frontali long - taglio	0	kN statico 0 kN sismico
contributo delle spinte frontali long - momer	0	kNm statico 0 kNm sismico
contributo delle spinte frontali trasv - taglio	-139.5	kN statico 0 kN sismico
contributo delle spinte frontali trasv - mome	-102.3	kNm statico 0 kNm sismico

LATO ESTERNO

LATO BINARIO



CALCOLI PRELIMINARI: coefficienti di capacità portante indipendenti dai carichi

N <sub>0</sub>	=	48.93	B <sub>0</sub>	=	1
N <sub>1</sub>	=	74.90	B <sub>1</sub>	=	1
N <sub>2</sub>	=	61.35	B <sub>2</sub>	=	1

**SINTESI RISULTATI**

Capacità portante	F <sub>s min</sub>	=	2.95	n. Verif. Neg.	0
Scorrimento	F <sub>s min</sub>	=	1.6	n. Verif. Neg.	0
Ribaltamento	F <sub>s min</sub>	=	1.26	n. Verif. Neg.	0



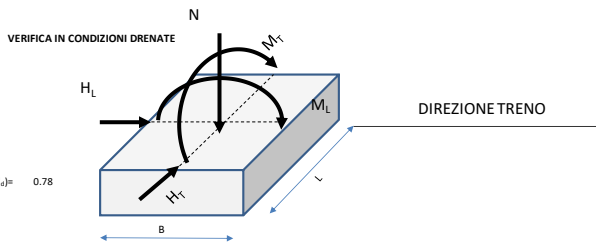
TITOLO: **Caso di carico 10 - combinazioni sismiche**

**FONDAZIONI A PLINTO**

**DESIGN ASSUMPTION**

**piano campagna sostanzialmente orizzontale**

angolo d'attrito caratteristico $\phi'_s$	38	°	0.663	rad	
coesione $c'$	0	kPa	+		
angolo d'attrito caratteristico $\phi'_s$ alla base	38	°	0.663	rad	
coesione alla base $c'$	0	kPa	+		
coefficiente $\gamma_s$	1.00				
coefficiente $\gamma_c$	1.00				
coefficiente $\gamma_s$ capacità portante	2.30				
coefficiente $\gamma_s$ scorrimento	1.10				
coefficiente $\gamma_s$ spinta passiva	1.40				
angolo d'attrito di design $\phi'_d$	38.00	°	0.663	rad	$\tan(\phi'_d) = 0.78$
coesione di design $c'_d$	0.00	kPa			
coeff. attrito di design $\mu'_d$	0.78				
coesione alla base di design	0.00	kPa			
Dimensione fondazione B[m] (LONGITUDINALE)	2.2	m			
Dimensione fondazione L[m] (TRASVERSALE)	2.2	m			
Profondità da piano campagna D [m]	2.2	m			(NB: coefficiente correttivo per rapporto D/B non considerato)
Altezza plinto [m] Hp	2.2	m			
Dimensione baggiolo b[m] (LONGITUDINALE)	0.8	m			
Dimensione maggiore baggiolo l [m] (TRASVERSALE)	0.8	m			
Altezza baggiolo [m] Hb	0.5	m			
Altezza terreno sopra plinto [m] Ht	0.25	m			
$q'$ = carico permanente ai lati	44	kPa			
$\gamma$ = peso specifico medio sopra la fondazione	20	kN/m <sup>3</sup>			(valore da stabilirsi in base alla profondità di falda)
$\gamma_f$ = peso specifico medio sotto la fondazione	20	kN/m <sup>3</sup>			(0 = Lancellotta ecc. 1 = originale EC7)
opzione calcolo coeff. $S_u$ e $S_v$	1				si useranno le formule originarie di EC7
opzione calcolo per tenere in conto peso terreno di ricoprimento	0	(1 si - 0 no)			
Peso specifico medio c.a.	25	kN/m <sup>3</sup>			
Peso proprio plinto + baggiolo + terreno sovrastante [kN]	274	kN			
Quota baricentro plinto + baggiolo + terreno sovrastante vs p.f. [kN]	1.30	m			
Coefficiente sismico kh	0.231	g			
Coefficiente sismico kv	-0.116	g			+ downward
Azione inerziale orizzontale plinto	63.34	kN			
Azione inerziale verticale plinto	-31.67	kN			

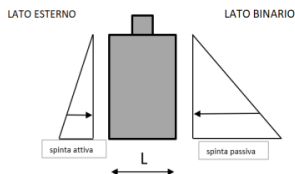


**Eccentricità degli scarichi rispetto a baricentro fondazione**

eccentricità longitudinale eL	0	m	+ se concorde con i momenti del traliccio
eccentricità trasversale eT	0.1	m	+ se concorde con i momenti del traliccio

**Coefficienti di spinta di progetto**

coefficiente di spinta attiva statico Ka	0.228	-	
coefficiente di spinta attiva sismico Ka,E	0.483	-	
coefficiente di spinta passiva statico Kp	4.395	-	
coefficiente di spinta passiva sismico Kp,E	3.251	-	
coeff. parziale riduttivo della spinta passiva $\gamma_{re}$	1.40	-	
moltiplicatore della spinta passiva $\alpha$	0.00	long	0.00 trasv
contributo delle spinte frontali long - taglio	0	kN	statico 0 kN sismico
contributo delle spinte frontali long - momento	0	kNm	statico 0 kNm sismico
contributo delle spinte frontali trasv - taglio	0	kN	statico 0 kN sismico
contributo delle spinte frontali trasv - momento	0	kNm	statico 0 kNm sismico



CALCOLI PRELIMINARI: coefficienti di capacità portante indipendenti dai carichi

$N_d = 48.93$	$G_d = 1$
$N_d = 74.90$	$G_d = 1$
$N_d = 61.35$	$G_d = 1$

SINTESI RISULTATI			
Capacità portante	$F_{s, min} = 9.21$	n. Verif. Neg.	0
Scorrimento	$F_{s, min} = 2.67$	n. Verif. Neg.	0
Ribaltamento	$F_{s, min} = 2.73$	n. Verif. Neg.	0

Le verifiche sono soddisfatte.

GENERAL CONTRACTOR 		ALTA SORVEGLIANZA 				
Relazione di calcolo pali di alimentazione	Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 311 di 336	

## 12.20 Verifiche di dettaglio

Ribaltamento – verifiche statiche

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
A	359.80	359.80	0.00	120.26	2.99	OK
A	359.80	359.80	0.00	158.12	2.28	OK
A	359.80	359.80	0.00	120.26	2.99	OK
A	359.80	359.80	0.00	158.12	2.28	OK
A	377.25	377.25	0.00	121.85	3.10	OK
A	377.25	377.25	0.00	159.71	2.36	OK
A	377.25	377.25	0.00	121.85	3.10	OK
A	377.25	377.25	0.00	159.71	2.36	OK
A	359.80	359.80	0.00	142.72	2.52	OK
A	359.80	359.80	0.00	180.58	1.99	OK
A	359.80	359.80	0.00	142.72	2.52	OK
A	359.80	359.80	0.00	180.58	1.99	OK
A	377.25	377.25	0.00	144.30	2.61	OK
A	377.25	377.25	0.00	182.16	2.07	OK
A	377.25	377.25	0.00	144.30	2.61	OK
A	377.25	377.25	0.00	182.16	2.07	OK
B AA	338.72	338.72	0.00	27.83	12.17	OK
B AA	338.72	338.72	0.00	19.62	17.26	OK
B AA	338.72	338.72	0.00	27.83	12.17	OK
B AA	338.72	338.72	0.00	19.62	17.26	OK
B AA	349.85	349.85	0.00	28.84	12.13	OK
B AA	349.85	349.85	0.00	20.63	16.96	OK
B AA	349.85	349.85	0.00	28.84	12.13	OK
B AA	349.85	349.85	0.00	20.63	16.96	OK
B AA	338.72	338.72	0.00	174.88	1.94	OK
B AA	338.72	338.72	0.00	196.94	1.72	OK
B AA	338.72	338.72	0.00	174.88	1.94	OK
B AA	338.72	338.72	0.00	196.94	1.72	OK
B AA	349.85	349.85	0.00	175.90	1.99	OK
B AA	349.85	349.85	0.00	197.95	1.77	OK
B AA	349.85	349.85	0.00	175.90	1.99	OK
B AA	349.85	349.85	0.00	197.95	1.77	OK
B WX	338.72	338.72	73.74	67.92	4.59	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WX	338.72	338.72	73.74	89.97	3.76	OK
B WX	338.72	338.72	73.74	67.92	4.59	OK
B WX	338.72	338.72	73.74	89.97	3.76	OK
B WX	349.85	349.85	73.74	68.93	4.74	OK
B WX	349.85	349.85	73.74	90.99	3.85	OK
B WX	349.85	349.85	73.74	68.93	4.74	OK
B WX	349.85	349.85	73.74	90.99	3.85	OK
B WX	338.72	338.72	73.74	85.88	3.94	OK
B WX	338.72	338.72	73.74	107.94	3.14	OK
B WX	338.72	338.72	73.74	85.88	3.94	OK
B WX	338.72	338.72	73.74	107.94	3.14	OK
B WX	349.85	349.85	73.74	86.89	4.03	OK
B WX	349.85	349.85	73.74	108.95	3.21	OK
B WX	349.85	349.85	73.74	86.89	4.03	OK
B WX	349.85	349.85	73.74	108.95	3.21	OK
B WXY	338.72	338.72	51.62	40.05	6.56	OK
B WXY	338.72	338.72	51.62	17.99	6.56	OK
B WXY	338.72	338.72	51.62	40.05	6.56	OK
B WXY	338.72	338.72	51.62	17.99	6.56	OK
B WXY	349.85	349.85	51.62	41.06	6.78	OK
B WXY	349.85	349.85	51.62	19.00	6.78	OK
B WXY	349.85	349.85	51.62	41.06	6.78	OK
B WXY	349.85	349.85	51.62	19.00	6.78	OK
B WXY	338.72	338.72	51.62	187.10	1.81	OK
B WXY	338.72	338.72	51.62	209.15	1.62	OK
B WXY	338.72	338.72	51.62	187.10	1.81	OK
B WXY	338.72	338.72	51.62	209.15	1.62	OK
B WXY	349.85	349.85	51.62	188.11	1.86	OK
B WXY	349.85	349.85	51.62	210.17	1.66	OK
B WXY	349.85	349.85	51.62	188.11	1.86	OK
B WXY	349.85	349.85	51.62	210.17	1.66	OK
B WY	338.72	338.72	0.00	83.42	4.06	OK
B WY	338.72	338.72	0.00	61.37	5.52	OK
B WY	338.72	338.72	0.00	83.42	4.06	OK
B WY	338.72	338.72	0.00	61.37	5.52	OK
B WY	349.85	349.85	0.00	84.44	4.14	OK
B WY	349.85	349.85	0.00	62.38	5.61	OK
B WY	349.85	349.85	0.00	84.44	4.14	OK
B WY	349.85	349.85	0.00	62.38	5.61	OK





Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WY	338.72	338.72	0.00	230.48	1.47	OK
B WY	338.72	338.72	0.00	252.53	1.34	OK
B WY	338.72	338.72	0.00	230.48	1.47	OK
B WY	338.72	338.72	0.00	252.53	1.34	OK
B WY	349.85	349.85	0.00	231.49	1.51	OK
B WY	349.85	349.85	0.00	253.54	1.38	OK
B WY	349.85	349.85	0.00	231.49	1.51	OK
B WY	349.85	349.85	0.00	253.54	1.38	OK
D I	350.87	350.87	0.00	35.87	9.78	OK
D I	353.22	353.22	0.00	19.39	18.22	OK
D I	354.24	354.24	0.00	36.18	9.79	OK
D I	356.60	356.60	0.00	19.70	18.11	OK
D I	365.64	365.64	0.00	37.22	9.82	OK
D I	368.00	368.00	0.00	20.73	17.75	OK
D I	369.01	369.01	0.00	37.52	9.83	OK
D I	371.37	371.37	0.00	21.04	17.65	OK
D I	350.87	350.87	0.00	238.57	1.47	OK
D I	353.22	353.22	0.00	269.18	1.31	OK
D I	354.24	354.24	0.00	238.87	1.48	OK
D I	356.60	356.60	0.00	269.49	1.32	OK
D I	365.64	365.64	0.00	239.91	1.52	OK
D I	368.00	368.00	0.00	270.53	1.36	OK
D I	369.01	369.01	0.00	240.22	1.54	OK
D I	371.37	371.37	0.00	270.83	1.37	OK
D W	350.87	350.87	0.00	16.07	21.83	OK
D W	352.05	352.05	0.00	14.23	24.75	OK
D W	352.55	352.55	0.00	16.22	21.73	OK
D W	353.73	353.73	0.00	14.07	25.13	OK
D W	365.64	365.64	0.00	17.41	21.00	OK
D W	366.82	366.82	0.00	12.88	28.47	OK
D W	367.33	367.33	0.00	17.57	20.91	OK
D W	368.51	368.51	0.00	12.73	28.95	OK
D W	350.87	350.87	0.00	218.76	1.60	OK
D W	352.05	352.05	0.00	249.27	1.41	OK
D W	352.55	352.55	0.00	218.92	1.61	OK
D W	353.73	353.73	0.00	249.43	1.42	OK
D W	365.64	365.64	0.00	220.11	1.66	OK
D W	366.82	366.82	0.00	250.62	1.46	OK
D W	367.33	367.33	0.00	220.26	1.67	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
D W	368.51	368.51	0.00	250.77	1.47	OK
DAA	352.05	352.05	0.00	38.23	9.21	OK
DAA	352.05	352.05	0.00	19.07	18.46	OK
DAA	353.73	353.73	0.00	38.38	9.22	OK
DAA	353.73	353.73	0.00	19.23	18.40	OK
DAA	366.82	366.82	0.00	39.57	9.27	OK
DAA	366.82	366.82	0.00	20.42	17.97	OK
DAA	368.51	368.51	0.00	39.72	9.28	OK
DAA	368.51	368.51	0.00	20.57	17.91	OK
DAA	352.05	352.05	0.00	240.92	1.46	OK
DAA	352.05	352.05	0.00	271.32	1.30	OK
DAA	353.73	353.73	0.00	241.07	1.47	OK
DAA	353.73	353.73	0.00	271.48	1.30	OK
DAA	366.82	366.82	0.00	242.26	1.51	OK
DAA	366.82	366.82	0.00	272.67	1.35	OK
DAA	368.51	368.51	0.00	242.42	1.52	OK
DAA	368.51	368.51	0.00	272.82	1.35	OK
A	323.82	323.82	0.00	107.11	3.02	OK
A	323.82	323.82	0.00	132.35	2.45	OK
A	323.82	323.82	0.00	107.11	3.02	OK
A	323.82	323.82	0.00	132.35	2.45	OK
A	335.46	335.46	0.00	108.17	3.10	OK
A	335.46	335.46	0.00	133.41	2.51	OK
A	335.46	335.46	0.00	108.17	3.10	OK
A	335.46	335.46	0.00	133.41	2.51	OK
A	323.82	323.82	0.00	129.57	2.50	OK
A	323.82	323.82	0.00	154.81	2.09	OK
A	323.82	323.82	0.00	129.57	2.50	OK
A	323.82	323.82	0.00	154.81	2.09	OK
A	335.46	335.46	0.00	130.63	2.57	OK
A	335.46	335.46	0.00	155.87	2.15	OK
A	335.46	335.46	0.00	130.63	2.57	OK
A	335.46	335.46	0.00	155.87	2.15	OK
B AA	304.85	304.85	0.00	34.85	8.75	OK
B AA	304.85	304.85	0.00	20.14	15.13	OK
B AA	304.85	304.85	0.00	34.85	8.75	OK
B AA	304.85	304.85	0.00	20.14	15.13	OK
B AA	312.27	312.27	0.00	35.52	8.79	OK
B AA	312.27	312.27	0.00	20.82	15.00	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B AA	312.27	312.27	0.00	35.52	8.79	OK
B AA	312.27	312.27	0.00	20.82	15.00	OK
B AA	304.85	304.85	0.00	167.19	1.82	OK
B AA	304.85	304.85	0.00	181.90	1.68	OK
B AA	304.85	304.85	0.00	167.19	1.82	OK
B AA	304.85	304.85	0.00	181.90	1.68	OK
B AA	312.27	312.27	0.00	167.87	1.86	OK
B AA	312.27	312.27	0.00	182.57	1.71	OK
B AA	312.27	312.27	0.00	167.87	1.86	OK
B AA	312.27	312.27	0.00	182.57	1.71	OK
B WX	304.85	304.85	73.74	60.23	4.13	OK
B WX	304.85	304.85	73.74	74.93	4.07	OK
B WX	304.85	304.85	73.74	60.23	4.13	OK
B WX	304.85	304.85	73.74	74.93	4.07	OK
B WX	312.27	312.27	73.74	60.90	4.24	OK
B WX	312.27	312.27	73.74	75.61	4.13	OK
B WX	312.27	312.27	73.74	60.90	4.24	OK
B WX	312.27	312.27	73.74	75.61	4.13	OK
B WX	304.85	304.85	73.74	78.19	3.90	OK
B WX	304.85	304.85	73.74	92.90	3.28	OK
B WX	304.85	304.85	73.74	78.19	3.90	OK
B WX	304.85	304.85	73.74	92.90	3.28	OK
B WX	312.27	312.27	73.74	78.87	3.96	OK
B WX	312.27	312.27	73.74	93.57	3.34	OK
B WX	312.27	312.27	73.74	78.87	3.96	OK
B WX	312.27	312.27	73.74	93.57	3.34	OK
B WXY	304.85	304.85	51.62	47.06	5.91	OK
B WXY	304.85	304.85	51.62	32.36	5.91	OK
B WXY	304.85	304.85	51.62	47.06	5.91	OK
B WXY	304.85	304.85	51.62	32.36	5.91	OK
B WXY	312.27	312.27	51.62	47.74	6.05	OK
B WXY	312.27	312.27	51.62	33.03	6.05	OK
B WXY	312.27	312.27	51.62	47.74	6.05	OK
B WXY	312.27	312.27	51.62	33.03	6.05	OK
B WXY	304.85	304.85	51.62	179.41	1.70	OK
B WXY	304.85	304.85	51.62	194.11	1.57	OK
B WXY	304.85	304.85	51.62	179.41	1.70	OK
B WXY	304.85	304.85	51.62	194.11	1.57	OK
B WXY	312.27	312.27	51.62	180.08	1.73	OK



Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
B WXY	312.27	312.27	51.62	194.79	1.60	OK
B WXY	312.27	312.27	51.62	180.08	1.73	OK
B WXY	312.27	312.27	51.62	194.79	1.60	OK
B WY	304.85	304.85	0.00	90.44	3.37	OK
B WY	304.85	304.85	0.00	75.74	4.03	OK
B WY	304.85	304.85	0.00	90.44	3.37	OK
B WY	304.85	304.85	0.00	75.74	4.03	OK
B WY	312.27	312.27	0.00	91.11	3.43	OK
B WY	312.27	312.27	0.00	76.41	4.09	OK
B WY	312.27	312.27	0.00	91.11	3.43	OK
B WY	312.27	312.27	0.00	76.41	4.09	OK
B WY	304.85	304.85	0.00	222.79	1.37	OK
B WY	304.85	304.85	0.00	237.49	1.28	OK
B WY	304.85	304.85	0.00	222.79	1.37	OK
B WY	304.85	304.85	0.00	237.49	1.28	OK
B WY	312.27	312.27	0.00	223.46	1.40	OK
B WY	312.27	312.27	0.00	238.17	1.31	OK
B WY	312.27	312.27	0.00	223.46	1.40	OK
B WY	312.27	312.27	0.00	238.17	1.31	OK
D I	315.78	315.78	0.00	45.56	6.93	OK
D I	318.14	318.14	0.00	25.51	12.47	OK
D I	319.15	319.15	0.00	45.87	6.96	OK
D I	321.51	321.51	0.00	25.81	12.46	OK
D I	325.63	325.63	0.00	46.46	7.01	OK
D I	327.99	327.99	0.00	26.40	12.42	OK
D I	329.00	329.00	0.00	46.76	7.04	OK
D I	331.36	331.36	0.00	26.71	12.41	OK
D I	315.78	315.78	0.00	227.98	1.39	OK
D I	318.14	318.14	0.00	248.47	1.28	OK
D I	319.15	319.15	0.00	228.29	1.40	OK
D I	321.51	321.51	0.00	248.77	1.29	OK
D I	325.63	325.63	0.00	228.88	1.42	OK
D I	327.99	327.99	0.00	249.36	1.32	OK
D I	329.00	329.00	0.00	229.19	1.44	OK
D I	331.36	331.36	0.00	249.67	1.33	OK
D W	315.78	315.78	0.00	25.76	12.26	OK
D W	316.96	316.96	0.00	5.59	56.65	OK
D W	317.47	317.47	0.00	25.91	12.25	OK
D W	318.65	318.65	0.00	5.75	55.44	OK

GENERAL CONTRACTOR  <b>IRICAV2</b>		ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE				
Relazione di calcolo pali di alimentazione		Progetto IN17	Lotto 10	Codifica Documento E I2 CL OC 00 0 0 010	Rev. A	Foglio 317 di 336

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
D W	325.63	325.63	0.00	26.65	12.22	OK
D W	326.81	326.81	0.00	6.49	50.35	OK
D W	327.32	327.32	0.00	26.81	12.21	OK
D W	328.49	328.49	0.00	6.64	49.45	OK
D W	315.78	315.78	0.00	208.18	1.52	OK
D W	316.96	316.96	0.00	228.56	1.39	OK
D W	317.47	317.47	0.00	208.33	1.52	OK
D W	318.65	318.65	0.00	228.71	1.39	OK
D W	325.63	325.63	0.00	209.08	1.56	OK
D W	326.81	326.81	0.00	229.45	1.42	OK
D W	327.32	327.32	0.00	209.23	1.56	OK
D W	328.49	328.49	0.00	229.60	1.43	OK
DAA	316.96	316.96	0.00	47.91	6.62	OK
DAA	316.96	316.96	0.00	27.64	11.47	OK
DAA	318.65	318.65	0.00	48.07	6.63	OK
DAA	318.65	318.65	0.00	27.80	11.46	OK
DAA	326.81	326.81	0.00	48.81	6.70	OK
DAA	326.81	326.81	0.00	28.54	11.45	OK
DAA	328.49	328.49	0.00	48.96	6.71	OK
DAA	328.49	328.49	0.00	28.69	11.45	OK
DAA	316.96	316.96	0.00	230.34	1.38	OK
DAA	316.96	316.96	0.00	250.61	1.26	OK
DAA	318.65	318.65	0.00	230.49	1.38	OK
DAA	318.65	318.65	0.00	250.76	1.27	OK
DAA	326.81	326.81	0.00	231.23	1.41	OK
DAA	326.81	326.81	0.00	251.50	1.30	OK
DAA	328.49	328.49	0.00	231.39	1.42	OK

Scorrimento – verifiche statiche

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B \cdot L) \cdot C'_{dbase}) / \gamma_R$	$E_d$	Rd/Ed	
		kN	kN		
A	232.3	7.5	31.05	OK	
A	232.3	10.3	22.57	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d / E_d$	
		kN	kN		
A	232.3	7.5	31.05	OK	
A	232.3	10.3	22.57	OK	
A	243.6	7.5	32.55	OK	
A	243.6	10.3	23.66	OK	
A	243.6	7.5	32.55	OK	
A	243.6	10.3	23.66	OK	
A	232.3	11.3	20.64	OK	
A	232.3	14.1	16.51	OK	
A	232.3	11.3	20.64	OK	
A	232.3	14.1	16.51	OK	
A	243.6	11.3	21.64	OK	
A	243.6	14.1	17.32	OK	
A	243.6	11.3	21.64	OK	
A	243.6	14.1	17.32	OK	
B AA	218.7	5.1	43.12	OK	
B AA	218.7	3.5	63.33	OK	
B AA	218.7	5.1	43.12	OK	
B AA	218.7	3.5	63.33	OK	
B AA	225.9	5.1	44.53	OK	
B AA	225.9	3.5	65.41	OK	
B AA	225.9	5.1	44.53	OK	
B AA	225.9	3.5	65.41	OK	
B AA	218.7	15.9	13.79	OK	
B AA	218.7	17.5	12.51	OK	
B AA	218.7	15.9	13.79	OK	
B AA	218.7	17.5	12.51	OK	
B AA	225.9	15.9	14.24	OK	
B AA	225.9	17.5	12.92	OK	
B AA	225.9	15.9	14.24	OK	
B AA	225.9	17.5	12.92	OK	
B WX	218.7	9.1	24.11	OK	
B WX	218.7	9.9	22.15	OK	
B WX	218.7	9.1	24.11	OK	
B WX	218.7	9.9	22.15	OK	
B WX	225.9	9.1	24.91	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
B WX	225.9	9.9	22.88	OK	
B WX	225.9	9.1	24.91	OK	
B WX	225.9	9.9	22.88	OK	
B WX	218.7	10.7	20.41	OK	
B WX	218.7	11.8	18.50	OK	
B WX	218.7	10.7	20.41	OK	
B WX	218.7	11.8	18.50	OK	
B WX	225.9	10.7	21.08	OK	
B WX	225.9	11.8	19.10	OK	
B WX	225.9	10.7	21.08	OK	
B WX	225.9	11.8	19.10	OK	
B WXY	218.7	8.4	26.06	OK	
B WXY	218.7	7.3	29.98	OK	
B WXY	218.7	8.4	26.06	OK	
B WXY	218.7	7.3	29.98	OK	
B WXY	225.9	8.4	26.92	OK	
B WXY	225.9	7.3	30.97	OK	
B WXY	225.9	8.4	26.92	OK	
B WXY	225.9	7.3	30.97	OK	
B WXY	218.7	17.9	12.24	OK	
B WXY	218.7	19.4	11.27	OK	
B WXY	218.7	17.9	12.24	OK	
B WXY	218.7	19.4	11.27	OK	
B WXY	225.9	17.9	12.65	OK	
B WXY	225.9	19.4	11.64	OK	
B WXY	225.9	17.9	12.65	OK	
B WXY	225.9	19.4	11.64	OK	
B WY	218.7	10.4	21.00	OK	
B WY	218.7	8.8	24.86	OK	
B WY	218.7	10.4	21.00	OK	
B WY	218.7	8.8	24.86	OK	
B WY	225.9	10.4	21.69	OK	
B WY	225.9	8.8	25.68	OK	
B WY	225.9	10.4	21.69	OK	
B WY	225.9	8.8	25.68	OK	
B WY	218.7	21.2	10.31	OK	
B WY	218.7	22.8	9.58	OK	
B WY	218.7	21.2	10.31	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d / E_d$	
		kN	kN		
B WY	218.7	22.8	9.58	OK	
B WY	225.9	21.2	10.65	OK	
B WY	225.9	22.8	9.90	OK	
B WY	225.9	21.2	10.65	OK	
B WY	225.9	22.8	9.90	OK	
D I	226.6	5.2	43.90	OK	
D I	228.1	2.9	78.49	OK	
D I	228.7	5.2	44.32	OK	
D I	230.3	2.9	79.24	OK	
D I	236.1	5.2	45.75	OK	
D I	237.6	2.9	81.77	OK	
D I	238.3	5.2	46.17	OK	
D I	239.8	2.9	82.52	OK	
D I	226.6	20.2	11.22	OK	
D I	228.1	22.5	10.16	OK	
D I	228.7	20.2	11.33	OK	
D I	230.3	22.5	10.26	OK	
D I	236.1	20.2	11.69	OK	
D I	237.6	22.5	10.58	OK	
D I	238.3	20.2	11.80	OK	
D I	239.8	22.5	10.68	OK	
D W	226.6	126.9	1.79	OK	
D W	227.3	129.2	1.76	OK	
D W	227.6	126.9	1.79	OK	
D W	228.4	129.2	1.77	OK	
D W	236.1	126.9	1.86	OK	
D W	236.9	129.2	1.83	OK	
D W	237.2	126.9	1.87	OK	
D W	237.9	129.2	1.84	OK	
D W	226.6	111.9	2.03	OK	
D W	227.3	109.6	2.07	OK	
D W	227.6	111.9	2.03	OK	
D W	228.4	109.6	2.08	OK	
D W	236.1	111.9	2.11	OK	
D W	236.9	109.6	2.16	OK	
D W	237.2	111.9	2.12	OK	
D W	237.9	109.6	2.17	OK	
DAA	227.3	5.5	41.04	OK	





Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d / E_d$	
		kN	kN		
DAA	227.3	3.3	69.24	OK	
DAA	228.4	5.5	41.24	OK	
DAA	228.4	3.3	69.57	OK	
DAA	236.9	5.5	42.77	OK	
DAA	236.9	3.3	72.14	OK	
DAA	237.9	5.5	42.96	OK	
DAA	237.9	3.3	72.47	OK	
DAA	227.3	20.6	11.05	OK	
DAA	227.3	22.8	9.96	OK	
DAA	228.4	20.6	11.10	OK	
DAA	228.4	22.8	10.00	OK	
DAA	236.9	20.6	11.51	OK	
DAA	236.9	22.8	10.38	OK	
DAA	237.9	20.6	11.57	OK	
DAA	237.9	22.8	10.42	OK	
A	209.1	6.5	31.94	OK	
A	209.1	8.4	24.83	OK	
A	209.1	6.5	31.94	OK	
A	209.1	8.4	24.83	OK	
A	216.6	6.5	33.09	OK	
A	216.6	8.4	25.73	OK	
A	216.6	6.5	33.09	OK	
A	216.6	8.4	25.73	OK	
A	209.1	10.3	20.26	OK	
A	209.1	12.2	17.15	OK	
A	209.1	10.3	20.26	OK	
A	209.1	12.2	17.15	OK	
A	216.6	10.3	20.99	OK	
A	216.6	12.2	17.76	OK	
A	216.6	10.3	20.99	OK	
A	216.6	12.2	17.76	OK	
B AA	196.8	5.6	35.07	OK	
B AA	196.8	4.5	43.43	OK	
B AA	196.8	5.6	35.07	OK	
B AA	196.8	4.5	43.43	OK	
B AA	201.6	5.6	35.93	OK	
B AA	201.6	4.5	44.48	OK	
B AA	201.6	5.6	35.93	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
B AA	201.6	4.5	44.48	OK	
B AA	196.8	15.3	12.84	OK	
B AA	196.8	16.4	12.00	OK	
B AA	196.8	15.3	12.84	OK	
B AA	196.8	16.4	12.00	OK	
B AA	201.6	15.3	13.16	OK	
B AA	201.6	16.4	12.29	OK	
B AA	201.6	15.3	13.16	OK	
B AA	201.6	16.4	12.29	OK	
B WX	196.8	8.9	22.24	OK	
B WX	196.8	9.3	21.13	OK	
B WX	196.8	8.9	22.24	OK	
B WX	196.8	9.3	21.13	OK	
B WX	201.6	8.9	22.78	OK	
B WX	201.6	9.3	21.65	OK	
B WX	201.6	8.9	22.78	OK	
B WX	201.6	9.3	21.65	OK	
B WX	196.8	10.4	18.97	OK	
B WX	196.8	11.1	17.78	OK	
B WX	196.8	10.4	18.97	OK	
B WX	196.8	11.1	17.78	OK	
B WX	201.6	10.4	19.43	OK	
B WX	201.6	11.1	18.21	OK	
B WX	201.6	10.4	19.43	OK	
B WX	201.6	11.1	18.21	OK	
B WXY	196.8	8.8	22.38	OK	
B WXY	196.8	8.0	24.58	OK	
B WXY	196.8	8.8	22.38	OK	
B WXY	196.8	8.0	24.58	OK	
B WXY	201.6	8.8	22.93	OK	
B WXY	201.6	8.0	25.18	OK	
B WXY	201.6	8.8	22.93	OK	
B WXY	201.6	8.0	25.18	OK	
B WXY	196.8	17.4	11.34	OK	
B WXY	196.8	18.4	10.71	OK	
B WXY	196.8	17.4	11.34	OK	
B WXY	196.8	18.4	10.71	OK	
B WXY	201.6	17.4	11.62	OK	



Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
B WXY	201.6	18.4	10.97	OK	
B WXY	201.6	17.4	11.62	OK	
B WXY	201.6	18.4	10.97	OK	
B WY	196.8	11.0	17.97	OK	
B WY	196.8	9.9	19.93	OK	
B WY	196.8	11.0	17.97	OK	
B WY	196.8	9.9	19.93	OK	
B WY	201.6	11.0	18.40	OK	
B WY	201.6	9.9	20.42	OK	
B WY	201.6	11.0	18.40	OK	
B WY	201.6	9.9	20.42	OK	
B WY	196.8	20.7	9.52	OK	
B WY	196.8	21.7	9.05	OK	
B WY	196.8	20.7	9.52	OK	
B WY	196.8	21.7	9.05	OK	
B WY	201.6	20.7	9.76	OK	
B WY	201.6	21.7	9.27	OK	
B WY	201.6	20.7	9.76	OK	
B WY	201.6	21.7	9.27	OK	
D I	203.9	5.9	34.48	OK	
D I	205.4	4.4	46.59	OK	
D I	206.1	5.9	34.85	OK	
D I	207.6	4.4	47.08	OK	
D I	210.3	5.9	35.56	OK	
D I	211.8	4.4	48.03	OK	
D I	212.4	5.9	35.93	OK	
D I	214.0	4.4	48.52	OK	
D I	203.9	19.4	10.49	OK	
D I	205.4	20.9	9.81	OK	
D I	206.1	19.4	10.60	OK	
D I	207.6	20.9	9.91	OK	
D I	210.3	19.4	10.81	OK	
D I	211.8	20.9	10.11	OK	
D I	212.4	19.4	10.93	OK	
D I	214.0	20.9	10.21	OK	
D W	203.9	126.2	1.62	OK	
D W	204.7	127.7	1.60	OK	
D W	205.0	126.2	1.62	OK	

GENERAL CONTRACTOR  <b>IRICAV2</b>	ALTA SORVEGLIANZA  <b>ITALFERR</b> GRUPPO FERROVIE DELLO STATO ITALIANE
Relazione di calcolo pali di alimentazione	Progetto IN17    Lotto 10    Codifica Documento E I2 CL OC 00 0 0 010    Rev. A    Foglio 324 di 336

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	COMB	$R_d = (N \cdot m_d + (B' \cdot L') \cdot c'_{dbase}) / \gamma_R$	$E_d$	$R_d/E_d$	
		kN	kN		
D W	205.7	127.7	1.61	OK	
D W	210.3	126.2	1.67	OK	
D W	211.0	127.7	1.65	OK	
D W	211.3	126.2	1.68	OK	
D W	212.1	127.7	1.66	OK	
D W	203.9	112.6	1.81	OK	
D W	204.7	111.1	1.84	OK	
D W	205.0	112.6	1.82	OK	
D W	205.7	111.1	1.85	OK	
D W	210.3	112.6	1.87	OK	
D W	211.0	111.1	1.90	OK	
D W	211.3	112.6	1.88	OK	
D W	212.1	111.1	1.91	OK	
DAA	204.7	6.3	32.54	OK	
DAA	204.7	4.8	42.76	OK	
DAA	205.7	6.3	32.71	OK	
DAA	205.7	4.8	42.98	OK	
DAA	211.0	6.3	33.55	OK	
DAA	211.0	4.8	44.08	OK	
DAA	212.1	6.3	33.72	OK	
DAA	212.1	4.8	44.31	OK	
DAA	204.7	19.8	10.32	OK	
DAA	204.7	21.3	9.60	OK	
DAA	205.7	19.8	10.38	OK	
DAA	205.7	21.3	9.65	OK	
DAA	211.0	19.8	10.65	OK	
DAA	211.0	21.3	9.90	OK	
DAA	212.1	19.8	10.70	OK	

Capacità portante – verifiche statiche

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	COMB	$R_d$	$E_d$	$R_d/E_d$	
		$q_{u,d}$ kPa	$q_{E,d} = N / (B' \cdot L')$		
A	$(2925. + 1242. +) / 2.3 =$	1811.7	101.51	17.85	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	COMB	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>
		q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
			kPa			
A	(2748. + 1260. +) /2.3 =	1742.5	120.57	14.45	OK	
A	(2925. + 1242. +) /2.3 =	1811.7	101.51	17.85	OK	
A	(2748. + 1260. +) /2.3 =	1742.5	120.57	14.45	OK	
A	(2945. + 1240. +) /2.3 =	1819.5	104.66	17.38	OK	
A	(2776. + 1258. +) /2.3 =	1753.6	122.88	14.27	OK	
A	(2945. + 1240. +) /2.3 =	1819.5	104.66	17.38	OK	
A	(2776. + 1258. +) /2.3 =	1753.6	122.88	14.27	OK	
A	(2790. + 1231. +) /2.3 =	1748.1	112.01	15.61	OK	
A	(2614. + 1246. +) /2.3 =	1678.7	135.67	12.37	OK	
A	(2790. + 1231. +) /2.3 =	1748.1	112.01	15.61	OK	
A	(2614. + 1246. +) /2.3 =	1678.7	135.67	12.37	OK	
A	(2815. + 1230. +) /2.3 =	1758.9	114.75	15.33	OK	
A	(2648. + 1245. +) /2.3 =	1692.8	137.02	12.35	OK	
A	(2815. + 1230. +) /2.3 =	1758.9	114.75	15.33	OK	
A	(2648. + 1245. +) /2.3 =	1692.8	137.02	12.35	OK	
B AA	(3286. + 1145. +) /2.3 =	1926.4	69.32	27.79	OK	
B AA	(3344. + 1149. +) /2.3 =	1953.6	67.53	28.93	OK	
B AA	(3286. + 1145. +) /2.3 =	1926.4	69.32	27.79	OK	
B AA	(3344. + 1149. +) /2.3 =	1953.6	67.53	28.93	OK	
B AA	(3288. + 1147. +) /2.3 =	1928.1	71.62	26.92	OK	
B AA	(3345. + 1151. +) /2.3 =	1954.4	69.83	27.99	OK	
B AA	(3288. + 1147. +) /2.3 =	1928.1	71.62	26.92	OK	
B AA	(3345. + 1151. +) /2.3 =	1954.4	69.83	27.99	OK	
B AA	(2557. + 1223. +) /2.3 =	1643.6	131.53	12.50	OK	
B AA	(2451. + 1230. +) /2.3 =	1600.5	152.00	10.53	OK	
B AA	(2557. + 1223. +) /2.3 =	1643.6	131.53	12.50	OK	
B AA	(2451. + 1230. +) /2.3 =	1600.5	152.00	10.53	OK	
B AA	(2582. + 1223. +) /2.3 =	1654.4	132.16	12.52	OK	
B AA	(2479. + 1230. +) /2.3 =	1612.8	151.35	10.66	OK	
B AA	(2582. + 1223. +) /2.3 =	1654.4	132.16	12.52	OK	
B AA	(2479. + 1230. +) /2.3 =	1612.8	151.35	10.66	OK	
B WX	(3298. + 845. +) /2.3 =	1801.5	101.72	17.71	OK	
B WX	(3236. + 854. +) /2.3 =	1778.1	110.74	16.06	OK	
B WX	(3298. + 845. +) /2.3 =	1801.5	101.72	17.71	OK	
B WX	(3236. + 854. +) /2.3 =	1778.1	110.74	16.06	OK	
B WX	(3309. + 853. +) /2.3 =	1809.5	103.69	17.45	OK	



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')			
COMB			kPa			
B WX	(3240. + 864. +) /2.3 =	1784.2	112.52	15.86	OK	
B WX	(3309. + 853. +) /2.3 =	1809.5	103.69	17.45	OK	
B WX	(3240. + 864. +) /2.3 =	1784.2	112.52	15.86	OK	
B WX	(3241. + 842. +) /2.3 =	1775.4	108.95	16.30	OK	
B WX	(3119. + 863. +) /2.3 =	1731.3	119.36	14.51	OK	
B WX	(3241. + 842. +) /2.3 =	1775.4	108.95	16.30	OK	
B WX	(3119. + 863. +) /2.3 =	1731.3	119.36	14.51	OK	
B WX	(3245. + 853. +) /2.3 =	1781.4	110.77	16.08	OK	
B WX	(3127. + 873. +) /2.3 =	1739.1	120.92	14.38	OK	
B WX	(3245. + 853. +) /2.3 =	1781.4	110.77	16.08	OK	
B WX	(3127. + 873. +) /2.3 =	1739.1	120.92	14.38	OK	
B WXY	(3288. + 928. +) /2.3 =	1832.9	85.12	21.53	OK	
B WXY	(3221. + 962. +) /2.3 =	1818.8	79.27	22.94	OK	
B WXY	(3288. + 928. +) /2.3 =	1832.9	85.12	21.53	OK	
B WXY	(3221. + 962. +) /2.3 =	1818.8	79.27	22.94	OK	
B WXY	(3298. + 933. +) /2.3 =	1839.8	87.33	21.07	OK	
B WXY	(3233. + 967. +) /2.3 =	1826.0	81.51	22.40	OK	
B WXY	(3298. + 933. +) /2.3 =	1839.8	87.33	21.07	OK	
B WXY	(3233. + 967. +) /2.3 =	1826.0	81.51	22.40	OK	
B WXY	(2589. + 1005. +) /2.3 =	1562.8	167.68	9.32	OK	
B WXY	(2470. + 1016. +) /2.3 =	1515.7	196.22	7.72	OK	
B WXY	(2589. + 1005. +) /2.3 =	1562.8	167.68	9.32	OK	
B WXY	(2470. + 1016. +) /2.3 =	1515.7	196.22	7.72	OK	
B WXY	(2616. + 1011. +) /2.3 =	1576.8	166.73	9.46	OK	
B WXY	(2500. + 1022. +) /2.3 =	1531.4	193.06	7.93	OK	
B WXY	(2616. + 1011. +) /2.3 =	1576.8	166.73	9.46	OK	
B WXY	(2500. + 1022. +) /2.3 =	1531.4	193.06	7.93	OK	
B WY	(2986. + 1167. +) /2.3 =	1805.9	84.41	21.39	OK	
B WY	(3096. + 1154. +) /2.3 =	1848.1	77.70	23.79	OK	
B WY	(2986. + 1167. +) /2.3 =	1805.9	84.41	21.39	OK	
B WY	(3096. + 1154. +) /2.3 =	1848.1	77.70	23.79	OK	
B WY	(2998. + 1168. +) /2.3 =	1811.5	86.62	20.91	OK	
B WY	(3104. + 1156. +) /2.3 =	1852.3	79.97	23.16	OK	
B WY	(2998. + 1168. +) /2.3 =	1811.5	86.62	20.91	OK	
B WY	(3104. + 1156. +) /2.3 =	1852.3	79.97	23.16	OK	
B WY	(2273. + 1224. +) /2.3 =	1520.3	199.08	7.64	OK	
B WY	(2168. + 1227. +) /2.3 =	1476.3	250.03	5.90	OK	
B WY	(2273. + 1224. +) /2.3 =	1520.3	199.08	7.64	OK	
B WY	(2168. + 1227. +) /2.3 =	1476.3	250.03	5.90	OK	



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
B WY	(2306. + 1225. +) /2.3 =	1535.2	194.23	7.90	OK
B WY	(2205. + 1229. +) /2.3 =	1492.7	238.71	6.25	OK
B WY	(2306. + 1225. +) /2.3 =	1535.2	194.23	7.90	OK
B WY	(2205. + 1229. +) /2.3 =	1492.7	238.71	6.25	OK
D I	(3261. + 1155. +) /2.3 =	1920.1	73.41	26.16	OK
D I	(3359. + 1154. +) /2.3 =	1962.3	70.20	27.95	OK
D I	(3262. + 1156. +) /2.3 =	1920.7	74.11	25.92	OK
D I	(3359. + 1154. +) /2.3 =	1962.4	70.89	27.68	OK
D I	(3265. + 1157. +) /2.3 =	1922.5	76.46	25.14	OK
D I	(3359. + 1156. +) /2.3 =	1963.0	73.25	26.80	OK
D I	(3266. + 1157. +) /2.3 =	1923.1	77.16	24.92	OK
D I	(3359. + 1156. +) /2.3 =	1963.2	73.94	26.55	OK
D I	(2297. + 1244. +) /2.3 =	1539.6	205.90	7.48	OK
D I	(2165. + 1248. +) /2.3 =	1484.2	278.86	5.32	OK
D I	(2307. + 1244. +) /2.3 =	1543.9	204.30	7.56	OK
D I	(2176. + 1249. +) /2.3 =	1489.0	274.20	5.43	OK
D I	(2339. + 1244. +) /2.3 =	1557.8	199.72	7.80	OK
D I	(2211. + 1250. +) /2.3 =	1504.7	260.96	5.77	OK
D I	(2348. + 1244. +) /2.3 =	1561.7	198.58	7.86	OK
D I	(2221. + 1250. +) /2.3 =	1509.1	257.66	5.86	OK
D W	(1588. + 329. +) /2.3 =	833.2	69.07	12.06	OK
D W	(1569. + 321. +) /2.3 =	821.7	68.91	11.92	OK
D W	(1595. + 332. +) /2.3 =	837.6	69.41	12.07	OK
D W	(1577. + 323. +) /2.3 =	826.3	69.19	11.94	OK
D W	(1650. + 352. +) /2.3 =	870.5	72.11	12.07	OK
D W	(1639. + 342. +) /2.3 =	861.4	71.41	12.06	OK
D W	(1657. + 354. +) /2.3 =	874.6	72.46	12.07	OK
D W	(1646. + 345. +) /2.3 =	865.8	71.69	12.08	OK
D W	(1258. + 450. +) /2.3 =	742.8	175.04	4.24	OK
D W	(1207. + 470. +) /2.3 =	729.1	226.51	3.22	OK
D W	(1266. + 453. +) /2.3 =	747.6	174.70	4.28	OK
D W	(1215. + 473. +) /2.3 =	734.0	225.32	3.26	OK
D W	(1326. + 476. +) /2.3 =	783.6	172.55	4.54	OK
D W	(1276. + 496. +) /2.3 =	770.7	217.49	3.54	OK
D W	(1334. + 479. +) /2.3 =	788.1	172.33	4.57	OK
D W	(1284. + 499. +) /2.3 =	775.3	216.64	3.58	OK
DAA	(3247. + 1155. +) /2.3 =	1913.9	74.18	25.80	OK
DAA	(3354. + 1150. +) /2.3 =	1958.3	69.91	28.01	OK
DAA	(3247. + 1155. +) /2.3 =	1914.2	74.53	25.68	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
DAA	(3354. + 1150. +) /2.3 =	1958.4	70.26	27.87	OK
DAA	(3251. + 1157. +) /2.3 =	1916.5	77.23	24.82	OK
DAA	(3354. + 1152. +) /2.3 =	1959.2	72.96	26.85	OK
DAA	(3252. + 1157. +) /2.3 =	1916.8	77.58	24.71	OK
DAA	(3354. + 1152. +) /2.3 =	1959.3	73.31	26.73	OK
DAA	(2288. + 1242. +) /2.3 =	1534.6	209.48	7.33	OK
DAA	(2148. + 1246. +) /2.3 =	1475.9	288.38	5.12	OK
DAA	(2293. + 1242. +) /2.3 =	1536.7	208.61	7.37	OK
DAA	(2154. + 1246. +) /2.3 =	1478.3	285.72	5.17	OK
DAA	(2329. + 1242. +) /2.3 =	1552.9	202.91	7.65	OK
DAA	(2195. + 1247. +) /2.3 =	1496.8	268.43	5.58	OK
DAA	(2334. + 1243. +) /2.3 =	1554.9	202.29	7.69	OK
DAA	(2200. + 1247. +) /2.3 =	1499.0	266.56	5.62	OK
A	(2933. + 1242. +) /2.3 =	1815.2	90.89	19.97	OK
A	(2801. + 1256. +) /2.3 =	1764.0	102.87	17.15	OK
A	(2933. + 1242. +) /2.3 =	1815.2	90.89	19.97	OK
A	(2801. + 1256. +) /2.3 =	1764.0	102.87	17.15	OK
A	(2947. + 1241. +) /2.3 =	1821.0	93.00	19.58	OK
A	(2820. + 1254. +) /2.3 =	1771.6	104.61	16.93	OK
A	(2947. + 1241. +) /2.3 =	1821.0	93.00	19.58	OK
A	(2820. + 1254. +) /2.3 =	1771.6	104.61	16.93	OK
A	(2782. + 1230. +) /2.3 =	1744.6	101.39	17.21	OK
A	(2652. + 1242. +) /2.3 =	1693.2	116.53	14.53	OK
A	(2782. + 1230. +) /2.3 =	1744.6	101.39	17.21	OK
A	(2652. + 1242. +) /2.3 =	1693.2	116.53	14.53	OK
A	(2802. + 1230. +) /2.3 =	1752.8	103.19	16.99	OK
A	(2676. + 1241. +) /2.3 =	1703.2	117.69	14.47	OK
A	(2802. + 1230. +) /2.3 =	1752.8	103.19	16.99	OK
A	(2676. + 1241. +) /2.3 =	1703.2	117.69	14.47	OK
B AA	(3225. + 1149. +) /2.3 =	1901.5	64.65	29.41	OK
B AA	(3307. + 1138. +) /2.3 =	1932.7	61.31	31.52	OK
B AA	(3225. + 1149. +) /2.3 =	1901.5	64.65	29.41	OK
B AA	(3307. + 1138. +) /2.3 =	1932.7	61.31	31.52	OK
B AA	(3228. + 1150. +) /2.3 =	1903.4	66.18	28.76	OK
B AA	(3308. + 1139. +) /2.3 =	1933.8	62.84	30.77	OK
B AA	(3228. + 1150. +) /2.3 =	1903.4	66.18	28.76	OK
B AA	(3308. + 1139. +) /2.3 =	1933.8	62.84	30.77	OK
B AA	(2500. + 1223. +) /2.3 =	1618.3	126.81	12.76	OK
B AA	(2421. + 1227. +) /2.3 =	1586.3	141.97	11.17	OK





Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	R <sub>d</sub>		E <sub>d</sub>	R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')		
COMB			kPa		
B AA	(2500. + 1223. +) / 2.3 =	1618.3	126.81	12.76	OK
B AA	(2421. + 1227. +) / 2.3 =	1586.3	141.97	11.17	OK
B AA	(2519. + 1223. +) / 2.3 =	1627.0	126.84	12.83	OK
B AA	(2442. + 1228. +) / 2.3 =	1595.8	141.22	11.30	OK
B AA	(2519. + 1223. +) / 2.3 =	1627.0	126.84	12.83	OK
B AA	(2442. + 1228. +) / 2.3 =	1595.8	141.22	11.30	OK
B WX	(3242. + 825. +) / 2.3 =	1768.5	94.12	18.79	OK
B WX	(3298. + 805. +) / 2.3 =	1783.9	100.14	17.81	OK
B WX	(3242. + 825. +) / 2.3 =	1768.5	94.12	18.79	OK
B WX	(3298. + 805. +) / 2.3 =	1783.9	100.14	17.81	OK
B WX	(3252. + 832. +) / 2.3 =	1775.3	95.39	18.61	OK
B WX	(3299. + 813. +) / 2.3 =	1788.0	101.31	17.65	OK
B WX	(3252. + 832. +) / 2.3 =	1775.3	95.39	18.61	OK
B WX	(3299. + 813. +) / 2.3 =	1788.0	101.31	17.65	OK
B WX	(3261. + 801. +) / 2.3 =	1766.3	101.58	17.39	OK
B WX	(3169. + 818. +) / 2.3 =	1733.5	108.63	15.96	OK
B WX	(3261. + 801. +) / 2.3 =	1766.3	101.58	17.39	OK
B WX	(3169. + 818. +) / 2.3 =	1733.5	108.63	15.96	OK
B WX	(3263. + 810. +) / 2.3 =	1770.9	102.73	17.24	OK
B WX	(3174. + 826. +) / 2.3 =	1739.0	109.64	15.86	OK
B WX	(3263. + 810. +) / 2.3 =	1770.9	102.73	17.24	OK
B WX	(3174. + 826. +) / 2.3 =	1739.0	109.64	15.86	OK
B WXY	(3292. + 891. +) / 2.3 =	1818.6	81.51	22.31	OK
B WXY	(3239. + 917. +) / 2.3 =	1807.2	77.12	23.44	OK
B WXY	(3292. + 891. +) / 2.3 =	1818.6	81.51	22.31	OK
B WXY	(3239. + 917. +) / 2.3 =	1807.2	77.12	23.44	OK
B WXY	(3300. + 896. +) / 2.3 =	1824.1	82.95	21.99	OK
B WXY	(3248. + 922. +) / 2.3 =	1813.0	78.58	23.07	OK
B WXY	(3300. + 896. +) / 2.3 =	1824.1	82.95	21.99	OK
B WXY	(3248. + 922. +) / 2.3 =	1813.0	78.58	23.07	OK
B WXY	(2528. + 983. +) / 2.3 =	1526.7	167.51	9.11	OK
B WXY	(2439. + 991. +) / 2.3 =	1491.3	189.76	7.86	OK
B WXY	(2528. + 983. +) / 2.3 =	1526.7	167.51	9.11	OK
B WXY	(2439. + 991. +) / 2.3 =	1491.3	189.76	7.86	OK
B WXY	(2550. + 988. +) / 2.3 =	1538.1	165.99	9.27	OK
B WXY	(2463. + 996. +) / 2.3 =	1503.7	186.77	8.05	OK
B WXY	(2550. + 988. +) / 2.3 =	1538.1	165.99	9.27	OK
B WXY	(2463. + 996. +) / 2.3 =	1503.7	186.77	8.05	OK
B WY	(2894. + 1171. +) / 2.3 =	1767.5	81.41	21.71	OK



Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')			
COMB			kPa			
B WY	(2975. + 1163. +) /2.3 =	1798.9	76.19	23.61	OK	
B WY	(2894. + 1171. +) /2.3 =	1767.5	81.41	21.71	OK	
B WY	(2975. + 1163. +) /2.3 =	1798.9	76.19	23.61	OK	
B WY	(2905. + 1172. +) /2.3 =	1772.6	82.82	21.40	OK	
B WY	(2984. + 1164. +) /2.3 =	1803.2	77.66	23.22	OK	
B WY	(2905. + 1172. +) /2.3 =	1772.6	82.82	21.40	OK	
B WY	(2984. + 1164. +) /2.3 =	1803.2	77.66	23.22	OK	
B WY	(2185. + 1220. +) /2.3 =	1480.6	212.70	6.96	OK	
B WY	(2108. + 1222. +) /2.3 =	1447.9	259.14	5.59	OK	
B WY	(2185. + 1220. +) /2.3 =	1480.6	212.70	6.96	OK	
B WY	(2108. + 1222. +) /2.3 =	1447.9	259.14	5.59	OK	
B WY	(2212. + 1222. +) /2.3 =	1492.8	206.23	7.24	OK	
B WY	(2136. + 1224. +) /2.3 =	1460.9	247.16	5.91	OK	
B WY	(2212. + 1222. +) /2.3 =	1492.8	206.23	7.24	OK	
B WY	(2136. + 1224. +) /2.3 =	1460.9	247.16	5.91	OK	
D I	(3184. + 1162. +) /2.3 =	1889.3	69.31	27.26	OK	
D I	(3294. + 1148. +) /2.3 =	1931.4	64.96	29.73	OK	
D I	(3186. + 1162. +) /2.3 =	1890.3	70.01	27.00	OK	
D I	(3295. + 1148. +) /2.3 =	1931.9	65.66	29.42	OK	
D I	(3189. + 1163. +) /2.3 =	1892.1	71.34	26.52	OK	
D I	(3296. + 1149. +) /2.3 =	1932.9	67.00	28.85	OK	
D I	(3191. + 1163. +) /2.3 =	1893.0	72.04	26.28	OK	
D I	(3297. + 1150. +) /2.3 =	1933.4	67.70	28.56	OK	
D I	(2225. + 1243. +) /2.3 =	1507.8	213.33	7.07	OK	
D I	(2131. + 1245. +) /2.3 =	1467.9	272.86	5.38	OK	
D I	(2237. + 1243. +) /2.3 =	1512.9	210.56	7.19	OK	
D I	(2143. + 1246. +) /2.3 =	1473.4	266.93	5.52	OK	
D I	(2258. + 1243. +) /2.3 =	1522.4	205.85	7.40	OK	
D I	(2166. + 1247. +) /2.3 =	1483.8	256.99	5.77	OK	
D I	(2269. + 1244. +) /2.3 =	1527.2	203.68	7.50	OK	
D I	(2178. + 1247. +) /2.3 =	1489.0	252.46	5.90	OK	
D W	(1397. + 277. +) /2.3 =	728.1	64.58	11.27	OK	
D W	(1432. + 268. +) /2.3 =	739.5	60.60	12.20	OK	
D W	(1406. + 280. +) /2.3 =	733.2	64.93	11.29	OK	
D W	(1441. + 271. +) /2.3 =	744.5	60.95	12.22	OK	
D W	(1448. + 294. +) /2.3 =	757.4	66.62	11.37	OK	
D W	(1483. + 285. +) /2.3 =	768.5	62.63	12.27	OK	
D W	(1456. + 297. +) /2.3 =	762.3	66.96	11.38	OK	
D W	(1491. + 288. +) /2.3 =	773.4	62.97	12.28	OK	

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Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	q <sub>u,d</sub> kPa		q <sub>E,d</sub> = N / (B'·L')			
COMB			kPa			
D W	(1092. + 377. +) /2.3 =	638.4	174.07	3.67	OK	
D W	(1059. + 389. +) /2.3 =	629.7	213.45	2.95	OK	
D W	(1101. + 380. +) /2.3 =	643.9	173.46	3.71	OK	
D W	(1068. + 393. +) /2.3 =	635.2	212.05	3.00	OK	
D W	(1144. + 397. +) /2.3 =	670.0	170.88	3.92	OK	
D W	(1112. + 410. +) /2.3 =	661.6	206.06	3.21	OK	
D W	(1153. + 400. +) /2.3 =	675.3	170.41	3.96	OK	
D W	(1121. + 413. +) /2.3 =	666.9	204.96	3.25	OK	
DAA	(3169. + 1161. +) /2.3 =	1882.5	70.14	26.84	OK	
DAA	(3278. + 1147. +) /2.3 =	1924.1	65.22	29.50	OK	
DAA	(3170. + 1161. +) /2.3 =	1883.0	70.48	26.72	OK	
DAA	(3279. + 1147. +) /2.3 =	1924.4	65.57	29.35	OK	
DAA	(3174. + 1162. +) /2.3 =	1885.5	72.16	26.13	OK	
DAA	(3281. + 1149. +) /2.3 =	1925.8	67.26	28.63	OK	
DAA	(3175. + 1163. +) /2.3 =	1886.0	72.51	26.01	OK	
DAA	(3281. + 1149. +) /2.3 =	1926.1	67.61	28.49	OK	
DAA	(2215. + 1240. +) /2.3 =	1502.2	217.84	6.90	OK	
DAA	(2112. + 1243. +) /2.3 =	1458.5	284.39	5.13	OK	
DAA	(2221. + 1240. +) /2.3 =	1504.8	216.34	6.96	OK	
DAA	(2118. + 1243. +) /2.3 =	1461.4	280.93	5.20	OK	
DAA	(2248. + 1241. +) /2.3 =	1517.0	209.89	7.23	OK	
DAA	(2148. + 1244. +) /2.3 =	1474.8	266.39	5.54	OK	
DAA	(2253. + 1241. +) /2.3 =	1519.4	208.72	7.28	OK	

#### Ribaltamento – verifiche sismiche

Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	R <sub>d</sub>		E <sub>d</sub>		R <sub>d</sub> /E <sub>d</sub>	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
Comb1	320.97	320.97	19.36	17.11	16.58	OK
Comb2	320.97	320.97	19.36	17.11	16.58	OK
Comb3	320.97	320.97	19.36	117.38	2.73	OK
Comb4	320.97	320.97	19.36	117.38	2.73	OK
Comb5	320.97	320.97	64.54	33.48	4.97	OK
Comb6	320.97	320.97	64.54	33.48	4.97	OK

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Azioni a base plinto	VERIFICA A RIBALTAMENTO EQU					
	Rd		Ed		Rd/Ed	
	dir. L	dir.T	dir. L	dir.T		
COMB	kNm	kNm	kNm	kNm		
Comb7	320.97	320.97	64.54	72.21	4.45	OK
Comb8	320.97	320.97	64.54	72.21	4.45	OK

Scorrimento – verifiche sismiche

Azioni a base plinto	VERIFICA A SCORRIMENTO				
	$R_d = (N \cdot m_d + (B' \cdot L') \cdot C'_{dbase}) / \gamma_R$		Ed	Rd/Ed	
	kN		kN		
COMB					
Comb1	207.2		69.9	2.96	OK
Comb2	207.2		69.9	2.96	OK
Comb3	207.2		77.7	2.67	OK
Comb4	207.2		77.7	2.67	OK
Comb5	207.2		73.7	2.81	OK
Comb6	207.2		73.7	2.81	OK
Comb7	207.2		75.1	2.76	OK
Comb8	207.2		75.1	2.76	OK

Capacità portante – verifiche sismiche

Azioni a base plinto	VERIFICA A CAPACITA' PORTANTE				
	Rd		Ed	Rd/Ed	
	$q_{u,d} \text{ kPa}$		$q_{E,d} = N / (B' \cdot L')$		
COMB			kPa		
Comb1	(2035. + 485. +) / 2.3 = 1095.8		67.77	16.17	OK
Comb2	(2035. + 485. +) / 2.3 = 1095.8		67.77	16.17	OK
Comb3	(1652. + 491. +) / 2.3 = 931.6		101.15	9.21	OK
Comb4	(1652. + 491. +) / 2.3 = 931.6		101.15	9.21	OK
Comb5	(1893. + 409. +) / 2.3 = 1001.0		84.25	11.88	OK
Comb6	(1893. + 409. +) / 2.3 = 1001.0		84.25	11.88	OK
Comb7	(1951. + 393. +) / 2.3 = 1019.1		97.36	10.47	OK
Comb8	(1951. + 393. +) / 2.3 = 1019.1		97.36	10.47	OK

Le verifiche sono soddisfatte.

## 13 VERIFICHE STRUTTURALI FONDAZIONI DIRETTE

### 13.1 Verifica baggiolo

Per semplicità operativa, le verifiche vengono svolte considerando le sollecitazioni massime agenti alla base del baggiolo risultanti dai valori di involuppo dei casi precedentemente illustrati ( $H_{\text{baggiolo}} = 50 \text{ cm}$ ), riportate di seguito.

#### Azioni di verifica a pressoflessione

$N_{Ed}$  trascurato conservativamente

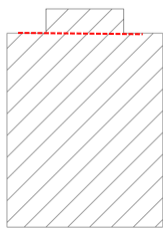
$M_{Ed,L} = 103 \text{ kNm}$  (valore massimo)

$M_{Ed,T} = 349 \text{ kNm}$  (valore massimo)

#### Azioni di verifica a taglio

$V_{Ed} = 120 \text{ kN}$  (valore massimo)

#### Sezione di verifica



#### Geometria

$B = H = 80 \text{ cm}$

#### Armatura

12 $\phi$ 18

#### Verifica

##### Verifica a pressoflessione

Verifica C.A. S.L.U. - File: Baggiolo

File Materiali Opzioni Visualizza Progetto Sez. Rett. Sismica Normativa: NTC 2018 ?

Titolo: Baggiolo

N° Vertici: 4 Zoom N° barre: 12 Zoom

N°	x [cm]	y [cm]	N°	As [cm²]	x [cm]	y [cm]
1	0	0	1	2.54	6.1	6.1
2	80	0	2	2.54	28.7	6.1
3	80	80	3	2.54	51.3	6.1
4	0	80	4	2.54	73.9	6.1
			5	2.54	6.1	73.9
			6	2.54	28.7	73.9

Sollecitazioni: S.L.U. Metodo n

$N_{Ed}$  0 kN  
 $M_{xEd}$  103 kNm  
 $M_{yEd}$  349 kNm

P.to applicazione N: Centro Baricentro cls  
 Coord. [cm]: xN 0, yN 0

Lato calcestruzzo - Acciaio snervato

Materiali: B450C C25/30

$\epsilon_{su}$  67.5‰  $\epsilon_{c2}$  2‰  
 $f_{yd}$  391.3 N/mm²  $\epsilon_{cu}$  3.5‰  
 $E_s/E_c$  200.000 N/mm²  $f_{cd}$  14.17  
 $E_{syd}$  1.957‰  $\sigma_{c,adm}$  9.75  
 $\sigma_{s,adm}$  255 N/mm²  $\tau_{co}$  0.6  
 $\tau_{c1}$  1.829

M<sub>xRd</sub> 218.6 kNm  
 M<sub>yRd</sub> 397.9 kNm  
 $\sigma_c$  -14.17 N/mm²  
 $\sigma_s$  391.3 N/mm²  
 $\epsilon_c$  3.5‰  
 $\epsilon_s$  12.26‰  
 d 93.12 cm  
 x 20.67 x/d 0.222  
 $\delta$  0.7175

Tipo Sezione: Rettan.re Trapezi  
 a T Circolare  
 Rettangoli Coord.  
 DXF

Metodo di calcolo: S.L.U.+ S.L.U.-  
 Metodo n

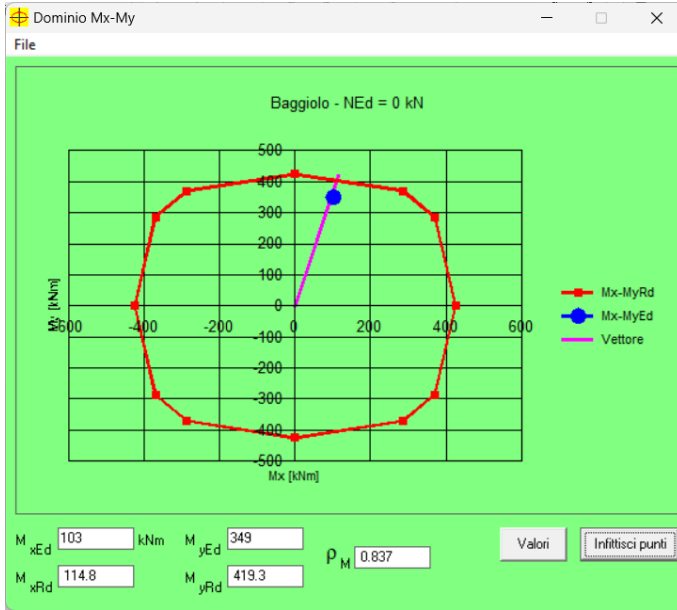
Tipo flessione: Retta Deviata

N° rett. 100

Calcola MRd Dominio Mx-My

angolo asse neutro  $\theta^0$  288

Precompresso



$\rho_M < 1 \rightarrow$  Verifica soddisfatta

Verifica a taglio

Azioni di verifica

$V_{Ed} = 120$  kN (valore massimo)

Geometria

$B = H = 80$  cm

Armatura

Si trascura l'armatura a taglio

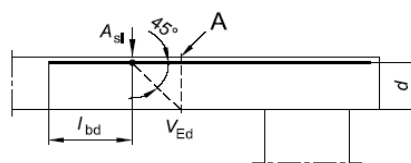
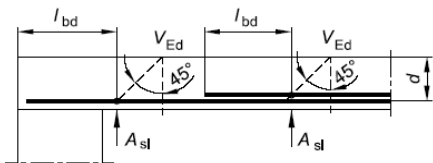
Verifica

§ 4.1.2.1.3.1 - ELEMENTI SENZA ARMATURE TRASVERSALI RESISTENTI A TAGLIO		
Azione di Taglio sollecitante a Stato Limite Ultimo	$V_{Ed}$	120 [kN]
Considerare o meno il contributo dell'armatura tesa nel calcolo		si [-]
Coefficiente $C_{Rd,c}$	$C_{Rd,c}$	0.12 [-]
Coefficiente k	k	1.52 [-]
		1.52 [-]
Rapporto geometrico d'armatura che si estende per non meno di $l_{bd} + d$	$\rho_t$	0 [-]
		0 [-]

figura 6.3 Definizione di  $A_{sl}$  nella espressione (6.2)

Legenda

A Sezione considerata



Resistenza a taglio offerta dal calcestruzzo teso

$V_{Rd,c} = 0.00$  [kN]

Resistenza minima del calcestruzzo teso

$V_{Rd,min} = 193.93$  [kN]

**Resistenza a taglio offerta dal calcestruzzo teso**

**$V_{Rd} = 193.93$  [kN]**

$V_{Ed} < V_{Rd}$

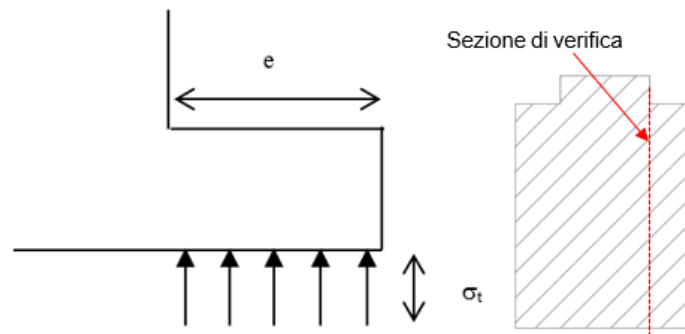
Verifica soddisfatta

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### 13.2 Verifica basamento

Per le verifiche strutturali del plinto si utilizza un modello di trave inflessa.

Lo schema di calcolo è riportato nella seguente figura.



*Schema di calcolo*

La mensola di lunghezza “e” e larghezza pari a “B” si suppone caricata con una pressione pari alla pressione massima scaricata al suolo.

Pertanto:

$$\sigma_{t,max} = 405 \text{ kPa massima pressione}$$

$$e = 1.1 \text{ m massima eccentricità}$$

$$B = 1 \text{ m}$$

$$V_{Ed} = \sigma_{t,max} \cdot e \cdot B = 446 \text{ kN}$$

$$M_{Ed} = (\sigma_{t,max} \cdot e^2 / 2) \cdot B = 245 \text{ kNm}$$

#### Verifica a flessione

Azioni di verifica

$$M_{Ed} = 245 \text{ kNm}$$

Geometria

$$B = 100 \text{ cm } H = 200 \text{ cm (altezza minima)}$$

Armatura

$$\varnothing 12/20$$



Verifica

$M_{Ed} < M_{Rd}$

Verifica soddisfatta

**Verifica a taglio**

Azioni di verifica

$V_{Ed} = 446 \text{ kN}$

Geometria

$B = 100 \text{ cm}$   $H = 200 \text{ cm}$  (altezza minima)

Armatura

Si trascura l'armatura a taglio.

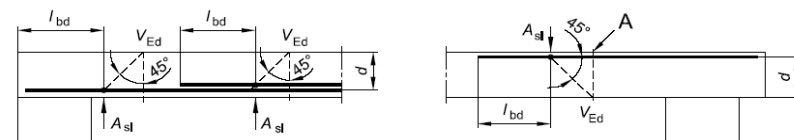
Verifica

§ 4.1.2.1.3.1 - ELEMENTI SENZA ARMATURE TRASVERSALI RESISTENTI A TAGLIO		
Azione di Taglio sollecitante a Stato Limite Ultimo	$V_{Ed}$	446 [kN]
Considerare o meno il contributo dell'armatura tesa nel calcolo		sì [-]
Coefficiente $C_{Rd,c}$	$C_{Rd,c}$	0.12 [-]
Coefficiente k	k	1.32 [-]
Rapporto geometrico d'armatura che si estende per non meno di $l_{bd} + d$	$\rho_t$	0 [-]
		0 [-]

figura 6.3 Definizione di  $A_{sl}$  nella espressione (6.2)

Legenda

A Sezione considerata



Resistenza a taglio offerta dal calcestruzzo teso	$V_{Rd,c}$	0.00 [kN]
Resistenza minima del calcestruzzo teso	$V_{Rd,min}$	515.94 [kN]
<b>Resistenza a taglio offerta dal calcestruzzo teso</b>	<b><math>V_{Rd}</math></b>	<b>515.94 [kN]</b>

$V_{Ed} < V_{Rd}$

Verifica soddisfatta