

ITINERARIO RAGUSA-CATANIA

Collegamento viario compreso tra lo Svincolo della S.S. 514 "di Chiaramonte"
con la S.S. 115 e lo Svincolo della S.S. 194 "Ragusana"
LOTTO 1 - Dallo svincolo n. 1 sulla S.S. 115 (compreso) allo svincolo n. 3 sulla S.P. 5 (escluso)

PROGETTO ESECUTIVO

COD. **PA895**

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**CAVALCAVIA
CAVALCAVIA AL KM 1+459
Relazione di calcolo impalcato**

CODICE PROGETTO

PROGETTO LIV. PROG. N. PROG.
L O 4 0 8 Z E 2 1 0 1

NOME FILE

T01CV02STRRE01B

CODICE ELAB.

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REVISIONE

B

SCALA:

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INDICE

1	DESCRIZIONE DELLE OPERE	4
2	NORMATIVA DI RIFERIMENTO E RIFERIMENTI TECNICI	7
2.1	NORME TECNICHE.....	7
2.2	RIFERIMENTI TECNICI	7
2.2.1	CNR e UNI.....	7
2.2.2	EUROCODICI.....	7
3	METODO DI CALCOLO	8
3.1	CODICI DI CALCOLO.....	8
3.1.1	Programmi di Verifica	8
4	MATERIALI.....	9
4.1	CONGLOMERATO CEMENTIZIO.....	9
4.1.1	Calcestruzzo - solette.....	9
4.1.2	Calcestruzzo – spalle.....	9
4.2	ACCIAIO.....	9
4.2.1	Acciaio per cemento armato tipo B450C.....	9
4.2.2	Acciaio per carpenteria tipo S355.....	9
4.2.3	Acciaio in reti e tralici elettrosaldati ad aderenza migliorata per c.a.	10
4.3	BULLONI AD ALTA RESISTENZA – CLASSE 10.9	10
4.4	PIOLI CON TESTA.....	10
4.5	SALDATURE DI TESTA O A T A COMPLETA PENETRAZIONE	10
4.6	SALDATURE A CORDONE D'ANGOLO	10
5	ANALISI GENERALE DEI CARICHI	11
5.1	PESI PROPRI STRUTTURALI	11
5.2	PESI PROPRI PORTATI.....	11

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

5.2.1 PESO PROPRIO SOLETTA E CORDOLI	11
5.2.2 PESO PERMANENTE PORTATO.....	12
5.3 AZIONI ACCIDENTALI.....	13
5.3.1 Carichi mobili	13
5.3.2 Frenamento	15
5.4 CALCOLO SEZIONE COLLABORANTE	16
5.5 AZIONI METEORICHE.....	17
5.5.1 Azioni dovute alla neve.....	17
5.5.2 Azioni dovute al vento	17
5.5.3 Azioni dovute alla temperatura	20
5.6 AZIONE SISMICA	21
6 MODELLAZIONE STRUTTURALE	25
6.1 COMBINAZIONI DI CARICO	28
6.2 VERIFICHE STRUTTURALI	32
6.2.1 VERIFICA ELEMENTI DI IMPALCATO	32
6.2.1.1 TRAVE PRINCIPALE CONCIO 1.....	45
6.2.1.2 TRAVE PRINCIPALE CONCIO 2.....	65
6.2.1.3 TRAVE PRINCIPALE CONCIO 3.....	85
6.2.2 VERIFICA A FATICA	106
6.2.3 TRAVE DI SPINA	109
6.2.4 TRAVERSO	112
6.2.4.1 VERIFICA TRAVERSO DI CAMPATA.....	113
6.2.4.2 VERIFICA TRAVERSO DI TESTATA.....	115
6.2.5 VERIFICA PIOLI.....	117
6.2.6 GIUNTI BULLONATI	119

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

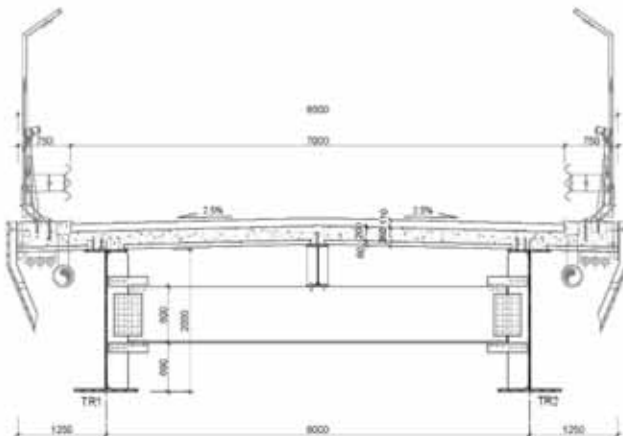
6.2.6.1	VERIFICA GIUNTO TRAVERSO DI CAMPATA	120
6.2.6.2	VERIFICA GIUNTO TRAVERSO DI TESTATA	122
6.2.7	VERIFICA VELETTA METALLICA	124
7	VERIFICA SOLETTA	132
7.1	VERIFICA SOLETTA FASE TRANSITORIA.....	132
7.1.1	ANALISI DEI CARICHI	132
7.1.2	VERIFICA A MOMENTO POSITIVO - CAMPATA.....	132
7.1.3	VERIFICA A MOMENTO NEGATIVO APPOGGIO	138
7.2	VERIFICA SOLETTA FASE DEFINITIVA	139
7.2.1	VERIFICA STRUTTURALE SOLETTA	146
8	VERIFICA ELEMENTI DI APPOGGIO	157
8.1	VERIFICA BAGGIOLI	159
8.2	ISOLATORI – EFFETTO VARIABILITA' RIGIDEZZA.....	160
8.3	VERIFICA GIUNTI	160
8.4	VERIFICA RITEGNI SISMICI.	160
8.5	VERIFICA DEFORMAZIONI	163
9	VALIDAZIONE CODICE DI CALCOLO	165
10	ALLEGATO 1 - TABULATO MIDAS	166

1 DESCRIZIONE DELLE OPERE

La presente relazione di calcolo riguarda l'impalcato posizionato alla progressiva 1+459 del Lotto 1. L'impalcato è realizzato in struttura mista acciaio-calcestruzzo e presenta una larghezza complessiva di 8,50 metri e luce di 42,50 metri, con cordoli laterali da 75cm. La soletta ha uno spessore complessivo medio di 26cm. Le travi in acciaio sono poste ad interasse pari a 6,00 metri e presentano un'altezza totale di 2000mm, con la presenza di una trave di spina centrale con effetto di rompitratta per la soletta. Le piattabande delle travi principali hanno larghezze e spessori variabili. I traversi sono costituiti da profili a doppio T saldati di altezza pari a 800mm e posti ad interasse 4100mm. L'impalcato viene realizzato a mezzo di 3 conci diversi (Concio C1, C2 e C3) che vengono saldati in opera, collegati agli elementi trasversali e poi il tutto viene sollevato da autogru di grossa portata posizionate in corrispondenza dei rilevati delle spalle. Per dettagli circa le geometrie delle travi fare riferimento agli elaborati specifici. Nel proseguo vengono riportate delle immagini rappresentative delle opere in oggetto.

SEZIONE TIPO IN CAMPATA

Scale 1:50



SEZIONE TIPO AGLI APPOGGI

Scale 1:50

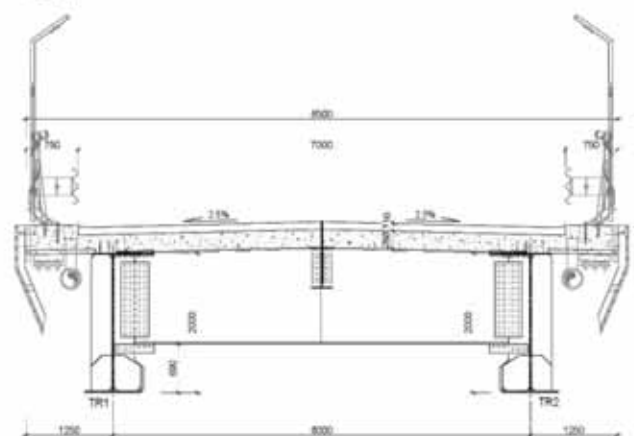


Figura 1 - Sezioni trasversali dell'impalcato

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

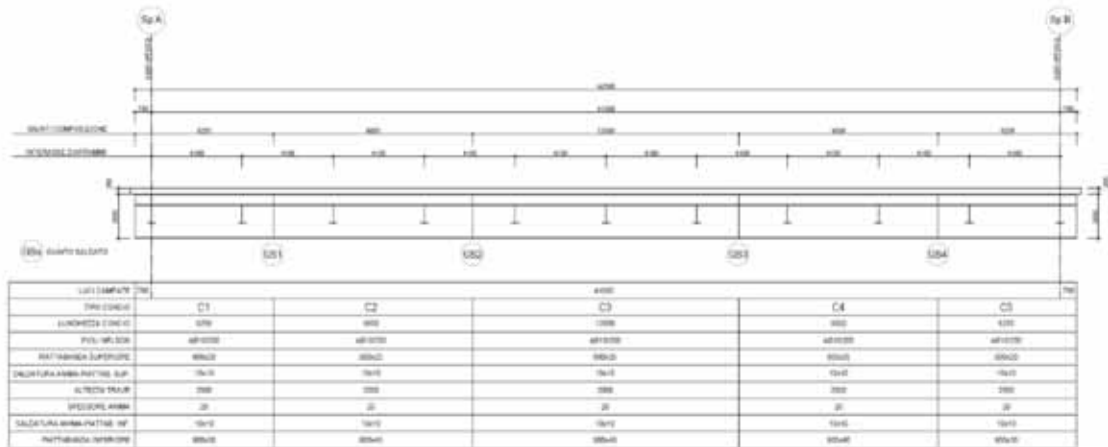


Figura 2 - Schema Conci

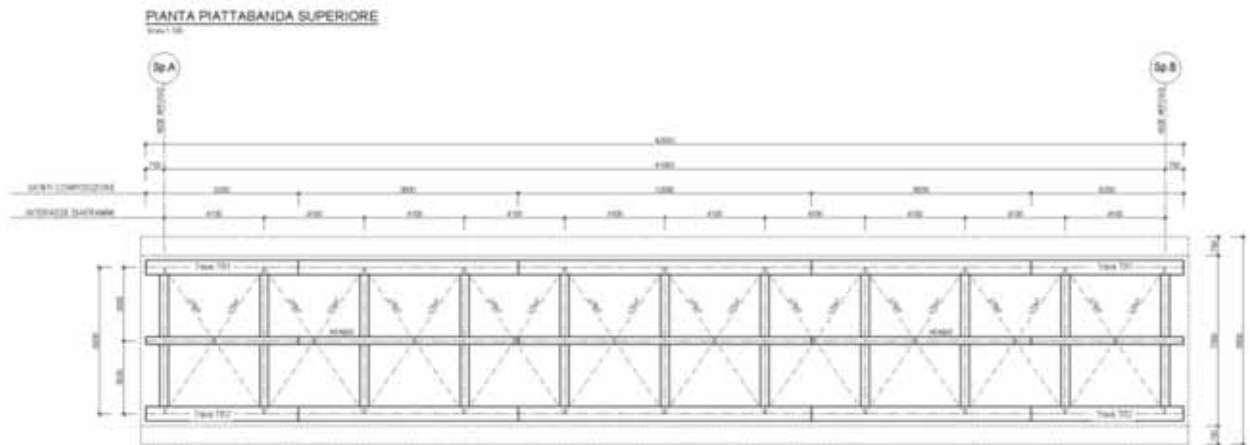


Figura 3 - Pianta conci

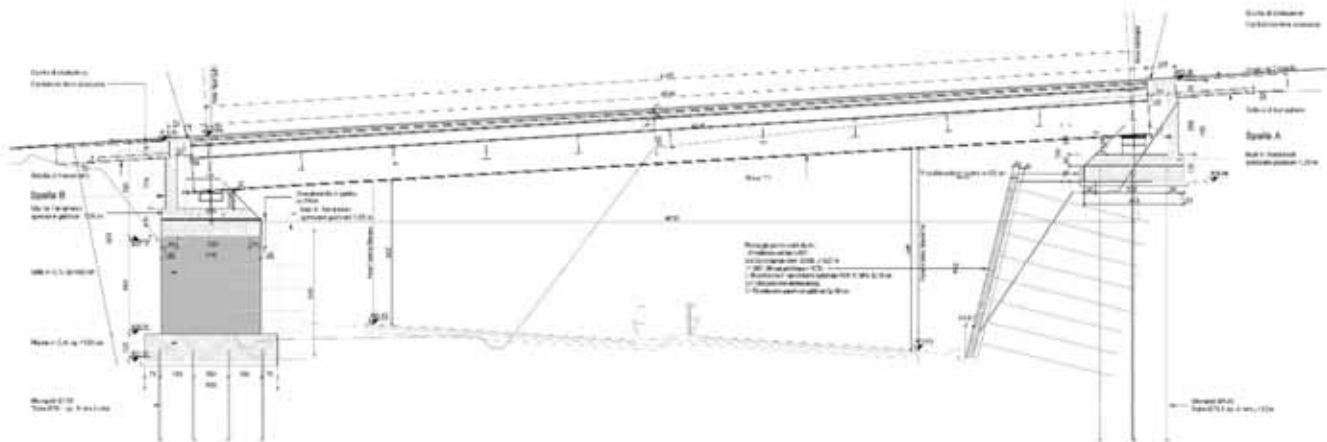


Figura 4 - Sezione prospettica

Lo schema di vincolo prevede l'utilizzo di 4 dispositivi di appoggio tipo isolatori elastomerici con nucleo di piombo che consentono uno spostamento di $\pm 200\text{mm}$ e di conseguenza un giunto di dilatazione di spalla che permetta il corrispondente spostamento. Si riporta di seguito le caratteristiche che deve avere il dispositivo di appoggio.

V	Fzd	Ke	ξ_e	Kv	Dg	te	h	H	Z
kN	kN	kN/mm	%	kN/mm	mm	mm	mm	mm	mm
20940	33970	4,42	19	4489	1000	153	277	357	1050
V	Carico verticale massimo agente in presenza del sisma allo SLC								
Fzd	Carico verticale massimo in assenza di SISMA e spostamento 10mm								
Ke	Rigidezza orizzontale equivalente								
ξ_e	Coefficiente di smorzamento viscoso equivalente								
Kv	Rigidezza verticale								
Dg	Diametro elastomero								
te	Spessore totale gomma								
h	Altezza escluse piastre di ancoraggio								
H	Altezza totale incluse piastre di ancoraggio								
Z	Lato piastre di ancoraggio								

SCHEMA APPOGGI



Figura 5 - Schema di vincolo

2 NORMATIVA DI RIFERIMENTO E RIFERIMENTI TECNICI

Le strutture sono state verificate con il criterio degli stati limite (SL). I calcoli sono stati eseguiti in osservanza alle seguenti disposizioni normative e regole tecniche:

2.1 NORME TECNICHE

- Ministero delle infrastrutture - D.M. 14/01/2008. Norme tecniche per le costruzioni.
- Consiglio superiore dei lavori pubblici. Istruzioni per l'applicazione delle "Norme tecniche per le costruzioni" di cui al D.M. 14/01/2008.

2.2 RIFERIMENTI TECNICI

2.2.1 CNR e UNI

- Norma UNI EN 11104:2004
- Calcestruzzo – Specificazione, prestazione, produzione e conformità – Istruzioni complementari per l'applicazione della EN 206-1.
- Norma UNI EN 13369:2013
- Regole comuni per i prodotti prefabbricati di calcestruzzo.
- Norma UNI EN 15050:2012
- Prodotti prefabbricati di calcestruzzo. Elementi da ponte.

2.2.2 EUROCODICI

- UNI EN 1993-1-1: Eurocodice 3 – Progettazione delle strutture in acciaio. Parte 1-1: Regole generali e regole per gli edifici.
- UNI EN 1993-1-5: Eurocodice 3 – Progettazione delle strutture in acciaio. Parte 1-5: Regole generali – Regole supplementari per lastre ortotrope in assenza di carichi trasversali.
- UNI EN 1993-1-9: Eurocodice 3 - Progettazione delle strutture in acciaio. Parte 1-9: Fatica.
- UNI EN 1993-1-10: Eurocodice 3 - Progettazione delle strutture in acciaio. Parte 1-10: Resilienza del materiale e proprietà attraverso lo spessore.
- UNI EN 1993-2: Eurocodice 3 – Progettazione delle strutture in acciaio. Parte 2: Ponti in acciaio.
- UNI EN 1998-2: Eurocodice 8 - Indicazioni progettuali per la resistenza sismica delle strutture. Parte 2: Ponti.

3 METODO DI CALCOLO

Lo studio delle strutture è stato condotto secondo i metodi della scienza delle costruzioni supponendo i materiali elastici, omogenei ed isotropi.

La ricerca dei parametri di sollecitazione è stata fatta secondo le disposizioni di carico più gravose avvalendosi di codici di calcolo automatico per l'analisi strutturale.

Le verifiche di resistenza delle sezioni sono state eseguite secondo il metodo degli stati limite.

3.1 CODICI DI CALCOLO

Tutti i codici di calcolo automatico utilizzati per il calcolo e la verifica delle strutture e la redazione della presente relazione di calcolo sono di sicura ed accertata validità e sono stati impiegati conformemente alle loro caratteristiche. Tale affermazione è suffragata dai seguenti elementi:

- grande diffusione del codice di calcolo sul mercato;
- storia consolidata del codice di calcolo (svariati anni di utilizzo);
- utilizzo delle versioni più aggiornate (dopo test);
- pratica d'uso frequente in studio.

In considerazione dei casi-studio, caratterizzati da piccoli spostamenti e tensioni inferiori ai limiti elastici dei materiali, si è ritenuto sufficiente adottare una schematizzazione della geometria e dei materiali di tipo lineare con leggi elastiche e isotrope ed omogenee.

3.1.1 Programmi di Verifica

Per la verifica delle sezioni in acciaio e composte è stato utilizzato un foglio di excel opportunamente testato.

4 MATERIALI

4.1 CONGLOMERATO CEMENTIZIO

4.1.1 Calcestruzzo - solette

Classe di resistenza	C32/40	$f_{ck}/R_{ck} = 32/40$ MPa
Resistenza di calcolo (SLU)	$f_{cd} = \frac{\alpha_{cc} \cdot f_{ck}}{\gamma_c} = 18.81$ MPa	
Resistenza a compressione media	$f_{cm} = f_{ck} + 8 = 41.20$ MPa	
Resistenza a trazione semplice	$f_{ctm} = 0,3 \cdot f_{ck}^{2/3} = 3.10$ MPa	
Modulo elastico	$E_{cm} = 22000 \cdot [f_{cm} / 10]^{0.3} = 33642.78$ MPa	

4.1.2 Calcestruzzo – spalle

Classe di resistenza	C32/40	$f_{ck}/R_{ck} = 32/40$ MPa
Resistenza di calcolo (SLU)	$f_{cd} = \frac{\alpha_{cc} \cdot f_{ck}}{\gamma_c} = 18.81$ MPa	
Resistenza a compressione media	$f_{cm} = f_{ck} + 8 = 41.20$ MPa	
Resistenza a trazione semplice	$f_{ctm} = 0,3 \cdot f_{ck}^{2/3} = 3.10$ MPa	
Modulo elastico	$E_{cm} = 22000 \cdot [f_{cm} / 10]^{0.3} = 33642.78$ MPa	

4.2 ACCIAIO

4.2.1 Acciaio per cemento armato tipo B450C

Tensione caratteristica di snervamento	$f_{yk} \geq 450$ MPa
Tensione caratteristica di rottura	$f_{tk} \geq 540$ MPa
Resistenza di calcolo	$f_{yd} = \frac{f_{yk}}{1,15} = 391$ MPa

4.2.2 Acciaio per carpenteria tipo S355

Tensione caratteristica di rottura	$f_{tk} = 470$ MPa (per $s > 40$ mm) $f_{tk} = 510$ MPa (per $s < 40$ mm)
Resistenza caratteristica di snervamento	$f_{yk} = 335$ MPa (per $s > 40$ mm) $f_{yk} = 355$ MPa (per $s < 40$ mm)
Coefficiente di sicurezza	$\gamma_{M0} = 1,05$

Coefficiente di sicurezza per verifiche a fatica $\gamma_{M,F} = 1,35$

4.2.3 Acciaio in reti e tralicci elettrosaldati ad aderenza migliorata per c.a.

Tipo di acciaio: B450C ad aderenza migliorata, controllato in stabilimento

Tensione caratteristica di snervamento: $f_{yk} \geq 450$ MPa

Tensione caratteristica di rottura: $f_{tk} \geq 540$ MPa

Allungamento percentuale: $A_{gtk} \geq 7.5\%$

4.3 BULLONI AD ALTA RESISTENZA – CLASSE 10.9

Vite: classe 10.9 (UNI EN 14399:2005)

Tensione di rottura a trazione $f_{tk} \geq 1000$ MPa

Tensione di snervamento $f_{yk} \geq 900$ MPa

4.4 PIOLI CON TESTA

Acciaio: S235J2G3+C450

Tensione di rottura a trazione $f_{tk} \geq 450$ MPa

Tensione di snervamento $f_{yk} \geq 370$ MPa

Allungamento $A_5 \geq 15\%$

4.5 SALDATURE DI TESTA O A T A COMPLETA PENETRAZIONE

Giunto di prima classe: $f_{d,S355} = 338$ MPa

Giunto di seconda classe: $0.85 f_{d,S355} = 287.38$ MPa

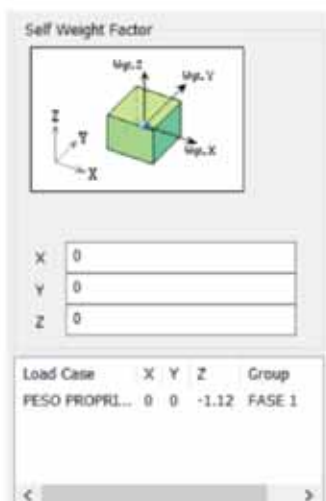
4.6 SALDATURE A CORDONE D'ANGOLO

Per S355: $|\sigma_{\perp}|, |\tau_{\perp}|, |\tau_{//}| \leq 0.70 f_{d,S355} = 236.6$ MPa

5 ANALISI GENERALE DEI CARICHI

5.1 PESI PROPRI STRUTTURALI

I pesi strutturali delle opere in acciaio comprensive di travi principali, trave di spina, traversi e controventi, vengono considerati in automatico nel programma di calcolo. Per considerare l'effetto del "piastrame", è stato scelto di aumentare il peso proprio del 12%, come riportato nell'immagine che segue.



5.2 PESI PROPRI PORTATI

I pesi proprio portati sono stati presi in conto nel modello di calcolo utilizzato, come carichi lineari direttamente applicati alle singole travi portanti. Si riporta di seguito la definizione dei carichi applicati.

5.2.1 PESO PROPRIO SOLETTA E CORDOLI

Per la determinazione delle azioni da applicare alle singole travi è stata schematizzata una trave su più appoggi a cui è stata applicato il carico distribuito della soletta e dei cordoli laterali. Le reazioni vincolari risultanti sono poi state applicate alle travi del modello.

PESO SOLETTA		
Hsoletta =	0,26	m
γ =	25	kN/mc
peso =	6,5	kN/mq
Carico trave SX =	17,976	
Carico trave Centrale =	19,299	
Carico trave DX =	17,976	
CORDOLI		
Hcordoli =	0,15	m
γ =	25	kN/mc
peso =	3,75	kN/mq
Carico trave SX =	4,037	
Carico trave Centrale =	-2,449	
Carico trave DX =	4,037	

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

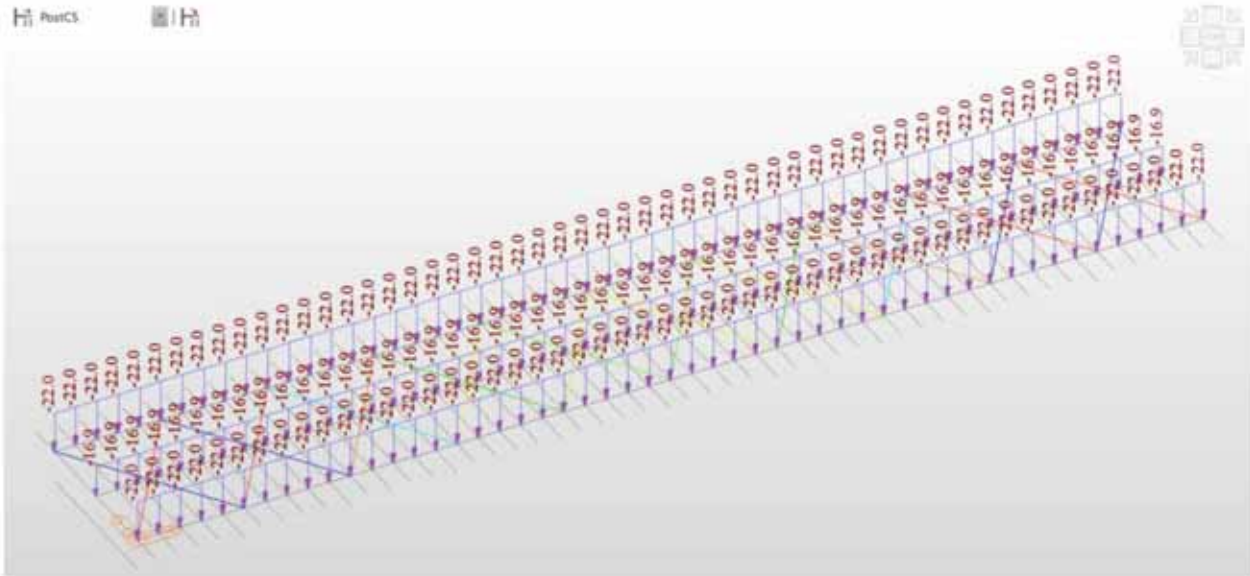


Figura 6 – Pesi propri soletta e cordoli

5.2.2 PESO PERMANENTE PORTATO

Per la determinazione delle azioni da applicare alle singole travi è stata schematizzata una trave su più appoggi a cui è stata applicato il carico del pacchetto stradale e delle barriere bordo ponte. Le reazioni vincolari risultanti sono poi state applicate alle travi del modello.

PERMANENTE PORTATO

Hsoletta =	0,11	cm
γ =	24	kN/mc
peso =	2,64	kN/mq
Carico trave SX =	4,459	
Carico trave Centrale =	9,562	
Carico trave DX =	4,459	

BARRIERE+VELETTE E TUBAZIONI

Barriere =	1.5	kN/ml
Tubazioni =	0.1	kN/ml
Veletta =	0.4	kN/ml
Totale	2.000	kN/ml
Carico trave SX =	2.498	
Carico trave Centrale =	-0.995	
Carico trave DX =	2.498	

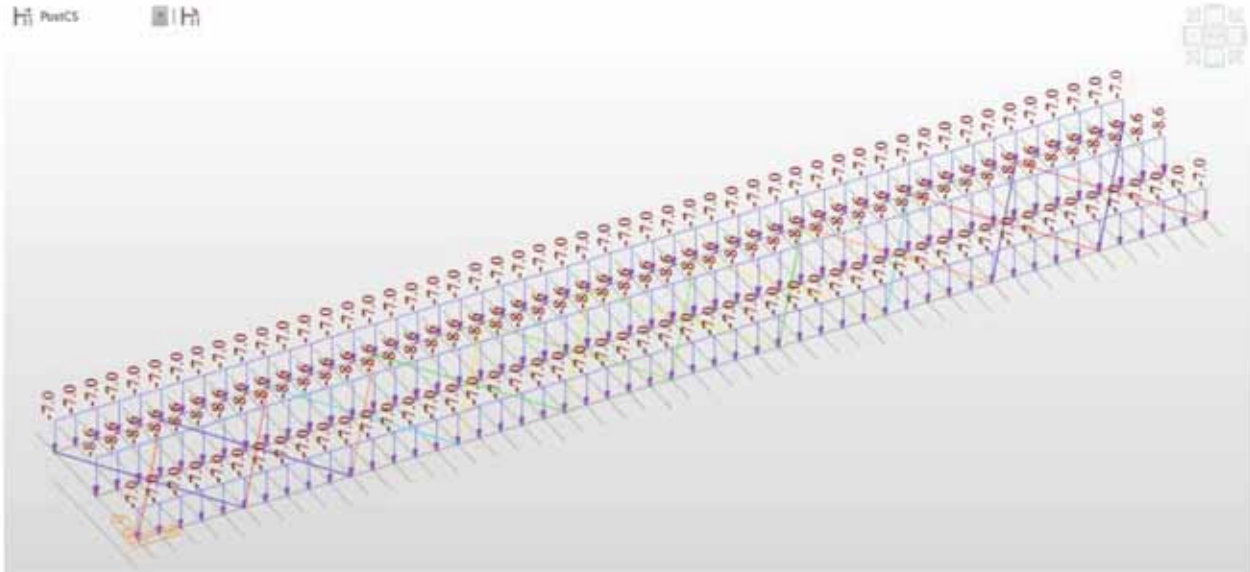


Figura 7 - Peso permanente portato

5.3 AZIONI ACCIDENTALI

5.3.1 Carichi mobili

Le azioni accidentali considerate nei calcoli sono quelle previste dall'attuale D.M. 14.1.2008 per i ponti classificati di prima categoria e calcolate in relazione alla larghezza dell'impalcato.

La carreggiata tra i cordoli ha larghezza di 7,00 m e pertanto sono state considerate ai fini del calcolo 2 corsie da 3,00 m più una parte rimanente di 1,00 m.

Si riporta lo schema di carico 1:

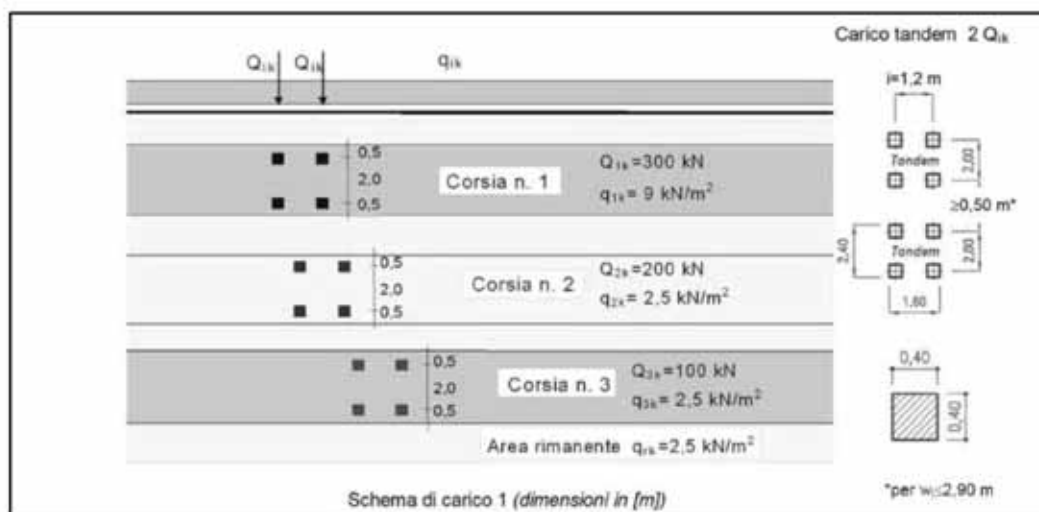


Figura 8 - Schema di carico 1

L'intensità dei carichi da applicare è riportata nella seguente tabella:

Tabella 5.1.II - Intensità dei carichi Q_{ik} e q_{ik} per le diverse corsie

Posizione	Carico asse Q_{ik} [kN]	q_{ik} [kN/m ²]
Corsia Numero 1	300	9,00
Corsia Numero 2	200	2,50
Corsia Numero 3	100	2,50
Altre corsie	0,00	2,50

Le suddette colonne di carico sono state disposte secondo lo schema longitudinale che produce le azioni accidentali più gravose per la struttura in esame.

Si riportano di seguito alcune immagini dei carichi considerati.

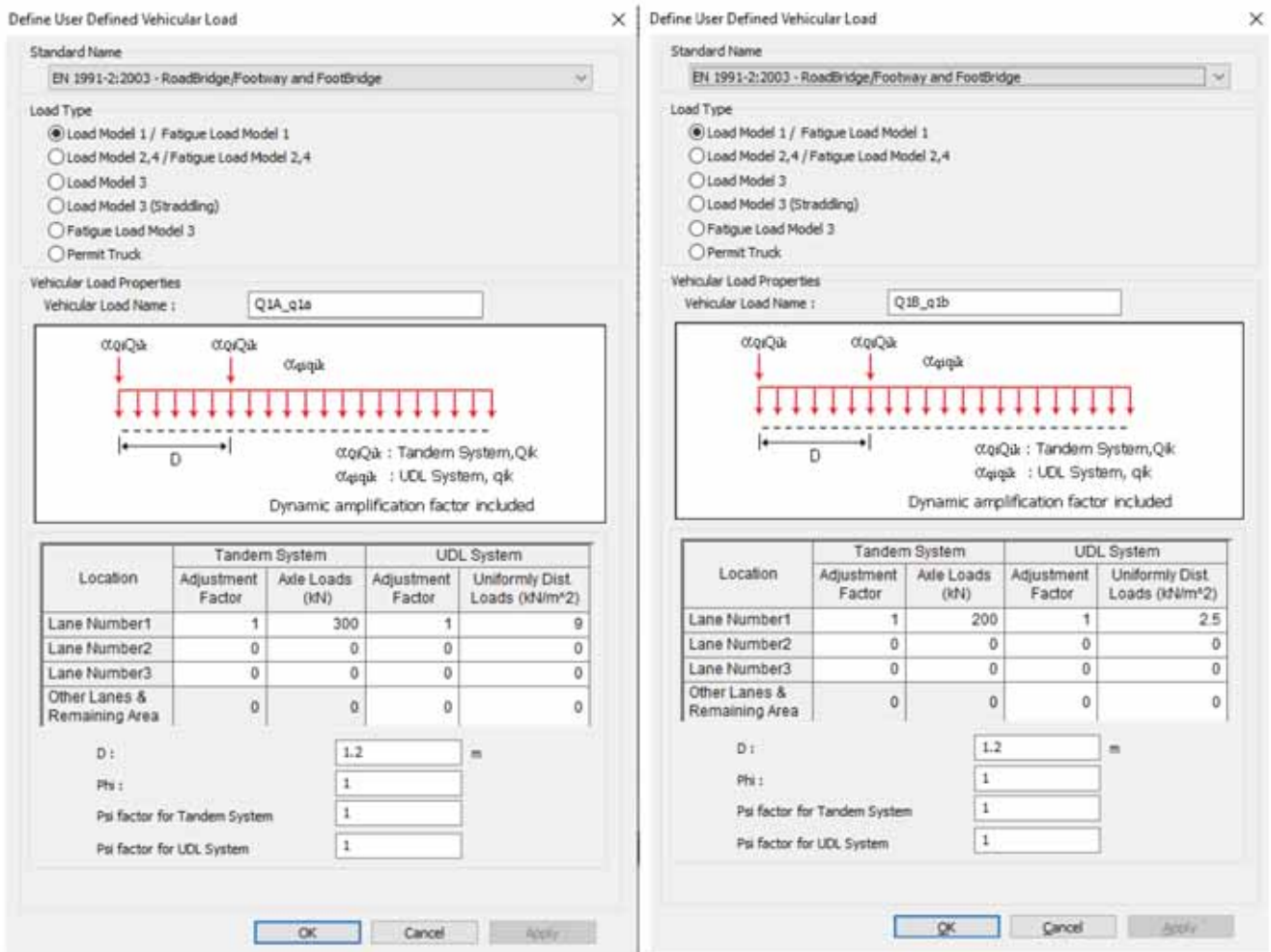


Figura 10 - Colonna di carico 1

Figura 9 - Colonna di carico 2

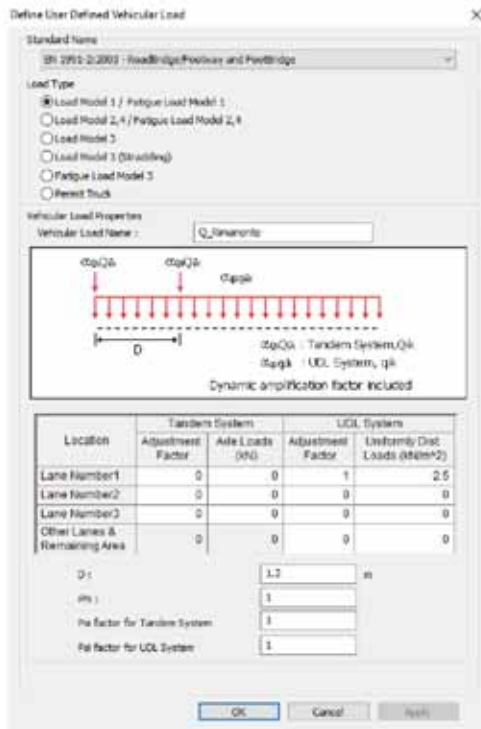


Figura 11 - Colonna di carico 3

5.3.2 Frenamento

FRENATURA	
Si considera un'azione longitudinale funzione del carico verticale agente sulla corsia convenzionale n°1	
$Q_{1k} = 0.6 \times (2 \times Q_{1k}) + 0.10 \times q_{1k} \times W1 \times L$	
Q_{1k} =	474,750 kN
q_{1k} =	3,724 kN

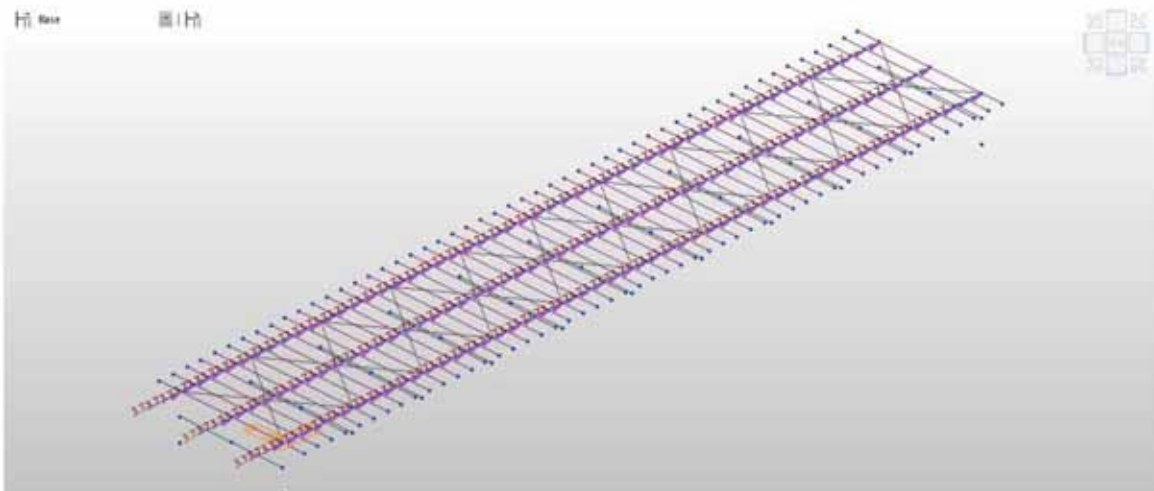
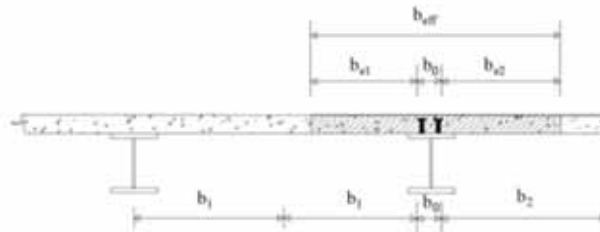


Figura 12 - Frenamento

5.4 CALCOLO SEZIONE COLLABORANTE

La distribuzione delle tensioni normali negli elementi composti è stata determinata mediante un modello che tiene conto della diffusione degli sforzi nelle ali della trave metallica e nella soletta in calcestruzzo. La larghezza efficace, b_{eff} , della soletta in calcestruzzo è stata determinata, in conformità a quanto prescritto dalla normativa, mediante l'espressione: $b_{eff} = b_0 + be_1 + be_2$, in cui b_0 è la distanza tra gli assi dei connettori esterni e $b_{ei} = \min (L_e/8, b_i)$ è il valore della larghezza collaborante da ciascun lato della sezione composta.



L_e , nelle travate in semplice appoggio, indica la luce della trave.

Per il caso in esame si ha:

$L_e =$	41,00 m		
$L_e/8 =$	5,125 m		
$b_0 =$	0,382 m		
$b_{i2} =$	1,059 m	SBALZO	
$b_{i1} =$	1,4045 m	DISTANZA	
$b_{e2} =$	1,059		
$b_{e1} =$	1,4045		
	2,8455 m	TRAVE PRINCIPALE	
$b_{eff} =$	2,809 m	TRAVE DI SPINA	

5.5 AZIONI METEORICHE

5.5.1 Azioni dovute alla neve

Il carico dovuto alla neve, non risulta dimensionante per il tipo di struttura

5.5.2 Azioni dovute al vento

Viene di seguito riportata una tabella di calcolo per la determinazione della pressione del vento da applicare alla struttura.

AZIONE DEL VENTO				
<i>(Inserire i dati necessari nelle celle campite)</i>	<i>simbolo</i>	<i>valore</i>	<i>unità</i>	<i>formula</i>
Altitudine sul livello del mare	$a_s =$	630	[m]	
Regione		Sicilia e Provincia di Reggio Calabria		
	Zona =	4		
Parametri tabella 3.3.1	$v_{b0} =$	28	[m/s]	
Parametri tabella 3.3.1	$a_0 =$	500	[m]	
Parametri tabella 3.3.1	$k_s =$	0.360	[-]	
Coefficiente di altitudine	$c_a =$	1.094	[-]	
Velocità di riferimento	$v_b =$	30.6	[m/s]	
Periodo di ritorno	$T_R =$	50	[anni]	
Velocità di riferimento associata a $T_R = 50$	$v_b =$	30.6	[m/s]	
Velocità di riferimento	$v_r =$	30.6	[m/s]	$v_r = v_b \times c_r$
CALCOLO PRESSIONE DEL VENTO				
Densità dell'aria	$\rho =$	1.25	[kg/m ³]	
Pressione cinetica di riferimento	$q_r =$	586.9	[N/m ²]	$1/2 \times \rho v_r^2$
Categoria di esposizione del terreno		II		
Parametri per la definizione del coefficiente di esposizione	$k_r =$	0.19	[-]	
	$z_0 =$	0.05	[m]	
	$z_{min} =$	4.00	[m]	
Quota struttura	$z =$	9	[m]	
Coefficiente di topografia	$c_t =$	1		
Classe di rugosità		D		
Coefficiente di esposizione	$c_e =$	2.29		
Coefficiente di forma	$c_p =$	1.40		
Coefficiente dinamico	$c_d =$	1		
Pressione del vento	$p =$	1.88	[kN/m²]	$p = q_b \times c_e \times c_p \times c_d$

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

Sulla base delle caratteristiche geometriche dell'impalcato, sono state determinate le azioni da applicare alle strutture in caso di ponte scarico e ponte carico.

VENTO A PONTE SCARICO		
Fh =	4.507	kN/ml
Pv =	0.789	kN/ml
VENTO A PONTE CARICO		
Fh =	10.142	kN/ml
Pv =	0.406	kN/ml

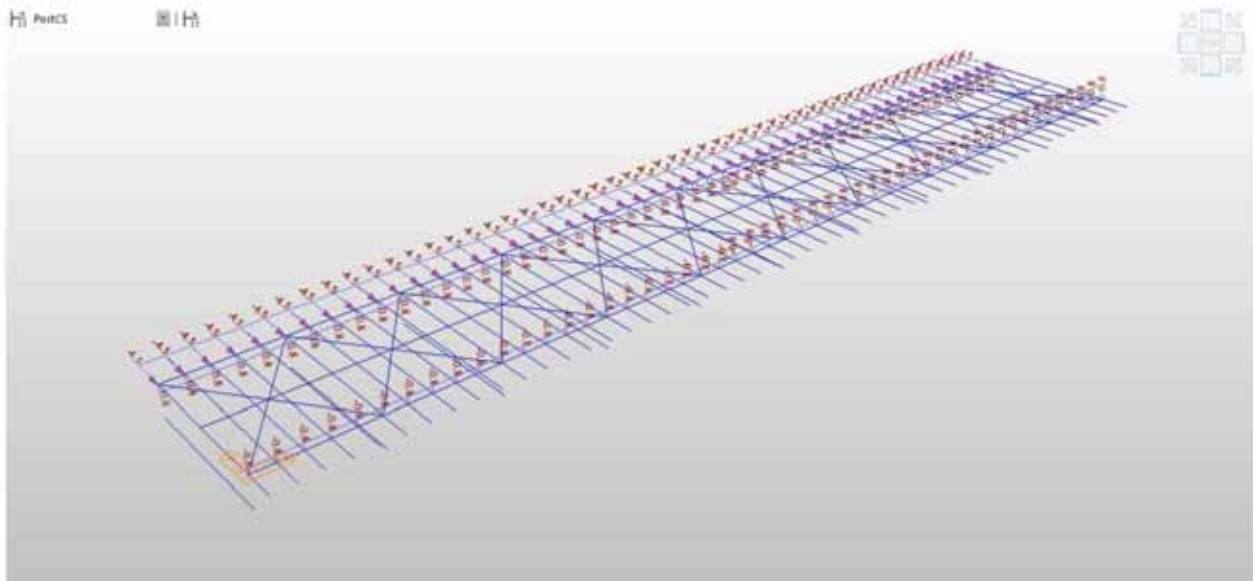


Figura 13 - Vento a ponte scarico

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

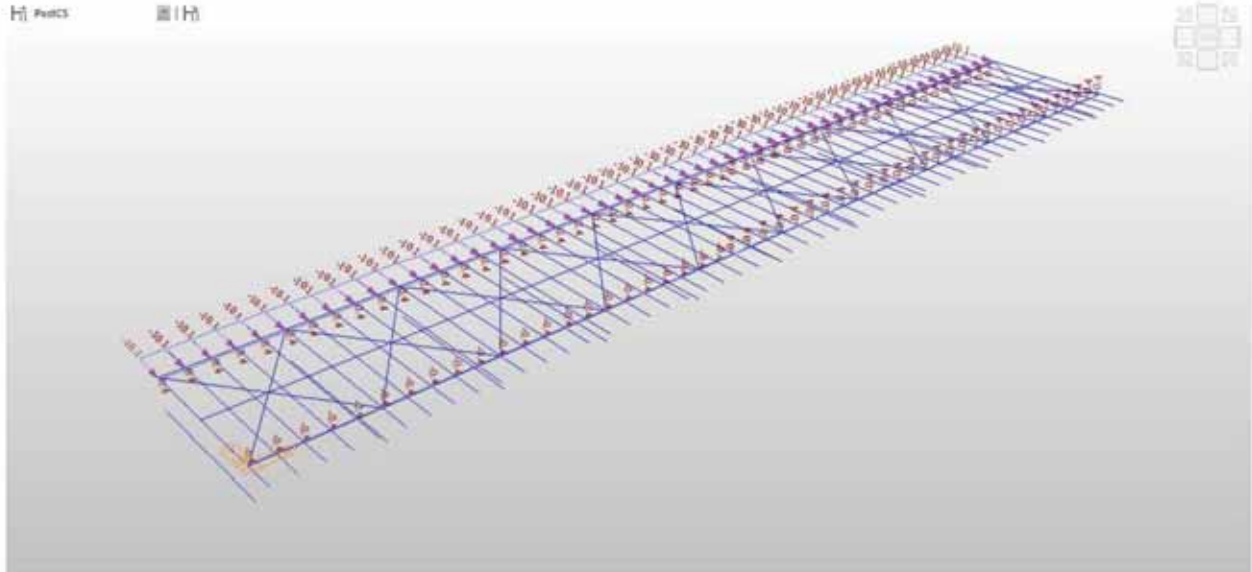


Figura 14 - Vento a ponte carico

5.5.3 Azioni dovute alla temperatura

L'azione termica, sia uniforme che a forma di gradiente, è stata applicata in base a quanto previsto dalla normativa vigente.

AZIONE DELLA TEMPERATURA				
<i>Inserire i dati necessari nelle celle campite)</i>				
	simbolo	valore	unità	formula
Altitudine di riferimento	$a_s =$	630	[m]	
Individuazione della zona :		Zona IV		
Calabria, Sicilia				
Temperatura massima estiva dell'aria	$T_{max} =$	45	[°C]	Valore raccomandato in assenza di studi specifici
Temperatura minima invernale dell'aria	$T_{min} =$	-15	[°C]	Valore raccomandato in assenza di studi specifici
<i>I valori di T_{max} e T_{min} sono riferiti ad un periodo di ritorno di 50 anni</i>				
<i>Per la valutazione della temperatura uniforme minima/massima del ponte, si considera il grafico riportato sull'eurocodice nella sezione Ponti</i>				
Tipologia di impalcato	Tipo 2			
	Impalcato a struttura mista			
	-			
	$T_0 =$	15	[°C]	Atteso Nazionale A.1(3)
Legenda	<p>1 - Tipo 1 $T_{e,max} = T_{max} + 16$</p> <p>2 - Tipo 2 $T_{e,max} = T_{max} + 4$</p> <p>3 - Tipo 3 $T_{e,max} = T_{max} + 2$</p> <p>4 - Tipo 1 $T_{e,min} = T_{min} - 3$</p> <p>5 - Tipo 2 $T_{e,min} = T_{min} + 4$</p> <p>6 - Tipo 3 $T_{e,min} = T_{min} + 8$</p>			
Calcolo variazione termica uniforme				
Temperatura uniforme del ponte massima	$T_{e,max} =$	49	[°C]	
Temperatura uniforme del ponte minima	$T_{e,min} =$	-11	[°C]	
Variazione termica di espansione	$\Delta T_{N,exp} =$	34	[°C]	
Variazione termica di contrazione	$\Delta T_{N,cont} =$	-26	[°C]	
Calcolo variazione termica lineare				
Spessore della superficie		100	[mm]	
Coefficiente riduttivo heat	$K_{sur,heat} =$	1.00	[-]	
Coefficiente riduttivo cool	$K_{sur,cool} =$	1.00	[-]	
Variazione termica lineare (heat)	$\Delta T_{M,heat} =$	15	[°C]	
Variazione termica lineare (cool)	$\Delta T_{M,cool} =$	-18	[°C]	

5.6 AZIONE SISMICA

Con riferimento al DM 14.01.2008, sono stati presi in considerazione i seguenti parametri, per il sito in esame:

Vita nominale della costruzione – $VN = 50$ anni

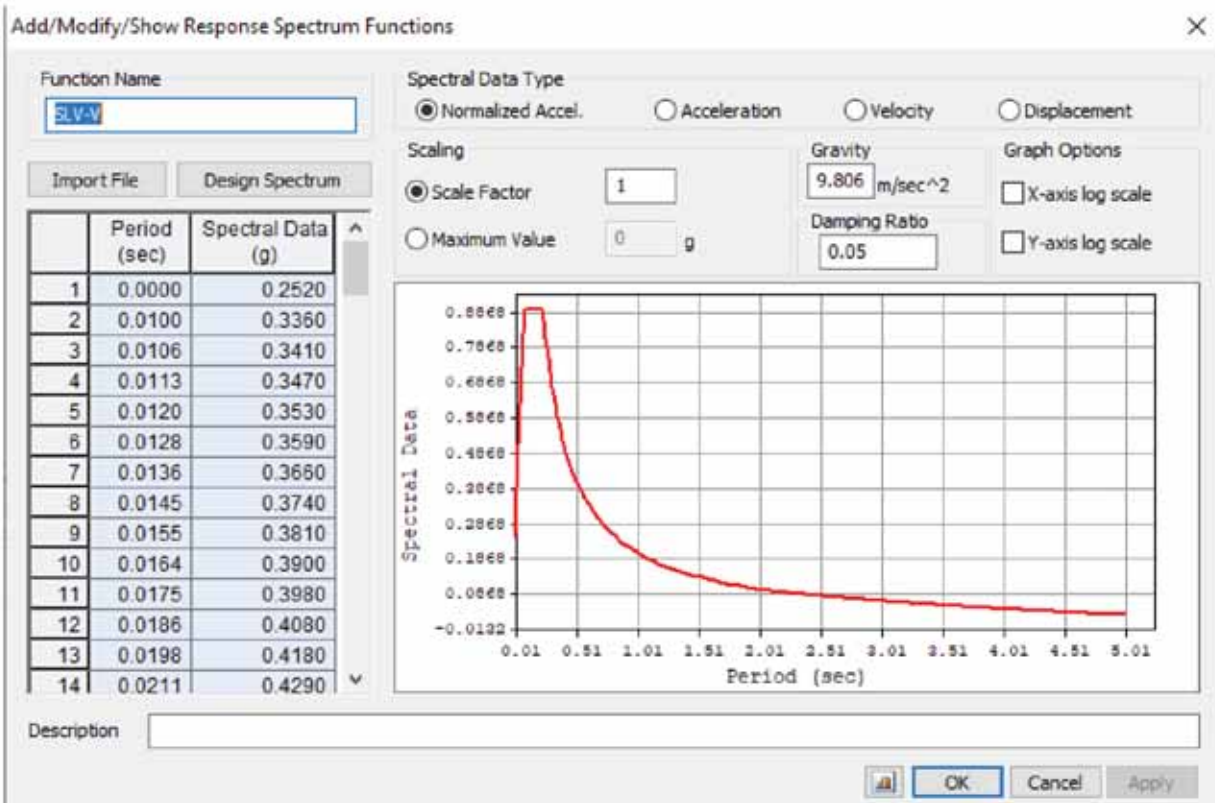
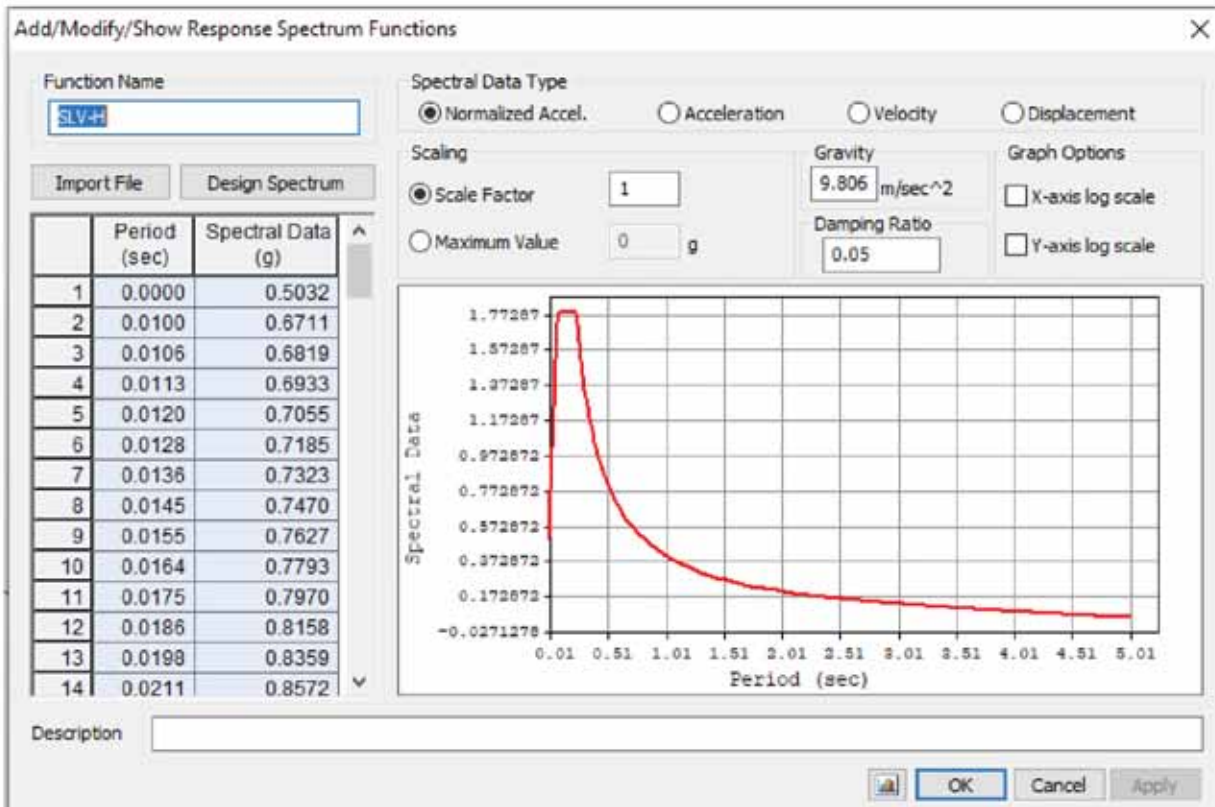
Coefficiente d'uso della costruzione – $cu = 2.0$

Ne deriva un periodo di riferimento per la costruzione $VR=100$ anni.

Chilometrica	Categoria di sottosuolo NTC	Categoria topografica	S_T	S_s	ag	FO	Tc*	Latitudine	Longitudine
1+459	RSL	T1							
3+005	B	T1	1.00	1.116	0.301	2.361	0.454	36.959319	14.669724
5+204	B	T1	1.00	1.105	0.312	2.36	0.455	36.975768	14.67698
12+235	RSL	T1							
15+818	RSL	T1							
0+553	RSL	T1							
1+259	B	T1	1.00	1.087	0.332	2.355	0.456	37.091473	14.63782
2+065	B	T1	1.00	1.086	0.333	2.356	0.457	37.098526	14.640441
2+781	B	T1	1.00	1.085	0.334	2.357	0.457	37.104181	14.643716
4+182	B	T1	1.00	1.081	0.337	2.36	0.458	37.114961	14.650551
8+318	B	T1	1.00	1.075	0.344	2.364	0.461	37.147444	14.671512
8+746	B	T1	1.00	1.075	0.344	2.363	0.462	37.151077	14.673177

Per quest'opera in particolare sono stati ricavati gli spettri di risposta da un'analisi sismica locale. Gli spettri di risposta utilizzati nel programma di calcolo vengono riportati nelle pagine seguenti.

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO



Add/Modify/Show Response Spectrum Functions

Function Name:

Import File | Design Spectrum

	Period (sec)	Spectral Data (g)
1	0.0000	0.1402
2	0.0100	0.1949
3	0.0106	0.1984
4	0.0113	0.2022
5	0.0120	0.2062
6	0.0128	0.2104
7	0.0136	0.2149
8	0.0145	0.2197
9	0.0155	0.2248
10	0.0164	0.2302
11	0.0175	0.2360
12	0.0186	0.2421
13	0.0198	0.2486
14	0.0211	0.2556

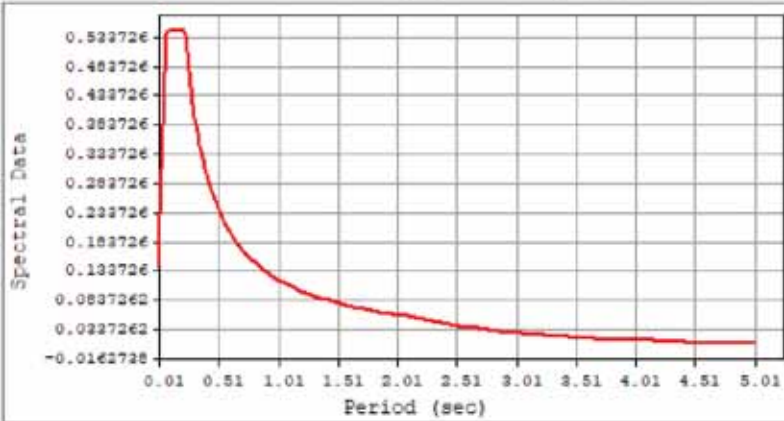
Spectral Data Type: Normalized Accel. Acceleration Velocity Displacement

Scaling: Scale Factor Maximum Value

Gravity: 9.806 m/sec²

Damping Ratio: 0.05

Graph Options: X-axis log scale Y-axis log scale



Description:

OK Cancel Apply

Add/Modify/Show Response Spectrum Functions

Function Name:

Import File | Design Spectrum

	Period (sec)	Spectral Data (g)
1	0.0000	0.8519
2	0.0100	0.9868
3	0.0106	0.9954
4	0.0113	1.0046
5	0.0120	1.0144
6	0.0128	1.0249
7	0.0136	1.0360
8	0.0145	1.0478
9	0.0155	1.0603
10	0.0164	1.0737
11	0.0175	1.0879
12	0.0186	1.1030
13	0.0198	1.1191
14	0.0211	1.1363

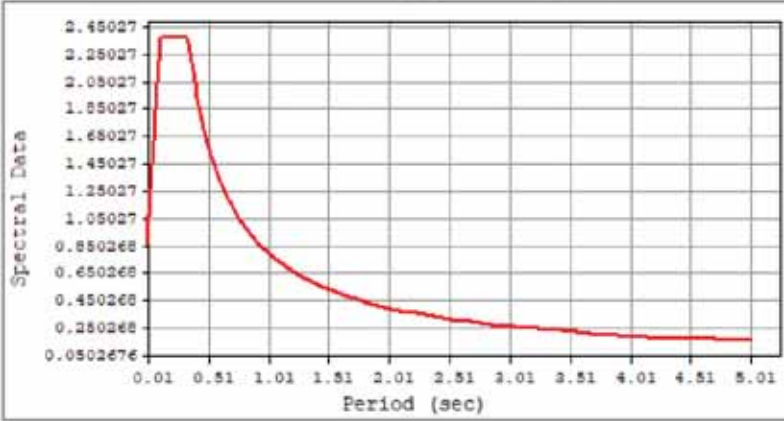
Spectral Data Type: Normalized Accel. Acceleration Velocity Displacement

Scaling: Scale Factor Maximum Value

Gravity: 9.806 m/sec²

Damping Ratio: 0.05

Graph Options: X-axis log scale Y-axis log scale



Description:

OK Cancel Apply

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

Node	Mode	UX	UY	UZ	RX	RY	RZ						
EIGENVALUE ANALYSIS													
	Mode No	Frequency		Period	Tolerance								
		(rad/sec)	(cycle/sec)	(sec)									
	1	6.290154	1.001109	0.998892	0.0000e+000								
	2	6.407884	1.019846	0.980540	0.0000e+000								
	3	10.876640	1.731071	0.577677	0.0000e+000								
	4	14.309642	2.277450	0.439088	0.0000e+000								
	5	18.031690	2.869833	0.348452	0.0000e+000								
MODAL PARTICIPATION MASSES PRINTOUT													
	Mode No	TRAN-X		TRAN-Y		TRAN-Z		ROT-N-X		ROT-N-Y		ROT-N-Z	
		MASS(%)	SUM(%)	MASS(%)	SUM(%)	MASS(%)	SUM(%)	MASS(%)	SUM(%)	MASS(%)	SUM(%)	MASS(%)	SUM(%)
	1	0.00	0.00	99.95	99.95	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00
	2	100.00	100.00	0.00	99.95	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
	3	0.00	100.00	0.00	99.95	0.00	0.00	0.00	0.02	0.00	0.00	99.99	99.99
	4	0.00	100.00	0.00	99.95	80.84	80.84	0.00	0.02	0.00	0.00	0.00	99.99
	5	0.00	100.00	0.03	99.98	0.00	80.84	78.80	78.82	0.00	0.00	0.00	99.99
	Mode No	TRAN-X		TRAN-Y		TRAN-Z		ROT-N-X		ROT-N-Y		ROT-N-Z	
		MASS	SUM	MASS	SUM	MASS	SUM	MASS	SUM	MASS	SUM	MASS	SUM
	1	0.00	0.00	428.34	428.34	0.00	0.00	0.60	0.60	0.00	0.00	0.00	0.00
	2	428.54	428.54	0.00	428.34	0.00	0.00	0.00	0.60	1.09	1.09	0.00	0.00
	3	0.00	428.54	0.00	428.34	0.00	0.00	0.00	0.60	0.00	1.09	62901.94	62901.94
	4	0.00	428.54	0.00	428.34	346.45	346.45	0.00	0.60	0.01	1.09	0.00	62901.94
	5	0.00	428.54	0.13	428.47	0.00	346.45	2400.22	2400.62	0.00	1.09	0.00	62901.94

E' stata eseguita un'analisi modale a spettro di risposta. Come si nota dall'immagine sopra riportata, avendo introdotto come appoggi degli isolatori, le azioni sismiche orizzontali si dimostrano praticamente disaccoppiate. In altre parole, andando ad analizzare i modi di vibrare che "muovono" maggior quantitativo di masse, si nota che il modo di vibrare numero 1 e 2 muovono massa in direzione rispettivamente Y ed X in modo disaccoppiato.

6 MODELLAZIONE STRUTTURALE

La modellazione strutturale è stata effettuata tramite il programma di calcolo Midas-Civil, schematizzando l'opera come un graticcio equivalente.

Trattandosi di un impalcato a sezione mista acciaio-clc, nell'ambito della modellazione, sono state introdotte le fasi di maturazione del clc necessarie per le verifiche degli elementi portanti e nel dettaglio:

- ✓ Fase1 : Presenza della sola struttura in acciaio soggetta al solo peso proprio strutturale (durata per la sola fase di varo)

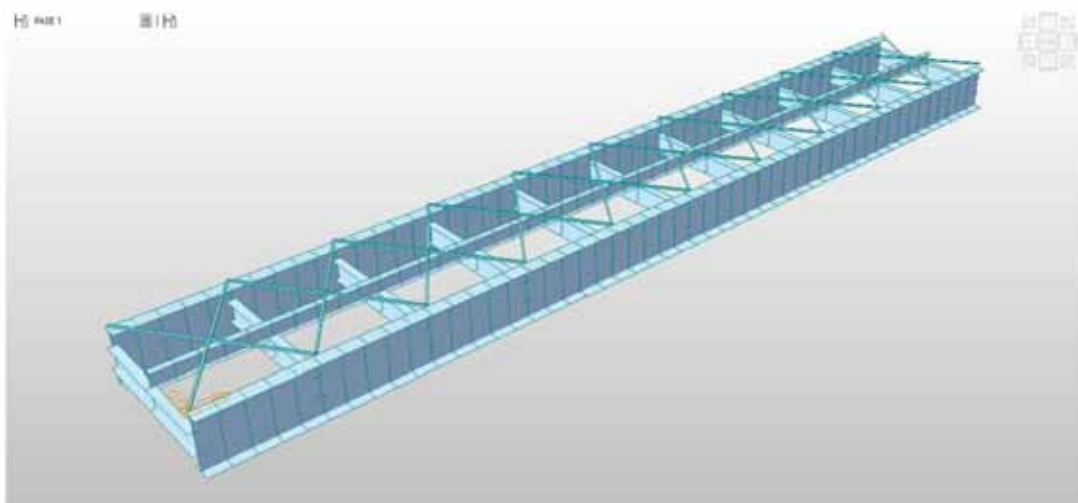


Figura 15 - Schema struttura in Fase 1

- ✓ Fase2: Presenza della struttura in acciaio e della soletta (non ancora collaborante) ma che interviene solo come peso portato (durata della fase 28giorni).
- ✓ Fase 3: Fase in cui hanno corso gli effetti reologici del calcestruzzo e in cui viene posato anche il carico permanente portato (durata giorni – fino alla fine degli effetti reologici).

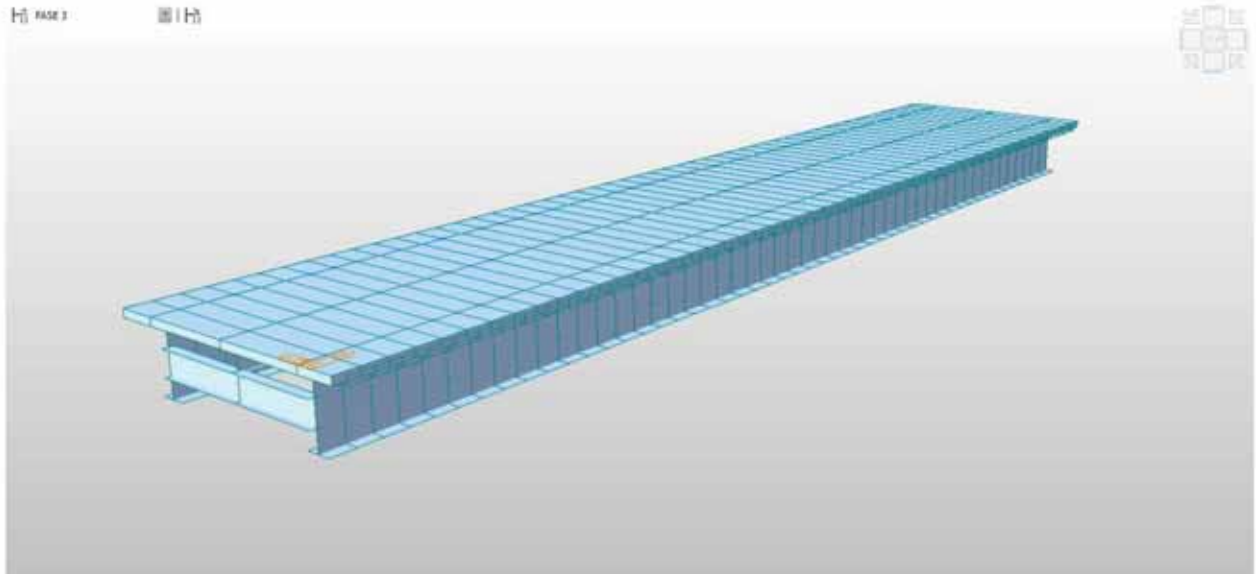


Figura 16 - Schema struttura in Fase 2-3

Inserendo in modo opportuno le varie curve di maturazione e ritiro del calcestruzzo, il programma di calcolo tiene in conto in automatico degli effetti reologici nel tempo. Pertanto, nelle varie fasi di carico, e di maturazione del getto, si instaurano effetti dovuti a ritiro e viscosità che vengono tenuti in conto in automatico dal programma di calcolo nell'ambito delle singole fasi introdotte. La fase 3, che ha una durata effettiva di circa 10000 giorni, ha lo scopo di esaurire tutti gli effetti reologici del calcestruzzo e precede la successiva fase di applicazione dei carichi variabili da traffico e meteorologici.

Construction Stage

Name	Duration	Date	Step	Result
FASE 1	2	2	0	Stage
FASE 2	28	30	0	Stage
FASE 3	10000	10030	0	Stage

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

Add/Modify Time Dependent Material (Creep / Shrinkage)

Name : C+S Code : European

European

Characteristic compressive cylinder strength of concrete at the age of 28 days (f_{ck}) : 32000 kN/m²

Relative Humidity of ambient environment (40 - 99) : 70 %

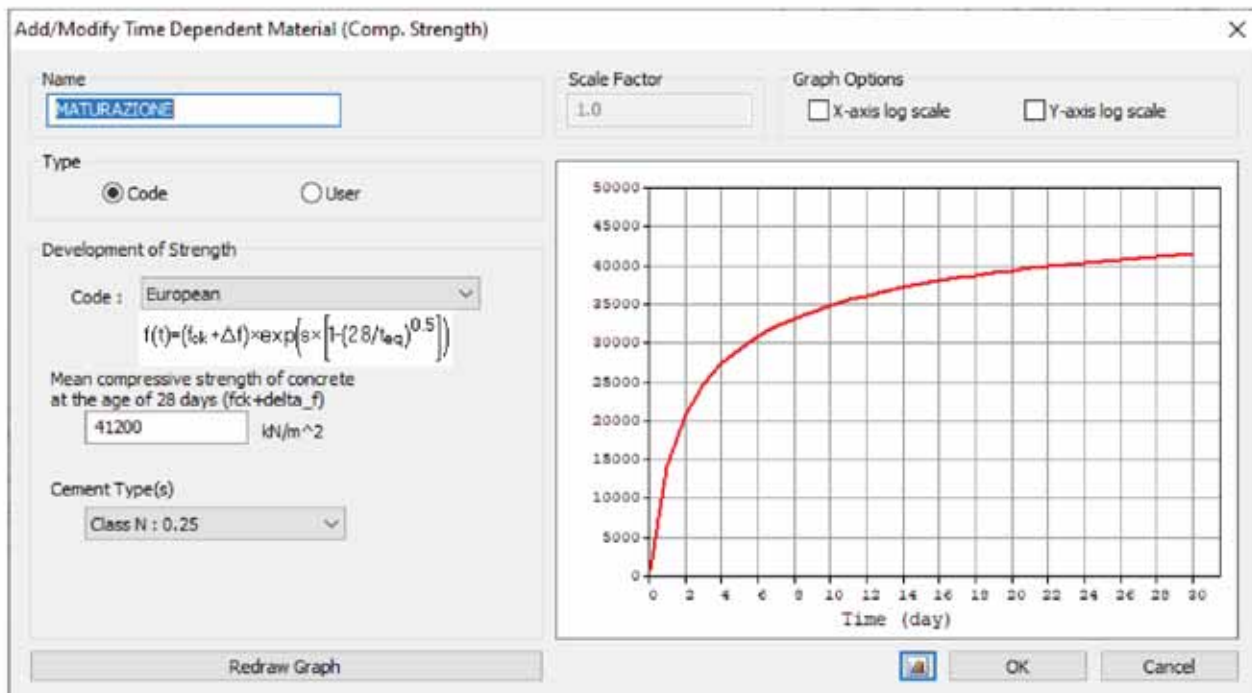
Notional size of member : 0.25 m
h = 2 * A_c / u (A_c : Section Area, u : Perimeter in contact with atmosphere)

Type of cement
 Class S Class N Class R

Type of code
 EN 1992-1 (General Structure) EN 1992-2 (Concrete Bridge) Use of silica-fume

Age of concrete at the beginning of shrinkage : 3 day

Show Result... OK Cancel Apply



Per quanto riguarda la soletta, la stessa viene modellata con elementi tipo frame di dimensioni pari all'interasse previsto e viene utilizzata per l'applicazione in senso trasversale dei carichi mobili. In altre parole, i carichi mobili vengono ripartiti lungo gli elementi principali tramite la soletta.

6.1 COMBINAZIONI DI CARICO

Le combinazioni di carico considerate sono quelle desunte secondo lo schema seguente.

Gruppo di azioni	Carichi sulla carreggiata					Carichi su marciapiedi e piste ciclabili
	Carichi verticali			Carichi orizzontali		Carichi verticali
	Modello principale (Schema di carico 1, 2, 3, 4, 6)	Veicoli speciali	Folla (Schema di carico 5)	Frenatura q_3	Forza centrifuga q_4	
1	Valore caratteristico					Carico uniformemente distribuito
2 a	Valore frequente			Valore caratteristico		Schema di carico 5 con valore di combinazione 2.5 kN/m ²
2 b	Valore frequente				Valore caratteristico	
3 ^(*)						Schema di carico 5 con valore caratteristico 5.0 kN/m ²
4 ^(**)			Schema di carico 5 con valore caratteristico 5.0 kN/m ²			Schema di carico 5 con valore caratteristico 5.0 kN/m ²
5 ^(***)	Da definirsi per il singolo progetto	Valore caratteristico o nominale				

^(*) Ponti di 3^a categoria
^(**) Da considerare solo se richiesto dal particolare progetto (ad es. ponti in zona urbana)
^(***) Da considerare solo se si considerano veicoli speciali

I coefficienti parziali di sicurezza per le combinazioni di carico SLU sono i seguenti.

		Coefficiente	EQU ⁽¹⁾	A1 STR	A2 GEO
Carichi permanenti	favorevoli	γ_{G1}	0,90	1,00	1,00
	sfavorevoli		1,10	1,35	1,00
Carichi permanenti non strutturali ⁽²⁾	favorevoli	γ_{G2}	0,00	0,00	0,00
	sfavorevoli		1,50	1,50	1,30
Carichi variabili da traffico	favorevoli	γ_Q	0,00	0,00	0,00
	sfavorevoli		1,35	1,35	1,15
Carichi variabili	favorevoli	γ_{Qi}	0,00	0,00	0,00
	sfavorevoli		1,50	1,50	1,30
Distorsioni e presollecitazioni di progetto	favorevoli	γ_{e1}	0,90	1,00	1,00
	sfavorevoli		1,00 ⁽³⁾	1,00 ⁽⁴⁾	1,00
Ritiro e viscosità, Variazioni termiche, Cedimenti vincolari	favorevoli	$\gamma_{e2}, \gamma_{e3}, \gamma_{e4}$	0,00	0,00	0,00
	sfavorevoli		1,20	1,20	1,00

⁽¹⁾ Equilibrio che non coinvolga i parametri di deformabilità e resistenza del terreno; altrimenti si applicano i valori di GEO.
⁽²⁾ Nel caso in cui i carichi permanenti non strutturali (ad es. carichi permanenti portati) siano compiutamente definiti si potranno adottare gli stessi coefficienti validi per le azioni permanenti.
⁽³⁾ 1,30 per instabilità in strutture con precompressione esterna
⁽⁴⁾ 1,20 per effetti locali

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

I coefficienti ψ per le azioni variabili per i ponti stradali sono i seguenti.

Azioni	Gruppo di azioni (Tabella 5.1.IV)	Coefficiente ψ_0 di combinazione	Coefficiente ψ_1 (valori frequenti)	Coefficiente ψ_2 (valori quasi permanenti)
Azioni da traffico (Tabella 5.1.IV)	Schema 1 (Carichi tandem)	0,75	0,75	0,0
	Schemi 1, 5 e 6 (Carichi distribuiti)	0,40	0,40	0,0
	Schemi 3 e 4 (carichi concentrati)	0,40	0,40	0,0
	Schema 2	0,0	0,75	0,0
	2	0,0	0,0	0,0
	3	0,0	0,0	0,0
Vento q_3	4 (folia)	----	0,75	0,0
	5	0,0	0,0	0,0
	Vento a ponte scarico SLU e SLE	0,6	0,2	0,0
	Esecuzione	0,8	----	0,0
Neve q_3	Vento a ponte carico	0,6		
	SLU e SLE	0,0	0,0	0,0
Temperatura	esecuzione	0,8	0,6	0,5
	T_k	0,6	0,6	0,5

Si riporta di seguito una tabella raffigurante tutte le combinazioni di carico utilizzate.

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

		PESO PROPRIO ACCIAIO	PESO PROPRIO SOLETTA	PERMANENTE PORTATO	VENTO PONTE SCARICO	VENTO PONTE CARICO	TERMICA UNIFORME +	TERMICA UNIFORME -	TERMICA GRADIENTE +	TERMICA GRADIENTE -	FREINATURA	LMD1	LMD2	LMD3	SISMA X	SISMA Y	SISMA Z
SLU	SLU1	1.35	1.35	1.35	1.5	0	0.9	0	0	0	1.0125	1.0125	1.0125	1.0125	0	0	0
	SLU2	1.35	1.35	1.35	1.5	0	0	0.9	0	0	1.0125	1.0125	1.0125	1.0125	0	0	0
	SLU3	1.35	1.35	1.35	1.5	0	0	0	0.9	0	1.0125	1.0125	1.0125	1.0125	0	0	0
	SLU4	1.35	1.35	1.35	1.5	0	0	0	0	0.9	1.0125	1.0125	1.0125	1.0125	0	0	0
	SLU5	1.35	1.35	1.35	0	1.5	0.9	0	0	0	1.0125	1.0125	1.0125	1.0125	0	0	0
	SLU6	1.35	1.35	1.35	0	1.5	0	0.9	0	0	1.0125	1.0125	1.0125	1.0125	0	0	0
	SLU7	1.35	1.35	1.35	0	1.5	0	0	0.9	0	1.0125	1.0125	1.0125	1.0125	0	0	0
	SLU8	1.35	1.35	1.35	0	1.5	0	0	0	0.9	1.0125	1.0125	1.0125	1.0125	0	0	0
	SLU9	1.35	1.35	1.35	0.9	0	0.9	0	0	0	1.35	1.35	0	0	0	0	0
	SLU10	1.35	1.35	1.35	0.9	0	0	0.9	0	0	1.35	1.35	0	0	0	0	0
	SLU11	1.35	1.35	1.35	0.9	0	0	0	0.9	0	1.35	1.35	0	0	0	0	0
	SLU12	1.35	1.35	1.35	0.9	0	0	0	0	0.9	1.35	1.35	0	0	0	0	0
	SLU13	1.35	1.35	1.35	0	0.9	0.9	0	0	0	1.35	1.35	0	0	0	0	0
	SLU14	1.35	1.35	1.35	0	0.9	0	0.9	0	0	1.35	1.35	0	0	0	0	0
	SLU15	1.35	1.35	1.35	0	0.9	0	0	0.9	0	1.35	1.35	0	0	0	0	0
	SLU16	1.35	1.35	1.35	0	0.9	0	0	0	0.9	1.35	1.35	0	0	0	0	0
	SLU17	1.35	1.35	1.35	0.9	0	0.9	0	0	0	1.35	1.35	1.35	1.35	0	0	0
	SLU18	1.35	1.35	1.35	0.9	0	0	0.9	0	0	1.35	1.35	1.35	1.35	0	0	0
	SLU19	1.35	1.35	1.35	0.9	0	0	0	0.9	0	1.35	1.35	1.35	1.35	0	0	0
	SLU20	1.35	1.35	1.35	0.9	0	0	0	0	0.9	1.35	1.35	1.35	1.35	0	0	0
	SLU21	1.35	1.35	1.35	0	0.9	0.9	0	0	0	1.35	1.35	1.35	1.35	0	0	0
	SLU22	1.35	1.35	1.35	0	0.9	0	0.9	0	0	1.35	1.35	1.35	1.35	0	0	0
	SLU23	1.35	1.35	1.35	0	0.9	0	0	0.9	0	1.35	1.35	1.35	1.35	0	0	0
	SLU24	1.35	1.35	1.35	0	0.9	0	0	0	0.9	1.35	1.35	1.35	1.35	0	0	0
RARA	RARA_1	1	1	1	1	0	0.6	0	0	0	0.75	0.75	0	0	0	0	0
	RARA_2	1	1	1	1	0	0	0.6	0	0	0.75	0.75	0	0	0	0	0
	RARA_3	1	1	1	1	0	0	0	0.6	0	0.75	0.75	0	0	0	0	0
	RARA_4	1	1	1	1	0	0	0	0	0.6	0.75	0.75	0	0	0	0	0
	RARA_5	1	1	1	0	1	0.6	0	0	0	0.75	0.75	0	0	0	0	0
	RARA_6	1	1	1	0	1	0	0.6	0	0	0.75	0.75	0	0	0	0	0
	RARA_7	1	1	1	0	1	0	0	0.6	0	0.75	0.75	0	0	0	0	0
	RARA_8	1	1	1	0	1	0	0	0	0.6	0.75	0.75	0	0	0	0	0
	RARA_9	1	1	1	0.6	0	0.6	0	0	0	1	1	0	0	0	0	0
	RARA_10	1	1	1	0.6	0	0	0.6	0	0	1	1	0	0	0	0	0
	RARA_11	1	1	1	0.6	0	0	0	0.6	0	1	1	0	0	0	0	0
	RARA_12	1	1	1	0.6	0	0	0	0	0.6	1	1	0	0	0	0	0
	RARA_13	1	1	1	0	0.6	0.6	0	0	0	1	1	0	0	0	0	0
	RARA_14	1	1	1	0	0.6	0	0.6	0	0	1	1	0	0	0	0	0
	RARA_15	1	1	1	0	0.6	0	0	0.6	0	1	1	0	0	0	0	0
	RARA_16	1	1	1	0	0.6	0	0	0	0.6	1	1	0	0	0	0	0
FREQ	FREQ_1	1	1	1	0.2	0	0.5	0	0	0	0.75	0.75	0	0	0	0	0
	FREQ_2	1	1	1	0.2	0	0	0.5	0	0	0.75	0.75	0	0	0	0	0
	FREQ_3	1	1	1	0.2	0	0	0	0.5	0	0.75	0.75	0	0	0	0	0
	FREQ_4	1	1	1	0.2	0	0	0	0	0.5	0.75	0.75	0	0	0	0	0
	FREQ_5	1	1	1	0	0	0.5	0	0	0	0.75	0.75	0	0	0	0	0
	FREQ_6	1	1	1	0	0	0	0.5	0	0	0.75	0.75	0	0	0	0	0
	FREQ_7	1	1	1	0	0	0	0	0.5	0	0.75	0.75	0	0	0	0	0
	FREQ_8	1	1	1	0	0	0	0	0	0.5	0.75	0.75	0	0	0	0	0
	FREQ_9	1	1	1	0.2	0	0.5	0	0	0	0.75	0.75	0.75	0.75	0	0	0
	FREQ_10	1	1	1	0.2	0	0	0.5	0	0	0.75	0.75	0.75	0.75	0	0	0
	FREQ_11	1	1	1	0.2	0	0	0	0.5	0	0.75	0.75	0.75	0.75	0	0	0
	FREQ_12	1	1	1	0.2	0	0	0	0	0.5	0.75	0.75	0.75	0.75	0	0	0
	FREQ_13	1	1	1	0	0	0.5	0	0	0	0.75	0.75	0.75	0.75	0	0	0
	FREQ_14	1	1	1	0	0	0	0.5	0	0	0.75	0.75	0.75	0.75	0	0	0
	FREQ_15	1	1	1	0	0	0	0	0	0.5	0.75	0.75	0.75	0.75	0	0	0
	FREQ_16	1	1	1	0	0	0	0	0	0.5	0.75	0.75	0.75	0.75	0	0	0

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

QP	QP_1	1	1	1	0	0	0.5	0	0	0	0	0	0	0	0	0	0	0
	QP_2	1	1	1	0	0	0	0.5	0	0	0	0	0	0	0	0	0	0
	QP_3	1	1	1	0	0	0	0	0.5	0	0	0	0	0	0	0	0	0
	QP_4	1	1	1	0	0	0	0	0	0.5	0	0	0	0	0	0	0	0
SISMA SLV	SLV1	1	1	1	0	0	0.5	0	0	0	0	0	0	0	0	1	0.3	0
	SLV2	1	1	1	0	0	0.5	0	0	0	0	0	0	0	0	-1	0.3	0
	SLV3	1	1	1	0	0	0.5	0	0	0	0	0	0	0	0	1	-0.3	0
	SLV4	1	1	1	0	0	0.5	0	0	0	0	0	0	0	0	-1	-0.3	0
	SLV5	1	1	1	0	0	0.5	0	0	0	0	0	0	0	0	0.3	1	0
	SLV6	1	1	1	0	0	0.5	0	0	0	0	0	0	0	0	0.3	-1	0
	SLV7	1	1	1	0	0	0.5	0	0	0	0	0	0	0	0	-0.3	1	0
	SLV8	1	1	1	0	0	0.5	0	0	0	0	0	0	0	0	-0.3	-1	0
	SLV9	1	1	1	0	0	0	0.5	0	0	0	0	0	0	0	1	0.3	0
	SLV10	1	1	1	0	0	0	0.5	0	0	0	0	0	0	0	-1	0.3	0
	SLV11	1	1	1	0	0	0	0.5	0	0	0	0	0	0	0	1	-0.3	0
	SLV12	1	1	1	0	0	0	0.5	0	0	0	0	0	0	0	-1	-0.3	0
	SLV13	1	1	1	0	0	0	0.5	0	0	0	0	0	0	0	0.3	1	0
	SLV14	1	1	1	0	0	0	0.5	0	0	0	0	0	0	0	0.3	-1	0
	SLV15	1	1	1	0	0	0	0.5	0	0	0	0	0	0	0	-0.3	1	0
	SLV16	1	1	1	0	0	0	0.5	0	0	0	0	0	0	0	-0.3	-1	0
	SLV17	1	1	1	0	0	0	0	0.5	0	0	0	0	0	0	1	0.3	0
	SLV18	1	1	1	0	0	0	0	0.5	0	0	0	0	0	0	-1	0.3	0
	SLV19	1	1	1	0	0	0	0	0.5	0	0	0	0	0	0	1	-0.3	0
	SLV20	1	1	1	0	0	0	0	0.5	0	0	0	0	0	0	-1	-0.3	0
	SLV21	1	1	1	0	0	0	0	0.5	0	0	0	0	0	0	0.3	1	0
	SLV22	1	1	1	0	0	0	0	0.5	0	0	0	0	0	0	0.3	-1	0
	SLV23	1	1	1	0	0	0	0	0.5	0	0	0	0	0	0	-0.3	1	0
	SLV24	1	1	1	0	0	0	0	0.5	0	0	0	0	0	0	-0.3	-1	0
	SLV25	1	1	1	0	0	0	0	0	0.5	0	0	0	0	0	1	0.3	0
	SLV26	1	1	1	0	0	0	0	0	0.5	0	0	0	0	0	-1	0.3	0
	SLV27	1	1	1	0	0	0	0	0	0.5	0	0	0	0	0	1	-0.3	0
	SLV28	1	1	1	0	0	0	0	0	0.5	0	0	0	0	0	-1	-0.3	0
	SLV29	1	1	1	0	0	0	0	0	0.5	0	0	0	0	0	0.3	1	0
	SLV30	1	1	1	0	0	0	0	0	0.5	0	0	0	0	0	0.3	-1	0
	SLV31	1	1	1	0	0	0	0	0	0.5	0	0	0	0	0	-0.3	1	0
	SLV32	1	1	1	0	0	0	0	0	0.5	0	0	0	0	0	-0.3	-1	0
	SLV33	1	1	1	0	0	0.5	0	0	0	0	0	0	0	0	0.3	0.3	1
	SLV34	1	1	1	0	0	0.5	0	0	0	0	0	0	0	0	-0.3	0.3	1
	SLV35	1	1	1	0	0	0.5	0	0	0	0	0	0	0	0	0.3	-0.3	1
	SLV36	1	1	1	0	0	0.5	0	0	0	0	0	0	0	0	-0.3	-0.3	1
	SLV37	1	1	1	0	0	0	0.5	0	0	0	0	0	0	0	0.3	0.3	1
	SLV38	1	1	1	0	0	0	0.5	0	0	0	0	0	0	0	-0.3	0.3	1
	SLV39	1	1	1	0	0	0	0.5	0	0	0	0	0	0	0	0.3	-0.3	1
	SLV40	1	1	1	0	0	0	0.5	0	0	0	0	0	0	0	-0.3	-0.3	1
	SLV41	1	1	1	0	0	0	0	0.5	0	0	0	0	0	0	0.3	0.3	1
	SLV42	1	1	1	0	0	0	0	0.5	0	0	0	0	0	0	-0.3	0.3	1
	SLV43	1	1	1	0	0	0	0	0.5	0	0	0	0	0	0	0.3	-0.3	1
	SLV44	1	1	1	0	0	0	0	0.5	0	0	0	0	0	0	-0.3	-0.3	1
	SLV45	1	1	1	0	0	0.5	0	0	0	0	0	0	0	0	0.3	0.3	-1
	SLV46	1	1	1	0	0	0.5	0	0	0	0	0	0	0	0	-0.3	0.3	-1
	SLV47	1	1	1	0	0	0.5	0	0	0	0	0	0	0	0	0.3	-0.3	-1
	SLV48	1	1	1	0	0	0.5	0	0	0	0	0	0	0	0	-0.3	-0.3	-1
	SLV49	1	1	1	0	0	0	0.5	0	0	0	0	0	0	0	0.3	0.3	-1
	SLV50	1	1	1	0	0	0	0.5	0	0	0	0	0	0	0	-0.3	0.3	-1
	SLV51	1	1	1	0	0	0	0.5	0	0	0	0	0	0	0	0.3	-0.3	-1
	SLV52	1	1	1	0	0	0	0.5	0	0	0	0	0	0	0	-0.3	-0.3	-1
	SLV53	1	1	1	0	0	0	0	0.5	0	0	0	0	0	0	0.3	0.3	-1
	SLV54	1	1	1	0	0	0	0	0.5	0	0	0	0	0	0	-0.3	0.3	-1
	SLV55	1	1	1	0	0	0	0	0.5	0	0	0	0	0	0	0.3	-0.3	-1
	SLV56	1	1	1	0	0	0	0	0.5	0	0	0	0	0	0	-0.3	-0.3	-1
SISMA SLD	SLD1	1	1	1	0	0	0.5	0	0	0	0	0	0	0	1	0	0	
	SLD2	1	1	1	0	0	0.5	0	0	0	0	0	0	0	-1	0	0	
	SLD3	1	1	1	0	0	0.5	0	0	0	0	0	0	0	1	0	0	
	SLD4	1	1	1	0	0	0.5	0	0	0	0	0	0	0	-1	0	0	

6.2 VERIFICHE STRUTTURALI

6.2.1 VERIFICA ELEMENTI DI IMPALCATO

Si riportano di seguito alcune immagini del modello 3D effettuato con la suddivisione in conci delle travi principali.

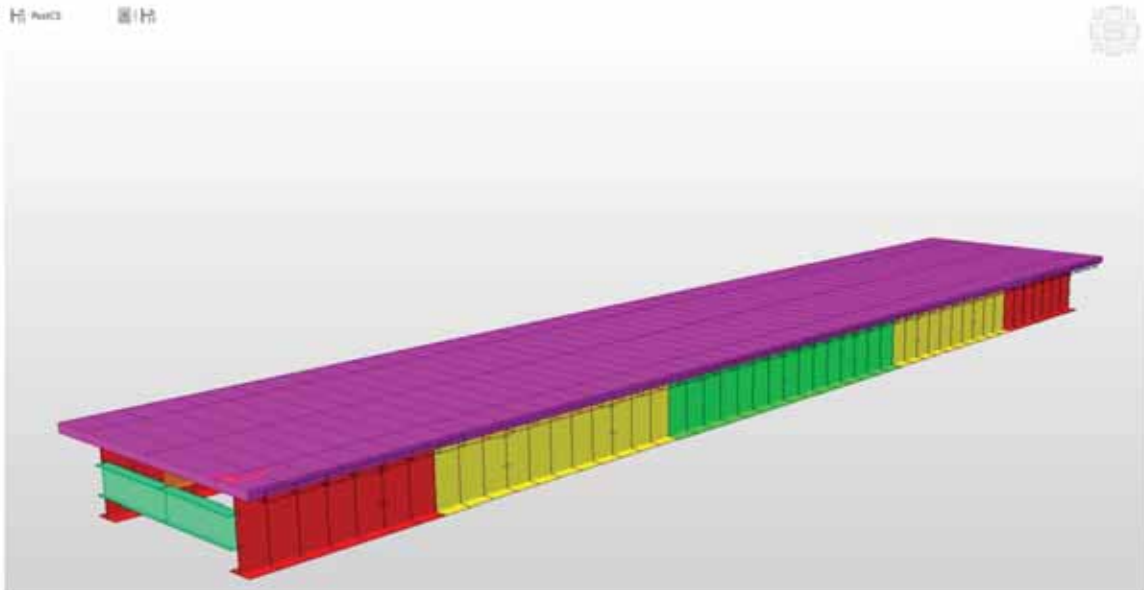


Figura 17 - Immagine modello 3D

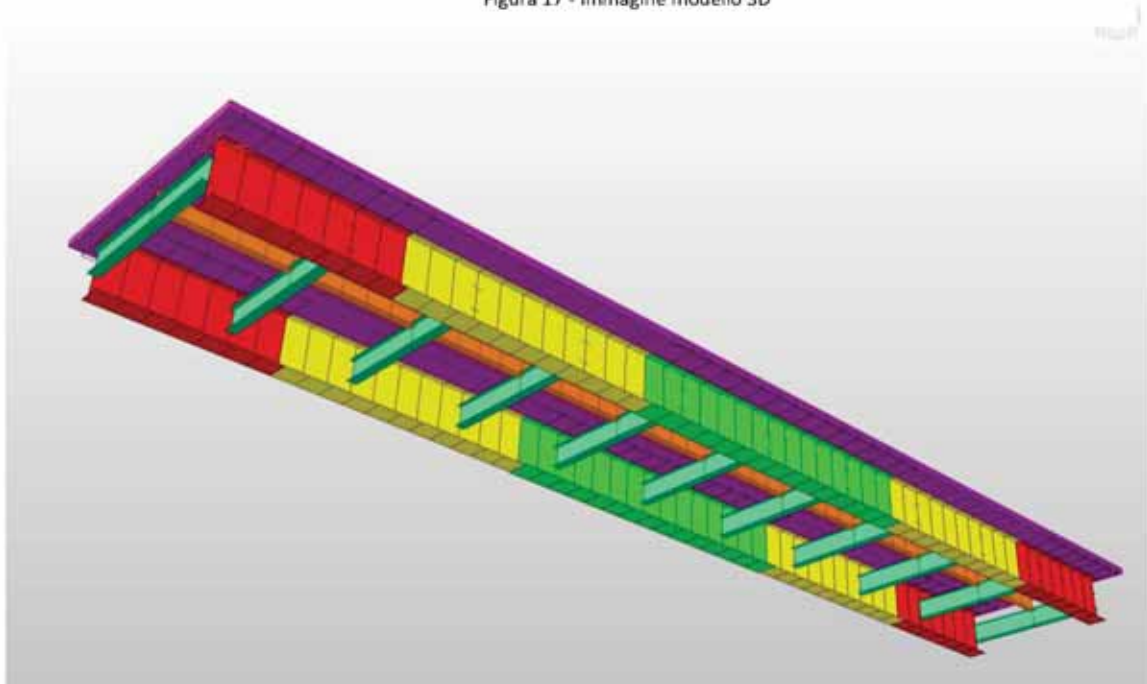


Figura 18 - Immagine modello 3D

Si riportano inoltre i diagrammi delle sollecitazioni M, N e T nelle varie fasi operative.

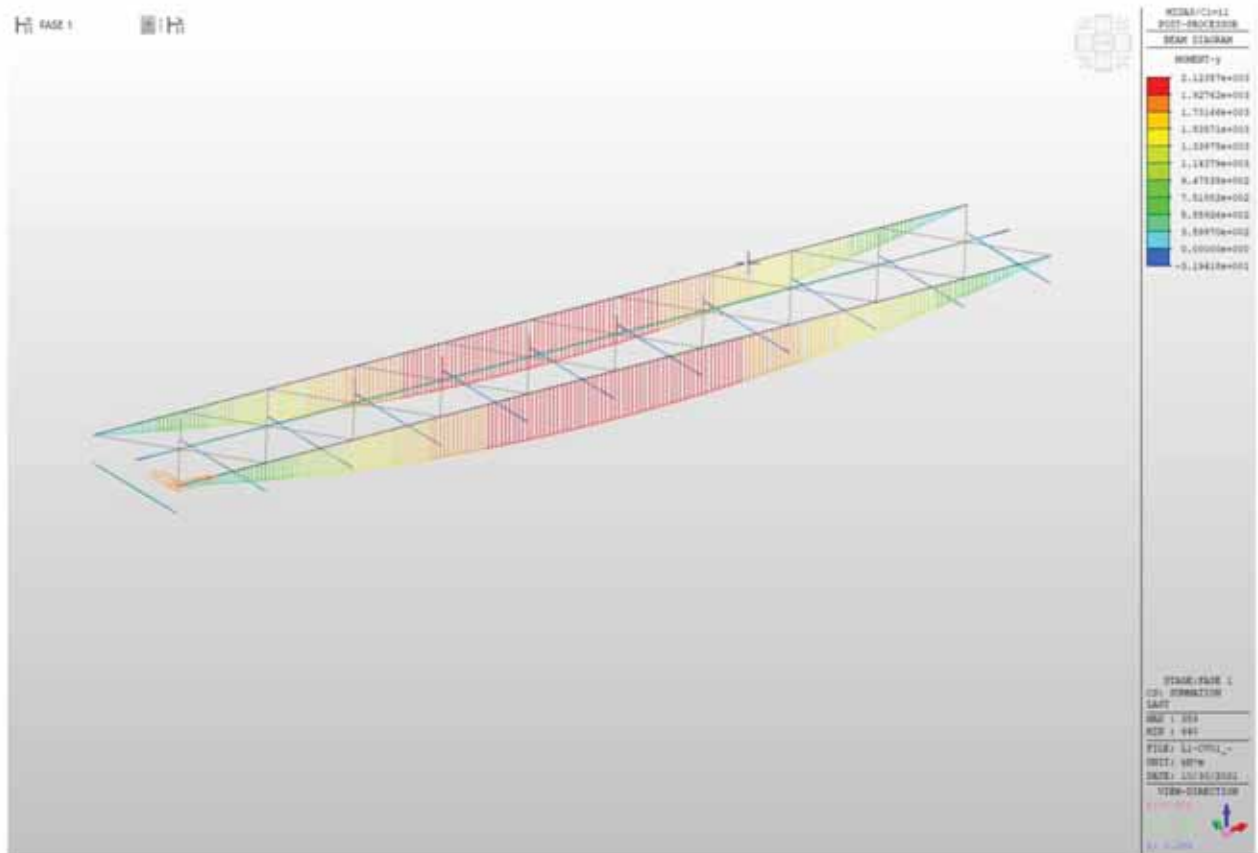


Figura 19 - Diagramma My - Fase 1

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

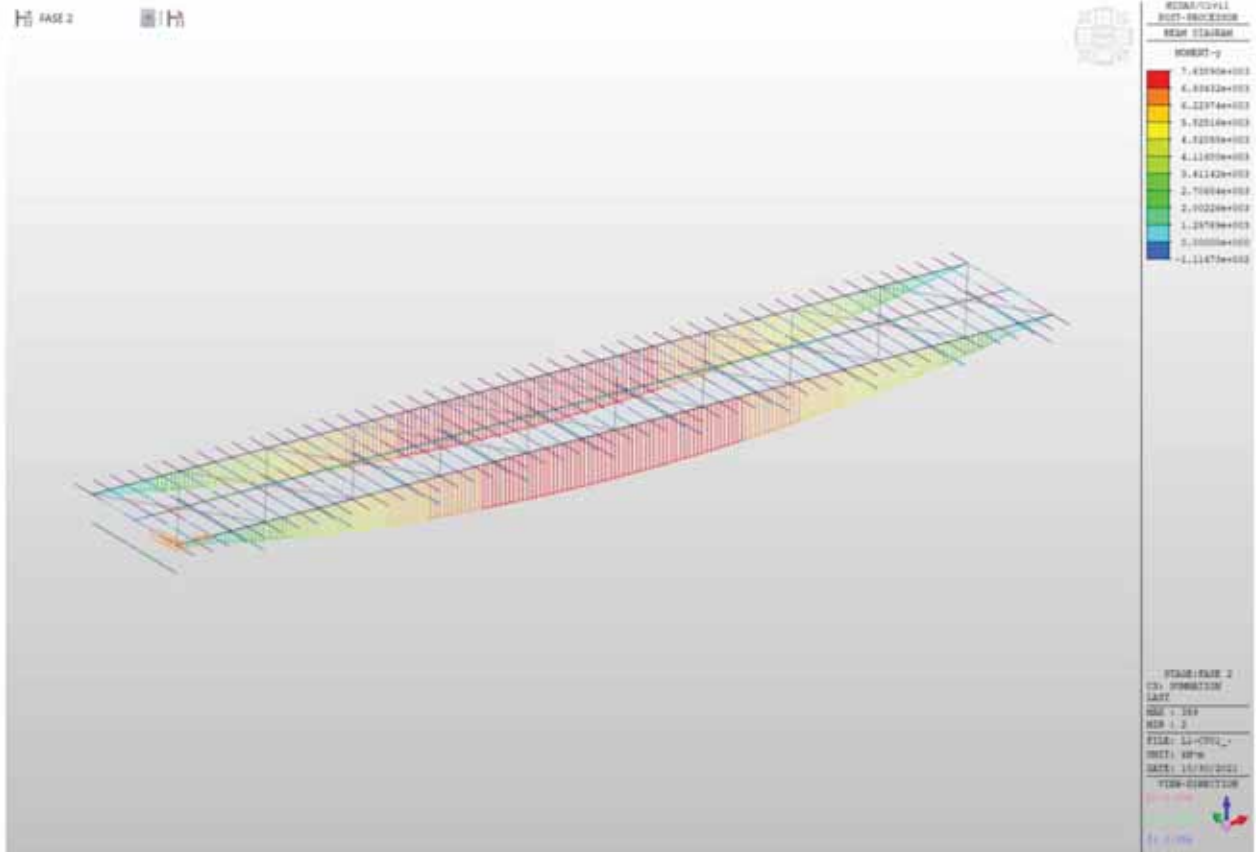


Figura 20 - Diagramma My - Fase 2

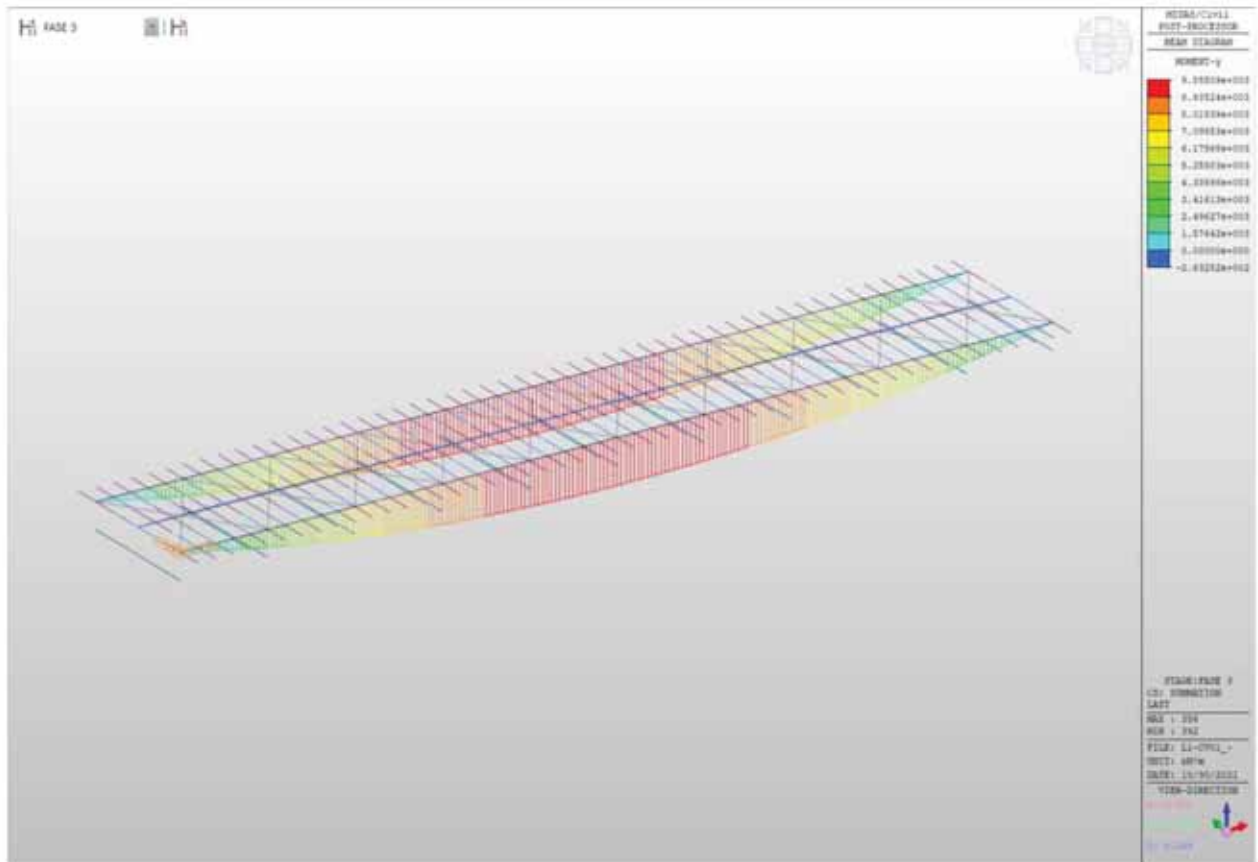


Figura 21 - Diagramma My - Fase 3

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

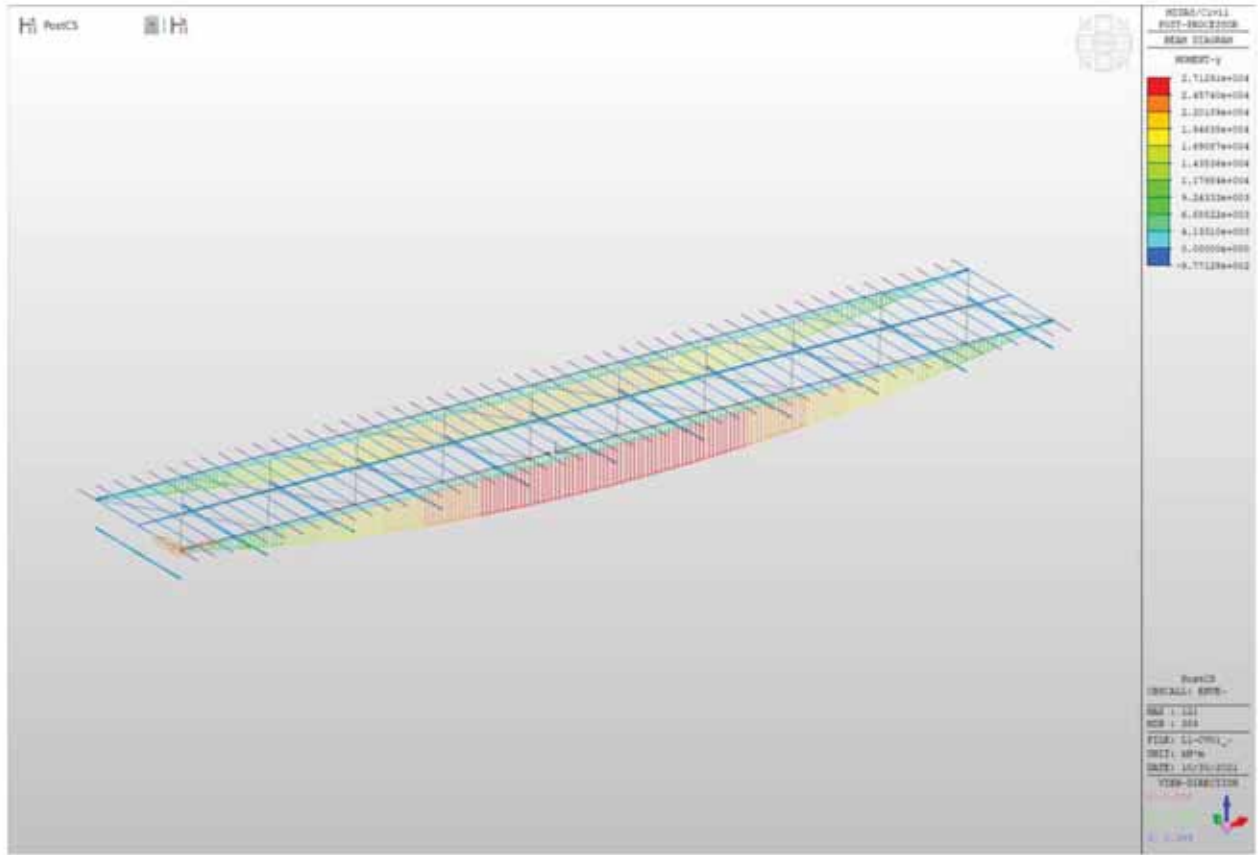


Figura 22 - Diagramma My – Involuppo SLU-SLV

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

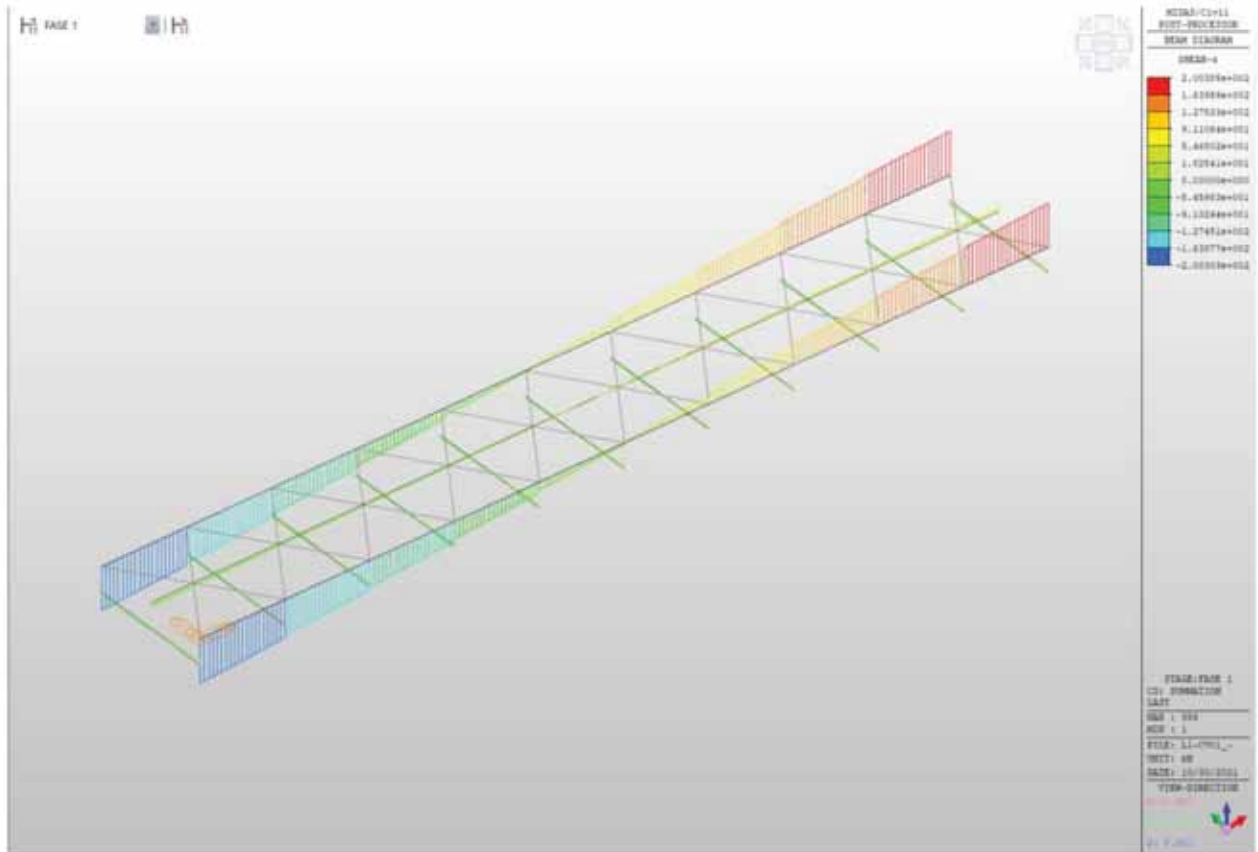


Figura 23 - Diagramma Tz - Fase 1

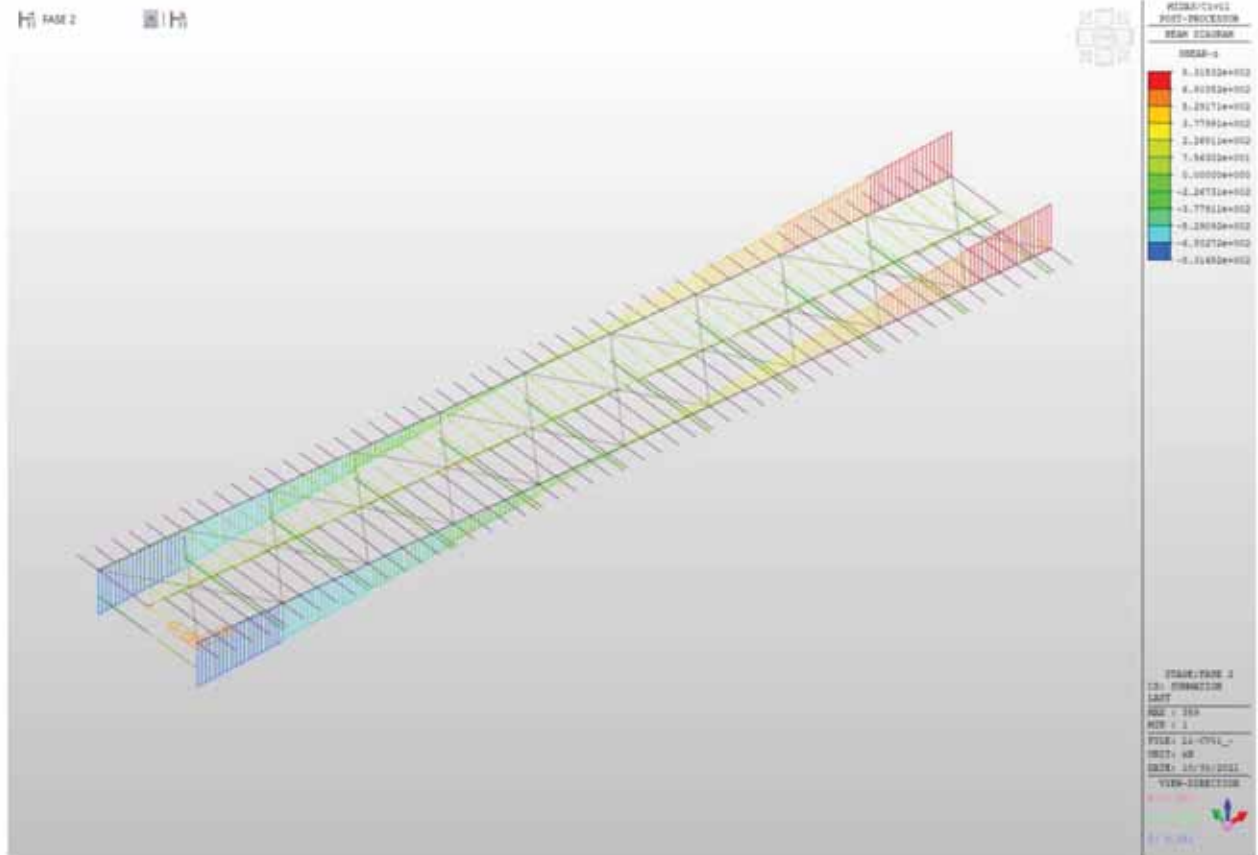


Figura 24 - Diagramma Tz - Fase 2

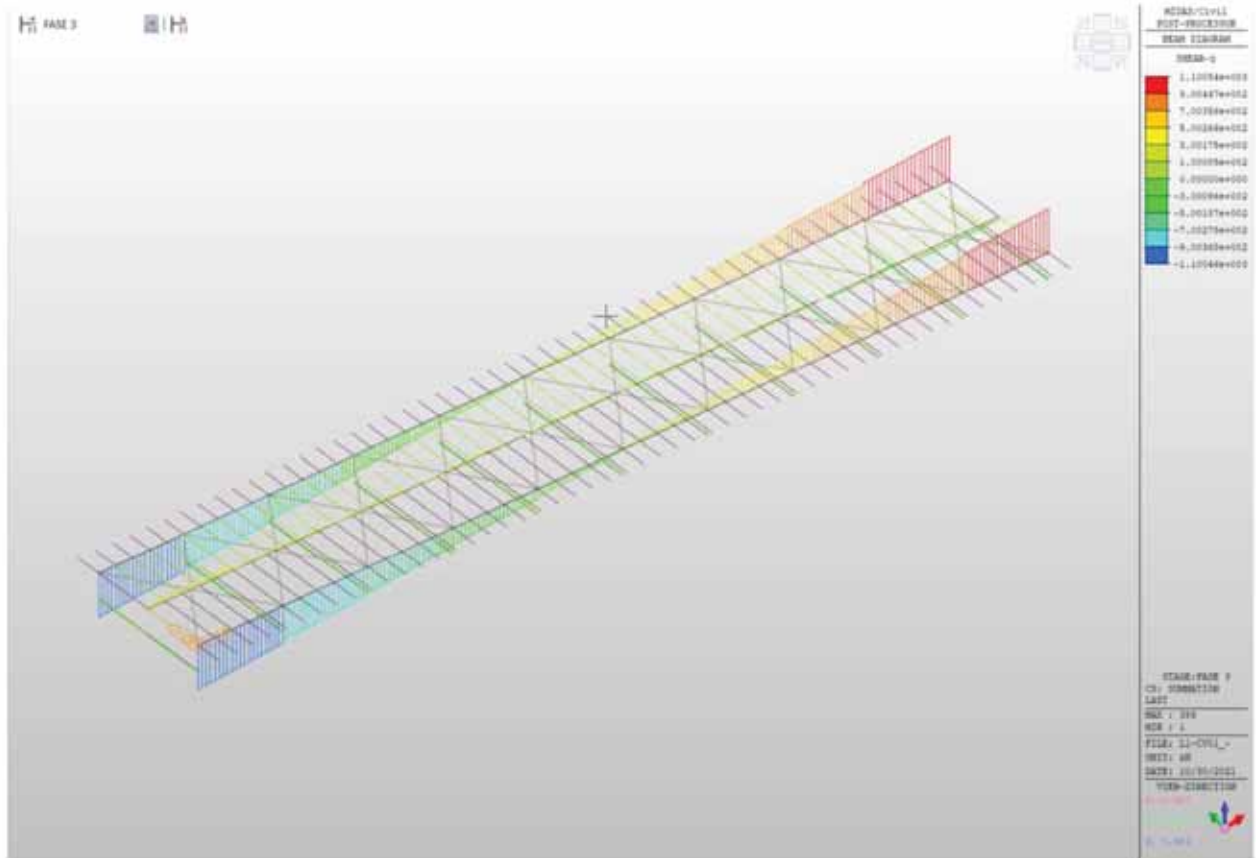


Figura 25 - Diagramma Tz - Fase 3

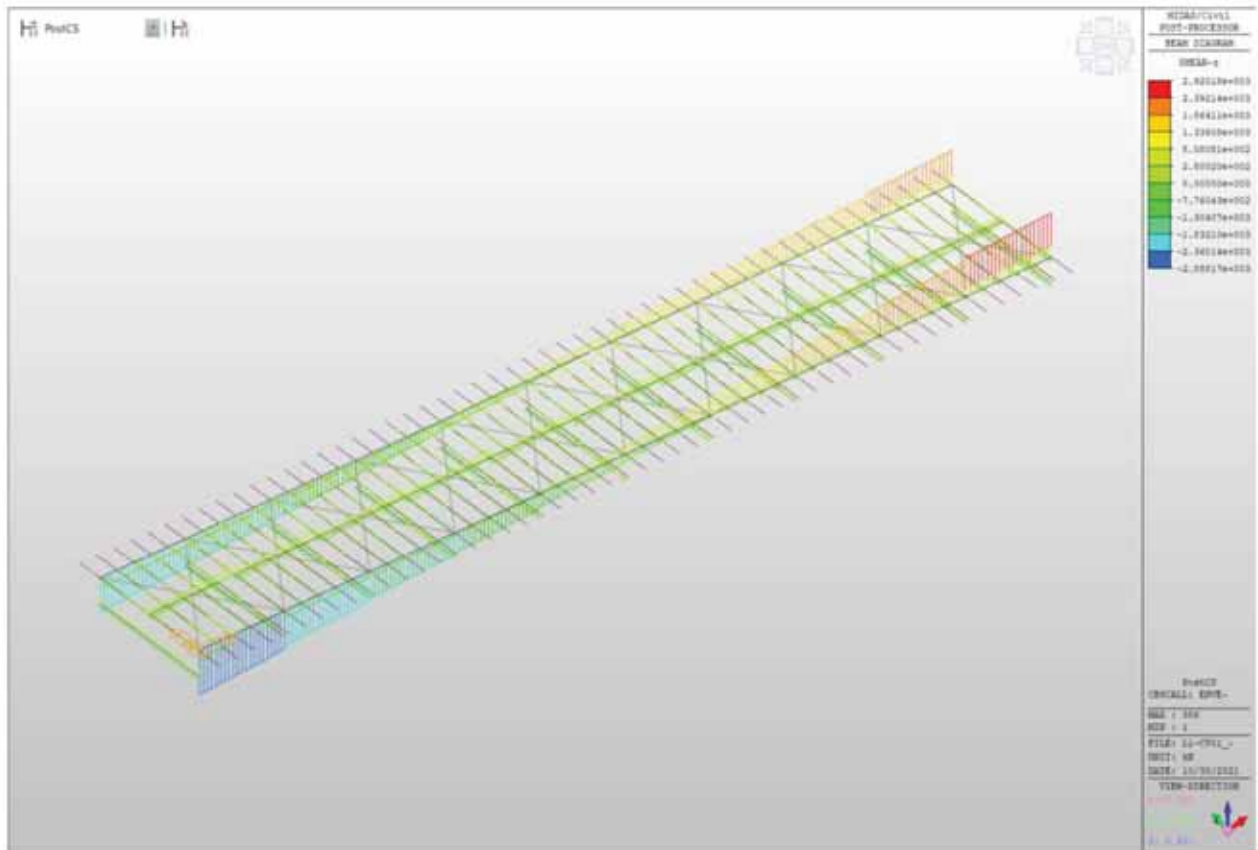


Figura 26 - Diagramma Tz - Involuppo SLU-SLV

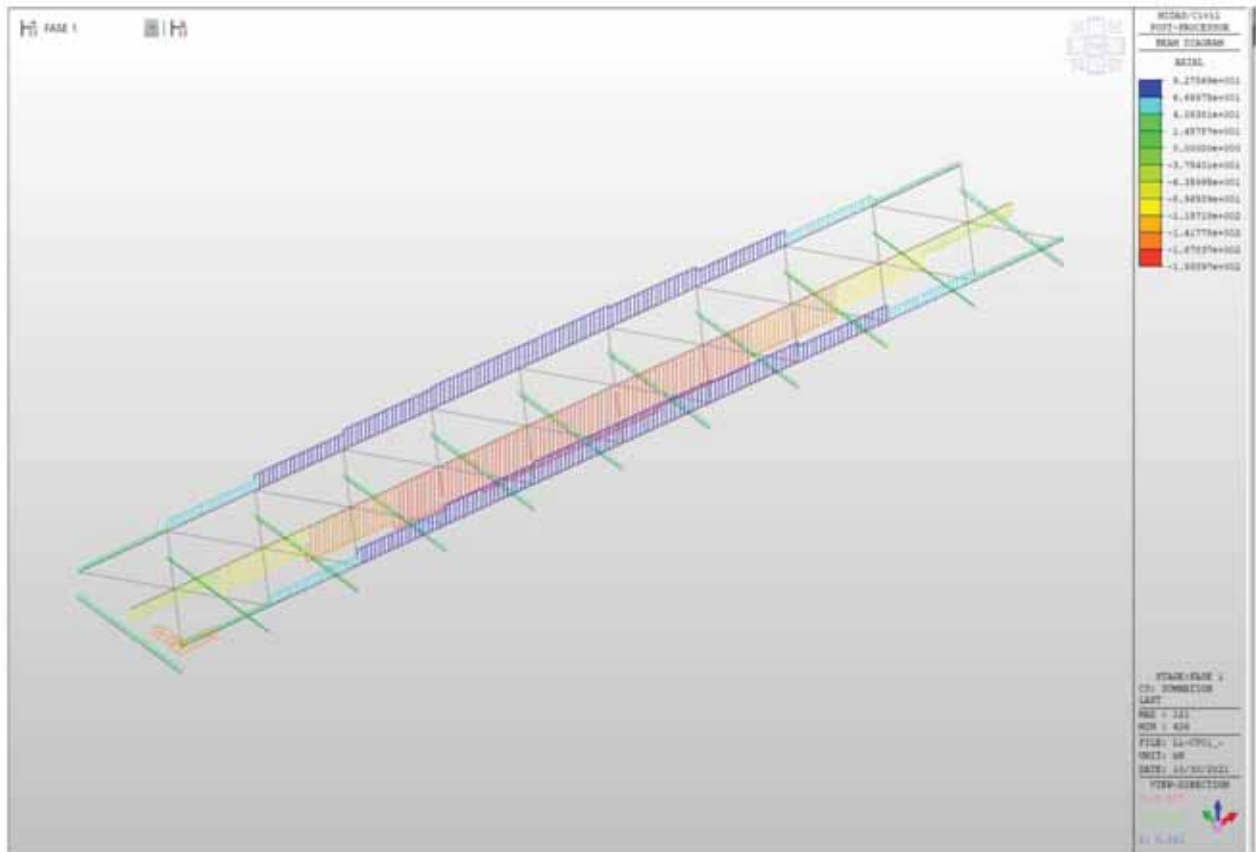


Figura 27 - Diagramma N - Fase 1

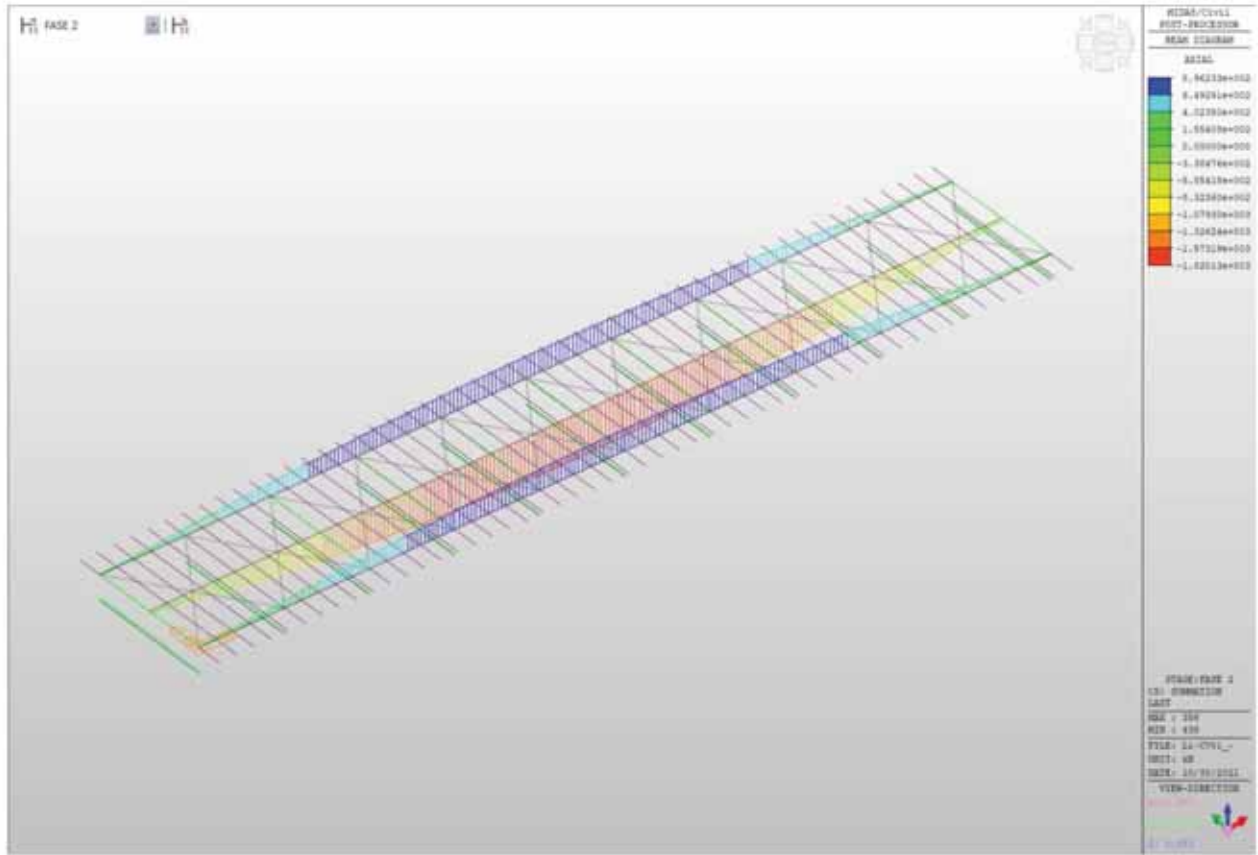


Figura 28 - Diagramma N - Fase 2

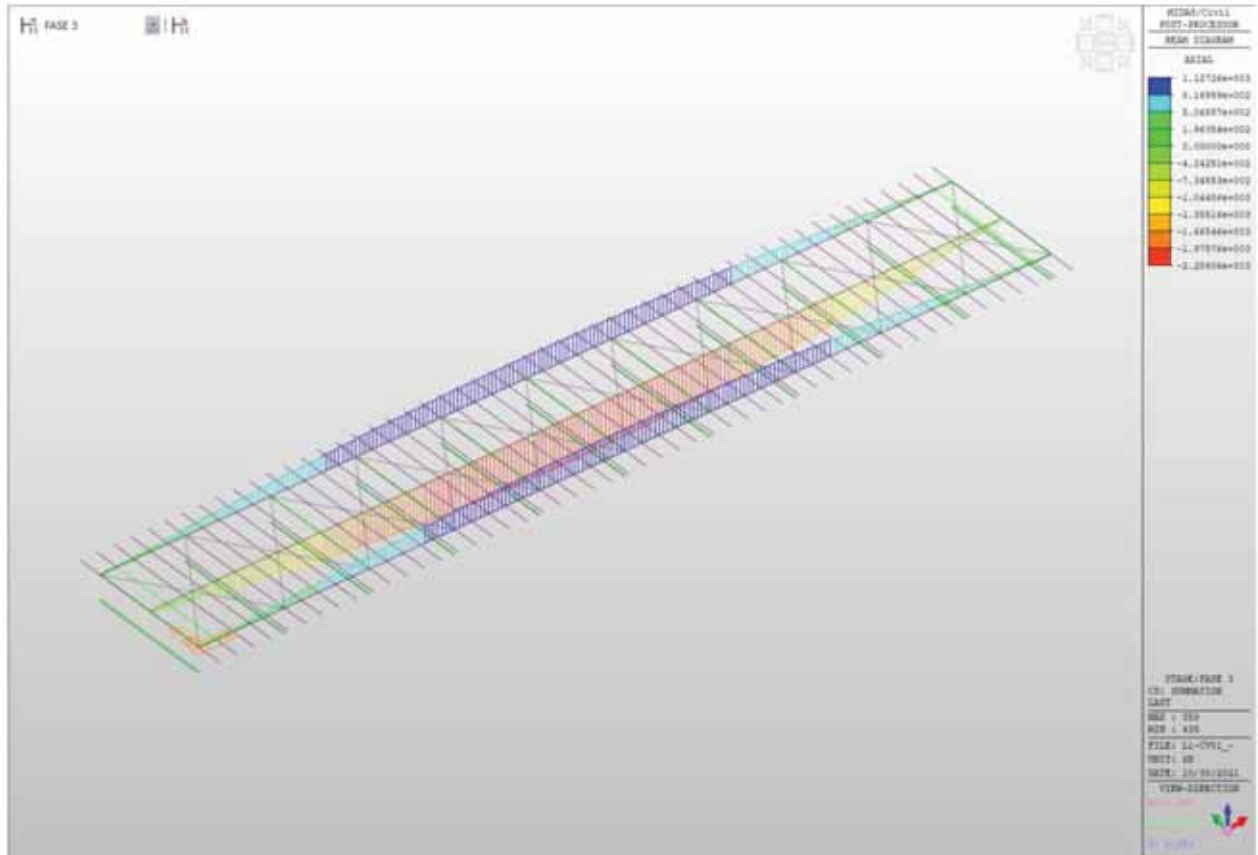


Figura 29 - Diagramma N - Fase 3

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

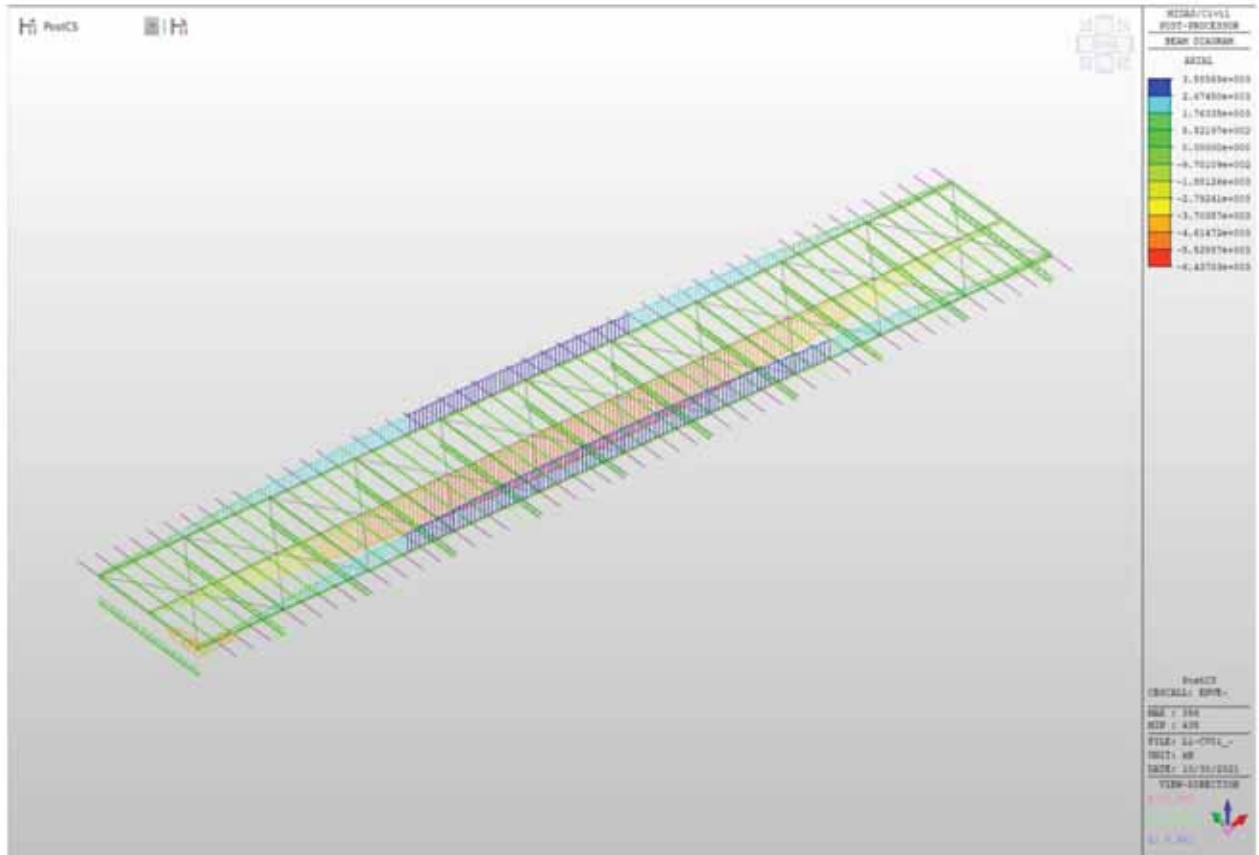


Figura 30 - Diagramma N - Involuppo SLU-SLV

6.2.1.1 TRAVE PRINCIPALE CONCIO 1

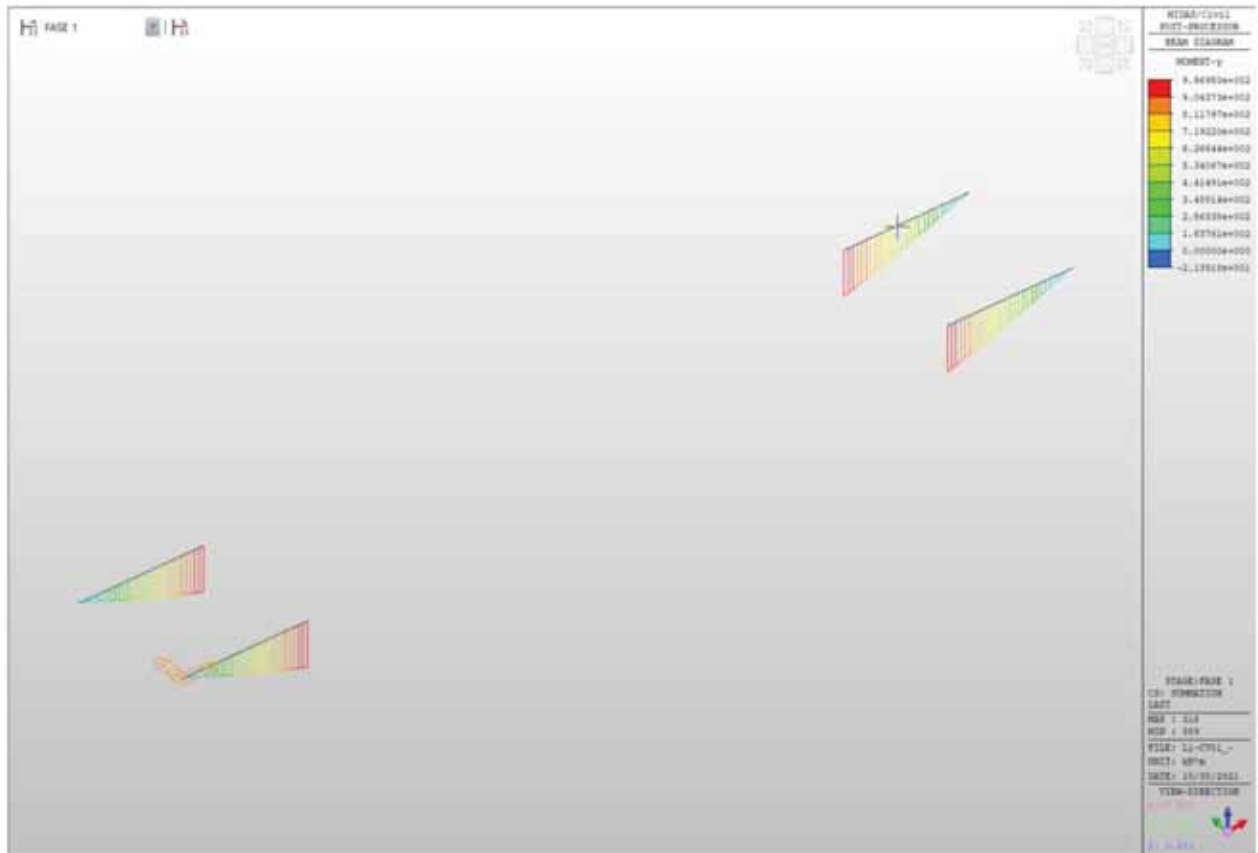


Figura 31 - Concio 1 - Diagramma My - Fase 1

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO



Figura 32 - Concio 1 - Diagramma My - Fase 2

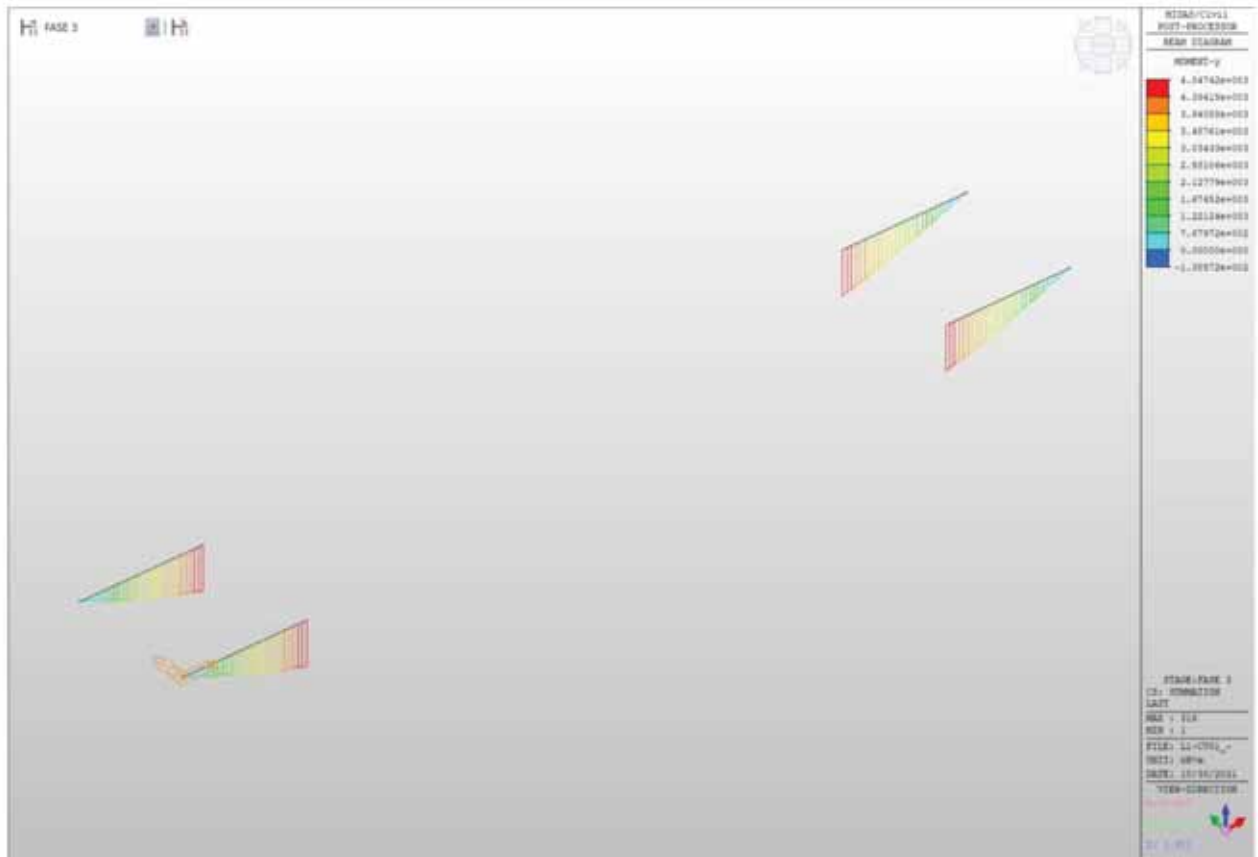


Figura 33 - Concio 1 - Diagramma My - Fase 3

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

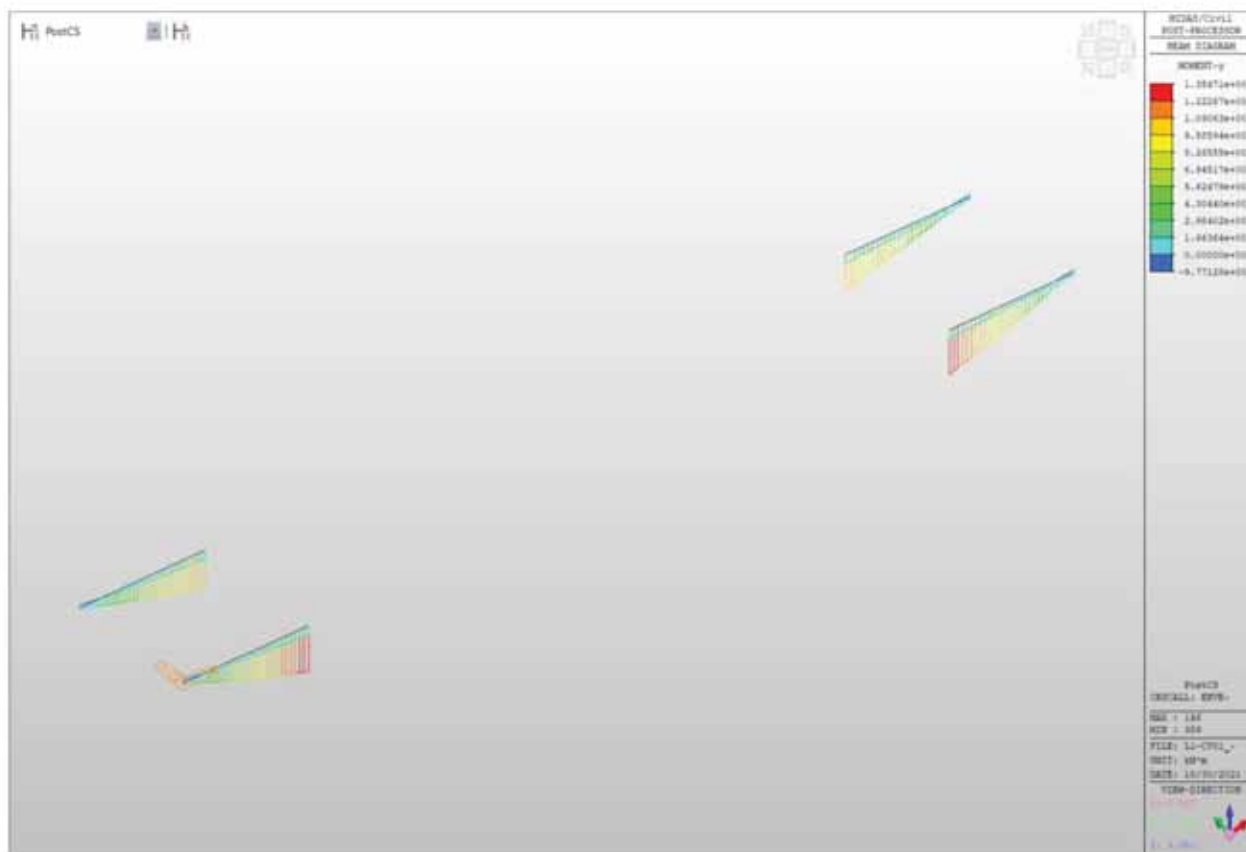


Figura 34 - Concio 1 - Diagramma My - Involuppo SLU-SLV

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

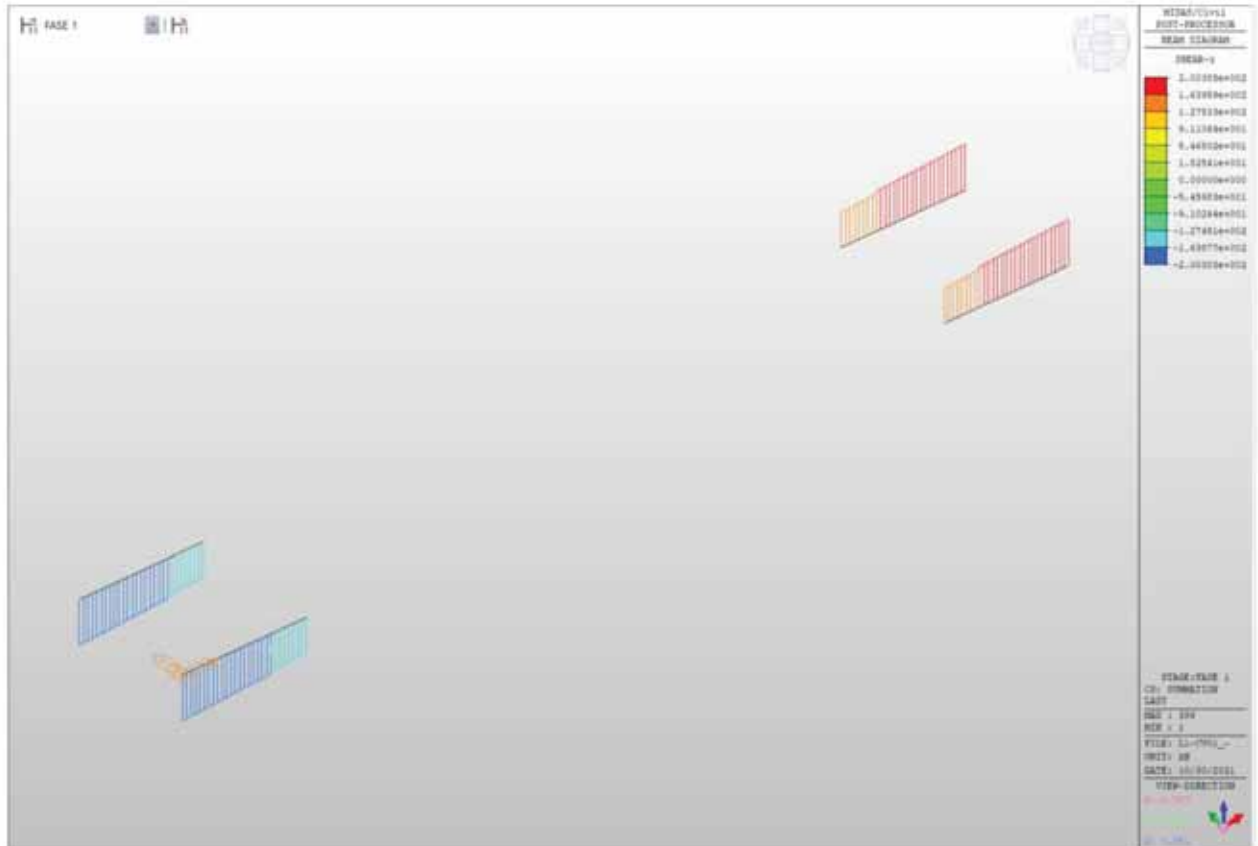


Figura 35 - Concio 1 - Diagramma Tz - Fase 1

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

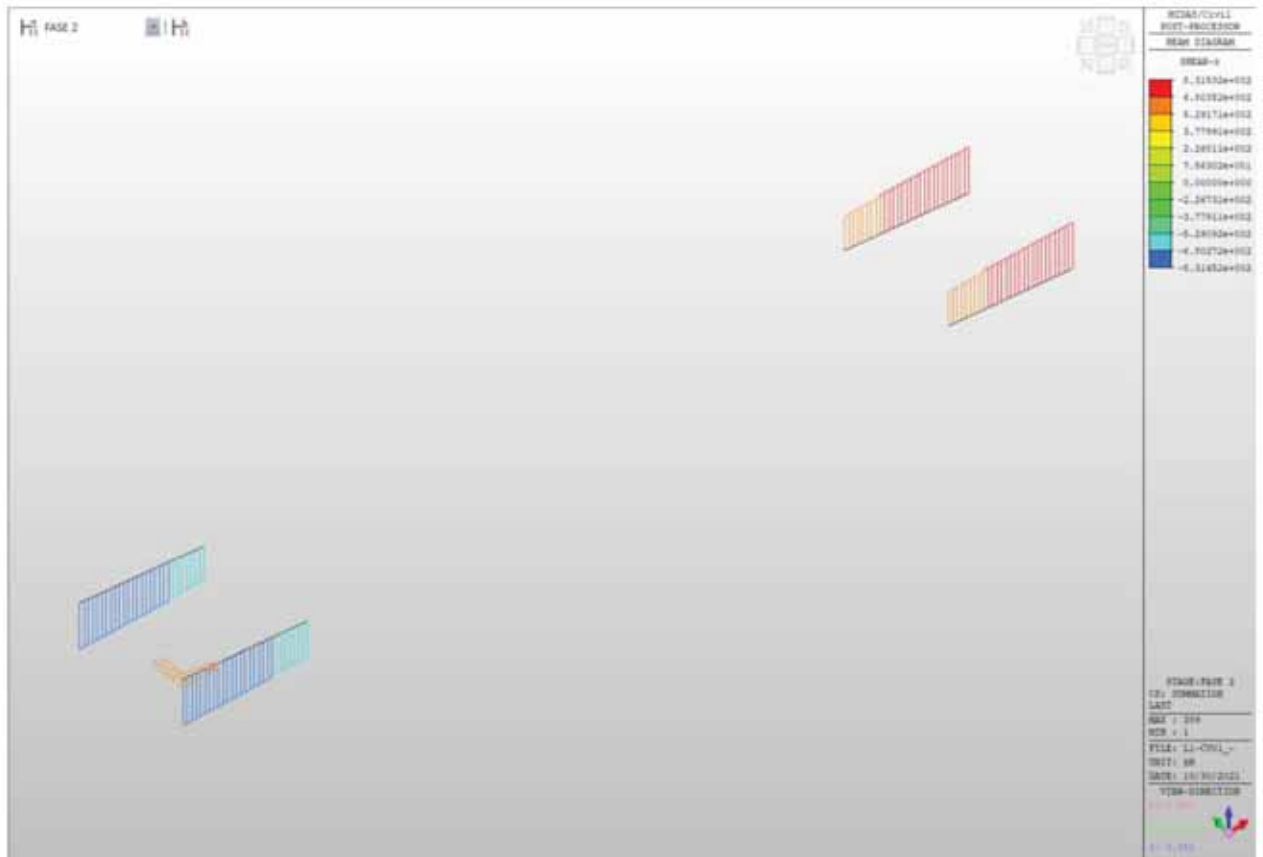


Figura 36 - Concio 1 - Diagramma Tz - Fase 2

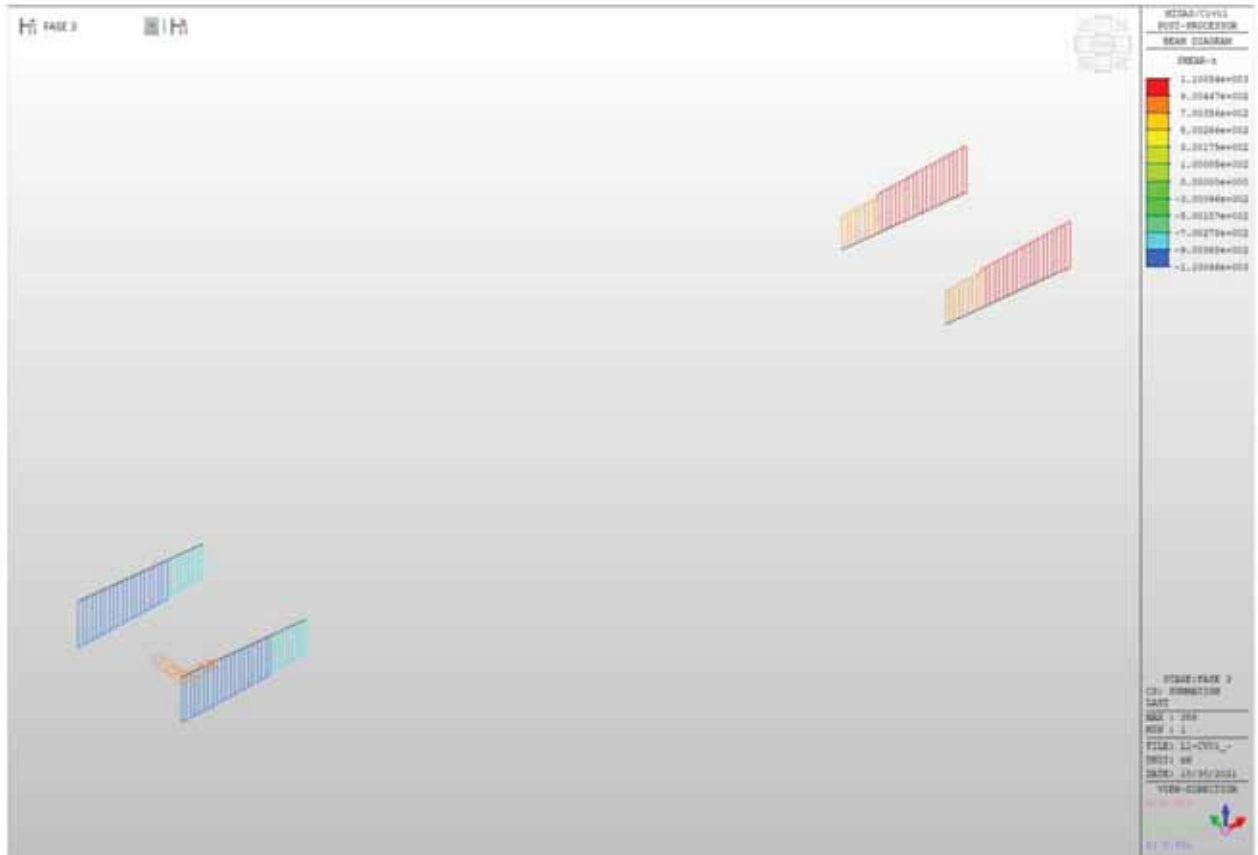


Figura 37 - Concio 1 - Diagramma Tz - Fase 3

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

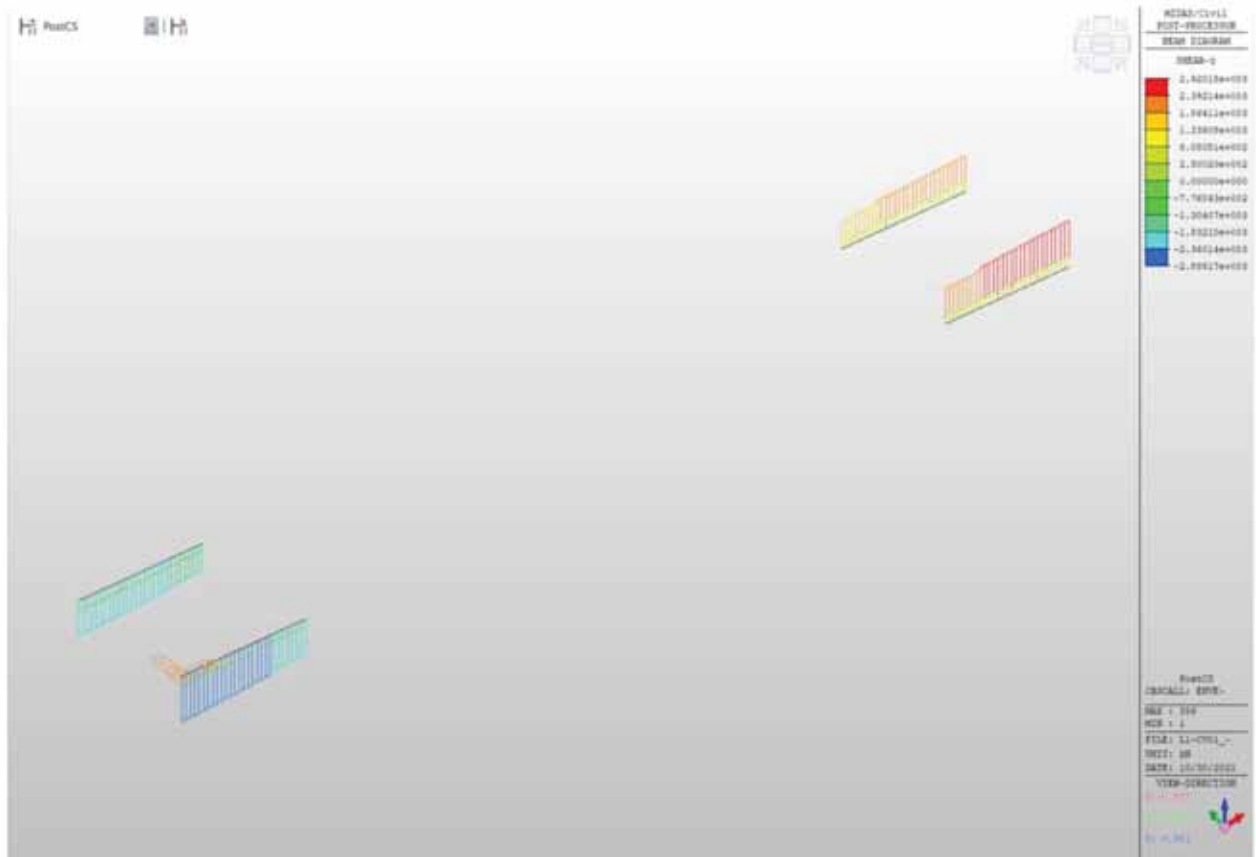


Figura 38 - Concio 1 - Diagramma Tz - Involuppo SLU-SLV

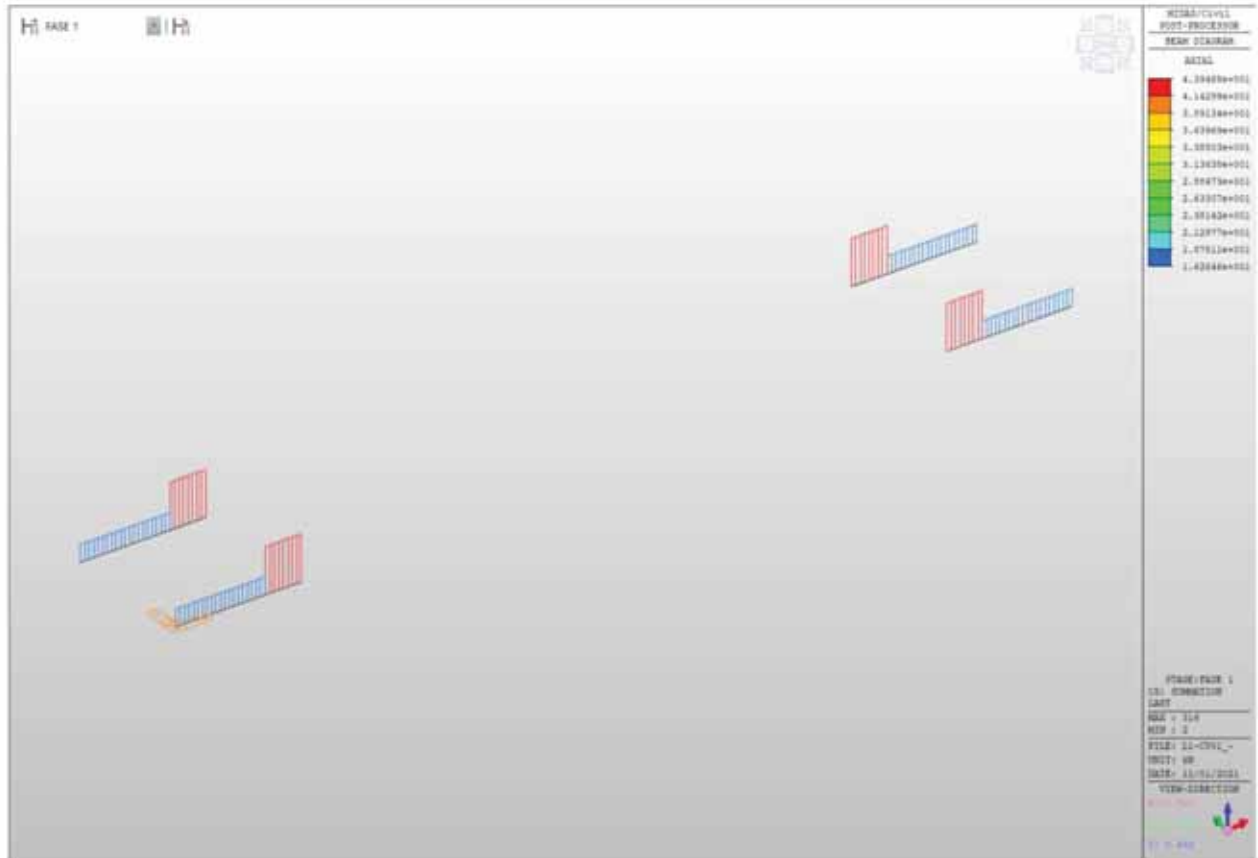


Figura 39 - Concio 1 - Diagramma N - Fase 1

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

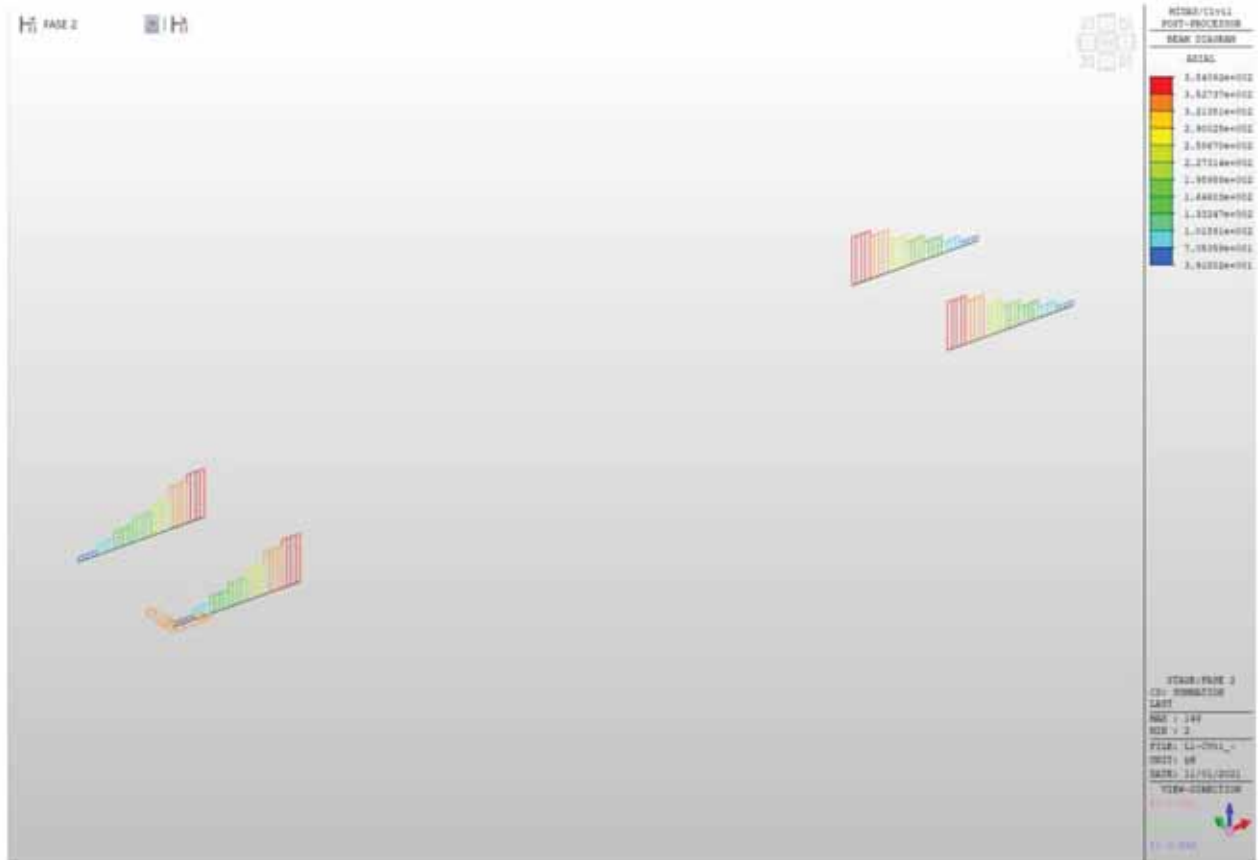


Figura 40 - Concio 1 - Diagramma N - Fase 2



Figura 41 - Concio 1 - Diagramma N - Fase 3

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

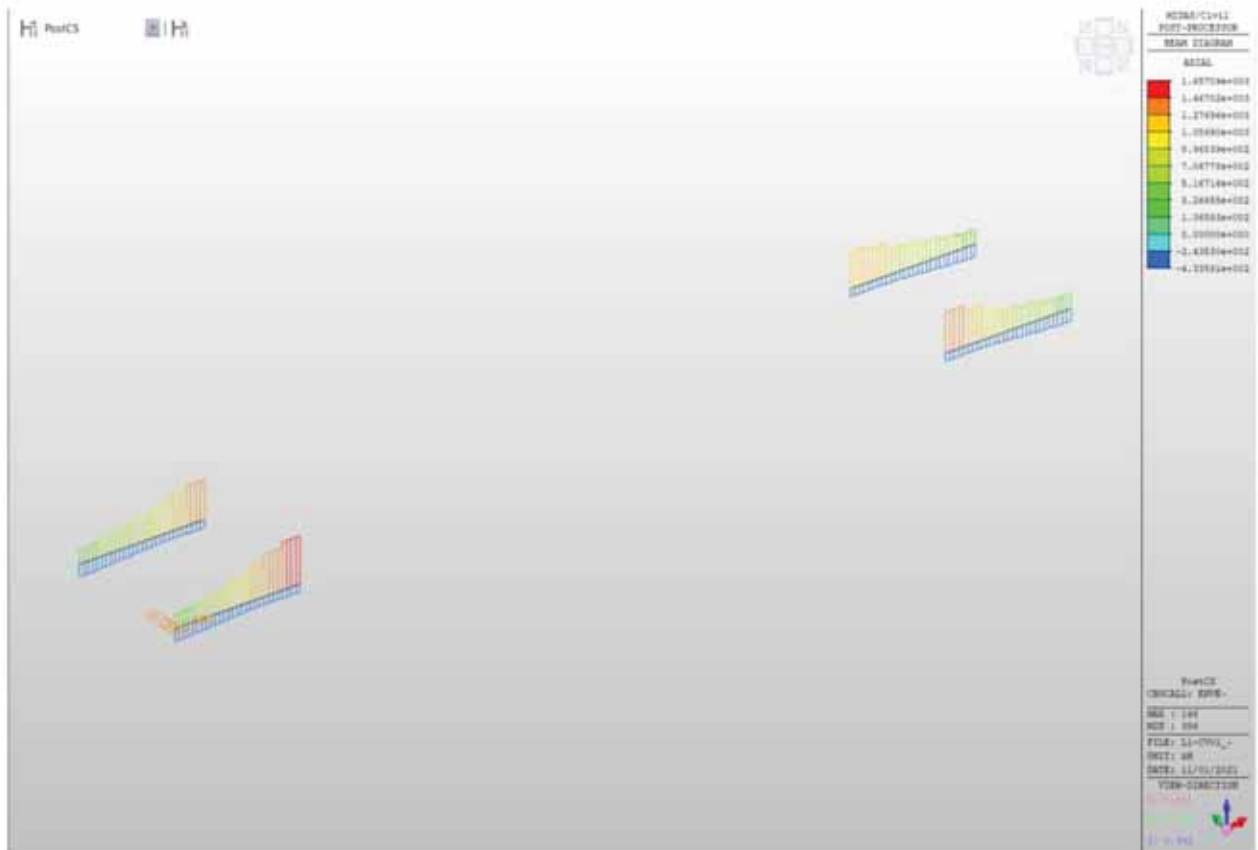
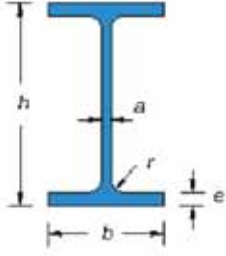


Figura 42 - Concio 1 - Diagramma N - Inviluppo SLU-SLV

VERIFICA SEZIONE IN ACCIAIO COMPOSTA

CARATTERISTICHE PROFILO:

Tipo: <input type="text" value="S355"/>					
B _{sup} =	600	mm		A _{t, sup} =	12000.00 mm ²
t _{r, sup} =	20.0	mm			
B _{inf} =	800	mm		A _{t, inf} =	24000.00 mm ²
t _{r, inf} =	30.0	mm			
H =	2000	mm		A _w =	39000.00 mm ²
t _w = a =	20.0	mm		n. traversi:	1
L =	4100	mm			
A _{TOT} =	75000.00	mm ²			
Y _{G, inf} =	845.80	mm		Y _{G, sup} =	1154.20 mm
J _{yy} =	4.56E+10	mm ⁴		J _t =	14000000 mm ⁴
J _{zz} =	1641333333	mm ⁴		J _o =	1.069E+09 mm ⁶
W _{el, yy, inf} =	53942512	mm ³		W _{el, yy, sup} =	39529178 mm ³
W _{pl, yy} =	53188993	mm ³			
W _{pl, xxx} =	$2 \left[\frac{t_w H^2}{8} + t_f (b - t_w) \frac{H - t_f}{2} + 2r^2 \left(\frac{H}{2} - t_f - r \right) - 2 \frac{\pi r^2}{4} \left(\frac{H}{2} - t_f + r + \frac{4r}{3\pi} \right) \right]$				
ρ _{yy} =	779.95	mm		ρ _{xx} =	$\sqrt{\frac{J_{xx}}{A}}$
ρ _{zz} =	147.93	mm			
Peso =	588.75	kg/m			
E =	210000	N/mm ²	modulo elastico		
ν =	0.3				coeff. poisson
G =	80769	N/mm ²		G =	$\frac{E}{2(1 + \nu)}$ modulo elasticità trasversale
α =	0.000012	°C ⁻¹	coeff. espansione termica lineare		
f _{yk} =	355	N/mm ²	tensione snervamento caratteristica		
f _{tk} =	510	N/mm ²	tensione rottura caratteristica		
γ _{M0} =	1.05		per sezioni classe 1,2,3 e 4		
γ _{M1} =	1.05		per instabilità membrature		
γ _{M1} =	1.10		per instabilità membrature ponti stradali e ferroviari		
γ _{M2} =	1.25		per sezioni tese indebolite dai fori nei riguardi della frattura		

SOLLECITAZIONI:

N _{t, sd} =	0	N	caso per trave tesa
N _{c, sd} =	384090	N	caso per trave compressa
M _{sd} =	3686000000	Nmm	caso per trave inflessa in una direzione
V _{sd} =	831530	N	taglio
Caso per trave a flessione deviata (Momenti flettenti agenti alle estremità M _B < M _A):			
M _B =	0	Nmm	M _A = 3686000000 Nmm
Valori del momento massimo e minimo dell'asta:			
M _{max, y, sd} =	0	Nmm	M _{max, y, sd} = 0 Nmm
M _{max, z, sd} =	0	Nmm	M _{max, z, sd} = 0 Nmm

CLASSE APPARTENENZA PROFILO (NTC2008, 4.2.3.1):					
ALA SUPERIORE		ALA INFERIORE		ANIMA	
$C/t_{f,sup} =$	14.50	$C/t_{f,inf} =$	13.00	3	$C/t_w =$ 97.50
$\varepsilon =$	0.81	$\varepsilon =$	0.81		$\varepsilon =$ 0.81
Curva di instabilità "b" (Asse yy):					
Fattore di imperfezione α :		0.34			
Curva di instabilità "c" (Asse zz):					
Fattore di imperfezione a:		0.49			
SOLLECITAZIONE DELL'ASTA A TAGLIO (NTC2008, 4.2.4.1.2):					
$\frac{V_{sd}}{V_{c,Rd}} \leq 1$					
Area taglio resistente:		$A_v =$	39500	mm ²	
$V_{c,Rd} = \frac{A_v f_{yk}}{\sqrt{3} \gamma_{M0}}$	$V_{c,Rd} =$	7710375	N	\Rightarrow	0.11 OK!(<1)
Verifica in presenza di torsione uniforme:					
$\tau_{t,sd} =$	0	N/mm ²			
$V_{c,Rd,red} = \left[1 - \frac{\tau_{t,sd}}{\frac{f_{yk}}{\sqrt{3} \gamma_{M0}}} \right] V_{c,Rd}$					
$V_{c,Rd,red} =$	7710375	N	\Rightarrow	0.11	OK!(<1)
Verifica in termini tensionali nel punto più sollecitato:					
$\frac{\tau_{sd}}{\frac{f_{yk}}{\sqrt{3} \gamma_{M0}}} \leq 1 \Rightarrow 0.00$ OK!(<1)					

SOLLECITAZIONE DELL'ASTA A COMPRESSIONE SEMPLICE (NTC2008, 4.2.4.1.2):

$$\frac{N_{sd}}{N_{c,Rd}} \leq 1 \quad N_{cr} = \frac{\pi^2 EJ}{(\eta l)^2} \quad 202370925 \quad \text{N} \quad N_{c,sd} < 0,04 N_{cr}$$

Instabilità trascurabile!

0.04 Ncr = 8094837 N **Instabilità trascurabile se $\bar{\lambda} < 0.2$**

Calcolo snellezza membrana (< di 200 per le travature principali e < di 250 per le secondarie):

$$\mu = 1.00 \quad l_0 = \mu l = 4100 \quad \text{mm}$$

$$\lambda = l_0 / \rho = 5$$

Calcolo resistenza per sezioni in classe 1,2 e 3:

$$N_{c,Rd} = \frac{A f_{yk}}{\gamma_{M0}} \quad N_{c,Rd} = 25357143 \quad \text{N} \quad \Rightarrow \quad 0.02 \quad \text{OK! (<1)}$$

STABILITA' DELLE MEMBRATURE (NTC2008, 4.2.4.1.3):

Curva di instabilità "b" (Asse yy):

Fattore di imperfezione α : 0.49

Verifica per sezioni classe 1,2 e 3:

$$\bar{\lambda} = \sqrt{\frac{A f_{yk}}{N_{cr}}} \quad 0.36 \quad \bar{\lambda} > 0.2$$

Serve verifica instabilità!

$$\Phi = 0.5 \left[1 + \alpha(\bar{\lambda} - 0.2) + \bar{\lambda}^2 \right] \quad 0.61$$

$$\chi = \frac{1}{\Phi + \sqrt{\Phi^2 - \bar{\lambda}^2}} \quad 0.92$$

$$N_{b,Rd} = \frac{\chi A f_{yk}}{\gamma_{M1}} \quad 22192368 \quad \text{N}$$

$$\frac{N_{c,sd}}{N_{b,Rd}} \leq 1 \quad \Rightarrow \quad 0.02 \quad \text{OK! (<1)}$$

SOLLECITAZIONE DELL'ASTA A FLESSIONE MONOASSIALE RETTA (NTC2008, 4.2.4.1.2):

$$\frac{M_{sd}}{M_{c,Rd}} \leq 1$$

$$V_{sd} < 0,5 V_{c,Rd}$$

Il taglio non influisce sulla verifica a flessione!

$$\rho = \left[\frac{2V_{sd}}{V_{c,Rd}} - 1 \right]^2$$

0.61514

$$f_{y,red} = (1 - \rho)f_{yk}$$

137 N/mm²

$$f_{yk} =$$

355 N/mm²

Calcolo resistenza elastica sezione lorda, classe 3:

$$M_{el,Rd} = \frac{W_{el,min} f_{yk}}{\gamma_{M0}}$$

$M_{c,Rd} = 18237706578$

Nmm

=>

0.20

OK!(<1)

n. fori = 0

diametro = 0 mm

$$\frac{0,9 A_{f,net} f_{tk}}{\gamma_{M2}} \geq \frac{A_f f_{yk}}{\gamma_{M0}}$$

Non serve la verifica per la presenza dei fori!

TRAVI INFLESSE (NTC2008, 4.2.4.1.3.2):

Calcolo snellezza membrana (< di 200 per le travature principali e < di 250 per le secondarie):

$$\mu = 0.70$$

$$L_{cr} = L / \mu = 2870 \text{ mm}$$

$$W_{yy} = 53942512 \text{ mm}^3$$

$$W_{yy} = 39529178 \text{ mm}^3$$

$$\psi = 1.75 - 1.05 \frac{M_B}{M_A} + 0.3 \left(\frac{M_B}{M_A} \right)^2$$

1.75

$$M_{cr} = \psi \frac{\pi}{L_{cr}} \sqrt{E J_y G J_T} \sqrt{1 + \left(\frac{\pi}{L_{cr}} \right)^2 \frac{E J_{\omega}}{G J_T}}$$

1.994E+11

Nmm

0.018

$$M_{sd} / M_{cr} = 0.018$$

Risulta < 0.16 Non serve la verifica instabilità

$$\bar{\lambda}_{LT} = \sqrt{\frac{W_y f_{yk}}{M_{cr}}}$$

0.27

Risulta < 0.4 Non serve la verifica instabilità

Stabilità dei pannelli soggetti a taglio (NTC2008, 4.2.4.1.3.4.1):

Se irrigiditori trasversali rigido o no,

$$I_{st} = 45000000 \text{ mm}^4 \quad 0.75hwt^3 = 5710886 \text{ mm}^4 \quad \text{Irrigiditore Trasversali rigidi}$$

Coefficiente minimo di instabilità per taglio del pannello (In assenza di irrigiditori longitudinali),

$$a/hw = 2.05 \quad k_{\tau} = 7.29$$

Coefficiente minimo di instabilità per taglio del pannello (irrigiditori longitudinali più di due o $a/hw > 3$),

$$I_{sl} = 0 \text{ mm}^4 \quad k_{\tau l} = 0.00$$

$$a/hw = 2.05 \quad k_{\tau} = 7.29$$

Coefficiente minimo di instabilità per taglio del pannello (irrigiditori longitudinali più di due o $a/hw < 3$),

$$I_{sl} = 0 \text{ mm}^4 \quad a/hw = 2.05 \quad k_{\tau} = 5.60$$

$$k_{\tau} = 7.29$$

$$\eta = 1.2 \quad hw/t = 97.50 \quad \text{Serve la verifica di instabilità}$$

$$\sigma_E = 19 \text{ MPa} \quad \tau_{cr} = 138.53 \quad \lambda_w = 1.22$$

Montanti di appoggio rigidi,

$$\chi_w = 0.71$$

Gli altri casi,

$$\chi_w = 0.68$$

$$V_{bw,Rd} = 5326791 \text{ N}$$

Momento resistente sole piattabande,

$$Y_{G,inf} = 673.33 \text{ mm} \quad Y_{G,sup} = 1326.67 \text{ mm}$$

$$J_{yy} = 31207200000 \text{ mm}^4$$

$$W_{el,yy,inf} = 46347327 \text{ mm}^3 \quad W_{el,yy,sup} = 23523015 \text{ mm}^3$$

$$M_{t,red} = 7702048414 \text{ Nmm}$$

$$bf = 243 \text{ mm}$$

$$V_{bf,Rd} = 16589 \text{ N}$$

$$V_{b,Rd} = 5343379 \text{ N} \quad 0.156 \quad \text{OK! (<1)}$$

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

Stabilità dei pannelli soggetti a Compressione (NTC2008, 4.2.4.1.3.4.1):					
Stress,					
σ_{sup} =	93.25	MPa			
σ_{inf} =	-68.33	MPa			
σ_{int} =	52.04	MPa			
Irrigidati su entrambi i lati (Anima),					
b =	1950.0	mm	(Web bw)	a =	4100 mm
σ_1 =	93.2	(Max)		σ_2 =	-68.33 (Min)
ψ =	-0.7			$k\sigma$ =	17.67
λ_p =	1.0			ρ =	0.99
$\sigma_{cr,p}$ =	353.2	MPa		$\sigma_{cr,c}$ =	4.516 MPa
ζ =	1.0			λ_c =	8.866
α =	0.34			Φ =	116.298
χ_c =	0.004				
ρ_c =	0.99				
b_{eff} =	1116.14	mm	b_{e1} =	446.45 mm	b_{e2} = 669.68 mm
b_t =	824.66	mm			
Irrigidati a un lato (Piattebande),					
Piattebanda Superiore,					
b =	290	mm	(Flange Sup)		
σ (Irr.) =	93.2			σ (Lib.) =	93.25
$k\sigma$ =	0.43				
λ_p =	1.0			ρ =	0.84
b_{eff} =	242.69	mm		b_t =	0 mm
Effective Section Properties,					
$A_{c,eff}$ (Piattebanda Sup) =	9707.6	mm ²			
$A_{c,eff}$ (Piattebanda Inf) =	24000.0	mm ²			
$A_{c,eff}$ (Anima) =	22322.7	mm ²			
A_c (Anima tensione) =	16493.1	mm ²			
$A_{c,eff}$ (Total) =	72523.4	mm ²			
$Y_{g,inf}$ =	807.9	mm		$Y_{g,sup}$ =	1192.1 mm
I_{eff} =	4.36E+10	mm ⁴			
W_{eff} (inf) =	53906793	mm ³		W_{eff} (sup) =	36533044 mm ³
e =	37.90	mm			
η =	0.30				

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

Fase 2

Soletta c.a.collaborante

b_{eff} =	2.84	m
Altezza soletta:	0.26	m
Area soletta:	0.74	m ²
J_{yy} =	0.00416	m ⁴
Peso =	18.46	kN/m

Trave acciaio

Area trave acciaio:	0.075	m ²
H trave acciaio:	2.00	m
Y_G =	0.846	m
J_{yy} =	0.045625	m ⁴
Peso =	5.89	kN/m

Barre armatura soletta

1° strato barre (superiore)		2° strato barre (inferiore)	
n. Barre:	14	n. Barre:	14
interasse:	0.20 m	interasse:	0.20 m
Diametro:	0.02 m	Diametro:	0.02 m
Area:	0.004398 m ²	Area:	0.004398 m ²
Y_1 =	0.05 m	Y_2 =	0.21 m

n = 18.0

Coeff. omogeneizzazione con viscosità in atto

Materiali

cls	Barre armature	Acciaio
R_{ck} = 40 MPa	f_{yk} = 450 MPa	f_{yk} = 355 MPa
f_{ck} = 33.20 MPa	γ_M = 1.15	γ_{M0} = 1.05
f_{cd} = 18.81 MPa	$f_{ytd,s}$ = 391.30 MPa	$f_{ytd,a}$ = 338.10 MPa
f_{cm} = 41.2 MPa		
f_{tdm} = 3.10 MPa		
E_{cm} = 33643 MPa		

Caratteristiche geometriche

A_{id} =	0.1248	m ²	Area sezione omogeneizzata in area di acciaio
A_v =	39500	mm ²	Area taglio sezione di acciaio
$Y_{G,inf,id}$ =	1.36	m	Asse neutro rispetto lembo inferiore:
$Y_{G,sup,id}$ =	0.90	m	Asse neutro rispetto lembo superiore
$J_{ax,id}$ =	0.095279	m ⁴	Momento d'inerzia sezione omogeneizzata ad acciaio
$W_{inf,id}$ =	0.070143	m ³	Modulo elastico sezione omogeneizzata ad acciaio
$W_{sup,id}$ =	0.105673	m ³	Modulo elastico sezione omogeneizzata ad acciaio

Sollecitazioni

M_{sd} =	4847.42	kNm	(SLU)	
M_{ed} =	23714.95	kNm	=>	0.20 ok!
T_{sd} =	1100.54	kN	(SLU)	
T_{ed} =	7343.21	kN	=>	0.15 ok!

Tensioni

σ_c =	2.55	MPa	=>	0.14 ok!(<1)	Tensione al lembo superiore soletta
$\sigma_{s,sup}$ =	43.33	MPa	=>	0.11 ok!(<1)	Tensione barre superiori soletta
$\sigma_{s,inf}$ =	35.19	MPa	=>	0.09 ok!(<1)	Tensione barre inferiori soletta
$\sigma_{a,sup}$ =	32.64	MPa	=>	0.10 ok!(<1)	Tensione acciaio lembo superiore
$\sigma_{a,inf}$ =	69.11	MPa	=>	0.20 ok!(<1)	Tensione acciaio lembo inferiore

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

Fase 3

Soletta c.a.collaborante

b_{eff}	=	2.84	m
Altezza soletta:		0.26	m
Area soletta:		0.74	m ²
J_{xx}	=	0.00416	m ⁴
Peso	=	18.46	kN/m

Trave acciaio

Area trave acciaio:		0.075	m ²
H trave acciaio:		2.00	m
y_c	=	0.846	m
J_{xx}	=	0.045625	m ⁴
Peso	=	5.89	kN/m

Barre armatura soletta

1° strato barre (superiore)		2° strato barre (inferiore)	
n. Barre:	14	n. Barre:	14
Interasse:	0.20 m	Interasse:	0.20 m
Diametro:	0.02 m	Diametro:	0.02 m
Area:	0.004398 m ²	Area:	0.004398 m ²
y_1	= 0.05 m	y_2	= 0.21 m

$n = 5.2$ Coeff. omogeneizzazione a tempo infinito

Materiali

cls	Barre armature	Acciaio
$R_{ck} = 40$ MPa	$f_{yk} = 450$ MPa	$f_{yk} = 355$ MPa
$f_{ck} = 33.20$ MPa	$\gamma_M = 1.15$	$\gamma_{M0} = 1.05$
$f_{cd} = 18.81$ MPa	$f_{yk,d} = 391.30$ MPa	$f_{yk,d} = 338.10$ MPa
$f_{cm} = 41.2$ MPa		
$f_{ctm} = 3.10$ MPa		
$E_{cm} = 33643$ MPa		

Caratteristiche geometriche

$A_{s,d}$	=	0.2029	m ²	Area sezione omogeneizzata in area di acciaio
A_s	=	39500	mm ²	Area taglio sezione di acciaio
$y_{c,i,n,d}$	=	1.66	m	Asse neutro rispetto lembo inferiore:
$y_{c,s,i,n,d}$	=	0.60	m	Asse neutro rispetto lembo superiore
$J_{s,i,n,d}$	=	0.124318	m ⁴	Momento d'inerzia sezione omogeneizzata ad acciaio
$W_{i,n,d}$	=	0.075103	m ³	Modulo elastico sezione omogeneizzata ad acciaio
$W_{s,i,n,d}$	=	0.205584	m ³	Modulo elastico sezione omogeneizzata ad acciaio

Sollecitazioni

$M_{s,d}$	=	13547.10	kNm	(SLU)	
$M_{i,d}$	=	25392.09	kNm	=>	0.53 ok!
$T_{s,d}$	=	2920.18	kN	(SLU)	
$T_{i,d}$	=	7343.21	kN	=>	0.40 ok!

Tensioni

σ_c	=	10.63	MPa	=>	0.56 ok!(<1)	Tensione al lembo superiore soletta
$\sigma_{s,i,n,d}$	=	60.45	MPa	=>	0.15 ok!(<1)	Tensione barre superiori soletta
$\sigma_{s,s,i,n,d}$	=	43.01	MPa	=>	0.11 ok!(<1)	Tensione barre inferiori soletta
$\sigma_{a,s,i,n,d}$	=	37.56	MPa	=>	0.11 ok!(<1)	Tensione acciaio lembo superiore
$\sigma_{a,i,n,d}$	=	180.38	MPa	=>	0.53 ok!(<1)	Tensione acciaio lembo inferiore

6.2.1.2 TRAVE PRINCIPALE CONCIO 2

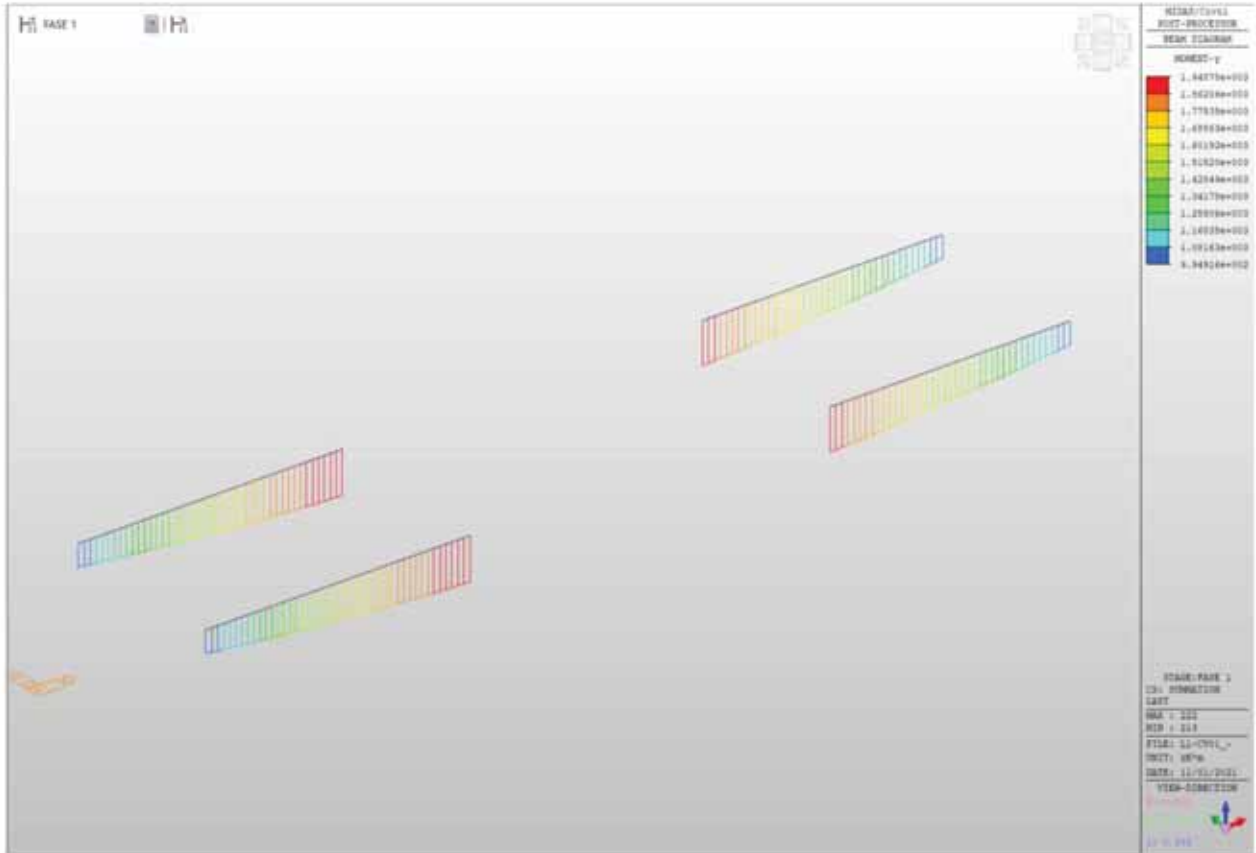


Figura 43 - Concio 2 - Diagramma My - Fase 1

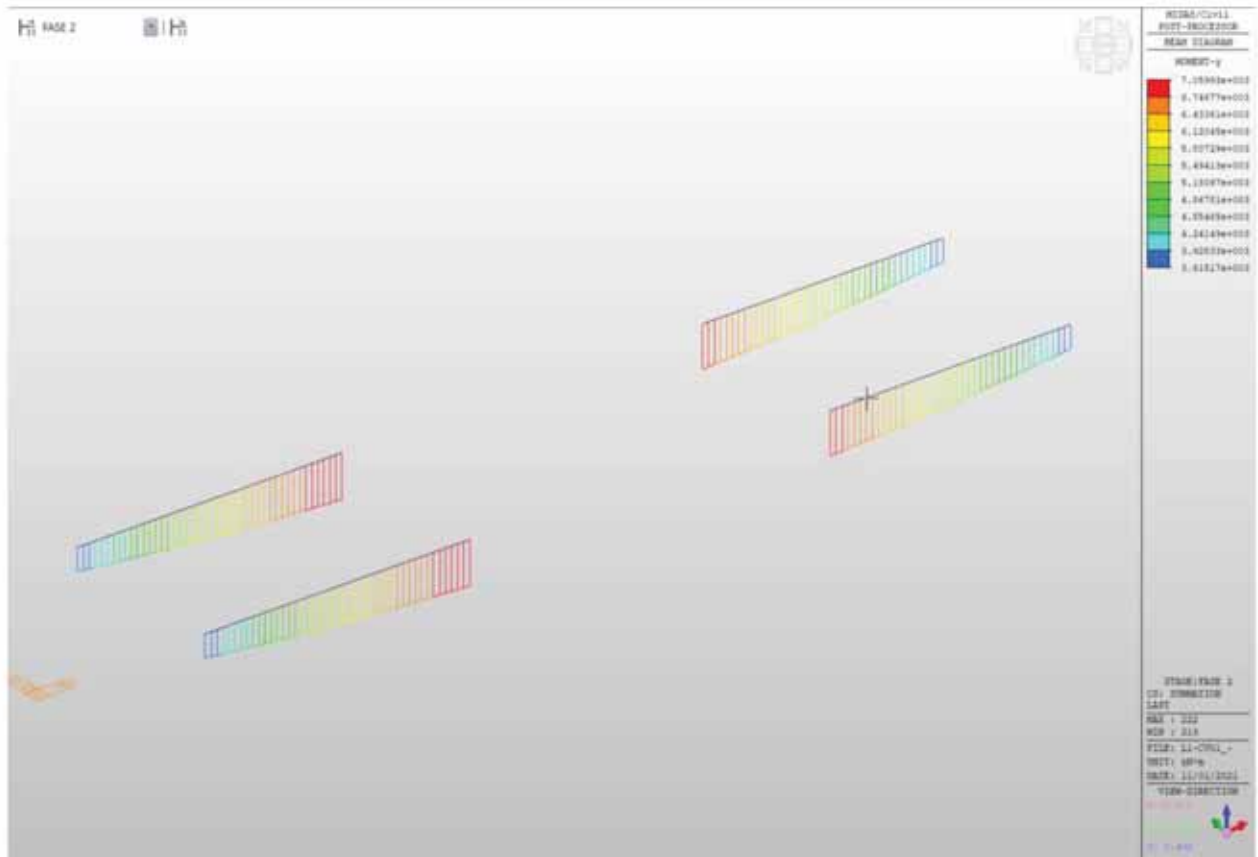


Figura 44 - Concio 2 - Diagramma My - Fase 2

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

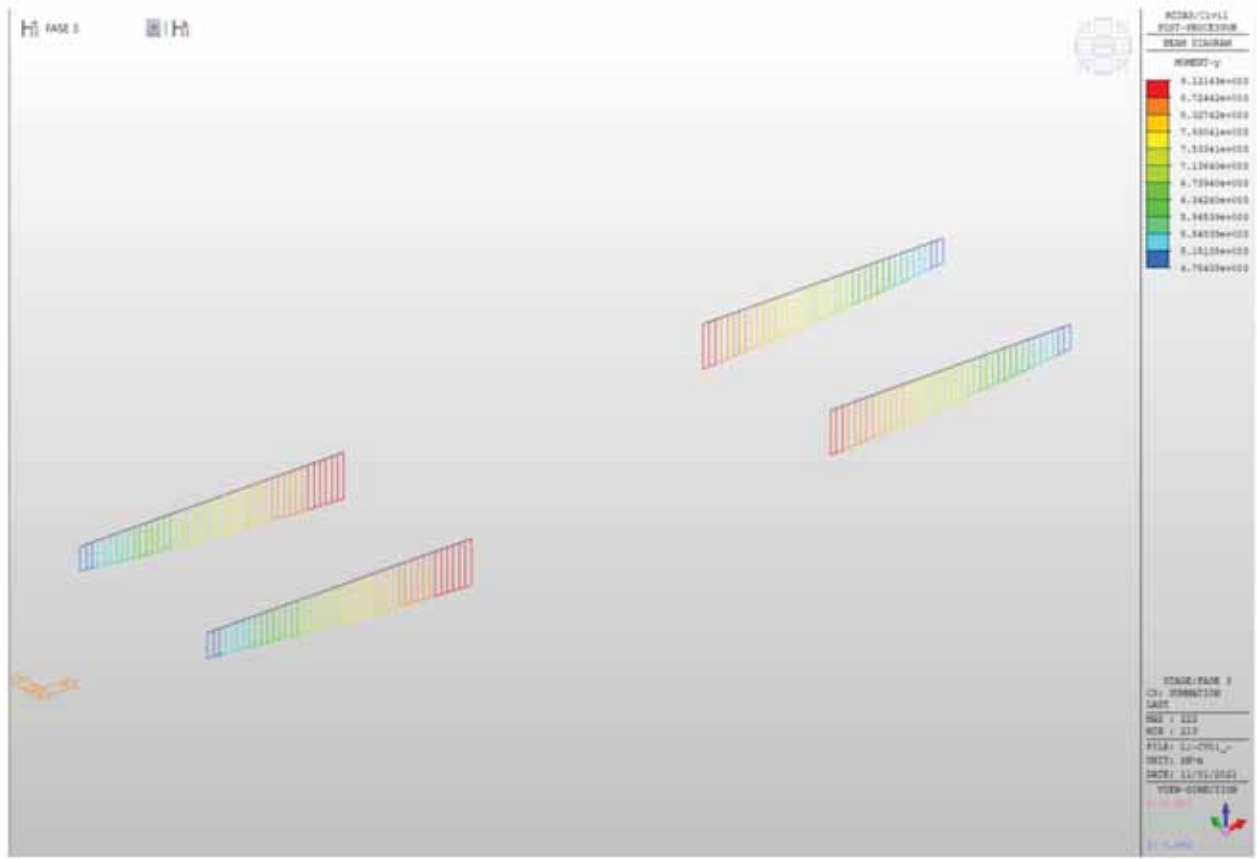


Figura 45 - Concio 2 - Diagramma My - Fase 3

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO



Figura 46 - Concio 2 - Diagramma My - Involuppo SLU-SLV

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

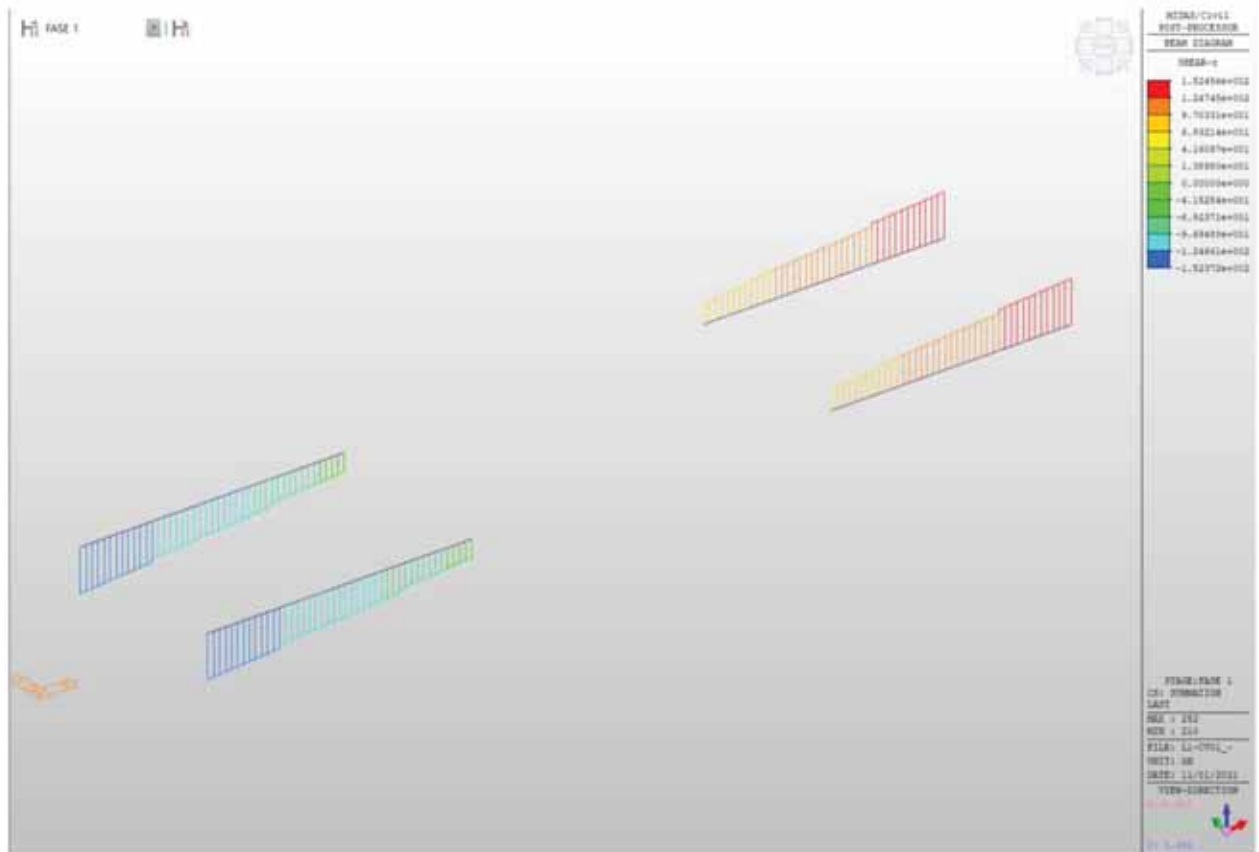


Figura 47 - Concio 2 - Diagramma Tz - Fase 1

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

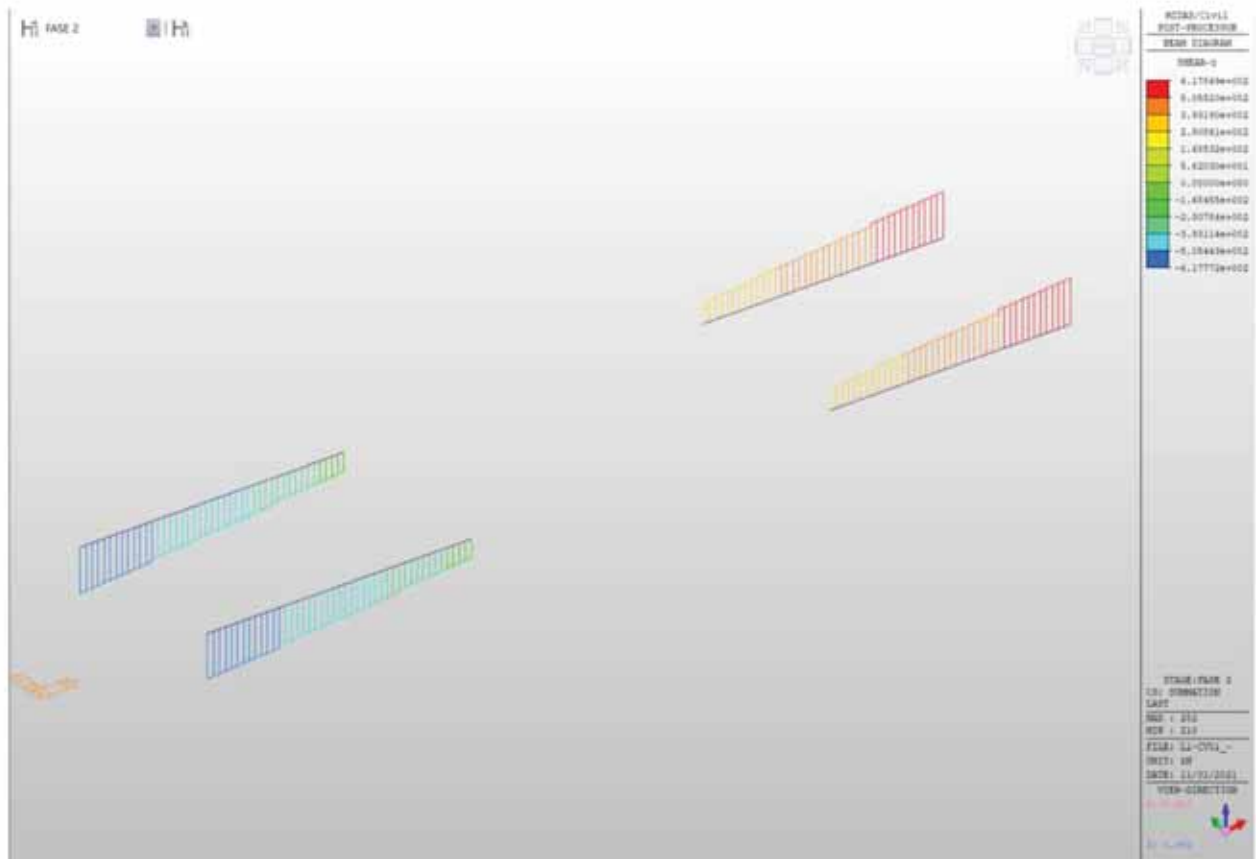


Figura 48 - Concio 2 - Diagramma Tz - Fase 2

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

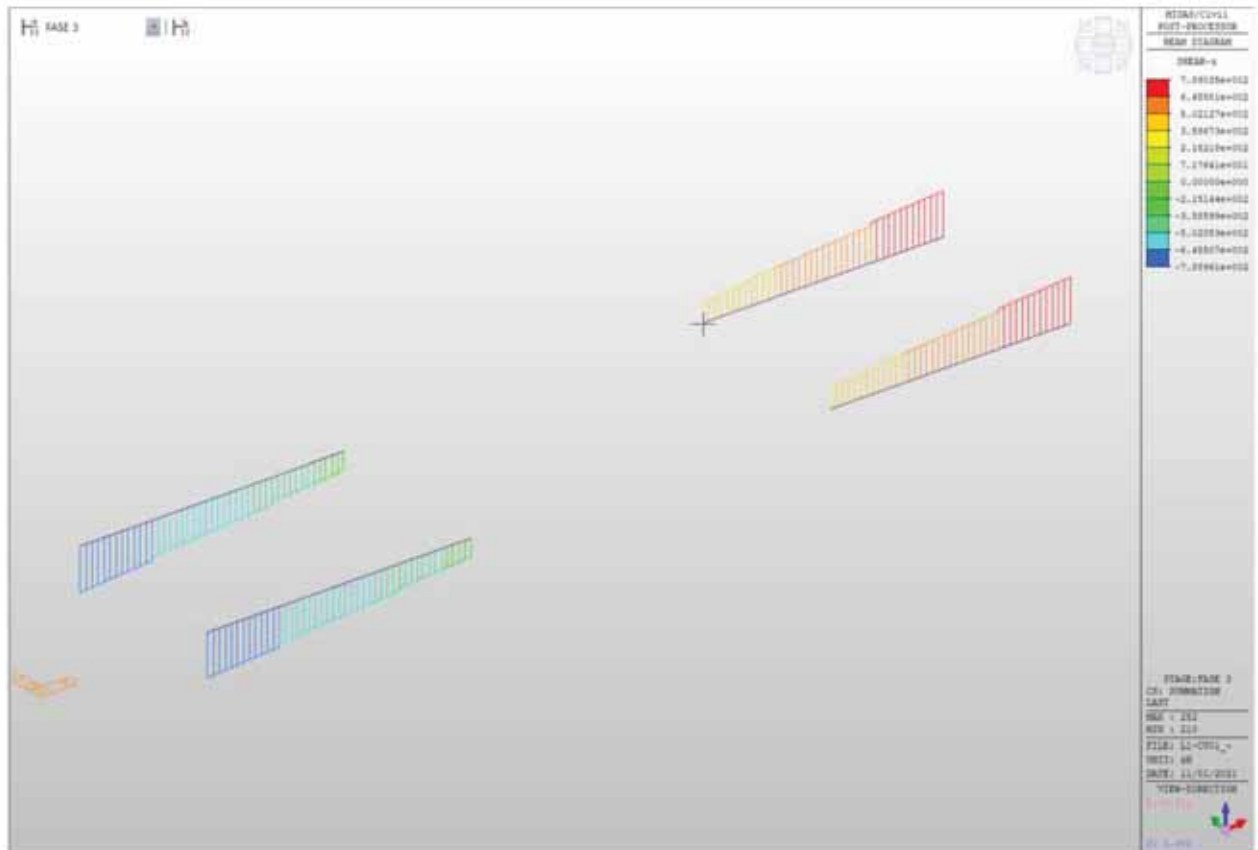


Figura 49 - Concio 2 - Diagramma Tz - Fase 3

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

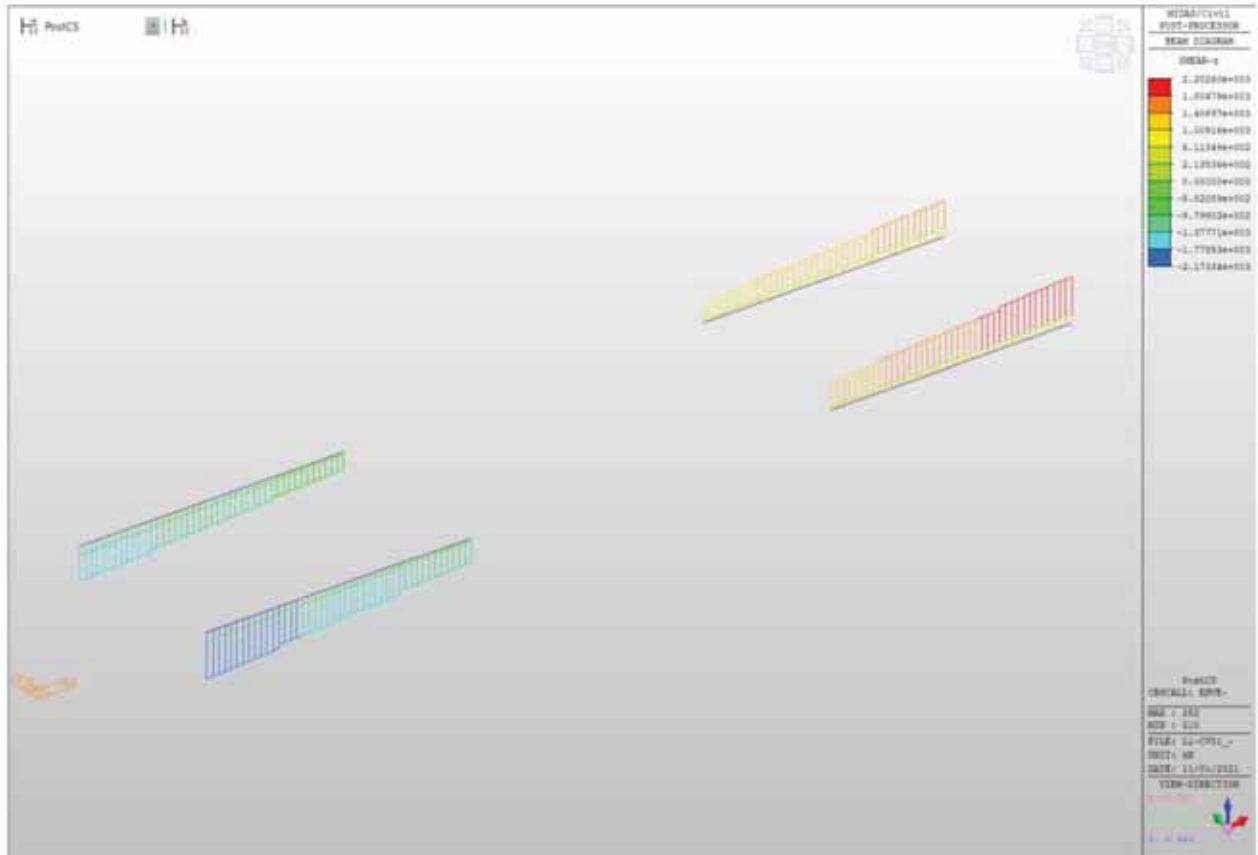


Figura 50 - Concio 2 - Diagramma Tz - Involuppo SLU-SLV

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

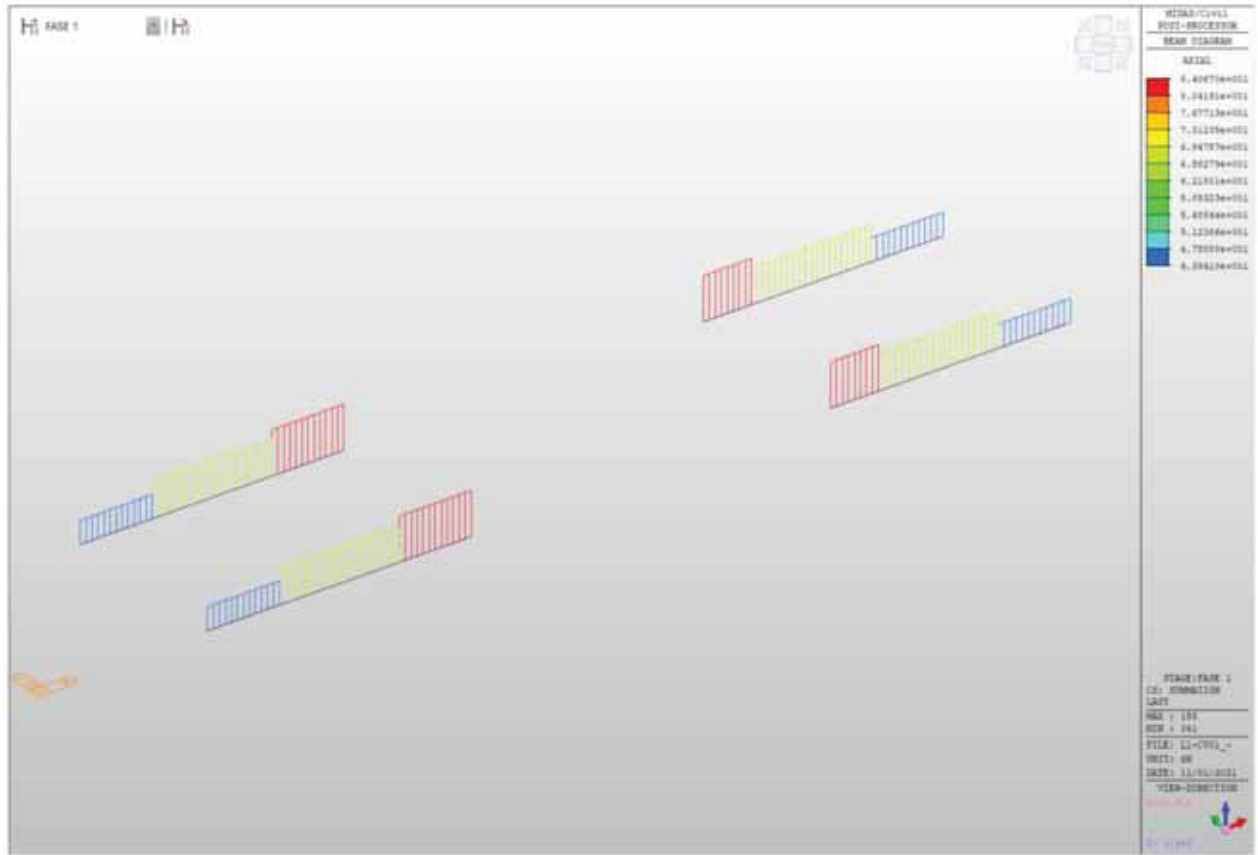


Figura 51 - Concio 2 - Diagramma N - Fase 1

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

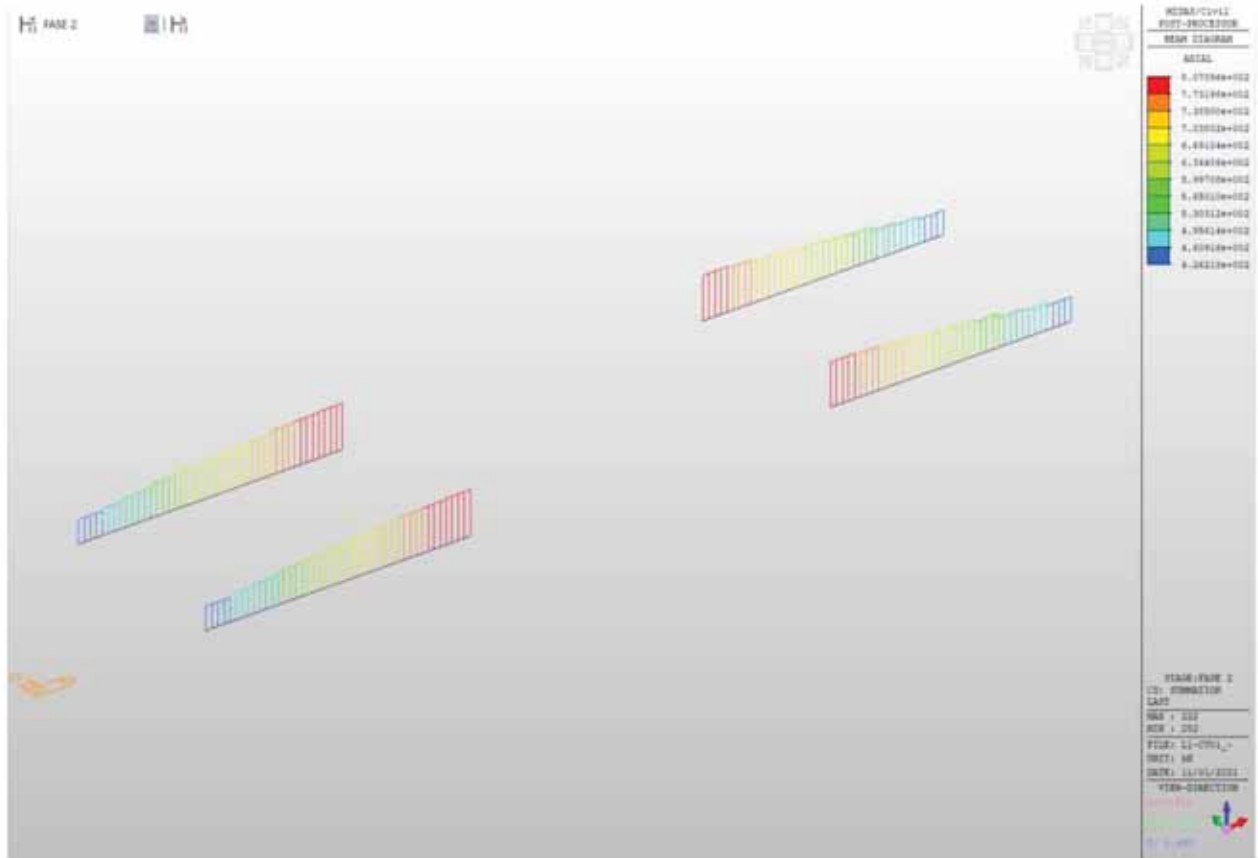


Figura 52 - Concio 2 - Diagramma N - Fase 2



Figura 53 - Concio 2 - Diagramma N - Fase 3

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

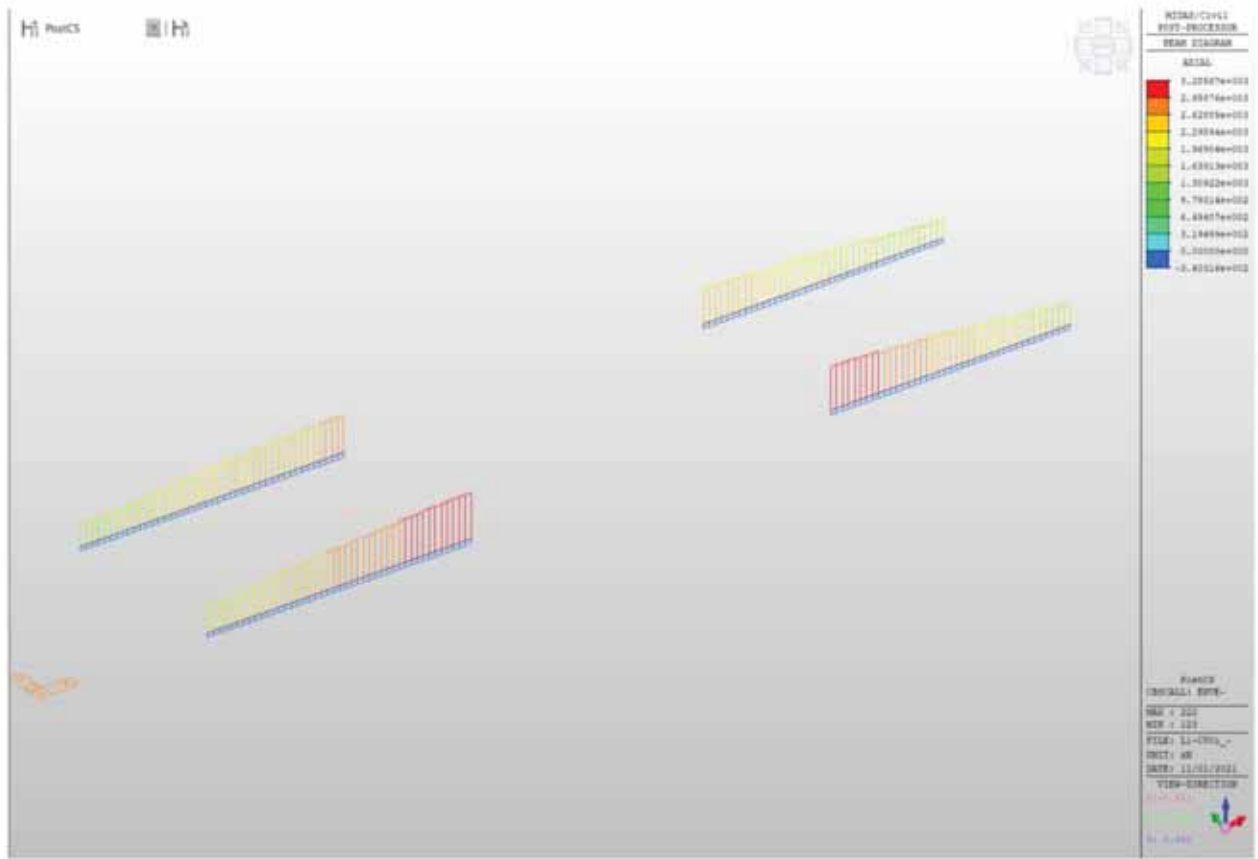
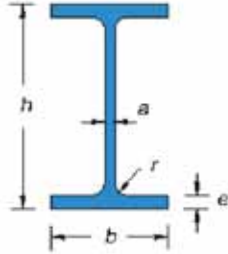


Figura 54 - Concio 2 - Diagramma N - Inviluppo SLU-SLV

VERIFICA SEZIONE IN ACCIAIO COMPOSTA

CARATTERISTICHE PROFILO:

Tipo:	S355				
B _{SUP} =	600	mm	A _{r,sup} =	15000.00 mm ²	
t _{r,sup} =	25.0	mm	A _{r,inf} =	32000.00 mm ²	
B _{INF} =	800	mm	A _w =	38700.00 mm ²	
t _{r,inf} =	40.0	mm	n. traversi:	1	
H =	2000	mm			
t _w = a =	20.0	mm			
L =	4100	mm			
A _{TOT} =	85700.00	mm ²			
Y _{G,inf} =	810.30	mm	Y _{G,sup} =	1189.70 mm	
J _{yy} =	5.44E+10	mm ⁴	J _t =	25351667 mm ⁴	
J _{zz} =	2158000000	mm ⁴	J _{xx} =	1.069E+09 mm ⁶	
W _{el,yy,inf} =	67084376	mm ³	W _{el,yy,sup} =	45690950 mm ³	
W _{pl,yy} =	62446486	mm ³			
$W_{pl,xx} = 2 \left[\frac{t_w H^2}{8} + t_f (b - t_w) \frac{H - t_f}{2} + 2r^2 \left(\frac{H}{2} - t_f - \frac{r}{2} \right) - 2 \frac{\pi r^2}{4} \left(\frac{H}{2} - t_f + r + \frac{4r}{3\pi} \right) \right]$					
ρ _{yy} =	796.42	mm	ρ _{xx} =	$\sqrt{\frac{J_{xx}}{A}}$	
ρ _{zz} =	158.68	mm			
Peso =	672.75	kg/m			
E =	210000	N/mm ²	modulo elastico		
ν =	0.3		coeff. poisson		
G =	80769	N/mm ²	G =	$\frac{E}{2(1 + \nu)}$ modulo elasticità trasversale	
α =	0.000012	°C ⁻¹	coeff. espansione termica lineare		
f _{yk} =	355	N/mm ²	tensione snervamento caratteristica		
f _{tk} =	510	N/mm ²	tensione rottura caratteristica		
γ _{M0} =	1.05		per sezioni classe 1,2,3 e 4		
γ _{M1} =	1.05		per instabilità membrature		
γ _{M1} =	1.10		per instabilità membrature ponti stradali e ferroviari		
γ _{M2} =	1.25		per sezioni tese indebolite dai fori nei riguardi della frattura		

SOLLECITAZIONI:

N _{t,sd} =	0	N	caso per trave tesa
N _{c,sd} =	808000	N	caso per trave compressa
M _{sd} =	7060000000	Nmm	caso per trave inflessa in una direzione
V _{sd} =	618000	N	taglio
Caso per trave a flessione deviata (Momenti flettenti agenti alle estremità M _B < M _A):			
M _B =	3615000000	Nmm	M _A = 7060000000 Nmm
Valori del momento massimo e minimo dell'asta:			
M _{max,y,sd} =	0	Nmm	M _{max,y,sd} = 0 Nmm
M _{max,z,sd} =	0	Nmm	M _{max,z,sd} = 0 Nmm

CLASSE APPARTENENZA PROFILO (NTC2008, 4.2.3.1):					
ALA SUPERIORE		ALA INFERIORE		ANIMA	
$C/t_{f,sup} =$	11.60	$C/t_{f,inf} =$	9.75	3	$C/t_w =$ 96.75
$\varepsilon =$	0.81	$\varepsilon =$	0.81		$\varepsilon =$ 0.81
Curva di instabilità "b" (Asse yy):					
Fattore di imperfezione α :		0.34			
Curva di instabilità "c" (Asse zz):					
Fattore di imperfezione a:		0.49			
SOLLECITAZIONE DELL'ASTA A TAGLIO (NTC2008, 4.2.4.1.2):					
$\frac{V_{sd}}{V_{c,Rd}} \leq 1$					
Area taglio resistente:				$A_v =$	39350 mm ²
$V_{c,Rd} = \frac{A_v f_{yk}}{\sqrt{3} \gamma_{M0}}$	$V_{c,Rd} =$	7681095	N	\Rightarrow	0.08 OK!(<1)
Verifica in presenza di torsione uniforme:					
$\tau_{t,sd} =$		0	N/mm ²		
$V_{c,Rd,red} = \left[1 - \frac{\tau_{t,sd}}{\frac{f_{yk}}{\sqrt{3} \gamma_{M0}}} \right] V_{c,Rd}$					
$V_{c,Rd,red} =$	7681095	N	\Rightarrow	0.08	OK!(<1)
Verifica in termini tensionali nel punto più sollecitato:					
$\frac{\tau_{sd}}{\frac{f_{yk}}{\sqrt{3} \gamma_{M0}}} \leq 1 \Rightarrow 0.00$ OK!(<1)					

SOLLECITAZIONE DELL'ASTA A COMPRESSIONE SEMPLICE (NTC2008, 4.2.4.1.2):

$$\frac{N_{sd}}{N_{c,Rd}} \leq 1 \quad N_{cr} = \frac{\pi^2 EJ}{(\eta l)^2} \quad 266074201 \quad \text{N} \quad N_{c,sd} < 0,04 N_{cr}$$

Instabilità trascurabile!

0.04 Ncr = 10642968 N *Instabilità trascurabile se $\bar{\lambda} < 0.2$*

Calcolo snellezza membrana (< di 200 per le travature principali e < di 250 per le secondarie):

$$\mu = 1.00 \quad l_0 = \mu l = 4100 \quad \text{mm}$$

$$\lambda = l_0 / \rho = 5$$

Calcolo resistenza per sezioni in classe 1,2 e 3:

$$N_{c,Rd} = \frac{A f_{yk}}{\gamma_{M0}} \quad N_{c,Rd} = 28974762 \quad \text{N} \quad \Rightarrow \quad 0.03 \quad \text{OK! (<1)}$$

STABILITA' DELLE MEMBRATURE (NTC2008, 4.2.4.1.3):

Curva di instabilità "b" (Asse yy):

Fattore di imperfezione α : 0.49

Verifica per sezioni classe 1,2 e 3:

$$\bar{\lambda} = \sqrt{\frac{A f_{yk}}{N_{cr}}} \quad 0.34 \quad \bar{\lambda} > 0.2$$

Serve verifica instabilità!

$$\Phi = 0.5 \left[1 + \alpha(\bar{\lambda} - 0.2) + \bar{\lambda}^2 \right] \quad 0.59$$

$$\chi = \frac{1}{\Phi + \sqrt{\Phi^2 - \bar{\lambda}^2}} \quad 0.93$$

$$N_{b,Rd} = \frac{\chi A f_{yk}}{\gamma_{M1}} \quad 25710376 \quad \text{N}$$

$$\frac{N_{c,sd}}{N_{b,Rd}} \leq 1 \quad \Rightarrow \quad 0.03 \quad \text{OK! (<1)}$$

SOLLECITAZIONE DELL'ASTA A FLESSIONE MONOASSIALE RETTA (NTC2008, 4.2.4.1.2):

$$\frac{M_{sd}}{M_{c,Rd}} \leq 1$$

$$V_{sd} < 0,5 V_{c,Rd}$$

Il taglio non influisce sulla verifica a flessione!

$$\rho = \left[\frac{2V_{sd}}{V_{c,Rd}} - 1 \right]^2$$

0.70406

$$f_{y,red} = (1 - \rho)f_{yk}$$

105 N/mm²

$$f_{yk} =$$

355 N/mm²

Calcolo resistenza elastica sezione lorda, classe 3:

$$M_{el,Rd} = \frac{W_{el,min} f_{yk}}{\gamma_{M0}}$$

$M_{c,Rd} =$ 22680908179

Nmm

=>

0.31

OK!(<1)

n. fori = 0

diametro = 0 mm

$$\frac{0,9 A_f \sigma_{fk}}{\gamma_{M2}} \geq \frac{A_f f_{yk}}{\gamma_{M0}}$$

Non serve la verifica per la presenza dei fori!

TRAVI INFLESSE (NTC2008, 4.2.4.1.3.2):

Calcolo snellezza membrana (< di 200 per le travature principali e < di 250 per le secondarie):

$$\mu = 0.70$$

$$L_{cr} = L / \mu = 2870 \text{ mm}$$

$$W_{yy} = 67084376 \text{ mm}^3$$

$$W_{yy} = 45690950 \text{ mm}^3$$

$$\psi = 1.75 - 1.05 \frac{M_B}{M_A} + 0.3 \left(\frac{M_B}{M_A} \right)^2$$

1.29

$$M_{cr} = \psi \frac{\pi}{L_{cr}} \sqrt{E J_y G J_T} \sqrt{1 + \left(\frac{\pi}{L_{cr}} \right)^2 \frac{E J_{\omega}}{G J_T}}$$

2.161E+11

Nmm

0.033

$$M_{sd} / M_{cr} = 0.033$$

Risulta < 0.16 Non serve la verifica instabilità

$$\bar{\lambda}_{LT} = \sqrt{\frac{W_y f_{yk}}{M_{cr}}}$$

0.27

Risulta < 0.4 Non serve la verifica instabilità

Stabilità dei pannelli soggetti a taglio (NTC2008, 4.2.4.1.3.4.1):

Se irrigiditori trasversali rigido o no,

$$I_{st} = 45000000 \text{ mm}^4 \quad 0.75hwt^3 = 5710886 \text{ mm}^4 \quad \text{Irrigiditore Trasversali rigidi}$$

Coefficiente minimo di instabilità per taglio del pannello (In assenza di irrigiditori longitudinali),

$$a/hw = 2.05 \quad k_{\tau} = 7.29$$

Coefficiente minimo di instabilità per taglio del pannello (irrigiditori longitudinali più di due o $a/hw > 3$),

$$I_{sl} = 0 \text{ mm}^4 \quad k_{\tau l} = 0.00$$

$$a/hw = 2.05 \quad k_{\tau} = 7.29$$

Coefficiente minimo di instabilità per taglio del pannello (irrigiditori longitudinali più di due o $a/hw < 3$),

$$I_{sl} = 0 \text{ mm}^4 \quad a/hw = 2.05 \quad k_{\tau} = 5.60$$

$$k_{\tau} = 7.29$$

$$\eta = 1.2 \quad hw/t = 96.75 \quad \text{Serve la verifica di instabilità}$$

$$\sigma_{\epsilon} = 19 \text{ MPa} \quad \tau_{cr} = 138.53 \quad \lambda_w = 1.22$$

Montanti di appoggio rigidi,

$$\chi_w = 0.71$$

Gli altri casi,

$$\chi_w = 0.68$$

$$V_{bw,Rd} = 5326791 \text{ N}$$

Momento resistente sole piattabande,

$$Y_{G,inf} = 647.93 \text{ mm} \quad Y_{G,sup} = 1352.07 \text{ mm}$$

$$J_{yy} = 39539239406 \text{ mm}^4$$

$$W_{el,yy,inf} = 61024358 \text{ mm}^3 \quad W_{el,yy,sup} = 29243389 \text{ mm}^3$$

$$M_{t,red} = 9384313103 \text{ Nmm}$$

$$bf = 303.75 \text{ mm} \quad V_{bf,Rd} = 15278 \text{ N}$$

$$V_{b,Rd} = 5342068 \text{ N} \quad 0.116 \quad \text{OK! (<1)}$$

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

Stabilità dei pannelli soggetti a Compressione (NTC2008, 4.2.4.1.3.4.1):					
Stress,					
$\sigma_{sup} =$	154.52	MPa			
$\sigma_{inf} =$	-105.24	MPa			
$\sigma_{irr.} =$	88.28	MPa			
Irrigidati su entrambi i lati (Anima),					
$b =$	1935.0	mm	(Web bw)	$a =$	4100 mm
$\sigma_1 =$	154.5	(Max)		$\sigma_2 =$	-105.24 (Min)
$\psi =$	-0.7			$k\sigma =$	16.63
$\lambda_p =$	1.0			$\rho =$	0.97
$\sigma_{cr,p} =$	337.6	MPa		$\sigma_{cr,c} =$	4.516 MPa
$\zeta =$	1.0			$\lambda_c =$	8.866
$\alpha =$	0.34			$\Phi =$	116.298
$\chi_c =$	0.004				
$\rho_c =$	0.97				
$b_{eff} =$	1116.09	mm	$b_{e1} =$	446.44 mm	$b_{e2} =$ 669.65 mm
$b_t =$	783.97	mm			
Irrigidati a un lato (Piattebande), Piattebanda Superiore,					
$b =$	290	mm	(Flange Sup)		
$\sigma (Irr.) =$	154.5			$\sigma (Lib.) =$	154.52
$k\sigma =$	0.43				
$\lambda_p =$	1.0			$\rho =$	0.84
$b_{eff} =$	242.69	mm		$b_t =$	0 mm
Effective Section Properties,					
$A_{c,eff} (Piattebanda Sup) =$	12134.4	mm ²			
$A_{c,eff} (Piattebanda Inf) =$	32000.0	mm ²			
$A_{c,eff} (Anima) =$	22321.8	mm ²			
$A_c (Anima tensione) =$	15679.3	mm ²			
$A_{c,eff} (Total) =$	82135.6	mm ²			
$Y_{g,inf} =$	763.3	mm		$Y_{g,sup} =$	1236.7 mm
$I_{eff} =$	5.15E+10	mm ⁴			
$W_{eff} (inf) =$	67412763	mm ³		$W_{eff} (sup) =$	41604745 mm ³
$e =$	47.03	mm			
$\eta =$	0.50				

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

Fase 2

Soletta c.a. collaborante

b_{em} =	2.84	m
Altezza soletta:	0.26	m
Area soletta:	0.74	m ²
J_{yy} =	0.00416	m ⁴
Peso =	18.46	kN/m

Trave acciaio

Area trave acciaio:	0.0857	m ²
H trave acciaio:	2.00	m
Y_C =	0.810	m
J_{yy} =	0.054359	m ⁴
Peso =	6.73	kN/m

Barre armatura soletta

1° strato barre (superiore)		2° strato barre (inferiore)	
n. Barre:	14	n. Barre:	14
Interasse:	0.20 m	Interasse:	0.20 m
Diametro:	0.02 m	Diametro:	0.02 m
Area:	0.004398 m ²	Area:	0.004398 m ²
y_1 =	0.05 m	y_2 =	0.21 m

n = 18.0

Coeff. omogeneizzazione con viscosità in atto

Materiali

cls	Barre armature	Acciaio
R_{ck} = 40 MPa	f_{yk} = 450 MPa	f_{yk} = 355 MPa
f_{ck} = 33.20 MPa	γ_M = 1.15	γ_{Mo} = 1.05
f_{ct} = 18.81 MPa	$f_{y0.1}$ = 391.30 MPa	$f_{y0.2}$ = 338.10 MPa
f_{cm} = 41.2 MPa		
f_{ctm} = 3.10 MPa		
E_{cm} = 33643 MPa		

Caratteristiche geometriche

A_{ge} =	0.1355	m ²	Area sezione omogeneizzata in area di acciaio
A_v =	39350	mm ²	Area taglio sezione di acciaio
$Y_{C,inf,0}$ =	1.30	m	Asse neutro rispetto lembo inferiore:
$Y_{C,sup,0}$ =	0.96	m	Asse neutro rispetto lembo superiore
$J_{xx,0}$ =	0.109515	m ⁴	Momento d'inerzia sezione omogeneizzata ad acciaio
$W_{el,0}$ =	0.084538	m ³	Modulo elastico sezione omogeneizzata ad acciaio
$W_{pl,0}$ =	0.113538	m ³	Modulo elastico sezione omogeneizzata ad acciaio

Sollecitazioni

M_{ed} =	9121.00	kNm	(SLU)	
M_{0d} =	28582.02	kNm	=>	0.32 ok!
T_{ed} =	781.00	kN	(SLU)	
T_{0d} =	7315.33	kN	=>	0.11 ok!

Tensioni

σ_c =	4.46	MPa	=>	0.24	ok!(<1)	Tensione al lembo superiore soletta
$\sigma_{s,sup}$ =	76.17	MPa	=>	0.19	ok!(<1)	Tensione barre superiori soletta
$\sigma_{s,inf}$ =	62.84	MPa	=>	0.16	ok!(<1)	Tensione barre inferiori soletta
$\sigma_{a,sup}$ =	58.68	MPa	=>	0.17	ok!(<1)	Tensione acciaio lembo superiore
$\sigma_{a,inf}$ =	107.89	MPa	=>	0.32	ok!(<1)	Tensione acciaio lembo inferiore

Fase 3

Soletta c.a. collaborante

b_{eff} =	2.84	m
Altezza soletta:	0.26	m
Area soletta:	0.74	m ²
J_{xx} =	0.00416	m ⁴
Peso =	18.46	kN/m

Trave acciaio

Area trave acciaio:	0.0857	m ²
H trave acciaio:	2.00	m
y_0 =	0.810	m
J_{xx} =	0.054359	m ⁴
Peso =	6.73	kN/m

Barre armatura soletta

1° strato barre (superiore)		2° strato barre (inferiore)	
n. Barre:	14	n. Barre:	14
Interasse:	0.20 m	Interasse:	0.20 m
Diametro:	0.02 m	Diametro:	0.02 m
Area:	0.004398 m ²	Area:	0.004398 m ²
y_1 =	0.05 m	y_2 =	0.21 m

n = 6.2 Coeff. omogeneizzazione a tempo infinito

Materiali

cls	Barre armature	Acciaio
R_{ck} = 40 MPa	f_{yk} = 450 MPa	f_{yk} = 355 MPa
f_{ck} = 33.20 MPa	γ_M = 1.15	γ_{M0} = 1.05
f_{ct} = 18.81 MPa	$f_{ytd,s}$ = 391.30 MPa	$f_{ytd,a}$ = 338.10 MPa
f_{cm} = 41.2 MPa		
f_{ctm} = 3.10 MPa		
E_{cm} = 33643 MPa		

Caratteristiche geometriche

$A_{0,0}$ =	0.2136	m ²	Area sezione omogeneizzata in area di acciaio
A_v =	39350	mm ²	Area taglio sezione di acciaio
$y_{G,inf,0}$ =	1.60	m	Asse neutro rispetto lembo inferiore:
$y_{G,sup,0}$ =	0.66	m	Asse neutro rispetto lembo superiore
$J_{0,0}$ =	0.144456	m ⁴	Momento d'inerzia sezione omogeneizzata ad acciaio
$W_{inf,0}$ =	0.090257	m ³	Modulo elastico sezione omogeneizzata ad acciaio
$W_{sup,0}$ =	0.219037	m ³	Modulo elastico sezione omogeneizzata ad acciaio

Sollecitazioni

M_{sd} =	25144.00	kNm	(SLU)	
M_{ed} =	30515.36	kNm	=>	0.82 ok!
T_{sd} =	2206.00	kN	(SLU)	
T_{ed} =	7315.33	kN	=>	0.30 ok!

Tensioni

σ_c =	18.52	MPa	=>	0.98 ok!(<1)	Tensione al lembo superiore soletta
$\sigma_{s,sup}$ =	106.09	MPa	=>	0.27 ok!(<1)	Tensione barre superiori soletta
$\sigma_{s,inf}$ =	78.24	MPa	=>	0.20 ok!(<1)	Tensione barre inferiori soletta
$\sigma_{a,sup}$ =	69.54	MPa	=>	0.21 ok!(<1)	Tensione acciaio lembo superiore
$\sigma_{a,inf}$ =	278.58	MPa	=>	0.82 ok!(<1)	Tensione acciaio lembo inferiore

6.2.1.3 TRAVE PRINCIPALE CONCIO 3

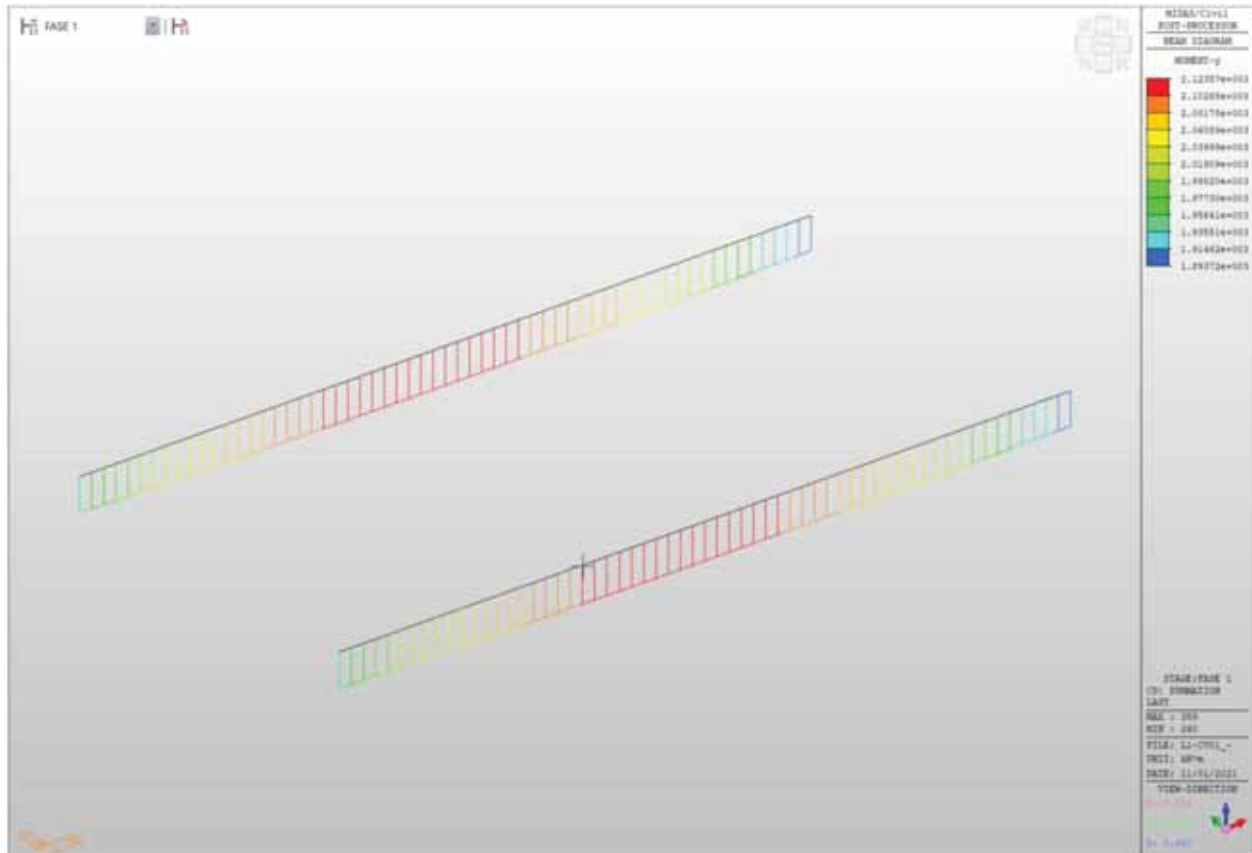


Figura 55 - Concio 3 - Diagramma My - Fase 1

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

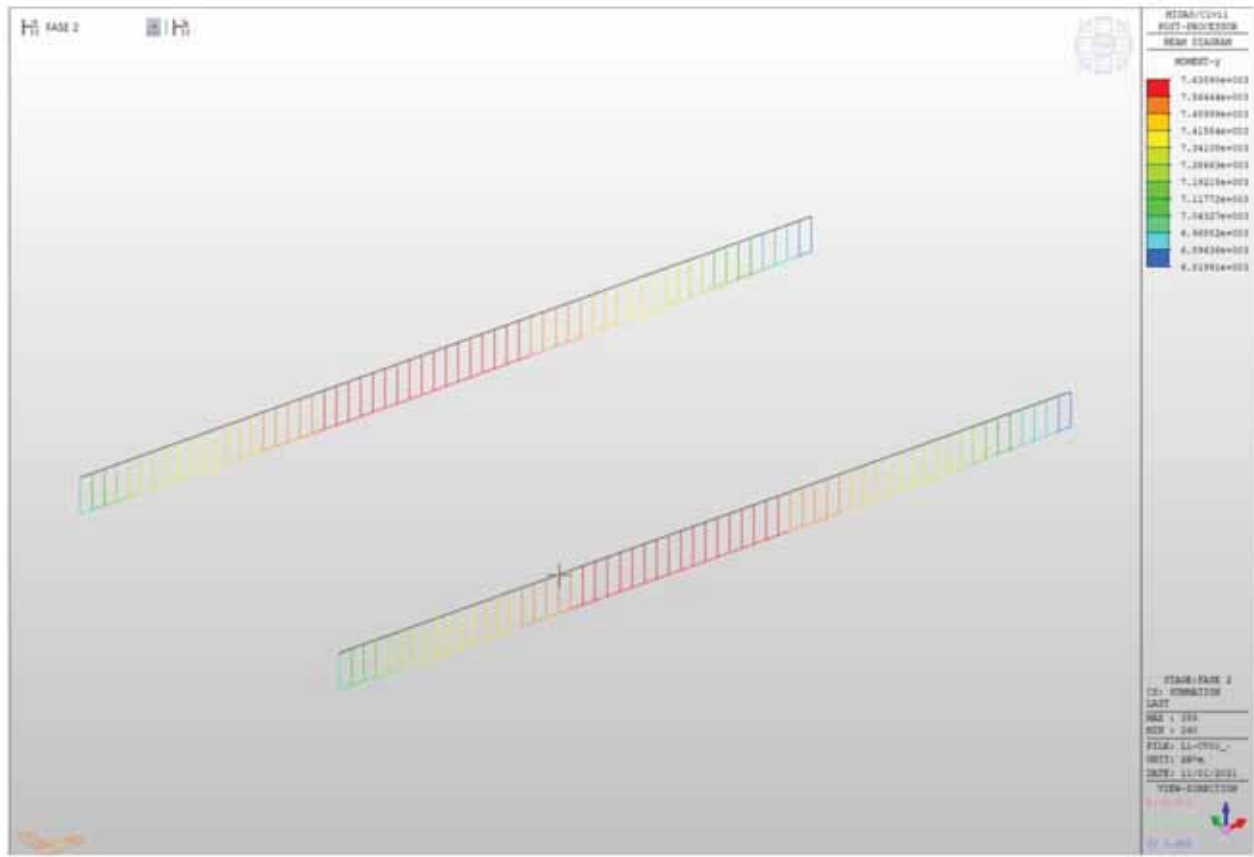


Figura 56 - Concio 3 - Diagramma My - Fase 2

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

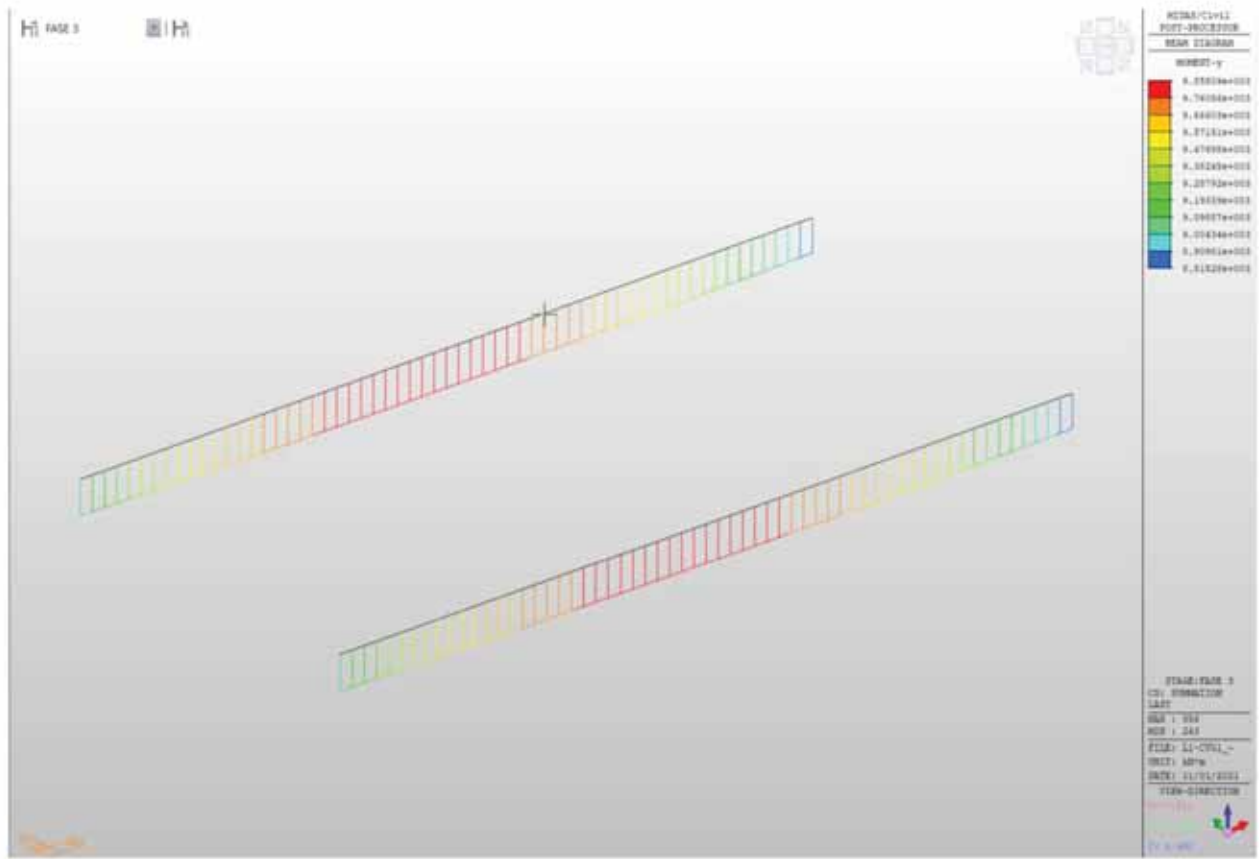


Figura 57 - Concio 3 - Diagramma My - Fase 3

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

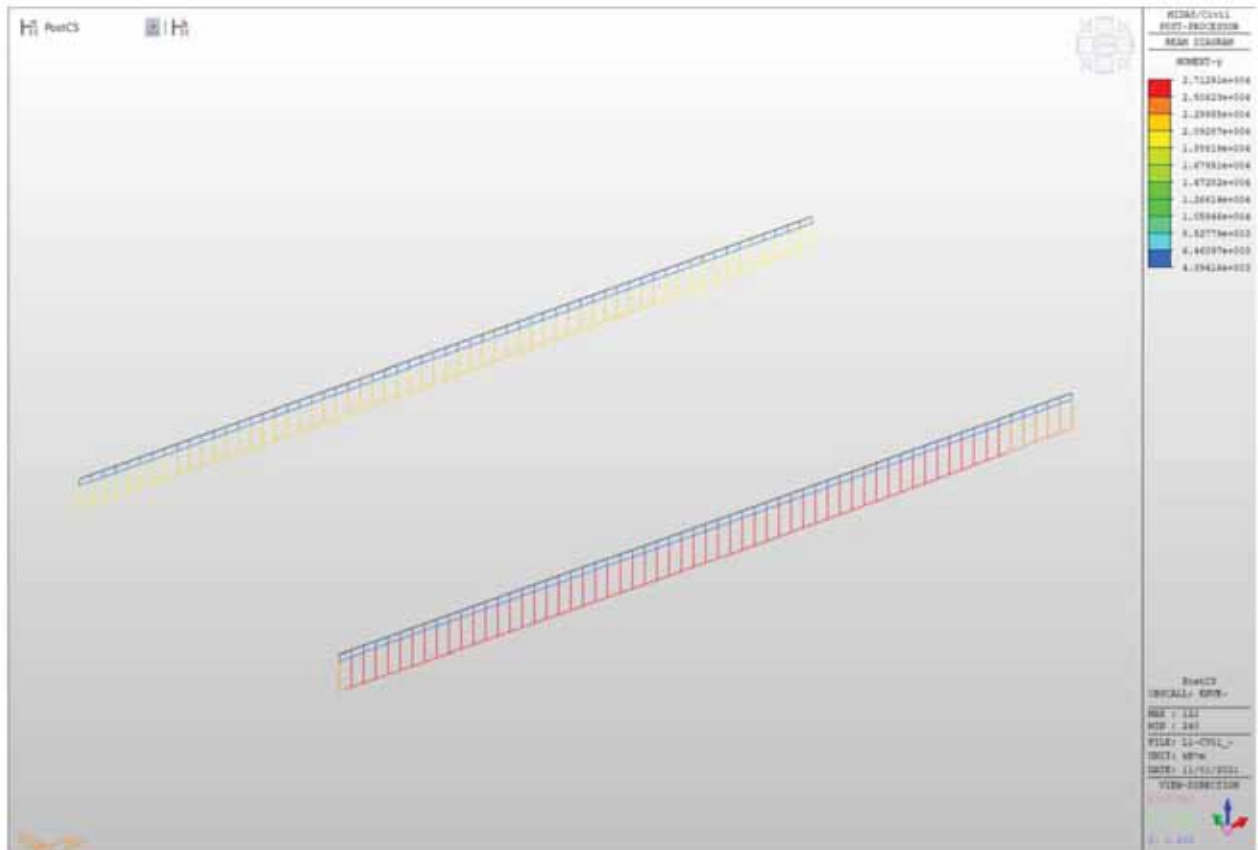


Figura 58 - Concio 3 - Diagramma My - Involuppo SLU-SLV

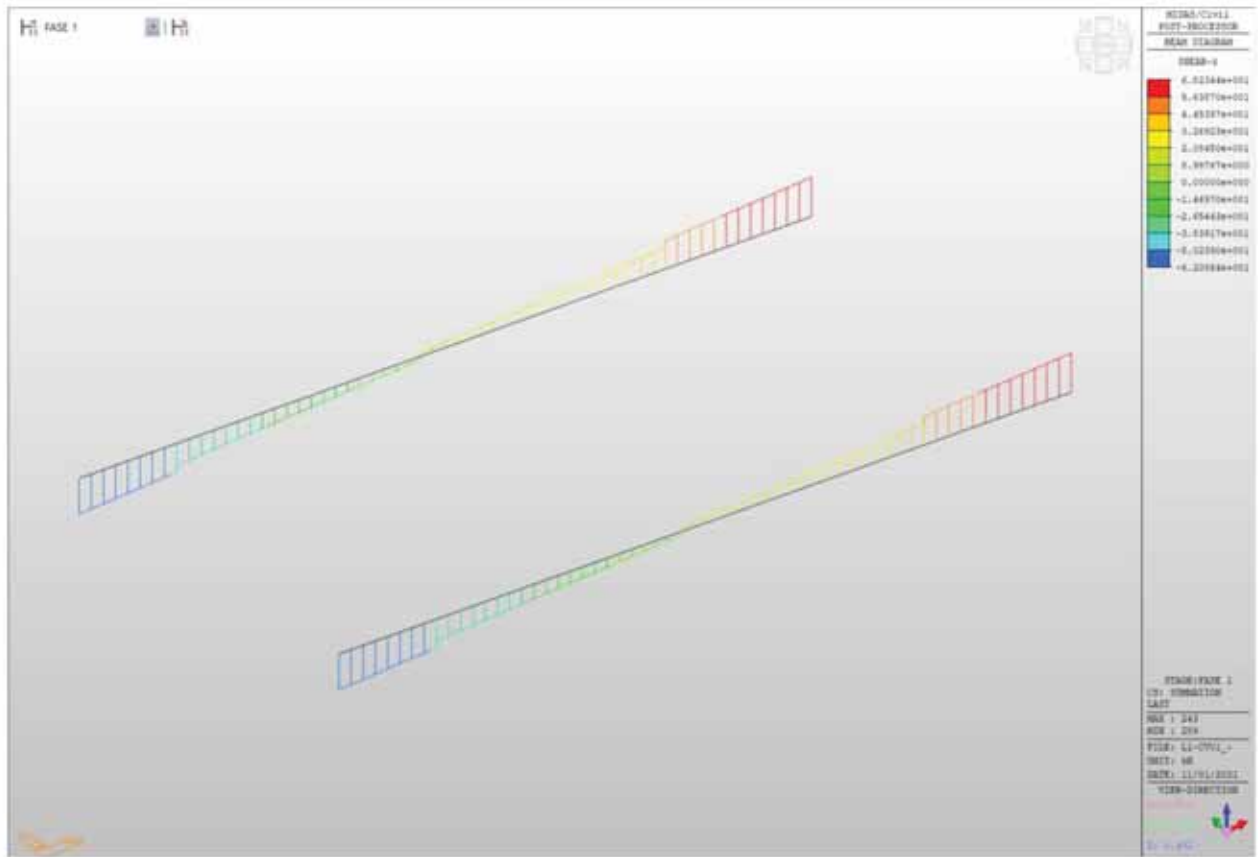


Figura 59 - Concio 3 - Diagramma Tz - Fase 1

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

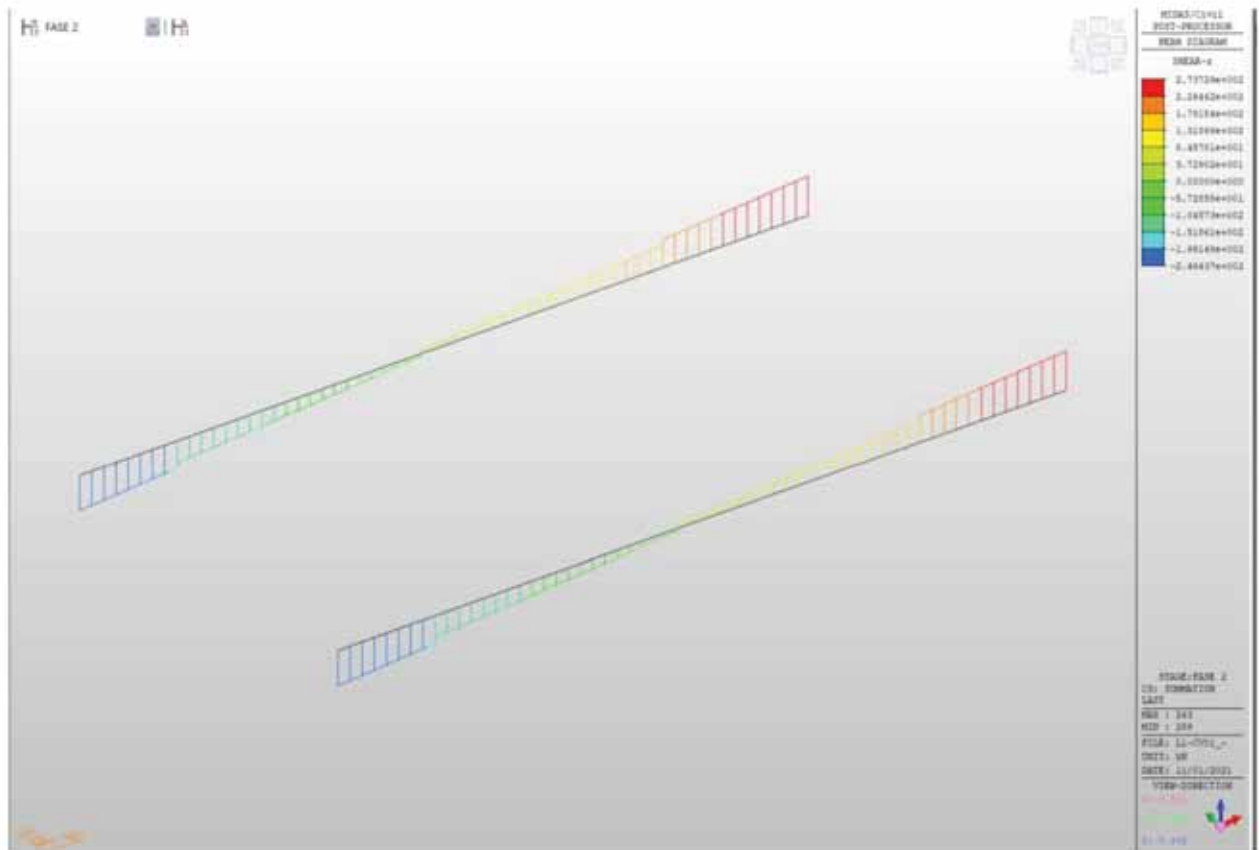


Figura 60 - Concio 3 - Diagramma Tz - Fase 2

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

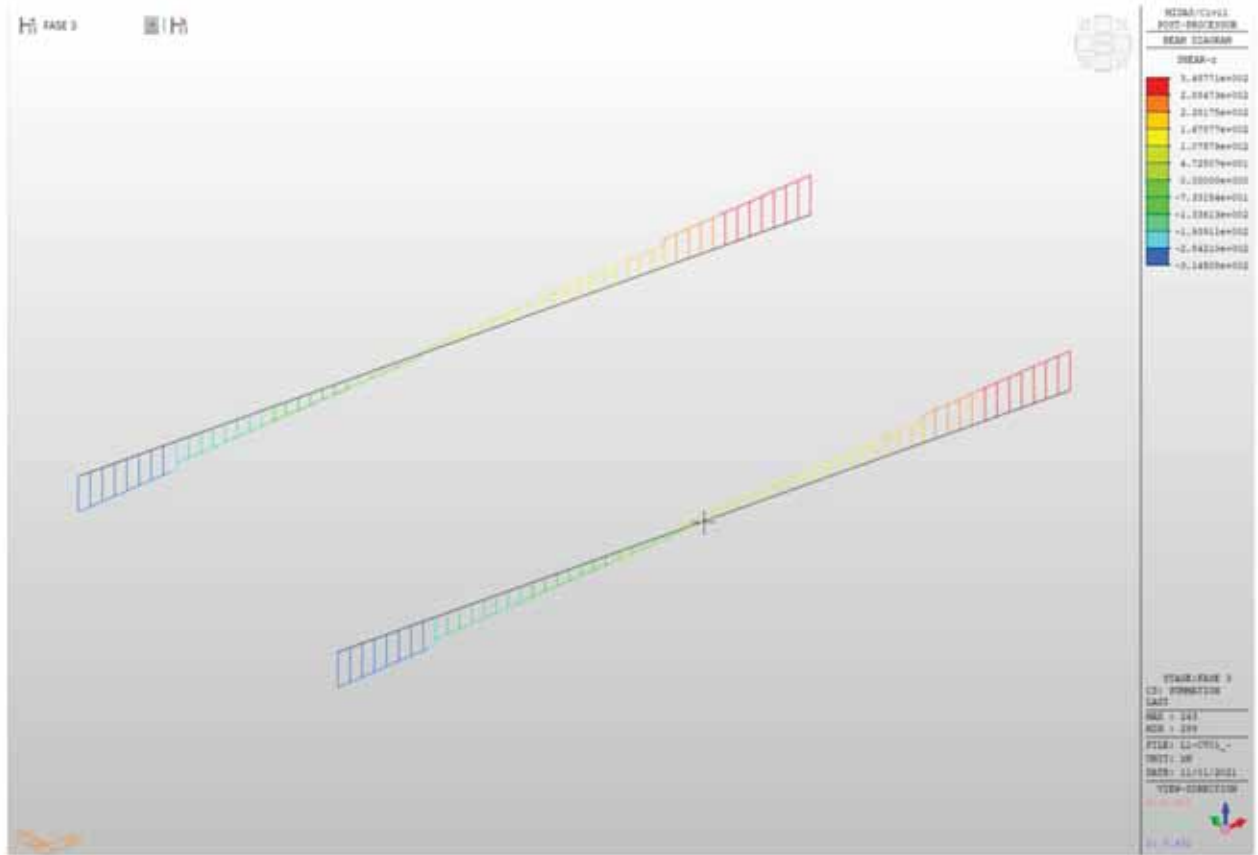


Figura 61 - Concio 3 - Diagramma Tz - Fase 3

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

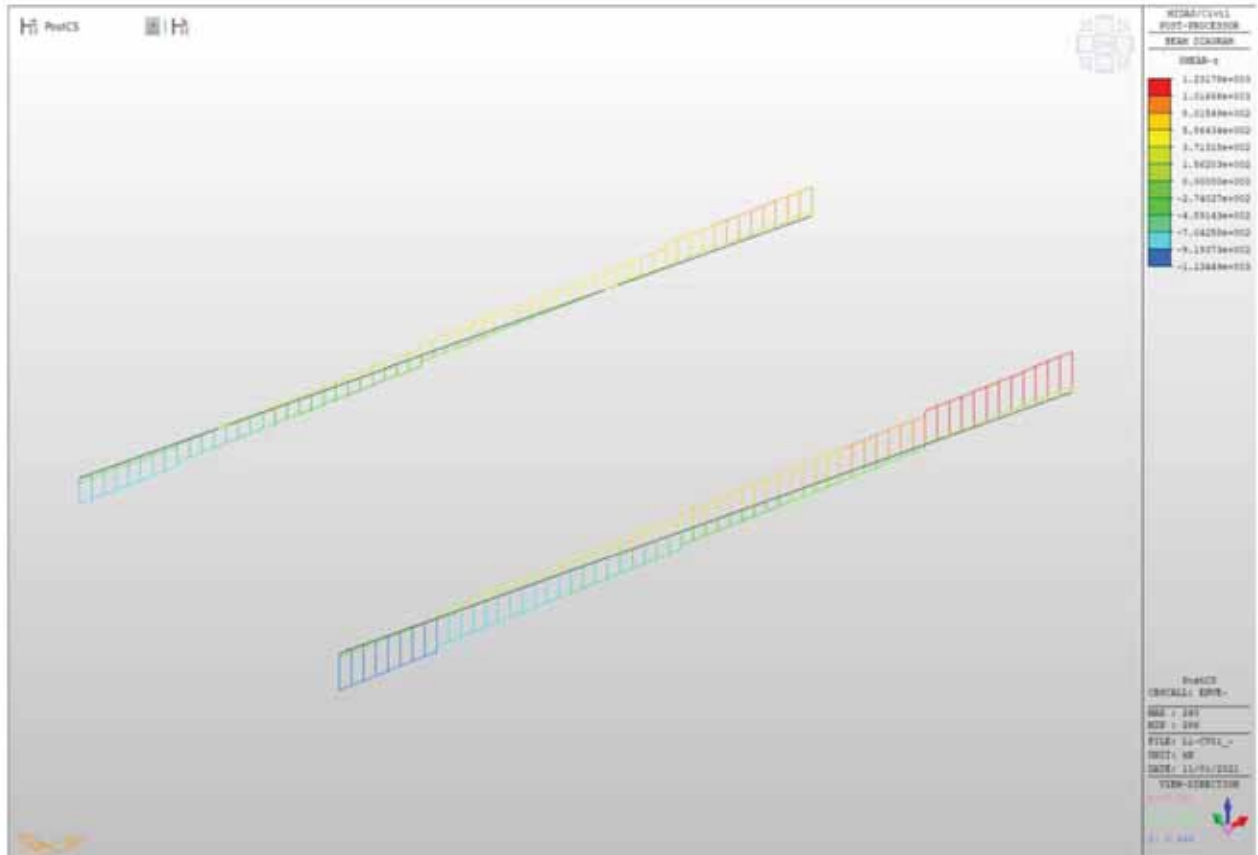


Figura 62 - Concio 3 - Diagramma Tz - Involuppo SLU-SLV

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

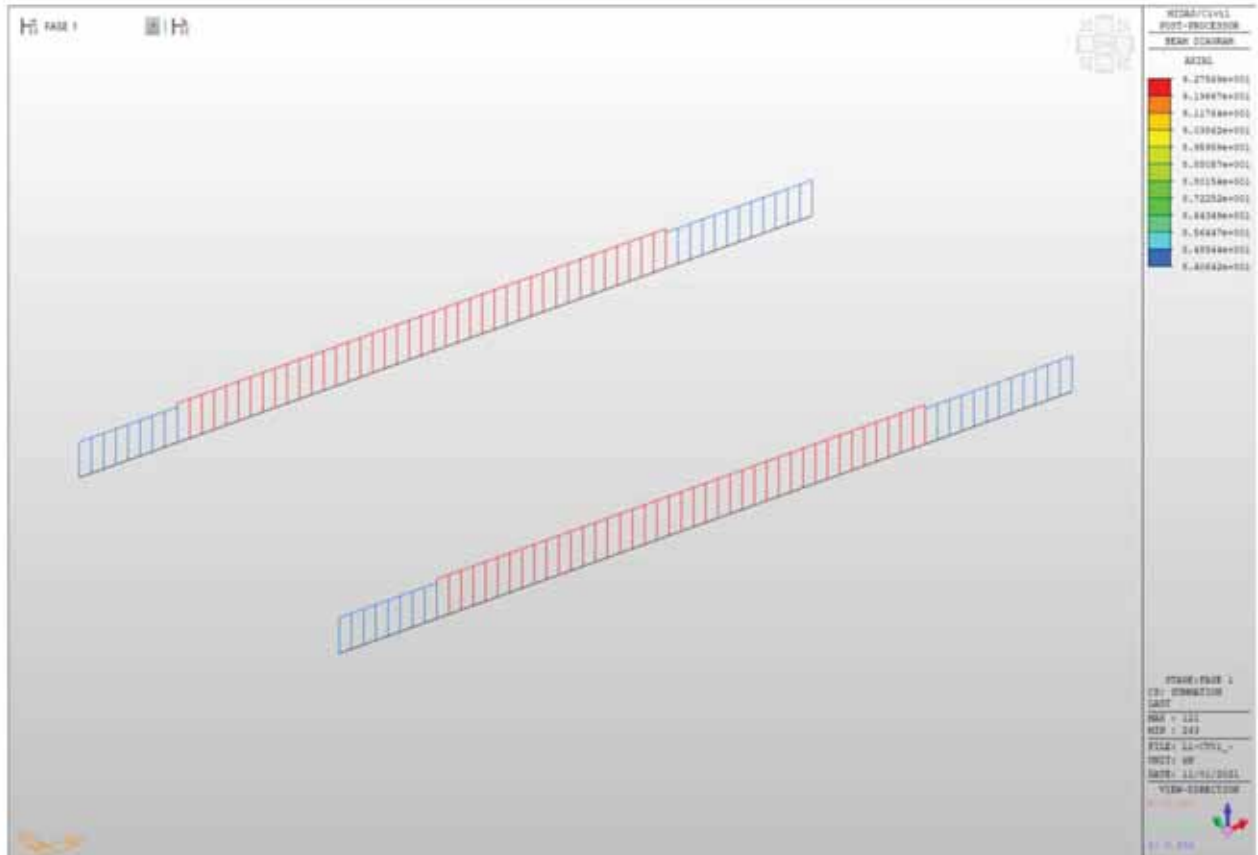


Figura 63 - Concio 3 - Diagramma N - Fase 1

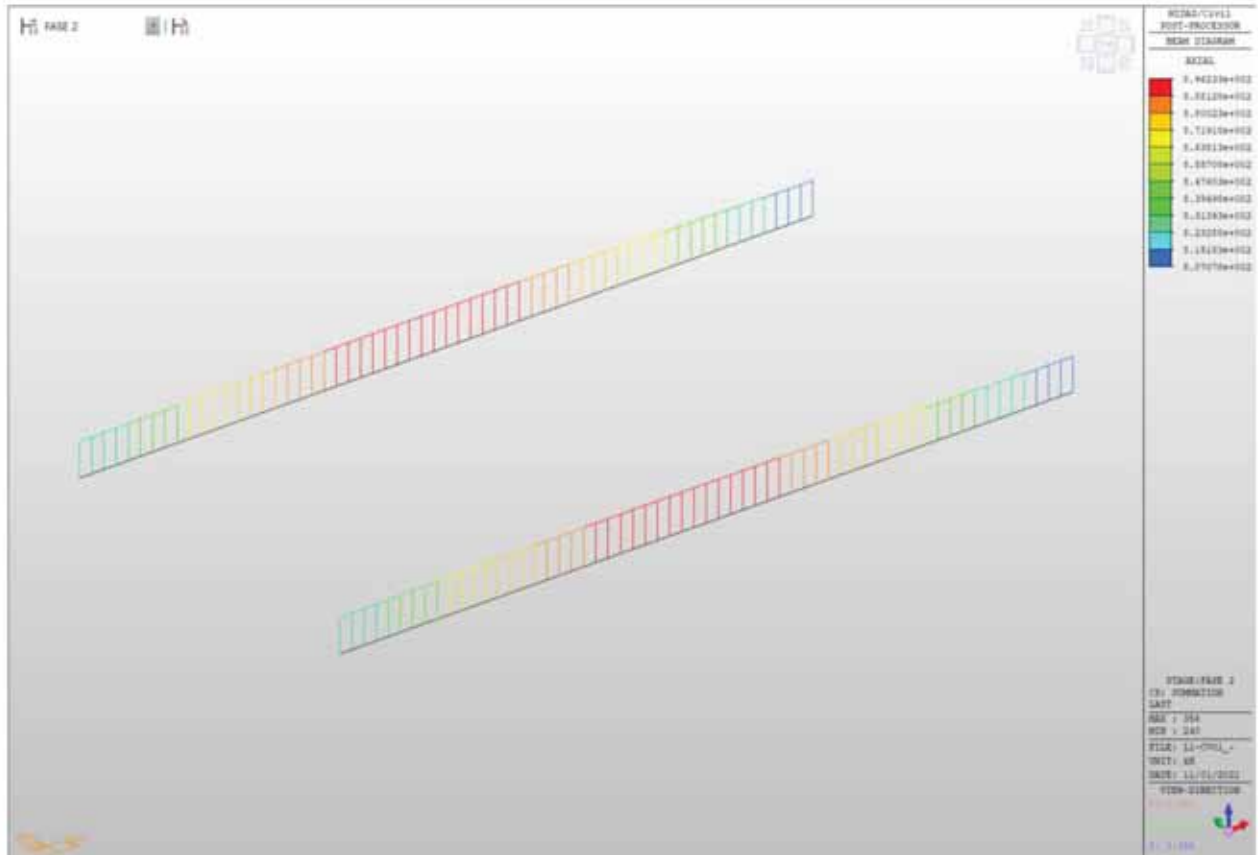


Figura 64 - Concio 3 - Diagramma N - Fase 2

LOTTO 1 - CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

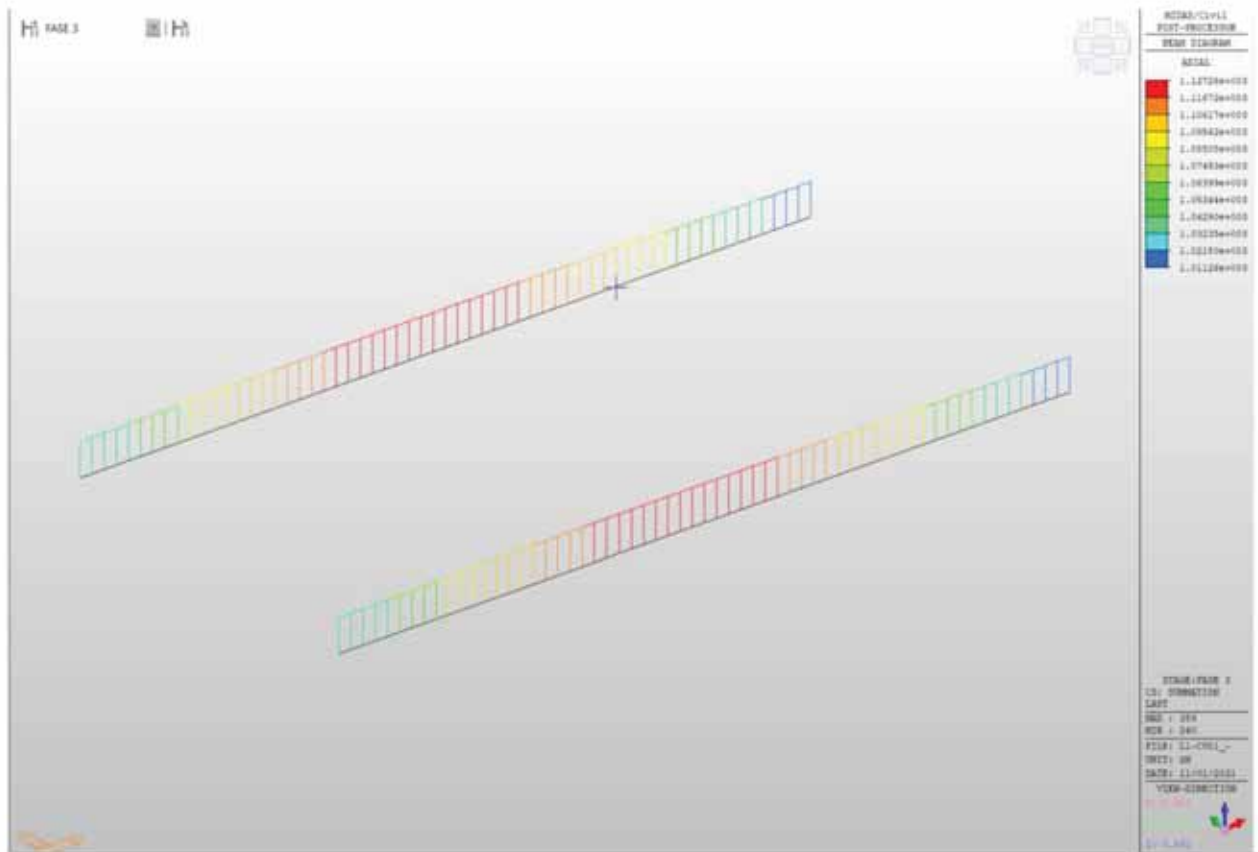


Figura 65 - Concio 3 - Diagramma N - Fase 3

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

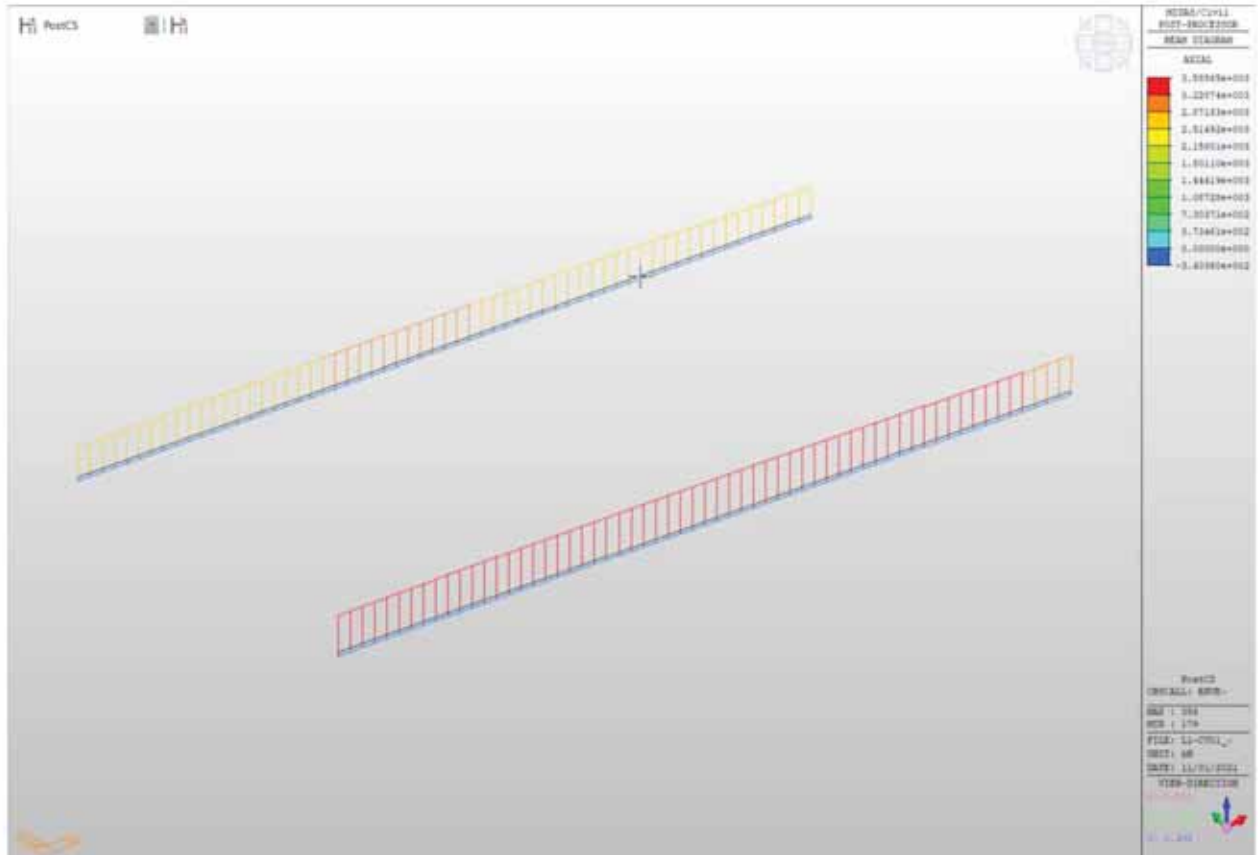
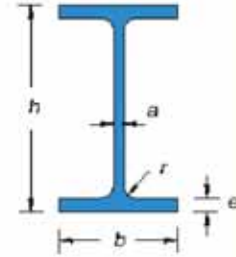


Figura 66 - Concio 3 - Diagramma N - Inviluppo SLU-SLV

VERIFICA SEZIONE IN ACCIAIO COMPOSTA

CARATTERISTICHE PROFILO:

Tipo:	S355						
B _{SUP} =	600	mm					
t _{r,SUP} =	25.0	mm	A _{r,sup} =	15000.00	mm ²		
B _{INF} =	900	mm					
t _{r,INF} =	40.0	mm	A _{r,inf} =	36000.00	mm ²		
H =	2000	mm					
t _w = a =	20.0	mm	A _w =	38700.00	mm ²		
L =	4100	mm	n. traversi:	1			
A _{TOT} =	89700.00	mm ²					
Y _{G,inf} =	775.06	mm	Y _{G,sup} =	1224.94	mm		
J _{yy} =	5.67E+10	mm ⁴	J _t =	27485000	mm ⁴		
J _{zz} =	2881333333	mm ⁴	J _w =	1.069E+09	mm ⁶		
W _{el,yy,inf} =	73215022	mm ³	W _{el,yy,sup} =	46325419	mm ³		
W _{pl,yy} =	65170435	mm ³					
W _{pl,xx} =	$2 \left[\frac{t_w H^2}{8} + t_f (b - t_w) \frac{H - t_f}{2} + 2r^2 \left(\frac{H}{2} - t_f - \frac{r}{2} \right) - 2 \frac{\pi^2}{4} \left(\frac{H}{2} - t_f + r + \frac{4r}{3\pi} \right) \right]$						
ρ _{yy} =	795.37	mm	ρ _{xx} =	$\sqrt{\frac{J_{xx}}{A}}$			
ρ _{zz} =	179.23	mm					
Peso =	704.15	kg/m					
E =	210000	N/mm ²	modulo elastico				
ν =	0.3		coeff. poisson				
G =	80769	N/mm ²	$G = \frac{E}{2(1 + \nu)}$		modulo elasticità trasversale		
α =	0.000012	°C ⁻¹	coeff. espansione termica lineare				
f _{yk} =	355	N/mm ²	tensione snervamento caratteristica				
f _{tk} =	510	N/mm ²	tensione rottura caratteristica				
γ _{M0} =	1.05	per sezioni classe 1,2,3 e 4					
γ _{M1} =	1.05	per instabilità membrature					
γ _{M1} =	1.10	per instabilità membrature ponti stradali e ferroviari					
γ _{M2} =	1.25	per sezioni tese indebolite dai fori nei riguardi della frattura					



SOLLECITAZIONI:

N _{t,sd} =	0	N	caso per trave tesa
N _{c,sd} =	896000	N	caso per trave compressa
M _{sd} =	7640000000	Nmm	caso per trave inflessa in una direzione
V _{sd} =	274000	N	taglio
Caso per trave a flessione deviata (Momenti flettenti agenti alle estremità M _B < M _A):			
M _B =	36160000000	Nmm	M _A = 7640000000 Nmm
Valori del momento massimo e minimo dell'asta:			
M _{max,y,sd} =	0	Nmm	M _{max,y,sd} = 0 Nmm
M _{max,z,sd} =	0	Nmm	M _{max,z,sd} = 0 Nmm

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

CLASSE APPARTENENZA PROFILO (NTC2008, 4.2.3.1):					
ALA SUPERIORE		ALA INFERIORE		ANIMA	
$C/t_{f,sup} =$	11.60	3	$C/t_{f,inf} =$	11.00	3
$\varepsilon =$	0.81		$\varepsilon =$	0.81	
				$C/t_w =$	96.75
				$\varepsilon =$	0.81
Curva di instabilità "b" (Asse yy):					
Fattore di imperfezione α :		0.34			
Curva di instabilità "c" (Asse zz):					
Fattore di imperfezione a:		0.49			
SOLLECITAZIONE DELL'ASTA A TAGLIO (NTC2008, 4.2.4.1.2):					
$\frac{V_{sd}}{V_{c,Rd}} \leq 1$					
Area taglio resistente:		$A_v =$	39350	mm ²	
$V_{c,Rd} = \frac{A_v f_{yk}}{\sqrt{3} \gamma_{M0}}$	$V_{c,Rd} =$	7681095	N	\Rightarrow	0.04 OK!(<1)
Verifica in presenza di torsione uniforme:					
$\tau_{t,sd} =$	0	N/mm ²			
$V_{c,Rd,red} = \left[1 - \frac{\tau_{t,sd}}{\frac{f_{yk}}{\sqrt{3} \gamma_{M0}}} \right] V_{c,Rd}$					
$V_{c,Rd,red} =$	7681095	N	\Rightarrow	0.04	OK!(<1)
Verifica in termini tensionali nel punto più sollecitato:					
$\frac{\tau_{sd}}{\frac{f_{yk}}{\sqrt{3} \gamma_{M0}}} \leq 1 \quad \Rightarrow \quad 0.00 \quad \text{OK!(<1)}$					

SOLLECITAZIONE DELL'ASTA A COMPRESSIONE SEMPLICE (NTC2008, 4.2.4.1.2):

$$\frac{N_{sd}}{N_{c,Rd}} \leq 1 \quad N_{cr} = \frac{\pi^2 EJ}{(\eta l)^2} \quad 355258788 \quad \text{N} \quad N_{c,sd} < 0,04 N_{cr}$$

Instabilità trascurabile!

0.04 Ncr = 14210352 N *Instabilità trascurabile se $\bar{\lambda} < 0.2$*

Calcolo snellezza membrana (< di 200 per le travature principali e < di 250 per le secondarie):

$$\mu = 1.00 \quad l_0 = \mu l = 4100 \quad \text{mm}$$

$$\lambda = l_0 / \rho = 5$$

Calcolo resistenza per sezioni in classe 1,2 e 3:

$$N_{c,Rd} = \frac{A f_{yk}}{\gamma_{M0}} \quad N_{c,Rd} = 30327143 \quad \text{N} \quad \Rightarrow \quad 0.03 \quad \text{OK! (<1)}$$

STABILITA' DELLE MEMBRATURE (NTC2008, 4.2.4.1.3):

Curva di instabilità "b" (Asse yy):

Fattore di imperfezione α : 0.49

Verifica per sezioni classe 1,2 e 3:

$$\bar{\lambda} = \sqrt{\frac{A f_{yk}}{N_{cr}}} \quad 0.30 \quad \bar{\lambda} > 0.2$$

Serve verifica instabilità!

$$\Phi = 0.5 \left[1 + \alpha(\bar{\lambda} - 0.2) + \bar{\lambda}^2 \right] \quad 0.57$$

$$\chi = \frac{1}{\Phi + \sqrt{\Phi^2 - \bar{\lambda}^2}} \quad 0.95$$

$$N_{b,Rd} = \frac{\chi A f_{yk}}{\gamma_{M1}} \quad 27485538 \quad \text{N}$$

$$\frac{N_{c,sd}}{N_{b,Rd}} \leq 1 \quad \Rightarrow \quad 0.03 \quad \text{OK! (<1)}$$

SOLLECITAZIONE DELL'ASTA A FLESSIONE MONOASSIALE RETTA (NTC2008, 4.2.4.1.2):

$$\frac{M_{sd}}{M_{c,Rd}} \leq 1$$

$$V_{sd} < 0,5 V_{c,Rd}$$

Il taglio non influisce sulla verifica a flessione!

$$\rho = \left[\frac{2V_{sd}}{V_{c,Rd}} - 1 \right]^2$$

0.86240

$$f_{y,red} = (1 - \rho)f_{yk}$$

49 N/mm²

$$f_{yk} =$$

355 N/mm²

Calcolo resistenza elastica sezione lorda, classe 3:

$$M_{el,Rd} = \frac{W_{el,min} f_{yk}}{\gamma_{M0}}$$

$M_{c,Rd} =$ 24753650288

Nmm

\Rightarrow

0.31

OK!(<1)

n. fori = 0

diametro = 0 mm

$$\frac{0,9 A_{f,net} f_{tk}}{\gamma_{M2}} \geq \frac{A_f f_{yk}}{\gamma_{M0}}$$

Non serve la verifica per la presenza dei fori!

TRAVI INFLESSE (NTC2008, 4.2.4.1.3.2):

Calcolo snellezza membrana (< di 200 per le travature principali e < di 250 per le secondarie):

$$\mu = 0.70$$

$$L_{cr} = L / \mu = 2870 \text{ mm}$$

$$W_{yy} = 73215022 \text{ mm}^3$$

$$W_{yy} = 46325419 \text{ mm}^3$$

$$\psi = 1.75 - 1.05 \frac{M_B}{M_A} + 0.3 \left(\frac{M_B}{M_A} \right)^2$$

3.50

$$M_{cr} = \psi \frac{\pi}{L_{cr}} \sqrt{E J_y G J_T} \sqrt{1 + \left(\frac{\pi}{L_{cr}} \right)^2 \frac{E J_{\omega}}{G J_T}}$$

6.233E+11

Nmm

0.012

$$M_{sd}/M_{cr} =$$

0.012

Risulta < 0.16 Non serve la verifica instabilità

$$\bar{\lambda}_{LT} = \sqrt{\frac{W_y f_{yk}}{M_{cr}}}$$

0.16

Risulta < 0.4 Non serve la verifica instabilità

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

Stabilità dei pannelli soggetti a taglio (NTC2008, 4.2.4.1.3.4.1):

Se irrigiditori trasversali rigido o no,

$$I_{st} = 45000000 \text{ mm}^4 \quad 0.75hwt^3 = 5710886 \text{ mm}^4 \quad \text{Irrigiditore Trasversali rigidi}$$

Coefficiente minimo di instabilità per taglio del pannello (In assenza di irrigiditori longitudinali),

$$a/hw = 2.05 \quad k_{\tau} = 7.29$$

Coefficiente minimo di instabilità per taglio del pannello (irrigiditori longitudinali più di due o $a/hw > 3$),

$$I_{sl} = 0 \text{ mm}^4 \quad k_{\tau l} = 0.00$$

$$a/hw = 2.05 \quad k_{\tau} = 7.29$$

Coefficiente minimo di instabilità per taglio del pannello (irrigiditori longitudinali più di due o $a/hw < 3$),

$$I_{sl} = 0 \text{ mm}^4 \quad a/hw = 2.05 \quad k_{\tau} = 5.60$$

$$k_{\tau} = 7.29$$

$$\eta = 1.2 \quad hw/t = 96.75 \quad \text{Serve la verifica di instabilità}$$

$$\sigma_E = 19 \text{ MPa} \quad \tau_{cr} = 138.53 \quad \lambda_w = 1.22$$

Montanti di appoggio rigidi,

$$\chi_w = 0.71$$

Gli altri casi,

$$\chi_w = 0.68$$

$$V_{bw,Rd} = 5326791 \text{ N}$$

Momento resistente sole piattabande,

$$Y_{G,inf} = 598.68 \text{ mm} \quad Y_{G,sup} = 1401.32 \text{ mm}$$

$$J_{yy} = 40993235662 \text{ mm}^4$$

$$W_{el,yy,inf} = 68473103 \text{ mm}^3 \quad W_{el,yy,sup} = 29253227 \text{ mm}^3$$

$$M_{t,red} = 9376437782 \text{ Nmm}$$

$$bf = 303.75 \text{ mm} \quad V_{bf,Rd} = 11423 \text{ N}$$

$$V_{b,Rd} = 5338214 \text{ N} \quad 0.051 \quad \text{OK! (<1)}$$

Stabilità dei pannelli soggetti a Comoresione (NTC2008, 4.2.4.1.3.4.1):

Stress,

$\sigma_{sup} =$ 164.92 MPa

$\sigma_{inf} =$ -104.35 MPa

$\sigma_{irr.} =$ 96.26 MPa

Irrigidati su entrambi i lati (Anima),

$b =$ 1935.0 mm (Web bw) $a =$ 4100 mm

$\sigma_1 =$ 164.9 (Max) $\sigma_2 =$ -104.35 (Min)

$\psi =$ -0.6 $k\sigma =$ 15.71

$\lambda_p =$ 1.1 $\rho =$ 0.94

$\sigma_{cr,p} =$ 318.8 MPa $\sigma_{cr,c} =$ 4.516 MPa

$\zeta =$ 1.0 $\lambda_c =$ 8.866

$\alpha =$ 0.34 $\Phi =$ 116.298

$\chi_c =$ 0.004

$\rho_c =$ 0.94

$b_{eff} =$ 1116.71 mm $b_{e1} =$ 446.69 mm $b_{e2} =$ 670.03 mm

$b_t =$ 749.87 mm

Irrigidati a un lato (Piattebande),

Piattabanda Superiore,
 $b =$ 290 mm (Flange Sup)

$\sigma_{(Irr.)} =$ 164.9 $\sigma_{(Lib.)} =$ 164.92

$k\sigma =$ 0.43

$\lambda_p =$ 1.0 $\rho =$ 0.84

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

$b_{eff} =$	242.69	mm	$bt =$	0	mm
Effective Section Properties,					
$A_{c,eff}$ (Piattabanda Sup) =	12134.4	mm ²			
$A_{c,eff}$ (Piattabanda Inf) =	36000.0	mm ²			
$A_{c,eff}$ (Anima) =	22334.3	mm ²			
A_c (Anima tensione) =	14997.4	mm ²			
$A_{c,eff}$ (Total) =	85466.1	mm ²			
$Y_{g,inf} =$	722.9	mm	$Y_{g,sup} =$	1277.1	mm
$I_{eff} =$	5.36E+10	mm ⁴			
W_{eff} (inf) =	74080495	mm ³	W_{eff} (sup) =	41932643	mm ³
$e =$	52.16	mm			
$\eta =$	0.54				

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

Fase 2

Soletta c.a. collaborante

b_{eff} =	2.84	m
Altezza soletta:	0.26	m
Area soletta:	0.74	m ²
J_{yy} =	0.00416	m ⁴
Peso =	18.46	kN/m

Trave acciaio

Area trave acciaio:	0.0897	m ²
H trave acciaio:	2.00	m
y_G =	0.775	m
J_{yy} =	0.056746	m ⁴
Peso =	7.04	kN/m

Barre armatura soletta

1° strato barre (superiore)			2° strato barre (inferiore)		
n. Barre:	28		n. Barre:	28	
interasse:	0.10	m	interasse:	0.10	m
Diametro:	0.022	m	Diametro:	0.022	m
Area:	0.010644	m ²	Area:	0.010644	m ²
y_1 =	0.05	m	y_2 =	0.21	m

$n = 18.0$

Coeff. omogeneizzazione con viscosità in atto

Materiali

cls	Barre armature	Acciaio
$R_{ck} = 40$ MPa	$f_{yk} = 450$ MPa	$f_{yk} = 355$ MPa
$f_{ck} = 33.20$ MPa	$\gamma_M = 1.15$	$\gamma_{Mo} = 1.05$
$f_{cd} = 18.81$ MPa	$f_{y0.5} = 391.30$ MPa	$f_{y0.5} = 338.10$ MPa
$f_{ctm} = 41.2$ MPa		
$f_{ctm} = 3.10$ MPa		
$E_{cm} = 33643$ MPa		

Caratteristiche geometriche

A_{cl} =	0.1520	m ²	Area sezione omogeneizzata in area di acciaio
A_v =	39350	mm ²	Area taglio sezione di acciaio
$y_{G,inf,d}$ =	1.33	m	Asse neutro rispetto lembo inferiore:
$y_{G,sup,d}$ =	0.93	m	Asse neutro rispetto lembo superiore
$J_{xx,d}$ =	0.124615	m ⁴	Momento d'inerzia sezione omogeneizzata ad acciaio
$W_{inf,d}$ =	0.093664	m ³	Modulo elastico sezione omogeneizzata ad acciaio
$W_{sup,d}$ =	0.134061	m ³	Modulo elastico sezione omogeneizzata ad acciaio

Sollecitazioni

M_{ed} =	9855.00	kNm	(SLU)	
M_{ed} =	31667.22	kNm	=>	0.31 ok!
T_{ed} =	349.00	kN	(SLU)	
T_{ed} =	7315.33	kN	=>	0.05 ok!

Tensioni

σ_c =	4.08	MPa	=>	0.22 ok!(<1)	Tensione al lembo superiore soletta
$\sigma_{s,sup}$ =	69.56	MPa	=>	0.18 ok!(<1)	Tensione barre superiori soletta
$\sigma_{s,inf}$ =	56.90	MPa	=>	0.15 ok!(<1)	Tensione barre inferiori soletta
$\sigma_{a,sup}$ =	52.95	MPa	=>	0.16 ok!(<1)	Tensione acciaio lembo superiore
$\sigma_{a,inf}$ =	105.22	MPa	=>	0.31 ok!(<1)	Tensione acciaio lembo inferiore

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

Fase 3

Soletta c.a. collaborante

b_{eff} =	2.84	m
Altezza soletta:	0.26	m
Area soletta:	0.74	m ²
J_{xx} =	0.00416	m ⁴
Peso =	18.46	kN/m

Trave acciaio

Area trave acciaio:	0.0897	m ²
H trave acciaio:	2.00	m
y_G =	0.775	m
J_{xx} =	0.056746	m ⁴
Peso =	7.04	kN/m

Barre armatura soletta

1° strato barre (superiore)		2° strato barre (inferiore)	
n. Barre:	28	n. Barre:	28
Interasse:	0.10 m	Interasse:	0.10 m
Diametro:	0.022 m	Diametro:	0.022 m
Area:	0.010644 m ²	Area:	0.010644 m ²
y_1 =	0.05 m	y_2 =	0.21 m

n = 6.2 Coeff. omogeneizzazione a tempo infinito

Materiali

cls	Barre armature	Acciaio
R_{ck} = 40 MPa	f_{yk} = 450 MPa	f_{yk} = 355 MPa
f_{tk} = 33.20 MPa	γ_M = 1.15	γ_{M0} = 1.05
f_{td} = 18.81 MPa	$f_{yt,s}$ = 391.30 MPa	$f_{yt,a}$ = 338.10 MPa
f_{cm} = 41.2 MPa		
f_{dm} = 3.10 MPa		
E_{cm} = 33643 MPa		

Caratteristiche geometriche

A_e =	0.2301	m ²	Area sezione omogeneizzata in area di acciaio
A_v =	39350	mm ²	Area taglio sezione di acciaio
$y_{G,inf,cl}$ =	1.60	m	Asse neutro rispetto lembo inferiore:
$y_{G,sup,cl}$ =	0.66	m	Asse neutro rispetto lembo superiore
$J_{xx,cl}$ =	0.15803	m ⁴	Momento d'inerzia sezione omogeneizzata ad acciaio
$W_{inf,cl}$ =	0.09866	m ³	Modulo elastico sezione omogeneizzata ad acciaio
$W_{sup,cl}$ =	0.240081	m ³	Modulo elastico sezione omogeneizzata ad acciaio

Sollecitazioni

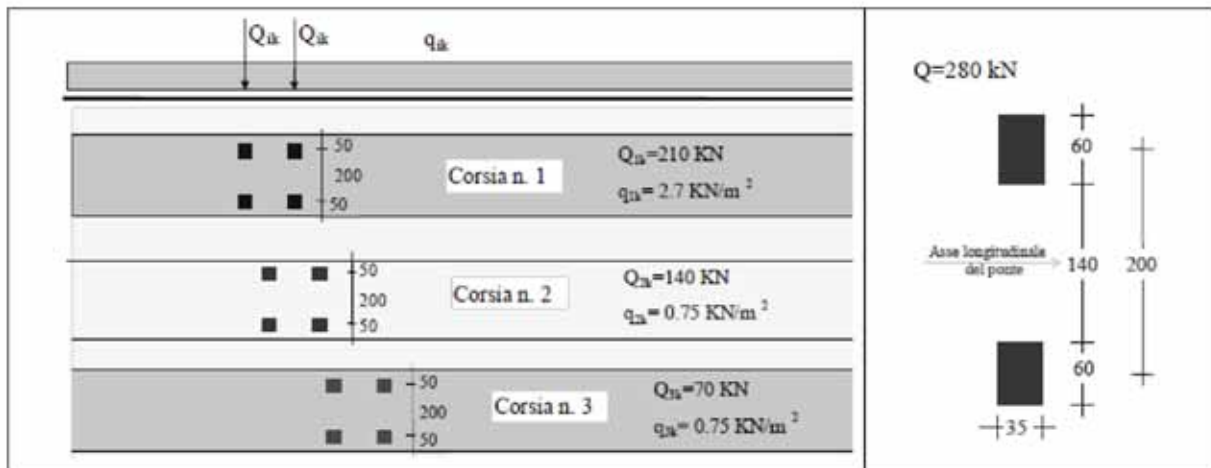
M_{ed} =	27129.00	kNm	(SLU)	
M_{td} =	33356.36	kNm	=>	0.81 ok!
T_{ed} =	1232.00	kN	(SLU)	
T_{td} =	7315.33	kN	=>	0.17 ok!

Tensioni

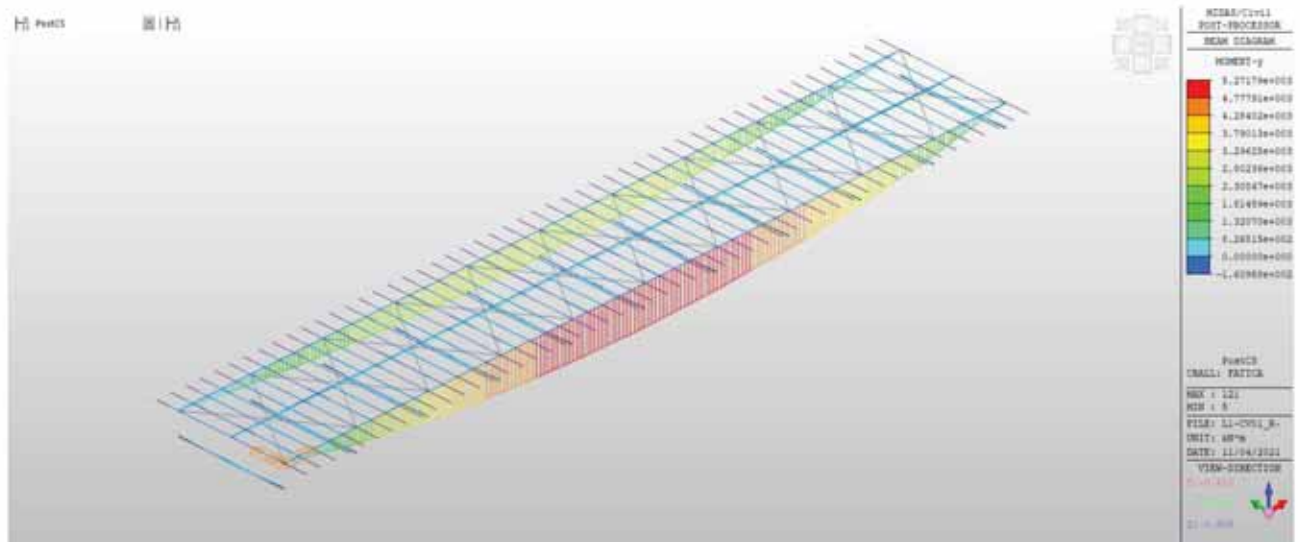
σ_c =	18.23	MPa	=>	0.97 ok!(<1)	Tensione al lembo superiore soletta
$\sigma_{s,sup}$ =	104.42	MPa	=>	0.27 ok!(<1)	Tensione barre superiori soletta
$\sigma_{s,inf}$ =	76.95	MPa	=>	0.20 ok!(<1)	Tensione barre inferiori soletta
$\sigma_{a,sup}$ =	68.36	MPa	=>	0.20 ok!(<1)	Tensione acciaio lembo superiore
$\sigma_{a,inf}$ =	274.98	MPa	=>	0.81 ok!(<1)	Tensione acciaio lembo inferiore

6.2.2 VERIFICA A FATICA

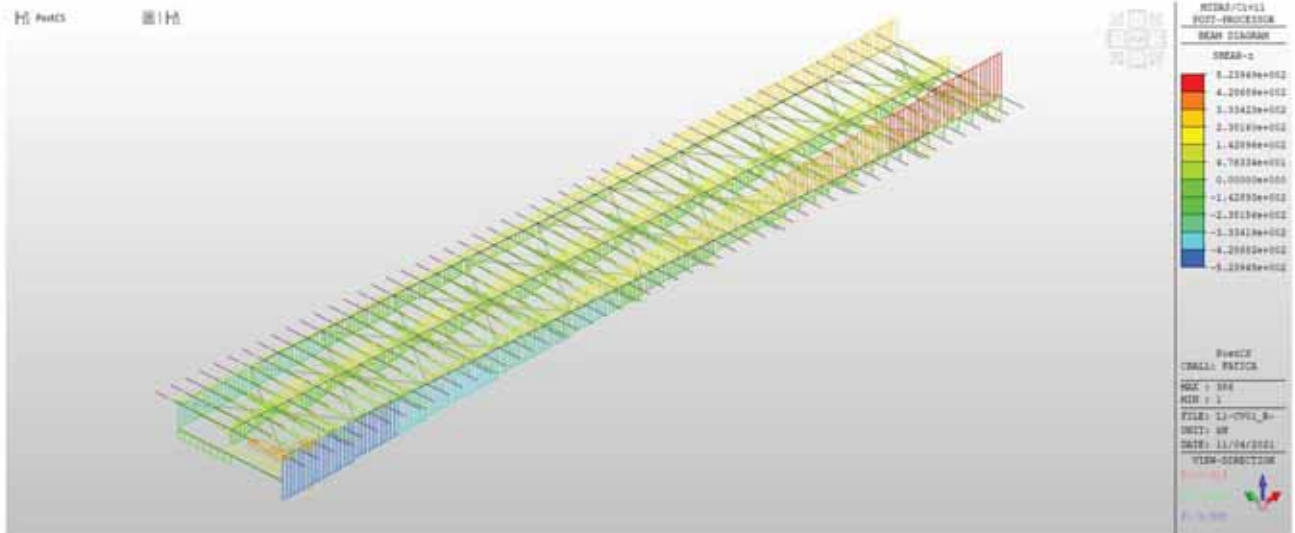
Le verifiche a fatica sono state effettuate considerando il modello di carico che è costituito dallo schema di carico 1 con valori dei carichi concentrati ridotti del 30% e valori dei carichi distribuiti ridotti del 70%.



Si riportano di seguito le sollecitazioni calcolate sulla trave oggetto di verifica soggetta ai carichi suddetti.



LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO



Si procede con il calcolo delle variazioni di tensioni sulla trave in acciaio dovute al transito dei carichi suddetti.

Sollecitazioni

M_{ed}	5272.00	kNm	(SLU)		
M_{ed}	33356.36	kNm	\Rightarrow	0.16	ok!
T_{ed}	524.00	kN	(SLU)		
T_{ed}	7315.33	kN	\Rightarrow	0.07	ok!

Tensioni

$\sigma_{s,sup}$	20.29	MPa	\Rightarrow	0.05	ok!(<1)	Tensione barre superiori soletta
$\sigma_{s,inf}$	14.95	MPa	\Rightarrow	0.04	ok!(<1)	Tensione barre inferiori soletta
$\sigma_{a,sup}$	13.29	MPa	\Rightarrow	0.04	ok!(<1)	Tensione acciaio lembo superiore
$\sigma_{a,inf}$	53.44	MPa	\Rightarrow	0.16	ok!(<1)	Tensione acciaio lembo inferiore

VERIFICHE PER VITA ILLIMITATA

Le verifiche a fatica per vita illimitata possono essere condotte controllando che il massimo delta di tensione Δs_{max} indotto nel dettaglio stesso dallo spettro di carico risulti minore del limite di fatica del dettaglio stesso:

$$\Delta s_{max,d} = \gamma_{Mf} \Delta s_{max} \leq \Delta s_{\Delta}$$



oppure

$$\Delta t_{max,d} = \gamma_{Mf} \Delta t_{max} < \Delta t_D = \Delta t_L$$

$$\Delta s_D = 0,737 \Delta s_C$$

$$\gamma_{Mf} = 1,35 \text{ (strutture sensibili alla rottura per fatica - conseguenze significative)}$$

Travi in composizione saldata

100	 	<p>5) Saldatura manuale a cordoni d'angolo o a piena penetrazione</p> <p>6) Saldatura a piena penetrazione manuale o automatica eseguita da un solo lato, in particolare per travi a cassone</p>	<p>5) e 6) Deve essere assicurato un corretto contatto tra anima e piattabanda. Il bordo dell'anima deve essere preparato in modo da garantire una penetrazione regolare alla radice, senza interruzioni</p>
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Delta massimo di tensione attacco anima-ala inf:

$$\Delta S_{max} = 53,44 \text{ MPa}$$

Limiti di fatica ad ampiezza costante: $\Delta S_D = 0,737 \times 100 = 73,70 \text{ MPa}$

Verifica a fatica: $\gamma_{Mf} \Delta S_{max} < \Delta S_D$ $1,35 \times 53,44 = 74,14 \text{ MPa} < 73,70 \text{ MPa} = \Delta S_D$

Saldature di testa trasversali

112	   	<p>Saldature senza piatto di sostegno</p> <ol style="list-style-type: none"> Giunti trasversali in piatti e lamiere Giunti di anime e piattabande in travi composte eseguiti prima dell'assemblaggio Giunti trasversali completi di profili laminati, in assenza di lunette di scarico Giunti trasversali di lamiere e piatti con rastremazioni in larghezza e spessore con pendenza non maggiore di 1:4. Nelle zone di transizione gli intagli nelle saldature devono essere eliminati <p>Per spessori $t > 25 \text{ mm}$, si deve adottare una classe ridotta del coefficiente</p> $k_1 = (25/t)^{0,7}$	<p>Saldature effettuate da entrambi i lati, molate in direzione degli sforzi e sottoposte a controlli non distruttivi</p> <p>Le saldature devono essere iniziate e terminate su tacchi d'estremità, da rimuovere una volta completata la saldatura</p> <p>I bordi esterni delle saldature devono essere molati in direzione degli sforzi</p> <p>3) Vale solo per profilati tagliati e risaldati</p>
-----	---	--	---

Delta massimo di tensione attacco anima-ala inf:

$$D S_{max} = 53,44 \text{ MPa}$$

Limiti di fatica ad ampiezza costante: $\Delta S_D = 0,737 \times 112 = 82,54 \text{ MPa}$

Verifica a fatica: $\gamma_{Mf} \Delta S_{max} < \Delta S_D$ $1,35 \times 53,44 = 72,14 \text{ MPa} < 82,54 \text{ MPa} = \Delta S_D$

6.2.3 TRAVE DI SPINA

Si riporta di seguito la verifica della trave di spina. La trave presenta un valore di momento flettente di involucro positivo e negativo lungo tutto il suo sviluppo per effetto dell'involuppo delle azioni statiche e sismiche. In particolare, le azioni sismiche verticali, producono proprio un effetto di inversione di momento. Per tale motivo a favore di sicurezza si verifica la trave di spina solo come elemento in acciaio trascurando l'effetto della soletta collaborante.

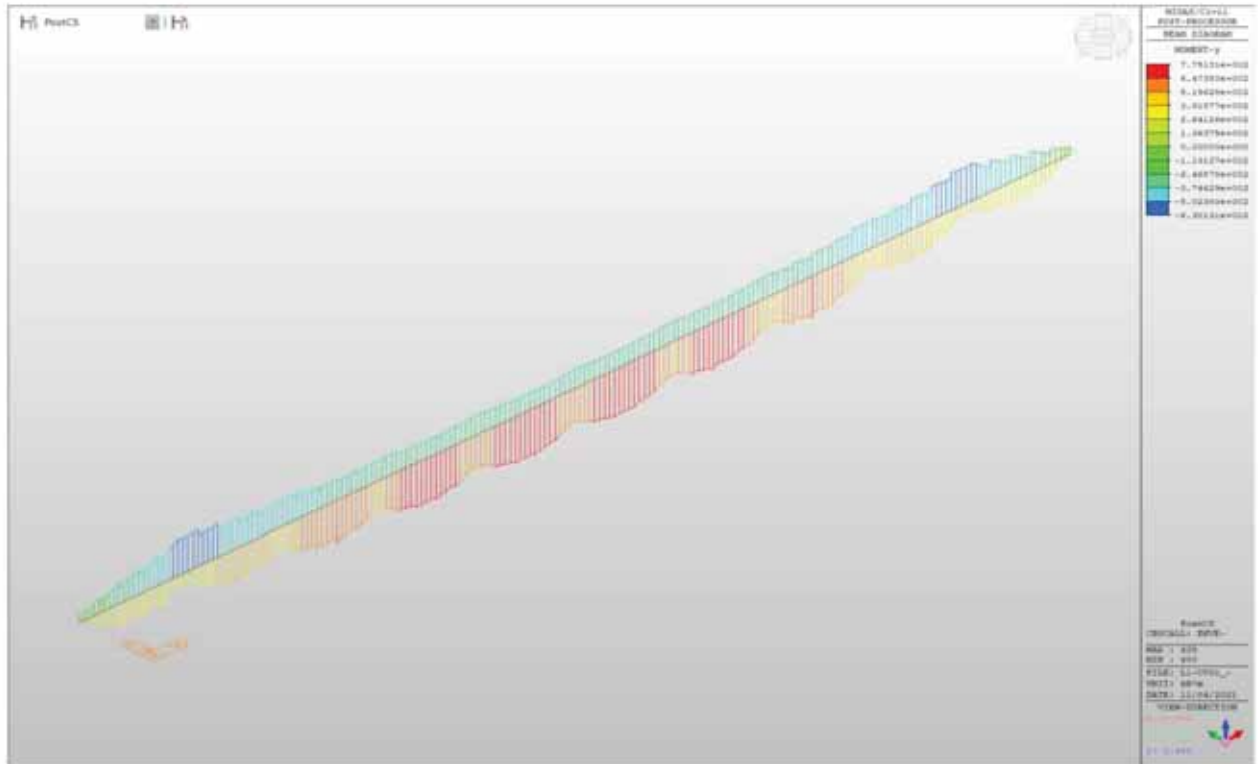


Figura 67- Trave di spina - Diagramma My - Involuppo SLU-SLV

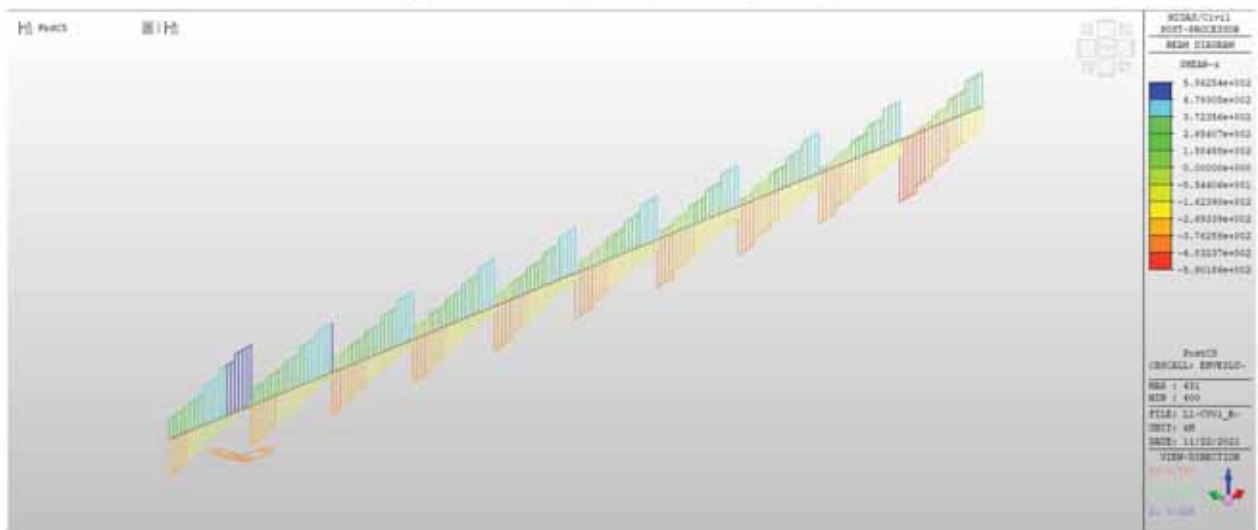
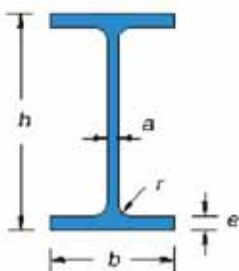


Figura 68 - Trave di spina - Diagramma Tz - Involuppo SLU-SLV

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

CARATTERISTICHE PROFILO:			
Tipo:	5355		
B_{SUP}	300	mm	
$t_{f,SUP}$	25.0	mm	$A_{f,sup} = 7500.00 \text{ mm}^2$
B_{INF}	300	mm	
$t_{f,INF}$	25.0	mm	$A_{f,inf} = 7500.00 \text{ mm}^2$
H	590	mm	
$t_w = a$	13.0	mm	$A_w = 7020.00 \text{ mm}^2$
L	4100	mm	n. traversi: 1
A_{TOT}	22020.00	mm ²	
$Y_{G,inf}$	295.00	mm	$Y_{G,sup} = 295.00 \text{ mm}$
J_{xx}	1368461000	mm ⁴	$J_t = 3520460 \text{ mm}^4$
J_{yy}	112608019	mm ⁴	$J_{\omega} = 5.070E+11 \text{ mm}^6$
$W_{eL,inf}$	4638851	mm ³	$W_{eL,sup} = 4638851 \text{ mm}^3$
W_{pl}	5185200	mm ³	
$W_{pl,xxx} = 2 \left[\frac{t_w H^2}{8} + t_f (b - t_w) \frac{H - t_f}{2} + 2r^2 \left(\frac{H}{2} - t_f - \frac{r}{2} \right) - 2 \frac{\pi r^2}{4} \left(\frac{H}{2} - t_f + r + \frac{4r}{3\pi} \right) \right]$			
ρ_{xx}	249.29	mm	$\rho_{xxx} = \sqrt{\frac{J_{xx}}{A}}$
ρ_{yy}	71.51	mm	
Peso	172.86	kg/m	
E	210000	N/mm ²	modulo elastico
ν	0.3		coeff. poisson
G	80769	N/mm ²	$G = \frac{E}{2(1 + \nu)}$ modulo elasticità trasversale
α	0.000012	°C ⁻¹	coeff. espansione termica lineare
f_{yk}	355	N/mm ²	tensione snervamento caratteristica
f_{tk}	510	N/mm ²	tensione rottura caratteristica
γ_{M0}	1.05		per sezioni classe 1,2,3 e 4
γ_{M1}	1.05		per instabilità membrature
γ_{M1}	1.10		per instabilità membrature ponti stradali e ferroviari
γ_{M2}	1.25		per sezioni tese indebolite dai fori nei riguardi della frattura
			
SOLLECITAZIONI:			
$N_{t,sd}$	0	N	caso per trave tesa
$N_{c,sd}$	0	N	caso per trave compressa
$M_{t,sd}$	775130000	Nmm	caso per trave inflessa in una direzione
V_{sd}	590180	N	taglio
Caso per trave a flessione deviata:			
$M_{y,sd}$	0	Nmm	$M_{z,sd} = 0$ Nmm
Valori del momento massimo e minimo dell'asta:			
$M_{max,y,sd}$	0	Nmm	$M_{max,y,sd} = 0$ Nmm
$M_{max,z,sd}$	0	Nmm	$M_{max,z,sd} = 0$ Nmm

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

CLASSE APPARTENENZA PROFILO (NTC2008, 4.2.3.1):					
ALA SUPERIORE		ALA INFERIORE		ANIMA	
$C/t_{i,sup} =$	5.74	$C/t_{i,inf} =$	5.74	$C/t_w =$	41.54
$\varepsilon =$	0.81	$\varepsilon =$	0.81	$\varepsilon =$	0.81
Curva di instabilità "b": Fattore di imperfezione α : 0.34					
<input checked="" type="radio"/> Parte soggetta a flessione <input type="radio"/> Parte soggetta a compressione <input type="radio"/> Parte soggetta a flessione ed a compressione				ANIMA Classe 1	

SOLLECITAZIONE DELL'ASTA A TAGLIO (NTC2008, 4.2.4.1.2):					
$\frac{V_{sd}}{V_{c,Rd}} \leq 1$					
Area taglio resistente:		$A_v =$	7345	mm ²	
$V_{c,Rd} = \frac{A_v f_{yk}}{\sqrt{3} \gamma_{M0}}$	$V_{c,Rd} =$	1433739	N	\Rightarrow	0.41 OK!(<1)

SOLLECITAZIONE DELL'ASTA A FLESSIONE MONDASSIALE RETTA (NTC2008, 4.2.4.1.2):					
$\frac{M_{sd}}{M_{c,Rd}} \leq 1$					
$V_{sd} < 0,5 V_{c,Rd}$		<i>Il taglio non influisce sulla verifica a flessione!</i>			
$\rho = \left[\frac{2V_{sd}}{V_{c,Rd}} - 1 \right]^2$	0.03123	$f_{y,red} = (1 - \rho) f_{yk}$	344	N/mm ²	
		$f_{yk} =$	355	N/mm ²	
Calcolo resistenza plastica sezione lorda, classe 1 e 2:					
$M_{pl,Rd} = \frac{W_{pl} f_{yk}}{\gamma_{M0}}$	$M_{pl,Rd} =$	1753091429	Nmm	\Rightarrow	0.44 OK!(<1)
Calcolo resistenza elastica sezione lorda, classe 3:					
$M_{el,Rd} = \frac{W_{el,min} f_{yk}}{\gamma_{M0}}$	$M_{el,Rd} =$	1568373382	Nmm	\Rightarrow	0.49 OK!(<1)

6.2.4 TRAVERSO

Si riportano di seguito i diagrammi di sollecitazione e di verifica dei traveri.

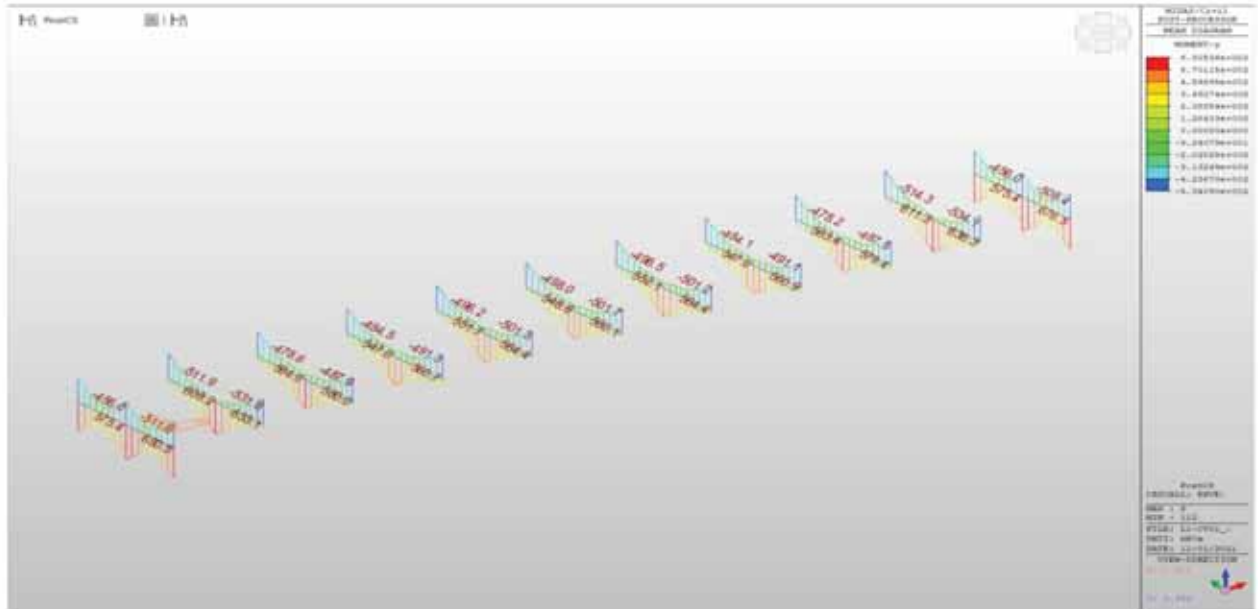


Figura 69 – Traverso - Momento SLU-SLV

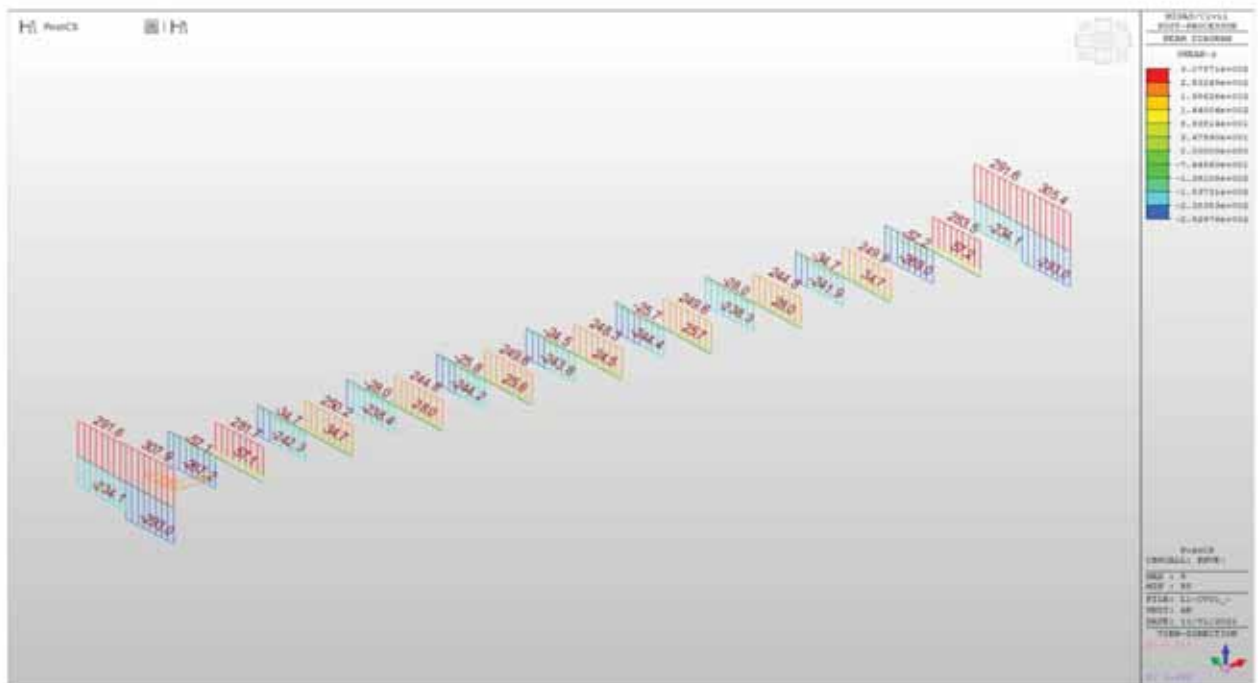
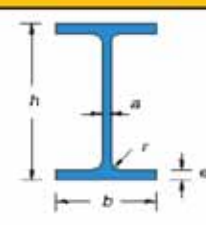


Figura 70 - Traverso - Taglio SLU-SLV

6.2.4.1 VERIFICA TRAVERSO DI CAMPATA

CARATTERISTICHE PROFILO			
Tipo:	5355		
B_{SUP} =	350	mm	
$t_{r,SUP}$ =	25,0	mm	$A_{r,SUP}$ = 8750,00 mm ²
B_{INF} =	350	mm	$A_{r,INF}$ = 8750,00 mm ²
$t_{r,INF}$ =	25,0	mm	
H =	800	mm	
$t_w = a$ =	20,0	mm	A_w = 15000,00 mm ²
L =	4100	mm	n. traversi: 1
A_{TOT} =	32500,00	mm ²	
$Y_{0,INF}$ =	400,00	mm	$Y_{0,SUP}$ = 400,00 mm
J_{XX} =	3331770833	mm ⁴	J_y = 5645833 mm ⁴
J_W =	179179167	mm ⁴	J_w = 2,731E+14 mm ⁶
$W_{el,INF}$ =	8329427	mm ³	$W_{el,SUP}$ = 8329427 mm ³
W_{pl} =	9593750	mm ³	
$W_{pl,XX} = 2 \left[\frac{t_w H^2}{8} + t_f (b - t_w) \frac{H - t_f}{2} + 2r^2 \left(\frac{H}{2} - t_f - \frac{r}{2} \right) - 2 \frac{\pi r^2}{4} \left(\frac{H}{2} - t_f + r + \frac{4r}{3\pi} \right) \right]$			
ρ_{XX} =	320,18	mm	$\rho_{XX} = \sqrt{\frac{J_{XX}}{A}}$
ρ_W =	74,25	mm	
Peso =	255,13	kg/m	
E =	210000	N/mm ²	modulo elastico
ν =	0,3		coeff. poisson
G =	80769	N/mm ²	$G = \frac{E}{2(1 + \nu)}$ modulo elasticità trasversale
α =	0,000012	°C ⁻¹	coeff. espansione termica lineare
f_{yk} =	355	N/mm ²	tensione snervamento caratteristica
f_{tk} =	510	N/mm ²	tensione rottura caratteristica
γ_{M0} =	1,05		per sezioni classe 1,2,3 e 4
γ_{M1} =	1,05		per instabilità membrature
γ_{M2} =	1,10		per instabilità membrature ponti stradali e ferroviari
γ_{M3} =	1,25		per sezioni tese indebolite dai fori nei riguardi della frattura



SOLLECITAZIONI			
$N_{t,d}$ =	0	N	caso per trave tesa
$N_{c,d}$ =	0	N	caso per trave compressa
M_{d} =	636300000	Nmm	caso per trave inflessa in una direzione
V_{d} =	283500	N	taglio
Caso per trave a flessione deviata:			
$M_{y,d}$ =	0	Nmm	$M_{z,d}$ = 0 Nmm
Valori del momento massimo e minimo dell'asta:			
$M_{max,y,d}$ =	0	Nmm	$M_{max,z,d}$ = 0 Nmm
$M_{min,y,d}$ =	0	Nmm	$M_{min,z,d}$ = 0 Nmm

CLASSE APPARTENENZA PROFILO (NTC2008, 4.2.3.1)			
ALA SUPERIORE		ALA INFERIORE	
$C/t_{r,SUP}$ =	6,60	$C/t_{r,INF}$ =	6,60
ϵ =	0,81	ϵ =	0,81
		ANIMA	
		C/t_w = 37,50	
		ϵ = 0,81	
Curva di instabilità "b":			
Fattore di imperfezione α :		0,34	
		ANIMA	
		Classe I	
<input checked="" type="radio"/> Parte soggetta a flessione <input type="radio"/> Parte soggetta a compressione <input type="radio"/> Parte soggetta a flessione ed a compressione			

SOLLECITAZIONE DELL'ASTA A TAGLIO (NTC2008, 4.2.4.1.2):

$$\frac{V_{sd}}{V_{c,Rd}} \leq 1$$

Area taglio resistente:

$$A_v = 15500 \text{ mm}^2$$

$$V_{c,Rd} = \frac{A_v f_{yk}}{\sqrt{3} \gamma_{M0}}$$

$$V_{c,Rd} = 3025590 \text{ N}$$

N

=>

$$0,09$$

OK!(<1)

Verifica in presenza di torsione uniforme:

$$\tau_{t,sd} = 0 \text{ N/mm}^2$$

$$V_{c,Rd,red} = \left[1 - \frac{\tau_{t,sd}}{\frac{f_{yk}}{\sqrt{3} \gamma_{M0}}} \right] V_{c,Rd}$$

$$V_{c,Rd,red} = 3025590 \text{ N}$$

N

=>

$$0,09$$

OK!(<1)

SOLLECITAZIONE DELL'ASTA A FLESSIONE MONOASSIALE RETTA (NTC2008, 4.2.4.1.2):

$$\frac{M_{sd}}{M_{c,Rd}} \leq 1$$

$$V_{sd} < 0,5 V_{c,Rd}$$

Il taglio non influisce sulla verifica a flessione!

$$\rho = \left[\frac{2V_{sd}}{V_{c,Rd}} - 1 \right]^2$$

$$0,66032$$

$$f_{y,red} = (1 - \rho) f_{yk}$$

$$121 \text{ N/mm}^2$$

$$f_{yk} =$$

$$355 \text{ N/mm}^2$$

Calcolo resistenza plastica sezione lorda, classe 1 e 2:

$$M_{pl,Rd} = \frac{W_{pl} f_{yk}}{\gamma_{M0}}$$

$$M_{pl,Rd} = 3243601190 \text{ Nmm}$$

Nmm

=>

$$0,20$$

OK!(<1)

Calcolo resistenza elastica sezione lorda, classe 3:

$$M_{el,Rd} = \frac{W_{el,min} f_{yk}}{\gamma_{M0}}$$

$$M_{el,Rd} = 2816139633 \text{ Nmm}$$

Nmm

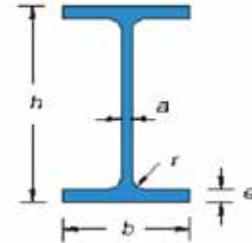
=>

$$0,23$$

OK!(<1)

6.2.4.2 VERIFICA TRAVERSO DI TESTATA

CARATTERISTICHE PROFILO:			
Tipo:	<input type="text" value="S355"/>		
B_{SUP}	350	mm	
$t_{f,SUP}$	25,0	mm	$A_{t,SUP} = 8750,00 \text{ mm}^2$
B_{INF}	350	mm	
$t_{f,INF}$	25,0	mm	$A_{t,INF} = 8750,00 \text{ mm}^2$
H	1350	mm	
$t_w = a$	20,0	mm	$A_w = 26000,00 \text{ mm}^2$
L	4100	mm	n. traversi: 1
A_{TOT}	43500,00	mm ²	
$Y_{G,inf}$	675,00	mm	$Y_{G,sup} = 675,00 \text{ mm}$
J_{xx}	11343437500	mm ⁴	$J_t = 7112500 \text{ mm}^4$
J_{yy}	179545833	mm ⁴	$J_w = 2,731E+14 \text{ mm}^6$
$W_{el,inf}$	16805093	mm ³	$W_{el,sup} = 16805093 \text{ mm}^3$
W_{pl}	20043750	mm ³	
$W_{pl,xxx} = 2 \left[\frac{t_w H^2}{8} + t_f (b - t_w) \frac{H - t_f}{2} + 2r^2 \left(\frac{H}{2} - t_f - \frac{r}{2} \right) - 2 \frac{\pi r^2}{4} \left(\frac{H}{2} - t_f + r + \frac{4r}{3\pi} \right) \right]$			
ρ_{xx}	510,66	mm	$\rho_{xxx} = \sqrt{\frac{J_{xxx}}{A}}$
ρ_{yy}	64,25	mm	
Peso	341,48	kg/m	
E	210000	N/mm ²	modulo elastico
ν	0,3		coeff. poisson
G	80769	N/mm ²	$G = \frac{E}{2(1 + \nu)}$ modulo elasticità trasversale
α	0,000012	°C ⁻¹	coeff. espansione termica lineare
f_{yk}	355	N/mm ²	tensione snervamento caratteristica
f_{tk}	510	N/mm ²	tensione rottura caratteristica
γ_{M0}	1,05		per sezioni classe 1,2,3 e 4
γ_{M1}	1,05		per instabilità membrature
γ_{M1}	1,10		per instabilità membrature ponti stradali e ferroviari
γ_{M2}	1,25		per sezioni tese indebolite dai fori nei riguardi della frattura



SOLLECITAZIONI:			
$N_{t,sd}$	0	N	caso per trave tesa
$N_{c,sd}$	0	N	caso per trave compressa
$M_{y,sd}$	680530000	Nmm	caso per trave inflessa in una direzione
V_{sd}	308000	N	taglio
Caso per trave a flessione deviata:			
$M_{y,sd}$	0	Nmm	$M_{z,sd} = 0$ Nmm
Valori del momento massimo e minimo dell'asta:			
$M_{max,y,sd}$	0	Nmm	$M_{max,y,sd} = 0$ Nmm
$M_{max,z,sd}$	0	Nmm	$M_{max,z,sd} = 0$ Nmm

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

CLASSE APPARTENENZA PROFILO (NTC2008, 4.2.3.1):					
ALA SUPERIORE		ALA INFERIORE		ANIMA	
$C/t_{i, sup} =$	6,60	$C/t_{i, inf} =$	6,60	$C/t_w =$	65,00
$\varepsilon =$	0,81	$\varepsilon =$	0,81	$\varepsilon =$	0,81
Curva di instabilità "b":					
Fattore di imperfezione $\alpha:$		0,34		ANIMA	
				Classe 2	
<input checked="" type="radio"/> Parte soggetta a flessione <input type="radio"/> Parte soggetta a compressione <input type="radio"/> Parte soggetta a flessione ed a compressione					

SOLLECITAZIONE DELL'ASTA A TAGLIO (NTC2008, 4.2.4.1.2):					
$\frac{V_{sd}}{V_{c,Rd}} \leq 1$					
Area taglio resistente:		$A_v =$	26500	mm ²	
$V_{c,Rd} = \frac{A_v f_{yk}}{\sqrt{3} \gamma_{M0}}$	$V_{c,Rd} =$	5172783	N	\Rightarrow	0,06 OK!(<1)
Verifica in presenza di torsione uniforme:					
$\tau_{t, sd} =$	0	N/mm ²			
$V_{c,Rd,red} = \left[1 - \frac{\tau_{t, sd}}{f_{yk}} \right] V_{c,Rd}$					
$V_{c,Rd,red} =$	5172783	N	\Rightarrow	0,06	OK!(<1)

SOLLECITAZIONE DELL'ASTA A FLESSIONE MONOASSIALE RETTA (NTC2008, 4.2.4.1.2):					
$\frac{M_{sd}}{M_{c,Rd}} \leq 1$					
$V_{sd} < 0,5 V_{c,Rd}$	Il taglio non influisce sulla verifica a flessione!				
$\rho = \left[\frac{2V_{sd}}{V_{c,Rd}} - 1 \right]^2$	0,77601	$f_{y,red} = (1 - \rho) f_{yk}$	80	N/mm ²	
		$f_{yk} =$	355	N/mm ²	
Calcolo resistenza plastica sezione lorda, classe 1 e 2:					
$M_{pl,Rd} = \frac{W_{pl} f_{yk}}{\gamma_{M0}}$	$M_{pl,Rd} =$	6776696429	Nmm	\Rightarrow	0,10 OK!(<1)
Calcolo resistenza elastica sezione lorda, classe 3:					
$M_{el,Rd} = \frac{W_{el, min} f_{yk}}{\gamma_{M0}}$	$M_{el,Rd} =$	5681721781	Nmm	\Rightarrow	0,12 OK!(<1)

6.2.5 VERIFICA PIOLI

Si riporta nel seguito la verifica del sistema di collegamento fra trave metallica e soletta gettata in opera. Il sistema di connessione è realizzato mediante pioli di tipo Nelson resistenti a taglio, saldati alla piattabanda superiore della trave principale ed annegati nella soletta in calcestruzzo. Si ritiene che l'intera forza di scorrimento sia assorbita solo dalla piolatura predisposta sulle travi principali di impalcato, trascurando, a favore di sicurezza il contributo della piolatura posta sulla trave di spina. Il dimensionamento dei connettori è stato eseguito in riferimento alle prescrizioni indicate dalla normativa. Scegliendo di inserire i pioli a passo costante lungo tutto lo sviluppo della trave, si è scelto di determinare la forza di scorrimento applicata tramite l'integrazione delle tensioni indotte sulla soletta collaborante considerando le tensioni indotte ai lembi della soletta stessa.

La collaborazione tra la trave metallica e la soletta è assicurata mediante pioli elettrosaldati all'ala della trave di acciaio. Per le verifiche si fa riferimento al punto 4.3.4.3.1.2 delle NTC.

$$P_{rd,s} = 0,8 f_u (\pi d^2 / 4) / \gamma_v \quad [4.3.9]$$

$$P_{rd,s} = 0,29 \alpha d^2 (f_{ck} E_{cm})^{0,3} / \gamma_v \quad [4.3.10]$$

In cui:

γ_v è il fattore parziale definito al § 4.3.3;

f_{tk} è la resistenza caratteristica a rottura dell'acciaio del piolo (comunque $f_{tk} \leq 500$ MPa);

f_{ck} è la resistenza cilindrica caratteristica del calcestruzzo della soletta;

E_{cm} è il valore medio del modulo elastico secante del calcestruzzo della soletta definito al § 11.2.10.3;

d è il diametro del piolo, compreso tra 16 e 25 mm;

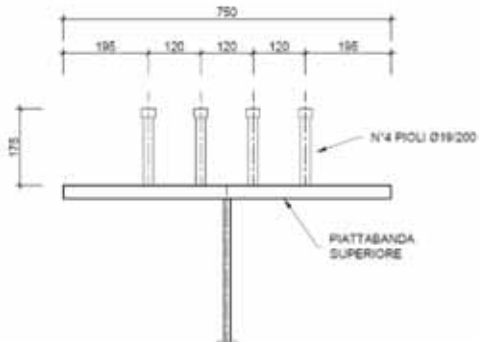
h_{sc} è l'altezza del piolo dopo la saldatura;

$$\alpha = 0,2 (h_{sc} / d + 1) \quad \text{per } 3 \leq h_{sc} / d \leq 4, \quad [4.3.11 a]$$

$$\alpha = 1,0 \quad \text{per } h_{sc} / d > 4. \quad [4.3.11 b]$$

Per il caso in esame si ottiene:

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO



ftk =	450	Mpa
fck =	32	Mpa
Ecm =	33346	Mpa
α =	1	
d =	19	mm
γv =	1,25	
Prd,a =	81,656	kN
Prd,c =	86,515	kN

Si procedere ora con il calcolo della forza di scorrimento e quindi con il valore di carico massimo determinato per ciascun piolo.

L =	41	m
Bsol =	2840	mm
H tot =	2260	mm
H sol =	260	mm
Y_{G,sup,ld} =	658,23	mm
σ_{c1} =	18,23	Mpa
σ_{c2} =	11,03	Mpa
Fv_(L/2) =	526,8263	kN
Δx =	200	mm
N_{Pioli} =	4	
Fv_(PIOLO) =	26,34	kN

Fv_{Piolo} < min (Prd,a ; Prd,c) - Ok Verificato

6.2.6 GIUNTI BULLONATI

Si riporta di seguito la verifica dei giunti bullonati previsti nei traversi di spalla che risultano essere maggiormente sollecitati.



Figura 71 - Traverso di Campata

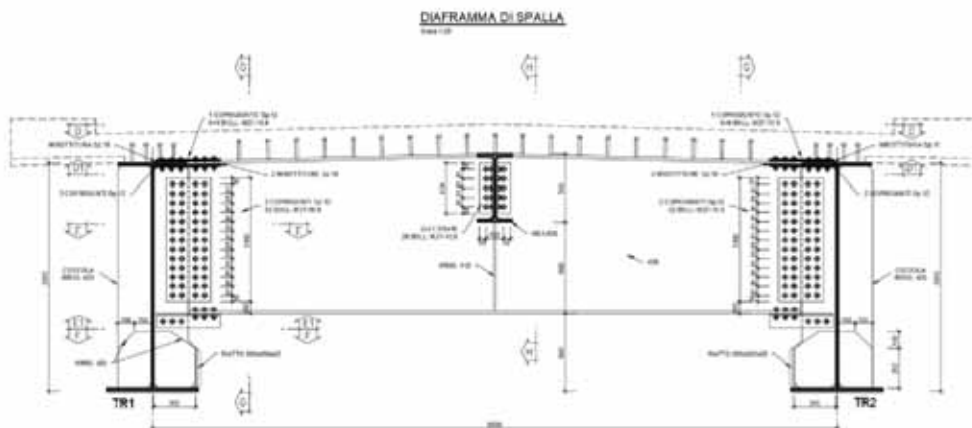


Figura 72 – Traverso di Testata

6.2.6.1 VERIFICA GIUNTO TRAVERSO DI CAMPATA

$\gamma_{M0} =$	1,05	per sezioni classe 1,2,3 e 4		
$\gamma_{M1} =$	1,05	per instabilità membrature		
$\gamma_{M1} =$	1,10	per instabilità membrature ponti stradali e ferroviari		
$\gamma_{M2} =$	1,25	per sezioni tese indebolite dai fori nei riguardi della frattura		
Resistenza a taglio bulloni 4.6, 5.6 e 8.8				
27	▼	10,9	▼	
$F_{V,Rd} = \frac{0,6 \cdot f_{tb} \cdot A_{res}}{\gamma_{M2}}$		220,32	kN	
Resistenza a taglio bulloni 6.8 e 10.9				
$F_{V,Rd} = \frac{0,5 \cdot f_{tb} \cdot A_{res}}{\gamma_{M2}}$		183,6	kN	
Resistenza a rifollamento				
$F_{b,Rd} = \frac{k \cdot \alpha \cdot f_{tk} \cdot d \cdot t}{\gamma_{M2}}$		182,87	kN	di bordo
		182,87	kN	interni
dove:				
d è il diametro nominale del gambo del bullone,				
t è lo spessore della piastra collegata,				
f_{tb} è la resistenza a rottura del materiale della piastra collegata,				
$\alpha = \min \{e_1 / (3 d_0) ; f_{tb} / f_t ; 1\}$ per bulloni di bordo nella direzione del carico applicato,				
$\alpha = \min \{p_1 / (3 d_0) - 0,25 ; f_{tb} / f_t ; 1\}$ per bulloni interni nella direzione del carico applicato,				
$k = \min \{2,8 e_2 / d_0 - 1,7 ; 2,5\}$ per bulloni di bordo nella direzione perpendicolare al carico applicato,				
$k = \min \{1,4 p_2 / d_0 - 1,7 ; 2,5\}$ per bulloni interni nella direzione perpendicolare al carico applicato,				
essendo e_1 , e_2 , p_1 e p_2 indicati in Fig. 4.2.3 e d_0 il diametro nominale del foro di alloggiamento del bullone,				
S355	▼			
d =	27	mm		
$f_{tk} =$	510	mm		
$\alpha =$	0,50	mm		
$\alpha =$	0,50	mm		
k =	1,66	mm		
k =	1,66	mm		
$e_1 =$	36	mm		
$e_2 =$	36	mm		
$p_1 =$	66	mm		
$p_2 =$	72	mm		
$V_{s,d} =$	283,50	kN	taglio assorbito da anima	
$M_{s,d} =$	534,10	kNm		
Braccio =	0,800	m		
$F_{s,d} =$	667,63	kN	forza alle flange	

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

Resistenza a taglio bulloni (flangia)				
$t_{\text{piastra}} =$	20	mm		
$h_{\text{piastra}} =$	272	mm		
$n_{\text{piastre}} =$	1	piastre		
$n_f =$	1	file		
$n_{\text{pt}} =$	2	piani di taglio		
$n_b =$	3	bulloni		
$F_{V,Rd_anima} = n \cdot n_b \cdot F_{V,Rd}$	1101,6	kN		ok!
Resistenza a taglio delle piastre anima:				
$n_f =$	2	file		
$n_{\text{pt}} =$	2	piani di taglio		
$n_b =$	7	bulloni		
$t_{\text{piastra}} =$	12	mm		
$h_{\text{piastra}} =$	596	mm		
$n_{\text{piastre}} =$	2	piastre		
$V_{V,Rd_piastre} = n_{\text{piastre}} \cdot \frac{f_y \cdot A}{\gamma_{M_2} \cdot \sqrt{3}}$	5584	kN		ok!
Resistenza a rifollamento flangia				
$F_{V,Ed} =$	111,27	kN	Sollecitazione taglio bullone	
$F_{b,Rd} =$	182,87	kN	ok!	
Resistenza a rifollamento anima				
$F_{V,Ed} =$	10,13	kN	Sollecitazione taglio bullone	
$F_{b,Rd} =$	182,87	kN	ok!	

6.2.6.2 VERIFICA GIUNTO TRAVERSO DI TESTATA

γ_{M0}	=	1,05	per sezioni classe 1,2,3 e 4		
γ_{M1}	=	1,05	per instabilità membrature		
γ_{M1}	=	1,10	per instabilità membrature ponti stradali e ferroviari		
γ_{M2}	=	1,25	per sezioni tese indebolite dai fori nei riguardi della frattura		
Resistenza a taglio bulloni 4.6, 5.6 e 8.8					
27		10,9			
$F_{V,Rd} = \frac{0,6 \cdot f_{tb} \cdot A_{res}}{\gamma_{M2}}$		220,32	kN		
Resistenza a taglio bulloni 6.8 e 10.9					
$F_{V,Rd} = \frac{0,5 \cdot f_{tb} \cdot A_{res}}{\gamma_{M2}}$		183,6	kN		
Resistenza a rifollamento					
$F_{b,Rd} = \frac{k \cdot \alpha \cdot f_{tk} \cdot d \cdot t}{\gamma_{M2}}$		182,87	kN	di bordo	
		182,87	kN	interni	
dove:					
d è il diametro nominale del gambo del bullone,					
t è lo spessore della piastra collegata,					
f _{tk} è la resistenza a rottura del materiale della piastra collegata,					
α = min {e ₁ / (3 d ₀) ; f _{tk} / f _t ; 1} per bulloni di bordo nella direzione del carico applicato,					
α = min {p ₁ / (3 d ₀) - 0,25 ; f _{tk} / f _t ; 1} per bulloni interni nella direzione del carico applicato,					
k = min {2,8 e ₂ / d ₀ - 1,7 ; 2,5} per bulloni di bordo nella direzione perpendicolare al carico applicato,					
k = min {1,4 p ₂ / d ₀ - 1,7 ; 2,5} per bulloni interni nella direzione perpendicolare al carico applicato,					
essendo e ₁ , e ₂ , p ₁ e p ₂ indicati in Fig. 4.2.3 e d ₀ il diametro nominale del foro di alloggiamento del bullone,					
S355					
d	=	27	mm		
f _{tk}	=	510	mm		
α	=	0,50	mm		
α	=	0,50	mm		
k	=	1,66	mm		
k	=	1,66	mm		
e ₁	=	36	mm		
e ₂	=	36	mm		
p ₁	=	66	mm		
p ₂	=	72	mm		
V _{s,d}	=	308,00	kN	taglio assorbito da anima	
M _{s,d}	=	680,53	kNm		
Braccio	=	1,260	m		
F _{s,d}	=	540,10	kN	forza alle flange	

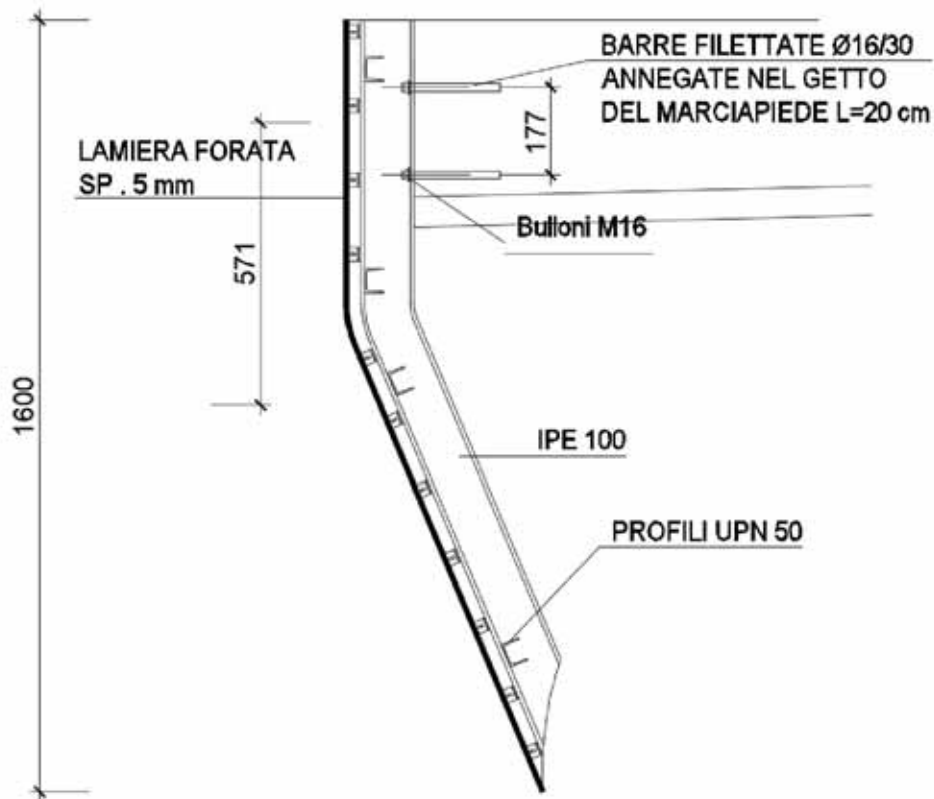
LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

Resistenza a taglio bulloni (flangia)					
$t_{\text{piastra}} =$	20	mm			
$h_{\text{piastra}} =$	272	mm			
$n_{\text{piastre}} =$	1	piastre			
$n_f =$	1	file			
$n_{\text{pt}} =$	2	piani di taglio			
$n_b =$	6	bulloni			
$F_{V,Rd_anima} = n \cdot n_b \cdot F_{V,Rd}$	2203,2	kN			ok!
Resistenza a taglio delle piastre anima:					
$n_f =$	2	file			
$n_{\text{pt}} =$	2	piani di taglio			
$n_b =$	26	bulloni			
$t_{\text{piastra}} =$	12	mm			
$h_{\text{piastra}} =$	1082	mm			
$n_{\text{piastre}} =$	2	piastre			
$V_{V,Rd_piastre} = n_{\text{piastre}} \cdot \frac{f_y \cdot A}{\gamma_{M_0} \cdot \sqrt{3}}$	10138	kN			ok!
Resistenza a rifollamento flangia					
$F_{V,Ed} =$	45,01	kN	Sollecitazione taglio bullone		
$F_{b,Rd} =$	182,87	kN			ok!
Resistenza a rifollamento anima					
$F_{V,Ed} =$	2,96	kN	Sollecitazione taglio bullone		
$F_{b,Rd} =$	182,87	kN			ok!

6.2.7 VERIFICA VELETTA METALLICA

Si riporta di seguito la verifica degli elementi di supporto previsti a sostegno della veletta metallica laterale al cordolo dell'impalcato.

La veletta è composta da elementi di sostegno in acciaio sia trasversali IPE100 che trasversali UPN 50 ed una lamiera forata in alluminio di spessore pari a 5mm.



LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

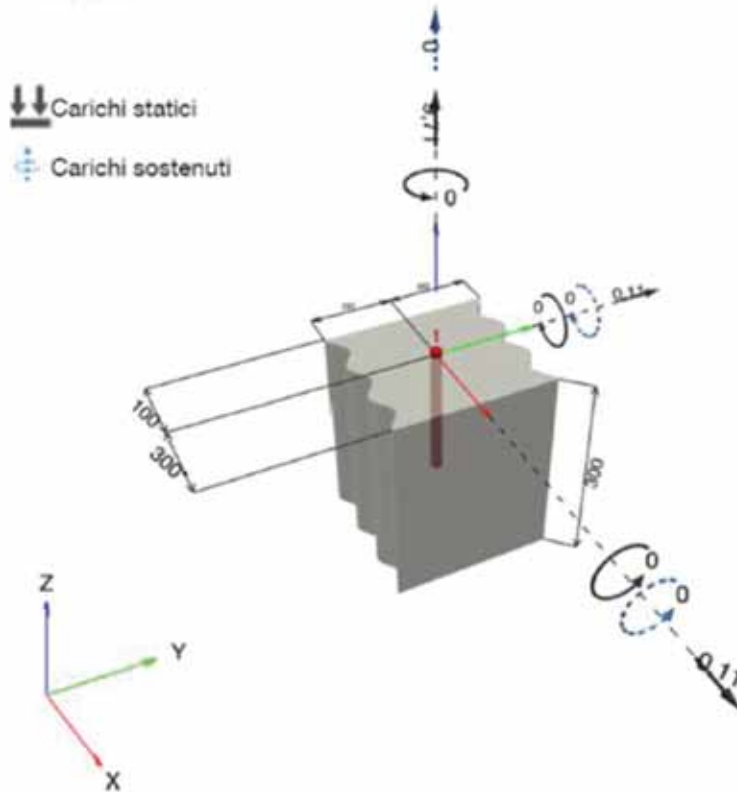
Peso Proprio Veletta		
Peso UPN 50 =	5,59	kg/ml
Peso Totale UPN 50 =	22,36	kg/ml
Peso IPE 100 =	8,10	kg/ml
Lunghezza IPE 100 =	1,40	m
Peso Totale IPE 100 =	11,34	kg/ml
Lunghezza Lamiera alluminio =	1,65	ml
Spessore Lamiera alluminio =	0,005	m
% Foratura Lamiera alluminio =	60%	
Peso Lamiera alluminio =	8,91	kg/mq
Peso Totale =	42,61	kg/mq
	0,4261	kN/ml
Forza Orizzontale Vento		
ph =	1,88	kN/mq
H =	1,6	m
Fv =	3,008	kN
Braccio Fv =	0,571	m
Ftrazione =	6,469	kN
Taglio =	0,071	kN
Ft_d =	9,704	kN
T_d =	0,107	kN

Si riporta di seguito la verifica di aderenza a trazione della barra filettata $\phi 16$ prevista ammorsata per 20cm all'interno del cordolo laterale.

1 Dati da inserire

Tipo e dimensione dell'ancorante:	HIT-RE 500 V4 + HAS-U 5.8 HDG M16
Periodo di ritorno (durata in anni):	50
Codice articolo:	2223897 HAS-U 5.8 HDG M16x260 (inserire) / 2287552 HIT-RE 500 V4 (composto indurente)
Profondità di posa effettiva:	$h_{eff,act} = 200,0$ mm ($h_{eff,inst} = -$ mm)
Materiale:	5.8
Certificazione No.:	ETA 20/0541
Emesso / Validato:	04/09/2021 -
Prova:	metodo di calcolo EN 1992-4, chimica
Fissaggio distanziato:	
Profilo:	
Materiale base:	non fessurato calcestruzzo, C25/30, $f_{c,cal} = 25,00$ N/mm ² , $h = 300,0$ mm, Temp. Breve/Lungo: 0/0 °C, Coefficiente parziale di sicurezza materiale definito dall'utente $\gamma_c = 1,500$
Installazione:	Foro eseguito con perforatore, Condizioni di installazione: asciutto
Armatura:	nessuna armatura o interasse tra le armature ≥ 150 mm (qualunque \emptyset) o ≥ 100 mm ($\emptyset \leq 10$ mm) senza armatura di bordo longitudinale

Geometria [mm] & Carichi [kN, kNm]



LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

1.1 Combinazione carichi

Caso	Descrizione	Forze [kN] / Momenti [kNm]	Sismico	Fuoco	Util. max. Tasseello [%]
1	Combinazione 1	N = 9,710; V _x = 0,110; V _y = 0,110; M _x = 0,000; M _y = 0,000; M _z = 0,000; N _{tot} = 0,000; M _{x,tot} = 0,000; M _{y,tot} = 0,000;	no	no	20

2 Condizione di carico/Carichi risultanti sull'ancorante

Carichi sull'ancorante [kN]

Trazione: (+ Trazione, - Compressione)

Ancorante	Trazione	Taglio	Taglio in dir. x	Taglio in dir. y
1	9,710	0,156	0,110	0,110

Compressione max. nel calcestruzzo: - [%]
Max. sforzo di compressione nel calcestruzzo: - [N/mm²]
risultante delle forze di trazione nel (x/y)=(0,0/0,0): 0,000 [kN]
risultante delle forze di compressione (x/y)=(0,0/0,0): 0,000 [kN]

3 Carico di trazione (EN 1992-4, sezione 7.2.1)

	Carico [kN]	Resistenza [kN]	Utilizzo β _N [%]	Stato
Rottura dell'acciaio*	9,710	52,333	19	OK
Rottura combinata conica del calcestruzzo e per sfilamento**	9,710	67,984	15	OK
Rottura conica del calcestruzzo**	9,710	55,311	18	OK
Fessurazione**	9,710	49,893	20	OK

*ancorante più sollecitato **gruppo di ancoranti (ancoranti sollecitati)

3.1 Rottura dell'acciaio

$$N_{Ed} \leq N_{Rd,s} = \frac{N_{Rp,s}}{\gamma_{M,s}} \quad \text{EN 1992-4, Tabella 7.1}$$

N _{Rp,s} [kN]	γ _{M,s}	N _{Rd,s} [kN]	N _{Ed} [kN]
78,500	1,500	52,333	9,710

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

3.2 Rottura combinata conica del calcestruzzo e per sfilamento

$$N_{Ed} \leq N_{Rd,c} = \frac{N_{Rk,c}}{\gamma_{M,c}} \quad \text{EN 1992-4, Tabella 7.1}$$

$$N_{Rk,c} = N_{Rk,c}^0 \cdot \frac{A_{c,N}^0}{A_{c,N}} \cdot \psi_{s,N} \cdot \psi_{s,Nb} \cdot \psi_{re,N} \cdot \psi_{ec1,N} \cdot \psi_{ec2,N} \quad \text{EN 1992-4, Eq. (7.13)}$$

$$N_{Rk,c}^0 = \psi_{s,s} \cdot \tau_{Rk,c} \cdot z \cdot d \cdot h_{ef} \quad \text{EN 1992-4, Eq. (7.14)}$$

$$\psi_{s,s} = 1 \quad \text{EN 1992-4, Eq. (7.14a)}$$

$$\psi_{s,Nb} = 7,3 \cdot d \cdot \sqrt{\psi_{s,s} \cdot \tau_{Rk,c}} \leq 3 \cdot h_{ef} \quad \text{EN 1992-4, Eq. (7.15)}$$

$$\psi_{s,N} = \psi_{s,Nb}^0 \cdot \left(\frac{s}{\psi_{s,Nb}} \right)^{0,5} \cdot (\psi_{s,Nb}^0 - 1) \geq 1,00 \quad \text{EN 1992-4, Eq. (7.17)}$$

$$\psi_{s,N}^0 = \sqrt{n} \cdot (\sqrt{n} - 1) \cdot \left(\frac{\tau_{Rk,c}}{\tau_{Rk,c}^{LS}} \right)^{1,5} \geq 1,00 \quad \text{EN 1992-4, Eq. (7.18)}$$

$$\tau_{Rk,c} = \frac{k_3}{z \cdot d} \cdot \sqrt{h_{ef} \cdot f_{ct}} \quad \text{EN 1992-4, Eq. (7.10)}$$

$$\psi_{re,N} = 0,7 + 0,3 \cdot \frac{c}{c_{0,75}} \leq 1,00 \quad \text{EN 1992-4, Eq. (7.20)}$$

$$\psi_{ec1,N} = \frac{1}{1 + \left(\frac{2 \cdot e_{c1,N}}{\psi_{s,Nb}} \right)} \leq 1,00 \quad \text{EN 1992-4, Eq. (7.21)}$$

$$\psi_{ec2,N} = \frac{1}{1 + \left(\frac{2 \cdot e_{c2,N}}{\psi_{s,Nb}} \right)} \leq 1,00 \quad \text{EN 1992-4, Eq. (7.21)}$$

$A_{c,N} [mm^2]$	$A_{c,N}^0 [mm^2]$	$\tau_{Rk,c} [N/mm^2]$	$s_{0,75} [mm]$	$c_{0,75} [mm]$	$c_{tot} [mm]$	$f_{ct} [N/mm^2]$
164.117	231.018	17,00	481,6	240,8	100,0	25,00
ψ_s	$\tau_{Rk,c} [N/mm^2]$	k_3	$\tau_{Rk,c} [N/mm^2]$	$\psi_{s,Nb}^0$	$\psi_{s,Nb}$	
1,023	17,38	11,000	15,47	1,000	1,000	
$e_{c1,N} [mm]$	$\psi_{ec1,N}$	$e_{c2,N} [mm]$	$\psi_{ec2,N}$	$\psi_{s,N}$	$\psi_{re,N}$	
0,0	1,000	0,0	1,000	0,825	1,000	
$\psi_{s,s}^0$	$\alpha_{T,s}$	$\psi_{s,s}$				
0,880	0,000	1,000				
$N_{Rk,c}^0 [kN]$	$N_{Rk,c} [kN]$	$\gamma_{M,c}$	$N_{Rd,c} [kN]$	$N_{Ed} [kN]$		
174,750	101,970	1,500	67,984	0,710		

ID gruppo ancoranti
1

3.3 Rottura conica del calcestruzzo

$$N_{Ed} \leq N_{Rd,c} = \frac{N_{Rk,c}}{\gamma_{M,c}} \quad \text{EN 1992-4, Tabella 7.1}$$

$$N_{Rk,c} = N_{Rk,c}^0 \cdot \frac{A_{c,N}^0}{A_{c,N}} \cdot \psi_{s,N} \cdot \psi_{s,Nb} \cdot \psi_{re,N} \cdot \psi_{ec1,N} \cdot \psi_{ec2,N} \cdot \psi_{MN} \quad \text{EN 1992-4, Eq. (7.1)}$$

$$N_{Rk,c}^0 = k_1 \cdot \sqrt{z} \cdot h_{ef}^{1,5} \quad \text{EN 1992-4, Eq. (7.2)}$$

$$A_{c,N}^0 = s_{0,N} \cdot s_{0,N} \quad \text{EN 1992-4, Eq. (7.3)}$$

$$\psi_{s,N} = 0,7 + 0,3 \cdot \frac{c}{c_{0,75}} \leq 1,00 \quad \text{EN 1992-4, Eq. (7.4)}$$

$$\psi_{ec1,N} = \frac{1}{1 + \left(\frac{2 \cdot e_{c1,N}}{s_{0,N}} \right)} \leq 1,00 \quad \text{EN 1992-4, Eq. (7.6)}$$

$$\psi_{ec2,N} = \frac{1}{1 + \left(\frac{2 \cdot e_{c2,N}}{s_{0,N}} \right)} \leq 1,00 \quad \text{EN 1992-4, Eq. (7.6)}$$

$$\psi_{MN} = 1 \quad \text{EN 1992-4, Eq. (7.7)}$$

$A_{c,N} [mm^2]$	$A_{c,N}^0 [mm^2]$	$c_{0,75} [mm]$	$s_{0,N} [mm]$	$f_{ct} [N/mm^2]$		
240.000	360.000	300,0	600,0	25,00		
$e_{c1,N} [mm]$	$\psi_{ec1,N}$	$e_{c2,N} [mm]$	$\psi_{ec2,N}$	$\psi_{s,N}$	$\psi_{re,N}$	
0,0	1,000	0,0	1,000	0,800	1,000	
$z [mm]$	ψ_{MN}	k_1	$N_{Rk,c}^0 [kN]$	$\gamma_{M,c}$	$N_{Rd,c} [kN]$	$N_{Ed} [kN]$
0,0	1,000	11,000	155,603	1,500	55,311	0,710

ID gruppo ancoranti
1

3.4 Fessurazione

$$N_{Ed} \leq N_{Rd,SP} = \frac{N_{Rk,SP}}{\gamma_{M20}} \quad \text{EN 1992-4, Tabella 7.1}$$

$$N_{Rd,SP} = N_{Rk,SP} \cdot \frac{A_{c,N}}{A_{c,N}^0} \cdot \psi_{s,N} \cdot \psi_{rc,N} \cdot \psi_{ec1,N} \cdot \psi_{ec2,N} \cdot \psi_{h,SP} \quad \text{EN 1992-4, Eq. (7.23)}$$

$$N_{Rk,SP}^0 = \min(N_{Rk,SP}^t, N_{Rk,SP}^c) \quad \text{EN 1992-4, Eq. (7.3)}$$

$$A_{c,N}^0 = s_{cr,SP} \cdot s_{cr,SP} \quad \text{EN 1992-4, Eq. (7.3)}$$

$$\psi_{s,N} = 0,7 + 0,3 \cdot \frac{c}{c_{cr,SP}} \leq 1,00 \quad \text{EN 1992-4, Eq. (7.4)}$$

$$\psi_{ec1,N} = \frac{1}{1 + \left(\frac{2 \cdot e_{c1,N}}{s_{cr,SP}}\right)} \leq 1,00 \quad \text{EN 1992-4, Eq. (7.6)}$$

$$\psi_{ec2,N} = \frac{1}{1 + \left(\frac{2 \cdot e_{c2,N}}{s_{cr,SP}}\right)} \leq 1,00 \quad \text{EN 1992-4, Eq. (7.6)}$$

$$\psi_{h,SP} = \left(\frac{h}{h_{ref}}\right)^{2/3} \leq \max\left\{1; \left(\frac{h_{ref} + 1,5 \cdot c_1}{h_{ref}}\right)^{2/3}\right\} \leq 2,00 \quad \text{EN 1992-4, Eq. (7.24)}$$

$A_{c,N}$ [mm ²]	$A_{c,N}^0$ [mm ²]	$c_{cr,SP}$ [mm]	$s_{cr,SP}$ [mm]	$\psi_{h,SP}$	$f_{c,eff}$ [N/mm ²]	
304.000	577.600	380,0	760,0	1,173	25,00	
$e_{c1,N}$ [mm]	$\psi_{ec1,N}$	$e_{c2,N}$ [mm]	$\psi_{ec2,N}$	$\psi_{s,N}$	$\psi_{rc,N}$	k_1
0,0	1,000	0,0	1,000	0,779	1,000	11,000
$N_{Rk,SP}^0$ [kN]	γ_{M20}	$N_{Rd,SP}$ [kN]	N_{Ed} [kN]			
155,563	1,500	49,893	9,710			

ID gruppo ancoranti

1

4 Carico di taglio (EN 1992-4, sezione 7.2.2)

	Carico [kN]	Resistenza [kN]	Utilizzo β_v [%]	Stato
Rottura dell'acciaio (senza braccio di leva)*	0,156	37,728	1	OK
Rottura dell'acciaio (con braccio di leva)*	N/A	N/A	N/A	N/A
Rottura per pryout**	0,156	110,623	1	OK
Rottura del bordo del calcestruzzo in direzione x-**	0,110	33,825	1	OK

*ancorante più sollecitato **gruppo di ancoranti (ancoranti specifici)

4.1 Rottura dell'acciaio (senza braccio di leva)

$$V_{Ed} \leq V_{Rd,s} = \frac{V_{Rd,s}}{\gamma_{M,s}} \quad \text{EN 1992-4, Tabella 7.2}$$

$$V_{Rd,s} = k_7 \cdot V_{Rk,s} \quad \text{EN 1992-4, Eq. (7.35)}$$

$V_{Rd,s}^0$ [kN]	k_7	$V_{Rk,s}$ [kN]	$\gamma_{M,s}$	$V_{Rd,s}$ [kN]	V_{Ed} [kN]
47,160	1,000	47,160	1,250	37,728	0,156

4.2 Rottura per pryout (cono del calcestruzzo)

$$V_{Ed} \leq V_{Rd,cp} = \frac{V_{Rd,cp}}{\gamma_{M,cp}} \quad \text{EN 1992-4, Tabella 7.2}$$

$$V_{Rd,cp} = k_8 \cdot \min(N_{Rk,c}; N_{Rk,p}) \quad \text{EN 1992-4, Eq. (7.39c)}$$

$$N_{Rk,c} = N_{Rk,c}^0 \cdot \frac{A_{c,N}}{A_{c,N}^0} \cdot \psi_{s,N} \cdot \psi_{re,N} \cdot \psi_{ec1,N} \cdot \psi_{ec2,N} \cdot \psi_{MN} \quad \text{EN 1992-4, Eq. (7.1)}$$

$$N_{Rk,c}^0 = k_1 \cdot \sqrt{f_{ct}} \cdot h_{ef}^{1.5} \quad \text{EN 1992-4, Eq. (7.2)}$$

$$A_{c,N}^0 = s_{cr,N} \cdot s_{cr,N} \quad \text{EN 1992-4, Eq. (7.3)}$$

$$\psi_{s,N} = 0,7 + 0,3 \cdot \frac{c}{c_{cr,N}} \leq 1,00 \quad \text{EN 1992-4, Eq. (7.4)}$$

$$\psi_{ec1,N} = \frac{1}{1 + \left(\frac{2 \cdot e_{v1}}{s_{cr,N}} \right)} \leq 1,00 \quad \text{EN 1992-4, Eq. (7.6)}$$

$$\psi_{ec2,N} = \frac{1}{1 + \left(\frac{2 \cdot e_{v2}}{s_{cr,N}} \right)} \leq 1,00 \quad \text{EN 1992-4, Eq. (7.6)}$$

$$\psi_{MN} = 1 \quad \text{EN 1992-4, Eq. (7.7)}$$

$A_{c,N}$ [mm ²]	$A_{c,N}^0$ [mm ²]	$c_{cr,N}$ [mm]	$s_{cr,N}$ [mm]	k_8	$f_{ct,eff}$ [N/mm ²]	
240.000	360.000	300,0	600,0	2,000	25,00	
e_{v1} [mm]	$\psi_{ec1,N}$	e_{v2} [mm]	$\psi_{ec2,N}$	$\psi_{s,N}$	$\psi_{re,N}$	ψ_{MN}
0,0	1,000	0,0	1,000	0,800	1,000	1,000
k_1	$N_{Rk,c}^0$ [kN]	$\gamma_{M,cp}$	$V_{Rd,cp}$ [kN]	V_{Ed} [kN]		
11,000	155,563	1,500	110,623	0,156		

ID gruppo ancoranti

1

4.3 Rottura del bordo del calcestruzzo in direzione x-

$$V_{Ed} \leq V_{Rd,c} = \frac{V_{Rd,s}}{\gamma_{Mz}} \quad \text{EN 1992-4, Tabella 7.2}$$

$$V_{Rd,c} = k_T \cdot V_{Rd,c}^0 \cdot \frac{A_{c,v}}{A_{c,v}^0} \cdot \psi_{s,v} \cdot \psi_{n,v} \cdot \psi_{ec,v} \cdot \psi_{m,v} \quad \text{EN 1992-4, Eq. (7.40)}$$

$$V_{Rd,c}^0 = k_s \cdot d_{nom}^{\alpha} \cdot \rho_{ct} \cdot \sqrt{c_1} \cdot c_1^{0.5} \quad \text{EN 1992-4, Eq. (7.41)}$$

$$\alpha = 0,1 \cdot \left(\frac{l}{c_1} \right) \quad \text{EN 1992-4, Eq. (7.42)}$$

$$\beta = 0,1 \cdot \left(\frac{d_{nom}}{c_1} \right)^{0.2} \quad \text{EN 1992-4, Eq. (7.43)}$$

$$A_{c,v}^0 = 4,5 \cdot c_1^2 \quad \text{EN 1992-4, Eq. (7.44)}$$

$$\psi_{s,v} = 0,7 + 0,3 \cdot \frac{c_2}{1,5 \cdot c_1} \leq 1,00 \quad \text{EN 1992-4, Eq. (7.45)}$$

$$\psi_{n,v} = \left(\frac{1,5 \cdot c_1}{h} \right)^{0.5} \geq 1,00 \quad \text{EN 1992-4, Eq. (7.46)}$$

$$\psi_{ec,v} = \frac{1}{1 + \left(\frac{2 \cdot e_v}{3 \cdot c_1} \right)} \leq 1,00 \quad \text{EN 1992-4, Eq. (7.47)}$$

$$\psi_{m,v} = \sqrt{\frac{1}{(\cos \alpha_v)^2 + (0,5 \cdot \sin \alpha_v)^2}} \geq 1,00 \quad \text{EN 1992-4, Eq. (7.48)}$$

l [mm]	d_{nom} [mm]	k_s	α	β	f_{ctd} [N/mm ²]
192,0	16,00	2,400	0,139	0,069	26,00
c_1 [mm]	$A_{c,v}$ [mm ²]	$A_{c,v}^0$ [mm ²]			
100,0	45.000	45.000			
$\psi_{s,v}$	$\psi_{n,v}$	$\psi_{ec,v}$	$e_{c,v}$ [mm]	$\psi_{m,v}$	$\psi_{m,v}$
1,000	1,000	2,000	0,0	1,000	1,000
$V_{Rd,c}^0$ [kN]	k_T	γ_{Mz}	$V_{Rd,c}$ [kN]	V_{Ed} [kN]	
25,369	1,0	1,500	33,825	0,110	

5 Carichi combinati di trazione e di taglio (EN 1992-4, sezione 7.2.3)

Rottura dell'acciaio

β_N	β_V	α	Utilizzo $\beta_{N,V}$ [%]	Stato
0,186	0,004	2,000	4	OK

$$\beta_N^2 + \beta_V^2 \leq 1,0$$

Rottura del calcestruzzo

β_N	β_V	α	Utilizzo $\beta_{N,V}$ [%]	Stato
0,195	0,003	1,500	9	OK

$$\beta_N^2 + \beta_V^2 \leq 1,0$$

6 Spostamenti (ancorante più sollecitato)

Carichi a breve termine:

$$N_{sk} = 7,193 \text{ [kN]} \quad \delta_N = 0,0429 \text{ [mm]}$$

$$V_{sk} = 0,115 \text{ [kN]} \quad \delta_V = 0,0046 \text{ [mm]}$$

$$\delta_{wV} = 0,0432 \text{ [mm]}$$

Carichi a lungo termine:

$$N_{sk} = 7,193 \text{ [kN]} \quad \delta_N = 0,0930 \text{ [mm]}$$

$$V_{sk} = 0,115 \text{ [kN]} \quad \delta_V = 0,0069 \text{ [mm]}$$

$$\delta_{wV} = 0,0933 \text{ [mm]}$$

7 VERIFICA SOLETTA

Si riportano di seguito le verifiche effettuate per il dimensionamento delle solette di impalcato.

7.1 VERIFICA SOLETTA FASE TRANSITORIA

In questa fase di calcolo viene verificata la lastra di predalles con relativi tralicci al fine di sostenere i carichi della soletta, del peso degli operatori e di eventuali barriere di protezione laterali provvisorie per la sicurezza degli operatori.

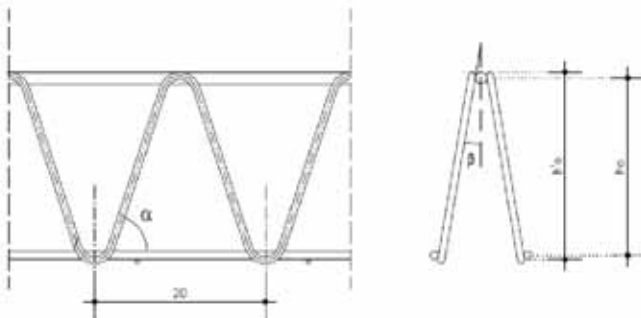
Si riportano di seguito i valori dei carichi utilizzati ed il calcolo delle sollecitazioni in campata ed in appoggio al fine di dimensionare il traliccio da prevedere nel predalles.

7.1.1 ANALISI DEI CARICHI

Si considera il peso proprio della lastra di predalles, il peso del getto della soletta, il peso di un parapetto di protezione e di un mezzo operativo per le varie lavorazioni.

		Sp [m]	γ [kN/m ³]		
Gk1	Peso Proprio	0.05	25	1.25	kN/m ²
Gk2	Peso Soletta	0.21	25	5.25	kN/m ²
Gk2	Peso Parapetto Sic.			0.4	kN/m
Qk	Peso Mezzo Operativo			1	kN/m ²

Le verifiche vengono eseguite facendo riferimento allo Stato Limite Ultimo della sezione. Si verifica che le tensioni sugli elementi metallici che costituiscono il traliccio siano inferiori alla tensione di calcolo e che la stabilità degli elementi compressi risulti soddisfatta. Di seguito si riporta una rappresentazione schematica del traliccio utilizzato.



Altezza totale del traliccio:	$h'_0 = 165 \text{ mm}$
Diametro correnti superiori:	$f_{cs} = 16 \text{ mm}$
Diametro correnti inferiori:	$f_{ci} = 14 \text{ mm}$
Diametro staffa:	$f_{ci} = 10 \text{ mm}$

7.1.2 VERIFICA A MOMENTO POSITIVO - CAMPATA

Analizzando gli elaborati grafici allegati al presente progetto esecutivo, si evince che la distanza tra le anime delle travi di appoggio è pari a 2.55m e considerando 5 cm di appoggio su entrambe le strutture,

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

si considera una luce di calcolo pari a 2.65m. Si riporta di seguito il calcolo delle sollecitazioni di progetto.

SEZIONE IN CAMPATA				
	LC	2.65		
	MOMENTO FLETTENTE	TAGLIO	Med	Ted
Gk1	$1.25 \times 1.20 \times 2.65^2 / 8$	$1.25 \times 1.20 \times 2.65/2$	1.32	1.99
Gk2	$5.25 \times 1.20 \times 2.65^2 / 8$	$5.25 \times 1.20 \times 2.65/2$	5.53	8.35
Qk	$1 \times 1.20 \times 2.65^2 / 8$	$1 \times 1.20 \times 2.65/2$	1.05	1.59
	Med		13.85	15.50
	Ted			
	Ned = (Med / h₀) / 3		30.77	

Altezza totale traliccio	ht=	16.50	cm	
Larghezza totale traliccio	B=	9.00	cm	
Interasse tralicci	i=	40.00	cm	
Numero di tralicci /m	n=	3		
Passo traliccio	p=	20.00	cm	
Quota corrente inferiore	s=	2.00	cm	
Corrente superiore	1	∅s=	1.60	cm
Ferro integr sup (I)	0	∅s' =	0.00	cm
Ferro integr sup (II)	0	∅s" =	0.00	cm
Corrente inferiore	2	∅i=	1.40	cm
Diagonale		∅d=	1.00	cm
Altezza utile traliccio	d=	13.0	cm	
Interasse ferri inferiori	pi=	7.6	cm	
Interasse trasv. diagonale	bd=	5.2	cm	
Inclinazione longitudinale	α=	1.065	rad	61.0 °
Inclinazione trasversale	β=	0.192	rad	11.0 °
Area corrente superiore	As=	2.01	cm ²	
Area ferro integr sup (I)	As' =	0.00	cm ²	
Area ferro integr sup (II)	As" =	0.00	cm ²	
Area corrente inferiore	Ai=	3.08	cm ²	
Area diagonale	Ad=	0.79	cm ²	
Inerzia corrente superiore	Js=	0.3217	cm ⁴	
Inerzia ferro integr sup (I)	Js' =	0.0000	cm ⁴	
Inerzia ferro integr sup (II)	Js" =	0.0000	cm ⁴	
Inerzia corrente inferiore	Ji=	0.3771	cm ⁴	
Inerzia diagonale	Jd=	0.0491	cm ⁴	

CARATTERISTICHE DI RESISTENZA TRALICCIO

	Area cm ²	Quota cm	J cm ⁴	Jtrasp cm ⁴	J+Jtrasp cm ⁴
Corr sup + ferro (I)	2.01	15.7	0.322	124.3	124.7
Ferro (II)	0.00	14.9	0.000	0.0	0.0
Corrente inf	3.08	2.7	0.377	81.2	81.6

Quota baricentro	YG=	7.84	cm
Area totale	Atot=	5.1	cm ²
Inerzia totale	Jtot=	206.3	cm ⁴
Modulo di resistenza c. sup.	Ws=	26.23	cm ³
Modulo di resistenza ferro (II)	Ws''=	29.2	cm ³
Modulo di resistenza c. inf.	Wi=	40.2	cm ³

CARATTERISTICHE DI RESISTENZA ALL'INSTABILITÀ TRALICCIO

Corrente superiore

Lunghezza asta	L=	20.0	cm
Coefficiente riduttivo	β =	0.7	
Lunghezza libera inflessione	L0=	14.0	cm
Carico critico Euleriano	Ncr=	340183	N
Snellezza adimensionale	λ =	0.52	
Fattore di imperfezione	α =	0.49	
Coefficiente	Φ =	0.71	
Fattore di riduzione (≤ 1)	χ =	0.83	
Resistenza asta compressione	NbRd=	-65.6	kN

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

Corrente inferiore

Lunghezza asta	L=	20.0	cm
Coefficiente riduttivo	β =	0.7	
Lunghezza libera inflessione	L0=	14.0	cm
Carico critico Euleriano	Ncr=	199409	N
Snellezza adimensionale	λ =	0.59	
Fattore di imperfezione	α =	0.49	
Coefficiente	Φ =	0.77	
Fattore di riduzione (≤ 1)	χ =	0.79	
Resistenza asta compressione	NbRd=	-47.7	kN

Diagonale

Lunghezza asta	L=	16.6	
Coefficiente riduttivo	β =	0.7	
Lunghezza libera inflessione	L0=	11.6	cm
Carico critico Euleriano	Ncr=	75294	N
Snellezza adimensionale	λ =	0.69	
Fattore di imperfezione	α =	0.49	
Coefficiente	Φ =	0.85	
Fattore di riduzione (≤ 1)	χ =	0.73	
Resistenza asta compressione	NbRd=	-22.6	kN

VERIFICA TRALICCIO

Momento sollecitante	Msd=	13.85	kNm	campata
Taglio sollecitante	Vsd=	15.5	kN	appoggio
Momento soll. /traliccio	msd=	4.62	kNm	campata
Taglio sollec. /traliccio	vsd=	5.17	kN	appoggio

Corrente superiore compresso

Verifica di resistenza

Tensione limite di calcolo	f _{yd} =	-391	N/mm ²
Tensione corrente superiore	σ_s =	-176	N/mm ²
Coefficiente di sicurezza	c.s.=	2.22	VERIFICATO

Verifica di instabilità

Resistenza asta compressa	NbRd=	-65.6	kN
Compressione	Nsd=	-35.4	kN
Coefficiente di sicurezza	c.s.=	1.85	VERIFICATO

Corrente inferiore	teso		
Verifica di resistenza			
Tensione limite di calcolo	$f_{yd} =$	391	N/mm^2
Tensione corrente inferiore	$\sigma_i =$	115	N/mm^2
Coefficiente di sicurezza	$c.s. =$	3.40	VERIFICATO

Diagonale			
All'appoggio, per effetto del taglio si ha:			
Compressione sul diagonale		-3.0	kN
Verifica di resistenza			
Tensione limite	$f_{yd} =$	-391.3	N/mm^2
Tensione diagonale	$\sigma =$	-38.3	N/mm^2
Coefficiente di sicurezza	$c.s. =$	10.21	VERIFICATO
Verifica di instabilità			
Resistenza asta compressa	$N_{bRd} =$	-22.6	kN
Compressione	$N_{sd} =$	-3.0	kN
Coefficiente di sicurezza	$c.s. =$	7.50	VERIFICATO

Si esegue ora la verifica della struttura allo SLU.

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

Verifica C.A. S.L.U. - File: TRALICCIO M+

File Materiali Opzioni Visualizza Progetto Sez. Rett. Sismica Normativa: NTC 2008

Titolo : _____

N° figure elementari Zoom N° strati barre Zoom

N°	b [cm]	h [cm]	N°	As [cm²]	d [cm]
1	0.1	14	1	6.03	0.8
2	120	5	2	9.24	16.5

Tipo Sezione
 Rettan.re Trapezi
 a T Circolare
 Rettangoli Coord.

Sollecitazioni
 S.L.U. → Metodo n
 ←

N_{Ed} kN
 M_{xEd} kNm
 M_{yEd}

P.to applicazione N
 Centro Baricentro cls
 Coord.[cm] xN yN

Tipo rottura
 Lato calcestruzzo - Acciaio elastico

Metodo di calcolo
 S.L.U. + S.L.U. -
 Metodo n

Tipo flessione
 Retta Deviata

N° rett.

Calcola MRd Dominio M-N
 L₀ cm Col. modello

Precompresso

Materiali

B450C		C30/37	
ϵ_{su}	67.5 ‰	ϵ_{c2}	2 ‰
I_{yd}	391.3 N/mm ²	ϵ_{cu}	3.5 ‰
E_s	200.000 N/mm ²	I_{cd}	17
E_s/E_c	15	I_{cc}/I_{cd}	0.8
ϵ_{syd}	1.957 ‰	$\sigma_{c,adm}$	11.5
$\sigma_{s,adm}$	255 N/mm ²	τ_{co}	0.6933
		τ_{c1}	2.029

M_{xRd} kN m
 σ_c N/mm²
 σ_s N/mm²
 ϵ_c 3.5 ‰
 ϵ_s 1.286 ‰
 d 16.5 cm
 x 12.07 x/d 0.7313
 δ 1

Med < Mrd Verifica soddisfatta

7.1.3 VERIFICA A MOMENTO NEGATIVO APPOGGIO

Analizzando gli elaborati grafici allegati al presente progetto esecutivo, si evince che la distanza dello sbalzo rispetto all'asse dell'anima della trave di appoggio è pari a 1.25m. Si riporta di seguito il calcolo delle sollecitazioni e la verifica strutturale allo SLU.

SEZIONE IN APPOGGIO		
	LC	1.25
MOMENTO FLETTENTE		
Gk1	$1.25 \times 1.20 \times 1.25^2 / 2$	1.17
Gk2	$5.25 \times 1.20 \times 1.25^2 / 2$	4.92
Gk2	$0.4 \times 1.20 \times 1.25$	0.60
Qk	$1 \times 1.20 \times 1.25^2 / 2$	0.94
	Med	11.27

Si esegue ora la verifica della struttura allo SLU.

Verifica C.A. S.L.U. - File: TRALICCIO M-

File Materiali Opzioni Visualizza Progetto Sez. Rett. Sismica Normativa: NTC 2008 ?

Titolo: _____

N° figure elementari: 2 Zoom N° strati barre: 2 Zoom

N°	b [cm]	h [cm]	N°	As [cm²]	d [cm]
1	0.1	14	1	6.03	0.8
2	120	5	2	9.239999	16.5

Sollecitazioni: S.L.U. Metodo n

N_{Ed} 0 kN
M_{xEd} 0 kNm
M_{yEd} 0 kNm

P.to applicazione N: Centro Baicentro cls
Coord. [cm]: xN 0 yN 0

Tipo rottura: Lato calcestruzzo - Acciaio snervato

Metodo di calcolo: S.L.U. + S.L.U. - Metodo n

Tipo flessione: Retta Deviata

N° rett. 100

Calcola MRd Dominio M-N

L₀ 0 cm Col. modello

Precompresso

Materiali:

B450C		C30/37	
E _{su}	67.5 ‰	E _{c2}	2 ‰
I _{yd}	391.3 N/mm ⁴	E _{cu}	3.5 ‰
E _s	200.000 N/mm ²	f _{cd}	17
E _s /E _c	15	I _{cc} /I _{cd}	0.8
E _{syd}	1.957 ‰	G _{c,adm}	11.5
G _{s,adm}	255 N/mm ²	T _{co}	0.6933
		T _{c1}	2.029

M_{xEd} -42.71 kNm

σ_c -17 N/mm²
σ_s 391.3 N/mm²
ε_c 3.5 ‰
ε_s 26.51 ‰
d 18.2 cm
x 2.122 x/d 0.1166
ξ 0.7

Med < Mrd Verifica soddisfatta

7.2 VERIFICA SOLETTA FASE DEFINITIVA

In questa fase di calcolo viene effettuato il calcolo della soletta considerando i seguenti carichi permanenti compatibilmente a quanto utilizzato per il dimensionamento dell'impalcato metallico.

PESO SOLETTA		
Hsoletta =	0.26	m
γ =	25	kN/mc
peso =	6.5	kN/mq
CORDOLI		
Hcordoli =	0.15	m
γ =	25	kN/mc
peso =	3.75	kN/mq
PERMANENTE PORTATO		
Hsoletta =	0.11	cm
γ =	24	kN/mc
peso =	2.64	kN/mq
BARRIERE+VELETTE E TUBAZIONI		
Barriere =	1.5	kN/ml
Tubazioni =	0.1	kN/ml
Veletta =	0.4	kN/ml
Totale	2.000	kN/ml

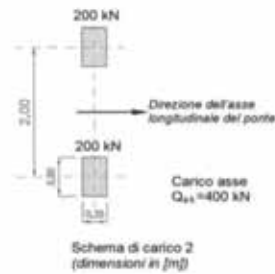
I carichi accidentali considerati sono quelli prescritti dalla normativa ed in particolare lo schema di carico 1, costituito da carichi concentrati su due assi in tandem, applicati su impronte di pneumatico di forma quadrata e lato pari a 0,40 m (Q_{ik}), oltre che da un carico distribuito a metro quadrato (q_{ik}) applicato alla corsia di carico.

I valori adottati per i carichi variano in base alla corsia di carico, secondo lo schema di normativa riportato nel seguito.



Oltre a questo, è stato adottato anche lo schema di carico 2, costituito da un singolo asse applicato su specifiche impronte di pneumatico di forma rettangolare, con larghezza 0,60 m ed altezza 0,35 m. Nel seguito l'immagine estratta dalla normativa.

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO



In aggiunta a quanto sopra, occorre tenere in conto anche l'urto di veicoli in svio (q_8). La normativa, a tal proposito, indica che le forze causate da collisioni accidentali sugli elementi di sicurezza, possono essere considerate attraverso una forza orizzontale equivalente di collisione pari a 100 kN. Tale forza è da intendersi applicata trasversalmente ed orizzontalmente 100 mm sotto la sommità dell'elemento su cui insiste, oppure, 1,0 m sopra il piano di marcia, a seconda di quale sia il minore per una striscia di 0.5m. Ai fini dell'applicazione di tale forza alla soletta di impalcato, è stata considerata una diffusione a terra ottenendo una larghezza di carico pari a $1.00 + 0.50 + 1.00$ ottenendo un effetto torcente sul bordo della soletta pari a $M_t = 100 \text{ kN}/2.5\text{m} = 40 \text{ kNm/m}$. I carichi concentrati previsti nei casi di carico, sono stati applicati tenendo in considerazione dell'effettiva geometria della mesh di calcolo utilizzata e considerando (come previsto dalla norma) una diffusione di carico a 45° fino al baricentro della soletta in cls.

Si riportano di seguito alcune immagini relative al modello e ai carichi applicati.

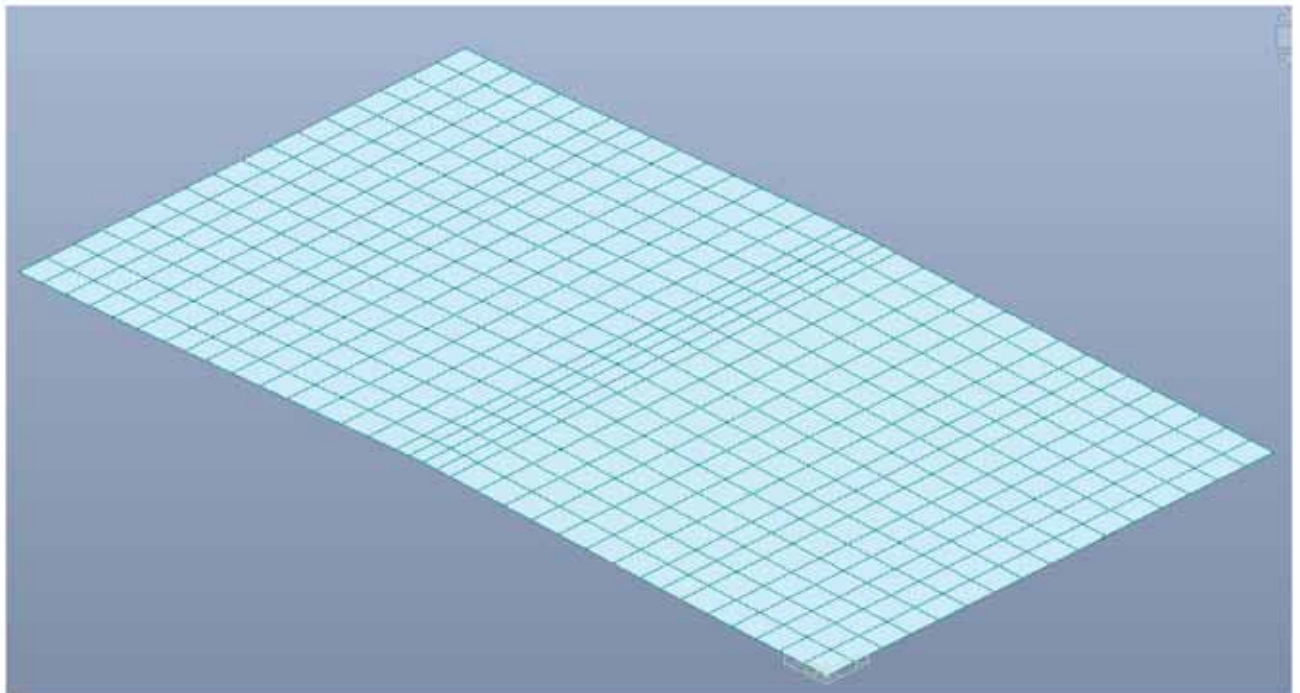


Figura 73 - Modello di calcolo

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

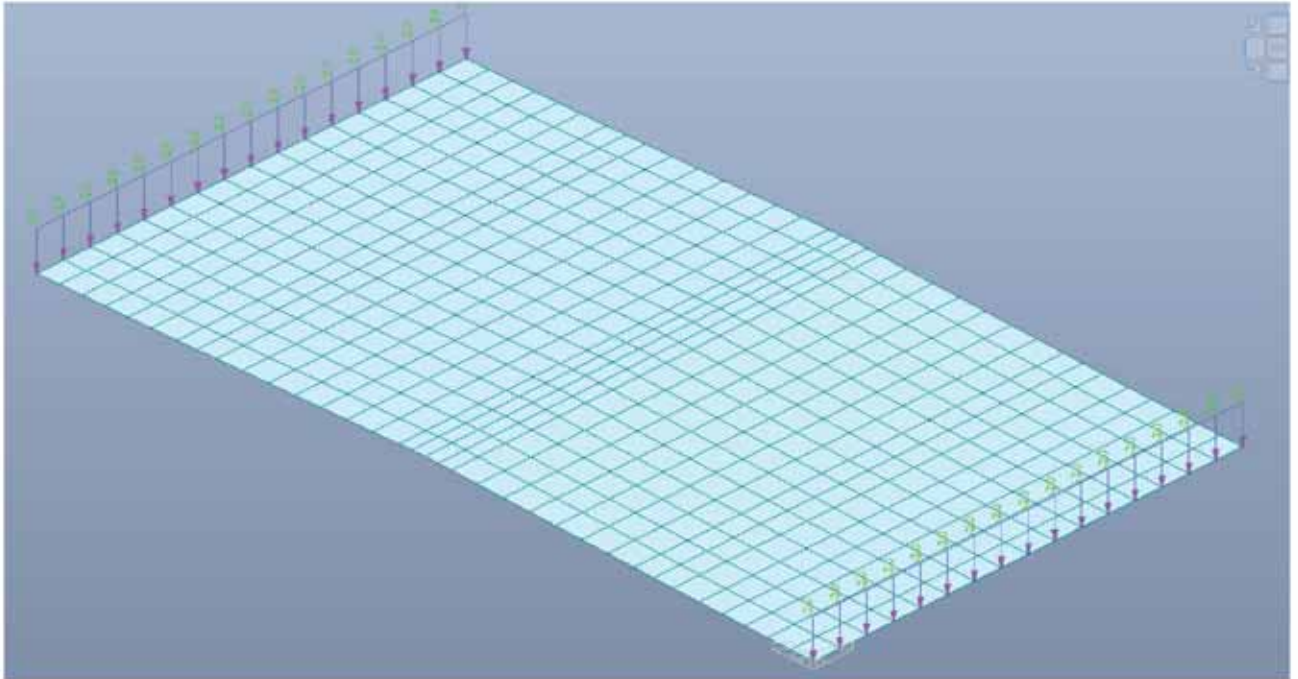


Figura 74 – Peso Barriera + Veletta + Tubazioni

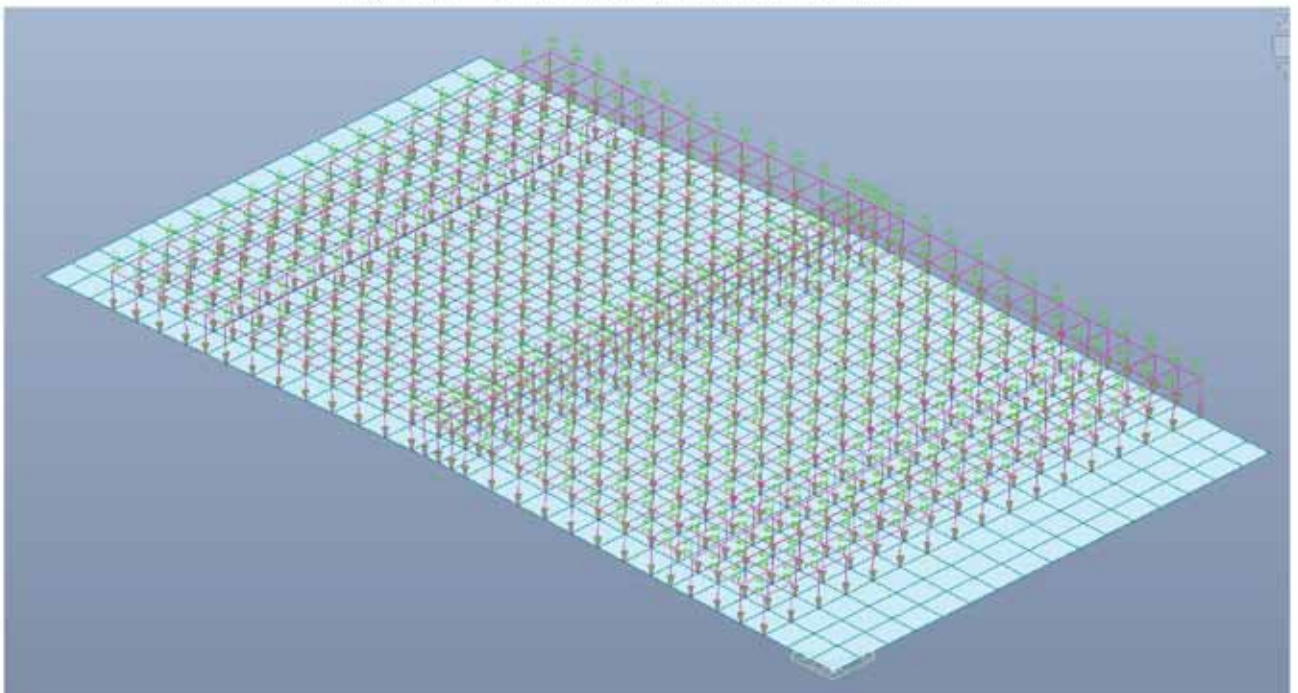


Figura 75 - Peso permanente portato

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

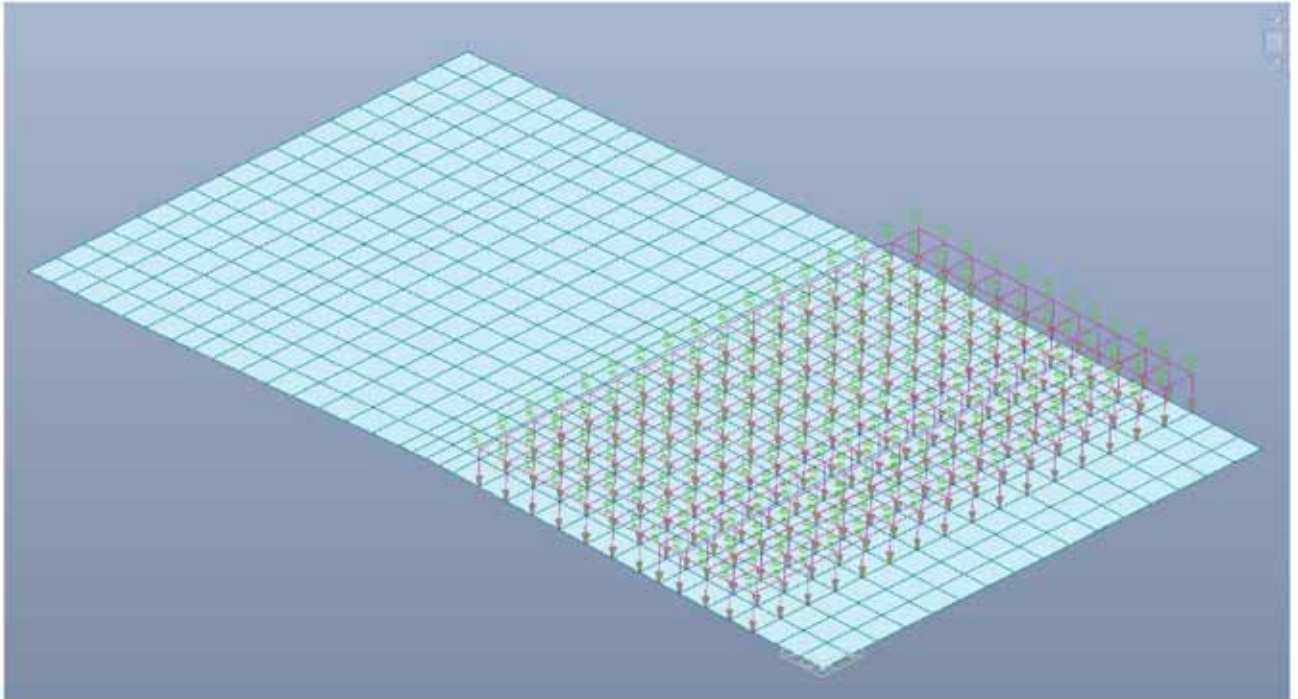


Figura 76 - Carico Distribuito prima colonna di carico

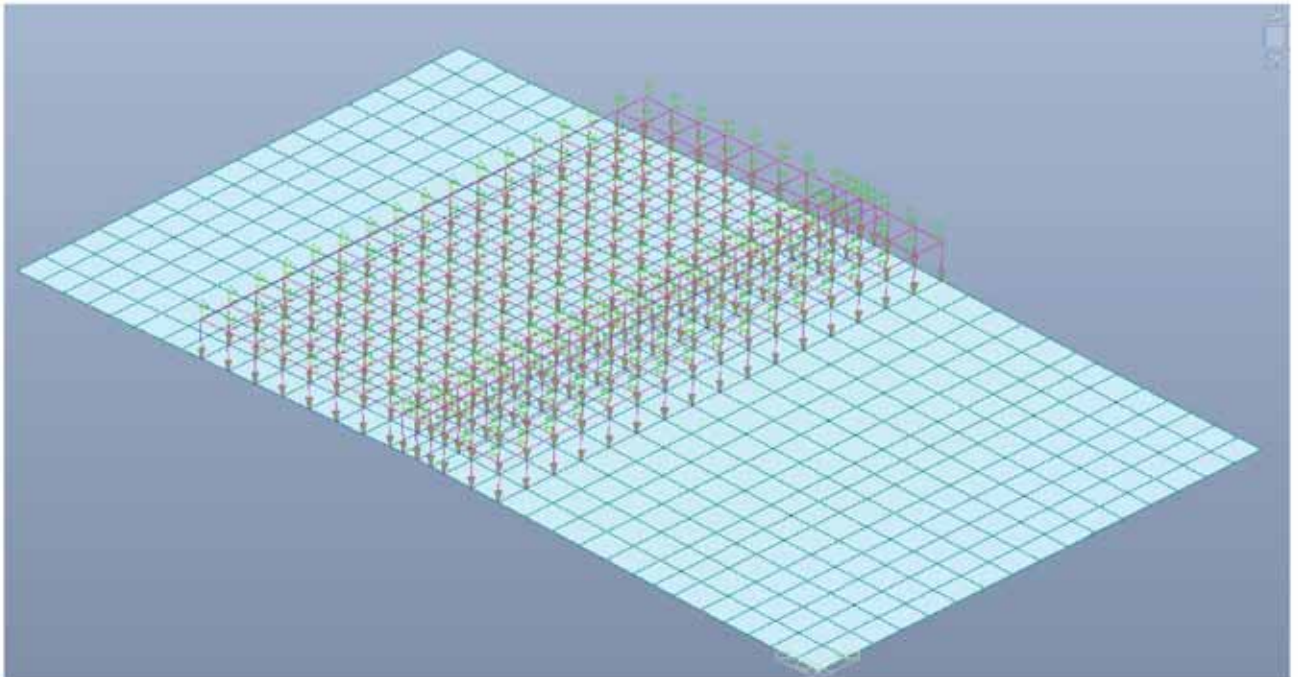


Figura 77 - Carico Distribuito seconda colonna di carico

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

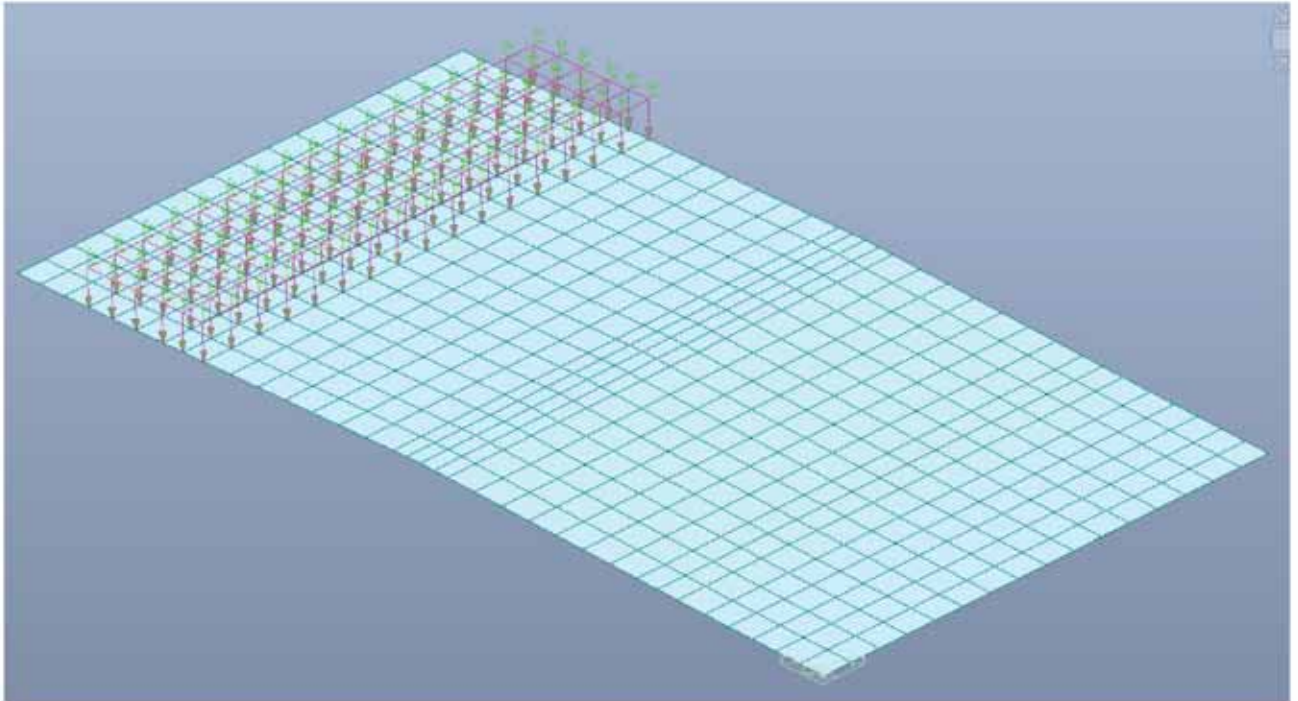


Figura 78 - Carico Distribuito terza colonna di carico

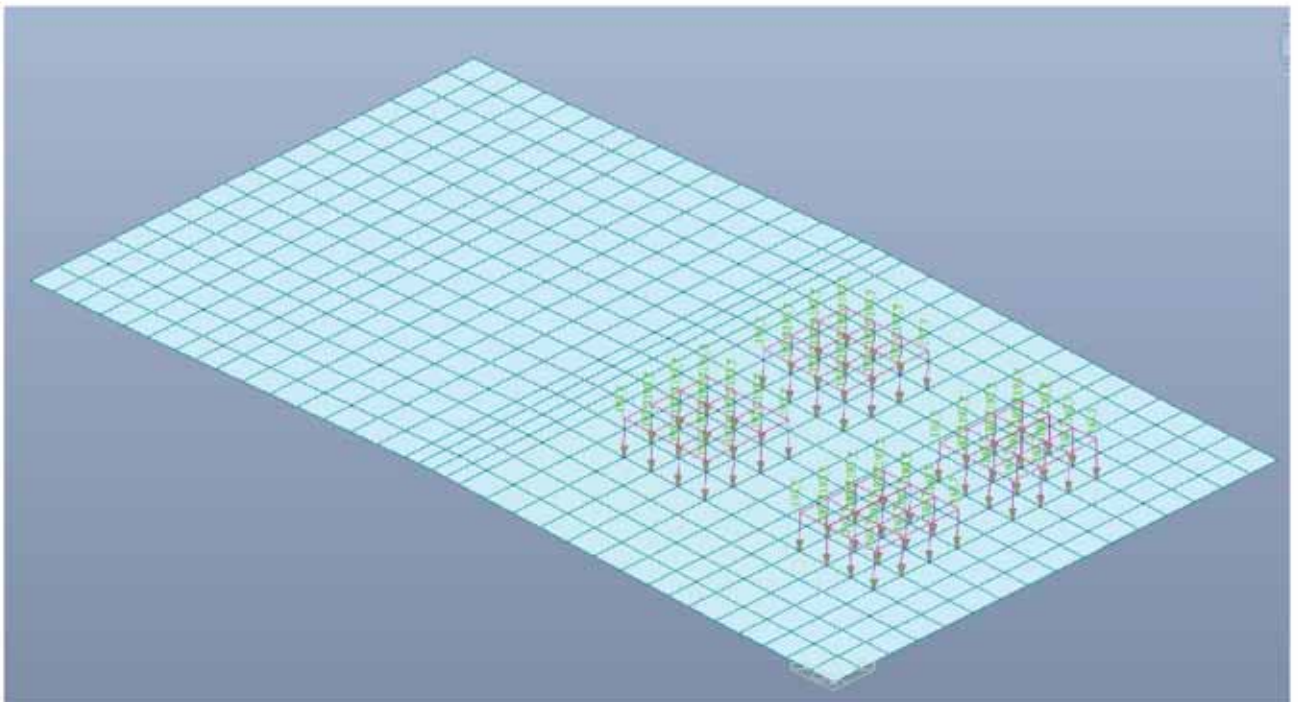


Figura 79 – Carico Q1a

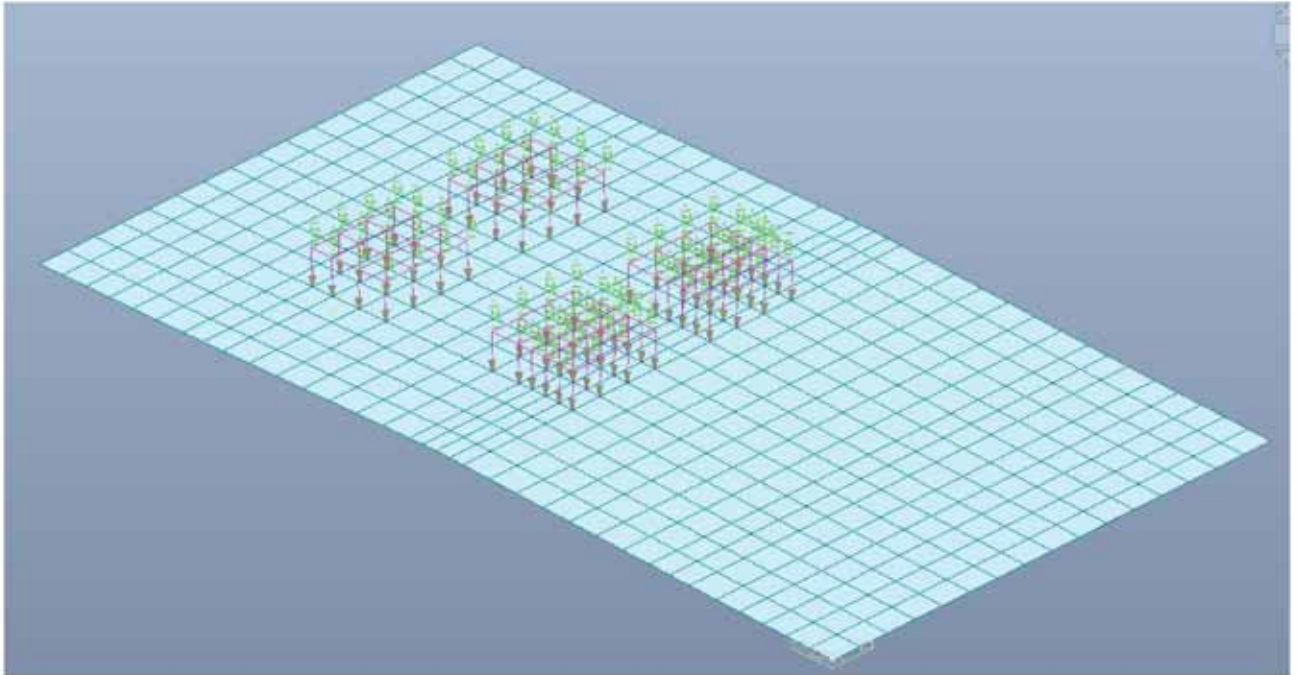


Figura 80 – Carico Q1b

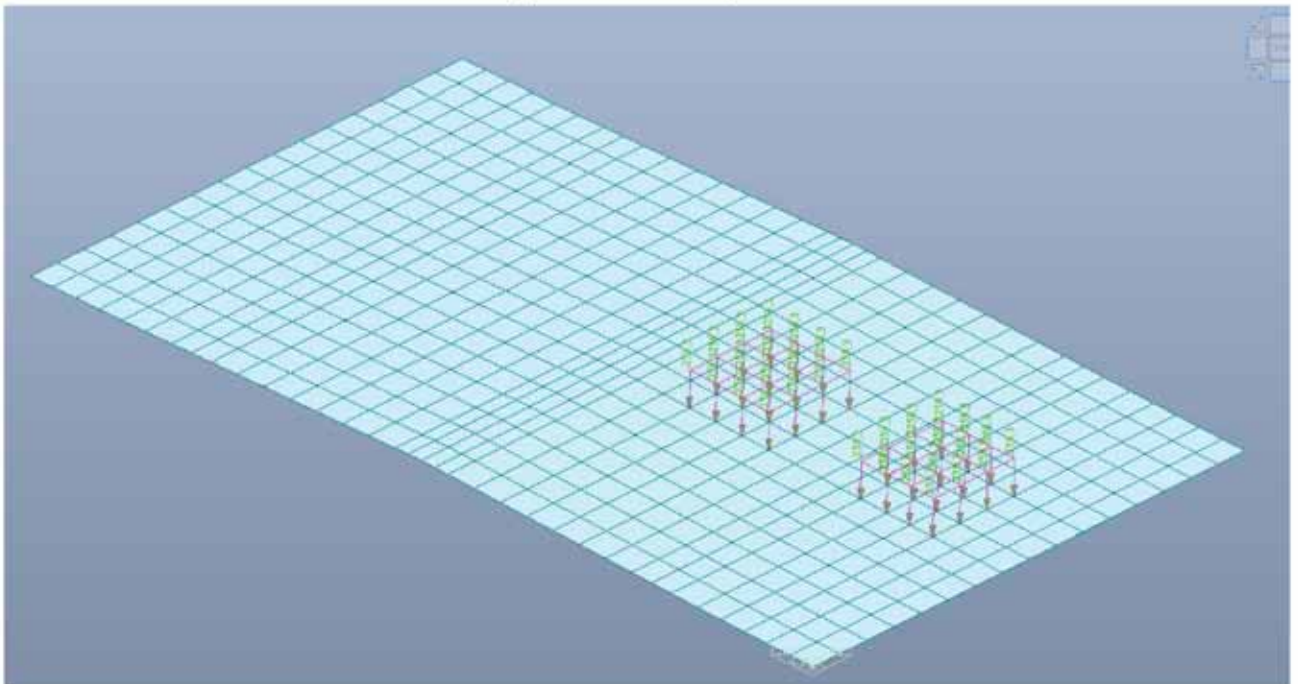


Figura 81 - Carico Schema 2

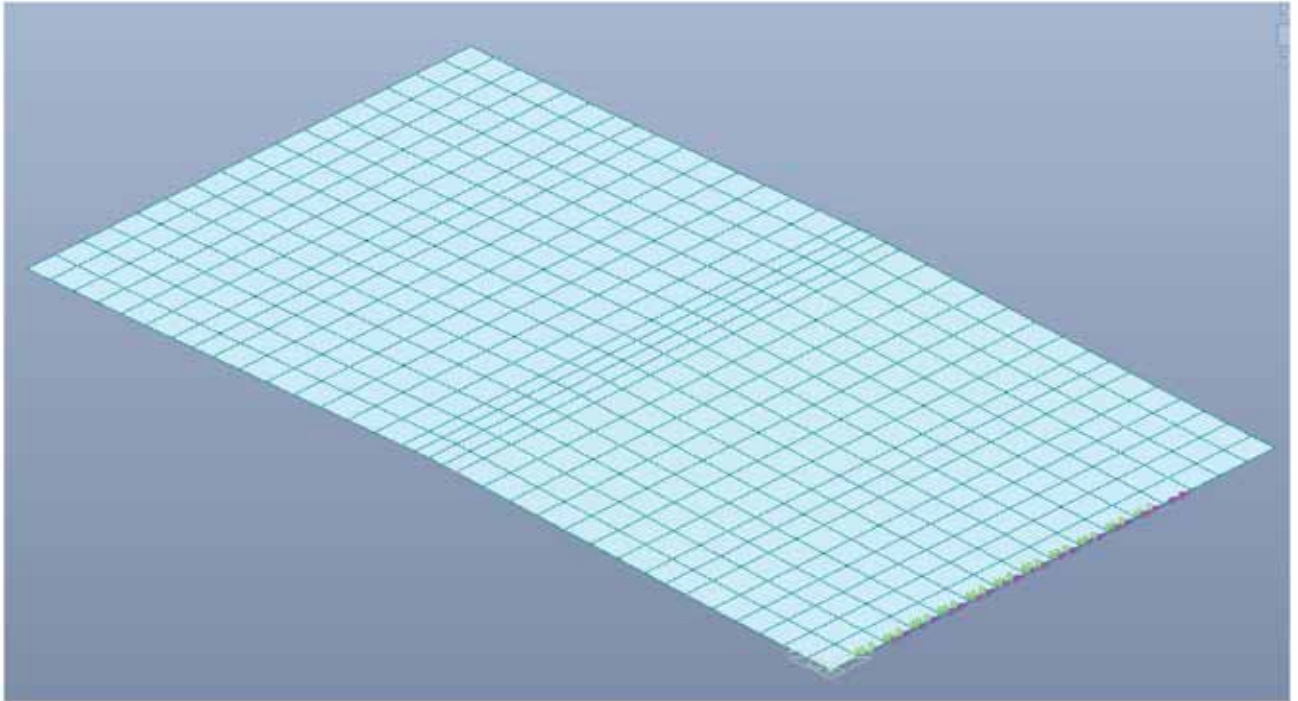


Figura 82 - Momento torcente che simula l'effetto dell'urto

Di riporta di seguito i diagrammi delle sollecitazioni ottenute sia agli Stati limiti Ultimi che agli Stati limiti di esercizio con le relative verifiche strutturali.

7.2.1 VERIFICA STRUTTURALE SOLETTA

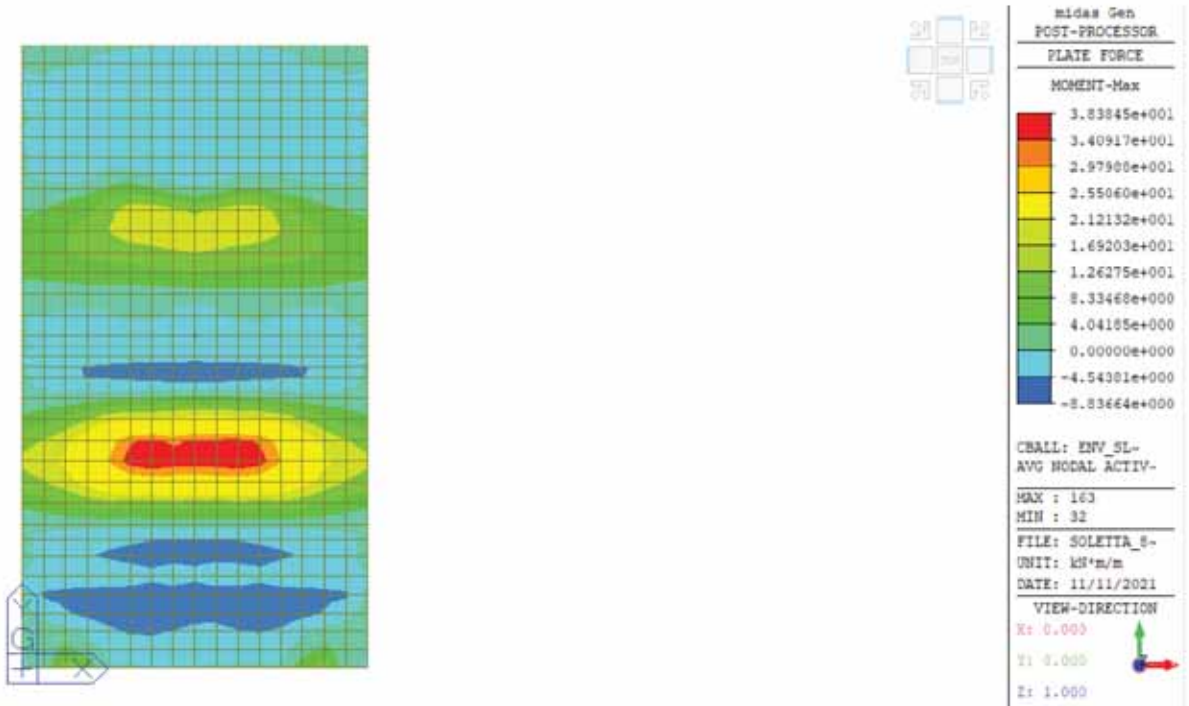


Figura 83 - Max Momento SLU

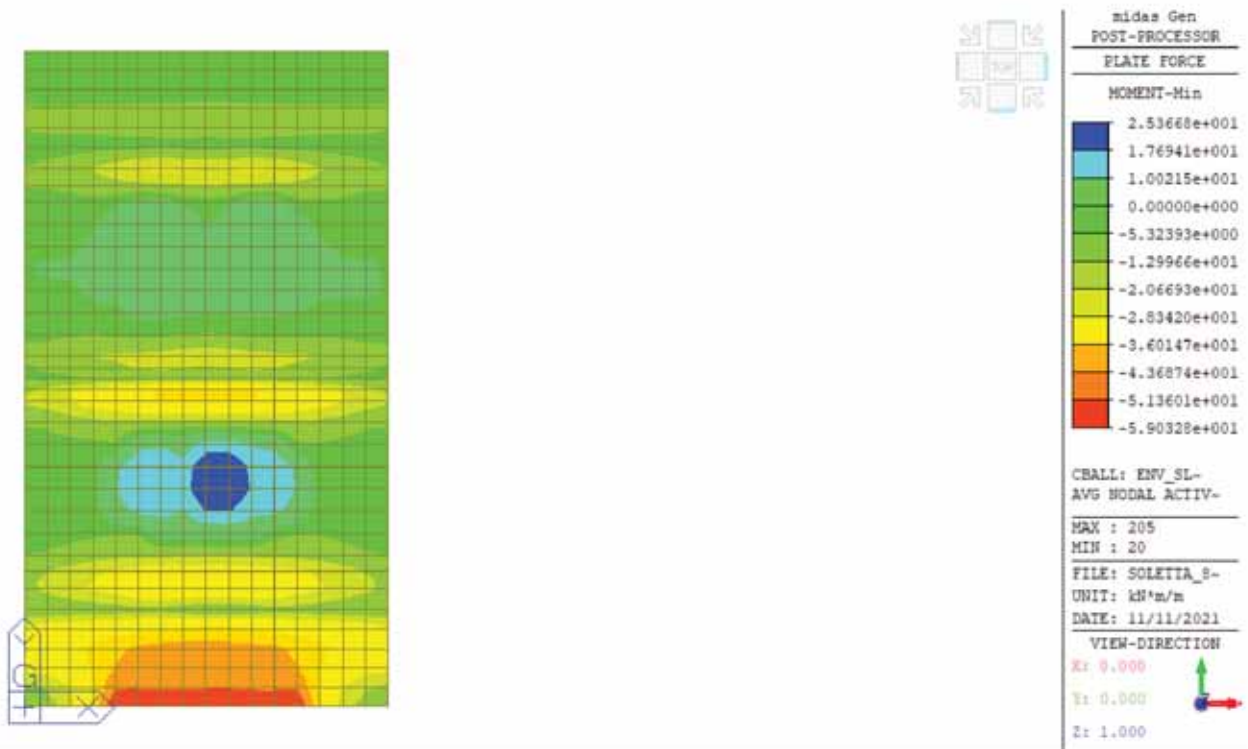


Figura 84 - Min Momento SLU

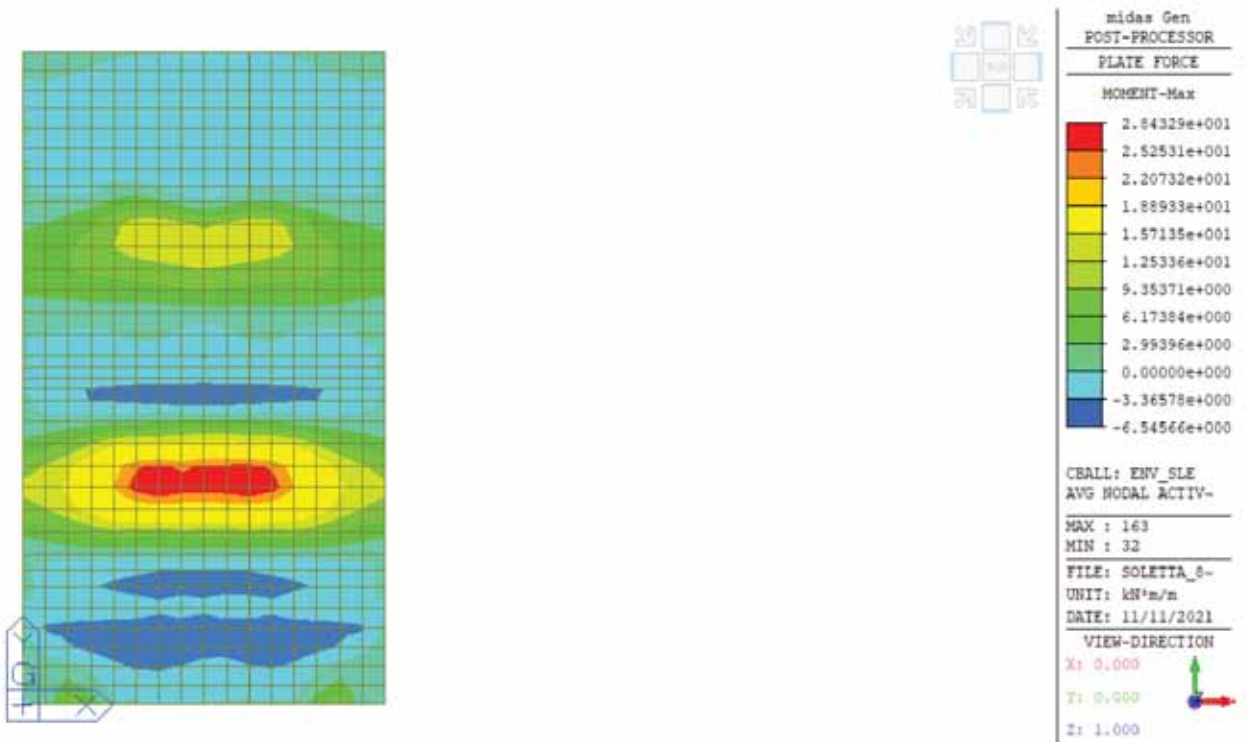


Figura 85 - Max Momento SLE

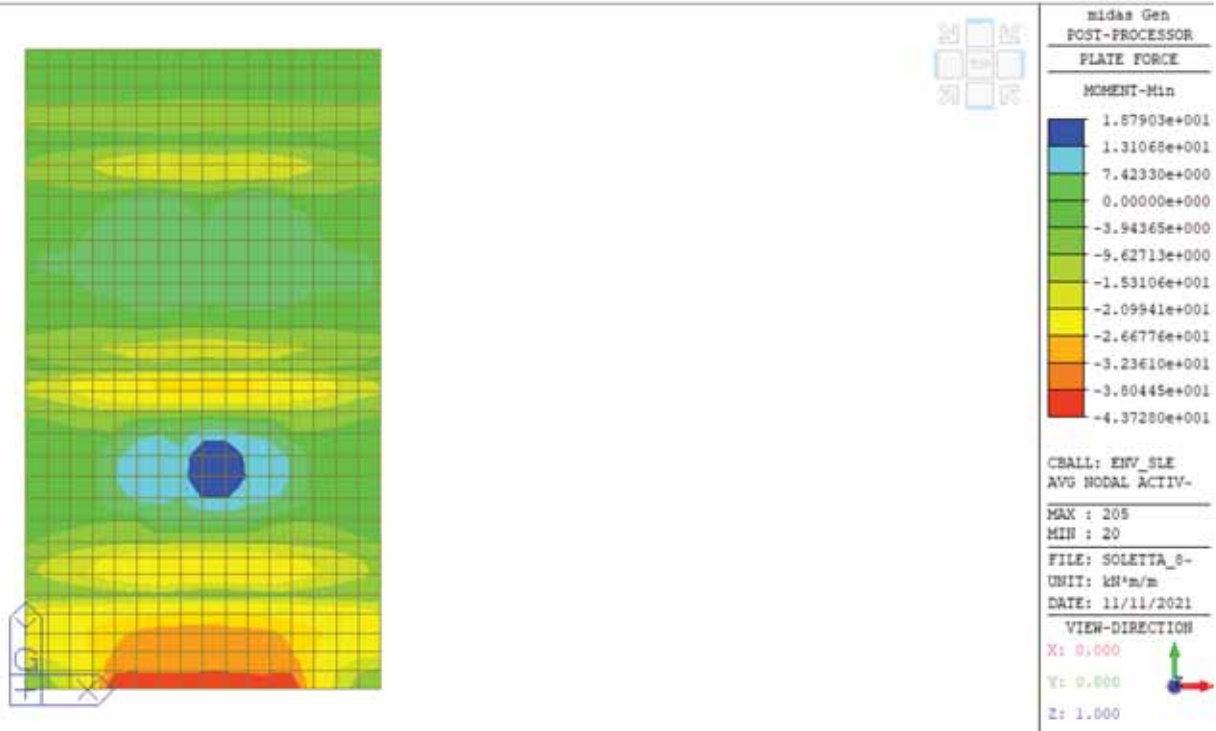


Figura 86 - Min Momento SLE

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

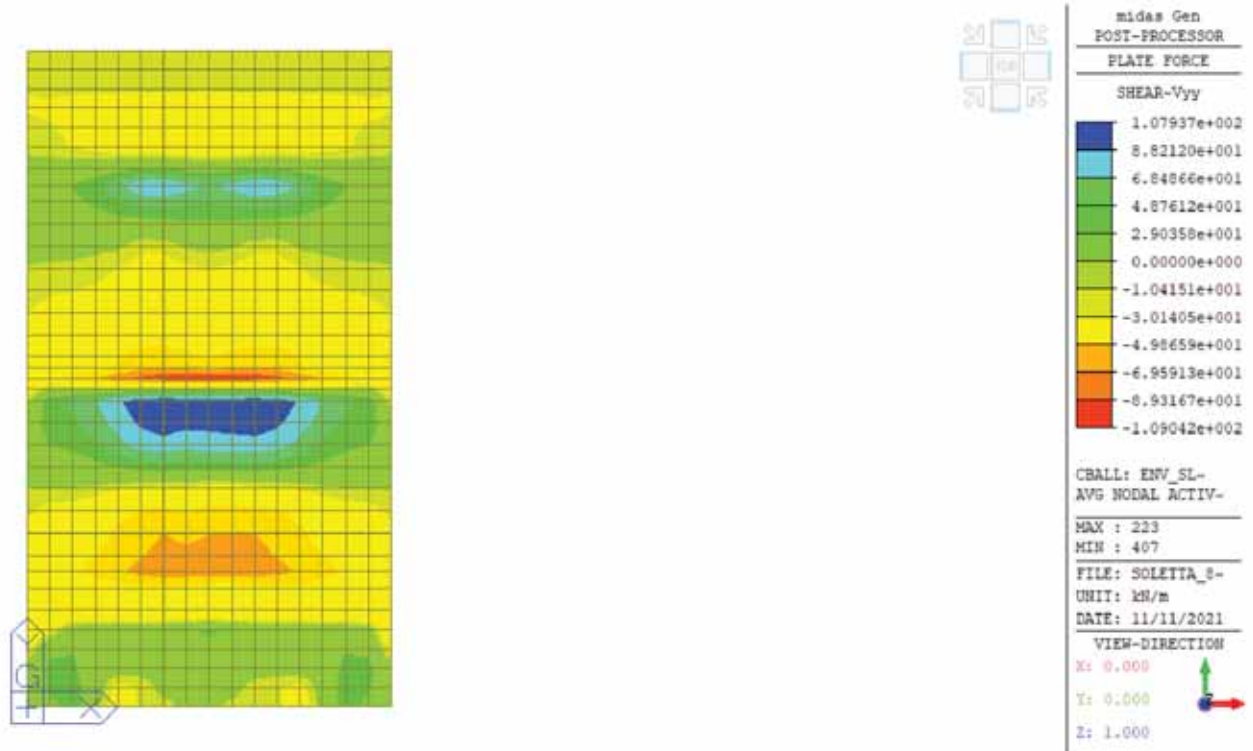
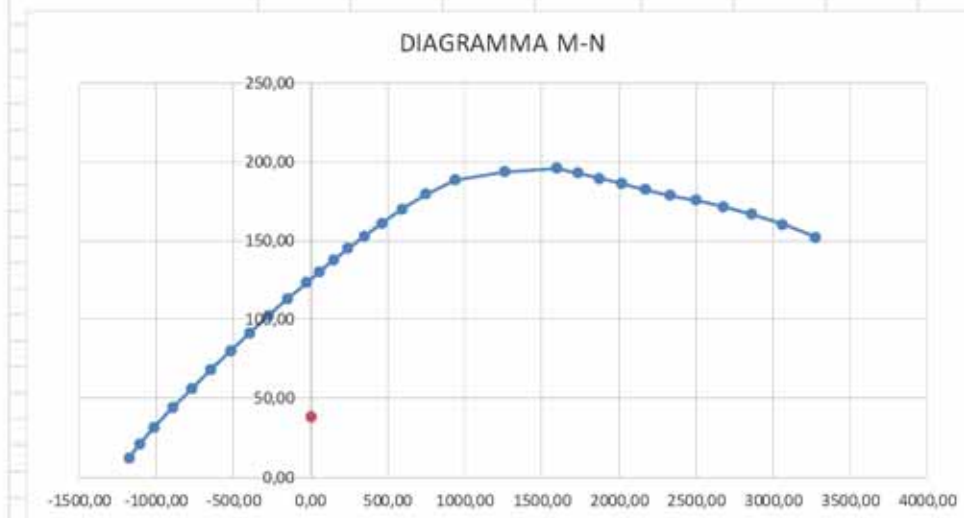


Figura 87 - Taglio SLU

VERIFICA FLESSIONALE MOMENTO POSITIVO

RIEPILOGO SOLLECITAZIONI		RIEPILOGO ARMATURE			RIEPILOGO GEOMETRIA			RIEPILOGO MATERIALI			
	M	N	n°	φ (mm)	y	B =	100	cm	fck	33,2	N/mm ²
	kNm	kN		(mm)	(cm)	H =	26	cm	Rck	40	N/mm ²
SLU/SLV	38,38	0,0							fcd =	18,81	
RARA	28,43	0,0	5	16	5				c	5	cm
FREQUENTE	28,43	0,0	1	0	0				fmax	16	mm
QUASI PERMANENTE	28,43	0,0	5	16	21				i	10	cm
			5	16	21				i'	0	cm
									fyk	450	N/mm ²



VERIFICHE TENSIONALI	RARA	QUASI PERMANENTE	σc	σs	σcmax	σsmax
			N/mm ²	N/mm ²	N/mm ²	N/mm ²
			3,37	78,65	19,92	360,00
			3,37		14,94	

VERIFICHE A FESSURAZIONE	QUASI PERMANENTE	FREQUENTE	Wk	Mf	M	Wklim	
			mm	kNm	kNm		
			0,0275	43,28	36,36	0,2	Ms < M1f
			0,0275	43,28	36,36	0,3	Ms < M1f

VERIFICA TENSIONALE COMBINAZIONE QUASI PERMANENTE :

M = 28,43 kNm

N = 0 kN

H/6 = 4,33 cm

B = 100 cm

H = 26 cm

Verifica:

n = 15

x = 8,21 cm

s-c = 3,37 N/mm²

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

$s-a = -19,76 \text{ N/mm}^2$ ($y = 5 \text{ cm}$: 5 f 16, $A_a = 10,05 \text{ cm}^2$, passo 20,0 cm)

$s-a' = 78,65 \text{ N/mm}^2$ ($y = 21 \text{ cm}$: 5 f 16, $A_{a'} = 10,05 \text{ cm}^2$, passo 20,0 cm)

$s-a'' = 78,65 \text{ N/mm}^2$ ($y = 21 \text{ cm}$: 5 f 16, $A_{a''} = 10,05 \text{ cm}^2$, passo 20,0 cm)

VERIFICA TENSIONALE COMBINAZIONE RARA :

$M = 28,43 \text{ kNm}$

$N = 0 \text{ kN}$

$H/6 = 4,33 \text{ cm}$

$B = 100 \text{ cm}$

$H = 26 \text{ cm}$

Verifica:

$n = 15$

$x = 8,21 \text{ cm}$

$s-c = 3,37 \text{ N/mm}^2$

$s-a = -19,76 \text{ N/mm}^2$ ($y = 5 \text{ cm}$: 5 f 16, $A_a = 10,05 \text{ cm}^2$, passo 20,0 cm)

$s-a' = 78,65 \text{ N/mm}^2$ ($y = 21 \text{ cm}$: 5 f 16, $A_{a'} = 10,05 \text{ cm}^2$, passo 20,0 cm)

$s-a'' = 78,65 \text{ N/mm}^2$ ($y = 21 \text{ cm}$: 5 f 16, $A_{a''} = 10,05 \text{ cm}^2$, passo 20,0 cm)

VERIFICA A FESSURAZIONE COMBINAZIONE QUASI PERMANENTE :

$M = 28,43 \text{ kNm}$

$N = 0 \text{ kNm}$

$R_{ck} = 40 \text{ N/mm}^2$

$f_{ctm} = 3,16 \text{ N/mm}^2$ ($0,27 \times R_{ck}^{2/3}$)

$B = 100 \text{ cm}$ (larghezza sezione)

$H = 26 \text{ cm}$ (altezza sezione)

$y = 5 \text{ cm}$ (posizione di armatura)

$A_a = 10,05 \text{ cm}^2$ (n_i 5 f 16 passo 20 cm)

$y' = 21 \text{ cm}$ (posizione di armatura)

$A_{a'} = 10,05 \text{ cm}^2$ (n_i 5 f 16 passo 10 cm)

$y'' = 21 \text{ cm}$ (posizione di armatura)

$A_{a''} = 10,05 \text{ cm}^2$ (n_i 5 f 16 passo 20 cm)

STADIO NON FESSURATO

$n = 15$ (coeff. omogeneizzazione)

$J_{id}(I) = 173'070 \text{ cm}^4$

$A_{id} = 3'022 \text{ cm}^2$

$x(I) = 13,373 \text{ cm}$ (asse neutro stato I, dal lembo compresso)

$M = 36,36 \text{ kNm}$ (Momento di formazione fessura $f_{ck} = 0,7 \times 1,2 \times f_{ctm}$)

$M_f = 43,28 \text{ kNm}$ (Momento di fessurazione f_{ctm})

Momento d'esercizio inferiore al momento di fessurazione quindi non serve calcolare l'ampiezza delle fessure

VERIFICA A FESSURAZIONE COMBINAZIONE FREQUENTE:

$M = 28,43 \text{ kNm}$

$N = 0 \text{ kNm}$

$R_{ck} = 40 \text{ N/mm}^2$

$f_{ctm} = 3,16 \text{ N/mm}^2 (0,27 \times R_{ck}^{2/3})$

$B = 100 \text{ cm}$ (larghezza sezione)

$H = 26 \text{ cm}$ (altezza sezione)

$y = 5 \text{ cm}$ (posizione di armatura)

$A_a = 10,05 \text{ cm}^2$ (n_i 5 f 16 passo 20 cm)

$y' = 21 \text{ cm}$ (posizione di armatura)

$A_{a'} = 10,05 \text{ cm}^2$ (n_i 5 f 16 passo 10 cm)

$y'' = 21 \text{ cm}$ (posizione di armatura)

$A_{a''} = 10,05 \text{ cm}^2$ (n_i 5 f 16 passo 20 cm)

STADIO NON FESSURATO

$n = 15$ (coeff. omogeneizzazione)

$J_{id}(I) = 173'070 \text{ cm}^4$

$A_{id} = 3'022 \text{ cm}^2$

$x(I) = 13,373 \text{ cm}$ (asse neutro stato I, dal lembo compresso)

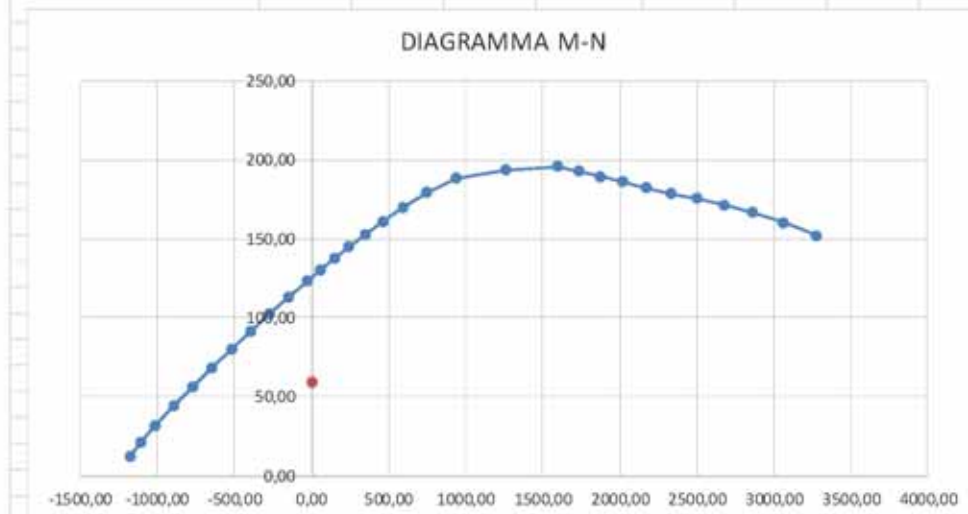
$M = 36,36 \text{ kNm}$ (Momento di formazione fessura $f_{cfk} = 0,7 \times 1,2 \times f_{ctm}$)

$M_f = 43,28 \text{ kNm}$ (Momento di fessurazione f_{ctm})

Momento d'esercizio inferiore al momento di fessurazione quindi non serve calcolare l'ampiezza delle fessure

VERIFICA FLESSIONALE MOMENTO NEGATIVO

RIEPILOGO SOLLECITAZIONI		RIEPILOGO ARMATURE			RIEPILOGO GEOMETRIA			RIEPILOGO MATERIALI			
	M	N	n°	φ (mm)	y	B =	100	cm	fck	33,2	N/mm ²
	kNm	kN		(mm)	(cm)	H =	26	cm	Rck	40	N/mm ²
SLU/SLV	59,03	0,0							fcd =	18,81	
RARA	43,73	0,0	5	16	5				c	5	cm
FREQUENTE	43,73	0,0	1	0	0				fmax	16	mm
QUASI PERMANENTE	43,73	0,0	5	16	21				i	10	cm
			5	16	21				i'	0	cm
									fyk	450	N/mm ²



VERIFICHE TENSIONALI		σc	σs	σcmax	σsmax
		N/mm ²	N/mm ²	N/mm ²	N/mm ²
RARA		5,18	120,97	19,92	360,00
QUASI PERMANENTE		5,18		14,94	

VERIFICHE A FESSURAZIONE		Wk	Mf	M	Wlim	
		mm	kNm	kNm		
QUASI PERMANENTE		0,0539	43,28	36,36	0,2	Controllo Wk
FREQUENTE		0,0539	43,28	36,36	0,3	Controllo Wk

VERIFICA TENSIONALE COMBINAZIONE QUASI PERMANENTE :

M = 43,73 kNm

N = 0 kN

H/6 = 4,33 cm

B = 100 cm

H = 26 cm

Verifica:

n = 15

x = 8,21 cm

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

$$s-c = 5,18 \text{ N/mm}^2$$

$$s-a = -30,39 \text{ N/mm}^2 \text{ (} y = 5 \text{ cm: } 5 \text{ f } 16, A_a = 10,05 \text{ cm}^2, \text{ passo } 20,0 \text{ cm)}$$

$$s-a' = 120,97 \text{ N/mm}^2 \text{ (} y = 21 \text{ cm: } 5 \text{ f } 16, A_{a'} = 10,05 \text{ cm}^2, \text{ passo } 20,0 \text{ cm)}$$

$$s-a'' = 120,97 \text{ N/mm}^2 \text{ (} y = 21 \text{ cm: } 5 \text{ f } 16, A_{a''} = 10,05 \text{ cm}^2, \text{ passo } 20,0 \text{ cm)}$$

VERIFICA TENSIONALE COMBINAZIONE RARA :

$$M = 43,73 \text{ kNm}$$

$$N = 0 \text{ kN}$$

$$H/6 = 4,33 \text{ cm}$$

$$B = 100 \text{ cm}$$

$$H = 26 \text{ cm}$$

Verifica:

$$n = 15$$

$$x = 8,21 \text{ cm}$$

$$s-c = 5,18 \text{ N/mm}^2$$

$$s-a = -30,39 \text{ N/mm}^2 \text{ (} y = 5 \text{ cm: } 5 \text{ f } 16, A_a = 10,05 \text{ cm}^2, \text{ passo } 20,0 \text{ cm)}$$

$$s-a' = 120,97 \text{ N/mm}^2 \text{ (} y = 21 \text{ cm: } 5 \text{ f } 16, A_{a'} = 10,05 \text{ cm}^2, \text{ passo } 20,0 \text{ cm)}$$

$$s-a'' = 120,97 \text{ N/mm}^2 \text{ (} y = 21 \text{ cm: } 5 \text{ f } 16, A_{a''} = 10,05 \text{ cm}^2, \text{ passo } 20,0 \text{ cm)}$$

VERIFICA A FESSURAZIONE COMBINAZIONE QUASI PERMANENTE :

$$M = 43,73 \text{ kNm}$$

$$N = 0 \text{ kNm}$$

$$R_{ck} = 40 \text{ N/mm}^2$$

$$f_{ctm} = 3,16 \text{ N/mm}^2 \text{ (} 0,27 \times R_{ck}^{2/3} \text{)}$$

$$B = 100 \text{ cm (larghezza sezione)}$$

$$H = 26 \text{ cm (altezza sezione)}$$

$$y = 5 \text{ cm (posizione di armatura)}$$

$$A_a = 10,05 \text{ cm}^2 \text{ (} n_i \text{ } 5 \text{ f } 16 \text{ passo } 20 \text{ cm)}$$

$$y' = 21 \text{ cm (posizione di armatura)}$$

$$A_{a'} = 10,05 \text{ cm}^2 \text{ (} n_i \text{ } 5 \text{ f } 16 \text{ passo } 10 \text{ cm)}$$

$$y'' = 21 \text{ cm (posizione di armatura)}$$

$$A_{a''} = 10,05 \text{ cm}^2 \text{ (} n_i \text{ } 5 \text{ f } 16 \text{ passo } 20 \text{ cm)}$$

STADIO NON FESSURATO

$$n = 15 \text{ (coeff. omogeneizzazione)}$$

$$J_{id}(I) = 173'070 \text{ cm}^4$$

$$A_{id} = 3'022 \text{ cm}^2$$

$$x(I) = 13,373 \text{ cm (asse neutro stato I, dal lembo compresso)}$$

$$M = 36,36 \text{ kNm (Momento di formazione fessura } f_{cfk} = 0,7 \times 1,2 \times f_{ctm} \text{)}$$

$$M_f = 43,28 \text{ kNm (Momento di fessurazione } f_{ctm} \text{)}$$

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

STADIO FESSURATO (II)

$n = 15$ (coeff. omogeneizzazione)

$x(II) = 8,2$ cm (asse neutro stato II)

$Jid(II) = 69'336$ cm²

$s_s = 120,97$ N/mm² (M,N)

$e_s = 0,000576$

Geometria tirante ideale

$b = 100$ cm

$h' = 17,8$ cm ($c + f/2 + i' + 7,5xf$)

$A_s = 20,11$ cm²

$A_c = 1780,00$ cm²

$A_s/A_c = 0,0113$

Distanza media fessure:

$c = 5$ cm (copriferro, da estradosso cls ad estradosso barra)

$i = 10,0$ cm (interasse ferri in orizzontali)

$i' = 0$ cm (interasse ferri verticale, nel caso di due strati di barre)

$f_{max} = 16$ mm diametro massimo barre

$r = 0,0113$ (A_s/A_c tirante ideale)

$k_1 = 0,4$ (barre a.m.)

$k_2 = 0,074$ ($0,25x[1-h'/(2x(H-x1))]$)

$s_m = 16,18$ cm ($2x(c+i/10)+k_1xk_2xf/r$)

Deformazione media:

$b_1 = 1$ (barre a.m.)

$b_2 = 0,5$ (carichi di lunga durata o numerosi cicli di carico)

$s_{sr} = 119,74$ N/mm² (stato II, Mf)

$s_{ss} = 120,97$ N/mm² (stato II, Magente)

$e_{sm} = 0,000294$ ($ss/Esx(1-b_1xb_2x(ssr/ss)^2)$)

Ampiezza teorica di fessura:

$w_k = 0,081$ mm ($1,7x e_{sm} x s_m$)

VERIFICA A FESSURAZIONE COMBINAZIONE FREQUENTE :

$M = 43,73$ kNm

$N = 0$ kNm

$R_{ck} = 40$ N/mm²

$f_{ctm} = 3,16$ N/mm² ($0,27xR_{ck}^{2/3}$)

$B = 100$ cm (larghezza sezione)

$H = 26$ cm (altezza sezione)

$y = 5$ cm (posizione di armatura)

$A_a = 10,05$ cm² ($n_i 5 f 16$ passo 20 cm)

$y' = 21$ cm (posizione di armatura)

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

$Aa' = 10,05 \text{ cm}^2$ (n_i 5 f 16 passo 10 cm)

$y'' = 21 \text{ cm}$ (posizione di armatura)

$Aa'' = 10,05 \text{ cm}^2$ (n_i 5 f 16 passo 20 cm)

STADIO NON FESSURATO

$n = 15$ (coeff. omogeneizzazione)

$J_{id(I)} = 173'070 \text{ cm}^4$

$A_{id} = 3'022 \text{ cm}^2$

$x(I) = 13,373 \text{ cm}$ (asse neutro stato I, dal lembo compresso)

$M = 36,36 \text{ kNm}$ (Momento di formazione fessura $f_{ck} = 0,7 \times 1,2 \times f_{ctm}$)

$M_f = 43,28 \text{ kNm}$ (Momento di fessurazione f_{ctm})

STADIO FESSURATO (II)

$n = 15$ (coeff. omogeneizzazione)

$x(II) = 8,2 \text{ cm}$ (asse neutro stato II)

$J_{id(II)} = 69'336 \text{ cm}^4$

$s_s = 120,97 \text{ N/mm}^2$ (M,N)

$e_s = 0,000576$

Geometria tirante ideale

$b = 100 \text{ cm}$

$h' = 17,8 \text{ cm}$ ($c + f/2 + i' + 7,5 \times f$)

$A_s = 20,11 \text{ cm}^2$

$A_c = 1780,00 \text{ cm}^2$

$A_s/A_c = 0,0113$

Distanza media fessure:

$c = 5 \text{ cm}$ (copriferro, da estradosso cls ad estradosso barra)

$i = 10,0 \text{ cm}$ (interasse ferri in orizzontali)

$i' = 0 \text{ cm}$ (interasse ferri verticale, nel caso di due strati di barre)

$f_{max} = 16 \text{ mm}$ diametro massimo barre

$r = 0,0113$ (A_s/A_c tirante ideale)

$k_1 = 0,4$ (barre a.m.)

$k_2 = 0,074$ ($0,25 \times [1 - h'/(2 \times (H - x_1))]$)

$s_m = 16,18 \text{ cm}$ ($2 \times (c + i/10) + k_1 \times k_2 \times f/r$)

Deformazione media:

$b_1 = 1$ (barre a.m.)

$b_2 = 0,5$ (carichi di lunga durata o numerosi cicli di carico)

$s_{sr} = 119,74 \text{ N/mm}^2$ (stato II, M_f)

$s_{ss} = 120,97 \text{ N/mm}^2$ (stato II, Magente)

$e_{sm} = 0,000294$ ($s_s/E_s \times (1 - b_1 \times b_2 \times (s_{sr}/s_s)^2)$)

Ampiezza teorica di fessura:

$w_k = 0,081 \text{ mm}$ ($1,7 \times e_{sm} \times s_m$)

VERIFICA A TAGLIO

VERIFICA A TAGLIO DELLA SEZIONE IN C.A. SECONDO NTC 14/01/2008

• Caratteristiche della sezione

$b_w = 1000$	mm larghezza	$f_{yk} = 450$	MPa	resist. caratteristica
$h = 260$	mm altezza	$g_s = 1,15$		coeff. sicurezza
$c = 50$	mm copriferro	$f_{yd} = 391,3$	MPa	resist. di calcolo
$f_{ck} = 33,2$	MPa resist. caratteristica	Armadura longitudinale tesa:		
$g_c = 1,50$	coeff. sicurezza	$A_{sl,1} = 5 \varnothing 16$		= 10,05 cm ²
$a_{cc} = 0,85$	coeff. riduttivo	$A_{sl,2} = 5 \varnothing 16$		= 10,05 cm ²
$d = 210$	mm altezza utile	$A_{sl,3} = 0 \varnothing 0$		= 0,00 cm ²
$f_{cd} = 18,81$	MPa resist. di calcolo			20,11 cm ²

• Sollecitazioni (compressione<0, trazione>0, taglio in valore assoluto)

$$N_{ed} = 0,0 \text{ kN} \quad V_{ed} = 109,40 \text{ kN}$$

• Elementi senza armature trasversali resistenti a taglio

$$k = 1 + (200/d)^{1/2} < 2 \quad k = 1,976 < 2$$

$$n_{min} = 0,035 k^{3/2} f_{ck}^{1/2} \quad n_{min} = 0,560$$

$$r_1 = A_{sl}/(b_w \times d) < 0,02 \quad r_1 = 0,010 < 0,02$$

$$\sigma_{cp} = N_{Ed}/A_c < 0,2 f_{cd} \quad \sigma_{cp} = 0,00 \text{ MPa} < 0,2 f_{cd}$$

$$(0,18 \times k \times (100 \times r_1 \times f_{ck})^{1/3} / g_c + 0,15 \times \sigma_{cp}) \times b_w \times d = 157,7 \text{ kN}$$

$$(n_{min} + 0,15 \times \sigma_{cp}) \times b_w \times d = 117,6 \text{ kN} \quad V_{Rd} = 157,7 \text{ kN}$$

la sezione è verificata in assenza di armature per il taglio

8 VERIFICA ELEMENTI DI APPOGGIO

Si riporta di seguito l'andamento degli spostamenti orizzontali necessari per il dimensionamento dei varchi, nonché gli scarichi necessari per il dimensionamento dei baggioli e dei ritegni sismici.

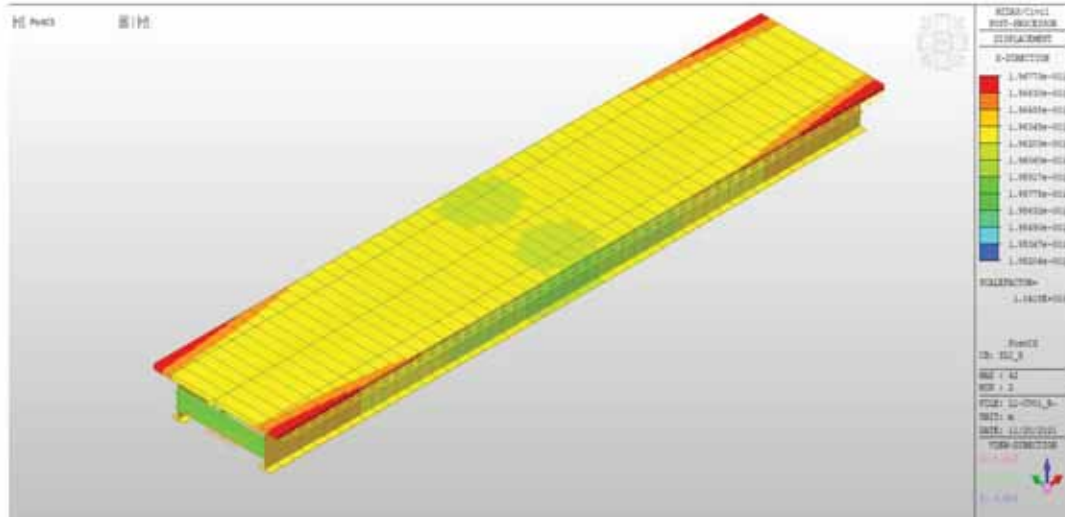


Figura 88 – Spostamenti Stato Limite Collasso X (SISMAX+0.30SISMAX)

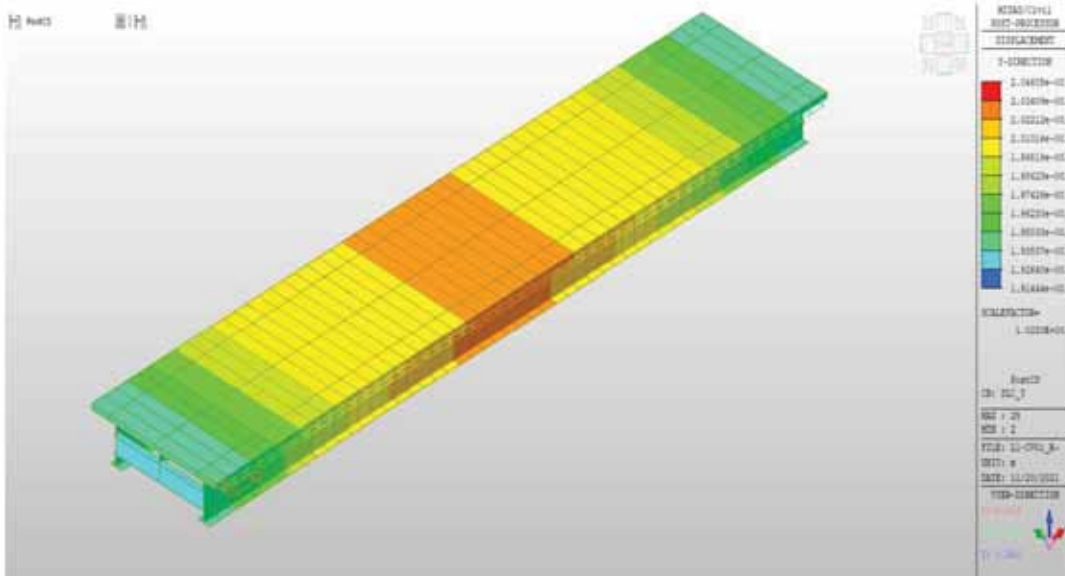


Figura 89 - Spostamenti Stato Limite Collasso Y (SISMAY+0.30SISMAX)

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

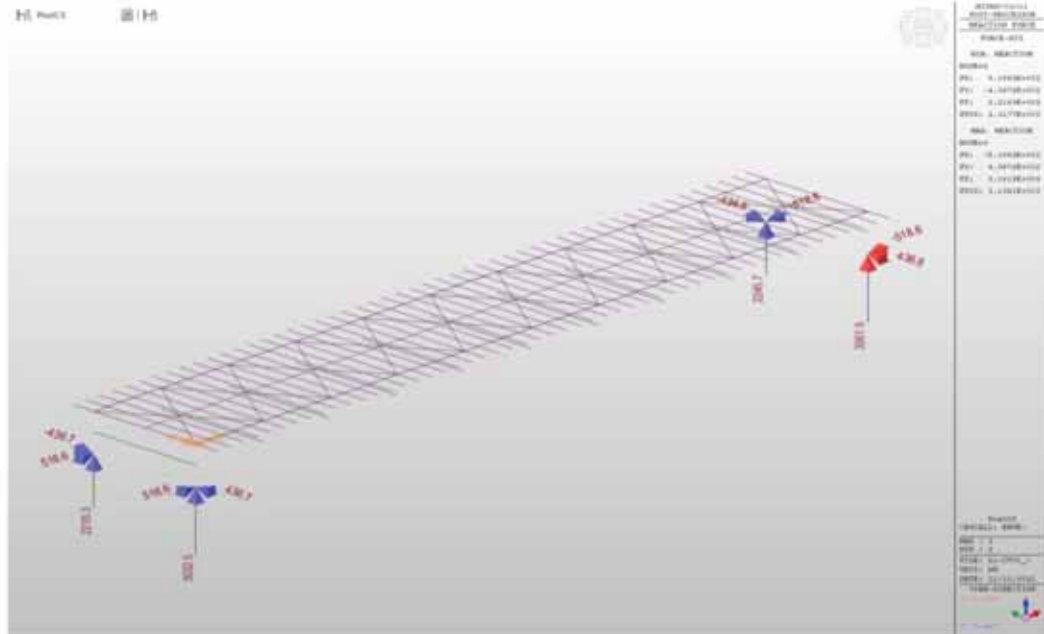


Figura 90 – Reazioni agli appoggi

Node	Load	FX (kN)	FY (kN)	FZ (kN)
1	FASE 3	62,024	0,753	1074,109
2	FASE 3	62,024	-0,753	1074,109
1	VENTO PONTE SCARICO	0,295	46,192	43,581
2	VENTO PONTE SCARICO	-0,295	46,202	-43,581
1	VENTO PONTE CARICO	-0,107	103,944	69,995
2	VENTO PONTE CARICO	0,108	103,967	-69,995
1	TERMICA UNIFORME +	33,271	8,963	0,000
2	TERMICA UNIFORME +	33,271	-8,963	0,000
1	TERMICA UNIFORME -	-31,124	-8,385	0,000
2	TERMICA UNIFORME -	-31,124	8,385	0,000
1	TERMICA GRADIENTE +	-12,933	-0,592	0,000
2	TERMICA GRADIENTE +	-12,933	0,592	0,000
1	TERMICA GRADIENTE -	15,519	0,710	0,000
2	TERMICA GRADIENTE -	15,519	-0,710	0,000
1	FRENATURA	-114,512	0,003	-10,839
2	FRENATURA	-114,512	-0,003	-10,839
1	EX(RS)	439,782	0,016	45,150
2	EX(RS)	439,782	0,016	45,150
1	EY(RS)	0,581	431,476	305,275
2	EY(RS)	0,581	431,476	305,275
1	EZ(RS)	16,915	0,097	396,813
2	EZ(RS)	16,915	0,097	396,813
1	DX(RS)	129,416	0,005	13,286
2	DX(RS)	129,416	0,005	13,286
1	CX(RS)	862,461	0,032	88,544
2	CX(RS)	862,461	0,032	88,544
1	LM01(all)	26,597	0,762	953,788
2	LM01(all)	8,531	-0,717	190,931
1	LM02(all)	5,846	0,723	182,578
2	LM02(all)	9,930	-0,736	365,318
1	LM03(all)	0,197	0,010	0,010
2	LM03(all)	1,600	-0,012	51,245

8.1 VERIFICA BAGGIOLI

DATI DI INPUT		
Forza orizzontale	V_{sd} [kN] =	518,6
Forza verticale (+ se di trazione)	$N_{sd} / 4$ [kN] =	-765,475
Altezza di applicazione forza orizzontale	a [m] =	0,41
Base baggiolo	h [m] =	1,05
Copriferro	c [m] =	0,05
Altezza utile	d [m] =	0,875
Profondità di incastro assunta	h' [m] =	0,00
Luce di calcolo mensola	L [m] =	0,41
Profondità baggiolo	b [m] =	1,00
Angolo inclinazione traliccio [°]	α [°] =	27,50
Angolo inclinazione traliccio [rad]	α [rad] =	0,48
Angolo inclinazione traliccio [°]	ψ [°] =	62,50
Angolo inclinazione traliccio [rad]	ψ [rad] =	1,09
VERIFICA CORRENTE TESO		
Trazione sulle barre d'armatura corrente teso	Z_{sd} [kN] =	-495,47
Classe acciaio		B450C
Resistenza a snervamento armatura	f_{yd} [MPa] =	391,3
Area armatura necessaria	A_{nec} [cm ²] =	12,7
Diametro armatura 1	$\varnothing 1$ [mm] =	16
Diametro armatura 2	$\varnothing 2$ [mm] =	0
Numero ferri $\varnothing 1$	$n_{\varnothing 1}$ [-] =	9
Numero ferri $\varnothing 2$	$n_{\varnothing 2}$ [-] =	0
Area armatura 1 (singola barra)	A_{s1} [cm ²] =	2,01
Area armatura 2 (singola barra)	A_{s2} [cm ²] =	0,00
Area armatura totale	A_{sTOT} [cm ²] =	18,1
Resistenza corrente teso	Z_{rd} [kN] =	708,09
Coefficiente di sicurezza	$Z_{rd} / Z_{sd} = c.s. =$	1,43
VERIFICA PUNTONE CLS COMPRESSO		
Resistenza cubica caratteristica	R_{ck} [MPa] =	40
Resistenza cilindrica caratteristica	f_{ck} [MPa] =	32
Coefficiente parziale di sicurezza	γ_c [-] =	1,50
Resistenza di calcolo a compressione	f_{cd} [MPa] =	18,13
Presenza di staffe		Si
Coefficiente presenza staffe (1 senza staffe; 1.5 con staffe)	c [-] =	1,50
Pendenza del puntone di calcestruzzo	$\cot \psi = \tan \alpha = \lambda =$	0,52
Altezza puntone	$0.4 * c * d * \sin \psi = hp$ [m] =	0,466
Compressione nel puntone	C_{sd} [kN] =	1072,93
Resistenza del puntone di calcestruzzo	$0.4 * b * d * f_{cd} * c / (1 + \lambda^2) = C_{rd}$ [kN] =	7490
Coefficiente di sicurezza	$C_{rd} / C_{sd} = c.s. =$	6,98

8.2 ISOLATORI – EFFETTO VARIABILITA' RIGIDEZZA

Si riportano di seguito le caratteristiche degli isolatori individuati.

V	Fzd	Ke	ξ_e	Kv	Dg	te	h	H	Z
kN	kN	kN/mm	%	kN/mm	mm	mm	mm	mm	mm
20940	33970	4,42	19	4489	1000	153	277	357	1050
V	Carico verticale massimo agente in presenza del sisma allo SLC								
Fzd	Carico verticale massimo in assenza di SISMA e spostamento 10mm								
Ke	Rigidezza orizzontale equivalente								
ξ_e	Coefficiente di smorzamento viscoso equivalente								
Kv	Rigidezza verticale								
Dg	Diametro elastomero								
te	Spessore totale gomma								
h	Altezza escluse piastre di ancoraggio								
H	Altezza totale incluse piastre di ancoraggio								
Z	Lato piastre di ancoraggio								

Il valore di $F_z \max = 3061.9$ kN inferiore ai limiti previsti per l'isolatore introdotto ($F_{zd} = 33970$ kN). Nel caso specifico, sono stati scelti isolatori elastomerici a nucleo di piombo e nell'ambito della rigidezza è stata effettuata una simulazione (che ha fornito sostanzialmente i medesimi risultati in termini di spostamento e reazioni agli appoggi) modificando la rigidezza dell'isolatore di +/-20% così come previsto dalle NTC2008 al punto 11.9.7.

8.3 VERIFICA GIUNTI

Per la determinazione dei varchi e quindi l'individuazione dei corretti giunti da utilizzare, sono stati considerati gli spostamenti sia dovuti alle azioni statiche che sismiche.

Nel dettaglio si nota che lo spostamento massimo, dovuto all'azione sismica in condizione SLC è pari a $d_{max} = 19.63$ cm. Si introduce quindi un giunto tipo GPE400 che permetta uno spostamento pari a +/-20cm.

8.4 VERIFICA RITEGNI SISMICI.

Il presente cavalcavia presenta come appoggi 4 isolatori di appoggio che permettono uno spostamento massimo orizzontale pari a 200mm. Si è scelto di introdurre comunque dei ritegni sismici per bloccare lo spostamento trasversale dell'impalcato in conseguenza dei valori di spostamento generati dal sisma. Si è scelto di permettere uno spostamento trasversale maggiore o comunque prossimo al valore riferito al sisma SLV e di dimensionare il ritegno con la forza che deriva dalla differenza di spostamento tra lo SLC ed il varco previsto.

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

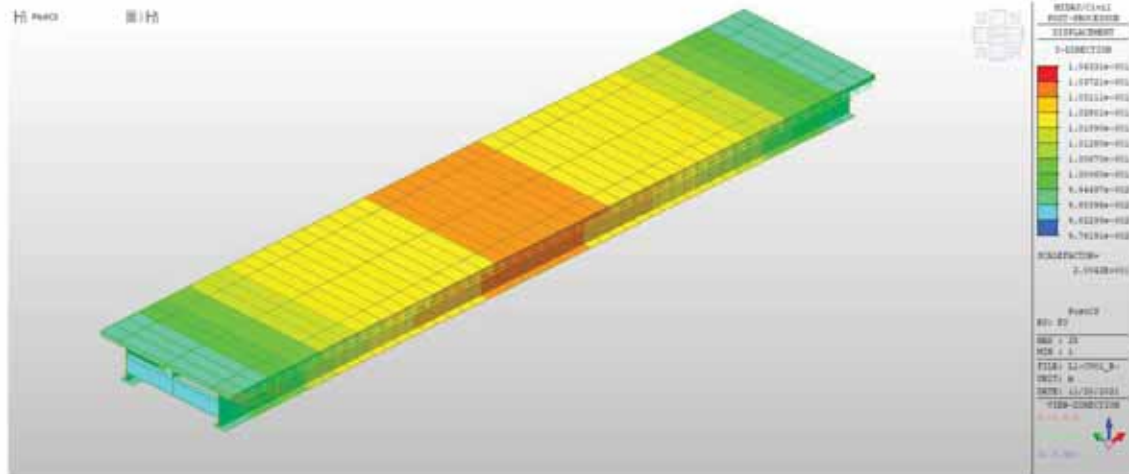
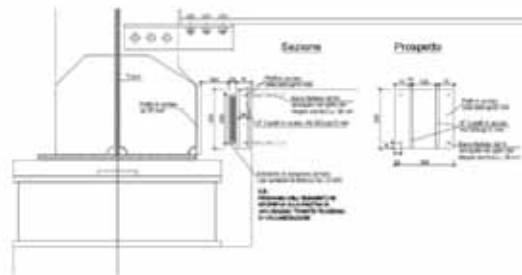


Figura 91 - Spostamento Y SLY (SISMA Y + 0.3 SISMA X)



Spostamento residuo = $20.46 - 14.00 = 6.46\text{cm}$

$K_{\text{isolatore}} = 4.420 \text{ kN/mm}$

$F_{\text{residua}} = 285.55 \text{ kN}$

Con tale forza vengono dimensionate le armature dei ritegni sismici

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

DATI DI INPUT		
Forza orizzontale	V_{sd} [kN] =	571.10
Forza verticale (+ se di trazione)	$N_{sd} / 4$ [kN] =	0
Altezza di applicazione forza orizzontale	a [m] =	0.84
Base baggio	h [m] =	1.00
Copriferro	c [m] =	0.05
Altezza utile	d [m] =	0.825
Profondità di incastro assunta	h' [m] =	0.00
Luce di calcolo mensola	L [m] =	0.84
Profondità baggio	b [m] =	1.00
Angolo inclinazione traliccio [°]	α [°] =	48.45
Angolo inclinazione traliccio [rad]	α [rad] =	0.85
Angolo inclinazione traliccio [°]	ψ [°] =	41.55
Angolo inclinazione traliccio [rad]	ψ [rad] =	0.73
VERIFICA CORRENTE TESO		
Trazione sulle barre d'armatura corrente teso	Z_{sd} [kN] =	644.29
Classe acciaio		B450C
Resistenza a snervamento armatura	f_{yd} [MPa] =	391.3
Area armatura necessaria	A_{nec} [cm ²] =	16.5
Diametro armatura 1	$\varnothing 1$ [mm] =	16
Diametro armatura 2	$\varnothing 2$ [mm] =	0
Numero ferri $\varnothing 1$	$n_{\varnothing 1}$ [-] =	9
Numero ferri $\varnothing 2$	$n_{\varnothing 2}$ [-] =	0
Area armatura 1 (singola barra)	A_{s1} [cm ²] =	2.01
Area armatura 2 (singola barra)	A_{s2} [cm ²] =	0.00
Area armatura totale	A_{sTOT} [cm ²] =	18.1
Resistenza corrente teso	Z_{Rd} [kN] =	708.09
Coefficiente di sicurezza	$Z_{Rd} / Z_{sd} = c.s.$ =	1.10
VERIFICA PUNTONE CLS COMPRESSO		
Resistenza cubica caratteristica	R_{ck} [MPa] =	40
Resistenza cilindrica caratteristica	f_{ck} [MPa] =	32
Coefficiente parziale di sicurezza	γ_c [-] =	1.50
Resistenza di calcolo a compressione	f_{cd} [MPa] =	18.13
Presenza di staffe		Si
Coefficiente presenza staffe (1 senza staffe; 1.5 con staffe)	c [-] =	1.50
Pendenza del puntone di calcestruzzo	$\cotg\psi = \tan\alpha = \lambda$ =	1.13
Altezza puntone	$0.4 \cdot c \cdot d \cdot \sin\psi = h_p$ [m] =	0.328
Compressione nel puntone	C_{sd} [kN] =	860.96
Resistenza del puntone di calcestruzzo	$0.4 \cdot b \cdot d \cdot f_{cd} \cdot c / (1 + \lambda^2) = C_{Rd}$ [kN] =	3949
Coefficiente di sicurezza	$C_{Rd} / C_{sd} = c.s.$ =	4.59

8.5 VERIFICA DEFORMAZIONI

Si riportano di seguito le deformazioni dell'impalcato dovuto al peso proprio, soletta e permanente, nonché la freccia in condizioni di esercizio.

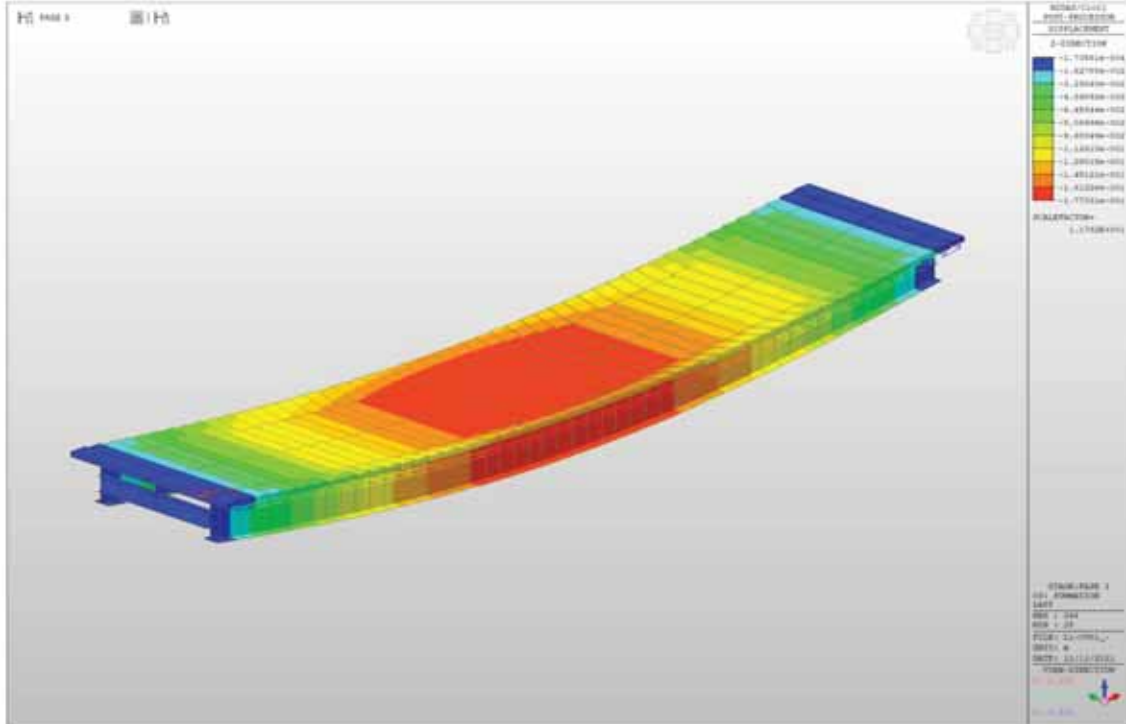


Figura 92 – Deformate - Fase 3

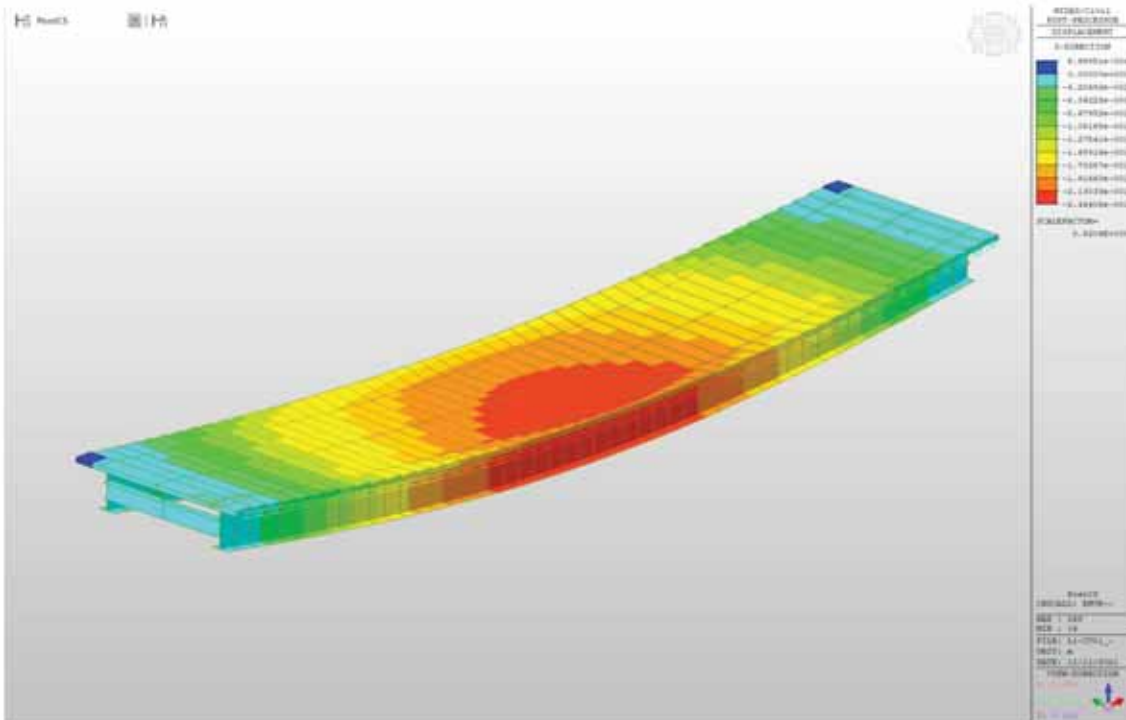


Figura 93 – Deformate - Inviluppo SLE

LOTTO 1 – CAVALCAVIA AL KM. 1+459 - RELAZIONE DI CALCOLO IMPALCATO

Per effetto del peso proprio dell'impalcato, della soletta e dei permanenti portati, si ottiene uno spostamento in mezzzeria pari a circa 17.73cm (monta da applicare in fase di costruzione).

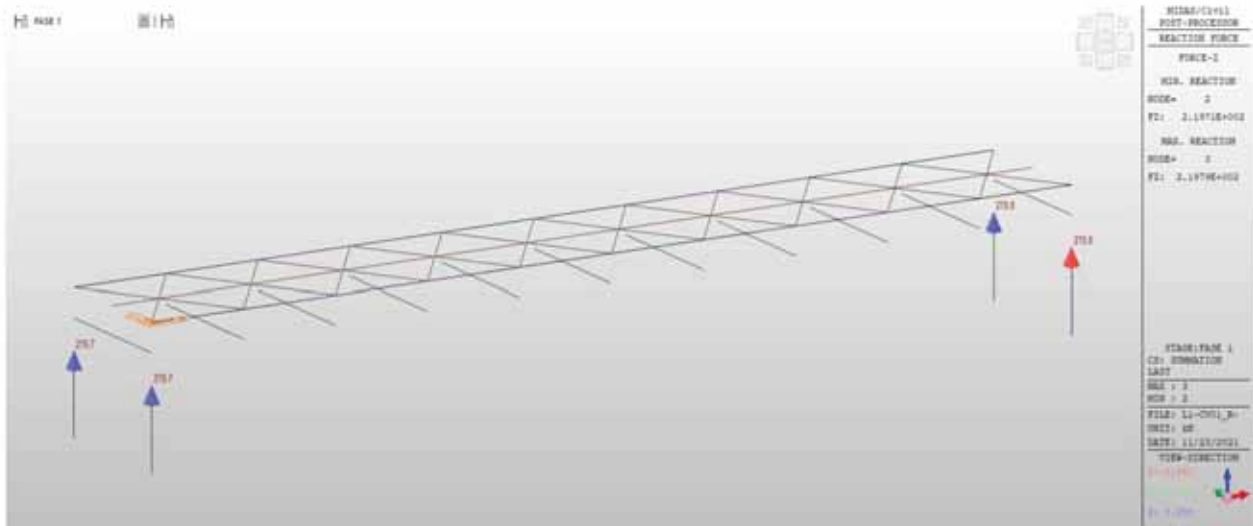
Considerando quindi tale valore come monta iniziale dai imporre all'impalcato, in condizione di esercizio si ottiene il seguente valore di freccia.

$$f = 23.44\text{cm} - 17.73\text{cm} = 5.71\text{cm}$$

9 VALIDAZIONE CODICE DI CALCOLO

Per effettuare la validazione del codice di calcolo, è stato determinato il peso della struttura ed è stato confrontato con gli scarichi derivanti dal modello dovuto ai soli pesi propri.

In base al punto 10.2 delle norme per le costruzioni NTC2008, qualora per la determinazione delle sollecitazioni di progetto si ricorra all'utilizzo di codici di calcolo, dovrà essere verificata l'attendibilità dei risultati tramite una validazione del modello di carico. Si riporta pertanto di seguito la validazione del modello andando a confrontare le reazioni vincolari per effetto del peso proprio della struttura ottenuti dal modello di calcolo e manualmente calcolando i singoli Pesì strutturali.



Calcolando i pesi in modo manuale e considerando l'incremento del peso proprio dovuto alla presenza delle piastre varie si ottiene:


	LUNGHEZZA CONCIO		PIATTABANDA SUP		PIATTABANDA INF		ANIMA			AREA	VOLME	PESO			
	mm	NUMERO	mm	Sp	mm	Sp	Htrave	B	Sp						mq
C1	6250	1	600	20	800	30	2000	1950	20	0.075	0.46875	3679.688			
C2	9000	1	600	25	800	40	2000	1935	20	0.0857	0.7713	6054.705			
C3	12000	1	600	25	900	40	2000	1935	20	0.0897	1.0764	8448.74	27918.53		
C4	9000	1	600	25	800	40	2000	1935	20	0.0857	0.7713	6054.705			
C5	6250	1	600	20	800	30	2000	1950	20	0.075	0.46875	3679.688		55837.05	
TRAVE DI SPINA	42500	1	300	25	300	25	590	1935	13	0.0857	0.7713	6054.705		6054.705	
TRAVERSI	5400	11	350	25	350	25	800	750	20	0.3575	1.9305	15154.43		15154.43	
														Peso tot	77046.18
														Reazione	19261.55
															192.6155 kN
														12%	215.7293 kN

La reazione vincolare ottenuta risulta essere compatibile con quella calcolata manualmente.

10 ALLEGATO 1 - TABULATO MIDAS

MIDAS

PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

```
-----  
; MIDAS/Civil Text (MCT) File.  
; Date : 2021/11/22  
-----
```

*VERSION
8.7.5

*UNIT ; Unit System
; FORCE, LENGTH, HEAT, TEMPER
KN , M, BTU, C


*PROJINFO ; Project Information
USER=.
ADDRESS=.

*STRUCTYPE ; Structure Type
; iSTYP, iMASS, iSMAS, bMASSOFFSET, bSELFWEIGHT, GRAV, TEMPER, bALIGNBEAM, bALIGNSLAB,
bROTRIGID
0, 1, 1, NO, YES, 9.806, 18, NO, NO, NO

*REBAR-MATL-CODE ; Rebar Material Code
; CONC_CODE, CONC_MDB, SRC_CODE, SRC_MDB
NTC08(RC), B450C, ASTM(RC), Grade 60

*NODE ; Nodes
; iNO, X, Y, Z
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34, 12.3, 6, -1.2
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39, 32.8, 6, -1.2

PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2


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PROJECT TITLE :

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	Author		File Name	L1-CV01_REVISIONE_2


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PROJECT TITLE :

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PROJECT TITLE :

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	Author		File Name	L1-CV01_REVISIONE_2

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 276, 24.6, 7.25, 0
 277, 25.42, 7.25, 0
 278, 26.24, 7.25, 0
 279, 27.06, 7.25, 0
 280, 27.88, 7.25, 0
 281, 28.7, 7.25, 0
 282, 29.52, 7.25, 0
 283, 30.34, 7.25, 0
 284, 31.16, 7.25, 0
 285, 31.98, 7.25, 0
 286, 32.8, 7.25, 0
 287, 33.62, 7.25, 0

PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

288, 34.44, 7.25, 0
 289, 35.26, 7.25, 0
 290, 36.08, 7.25, 0
 291, 36.9, 7.25, 0
 292, 37.72, 7.25, 0
 293, 38.54, 7.25, 0
 294, 39.36, 7.25, 0
 295, 40.18, 7.25, 0
 296, 41, 7.25, 0

*ELEMENT ; Elements

; iEL, TYPE, iMAT, iPRO, iN1, iN2, ANGLE, iSUB, EXVAL, iOPT(EXVAL2) ; Frame Element
 ; iEL, TYPE, iMAT, iPRO, iN1, iN2, ANGLE, iSUB, EXVAL, EXVAL2, bLMT ; Comp/Tens Truss
 ; iEL, TYPE, iMAT, iPRO, iN1, iN2, iN3, iN4, iSUB, iWID, LCAXIS ; Planar Element
 ; iEL, TYPE, iMAT, iPRO, iN1, iN2, iN3, iN4, iN5, iN6, iN7, iN8 ; Solid Element

1, BEAM , 1, 7, 93, 94, 0, 0
2, BEAM , 1, 7, 195, 196, 0, 0
4, BEAM , 1, 4, 31, 20, 0, 0
5, BEAM , 1, 4, 20, 9, 0, 0
53, BEAM , 3, 6, 42, 93, 0, 0
54, BEAM , 3, 6, 93, 144, 0, 0
55, BEAM , 3, 6, 144, 195, 0, 0
56, BEAM , 3, 6, 195, 246, 0, 0
57, BEAM , 1, 4, 41, 30, 0, 0
58, BEAM , 1, 4, 30, 19, 0, 0
59, BEAM , 3, 6, 92, 143, 0, 0
60, BEAM , 3, 6, 143, 194, 0, 0
61, BEAM , 3, 6, 194, 245, 0, 0
62, BEAM , 3, 6, 245, 296, 0, 0
63, BEAM , 1, 4, 32, 21, 0, 0
64, BEAM , 1, 4, 21, 10, 0, 0
65, BEAM , 3, 6, 47, 98, 0, 0
66, BEAM , 3, 6, 98, 149, 0, 0
67, BEAM , 3, 6, 149, 200, 0, 0
68, BEAM , 3, 6, 200, 251, 0, 0
69, BEAM , 1, 4, 33, 22, 0, 0
70, BEAM , 1, 4, 22, 11, 0, 0
71, BEAM , 3, 6, 52, 103, 0, 0
72, BEAM , 3, 6, 103, 154, 0, 0
73, BEAM , 3, 6, 154, 205, 0, 0
74, BEAM , 3, 6, 205, 256, 0, 0
75, BEAM , 1, 4, 34, 23, 0, 0
76, BEAM , 1, 4, 23, 12, 0, 0
77, BEAM , 3, 6, 57, 108, 0, 0
78, BEAM , 3, 6, 108, 159, 0, 0
79, BEAM , 3, 6, 159, 210, 0, 0
80, BEAM , 3, 6, 210, 261, 0, 0
81, BEAM , 1, 4, 35, 24, 0, 0
82, BEAM , 1, 4, 24, 13, 0, 0
83, BEAM , 3, 6, 62, 113, 0, 0
84, BEAM , 3, 6, 113, 164, 0, 0
85, BEAM , 3, 6, 164, 215, 0, 0
86, BEAM , 3, 6, 215, 266, 0, 0
87, BEAM , 1, 4, 36, 25, 0, 0
88, BEAM , 1, 4, 25, 14, 0, 0
89, BEAM , 3, 6, 67, 118, 0, 0
90, BEAM , 3, 6, 118, 169, 0, 0
91, BEAM , 3, 6, 169, 220, 0, 0
92, BEAM , 3, 6, 220, 271, 0, 0
93, BEAM , 1, 4, 37, 26, 0, 0
94, BEAM , 1, 4, 26, 15, 0, 0
95, BEAM , 3, 6, 72, 123, 0, 0

MIDAS


PROJECT TITLE :

	Company			Client
	Author			File Name
				L1-CV01_REVISIONE_2

96,	BEAM	,	3,	6,	123,	174,	0,	0
97,	BEAM	,	3,	6,	174,	225,	0,	0
98,	BEAM	,	3,	6,	225,	276,	0,	0
99,	BEAM	,	1,	4,	38,	27,	0,	0
100,	BEAM	,	1,	4,	27,	16,	0,	0
101,	BEAM	,	3,	6,	77,	128,	0,	0
102,	BEAM	,	3,	6,	128,	179,	0,	0
103,	BEAM	,	3,	6,	179,	230,	0,	0
104,	BEAM	,	3,	6,	230,	281,	0,	0
105,	BEAM	,	1,	4,	39,	28,	0,	0
106,	BEAM	,	1,	4,	28,	17,	0,	0
107,	BEAM	,	3,	6,	82,	133,	0,	0
108,	BEAM	,	3,	6,	133,	184,	0,	0
109,	BEAM	,	3,	6,	184,	235,	0,	0
110,	BEAM	,	3,	6,	235,	286,	0,	0
111,	BEAM	,	1,	4,	40,	29,	0,	0
112,	BEAM	,	1,	4,	29,	18,	0,	0
113,	BEAM	,	3,	6,	87,	138,	0,	0
114,	BEAM	,	3,	6,	138,	189,	0,	0
115,	BEAM	,	3,	6,	189,	240,	0,	0
116,	BEAM	,	3,	6,	240,	291,	0,	0
117,	BEAM	,	1,	7,	98,	99,	0,	0
118,	BEAM	,	1,	8,	103,	104,	0,	0
119,	BEAM	,	1,	8,	108,	109,	0,	0
120,	BEAM	,	1,	9,	113,	114,	0,	0
121,	BEAM	,	1,	9,	118,	119,	0,	0
122,	BEAM	,	1,	9,	123,	124,	0,	0
123,	BEAM	,	1,	8,	128,	129,	0,	0
124,	BEAM	,	1,	8,	133,	134,	0,	0
125,	BEAM	,	1,	7,	138,	139,	0,	0
126,	BEAM	,	1,	7,	200,	201,	0,	0
127,	BEAM	,	1,	8,	205,	206,	0,	0
128,	BEAM	,	1,	8,	210,	211,	0,	0
129,	BEAM	,	1,	9,	215,	216,	0,	0
130,	BEAM	,	1,	9,	220,	221,	0,	0
131,	BEAM	,	1,	9,	225,	226,	0,	0
132,	BEAM	,	1,	8,	230,	231,	0,	0
133,	BEAM	,	1,	8,	235,	236,	0,	0
134,	BEAM	,	1,	7,	240,	241,	0,	0
135,	BEAM	,	3,	6,	43,	94,	0,	0
136,	BEAM	,	1,	7,	94,	95,	0,	0
137,	BEAM	,	3,	6,	94,	145,	0,	0
138,	BEAM	,	3,	6,	145,	196,	0,	0
139,	BEAM	,	1,	7,	196,	197,	0,	0
140,	BEAM	,	3,	6,	196,	247,	0,	0
145,	BEAM	,	3,	6,	48,	99,	0,	0
146,	BEAM	,	1,	7,	99,	100,	0,	0
147,	BEAM	,	3,	6,	99,	150,	0,	0
148,	BEAM	,	3,	6,	150,	201,	0,	0
149,	BEAM	,	1,	7,	201,	202,	0,	0
150,	BEAM	,	3,	6,	201,	252,	0,	0
151,	BEAM	,	3,	6,	53,	104,	0,	0
152,	BEAM	,	1,	8,	104,	105,	0,	0
153,	BEAM	,	3,	6,	104,	155,	0,	0
154,	BEAM	,	3,	6,	155,	206,	0,	0
155,	BEAM	,	1,	8,	206,	207,	0,	0
156,	BEAM	,	3,	6,	206,	257,	0,	0
157,	BEAM	,	3,	6,	58,	109,	0,	0
158,	BEAM	,	1,	8,	109,	110,	0,	0
159,	BEAM	,	3,	6,	109,	160,	0,	0
160,	BEAM	,	3,	6,	160,	211,	0,	0
161,	BEAM	,	1,	8,	211,	212,	0,	0

MIDAS


PROJECT TITLE :

	Company			Client
	Author			File Name
				L1-CV01_REVISIONE_2

162, BEAM , 3, 6, 211, 262, 0, 0
163, BEAM , 3, 6, 63, 114, 0, 0
164, BEAM , 1, 9, 114, 115, 0, 0
165, BEAM , 3, 6, 114, 165, 0, 0
166, BEAM , 3, 6, 165, 216, 0, 0
167, BEAM , 1, 9, 216, 217, 0, 0
168, BEAM , 3, 6, 216, 267, 0, 0
169, BEAM , 3, 6, 68, 119, 0, 0
170, BEAM , 1, 9, 119, 120, 0, 0
171, BEAM , 3, 6, 119, 170, 0, 0
172, BEAM , 3, 6, 170, 221, 0, 0
173, BEAM , 1, 9, 221, 222, 0, 0
174, BEAM , 3, 6, 221, 272, 0, 0
175, BEAM , 3, 6, 73, 124, 0, 0
176, BEAM , 1, 9, 124, 125, 0, 0
177, BEAM , 3, 6, 124, 175, 0, 0
178, BEAM , 3, 6, 175, 226, 0, 0
179, BEAM , 1, 9, 226, 227, 0, 0
180, BEAM , 3, 6, 226, 277, 0, 0
181, BEAM , 3, 6, 78, 129, 0, 0
182, BEAM , 1, 8, 129, 130, 0, 0
183, BEAM , 3, 6, 129, 180, 0, 0
184, BEAM , 3, 6, 180, 231, 0, 0
185, BEAM , 1, 8, 231, 232, 0, 0
186, BEAM , 3, 6, 231, 282, 0, 0
187, BEAM , 3, 6, 83, 134, 0, 0
188, BEAM , 1, 8, 134, 135, 0, 0
189, BEAM , 3, 6, 134, 185, 0, 0
190, BEAM , 3, 6, 185, 236, 0, 0
191, BEAM , 1, 8, 236, 237, 0, 0
192, BEAM , 3, 6, 236, 287, 0, 0
193, BEAM , 3, 6, 88, 139, 0, 0
194, BEAM , 1, 7, 139, 140, 0, 0
195, BEAM , 3, 6, 139, 190, 0, 0
196, BEAM , 3, 6, 190, 241, 0, 0
197, BEAM , 1, 7, 241, 242, 0, 0
198, BEAM , 3, 6, 241, 292, 0, 0
199, BEAM , 3, 6, 44, 95, 0, 0
200, BEAM , 1, 7, 95, 96, 0, 0
201, BEAM , 3, 6, 95, 146, 0, 0
202, BEAM , 3, 6, 146, 197, 0, 0
203, BEAM , 1, 7, 197, 198, 0, 0
204, BEAM , 3, 6, 197, 248, 0, 0
209, BEAM , 3, 6, 49, 100, 0, 0
210, BEAM , 1, 8, 100, 101, 0, 0
211, BEAM , 3, 6, 100, 151, 0, 0
212, BEAM , 3, 6, 151, 202, 0, 0
213, BEAM , 1, 8, 202, 203, 0, 0
214, BEAM , 3, 6, 202, 253, 0, 0
215, BEAM , 3, 6, 54, 105, 0, 0
216, BEAM , 1, 8, 105, 106, 0, 0
217, BEAM , 3, 6, 105, 156, 0, 0
218, BEAM , 3, 6, 156, 207, 0, 0
219, BEAM , 1, 8, 207, 208, 0, 0
220, BEAM , 3, 6, 207, 258, 0, 0
221, BEAM , 3, 6, 59, 110, 0, 0
222, BEAM , 1, 8, 110, 111, 0, 0
223, BEAM , 3, 6, 110, 161, 0, 0
224, BEAM , 3, 6, 161, 212, 0, 0
225, BEAM , 1, 8, 212, 213, 0, 0
226, BEAM , 3, 6, 212, 263, 0, 0
227, BEAM , 3, 6, 64, 115, 0, 0


MIDAS

PROJECT TITLE :

	Company			Client
	Author			File Name
				L1-CV01_REVISIONE_2

228, BEAM , 1, 9, 115, 116, 0, 0
229, BEAM , 3, 6, 115, 166, 0, 0
230, BEAM , 3, 6, 166, 217, 0, 0
231, BEAM , 1, 9, 217, 218, 0, 0
232, BEAM , 3, 6, 217, 268, 0, 0
233, BEAM , 3, 6, 69, 120, 0, 0
234, BEAM , 1, 9, 120, 121, 0, 0
235, BEAM , 3, 6, 120, 171, 0, 0
236, BEAM , 3, 6, 171, 222, 0, 0
237, BEAM , 1, 9, 222, 223, 0, 0
238, BEAM , 3, 6, 222, 273, 0, 0
239, BEAM , 3, 6, 74, 125, 0, 0
240, BEAM , 1, 9, 125, 126, 0, 0
241, BEAM , 3, 6, 125, 176, 0, 0
242, BEAM , 3, 6, 176, 227, 0, 0
243, BEAM , 1, 9, 227, 228, 0, 0
244, BEAM , 3, 6, 227, 278, 0, 0
245, BEAM , 3, 6, 79, 130, 0, 0
246, BEAM , 1, 8, 130, 131, 0, 0
247, BEAM , 3, 6, 130, 181, 0, 0
248, BEAM , 3, 6, 181, 232, 0, 0
249, BEAM , 1, 8, 232, 233, 0, 0
250, BEAM , 3, 6, 232, 283, 0, 0
251, BEAM , 3, 6, 84, 135, 0, 0
252, BEAM , 1, 8, 135, 136, 0, 0
253, BEAM , 3, 6, 135, 186, 0, 0
254, BEAM , 3, 6, 186, 237, 0, 0
255, BEAM , 1, 8, 237, 238, 0, 0
256, BEAM , 3, 6, 237, 288, 0, 0
257, BEAM , 3, 6, 89, 140, 0, 0
258, BEAM , 1, 7, 140, 141, 0, 0
259, BEAM , 3, 6, 140, 191, 0, 0
260, BEAM , 3, 6, 191, 242, 0, 0
261, BEAM , 1, 7, 242, 243, 0, 0
262, BEAM , 3, 6, 242, 293, 0, 0
263, BEAM , 3, 6, 45, 96, 0, 0
264, BEAM , 1, 7, 96, 97, 0, 0
265, BEAM , 3, 6, 96, 147, 0, 0
266, BEAM , 3, 6, 147, 198, 0, 0
267, BEAM , 1, 7, 198, 199, 0, 0
268, BEAM , 3, 6, 198, 249, 0, 0
273, BEAM , 3, 6, 50, 101, 0, 0
274, BEAM , 1, 8, 101, 102, 0, 0
275, BEAM , 3, 6, 101, 152, 0, 0
276, BEAM , 3, 6, 152, 203, 0, 0
277, BEAM , 1, 8, 203, 204, 0, 0
278, BEAM , 3, 6, 203, 254, 0, 0
279, BEAM , 3, 6, 55, 106, 0, 0
280, BEAM , 1, 8, 106, 107, 0, 0
281, BEAM , 3, 6, 106, 157, 0, 0
282, BEAM , 3, 6, 157, 208, 0, 0
283, BEAM , 1, 8, 208, 209, 0, 0
284, BEAM , 3, 6, 208, 259, 0, 0
285, BEAM , 3, 6, 60, 111, 0, 0
286, BEAM , 1, 9, 111, 112, 0, 0
287, BEAM , 3, 6, 111, 162, 0, 0
288, BEAM , 3, 6, 162, 213, 0, 0
289, BEAM , 1, 9, 213, 214, 0, 0
290, BEAM , 3, 6, 213, 264, 0, 0
291, BEAM , 3, 6, 65, 116, 0, 0
292, BEAM , 1, 9, 116, 117, 0, 0
293, BEAM , 3, 6, 116, 167, 0, 0

PROJECT TITLE :

	Company			Client
	Author			File Name
				L1-CV01_REVISIONE_2

294, BEAM , 3, 6, 167, 218, 0, 0
295, BEAM , 1, 9, 218, 219, 0, 0
296, BEAM , 3, 6, 218, 269, 0, 0
297, BEAM , 3, 6, 70, 121, 0, 0
298, BEAM , 1, 9, 121, 122, 0, 0
299, BEAM , 3, 6, 121, 172, 0, 0
300, BEAM , 3, 6, 172, 223, 0, 0
301, BEAM , 1, 9, 223, 224, 0, 0
302, BEAM , 3, 6, 223, 274, 0, 0
303, BEAM , 3, 6, 75, 126, 0, 0
304, BEAM , 1, 8, 126, 127, 0, 0
305, BEAM , 3, 6, 126, 177, 0, 0
306, BEAM , 3, 6, 177, 228, 0, 0
307, BEAM , 1, 8, 228, 229, 0, 0
308, BEAM , 3, 6, 228, 279, 0, 0
309, BEAM , 3, 6, 80, 131, 0, 0
310, BEAM , 1, 8, 131, 132, 0, 0
311, BEAM , 3, 6, 131, 182, 0, 0
312, BEAM , 3, 6, 182, 233, 0, 0
313, BEAM , 1, 8, 233, 234, 0, 0
314, BEAM , 3, 6, 233, 284, 0, 0
315, BEAM , 3, 6, 85, 136, 0, 0
316, BEAM , 1, 7, 136, 137, 0, 0
317, BEAM , 3, 6, 136, 187, 0, 0
318, BEAM , 3, 6, 187, 238, 0, 0
319, BEAM , 1, 7, 238, 239, 0, 0
320, BEAM , 3, 6, 238, 289, 0, 0
321, BEAM , 3, 6, 90, 141, 0, 0
322, BEAM , 1, 7, 141, 142, 0, 0
323, BEAM , 3, 6, 141, 192, 0, 0
324, BEAM , 3, 6, 192, 243, 0, 0
325, BEAM , 1, 7, 243, 244, 0, 0
326, BEAM , 3, 6, 243, 294, 0, 0
327, BEAM , 3, 6, 46, 97, 0, 0
328, BEAM , 1, 7, 97, 98, 0, 0
329, BEAM , 3, 6, 97, 148, 0, 0
330, BEAM , 3, 6, 148, 199, 0, 0
331, BEAM , 1, 7, 199, 200, 0, 0
332, BEAM , 3, 6, 199, 250, 0, 0
337, BEAM , 3, 6, 51, 102, 0, 0
338, BEAM , 1, 8, 102, 103, 0, 0
339, BEAM , 3, 6, 102, 153, 0, 0
340, BEAM , 3, 6, 153, 204, 0, 0
341, BEAM , 1, 8, 204, 205, 0, 0
342, BEAM , 3, 6, 204, 255, 0, 0
343, BEAM , 3, 6, 56, 107, 0, 0
344, BEAM , 1, 8, 107, 108, 0, 0
345, BEAM , 3, 6, 107, 158, 0, 0
346, BEAM , 3, 6, 158, 209, 0, 0
347, BEAM , 1, 8, 209, 210, 0, 0
348, BEAM , 3, 6, 209, 260, 0, 0
349, BEAM , 3, 6, 61, 112, 0, 0
350, BEAM , 1, 9, 112, 113, 0, 0
351, BEAM , 3, 6, 112, 163, 0, 0
352, BEAM , 3, 6, 163, 214, 0, 0
353, BEAM , 1, 9, 214, 215, 0, 0
354, BEAM , 3, 6, 214, 265, 0, 0
355, BEAM , 3, 6, 66, 117, 0, 0
356, BEAM , 1, 9, 117, 118, 0, 0
357, BEAM , 3, 6, 117, 168, 0, 0
358, BEAM , 3, 6, 168, 219, 0, 0
359, BEAM , 1, 9, 219, 220, 0, 0


MIDAS

PROJECT TITLE :

	Company			Client
	Author			File Name
				L1-CV01_REVISIONE_2

360, BEAM , 3, 6, 219, 270, 0, 0
361, BEAM , 3, 6, 71, 122, 0, 0
362, BEAM , 1, 9, 122, 123, 0, 0
363, BEAM , 3, 6, 122, 173, 0, 0
364, BEAM , 3, 6, 173, 224, 0, 0
365, BEAM , 1, 9, 224, 225, 0, 0
366, BEAM , 3, 6, 224, 275, 0, 0
367, BEAM , 3, 6, 76, 127, 0, 0
368, BEAM , 1, 8, 127, 128, 0, 0
369, BEAM , 3, 6, 127, 178, 0, 0
370, BEAM , 3, 6, 178, 229, 0, 0
371, BEAM , 1, 8, 229, 230, 0, 0
372, BEAM , 3, 6, 229, 280, 0, 0
373, BEAM , 3, 6, 81, 132, 0, 0
374, BEAM , 1, 8, 132, 133, 0, 0
375, BEAM , 3, 6, 132, 183, 0, 0
376, BEAM , 3, 6, 183, 234, 0, 0
377, BEAM , 1, 8, 234, 235, 0, 0
378, BEAM , 3, 6, 234, 285, 0, 0
379, BEAM , 3, 6, 86, 137, 0, 0
380, BEAM , 1, 7, 137, 138, 0, 0
381, BEAM , 3, 6, 137, 188, 0, 0
382, BEAM , 3, 6, 188, 239, 0, 0
383, BEAM , 1, 7, 239, 240, 0, 0
384, BEAM , 3, 6, 239, 290, 0, 0
385, BEAM , 3, 6, 91, 142, 0, 0
386, BEAM , 1, 7, 142, 143, 0, 0
387, BEAM , 3, 6, 142, 193, 0, 0
388, BEAM , 3, 6, 193, 244, 0, 0
389, BEAM , 1, 7, 244, 245, 0, 0
390, BEAM , 3, 6, 244, 295, 0, 0
391, BEAM , 1, 3, 144, 145, 0, 0
392, BEAM , 1, 3, 149, 150, 0, 0
393, BEAM , 1, 3, 154, 155, 0, 0
394, BEAM , 1, 3, 159, 160, 0, 0
395, BEAM , 1, 3, 164, 165, 0, 0
396, BEAM , 1, 3, 169, 170, 0, 0
397, BEAM , 1, 3, 174, 175, 0, 0
398, BEAM , 1, 3, 179, 180, 0, 0
399, BEAM , 1, 3, 184, 185, 0, 0
400, BEAM , 1, 3, 189, 190, 0, 0
401, BEAM , 1, 3, 145, 146, 0, 0
402, BEAM , 1, 3, 150, 151, 0, 0
403, BEAM , 1, 3, 155, 156, 0, 0
404, BEAM , 1, 3, 160, 161, 0, 0
405, BEAM , 1, 3, 165, 166, 0, 0
406, BEAM , 1, 3, 170, 171, 0, 0
407, BEAM , 1, 3, 175, 176, 0, 0
408, BEAM , 1, 3, 180, 181, 0, 0
409, BEAM , 1, 3, 185, 186, 0, 0
410, BEAM , 1, 3, 190, 191, 0, 0
411, BEAM , 1, 3, 146, 147, 0, 0
412, BEAM , 1, 3, 151, 152, 0, 0
413, BEAM , 1, 3, 156, 157, 0, 0
414, BEAM , 1, 3, 161, 162, 0, 0
415, BEAM , 1, 3, 166, 167, 0, 0
416, BEAM , 1, 3, 171, 172, 0, 0
417, BEAM , 1, 3, 176, 177, 0, 0
418, BEAM , 1, 3, 181, 182, 0, 0
419, BEAM , 1, 3, 186, 187, 0, 0
420, BEAM , 1, 3, 191, 192, 0, 0
421, BEAM , 1, 3, 147, 148, 0, 0

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

```

422, BEAM , 1, 3, 152, 153, 0, 0
423, BEAM , 1, 3, 157, 158, 0, 0
424, BEAM , 1, 3, 162, 163, 0, 0
425, BEAM , 1, 3, 167, 168, 0, 0
426, BEAM , 1, 3, 172, 173, 0, 0
427, BEAM , 1, 3, 177, 178, 0, 0
428, BEAM , 1, 3, 182, 183, 0, 0
429, BEAM , 1, 3, 187, 188, 0, 0
430, BEAM , 1, 3, 192, 193, 0, 0
431, BEAM , 1, 3, 148, 149, 0, 0
432, BEAM , 1, 3, 153, 154, 0, 0
433, BEAM , 1, 3, 158, 159, 0, 0
434, BEAM , 1, 3, 163, 164, 0, 0
435, BEAM , 1, 3, 168, 169, 0, 0
436, BEAM , 1, 3, 173, 174, 0, 0
437, BEAM , 1, 3, 178, 179, 0, 0
438, BEAM , 1, 3, 183, 184, 0, 0
439, BEAM , 1, 3, 188, 189, 0, 0
440, BEAM , 1, 3, 193, 194, 0, 0
441, TRUSS , 1, 5, 195, 98, 0, 0
442, TRUSS , 1, 5, 93, 200, 0, 0
443, TRUSS , 1, 5, 200, 103, 0, 0
444, TRUSS , 1, 5, 98, 205, 0, 0
445, TRUSS , 1, 5, 205, 108, 0, 0
446, TRUSS , 1, 5, 103, 210, 0, 0
447, TRUSS , 1, 5, 210, 113, 0, 0
448, TRUSS , 1, 5, 108, 215, 0, 0
449, TRUSS , 1, 5, 215, 118, 0, 0
450, TRUSS , 1, 5, 113, 220, 0, 0
451, TRUSS , 1, 5, 220, 123, 0, 0
452, TRUSS , 1, 5, 118, 225, 0, 0
453, TRUSS , 1, 5, 225, 128, 0, 0
454, TRUSS , 1, 5, 123, 230, 0, 0
455, TRUSS , 1, 5, 230, 133, 0, 0
456, TRUSS , 1, 5, 128, 235, 0, 0
457, TRUSS , 1, 5, 235, 138, 0, 0
458, TRUSS , 1, 5, 133, 240, 0, 0
459, TRUSS , 1, 5, 240, 143, 0, 0
460, TRUSS , 1, 5, 138, 245, 0, 0

```

*GROUP ; Group

; NAME, NODE LIST, ELEM LIST, PLANE TYPE

```

FASE 1 , 1to4 9to41 93to245, 1 2 4 5 57to111by6 58to112by6 117to134 136 \
139 146to203by3 210to267by3 274to331by3 338to389by3 391to460, 0
FASE 2 , 42to296, 53to113by6 54to114by6 55to115by6 56to116by6 135to150by5 \
137to212by25 138to201by9 148to184by3 153to273by40 159to204by9 \
171to198by9 190to262by12 196to268by24 199to259by12 209to227by6 \
217to265by12 218to266by6 232to361by43 239to263by6 256to340by28 \
276to309by3 278to332by9 281to326by9 293to329by9 315to387by12 321 \
324to378by18 330to384by18 337to355by6 345to381by12 346to388by6 354 \
367to385by6 372 390, 0

```

*BNDR-GROUP ; Boundary Group

; NAME, AUTOTYPE

```
FASE 1, 0
```

*LOAD-GROUP ; Load Group

; NAME


```
FASE 1
```

```
FASE 2
```

```
FASE 3
```

MIDAS

PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

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*MATERIAL ; Material
; iMAT, TYPE, MNAME, SPHEAT, HEATCO, PLAST, TUNIT, bMASS, DAMPRATIO, [DATA1]
; STEEL, CONC, USER
; iMAT, TYPE, MNAME, SPHEAT, HEATCO, PLAST, TUNIT, bMASS, DAMPRATIO, [DATA2], [DATA2]
; SRC
; [DATA1] : 1, DB, NAME, CODE, USEELAST, ELAST
; [DATA1] : 2, ELAST, POISN, THERMAL, DEN, MASS
; [DATA1] : 3, Ex, Ey, Ez, Tx, Ty, Tz, Sxy, Sxz, Syz, Pxy, Pxz, Pyz, DEN, MASS
; Orthotropic
; [DATA2] : 1, DB, NAME, CODE, USEELAST, ELAST or 2, ELAST, POISN, THERMAL, DEN, MASS
1, STEEL, S355 , 0, 0, , C, NO, 0.02, 1, EN05-PS(S) , , S3
55 , NO, 2.1e+008
2, CONC , C32/40 , 0, 0, , C, YES, 0.05, 2, 3.3345e+007, 0.2, 1.0000e
-005, 0, 0
3, CONC , C32/40_NOP , 0, 0, , C, YES, 0.05, 2, 3.3345e+007, 0.2, 1.0000e
-005, 0, 0


*MATL-COLOR
; iMAT, W_R, W_G, W_B, HF_R, HF_G, HF_B, HE_R, HE_G, HE_B, bBLEND, FACT
1, 115, 0, 0, 255, 87, 87, 115, 0, 0, NO, 0.5
2, 0, 66, 45, 0, 192, 128, 0, 66, 45, NO, 0.5
3, 38, 57, 0, 128, 192, 0, 38, 57, 0, NO, 0.5

*TDM-TYPE ; Time Dependent Material
; NAME=NAME, CODE, STR, HU, VOL, AGE, CFACTA, CFACTB, TYPE, [ACI1 or ACI2] ; CODE=
ACI
; NAME=NAME, CODE, STR, HU, MSIZE, CTYPE, AGE ; CODE=
CEB1990,KS,CEB1978,KSCE 2010,KCI-USD12
; NAME=NAME, CODE, N1, PHI1, N2, PHI2 ; CODE=
MEM
; NAME=NAME, CODE, STR, HU, USS, UCS, VOL, RR, MOD ; CODE=
PCA
; NAME=NAME, CODE, STR, HU, VOL, UCS, VSR1, LAF, US, VSR, PST, bRCE, RR, MOD ; CODE=
COMBINED
; NAME=NAME, CODE, STR, HTYPE, HU, MSIZE, CTYPE, AGE, CM ; CODE=
JAPAN
; NAME=NAME, CODE, ELAST, HU, VOL, CC, WC, AGE ; CODE=
JSCE
; NAME=NAME, CODE, STR, HTYPE, HU, MSIZE, AGE ; CODE=
CHINA
; NAME=NAME, CODE, STR, HU, MSIZE, BSC, AGE ; CODE=
JTG
; NAME=NAME, CODE, STR, HU, VSR, AGE, bEXPOSE ; CODE=
AASHTO
; NAME=NAME, CODE, STR, HU, MSIZE, AGE ; CODE=
INDIA(IRC:18-2000)
; NAME=NAME, CODE, STR, HU, MSIZE, CTYPE, AGE ; CODE=
INDIA(IRC:112-2011)
; NAME=NAME, CODE, STR, HU, MSIZE, CTYPE, AGE, TCode, bSILICA ; CODE=
European
; NAME=NAME, CODE, STR, EE(Not Use), FS, HT, DSE, DSC, AGE ; CODE=
NZ Bridge(SP/M/022)
; NAME=NAME, CODE, STR, HU, AGE, M, CMETH, CTYPE, CREEP, CONCT, W, MAXS, A, PZ ; CODE=
Russian
; NAME=NAME, CODE, STR, HU, MSIZE, BSC, AGE, FLYASH ; CODE=
China(JTG D62-2016)
; NAME=NAME, CODE, STR, EE, HT, DSC, AGE ; CODE=
Australia
; NAME=NAME, CODE, bSSF, SSFNAME ; CODE=
USER(line1)
; CREEPFUNC1, AGE1, CREEPFUNC2, AGE2, ... ; USER(
from line 2)

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MIDAS

PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

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; [ACI1] : CURE, SLUMP, FAP, AIR, CC
; [ACI2] : UCC, USS
    NAME=C+S, European, 35000, 70, 0.25, Class N, 3, 1, NO

*TDM-ELAST    ; Time Dependent Material(Comp. Strength)
; NAME=NAME, TYPE, CODE, STRENGTH, A, B                ; TYPE=CODE(Korean St
andard, ACI)
; NAME=NAME, TYPE, CODE, STRENGTH, iCTYPE              ; TYPE=CODE(CEB-FIP,
Ohzagi)
; NAME=NAME, TYPE, CODE, STRENGTH                       ; TYPE=CODE(Chinese S
tandard)
; NAME=NAME, TYPE, CODE, STRENGTH, bUSE, [DATA]         ; TYPE=CODE(Japan(Hyd
ration))
; NAME=NAME, TYPE, CODE, STRENGTH, iTYPE               ; TYPE=CODE(Japan(Ela
stic))
; NAME=NAME, TYPE, CODE, STRENGTH                       ; TYPE=CODE(INDIA(IRC
:18-2000))
; NAME=NAME, TYPE, CODE, STRENGTH, iCTYPE              ; TYPE=CODE(INDIA(IRC
:112-2011))
; NAME=NAME, TYPE, CODE, STRENGTH, iCTYPE              ; TYPE=CODE(European)

; NAME=NAME, TYPE, CODE, STRENGTH,                     ; TYPE=CODE(CEB-FIP(1
978))
; NAME=NAME, TYPE, CODE, STRENGTH, TYPE, CMETH, CTYPE, MAXS, PZ ; TYPE=CODE(Russian))

; NAME=NAME, TYPE, CODE, STRENGTH,                     ; CODE=Australia
; NAME=NAME, TYPE, SCALE                                ; TYPE=USER(line 1)
;     DAY1, COMP1, TENS1, ELAST1, DAY2, COMP2, ...      ;     USER(from line
2)
; [DATA] : A, B, D, TSF or iCTYPE, TSF
    NAME=MATURAZIONE, CODE, EUROPEAN, 41200, 2

*TDM-LINK    ; Time Dependent Material Link
; iMAT, TDM-TYPE1(CREEP/SHRINKAGE), TDM-TYPE2(ELASTICITY)
    2, C+S, MATURAZIONE

*SECTION    ; Section
; iSEC, TYPE, SNAME, [OFFSET], bSD, bWE, SHAPE, [DATA1], [DATA2] ;
1st line - DB/USER
; iSEC, TYPE, SNAME, [OFFSET], bSD, bWE, SHAPE, BLT, D1, ..., D8, iCEL ;
1st line - VALUE
;     AREA, ASy, ASz, Ixx, Iyy, Izz                    ;
2nd line
;     CyP, CyM, CzP, CzM, QyB, QzB, PERI_OUT, PERI_IN, Cy, Cz ;
3rd line
;     Y1, Y2, Y3, Y4, Z1, Z2, Z3, Z4, Zyy, Zzz        ;
4th line
; iSEC, TYPE, SNAME, [OFFSET], bSD, bWE, SHAPE, ELAST, DEN, POIS, POIC, SF, THERMAL ;
1st line - SRC
;     D1, D2, [SRC]                                    ;
2nd line
; iSEC, TYPE, SNAME, [OFFSET], bSD, bWE, SHAPE, 1, DB, NAME1, NAME2, D1, D2 ;
1st line - COMBINED
; iSEC, TYPE, SNAME, [OFFSET], bSD, bWE, SHAPE, 2, D11, D12, D13, D14, D15, D21, D22, ;
D23, D24
; iSEC, TYPE, SNAME, [OFFSET2], bSD, bWE, SHAPE, iyVAR, izVAR, STYPE ;
1st line - TAPERED
;     DB, NAME1, NAME2                                ;
2nd line(STYPE=DB)
;     [DIM1], [DIM2]                                  ;
2nd line(STYPE=USER)

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MIDAS

PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2


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;      D11, D12, D13, D14, D15, D16, D17, D18 ;
2nd line(STYPE=VALUE)
;      AREA1, ASy1, ASz1, Ixx1, Iyy1, Izz1 ;
3rd line(STYPE=VALUE)
;      CyP1, CyM1, CzP1, CzM1, QyB1, QzB1, PERI_OUT1, PERI_IN1, Cy1, Cz1 ;
4th line(STYPE=VALUE)
;      Y11, Y12, Y13, Y14, Z11, Z12, Z13, Z14, Zyy1, Zyy2 ;
5th line(STYPE=VALUE)
;      D21, D22, D23, D24, D25, D26, D27, D28 ;
6th line(STYPE=VALUE)
;      AREA2, ASy2, ASz2, Ixx2, Iyy2, Izz2 ;
7th line(STYPE=VALUE)
;      CyP2, CyM2, CzP2, CzM2, QyB2, QzB2, PERI_OUT2, PERI_IN2, Cy2, Cz2 ;
8th line(STYPE=VALUE)
;      Y21, Y22, Y23, Y24, Z21, Z22, Z23, Z24, Zyy2, Zzz2 ;
9th line(STYPE=VALUE)
;      OPT1, OPT2, [JOINT] ; 2nd l
ine(STYPE=PSC)
;      ELAST, DEN, POIS, POIC, THERMAL ; 2nd l
ine(STYPE=PSC-CMPW)
;      bSHEARCHK, [SCHK-I], [SCHK-J], [WT-I], [WT-J], WI, WJ, bSYM, bSIDEHOLE ; 3rd l
ine(STYPE=PSC)
;      bSHEARCHK, bSYM, bHUNCH, [CMPWEB-I], [CMPWEB-J] ; 3rd l
ine(STYPE=PSC-CMPW)
;      bUSERDEFMESH SIZE, MESH SIZE, bUSERINPSTIFF, [STIFF-I], [STIFF-J] ; 4th l
ine(STYPE=PSC)
;      [SIZE-A]-i ; 5th l
ine(STYPE=PSC)
;      [SIZE-B]-i ; 6th l
ine(STYPE=PSC)
;      [SIZE-C]-i ; 7th l
ine(STYPE=PSC)
;      [SIZE-D]-i ; 8th l
ine(STYPE=PSC)
;      [SIZE-A]-j ; 9th l
ine(STYPE=PSC)
;      [SIZE-B]-j ; 10th
line(STYPE=PSC)
;      [SIZE-C]-j ; 11th
line(STYPE=PSC)
;      [SIZE-D]-j ; 12th
line(STYPE=PSC)
;      GN, CTC, Bc, Tc, Hh, EsEc, DsDc, Ps, Pc, bMULTI, EsEc-L, EsEc-S ; 2nd l
ine(STYPE=CMP-B/I)
;      SW_i, Hw_i, tw_i, B_i, Bf1_i, tf1_i, B2_i, Bf2_i, tf2_i ; 3rd l
ine(STYPE=CMP-B/I)
;      SW_j, Hw_j, tw_j, B_j, Bf1_j, tf1_j, B2_j, Bf2_j, tf2_j ; 4th l
ine(STYPE=CMP-B/I)
;      N1, N2, Hr, Hr2, tr1, tr2 ; 5th l
ine(STYPE=CMP-B)
;      GN, CTC, Bc, Tc, Hh, EgdEsb, DgdDsb, Pgd, Psb, bSYM, SW_i, SW_j ; 2nd l
ine(STYPE=CMP-CI/CT)
;      OPT1, OPT2, [JOINT] ; 3rd l
ine(STYPE=CMP-CI/CT)
;      [SIZE-A]-i ; 4th l
ine(STYPE=CMP-CI/CT)
;      [SIZE-B]-i ; 5th l
ine(STYPE=CMP-CI/CT)
;      [SIZE-C]-i ; 6th l
ine(STYPE=CMP-CI/CT)
;      [SIZE-D]-i ; 7th l
ine(STYPE=CMP-CI/CT)

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MIDAS

PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2


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; [SIZE-A]-j ; 8th 1
ine (STYPE=CMP-CI/CT)
; [SIZE-B]-j ; 9th 1
ine (STYPE=CMP-CI/CT)
; [SIZE-C]-j ; 10th
line (STYPE=CMP-CI/CT)
; [SIZE-D]-j ; 11th
line (STYPE=CMP-CI/CT)
; iSEC, TYPE, SNAME, [OFFSET], bSD, bWE, STYPE1, STYPE2 ; 1st 1
ine - CONSTRUCT
; SHAPE, ...(same with other type data from shape) ; Befor
e (STYPE1)
; SHAPE, ...(same with other type data from shape) ; After
(STYPE2)
; iSEC, TYPE, SNAME, [OFFSET], bSD, bWE, SHAPE ; 1st 1
ine - COMPOSITE-SB
; Hw, tw, B, Bf1, tf1, B2, Bf2, tf2 ; 2nd 1
ine
; N1, N2, Hr, Hr2, tr1, tr2 ; 3rd 1
ine
; SW, GN, CTC, Bc, Tc, Hh, EsEc, DsDc, Ps, Pc, bMulti, Elong, Esh ; 4th 1
ine
; iSEC, TYPE, SNAME, [OFFSET], bSD, bWE, SHAPE ; 1st 1
ine - COMPOSITE-SI
; Hw, tw, B, tf1, B2, tf2 ; 2nd 1
ine
; SW, GN, CTC, Bc, Tc, Hh, EsEc, DsDc, Ps, Pc, bMulti, Elong, Esh ; 3rd 1
ine
; iSEC, TYPE, SNAME, [OFFSET], bSD, bWE, SHAPE ; 1st 1
ine - COMPOSITE-CI/CT
; OPT1, OPT2, [JOINT] ; 2nd 1
ine
; [SIZE-A] ; 3rd 1
ine
; [SIZE-B] ; 4th 1
ine
; [SIZE-C] ; 5th 1
ine
; [SIZE-D] ; 6th 1
ine
; SW, GN, CTC, Bc, Tc, Hh, EgdEsb, DgdDsb, Pgd, Psb ; 7th 1
ine
; iSEC, TYPE, SNAME, [OFFSET], bSD, bWE, SHAPE ; 1st 1
ine - PSC
; OPT1, OPT2, [JOINT] ; 2nd 1
ine
; bSHEARCHK, [SCHK], [WT], WIDTH, bSYM, bSIDEHOLE ; 3rd 1
ine
; bUSERDEFMESH SIZE, MESH SIZE, bUSERINPSTIFF, [STIFF] ; 4th 1
ine
; bWE, [WARPING POINT]-i, [WARPING POINT]-j ; 5th 1
ine
; [SIZE-A] ; 6th 1
ine
; [SIZE-B] ; 7th 1
ine
; [SIZE-C] ; 8th 1
ine
; [SIZE-D] ; 9th 1
ine
; [DATA1] : 1, DB, NAME or 2, D1, D2, D3, D4, D5, D6, D7, D8, D9, D10
; [DATA2] : CCSHAPE or iCEL or iN1, iN2

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MIDAS

PROJECT TITLE :


	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

```
; [SRC] : 1, DB, NAME1, NAME2 or 2, D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, iN1, iN2

; [DIM1], [DIM2] : D1, D2, D3, D4, D5, D6, D7, D8
; [OFFSET] : OFFSET, iCENT, iREF, iHORZ, HUSER, iVERT, VUSER
; [OFFSET2] : OFFSET, iCENT, iREF, iHORZ, HUSERI, HUSERJ, iVERT, VUSERI, VUSERJ
; [JOINT] : 8(1CELL, 2CELL), 13(3CELL), 9(PSCM), 8(PSCH), 9(PSCT), 2(PSCB), 0(nCELL), 2(nCEL2)
; [SIZE-A] : 6(1CELL, 2CELL), 10(3CELL), 10(PSCM), 6(PSCH), 8(PSCT), 10(PSCB), 5(nCELL), 11(nCEL2)
; [SIZE-B] : 6(1CELL, 2CELL), 12(3CELL), 6(PSCM), 6(PSCH), 8(PSCT), 6(PSCB), 8(nCELL), 18(nCEL2)
; [SIZE-C] : 10(1CELL, 2CELL), 13(3CELL), 9(PSCM), 10(PSCH), 7(PSCT), 8(PSCB), 0(nCELL), 11(nCEL2)
; [SIZE-D] : 8(1CELL, 2CELL), 13(3CELL), 6(PSCM), 7(PSCH), 8(PSCT), 5(PSCB), 0(nCELL), 18(nCEL2)
; [STIFF] : AREA, ASy, ASz, Ixx, Iyy, Izz
; [SCHK] : bAUTO_Z1, Z1, bAUTO_Z3, Z3
; [WT] : bAUTO_TOR, TOR, bAUTO_SHR1, SHR1, bAUTO_SHR2, SHR2, bAUTO_SHR3, SHR3
; [CMPWEB] : EFD, LRF, A, B, H, T
; [WARPING POINT] : nWarpingCheck, X1,X2,X3,X4,X5,X6, Y1,Y2,Y3,Y4,Y5,Y6
1, COMPOSITE , TRAVE PRINCIPALE CAMPATA, CT, 0, 0, 0, 0, 0, 0, 0, YES, NO, I
1.93, 0.022, 0.7, 0.03, 1.2, 0.04
0, 0, 0, 0, 0, 0
0
0
0
2.84, 1, 2.84, 2.84, 0.26, 0, 6.16251, 3.0792, 0.3, 0.2, 1.2, NO, ,
2, COMPOSITE , TRAVE PRINCIPALE APPOGGIO, CT, 0, 0, 0, 0, 0, 0, YES, NO, I
1.93, 0.022, 0.7, 0.03, 0.9, 0.04
0, 0, 0, 0, 0, 0
0
0
0
2.84, 1, 2.84, 2.84, 0.26, 0, 6.16251, 3.0792, 0.3, 0.2, 1.2, NO, ,
3, COMPOSITE , TRAVE SPINA , CT, 0, 0, 0, 0, 0, 0, YES, NO, I
0.54, 0.013, 0.3, 0.025, 0.3, 0.025
0, 0, 0, 0, 0, 0
0
0
0
2.8, 1, 2.8, 2.8, 0.26, 0, 6.16251, 3.0792, 0.3, 0.2, 1.2, NO, ,
4, DBUSER , TRAVERSO , CC, 0, 0, 0, 0, 0, 0, YES, NO, H , 2, 0.8, 0.3
5, 0.02, 0.028, 0.35, 0.028, 0, 0, 0, 0
5, DBUSER , CONTROVENTI , CC, 0, 0, 0, 0, 0, 0, YES, NO, L , 1, UNI, L70
x7
6, DBUSER , SOLETTA , CC, 0, 0, 0, 0, 0, 0, YES, NO, SB , 2, 0.25, 0.
82, 0, 0, 0, 0, 0, 0, 0, 0
7, COMPOSITE , CONCIO C1 , CT, 0, 0, 0, 0, 0, 0, YES, NO, I
1.95, 0.02, 0.6, 0.02, 0.8, 0.03
0, 0, 0, 0, 0, 0
0
0
0
2.84, 1, 2.84, 2.84, 0.26, 0, 6.16251, 3.0792, 0.3, 0.2, 1.2, NO, ,
8, COMPOSITE , CONCIO C2 , CT, 0, 0, 0, 0, 0, 0, YES, NO, I
1.935, 0.02, 0.6, 0.025, 0.8, 0.04
0, 0, 0, 0, 0, 0
0
0
0
2.84, 1, 2.84, 2.84, 0.26, 0, 6.16251, 3.0792, 0.3, 0.2, 1.2, NO, ,
9, COMPOSITE , CONCIO C3 , CT, 0, 0, 0, 0, 0, 0, YES, NO, I
```

MIDAS

PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

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1.935, 0.02, 0.6, 0.025, 0.9, 0.04
0, 0, 0, 0, 0, 0
0
0
0
2.84, 1, 2.84, 2.84, 0.26, 0, 6.16251, 3.0792, 0.3, 0.2, 1.2, NO, ,

```

*SECT-COLOR

```

; iSEC, W_R, W_G, W_B, HF_R, HF_G, HF_B, HE_R, HE_G, HE_B, bBLEND, FACT
1, 31, 0, 81, 148, 87, 255, 31, 0, 81, NO, 0.5
2, 31, 0, 81, 148, 87, 255, 31, 0, 81, NO, 0.5
3, 108, 54, 0, 255, 128, 0, 108, 54, 0, NO, 0.5
4, 0, 66, 45, 0, 192, 128, 0, 66, 45, NO, 0.5
5, 65, 65, 65, 255, 255, 255, 65, 65, 65, NO, 0.5
6, 100, 0, 100, 192, 0, 192, 100, 0, 100, NO, 0.5
7, 0, 13, 13, 0, 128, 128, 0, 13, 13, NO, 0.5
8, 55, 0, 96, 146, 0, 255, 55, 0, 96, NO, 0.5
9, 0, 13, 13, 0, 128, 128, 0, 13, 13, NO, 0.5

```

*COMP-GEN-SECT-PSC-DESIGN ; Composite Section for PSC Design

```

; SECT, bCompPSC, (Z1, Z2, Z3, t1, t2, t3, TotT)-I, (Z1, Z2, Z3, t1, t2, t3, TotT)-J
1, NO, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
2, NO, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3, NO, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
7, NO, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
8, NO, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
9, NO, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0

```

*DGN-SECT

```

; iSEC, TYPE, SNAME, [OFFSET], bSD, bWE, SHAPE, [DATA1], [DATA2] ;
1st line - DB/USER ;
; iSEC, TYPE, SNAME, [OFFSET], bSD, bWE, SHAPE, BLT, D1, ..., D8, iCEL ;
1st line - VALUE ;
; AREA, ASy, ASz, Ixx, Iyy, Izz ;
2nd line ;
; CyP, CyM, CzP, CzM, QyB, QzB, PERI_OUT, PERI_IN, Cy, Cz ;
3rd line ;
; Y1, Y2, Y3, Y4, Z1, Z2, Z3, Z4, Zyy, Zzz ;
4th line ;
; iSEC, TYPE, SNAME, [OFFSET], bSD, bWE, SHAPE, ELAST, DEN, POIS, POIC, SF, THERMAL ;
1st line - SRC ;
; D1, D2, [SRC] ;
2nd line ;
; iSEC, TYPE, SNAME, [OFFSET], bSD, bWE, SHAPE, 1, DB, NAME1, NAME2, D1, D2 ;
1st line - COMBINED ;
; iSEC, TYPE, SNAME, [OFFSET], bSD, bWE, SHAPE, 2, D11, D12, D13, D14, D15, D21, D22, D23, D24 ;
; iSEC, TYPE, SNAME, [OFFSET2], bSD, bWE, SHAPE, iyVAR, izVAR, STYPE ;
1st line - TAPERED ;
; DB, NAME1, NAME2 ;
2nd line(STYPE=DB) ;
; [DIM1], [DIM2] ;
2nd line(STYPE=USER) ;
; D11, D12, D13, D14, D15, D16, D17, D18 ;
2nd line(STYPE=VALUE) ;
; AREA1, ASy1, ASz1, Ixx1, Iyy1, Izz1 ;
3rd line(STYPE=VALUE) ;
; CyP1, CyM1, CzP1, CzM1, QyB1, QzB1, PERI_OUT1, PERI_IN1, Cy1, Cz1 ;
4th line(STYPE=VALUE) ;
; Y11, Y12, Y13, Y14, Z11, Z12, Z13, Z14, Zyy1, Zyy2 ;
5th line(STYPE=VALUE) ;
; D21, D22, D23, D24, D25, D26, D27, D28 ;

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MIDAS

PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2


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6th line(STYPE=VALUE)
; AREA2, ASy2, ASz2, Ixx2, Iyy2, Izz2 ;
7th line(STYPE=VALUE)
; CyP2, CyM2, CzP2, CzM2, QyB2, QzB2, PERI_OUT2, PERI_IN2, Cy2, Cz2 ;
8th line(STYPE=VALUE)
; Y21, Y22, Y23, Y24, Z21, Z22, Z23, Z24, Zyy2, Zzz2 ;
9th line(STYPE=VALUE)
; OPT1, OPT2, [JOINT] ; 2nd l
ine(STYPE=PSC)
; ELAST, DEN, POIS, POIC, THERMAL ; 2nd l
ine(STYPE=PSC-CMPW)
; bSHEARCHK, [SCHK-I], [SCHK-J], [WT-I], [WT-J], WI, WJ, bSYM, bSIDEHOLE ; 3rd l
ine(STYPE=PSC)
; bSHEARCHK, bSYM, bHUNCH, [CMPWEB-I], [CMPWEB-J] ; 3rd l
ine(STYPE=PSC-CMPW)
; bUSERDEFMESH SIZE, MESH SIZE, bUSERINPSTIFF, [STIFF-I], [STIFF-J] ; 4th l
ine(STYPE=PSC)
; [SIZE-A]-i ; 5th l
ine(STYPE=PSC)
; [SIZE-B]-i ; 6th l
ine(STYPE=PSC)
; [SIZE-C]-i ; 7th l
ine(STYPE=PSC)
; [SIZE-D]-i ; 8th l
ine(STYPE=PSC)
; [SIZE-A]-j ; 9th l
ine(STYPE=PSC)
; [SIZE-B]-j ; 10th
line(STYPE=PSC)
; [SIZE-C]-j ; 11th
line(STYPE=PSC)
; [SIZE-D]-j ; 12th
line(STYPE=PSC)
; GN, CTC, Bc, Tc, Hh, EsEc, DsDc, Ps, Pc, bMULTI, EsEc-L, EsEc-S ; 2nd l
ine(STYPE=CMP-B/I)
; SW_i, Hw_i, tw_i, B_i, Bf1_i, tf1_i, B2_i, Bf2_i, tf2_i ; 3rd l
ine(STYPE=CMP-B/I)
; SW_j, Hw_j, tw_j, B_j, Bf1_j, tf1_j, B2_j, Bf2_j, tf2_j ; 4th l
ine(STYPE=CMP-B/I)
; N1, N2, Hr, Hr2, tr1, tr2 ; 5th l
ine(STYPE=CMP-B)
; GN, CTC, Bc, Tc, Hh, EgdEsb, DgdDsb, Pgd, Psb, bSYM, SW_i, SW_j ; 2nd l
ine(STYPE=CMP-CI/CT)
; OPT1, OPT2, [JOINT] ; 3rd l
ine(STYPE=CMP-CI/CT)
; [SIZE-A]-i ; 4th l
ine(STYPE=CMP-CI/CT)
; [SIZE-B]-i ; 5th l
ine(STYPE=CMP-CI/CT)
; [SIZE-C]-i ; 6th l
ine(STYPE=CMP-CI/CT)
; [SIZE-D]-i ; 7th l
ine(STYPE=CMP-CI/CT)
; [SIZE-A]-j ; 8th l
ine(STYPE=CMP-CI/CT)
; [SIZE-B]-j ; 9th l
ine(STYPE=CMP-CI/CT)
; [SIZE-C]-j ; 10th
line(STYPE=CMP-CI/CT)
; [SIZE-D]-j ; 11th
line(STYPE=CMP-CI/CT)
; iSEC, TYPE, SNAME, [OFFSET], bSD, bWE, STYPE1, STYPE2 ; 1st l

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MIDAS

PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

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ine - CONSTRUCT
;   SHAPE, ...(same with other type data from shape) ; Befor
e (STYPE1)
;   SHAPE, ...(same with other type data from shape) ; After
(STYPE2)
; iSEC, TYPE, SNAME, [OFFSET], bSD, bWE, SHAPE ; 1st l
ine - COMPOSITE-SB
;   Hw, tw, B, Bf1, tf1, B2, Bf2, tf2 ; 2nd l
ine
;   N1, N2, Hr, Hr2, tr1, tr2 ; 3rd l
ine
;   SW, GN, CTC, Bc, Tc, Hh, EsEc, DsDc, Ps, Pc, bMulti, Elong, Esh ; 4th l
ine
; iSEC, TYPE, SNAME, [OFFSET], bSD, bWE, SHAPE ; 1st l
ine - COMPOSITE-SI
;   Hw, tw, B, tf1, B2, tf2 ; 2nd l
ine
;   SW, GN, CTC, Bc, Tc, Hh, EsEc, DsDc, Ps, Pc, bMulti, Elong, Esh ; 3rd l
ine
; iSEC, TYPE, SNAME, [OFFSET], bSD, bWE, SHAPE ; 1st l
ine - COMPOSITE-CI/CT
;   OPT1, OPT2, [JOINT] ; 2nd l
ine
;   [SIZE-A] ; 3rd l
ine
;   [SIZE-B] ; 4th l
ine
;   [SIZE-C] ; 5th l
ine
;   [SIZE-D] ; 6th l
ine
;   SW, GN, CTC, Bc, Tc, Hh, EgdEsb, DgdDsb, Pgd, Psb ; 7th l
ine
; iSEC, TYPE, SNAME, [OFFSET], bSD, bWE, SHAPE ; 1st l
ine - PSC
;   OPT1, OPT2, [JOINT] ; 2nd l
ine
;   bSHEARCHK, [SCHK], [WT], WIDTH, bSYM, bSIDEHOLE ; 3rd l
ine
;   bUSERDEFMESH SIZE, MESH SIZE, bUSERINPSTIFF, [STIFF] ; 4th l
ine
;   bWE, [WARPING POINT]-i, [WARPING POINT]-j ; 5th l
ine
;   [SIZE-A] ; 6th l
ine
;   [SIZE-B] ; 7th l
ine
;   [SIZE-C] ; 8th l
ine
;   [SIZE-D] ; 9th l
ine
; [DATA1] : 1, DB, NAME or 2, D1, D2, D3, D4, D5, D6, D7, D8, D9, D10
; [DATA2] : CCSHAPE or iCEL or iN1, iN2
; [SRC] : 1, DB, NAME1, NAME2 or 2, D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, iN1, iN2

; [DIM1], [DIM2] : D1, D2, D3, D4, D5, D6, D7, D8
; [OFFSET] : OFFSET, iCENT, iREF, iHORZ, HUSER, iVERT, VUSER
; [OFFSET2] : OFFSET, iCENT, iREF, iHORZ, HUSERI, HUSERJ, iVERT, VUSERI, VUSERJ
; [JOINT] : 8(1CELL, 2CELL), 13(3CELL), 9(PSCM), 8(PSCH), 9(PSCT), 2(PSCB), 0(nCELL), 2(nCEL2)
; [SIZE-A] : 6(1CELL, 2CELL), 10(3CELL), 10(PSCM), 6(PSCH), 8(PSCT), 10(PSCB), 5(nCELL), 11(nCEL2)

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MIDAS

PROJECT TITLE :

MIDAS	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2


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; [SIZE-B] : 6(1CELL, 2CELL), 12(3CELL), 6(PSCM), 6(PSCH), 8(PSCT), 6(PSCB), 8(nCELL), 18(nCEL2)
; [SIZE-C] : 10(1CELL, 2CELL), 13(3CELL), 9(PSCM), 10(PSCH), 7(PSCT), 8(PSCB), 0(nCELL), 11(nCEL2)
; [SIZE-D] : 8(1CELL, 2CELL), 13(3CELL), 6(PSCM), 7(PSCH), 8(PSCT), 5(PSCB), 0(nCELL), 18(nCEL2)
; [STIFF] : AREA, ASy, ASz, Ixx, Iyy, Izz
; [SCHK] : bAUTO_Z1, Z1, bAUTO_Z3, Z3
; [WT] : bAUTO_TOR, TOR, bAUTO_SHR1, SHR1, bAUTO_SHR2, SHR2, bAUTO_SHR3, SHR3
; [CMPWEB] : EFD, LRF, A, B, H, T
; [WARPING POINT] : nWarpingCheck, X1,X2,X3,X4,X5,X6, Y1,Y2,Y3,Y4,Y5,Y6
1, COMPOSITE , TRAVE PRINCIPALE CAMPATA, CT, 0, 0, 0, 0, 0, 0, 0, YES, NO, I
1.93, 0.022, 0.7, 0.03, 1.2, 0.04
0, 0, 0, 0, 0, 0
0
0
0
2.84, 1, 2.84, 2.84, 0.26, 0, 6.16251, 3.0792, 0.3, 0.2, 1.2, NO, ,
2, COMPOSITE , TRAVE PRINCIPALE APPOGGIO, CT, 0, 0, 0, 0, 0, 0, 0, YES, NO, I
1.93, 0.022, 0.7, 0.03, 0.9, 0.04
0, 0, 0, 0, 0, 0
0
0
0
2.84, 1, 2.84, 2.84, 0.26, 0, 6.16251, 3.0792, 0.3, 0.2, 1.2, NO, ,
3, COMPOSITE , TRAVE SPINA , CT, 0, 0, 0, 0, 0, 0, 0, YES, NO, I
0.54, 0.013, 0.3, 0.025, 0.3, 0.025
0, 0, 0, 0, 0, 0
0
0
0
2.8, 1, 2.8, 2.8, 0.26, 0, 6.16251, 3.0792, 0.3, 0.2, 1.2, NO, ,
4, DBUSER , TRAVERSO , CC, 0, 0, 0, 0, 0, 0, 0, YES, NO, H , 2, 0.8, 0.3
5, 0.02, 0.028, 0.35, 0.028, 0, 0, 0, 0
5, DBUSER , CONTROVENTI , CC, 0, 0, 0, 0, 0, 0, 0, YES, NO, L , 1, UNI, L70
x7
6, DBUSER , SOLETTA , CC, 0, 0, 0, 0, 0, 0, 0, YES, NO, SB , 2, 0.25, 0.
82, 0, 0, 0, 0, 0, 0, 0, 0
7, COMPOSITE , CONCIO C1 , CT, 0, 0, 0, 0, 0, 0, 0, YES, NO, I
1.95, 0.02, 0.6, 0.02, 0.8, 0.03
0, 0, 0, 0, 0, 0
0
0
0
2.84, 1, 2.84, 2.84, 0.26, 0, 6.16251, 3.0792, 0.3, 0.2, 1.2, NO, ,
8, COMPOSITE , CONCIO C2 , CT, 0, 0, 0, 0, 0, 0, 0, YES, NO, I
1.935, 0.02, 0.6, 0.025, 0.8, 0.04
0, 0, 0, 0, 0, 0
0
0
0
2.84, 1, 2.84, 2.84, 0.26, 0, 6.16251, 3.0792, 0.3, 0.2, 1.2, NO, ,
9, COMPOSITE , CONCIO C3 , CT, 0, 0, 0, 0, 0, 0, 0, YES, NO, I
1.935, 0.02, 0.6, 0.025, 0.9, 0.04
0, 0, 0, 0, 0, 0
0
0
0
2.84, 1, 2.84, 2.84, 0.26, 0, 6.16251, 3.0792, 0.3, 0.2, 1.2, NO, ,

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*STLDCASE ; Static Load Cases

PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

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; LCNAME, LCTYPE, DESC
PESO PROPRIO ACCIAIO, CS, PESO PROPRIO ACCIAIO
PESO PROPRIO SOLETTA, CS, PESO PROPRIO SOLETTA
PERMANENTE PORTATO, CS, PERMANENTE PORTATO
VENTO PONTE SCARICO, W , VENTO PONTE SCARICO
VENTO PONTE CARICO, WL, VENTO PONTE CARICO
TERMICA UNIFORME +, T , TERMICA UNIFORME +
TERMICA UNIFORME -, T , TERMICA UNIFORME -
TERMICA GRADIENTE +, TPG, TERMICA GRADIENTE +
TERMICA GRADIENTE -, TPG, TERMICA GRADIENTE -
FRENATURA, BRK, FRENATURA

*SPRING ; Point Spring Supports
; NODE_LIST, Type, SDx, SDy, SDz, SRx, SRY, SRz, GROUP, FROMTYPE, EFFAREA, Kx, Ky, Kz
; LINEAR
; NODE_LIST, Type, Direction, Vx, Vy, Vz, Stiffness, GROUP, FROMTYPE, EFFAREA
; COMP, TENS
; NODE_LIST, Type, Multi-Linear Type, Direction, Vx, Vy, Vz, ax, ay, bx, by, cx, cy, d
x, dy, ex, ey, fx, fy, GROUP, FROMTYPE, EFFAREA ; MULTI
1to4, LINEAR, 4420, 4420, 4.489e+006, 0, 0, 0, NO, 0, 0, 0, 0, 0, 0, 0, 0, FASE 1, 0, 0,
0, 0, 0

*RIGIDLINK ; Rigid Link
; KEY, M-NODE, DOF, S-NODE LIST, GROUP
2, 1, 111111, 9 93, FASE 1
1, 2, 111111, 31 195, FASE 1
3, 3, 111111, 19 143, FASE 1
5, 4, 111111, 41 245, FASE 1
6, 10, 111111, 98, FASE 1
8, 11, 111111, 103, FASE 1
10, 12, 111111, 108, FASE 1
12, 13, 111111, 113, FASE 1
14, 14, 111111, 118, FASE 1
16, 15, 111111, 123, FASE 1
18, 16, 111111, 128, FASE 1
20, 17, 111111, 133, FASE 1
22, 18, 111111, 138, FASE 1
33, 20, 111111, 144, FASE 1
24, 21, 111111, 149, FASE 1
25, 22, 111111, 154, FASE 1
26, 23, 111111, 159, FASE 1
27, 24, 111111, 164, FASE 1
28, 25, 111111, 169, FASE 1
29, 26, 111111, 174, FASE 1
30, 27, 111111, 179, FASE 1
31, 28, 111111, 184, FASE 1
32, 29, 111111, 189, FASE 1
4, 30, 111111, 194, FASE 1
7, 32, 111111, 200, FASE 1
9, 33, 111111, 205, FASE 1
11, 34, 111111, 210, FASE 1
13, 35, 111111, 215, FASE 1
15, 36, 111111, 220, FASE 1
17, 37, 111111, 225, FASE 1
19, 38, 111111, 230, FASE 1
21, 39, 111111, 235, FASE 1
23, 40, 111111, 240, FASE 1

; *LOADTOMASS, DIR, bNODAL, bBEAM, bFLOOR, bPRES, GRAV
; LCNAME1, FACTOR1, LCNAME2, FACTOR2, ... ; from line 1
*LOADTOMASS, XYZ, YES, YES, YES, YES, 9.806

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PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

PESO PROPRIO SOLETTA, 1, PERMANENTE PORTATO, 1

*USE-STLD, PESO PROPRIO ACCIAIO

; *SELFWEIGHT, X, Y, Z, GROUP
 *SELFWEIGHT, 0, 0, -1.12, FASE 1


; End of data for load case [PESO PROPRIO ACCIAIO] -----

*USE-STLD, PESO PROPRIO SOLETTA

```
*BEAMLOAD ; Element Beam Loads
; ELEM_LIST, CMD, TYPE, DIR, bPROJ, [ECCEN], [VALUE], GROUP
; ELEM_LIST, CMD, TYPE, TYPE, DIR, VX, VY, VZ, bPROJ, [ECCEN], [VALUE], GROUP
; [VALUE] : D1, P1, D2, P2, D3, P3, D4, P4
; [ECCEN] : bECCEN, ECCDIR, I-END, J-END, bJ-END
; [ADDITIONAL] : bADDITIONAL, ADDITIONAL_I-END, ADDITIONAL_J-END, bADDITIONAL_J-END
1, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
2, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
117, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
118, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
119, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
120, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
121, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
122, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
123, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
124, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
125, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
126, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
127, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
128, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
129, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
130, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
131, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
132, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
133, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
134, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
136, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
139, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
146, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
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MIDAS

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2


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0, FASE 2, NO, 0, 0, NO,
149, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
152, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
155, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
158, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
161, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
164, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
167, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
170, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
173, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
176, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
179, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
182, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
185, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
188, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
191, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
194, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
197, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
200, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
203, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
210, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
213, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
216, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
219, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
222, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
225, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
228, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
231, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -22.013, 1, -22.013, 0, 0, 0,
0, FASE 2, NO, 0, 0, NO,
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MIDAS

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

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MIDAS

PROJECT TITLE :

MIDAS	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2


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MIDAS

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

```

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MIDAS

PROJECT TITLE :

MIDAS	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

```
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; End of data for load case [PESO PROPRIO SOLETTA] -----

*USE-STLD, PERMANENTE PORTATO

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; ELEM_LIST, CMD, TYPE, TYPE, DIR, VX, VY, VZ, bPROJ, [ECCEN], [VALUE], GROUP
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; [ECCEN] : bECCEN, ECCDIR, I-END, J-END, bJ-END
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  139, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
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MIDAS


PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

146, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
149, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
152, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
155, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
158, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
161, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
164, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
167, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
170, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
173, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
176, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
179, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
182, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
185, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
188, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
191, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
194, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
197, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
200, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
203, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
210, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
213, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
216, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
219, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
222, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
225, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
228, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
231, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
234, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
237, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
240, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	

MIDAS


PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

243, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
246, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
249, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
252, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
255, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
258, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
261, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
264, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
267, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
274, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
277, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
280, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
283, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
286, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
289, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
292, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
295, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
298, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
301, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
304, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
307, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
310, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
313, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
316, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
319, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
322, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
325, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
328, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
331, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
338, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
341, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	

MIDAS

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

344, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
347, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
350, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
353, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
356, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
359, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
362, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
365, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
368, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
371, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
374, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
377, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
380, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
383, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
386, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
389, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -6.957, 1, -6.957, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
391, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
392, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
393, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
394, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
395, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
396, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
397, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
398, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
399, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
400, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
401, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
402, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
403, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
404, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
405, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	

MIDAS

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

406, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
407, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
408, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
409, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
410, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
411, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
412, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
413, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
414, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
415, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
416, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
417, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
418, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
419, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
420, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
421, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
422, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
423, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
424, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
425, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
426, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
427, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
428, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
429, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
430, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
431, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
432, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
433, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
434, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
435, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	
436, BEAM	, UNILoad, GZ, NO	, NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO,	0, 0, NO,	

MIDAS

PROJECT TITLE :

MIDAS	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

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437, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
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438, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
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439, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO, 0, 0, NO,
440, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, -8.566, 1, -8.566, 0, 0, 0, 0
, FASE 3, NO, 0, 0, NO,

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; End of data for load case [PERMANENTE PORTATO] -----

*USE-STLD, VENTO PONTE SCARICO


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*BEAMLOAD ; Element Beam Loads
; ELEM_LIST, CMD, TYPE, DIR, bPROJ, [ECCEN], [VALUE], GROUP
; ELEM LIST, CMD, TYPE, TYPE, DIR, VX, VY, VZ, bPROJ, [ECCEN], [VALUE], GROUP
; [VALUE] : D1, P1, D2, P2, D3, P3, D4, P4
; [ECCEN] : bECCEN, ECCDIR, I-END, J-END, bJ-END
; [ADDITIONAL] : bADDITIONAL, ADDITIONAL_I-END, ADDITIONAL_J-END, bADDITIONAL_J-END
1, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, -0.789, 1, -0.789, 0, 0, 0, 0
, , NO, 0, 0, NO,
2, BEAM , UNILoad, GY, NO , NO, aDir[1], , , , 0, -4.507, 1, -4.507, 0, 0, 0, 0
, , NO, 0, 0, NO,
2, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, 0.789, 1, 0.789, 0, 0, 0, 0
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117, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, -0.789, 1, -0.789, 0, 0, 0, 0
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118, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, -0.789, 1, -0.789, 0, 0, 0, 0
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119, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, -0.789, 1, -0.789, 0, 0, 0, 0
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129, BEAM , UNILoad, GY, NO , NO, aDir[1], , , , 0, -4.507, 1, -4.507, 0, 0, 0, 0
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129, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, 0.789, 1, 0.789, 0, 0, 0, 0
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130, BEAM , UNILoad, GY, NO , NO, aDir[1], , , , 0, -4.507, 1, -4.507, 0, 0, 0, 0

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MIDAS

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2


```

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  185, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, 0.789, 1, 0.789, 0, 0, 0, 0,

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MIDAS

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2


```

, NO, 0, 0, NO,
  185, BEAM , UNILoad, GY, NO , NO, aDir[1], , , , 0, -4.507, 1, -4.507, 0, 0, 0, 0
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MIDAS

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2


```

, NO, 0, 0, NO,
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MIDAS

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

```

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319, BEAM , UNILoad, GY, NO , NO, aDir[1], , , , 0, -4.507, 1, -4.507, 0, 0, 0, 0,
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322, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, -0.789, 1, -0.789, 0, 0, 0, 0,
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325, BEAM , UNILoad, GY, NO , NO, aDir[1], , , , 0, -4.507, 1, -4.507, 0, 0, 0, 0,
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328, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, -0.789, 1, -0.789, 0, 0, 0, 0,
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331, BEAM , UNILoad, GY, NO , NO, aDir[1], , , , 0, -4.507, 1, -4.507, 0, 0, 0, 0,
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331, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, 0.789, 1, 0.789, 0, 0, 0, 0,
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344, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, -0.789, 1, -0.789, 0, 0, 0, 0,
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347, BEAM , UNILoad, GY, NO , NO, aDir[1], , , , 0, -4.507, 1, -4.507, 0, 0, 0, 0,
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356, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, -0.789, 1, -0.789, 0, 0, 0, 0,
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359, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, 0.789, 1, 0.789, 0, 0, 0, 0,
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359, BEAM , UNILoad, GY, NO , NO, aDir[1], , , , 0, -4.507, 1, -4.507, 0, 0, 0, 0,
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377, BEAM , UNILoad, GY, NO , NO, aDir[1], , , , 0, -4.507, 1, -4.507, 0, 0, 0, 0,
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380, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, -0.789, 1, -0.789, 0, 0, 0, 0,
, , NO, 0, 0, NO,
383, BEAM , UNILoad, GY, NO , NO, aDir[1], , , , 0, -4.507, 1, -4.507, 0, 0, 0, 0,

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MIDAS

PROJECT TITLE :

MIDAS	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

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, , NO, 0, 0, NO,
 383, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, 0.789, 1, 0.789, 0, 0, 0, 0,
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 389, BEAM , UNILOAD, GY, NO , NO, aDir[1], , , , 0, -4.507, 1, -4.507, 0, 0, 0, 0,
, , NO, 0, 0, NO,
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; End of data for load case [VENTO PONTE SCARICO] -----

*USE-STLD, VENTO PONTE CARICO

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*BEAMLOAD ; Element Beam Loads
; ELEM LIST, CMD, TYPE, DIR, bPROJ, [ECCEN], [VALUE], GROUP
; ELEM LIST, CMD, TYPE, TYPE, DIR, VX, VY, VZ, bPROJ, [ECCEN], [VALUE], GROUP
; [VALUE] : D1, P1, D2, P2, D3, P3, D4, P4
; [ECCEN] : bECCEN, ECCDIR, I-END, J-END, bJ-END
; [ADDITIONAL] : bADDITIONAL, ADDITIONAL_I-END, ADDITIONAL_J-END, bADDITIONAL_J-END
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, , NO, 0, 0, NO,
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 2, BEAM , UNILOAD, GY, NO , NO, aDir[1], , , , 0, -10.142, 1, -10.142, 0, 0, 0, 0,
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117, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -0.406, 1, -0.406, 0, 0, 0, 0,
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118, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -0.406, 1, -0.406, 0, 0, 0, 0,
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119, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -0.406, 1, -0.406, 0, 0, 0, 0,
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120, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -0.406, 1, -0.406, 0, 0, 0, 0,
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123, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -0.406, 1, -0.406, 0, 0, 0, 0,
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124, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -0.406, 1, -0.406, 0, 0, 0, 0,
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125, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -0.406, 1, -0.406, 0, 0, 0, 0,
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127, BEAM , UNILOAD, GY, NO , NO, aDir[1], , , , 0, -10.142, 1, -10.142, 0, 0, 0, 0,
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127, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, 0.406, 1, 0.406, 0, 0, 0, 0,
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128, BEAM , UNILOAD, GY, NO , NO, aDir[1], , , , 0, -10.142, 1, -10.142, 0, 0, 0, 0,
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128, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, 0.406, 1, 0.406, 0, 0, 0, 0,
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129, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, 0.406, 1, 0.406, 0, 0, 0, 0,
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129, BEAM , UNILOAD, GY, NO , NO, aDir[1], , , , 0, -10.142, 1, -10.142, 0, 0, 0, 0,
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, NO, 0, 0, NO,
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MIDAS

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2


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130, BEAM , UNILOAD, GY, NO , NO, aDir[1], , , , 0, -10.142, 1, -10.142, 0, 0, 0,
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131, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, 0.406, 1, 0.406, 0, 0, 0, 0,
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131, BEAM , UNILOAD, GY, NO , NO, aDir[1], , , , 0, -10.142, 1, -10.142, 0, 0, 0,
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132, BEAM , UNILOAD, GY, NO , NO, aDir[1], , , , 0, -10.142, 1, -10.142, 0, 0, 0,
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134, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, 0.406, 1, 0.406, 0, 0, 0, 0,
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136, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -0.406, 1, -0.406, 0, 0, 0, 0,
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149, BEAM , UNILOAD, GY, NO , NO, aDir[1], , , , 0, -10.142, 1, -10.142, 0, 0, 0,
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155, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, 0.406, 1, 0.406, 0, 0, 0, 0,
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155, BEAM , UNILOAD, GY, NO , NO, aDir[1], , , , 0, -10.142, 1, -10.142, 0, 0, 0,
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167, BEAM , UNILOAD, GY, NO , NO, aDir[1], , , , 0, -10.142, 1, -10.142, 0, 0, 0,
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173, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, 0.406, 1, 0.406, 0, 0, 0, 0,
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176, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -0.406, 1, -0.406, 0, 0, 0, 0,
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179, BEAM , UNILOAD, GY, NO , NO, aDir[1], , , , 0, -10.142, 1, -10.142, 0, 0, 0,
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182, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -0.406, 1, -0.406, 0, 0, 0, 0,
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MIDAS

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2


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185, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, 0.406, 1, 0.406, 0, 0, 0, 0,
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185, BEAM , UNILOAD, GY, NO , NO, aDir[1], , , , 0, -10.142, 1, -10.142, 0, 0, 0,
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222, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -0.406, 1, -0.406, 0, 0, 0, 0
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MIDAS

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2


```

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277, BEAM , UNILoad, GY, NO , NO, aDir[1], , , , 0, -10.142, 1, -10.142, 0, 0, 0,
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280, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, -0.406, 1, -0.406, 0, 0, 0, 0
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283, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, 0.406, 1, 0.406, 0, 0, 0, 0,
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283, BEAM , UNILoad, GY, NO , NO, aDir[1], , , , 0, -10.142, 1, -10.142, 0, 0, 0,
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286, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, -0.406, 1, -0.406, 0, 0, 0, 0
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289, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, 0.406, 1, 0.406, 0, 0, 0, 0,
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289, BEAM , UNILoad, GY, NO , NO, aDir[1], , , , 0, -10.142, 1, -10.142, 0, 0, 0,
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295, BEAM , UNILoad, GY, NO , NO, aDir[1], , , , 0, -10.142, 1, -10.142, 0, 0, 0,
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295, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, 0.406, 1, 0.406, 0, 0, 0, 0,
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301, BEAM , UNILoad, GZ, NO , NO, aDir[1], , , , 0, 0.406, 1, 0.406, 0, 0, 0, 0,
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313, BEAM , UNILoad, GY, NO , NO, aDir[1], , , , 0, -10.142, 1, -10.142, 0, 0, 0,
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MIDAS

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2


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316, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, -0.406, 1, -0.406, 0, 0, 0, 0
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341, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, 0.406, 1, 0.406, 0, 0, 0, 0
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341, BEAM , UNILOAD, GY, NO , NO, aDir[1], , , , 0, -10.142, 1, -10.142, 0, 0, 0, 0
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347, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, 0.406, 1, 0.406, 0, 0, 0, 0
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377, BEAM , UNILOAD, GY, NO , NO, aDir[1], , , , 0, -10.142, 1, -10.142, 0, 0, 0, 0
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MIDAS

PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

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383, BEAM , UNILOAD, GY, NO , NO, aDir[1], , , , 0, -10.142, 1, -10.142, 0, 0, 0,
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389, BEAM , UNILOAD, GZ, NO , NO, aDir[1], , , , 0, 0.406, 1, 0.406, 0, 0, 0, 0,
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; End of data for load case [VENTO PONTE CARICO] -----

*USE-STLD, TERMICA UNIFORME +

*ELTEMPER ; Element Temperatures
; ELEM_LIST, TEMPER, GROUP


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- 2, 49,
- 4, 49,
- 5, 49,
- 57, 49,
- 58, 49,
- 63, 49,
- 64, 49,
- 69, 49,
- 70, 49,
- 75, 49,
- 76, 49,
- 81, 49,
- 82, 49,
- 87, 49,
- 88, 49,
- 93, 49,
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- 133, 49,
- 134, 49,
- 136, 49,
- 139, 49,
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PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2


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PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

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PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

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460, 49,

; End of data for load case [TERMICA UNIFORME +] -----

*USE-STLD, TERMICA UNIFORME -

*ELTEMPER ; Element Temperatures
; ELEM_LIST, TEMPER, GROUP


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PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2


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PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

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PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2


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; End of data for load case [TERMICA UNIFORME -] -----

*USE-STLD, TERMICA GRADIENTE +

*THERGRAD ; Temperature Gradient
 ; ELEM_LIST, iETYP, TZ, bUSEHZ, HZ, TY, bUSEHY, HY, GROUP
 ; ELEM_LIST, iETYP, TZ, bUSEHZ, HZ, GROUP
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PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

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MIDAS

PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

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 410, 1, 15, YES, 0, 0, YES, 0,

PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

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440, 1, 15, YES, 0, 0, YES, 0,

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; End of data for load case [TERMICA GRADIENTE +] -----

*USE-STLD, TERMICA GRADIENTE -

*THERGRAD ; Temperature Gradient

; ELEM_LIST, iETYP, TZ, bUSEHZ, HZ, TY, bUSEHY, HY, GROUP


; ELEM_LIST, iETYP, TZ, bUSEHZ, HZ, GROUP

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2, 1, -18, YES, 0, 0, YES, 0,
4, 1, -18, YES, 0, 0, YES, 0,
5, 1, -18, YES, 0, 0, YES, 0,
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93, 1, -18, YES, 0, 0, YES, 0,
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PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

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PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

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325, 1, -18, YES, 0, 0, YES, 0,
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368, 1, -18, YES, 0, 0, YES, 0,
371, 1, -18, YES, 0, 0, YES, 0,
374, 1, -18, YES, 0, 0, YES, 0,
377, 1, -18, YES, 0, 0, YES, 0,
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395, 1, -18, YES, 0, 0, YES, 0,
396, 1, -18, YES, 0, 0, YES, 0,
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409, 1, -18, YES, 0, 0, YES, 0,
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PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

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439, 1, -18, YES, 0, 0, YES, 0,
440, 1, -18, YES, 0, 0, YES, 0,

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; End of data for load case [TERMICA GRADIENTE -] -----

*USE-STLD, FRENATURA


```

*BEAMLOAD ; Element Beam Loads
; ELEM_LIST, CMD, TYPE, DIR, bPROJ, [ECCEN], [VALUE], GROUP
; ELEM_LIST, CMD, TYPE, TYPE, DIR, VX, VY, VZ, bPROJ, [ECCEN], [VALUE], GROUP
; [VALUE] : D1, P1, D2, P2, D3, P3, D4, P4
; [ECCEN] : bECCEN, ECCDIR, I-END, J-END, bJ-END
; [ADDITIONAL] : bADDITIONAL, ADDITIONAL_I-END, ADDITIONAL_J-END, bADDITIONAL_J-END
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119, BEAM , UNILOAD, GX, NO , NO, aDir[1], , , , 0, 3.724, 1, 3.724, 0, 0, 0, 0,
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120, BEAM , UNILOAD, GX, NO , NO, aDir[1], , , , 0, 3.724, 1, 3.724, 0, 0, 0, 0,
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121, BEAM , UNILOAD, GX, NO , NO, aDir[1], , , , 0, 3.724, 1, 3.724, 0, 0, 0, 0,
, NO, 0, 0, NO,
122, BEAM , UNILOAD, GX, NO , NO, aDir[1], , , , 0, 3.724, 1, 3.724, 0, 0, 0, 0,
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123, BEAM , UNILOAD, GX, NO , NO, aDir[1], , , , 0, 3.724, 1, 3.724, 0, 0, 0, 0,
, NO, 0, 0, NO,
124, BEAM , UNILOAD, GX, NO , NO, aDir[1], , , , 0, 3.724, 1, 3.724, 0, 0, 0, 0,
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126, BEAM , UNILOAD, GX, NO , NO, aDir[1], , , , 0, 3.724, 1, 3.724, 0, 0, 0, 0,
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127, BEAM , UNILOAD, GX, NO , NO, aDir[1], , , , 0, 3.724, 1, 3.724, 0, 0, 0, 0,
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128, BEAM , UNILOAD, GX, NO , NO, aDir[1], , , , 0, 3.724, 1, 3.724, 0, 0, 0, 0,

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MIDAS

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2


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, NO, 0, 0, NO,
 129, BEAM , UNILoad, GX, NO , NO, aDir[1], , , , 0, 3.724, 1, 3.724, 0, 0, 0, 0,
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 179, BEAM , UNILoad, GX, NO , NO, aDir[1], , , , 0, 3.724, 1, 3.724, 0, 0, 0, 0,
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 182, BEAM , UNILoad, GX, NO , NO, aDir[1], , , , 0, 3.724, 1, 3.724, 0, 0, 0, 0,
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 185, BEAM , UNILoad, GX, NO , NO, aDir[1], , , , 0, 3.724, 1, 3.724, 0, 0, 0, 0,
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MIDAS

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2


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MIDAS

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2


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MIDAS

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

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MIDAS

PROJECT TITLE :

MIDAS	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2


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; End of data for load case [FRENATURA] -----

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*STAGE ; Define Construction Stage
; NAME=NAME, DURATION, bSAVESTAGE, bSAVESTEP, bINCRESTEP, INCRESTEP ; line 1
; STEP=DAY1, DAY2, ... ; line 2
; AELEM=GROUP1, AGE1, GROUP2, AGE2, ... ; line 3
; DELEM=GROUP1, REDIST1, GROUP2, REDIST2, ... ; line 4
; ABNDR=BGROUP1, POS1, BGROUP2, POS2, ... ; line 5
; DBNDR=BGROUP1, BGROUP2, ... ; line 6
; ALOAD=LGROUP1, DAY1, LGROUP2, DAY2, ... ; line 7
; DLOAD=LGROUP1, DAY1, LGROUP2, DAY2, ... ; line 8
NAME=FASE 1, 2, YES, NO, NO, 5
AELEM=FASE 1, 0
ABNDR=FASE 1, DEFORMED
ALOAD=FASE 1, FIRST
NAME=FASE 2, 28, YES, NO, NO, 5
AELEM=FASE 2, 0
ALOAD=FASE 2, FIRST
NAME=FASE 3, 10000, YES, NO, NO, 5
ALOAD=FASE 3, FIRST

*SFUNCTION ; Spectrum Function
; FUNC=NAME, iTYPE, iMETHOD, SCALE/MAX, GRAV, DRATIO, DESC, RMF ; line 1
; SPEC_CODE, [CODE_DATA] ; line 2
; PERIOD1, VALUE1, PERIOD2, VALUE2, ... ; from line 3
; [CODE_DATA] : NSC, SFI, SC, EQ, TG, DP, MaxEQ
; CH2001
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; [CODE_DATA] : SFI, SC, EQ, TG, DP, MaxEQ ; CHSH2003
; [CODE_DATA] : DIV, SC, SFI, EQ, TG, G ; GB50111_2006
; [CODE_DATA] : BT, ZM, ST, SI, SC, TG, CI, CS, CD, EPA, SMAX, PERIOD ; JTG/T B02-01-20
08
; [CODE_DATA] : iSPE, SParam, TB, TC, TD, AG, Q, IF, FPX, FPY ; P100-1(2013)
FUNC=SLV-H, 1, 0, 1, 9.806, 0.05, , 1.000000
USER
0.000000, 0.503177945, 0.010000, 0.671121571
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PROJECT TITLE :

	Company	Client	
	Author	File Name	L1-CV01_REVISIONE_2

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0.019810,	0.835875948,	0.021080,	0.857208147
0.022432,	0.879907408,	0.023870,	0.90406274
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1.535200,	0.2673699,	1.633640,	0.251258705
1.738380,	0.236119991,	1.849840,	0.22189285
1.968450,	0.208522579,	2.094660,	0.195958423
2.228970,	0.184150648,	2.371880,	0.173055243
2.523960,	0.162627883,	2.685800,	0.152828308
2.858000,	0.143620109,	3.041250,	0.134966303
3.236250,	0.126833919,	3.443750,	0.119191657
3.664560,	0.110424926,	3.899520,	0.097518831
4.149550,	0.086120945,	4.415620,	0.076054936
4.698740,	0.067165764,	5.000000,	0.059315853

FUNC=SLV-V, 1, 0, 1, 9.806, 0.05, , 1.000000
 USER

0.000000,	0.252,	0.010000,	0.336
0.010641,	0.341,	0.011324,	0.347
0.012049,	0.353,	0.012822,	0.359
0.013644,	0.366,	0.014519,	0.374
0.015450,	0.381,	0.016441,	0.39
0.017495,	0.398,	0.018617,	0.408
0.019810,	0.418,	0.021080,	0.429
0.022432,	0.44,	0.023870,	0.452
0.025401,	0.465,	0.027029,	0.479
0.028762,	0.493,	0.030607,	0.509

PROJECT TITLE :


	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

0.032569,	0.525,	0.034657,	0.543
0.036879,	0.561,	0.039244,	0.581
0.041760,	0.602,	0.044438,	0.625
0.047287,	0.649,	0.050319,	0.674
0.053545,	0.701,	0.056979,	0.73
0.060632,	0.761,	0.064519,	0.793
0.068656,	0.828,	0.073058,	0.865
0.077743,	0.894,	0.082727,	0.894
0.088032,	0.894,	0.093676,	0.894
0.099682,	0.894,	0.106074,	0.894
0.112875,	0.894,	0.120112,	0.894
0.127814,	0.894,	0.136009,	0.894
0.144730,	0.894,	0.154009,	0.894
0.163884,	0.894,	0.174392,	0.894
0.185573,	0.894,	0.197472,	0.894
0.210134,	0.894,	0.223607,	0.894
0.237944,	0.863,	0.253200,	0.811
0.269435,	0.762,	0.286711,	0.716
0.305094,	0.673,	0.324656,	0.632
0.345472,	0.594,	0.367623,	0.558
0.391194,	0.525,	0.416277,	0.493
0.442967,	0.463,	0.471369,	0.435
0.501593,	0.409,	0.533754,	0.385
0.567977,	0.361,	0.604394,	0.34
0.643146,	0.319,	0.684384,	0.3
0.728265,	0.282,	0.774959,	0.265
0.824648,	0.249,	0.877523,	0.234
0.933788,	0.22,	0.993660,	0.207
1.057370,	0.194,	1.125170,	0.182
1.197310,	0.171,	1.274080,	0.161
1.355770,	0.151,	1.442700,	0.142
1.535200,	0.134,	1.633640,	0.126
1.738380,	0.118,	1.849840,	0.111
1.968450,	0.104,	2.094660,	0.098
2.228970,	0.092,	2.371880,	0.087
2.523960,	0.081,	2.685800,	0.076
2.858000,	0.072,	3.041250,	0.067
3.236250,	0.063,	3.443750,	0.06
3.664560,	0.055,	3.899520,	0.049
4.149550,	0.043,	4.415620,	0.038
4.698740,	0.034,	5.000000,	0.03

FUNC=SLD-H, 1, 0, 1, 9.806, 0.05, , 1.000000
 USER

0.000000,	0.140208895,	0.010000,	0.194935429
0.010641,	0.198444494,	0.011324,	0.202178485
0.012049,	0.206151632,	0.012822,	0.210379804
0.013644,	0.214878872,	0.014519,	0.219666349
0.015450,	0.22476139,	0.016441,	0.2301826
0.017495,	0.235951324,	0.018617,	0.242090547
0.019810,	0.248622706,	0.021080,	0.25557407
0.022432,	0.262970908,	0.023870,	0.270842226
0.025401,	0.279218122,	0.027029,	0.288130885
0.028762,	0.297615541,	0.030607,	0.307708208
0.032569,	0.318447743,	0.034657,	0.329875738
0.036879,	0.342037068,	0.039244,	0.354977705
0.041760,	0.368748542,	0.044438,	0.383401572
0.047287,	0.398994803,	0.050319,	0.415587341
0.053545,	0.43324431,	0.056979,	0.452033024
0.060632,	0.472026268,	0.064519,	0.493301756
0.068656,	0.515941028,	0.073058,	0.540032196
0.077743,	0.544720268,	0.082727,	0.544720268
0.088032,	0.544720268,	0.093676,	0.544720268

PROJECT TITLE :

	Company	Client	
	Author	File Name	L1-CV01_REVISIONE_2

0.099682,	0.544720268,	0.106074,	0.544720268
0.112875,	0.544720268,	0.120112,	0.544720268
0.127814,	0.544720268,	0.136009,	0.544720268
0.144730,	0.544720268,	0.154009,	0.544720268
0.163884,	0.544720268,	0.174392,	0.544720268
0.185573,	0.544720268,	0.197472,	0.544720268
0.210134,	0.544720268,	0.223607,	0.540184586
0.237944,	0.507636481,	0.253200,	0.477049979
0.269435,	0.448304989,	0.286711,	0.421292015
0.305094,	0.39590767,	0.324656,	0.372052433
0.345472,	0.349634861,	0.367623,	0.32856773
0.391194,	0.308770213,	0.416277,	0.290165094
0.442967,	0.272681836,	0.471369,	0.256251588
0.501593,	0.240810886,	0.533754,	0.226300983
0.567977,	0.212665398,	0.604394,	0.199851512
0.643146,	0.187809696,	0.684384,	0.176493102
0.728265,	0.165858657,	0.774959,	0.155865091
0.824648,	0.146473471,	0.877523,	0.137647737
0.933788,	0.129353831,	0.993660,	0.121559744
1.057370,	0.114235372,	1.125170,	0.107351827
1.197310,	0.100883693,	1.274080,	0.094804922
1.355770,	0.089092586,	1.442700,	0.083724305
1.535200,	0.078679687,	1.633640,	0.0739386
1.738380,	0.069483689,	1.849840,	0.065297028
1.968450,	0.061362521,	2.094660,	0.057665232
2.228970,	0.052534047,	2.371880,	0.04639422
2.523960,	0.040971736,	2.685800,	0.036182783
2.858000,	0.031953972,	3.041250,	0.028219224
3.236250,	0.024920984,	3.443750,	0.022008278
3.664560,	0.019435944,	3.899520,	0.017164336
4.149550,	0.015158188,	4.415620,	0.013386465
4.698740,	0.011821878,	5.000000,	0.010440211
FUNC=SLC-H, 1, 0,	1, 9.806, 0.05,	, 1.000000	
USER			
0.000000,	0.851906063,	0.010000,	0.986794857
0.010641,	0.995443927,	0.011324,	1.004647389
0.012049,	1.014440316,	0.012822,	1.024861824
0.013644,	1.035951032,	0.014519,	1.047751103
0.015450,	1.06030925,	0.016441,	1.073671334
0.017495,	1.087889962,	0.018617,	1.103021787
0.019810,	1.119122113,	0.021080,	1.136255688
0.022432,	1.154487257,	0.023870,	1.173888312
0.025401,	1.194533042,	0.027029,	1.216501031
0.028762,	1.239878608,	0.030607,	1.2647548
0.032569,	1.291225377,	0.034657,	1.319392855
0.036879,	1.349367843,	0.039244,	1.381263647
0.041760,	1.415205714,	0.044438,	1.451322189
0.047287,	1.489756053,	0.050319,	1.530652986
0.053545,	1.574173507,	0.056979,	1.620483528
0.060632,	1.669762451,	0.064519,	1.722201819
0.068656,	1.778002615,	0.073058,	1.837382011
0.077743,	1.900569318,	0.082727,	1.967807335
0.088032,	2.039356398,	0.093676,	2.115493029
0.099682,	2.196511286,	0.106074,	2.282725458
0.112875,	2.374463327,	0.120112,	2.37552115
0.127814,	2.37552115,	0.136009,	2.37552115
0.144730,	2.37552115,	0.154009,	2.37552115
0.163884,	2.37552115,	0.174392,	2.37552115
0.185573,	2.37552115,	0.197472,	2.37552115
0.210134,	2.37552115,	0.223607,	2.37552115
0.237944,	2.37552115,	0.253200,	2.37552115
0.269435,	2.37552115,	0.286711,	2.37552115

PROJECT TITLE :

MIDAS	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

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0.305094,    2.37552115,    0.324656,    2.37552115
0.345472,    2.330057798,    0.367623,    2.18966095
0.391194,    2.057725138,    0.416277,    1.933735776
0.442967,    1.81722279,    0.471369,    1.707727338
0.501593,    1.604826478,    0.533754,    1.508128703
0.567977,    1.417257614,    0.604394,    1.331862539
0.643146,    1.25161274,    0.684384,    1.176196006
0.728265,    1.105325297,    0.774959,    1.038725568
0.824648,    0.976137367,    0.877523,    0.917320375
0.933788,    0.862047625,    0.993660,    0.810105798
1.057370,    0.761294275,    1.125170,    0.715420539
1.197310,    0.672315213,    1.274080,    0.631804696
1.355770,    0.5937362,    1.442700,    0.557960579
1.535200,    0.524341928,    1.633640,    0.492746093
1.738380,    0.463057403,    1.849840,    0.435156407
1.968450,    0.408935826,    2.094660,    0.384296128
2.228970,    0.361139776,    2.371880,    0.339380461
2.523960,    0.318931254,    2.685800,    0.299713206
2.858000,    0.281654908,    3.041250,    0.26468384
3.236250,    0.248735335,    3.443750,    0.233748015
3.664560,    0.219663405,    3.899520,    0.206427901
4.149550,    0.193989644,    4.415620,    0.182300499
4.698740,    0.171316082,    5.000000,    0.160993946
    
```

```

*SPLDCASE ; Spectrum Load Cases
; TYPE, bADDSIGN, iSIGNTYPE
; NAME=NAME, DIR, ANGLE, SCALE, PMFT, bDAMP, bECC, INTERP, DESC, ; line 1
; COMTYPE, bADDSIGN, iSIGNTYPE, bMODE ; line 2
; FUNC1, FUNC2, FUNC3, ... ; line 3
; bUSE1, dFACTOR1, bUSE2, dFACTOR2, ..., bUSEn, dFACTORn ; line 4 (bMODE
=YES)
; bCDR, [DR-DC] ; line 5 (bDAMP
=YES)
; [DR-DC] : iMDTYPE, DALL, iMODE1, DAMPING1, iMODE2, DAMPING2, ... ; iMDTYPE=1
; : iMDTYPE, iCOEF, bMASSP, MASSC, bSTIFFP, STIFFC ; iMDTYPE=2, iC
OEF=1
; : iMDTYPE, iCOEF, iCALC, bMASSP, FP1, DR1, bSTIFFP, FP2, DR2 ; iMDTYPE=2, iC
OEF=2
NAME=EX, XY, 0, 1, 1, NO, NO, LOG, SISMAX
CQC, NO, 0, YES
SLV-H
YES, 1, YES, 1, YES, 1, YES, 1, YES, 1
NAME=EY, XY, 90, 1, 1, NO, NO, LOG, SISMAX
CQC, NO, 0, YES
SLV-H
YES, 1, YES, 1, YES, 1, YES, 1, YES, 1
NAME=EZ, Z, 0, 1, 1, NO, NO, LOG, SISMAZ
CQC, NO, 0, YES
SLV-V
YES, 1, YES, 1, YES, 1, YES, 1, YES, 1
NAME=DX, XY, 0, 1, 1, NO, NO, LOG, SISMA_D_X
CQC, NO, 0, YES
SLD-H
YES, 1, YES, 1, YES, 1, YES, 1, YES, 1
NAME=CX, XY, 0, 1, 1, NO, NO, LOG, CX
CQC, NO, 0, YES
SLC-H
YES, 1, YES, 1, YES, 1, YES, 1, YES, 1
NAME=CY, XY, 90, 1, 1, NO, NO, LOG, CY
CQC, NO, 0, YES
SLC-H
YES, 1, YES, 1, YES, 1, YES, 1, YES, 1
    
```

MIDAS

PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

*MVLDCODE ; Moving Load Code
 ; CODE=CODE
 CODE=EUROCODE

*LINELANE ; Traffic Line Lanes
 ; NAME=NAME, LDIST, GROUP, SKEWS, SKEWE, MOVING, LW, WS, bLANEOPT, ALLOWWIDTH ; line
 1
 ; iELEM1, ECC1, FACT1, bSPAN1, ECCVL... ; from
 line 2


NAME=LC01, CROSS, FASE 2, 0, 0, BOTH, 3, 2, NO, 3
 1, -1, 0, NO, 0, 136, -1, 0, NO, 0, 200, -1, 0, NO, 0
 264, -1, 0, NO, 0, 328, -1, 0, NO, 0, 117, -1, 0, NO, 0
 146, -1, 0, NO, 0, 210, -1, 0, NO, 0, 274, -1, 0, NO, 0
 338, -1, 0, NO, 0, 118, -1, 0, NO, 0, 152, -1, 0, NO, 0
 216, -1, 0, NO, 0, 280, -1, 0, NO, 0, 344, -1, 0, NO, 0
 119, -1, 0, NO, 0, 158, -1, 0, NO, 0, 222, -1, 0, NO, 0
 286, -1, 0, NO, 0, 350, -1, 0, NO, 0, 120, -1, 0, NO, 0
 164, -1, 0, NO, 0, 228, -1, 0, NO, 0, 292, -1, 0, NO, 0
 356, -1, 0, NO, 0, 121, -1, 0, NO, 0, 170, -1, 0, NO, 0
 234, -1, 0, NO, 0, 298, -1, 0, NO, 0, 362, -1, 0, NO, 0
 122, -1, 0, NO, 0, 176, -1, 0, NO, 0, 240, -1, 0, NO, 0
 304, -1, 0, NO, 0, 368, -1, 0, NO, 0, 123, -1, 0, NO, 0
 182, -1, 0, NO, 0, 246, -1, 0, NO, 0, 310, -1, 0, NO, 0
 374, -1, 0, NO, 0, 124, -1, 0, NO, 0, 188, -1, 0, NO, 0
 252, -1, 0, NO, 0, 316, -1, 0, NO, 0, 380, -1, 0, NO, 0
 125, -1, 0, NO, 0, 194, -1, 0, NO, 0, 258, -1, 0, NO, 0
 322, -1, 0, NO, 0, 386, -1, 0, NO, 0

NAME=LC02, CROSS, FASE 2, 0, 0, BOTH, 3, 2, NO, 3
 1, -4, 0, NO, 0, 136, -4, 0, NO, 0, 200, -4, 0, NO, 0
 264, -4, 0, NO, 0, 328, -4, 0, NO, 0, 117, -4, 0, NO, 0
 146, -4, 0, NO, 0, 210, -4, 0, NO, 0, 274, -4, 0, NO, 0
 338, -4, 0, NO, 0, 118, -4, 0, NO, 0, 152, -4, 0, NO, 0
 216, -4, 0, NO, 0, 280, -4, 0, NO, 0, 344, -4, 0, NO, 0
 119, -4, 0, NO, 0, 158, -4, 0, NO, 0, 222, -4, 0, NO, 0
 286, -4, 0, NO, 0, 350, -4, 0, NO, 0, 120, -4, 0, NO, 0
 164, -4, 0, NO, 0, 228, -4, 0, NO, 0, 292, -4, 0, NO, 0
 356, -4, 0, NO, 0, 121, -4, 0, NO, 0, 170, -4, 0, NO, 0
 234, -4, 0, NO, 0, 298, -4, 0, NO, 0, 362, -4, 0, NO, 0
 122, -4, 0, NO, 0, 176, -4, 0, NO, 0, 240, -4, 0, NO, 0
 304, -4, 0, NO, 0, 368, -4, 0, NO, 0, 123, -4, 0, NO, 0
 182, -4, 0, NO, 0, 246, -4, 0, NO, 0, 310, -4, 0, NO, 0
 374, -4, 0, NO, 0, 124, -4, 0, NO, 0, 188, -4, 0, NO, 0
 252, -4, 0, NO, 0, 316, -4, 0, NO, 0, 380, -4, 0, NO, 0
 125, -4, 0, NO, 0, 194, -4, 0, NO, 0, 258, -4, 0, NO, 0
 322, -4, 0, NO, 0, 386, -4, 0, NO, 0

NAME=LC03, CROSS, FASE 2, 0, 0, BOTH, 1, 1, NO, 3
 2, 0, 0, NO, 0, 139, 0, 0, NO, 0, 203, 0, 0, NO, 0
 267, 0, 0, NO, 0, 331, 0, 0, NO, 0, 126, 0, 0, NO, 0
 149, 0, 0, NO, 0, 213, 0, 0, NO, 0, 277, 0, 0, NO, 0
 341, 0, 0, NO, 0, 127, 0, 0, NO, 0, 155, 0, 0, NO, 0
 219, 0, 0, NO, 0, 283, 0, 0, NO, 0, 347, 0, 0, NO, 0
 128, 0, 0, NO, 0, 161, 0, 0, NO, 0, 225, 0, 0, NO, 0
 289, 0, 0, NO, 0, 353, 0, 0, NO, 0, 129, 0, 0, NO, 0
 167, 0, 0, NO, 0, 231, 0, 0, NO, 0, 295, 0, 0, NO, 0
 359, 0, 0, NO, 0, 130, 0, 0, NO, 0, 173, 0, 0, NO, 0
 237, 0, 0, NO, 0, 301, 0, 0, NO, 0, 365, 0, 0, NO, 0
 131, 0, 0, NO, 0, 179, 0, 0, NO, 0, 243, 0, 0, NO, 0
 307, 0, 0, NO, 0, 371, 0, 0, NO, 0, 132, 0, 0, NO, 0
 185, 0, 0, NO, 0, 249, 0, 0, NO, 0, 313, 0, 0, NO, 0
 377, 0, 0, NO, 0, 133, 0, 0, NO, 0, 191, 0, 0, NO, 0
 255, 0, 0, NO, 0, 319, 0, 0, NO, 0, 383, 0, 0, NO, 0

MIDAS

PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

134, 0, 0, NO, 0, 197, 0, 0, NO, 0, 261, 0, 0, NO, 0
 325, 0, 0, NO, 0, 389, 0, 0, NO, 0


```

*VEHICLE      ; Vehicles
; if Moving Load Code is China
; NAME=NAME, 1, TYPE-NAME, CODE
; standard
; NAME=NAME, 2, LTYPE, [TRUCK/LANE] or [TRAIN/SUBWAY] or [CROWD]
; user: line 1
;   LOAD1, DIST1, LOAD2, DIST2, ...
; user: from line 2
; [TRUCK/LANE] : 1, P, Qm, Qq
; truck(JTG)
; [TRUCK/LANE] : 2, P, Qm, Qq
; lane load1
; [TRUCK/LANE] : 3, Qk, Pk1, L1, Pk2, L2
; lane load2
; [TRUCK/LANE] : 4, dW, dD
; crawler type
; [TRUCK/LANE] : 5
; GC type load
; [TRAIN/SUBWAY] : iTYPE, W1, D1, W2, D2
; train-type1,3
; [TRAIN/SUBWAY] : iTYPE, DD, FD, BD, MAINCOUNT
; train-type2
; [TRAIN/SUBWAY] : 4, P1, D1, P2, D2, P3, D3, P4, dD, Po, n, IFR
; subway
; [CROWD] : 1, dW1
; crowd-type1
; [CROWD] : 2, dW1, dL1, dW2, dL2, WIDTH
; crowd-type2
; if Moving Load Type is India
; NAME=NAME, 1, TYPE-NAME, CODE
; standard
; NAME=NAME, 2, bWTB, P, D, Pb, Db, dD1, dD2, NDIST
; user: line 1
; NAME=NAME, 2, bWTB, dD1, dD2, NDIST
; user: line 1
;   LOAD1, DIST1, LOAD2, DIST2, ...
; user: from line 2
; if Moving Load Code is CANADA
; NAME=NAME, 1, TYPE-NAME, DLA, CODE, [DYNA]
; standard
; NAME=NAME, 2, bTRAIN, W(W1), PL(D1), PLM(W2), PLV(D2), NDIST, [DYNA]
; user: line 1
;   LOAD1, DIST1, LOAD2, DIST2, ...
; user: from line 2
; [DYNA] : nDYNA, FACT1AXLE, FACT2AXLE, FACT3AXLE
; Dynamic Load Allowance
; if Moving Load Code is BS
; NAME=NAME, 1, TYPE-NAME, CODE, UNITNUM
; standard
; NAME=nLane, FACTOR1, FACTOR2, FACTOR3, FACTOR4, ADDDATA, AL, CA, LL
; HA, HA & HB, HA & HB(Auto)
; NAME=NAME, 2, iSTYPE, W1, W2, W3, L, Pa, Pb, D1, D2, d, UNITNUM
; user(BS 5400)
; NAME=NAME, 2, iSTYPE, [BD37/01-HA], [BS-DATA-LF]
; user(HA)
; NAME=NAME, 2, iSTYPE, [BS-DATA-HB]
; user(HB)
; NAME=NAME, 2, iSTYPE, [BD37/01-HA2], [BS-DATA-HB2], [BS-DATA-LF]
; user(HA&HB)

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MIDAS


PROJECT TITLE :

	Company	Client	
	Author	File Name	L1-CV01_REVISIONE_2

```
; NAME=NAME, 2, iSTYPE, [BD37/01-HA], [BD37/01-HB], [BS-DATA-LF]
; user(HA&HB(AUTO))
; NAME=NAME, 2, iSTYPE, W, L
; user(Pedestrian)
; NAME=NAME, 2, iSTYPE, V, AN, MINS, MAXS, P1, D1, P2, D2, ...
; user(Special Vehicle)
; [BS-DATA-HA] : W1, W2, W3, EXP, EXP2, L1, L2, Pa
; [BS-DATA-HA2] : W1, W2, W3, EXP, EXP2, L1, L2
; [BS-DATA-HB] : Pb, D1, D2, d, UNITNUM
; [BS-DATA-HB2] : Pb, D1, D2, d, dd, UNITNUM
; [BS-DATA-LF] : nLT, LF1, LF2, LF3, LF4
; if Moving Load Code is EUROCODE
; NAME=NAME, 1, iTYPE, TYPE-NAME, PSY1, PSY2, PHI, [AF7]
; standard (LM1, FLM1)
; NAME=NAME, 1, iTYPE, TYPE-NAME, bDF, bU, PHI, PSY, ADJ, IN
; standard (others)
; NAME=NAME, 2, 1, [AF7]
; user(Type 1)
; [LOAD7], D, PHI, TPSY, UPSY
; user(Type 1): line 2
; NAME=NAME, 2, 2, ALP, TPSY, W, BET, LPSY, P1, D1, P2, D2, ...
; user(Type 2)
; NAME=NAME, 2, 3
; user(Type 3)
; [LOADCASE1]
; user(Type 3): line 2
; [LOADCASE2]
; user(Type 3): line 3
; [LOADCASE3]
; user(Type 3): line 4
; NAME=NAME, 2, 4, WS, V, AN, MINS, MAXS, DYF, UI, F, P1, D1, P2, D2, ...
; user(Type 4)
; NAME=NAME, 2, 5, INT, bPHI1, PHI1, bPHI2, PHI2
; user(Type 5)
; [VEHICLE1]
; user(Type 5): line 2
; [VEHICLE2]
; user(Type 5): line 3
; [VEHICLE3]
; user(Type 5): line 4
; [AF7] : TF1, TF2, TF3, UF1, UF2, UF3, UF4
; adjustment factor
; [LOAD7] : TL1, TL2, TL3, UL1, UL2, UL3, UL4
; tandem/udl loads
; [LOADCASE] : bUSE, N, bDF, bUI, PHI, P1, L1, P2, L2, ...
; load case
; [VEHICLE] : bUSE, N, P1, L1, P2, L2, ...
; vehicle
; if Moving Load Code is RUSSIA
; NAME=NAME, 1, iTYPE, K, nDYNAFAC, dDYNAFAC, bFATI, nLOADFAC, dLOADFAC
; standard (SK)
; NAME=NAME, 1, iTYPE, K, nDYNAFAC, dDYNAFAC, bFATI, nLOADFAC, dLOADFAC
; standard (SK FATIGUE)
; NAME=NAME, 1, iTYPE, K, nDYNAFAC, dDYNAFAC, dDYNAFAC_UDL
; bFATI, nLOADFAC, dLOADFAC, dLOADFAC_UDL, s1[3], s1_UDL[3]
; standard (AK)
; NAME=NAME, 1, iTYPE, K, nDYNAFAC, dDYNAFAC, nLOADFAC, dLOADFAC,
; bTWOVEHI, TWOVEHI_FACT, b2NDREDUC, 2NDREDUC_FACT
; standard (N14)
; NAME=NAME, 1, iTYPE, K, nDYNAFAC, dDYNAFAC, nLOADFAC, dLOADFAC,
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MIDAS

PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

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;          bTWOVEHI, TWOVEHI_FACT, b2NDREDUC, 2NDREDUC_FACT
; standard (N11)
; NAME=NAME, 1, iTYPE, nDYNAFAC, dDYNAFAC, dEMPTYCAR

;          bFATI, nLOADFAC, dLOADFAC,
; standard (SUBWAY TRAINS)
; NAME=NAME, 1, iTYPE, VARIABLE, nDYNAFAC, dDYNAFAC, dEMPTYCAR

;          bFATI, nLOADFAC, dLOADFAC,
; standard (TRAMCARS)
; NAME=NAME, 1, iTYPE, nDYNAFAC, dDYNAFAC, bFATI, nLOADFAC, dLOADFAC
; standard (NK-80)
; NAME=NAME, 1, iTYPE, W, D, nDYNAFAC, dDYNAFAC, bFATI, nLOADFAC, dLOADFAC
; standard (NG-60)
; NAME=NAME, 1, iTYPE, BRIDGETYPE, W, bFATI, nLOADFAC, dLOADFAC
; standard (UNIFORM LOAD)
; NAME=NAME, 1, iTYPE, BRIDGETYPE, W, bFATI, nLOADFAC, dLOADFAC
; standard (UNIFORM LOAD (W/O OTHER LOADS))
; NAME=NAME, 1, iTYPE, BRIDGETYPE, P
; standard (CONCENTRATED LOAD (W/O OTHER LOADS))
; NAME=NAME, 2, iTYPE, W, nDYNAFAC, dDYNAFAC, dDYNAFAC_UDL

;          bFATI, nLOADFAC, dLOADFAC, dLOADFAC_UDL, s1[3], s1_UDL[3]
; user (Type 1)
; NAME=NAME, 2, iTYPE, nDYNAFAC, dDYNAFAC, dEMPTYCAR

;          bFATI, nLOADFAC, dLOADFAC,
; user (Type 2)
; NAME=NAME, 2, iTYPE, Variable, nDYNAFAC, dDYNAFAC, dEMPTYCAR


;          bFATI, nLOADFAC, dLOADFAC,
; user (Type 3)
; NAME=NAME, 2, iTYPE, nDYNAFAC, dDYNAFAC, nLOADFAC, dLOADFAC

;          bTWOVEHI, TWOVEHI_FACT, b2NDREDUC, 2NDREDUC_FACT
; user (Type 4)
; NAME=NAME, 2, iTYPE, nDYNAFAC, dDYNAFAC, nLOADFAC, dLOADFAC

;          bTWOVEHI, TWOVEHI_FACT, b2NDREDUC, 2NDREDUC_FACT
; user (Type 5)
; NAME=NAME, 2, iTYPE, W, D, nDYNAFAC, dDYNAFAC, bFATI, nLOADFAC, dLOADFAC
; user (Type 6)
; NAME=NAME, 2, iTYPE, P, W, bFATI, nLOADFAC, dLOADFAC
; user (Type 7)
; if Moving Load Code is KSCE-LSD15
; NAME=NAME, 1, TYPE-NAME, nLANETYPE, dDYNAFAC, CODE, nLANELOAD, L, CONVERTDIST
; standard
; NAME=NAME, 2, 8, L1, W1, W2, EXP, dDYNAFAC, nLANELOAD, L, CONVERTDIST
; user: line 1 (Type 1)
; NAME=NAME, 2, 1, W1, W2, D1, D2, 0, 0, 0, NO
; user: line 1 (Type 2)
; NAME=NAME, 2, 6, LOADNUM, DIST, W, L, 0, 0, 0, NO
; user: line 1 (Type 3)
;   LOAD1, DIST1, (DIST2_1), LOAD2, DIST2, (DIST2_2), ...
; user: from line 2
; if Moving Load Code is South Africa
; NAME=NAME, 1, TYPE-NAME, CODE, bINCREL, dINCREL
; standard NA
; NAME=NAME, 1, TYPE-NAME, CODE, UNITNUM
; standard NB
; NAME=NAME, 1, TYPE-NAME, CODE, OPPOSITE

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PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2


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; standard NC
; NAME=NAME, 2, TYPE, W1, L, W2, W3, PA, bINCREL, dINCREL
; user NA
; NAME=NAME, 2, TYPE, PB, UNITNUM, DELTA, D1, D2
; user NB
; NAME=NAME, 2, TYPE, P, OPPOSITE, NUM1, NUM2, NUM3 [DIST1], [DIST2], [DIST3]
; user NC
; if Load Type is Permit Truck
; NAME=NAME, 3, AXLE-TYPE-NUM, IMP-FACTOR
; user(Permit Truck)
;     AXLE-TYPE-NAME1, bEDWL1, bSV1, P1, D1, P2, D2, ..., Pn, Dn
; user(from line 2)
;     ...
;     AXLE-TYPE-NAMEn, bEDWLn, bSVn, P1, D1, P2, D2, ..., Pn, Dn
;     AXLE-TYPE1, SPACING1, bVS1, AXLE-TYPE2, SPACING2, bVS2 ...
; line 2+AXLE-TYPE-NUM
; if Moving Load Code is not one of those specified above.
; NAME=NAME, 1, TYPE-NAME, DLA, CODE
; standard
; NAME=NAME, 2, bTRAIN, W(W1), PL(D1), PLM(W2), PLV(D2), NDIST
; user: line 1
;     LOAD1, DIST1, LOAD2, DIST2, ...
; user: from line 2
NAME=Q1A_q1a, 2, 1, 1, 0, 0, 1, 0, 0, 0
    300, 0, 0, 9, 0, 0, 0, 1.2, 1, 1, 1
NAME=Q1B_q1b, 2, 1, 1, 0, 0, 1, 0, 0, 0
    200, 0, 0, 2.5, 0, 0, 0, 1.2, 1, 1, 1
NAME=Q_Rimanente, 2, 1, 0, 0, 0, 1, 0, 0, 0
    0, 0, 0, 2.5, 0, 0, 0, 1.2, 1, 1, 1

*MVLDCASE(EURO) ; Moving Load Cases
; NAME=NAME, bOPTIM, iTYPE, DESC, VHL1, VHL2, bLEAD, SERIAL
;                                     ; type 1, 3
;     nType, SLN1, SLN2, SLN3, ...
;                                     ; line 2 (nType=1)
;     nType, SRA1, SRA2, SRA3, ...
;                                     ; line 2/3 (nType=2)
;     nType, FLN1, FLN2, FLN3, ...
;                                     ; line 4 (nType=3)
; NAME=NAME, bOPTIM, iTYPE, DESC, iOPT, bLEAD, SERIAL
;                                     ; type 2
;     [SUB1]
;                                     ; line 2
;     ...
;                                     ; ...
;     [SUBn]
;                                     ; line n+1
; [SUB] : VCLA, SCA, MIN, MAX, SLN1, SLN2, ...
;                                     ; sub-loadcase
; NAME=NAME, bOPTIM, iTYPE, DESC, iOPT, bLEAD, SERIAL
;                                     ; type 4
;     0, SLN1, SLN2, SLN3, ...
;                                     ; line 2
;     1, SRA1, SRA2, SRA3, ...
;                                     ; line 3
;     2, STRadd1, STRadd2, STRadd3, ...
;                                     ; line 4
; NAME=NAME, bOPTIM, iTYPE, DESC, iOPT, SF1, SF2, SF3, bPSI1, MULF1, MULF2, MULF3, SER
IAL
;                                     ; type 5
;     [SUB1]
;                                     ; line 2
;     ...

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PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2


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;      [SUBn]                                ;      ...
;      ;                                     ;      line n+1
;      ; ////////////////////////////////////// //////////////////////////////////////
;      ; Moving Load Optimization
;      ;
;      NAME=NAME, bOPTIM, iTYPE, DESC, VHL1, VHL2, bLEAD, MINVEHL, LANEOP, LOADEDLANE, SERIAL
;      AL                                ; type 1, 3
;      nType, SRA1, SRA2, SRA3, ...      ;      line 2 (nType=2)
;      nType, FLN1, FLN2, FLN3, ...      ;      line 3 (nType=3)
;      NAME=NAME, bOPTIM, iTYPE, DESC, iOPT, bLEAD, MINVEHL, LANEOP, MIN, MAX, SERIAL
;      ; type 2
;      [ASSGNVEHL1]                       ;      line 2
;      ...                                ;      ...
;      [ASSGNVEHLn]                       ;      line n+1
;      [ASSGNVEHL] : VC, VCLA, SCA ...     ; Assignment-Vehicle
;      NAME=NAME, bOPTIM, iTYPE, DESC, iOPT, bLEAD, MINVEHL, LANEOP, LOADEDLANE, SERIAL
;      ; type 4
;      1, SRA1, SRA2, SRA3, ...          ;      line 3
;      NAME=NAME, bOPTIM, iTYPE, DESC, iOPT, SF1, SF2, SF3, bPSI1, MULF1, MULF2, MULF3, MIN
;      VEHL, LANEOP, MIN, MAX, SERIAL ; type 5
;      [ASSGNVEHL1]                       ;      line 2
;      ...                                ;      ...
;      [ASSGNVEHLn]                       ;      line n+1
NAME=LM01, NO, 1, , Q1A_q1a, , YES, 1
      1, LC01
NAME=LM02, NO, 1, , Q1B_q1b, , YES, 2
      1, LC02
NAME=LM03, NO, 1, , Q_Rimanente, , YES, 3
      1, LC03

*CPOSECT4CS      ; Composite Section for Construction Stage
; SEC=SEC, ASTAGE, TYPE, bTAP                                     //
line 1
;      [PART-INFO]-1                                           //
from line 2
;      ...
;      [PART-INFO]-n
; [PART-INFO] : [COMMON], [SCALE], H, VS                        //
TYPE=A,B,NORMAL
;      [COMMON], [SCALE], CY, CZ, [STIFF], H, VS               //
TYPE=USER
;      [COMMON], [SCALE], CYI, CZI, CYJ, CZJ, [STIFF]-I, [STIFF]-J, H, VS //
TYPE=USER, bTAP=YES
; [COMMON]: PART, MTYPE, MAT, CSTAGE, AGE
; [SCALE] : AREA, ASY, ASZ, IXX, IYY, IZZ, WAREA
; [STIFF] : AREA, ASY, ASZ, IXX, IYY, CYP, CYM, CZP, CZM, QYB, QZB, \
;      X1, X2, X3, X4, Y1, Y2, Y3, Y4
      SEC=7, FASE 1, NORMAL, NO
      1, ELEM, , , 0, 1, 1, 1, 1, 1, 1, 1, 1, 0.0221893, 0
      2, MATL, 2, FASE 3, 0, 1, 1, 1, 1, 1, 1, 1, 1, 0.227273, 0

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PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

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SEC=9, FASE 1, NORMAL, NO
  1, ELEM, , , 0, 1, 1, 1, 1, 1, 1, 1, 0.0257759, 0
  2, MATL, 2, FASE 3, 0, 1, 1, 1, 1, 1, 1, 1, 0.227273, 0
SEC=8, FASE 1, NORMAL, NO
  1, ELEM, , , 0, 1, 1, 1, 1, 1, 1, 1, 0.025355, 0
  2, MATL, 2, FASE 3, 0, 1, 1, 1, 1, 1, 1, 1, 0.227273, 0
SEC=3, FASE 1, NORMAL, NO
  1, ELEM, , , 0, 1, 1, 1, 1, 1, 1, 1, 0.0187086, 0
  2, MATL, 2, FASE 3, 0, 1, 1, 1, 1, 1, 1, 1, 0.230769, 0
    
```

```

*STAGE-COLOR ; Diagram Color for Construction Stage
; STAGENAME, iR(COLOR), iG(COLOR), iB(COLOR)
FASE 1, 255, 192, 87
FASE 2, 85, 0, 192
FASE 3, 192, 128, 0
    
```

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*LOADCOMB ; Combinations
; NAME=NAME, KIND, ACTIVE, bES, iTYPE, DESC, iSERV-TYPE, nLCOMTYPE ; line 1
; ANAL1, LCNAME1, FACT1, ... ; from line 2
NAME=SLU1, GEN, ACTIVE, 0, 0, , 0, 0
  ST, VENTO PONTE SCARICO, 1.5, ST, TERMICA UNIFORME +, 0.9
  ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
  MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU2, GEN, ACTIVE, 0, 0, , 0, 0
  ST, VENTO PONTE SCARICO, 1.5, ST, TERMICA UNIFORME -, 0.9
  ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
  MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU3, GEN, ACTIVE, 0, 0, , 0, 0
  ST, VENTO PONTE SCARICO, 1.5, ST, TERMICA GRADIENTE +, 0.9
  ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
  MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU4, GEN, ACTIVE, 0, 0, , 0, 0
  ST, VENTO PONTE SCARICO, 1.5, ST, TERMICA GRADIENTE -, 0.9
  ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
  MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU5, GEN, ACTIVE, 0, 0, , 0, 0
  ST, VENTO PONTE CARICO, 1.5, ST, TERMICA UNIFORME +, 0.9
  ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
  MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU6, GEN, ACTIVE, 0, 0, , 0, 0
  ST, VENTO PONTE CARICO, 1.5, ST, TERMICA UNIFORME -, 0.9
  ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
  MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU7, GEN, ACTIVE, 0, 0, , 0, 0
  ST, VENTO PONTE CARICO, 1.5, ST, TERMICA GRADIENTE +, 0.9
  ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
  MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU8, GEN, ACTIVE, 0, 0, , 0, 0
  ST, VENTO PONTE CARICO, 1.5, ST, TERMICA GRADIENTE -, 0.9
  ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
  MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU9, GEN, ACTIVE, 0, 0, , 0, 0
  ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA UNIFORME +, 0.9
  ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
NAME=SLU10, GEN, ACTIVE, 0, 0, , 0, 0
  ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA UNIFORME -, 0.9
  ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
NAME=SLU11, GEN, ACTIVE, 0, 0, , 0, 0
  ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA GRADIENTE +, 0.9
  ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
NAME=SLU12, GEN, ACTIVE, 0, 0, , 0, 0
  ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA GRADIENTE -, 0.9
    
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PROJECT TITLE :


MIDAS	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

```

ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
NAME=SLU13, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.9, ST, TERMICA UNIFORME +, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
NAME=SLU14, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.9, ST, TERMICA UNIFORME -, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
NAME=SLU15, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.9, ST, TERMICA GRADIENTE +, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
NAME=SLU16, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.9, ST, TERMICA GRADIENTE -, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
NAME=SLU17, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA UNIFORME +, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
CS, Summation, 1.35
NAME=SLU18, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA UNIFORME -, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
CS, Summation, 1.35
NAME=SLU19, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA GRADIENTE +, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
CS, Summation, 1.35
NAME=SLU20, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA GRADIENTE -, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
CS, Summation, 1.35
NAME=SLU21, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.9, ST, TERMICA UNIFORME +, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
CS, Summation, 1.35
NAME=SLU22, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.9, ST, TERMICA UNIFORME -, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
CS, Summation, 1.35
NAME=SLU23, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.9, ST, TERMICA GRADIENTE +, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
CS, Summation, 1.35
NAME=SLU24, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.9, ST, TERMICA GRADIENTE -, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
CS, Summation, 1.35
NAME=SLV1, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, 1, RS, EY, 0.3, CS, Summation, 1
NAME=SLV2, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, -1, RS, EY, 0.3, CS, Summation, 1
NAME=SLV3, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, 1, RS, EY, -0.3, CS, Summation, 1
NAME=SLV4, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, -1, RS, EY, -0.3, CS, Summation, 1
NAME=SLV5, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, 0.3, RS, EY, 1, CS, Summation, 1
NAME=SLV6, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, 0.3, RS, EY, -1, CS, Summation, 1
NAME=SLV7, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, -0.3, RS, EY, 1, CS, Summation, 1
NAME=SLV8, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, -0.3, RS, EY, -1, CS, Summation, 1
NAME=SLV9, GEN, ACTIVE, 0, 0, , 0, 0

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PROJECT TITLE :


	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

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ST, TERMICA UNIFORME -, 0.5, RS, EX, 1, RS, EY, 0.3, CS, Summation, 1
NAME=SLV10, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, -1, RS, EY, 0.3, CS, Summation, 1
NAME=SLV11, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, 1, RS, EY, -0.3, CS, Summation, 1
NAME=SLV12, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, -1, RS, EY, -0.3, CS, Summation, 1
NAME=SLV13, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, 0.3, RS, EY, 1, CS, Summation, 1
NAME=SLV14, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, 0.3, RS, EY, -1, CS, Summation, 1
NAME=SLV15, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, -0.3, RS, EY, 1, CS, Summation, 1
NAME=SLV16, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, -0.3, RS, EY, -1, CS, Summation, 1
NAME=SLV17, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, 1, RS, EY, 0.3, CS, Summation, 1
NAME=SLV18, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, -1, RS, EY, 0.3, CS, Summation, 1
NAME=SLV19, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, 1, RS, EY, -0.3, CS, Summation, 1
NAME=SLV20, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, -1, RS, EY, -0.3
CS, Summation, 1
NAME=SLV21, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, 0.3, RS, EY, 1, CS, Summation, 1
NAME=SLV22, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, 0.3, RS, EY, -1, CS, Summation, 1
NAME=SLV23, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, -0.3, RS, EY, 1, CS, Summation, 1
NAME=SLV24, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, -0.3, RS, EY, -1
CS, Summation, 1
NAME=SLV25, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE -, 0.5, RS, EX, 1, RS, EY, 0.3, MV, LM03, 0.75
CS, Summation, 1
NAME=SLV26, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE -, 0.5, RS, EX, -1, RS, EY, 0.3, MV, LM03, 0.75
CS, Summation, 1
NAME=SLV27, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE -, 0.5, RS, EX, 1, RS, EY, -0.3, MV, LM03, 0.75
CS, Summation, 1
NAME=SLV28, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE -, 0.5, RS, EX, -1, RS, EY, -0.3, MV, LM03, 0.75
CS, Summation, 1
NAME=SLV29, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE -, 0.5, RS, EX, 0.3, RS, EY, 1, MV, LM03, 0.75
CS, Summation, 1
NAME=SLV30, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE -, 0.5, RS, EX, 0.3, RS, EY, -1, MV, LM03, 0.75
CS, Summation, 1
NAME=SLV31, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE -, 0.5, RS, EX, -0.3, RS, EY, 1, MV, LM03, 0.75
CS, Summation, 1
NAME=SLV32, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE -, 0.5, RS, EX, -0.3, RS, EY, -1, MV, LM03, 0.75
CS, Summation, 1
NAME=SLV33, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, 0.3, RS, EY, 0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV34, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, -0.3, RS, EY, 0.3, RS, EZ, 1
    
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MIDAS

PROJECT TITLE :


	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

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CS, Summation, 1
NAME=SLV35, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, 0.3, RS, EY, -0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV36, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, -0.3, RS, EY, -0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV37, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, 0.3, RS, EY, 0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV38, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, -0.3, RS, EY, 0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV39, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, 0.3, RS, EY, -0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV40, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, -0.3, RS, EY, -0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV41, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, 0.3, RS, EY, 0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV42, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, -0.3, RS, EY, 0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV43, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, 0.3, RS, EY, -0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV44, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, -0.3, RS, EY, -0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV45, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, 0.3, RS, EY, 0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV46, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, -0.3, RS, EY, 0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV47, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, 0.3, RS, EY, -0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV48, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, -0.3, RS, EY, -0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV49, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, 0.3, RS, EY, 0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV50, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, -0.3, RS, EY, 0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV51, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, 0.3, RS, EY, -0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV52, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, -0.3, RS, EY, -0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV53, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, 0.3, RS, EY, 0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV54, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, -0.3, RS, EY, 0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV55, GEN, ACTIVE, 0, 0, , 0, 0

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PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

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ST, TERMICA GRADIENTE +, 0.5, RS, EX, 0.3, RS, EY, -0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV56, GEN, ACTIVE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, -0.3, RS, EY, -0.3, RS, EZ, -1
CS, Summation, 1
NAME=RARA_1, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 1, ST, TERMICA UNIFORME +, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_2, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 1, ST, TERMICA UNIFORME -, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_3, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 1, ST, TERMICA GRADIENTE +, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_4, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 1, ST, TERMICA GRADIENTE -, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_5, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 1, ST, TERMICA UNIFORME +, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_6, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 1, ST, TERMICA UNIFORME -, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_7, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 1, ST, TERMICA GRADIENTE +, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_8, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 1, ST, TERMICA GRADIENTE -, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_9, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.6, ST, TERMICA UNIFORME +, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=RARA_10, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.6, ST, TERMICA UNIFORME -, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=RARA_11, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.6, ST, TERMICA GRADIENTE +, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=RARA_12, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.6, ST, TERMICA GRADIENTE -, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=RARA_13, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.6, ST, TERMICA UNIFORME +, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=RARA_14, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.6, ST, TERMICA UNIFORME -, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=RARA_15, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.6, ST, TERMICA GRADIENTE +, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=RARA_16, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.6, ST, TERMICA GRADIENTE -, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=FREQ_1, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA UNIFORME +, 0.5
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=FREQ_2, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA UNIFORME -, 0.5
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=FREQ_3, GEN, ACTIVE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA GRADIENTE +, 0.5
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1

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PROJECT TITLE :

MIDAS	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

```

NAME=FREQ_4, GEN, ACTIVE, 0, 0, , 0, 0
  ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA GRADIENTE -, 0.5
  ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=FREQ_5, GEN, ACTIVE, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
  CS, Summation, 1
NAME=FREQ_6, GEN, ACTIVE, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
  CS, Summation, 1
NAME=FREQ_7, GEN, ACTIVE, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
  CS, Summation, 1
NAME=FREQ_8, GEN, ACTIVE, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE -, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
  CS, Summation, 1
NAME=FREQ_9, GEN, ACTIVE, 0, 0, , 0, 0
  ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA UNIFORME +, 0.5
  ST, FRENATURA, 0.75, MV, LM01, 0.75, MV, LM02, 0.75, CS, Summation, 1
NAME=FREQ_10, GEN, ACTIVE, 0, 0, , 0, 0
  ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA UNIFORME -, 0.5
  ST, FRENATURA, 0.75, MV, LM01, 0.75, MV, LM02, 0.75, CS, Summation, 1
NAME=FREQ_11, GEN, ACTIVE, 0, 0, , 0, 0
  ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA GRADIENTE +, 0.5
  ST, FRENATURA, 0.75, MV, LM01, 0.75, MV, LM02, 0.75, CS, Summation, 1
NAME=FREQ_12, GEN, ACTIVE, 0, 0, , 0, 0
  ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA GRADIENTE -, 0.5
  ST, FRENATURA, 0.75, MV, LM01, 0.75, MV, LM02, 0.75, CS, Summation, 1
NAME=FREQ_13, GEN, ACTIVE, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
  MV, LM02, 0.75, CS, Summation, 1
NAME=FREQ_14, GEN, ACTIVE, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
  MV, LM02, 0.75, CS, Summation, 1
NAME=FREQ_15, GEN, ACTIVE, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
  MV, LM02, 0.75, CS, Summation, 1
NAME=FREQ_16, GEN, ACTIVE, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE -, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
  MV, LM02, 0.75, CS, Summation, 1
NAME=QP_1, GEN, ACTIVE, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, CS, Summation, 1
NAME=QP_2, GEN, ACTIVE, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, CS, Summation, 1
NAME=QP_3, GEN, ACTIVE, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, CS, Summation, 1
NAME=QP_4, GEN, ACTIVE, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE -, 0.5, CS, Summation, 1
NAME=SLD1, GEN, ACTIVE, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, DX, 1, CS, Summation, 1
NAME=SLD2, GEN, ACTIVE, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, DX, -1, CS, Summation, 1
NAME=SLD3, GEN, ACTIVE, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, DX, 1, CS, Summation, 1
NAME=SLD4, GEN, ACTIVE, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, DX, -1, CS, Summation, 1
NAME=ENVESLU-SLV, GEN, ACTIVE, 0, 1, , 0, 0
  CB, SLU1, 1, CB, SLU2, 1, CB, SLU3, 1, CB, SLU4, 1, CB, SLU5, 1
  CB, SLU6, 1, CB, SLU7, 1, CB, SLU8, 1, CB, SLU9, 1, CB, SLU10, 1
  CB, SLU11, 1, CB, SLU12, 1, CB, SLU13, 1, CB, SLU14, 1, CB, SLU15, 1
  CB, SLU16, 1, CB, SLU17, 1, CB, SLU18, 1, CB, SLU19, 1, CB, SLU20, 1
  CB, SLU21, 1, CB, SLU22, 1, CB, SLU23, 1, CB, SLU24, 1, CB, SLV1, 1
  CB, SLV2, 1, CB, SLV3, 1, CB, SLV4, 1, CB, SLV5, 1, CB, SLV6, 1

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PROJECT TITLE :

MIDAS	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

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CB, SLV7, 1, CB, SLV8, 1, CB, SLV9, 1, CB, SLV10, 1, CB, SLV11, 1
CB, SLV12, 1, CB, SLV13, 1, CB, SLV14, 1, CB, SLV15, 1, CB, SLV16, 1
CB, SLV17, 1, CB, SLV18, 1, CB, SLV19, 1, CB, SLV20, 1, CB, SLV21, 1
CB, SLV22, 1, CB, SLV23, 1, CB, SLV24, 1, CB, SLV25, 1, CB, SLV26, 1
CB, SLV27, 1, CB, SLV28, 1, CB, SLV29, 1, CB, SLV30, 1, CB, SLV31, 1
CB, SLV32, 1, CB, SLV33, 1, CB, SLV34, 1, CB, SLV35, 1, CB, SLV36, 1
CB, SLV37, 1, CB, SLV38, 1, CB, SLV39, 1, CB, SLV40, 1, CB, SLV41, 1
CB, SLV42, 1, CB, SLV43, 1, CB, SLV44, 1, CB, SLV45, 1, CB, SLV46, 1
CB, SLV47, 1, CB, SLV48, 1, CB, SLV49, 1, CB, SLV50, 1, CB, SLV51, 1
CB, SLV52, 1, CB, SLV53, 1, CB, SLV54, 1, CB, SLV55, 1, CB, SLV56, 1
NAME=ENVE-RARA, GEN, ACTIVE, 0, 1, , 0, 0
CB, RARA_1, 1, CB, RARA_2, 1, CB, RARA_3, 1, CB, RARA_4, 1
CB, RARA_5, 1, CB, RARA_6, 1, CB, RARA_7, 1, CB, RARA_8, 1
CB, RARA_9, 1, CB, RARA_10, 1, CB, RARA_11, 1, CB, RARA_12, 1
CB, RARA_13, 1, CB, RARA_14, 1, CB, RARA_15, 1, CB, RARA_16, 1
NAME=ENVE-FREQ, GEN, ACTIVE, 0, 1, , 0, 0
CB, FREQ_1, 1, CB, FREQ_2, 1, CB, FREQ_3, 1, CB, FREQ_4, 1
CB, FREQ_5, 1, CB, FREQ_6, 1, CB, FREQ_7, 1, CB, FREQ_8, 1
CB, FREQ_9, 1, CB, FREQ_10, 1, CB, FREQ_11, 1, CB, FREQ_12, 1
CB, FREQ_13, 1, CB, FREQ_14, 1, CB, FREQ_15, 1, CB, FREQ_16, 1
NAME=ENVE-QP, GEN, ACTIVE, 0, 1, , 0, 0
CB, QP_1, 1, CB, QP_2, 1, CB, QP_3, 1, CB, QP_4, 1
NAME=ENVE-SLD, GEN, ACTIVE, 0, 1, , 0, 0
CB, SLD1, 1, CB, SLD2, 1, CB, SLD3, 1, CB, SLD4, 1
NAME=SLC_X, GEN, ACTIVE, 0, 0, , 0, 0
RS, CX, 1, RS, CY, 0.3
NAME=SLC_Y, GEN, ACTIVE, 0, 0, , 0, 0
RS, CY, 1, RS, CX, 0.3
NAME=SLU1, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 1.5, ST, TERMICA UNIFORME +, 0.9
ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU2, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 1.5, ST, TERMICA UNIFORME -, 0.9
ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU3, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 1.5, ST, TERMICA GRADIENTE +, 0.9
ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU4, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 1.5, ST, TERMICA GRADIENTE -, 0.9
ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU5, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 1.5, ST, TERMICA UNIFORME +, 0.9
ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU6, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 1.5, ST, TERMICA UNIFORME -, 0.9
ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU7, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 1.5, ST, TERMICA GRADIENTE +, 0.9
ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU8, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 1.5, ST, TERMICA GRADIENTE -, 0.9
ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU9, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA UNIFORME +, 0.9

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PROJECT TITLE :

MIDAS	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

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ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
NAME=SLU10, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA UNIFORME -, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
NAME=SLU11, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA GRADIENTE +, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
NAME=SLU12, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA GRADIENTE -, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
NAME=SLU13, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.9, ST, TERMICA UNIFORME +, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
NAME=SLU14, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.9, ST, TERMICA UNIFORME -, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
NAME=SLU15, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.9, ST, TERMICA GRADIENTE +, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
NAME=SLU16, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.9, ST, TERMICA GRADIENTE -, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
NAME=SLU17, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA UNIFORME +, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
CS, Summation, 1.35
NAME=SLU18, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA UNIFORME -, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
CS, Summation, 1.35
NAME=SLU19, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA GRADIENTE +, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
CS, Summation, 1.35
NAME=SLU20, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA GRADIENTE -, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
CS, Summation, 1.35
NAME=SLU21, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.9, ST, TERMICA UNIFORME +, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
CS, Summation, 1.35
NAME=SLU22, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.9, ST, TERMICA UNIFORME -, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
CS, Summation, 1.35
NAME=SLU23, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.9, ST, TERMICA GRADIENTE +, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
CS, Summation, 1.35
NAME=SLU24, STEEL, STRENGTH, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.9, ST, TERMICA GRADIENTE -, 0.9
ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
CS, Summation, 1.35
NAME=SLV1, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, 1, RS, EY, 0.3, CS, Summation, 1
NAME=SLV2, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, -1, RS, EY, 0.3, CS, Summation, 1
NAME=SLV3, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, 1, RS, EY, -0.3, CS, Summation, 1
NAME=SLV4, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, -1, RS, EY, -0.3, CS, Summation, 1

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PROJECT TITLE :

MIDAS	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

```

NAME=SLV5, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, EX, 0.3, RS, EY, 1, CS, Summation, 1
NAME=SLV6, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, EX, 0.3, RS, EY, -1, CS, Summation, 1
NAME=SLV7, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, EX, -0.3, RS, EY, 1, CS, Summation, 1
NAME=SLV8, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, EX, -0.3, RS, EY, -1, CS, Summation, 1
NAME=SLV9, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, RS, EX, 1, RS, EY, 0.3, CS, Summation, 1
NAME=SLV10, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, RS, EX, -1, RS, EY, 0.3, CS, Summation, 1
NAME=SLV11, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, RS, EX, 1, RS, EY, -0.3, CS, Summation, 1
NAME=SLV12, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, RS, EX, -1, RS, EY, -0.3, CS, Summation, 1
NAME=SLV13, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, RS, EX, 0.3, RS, EY, 1, CS, Summation, 1
NAME=SLV14, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, RS, EX, 0.3, RS, EY, -1, CS, Summation, 1
NAME=SLV15, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, RS, EX, -0.3, RS, EY, 1, CS, Summation, 1
NAME=SLV16, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, RS, EX, -0.3, RS, EY, -1, CS, Summation, 1
NAME=SLV17, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, RS, EX, 1, RS, EY, 0.3, CS, Summation, 1
NAME=SLV18, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, RS, EX, -1, RS, EY, 0.3, CS, Summation, 1
NAME=SLV19, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, RS, EX, 1, RS, EY, -0.3, CS, Summation, 1
NAME=SLV20, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, RS, EX, -1, RS, EY, -0.3
  CS, Summation, 1
NAME=SLV21, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, RS, EX, 0.3, RS, EY, 1, CS, Summation, 1
NAME=SLV22, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, RS, EX, 0.3, RS, EY, -1, CS, Summation, 1
NAME=SLV23, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, RS, EX, -0.3, RS, EY, 1, CS, Summation, 1
NAME=SLV24, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, RS, EX, -0.3, RS, EY, -1
  CS, Summation, 1
NAME=SLV25, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE -, 0.5, RS, EX, 1, RS, EY, 0.3, MV, LM03, 0.75
  CS, Summation, 1
NAME=SLV26, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE -, 0.5, RS, EX, -1, RS, EY, 0.3, MV, LM03, 0.75
  CS, Summation, 1
NAME=SLV27, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE -, 0.5, RS, EX, 1, RS, EY, -0.3, MV, LM03, 0.75
  CS, Summation, 1
NAME=SLV28, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE -, 0.5, RS, EX, -1, RS, EY, -0.3, MV, LM03, 0.75
  CS, Summation, 1
NAME=SLV29, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE -, 0.5, RS, EX, 0.3, RS, EY, 1, MV, LM03, 0.75
  CS, Summation, 1
NAME=SLV30, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE -, 0.5, RS, EX, 0.3, RS, EY, -1, MV, LM03, 0.75
  CS, Summation, 1
NAME=SLV31, STEEL, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE -, 0.5, RS, EX, -0.3, RS, EY, 1, MV, LM03, 0.75
  
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PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

```

CS, Summation, 1
NAME=SLV32, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA GRADIENTE -, 0.5, RS, EX, -0.3, RS, EY, -1, MV, LM03, 0.75
CS, Summation, 1
NAME=SLV33, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, 0.3, RS, EY, 0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV34, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, -0.3, RS, EY, 0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV35, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, 0.3, RS, EY, -0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV36, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, -0.3, RS, EY, -0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV37, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, 0.3, RS, EY, 0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV38, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, -0.3, RS, EY, 0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV39, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, 0.3, RS, EY, -0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV40, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, -0.3, RS, EY, -0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV41, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, 0.3, RS, EY, 0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV42, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, -0.3, RS, EY, 0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV43, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, 0.3, RS, EY, -0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV44, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, -0.3, RS, EY, -0.3, RS, EZ, 1
CS, Summation, 1
NAME=SLV45, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, 0.3, RS, EY, 0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV46, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, -0.3, RS, EY, 0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV47, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, 0.3, RS, EY, -0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV48, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, RS, EX, -0.3, RS, EY, -0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV49, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, 0.3, RS, EY, 0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV50, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, -0.3, RS, EY, 0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV51, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, 0.3, RS, EY, -0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV52, STEEL, STRENGTH, 0, 0, , 0, 0
    
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PROJECT TITLE :

MIDAS	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

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ST, TERMICA UNIFORME -, 0.5, RS, EX, -0.3, RS, EY, -0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV53, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, 0.3, RS, EY, 0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV54, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, -0.3, RS, EY, 0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV55, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, 0.3, RS, EY, -0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV56, STEEL, STRENGTH, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, -0.3, RS, EY, -0.3, RS, EZ, -1
CS, Summation, 1
NAME=RARA_1, STEEL, SERVICE, 0, 0, , 3, 0
ST, VENTO PONTE SCARICO, 1, ST, TERMICA UNIFORME +, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_2, STEEL, SERVICE, 0, 0, , 3, 0
ST, VENTO PONTE SCARICO, 1, ST, TERMICA UNIFORME -, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_3, STEEL, SERVICE, 0, 0, , 3, 0
ST, VENTO PONTE SCARICO, 1, ST, TERMICA GRADIENTE +, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_4, STEEL, SERVICE, 0, 0, , 3, 0
ST, VENTO PONTE SCARICO, 1, ST, TERMICA GRADIENTE -, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_5, STEEL, SERVICE, 0, 0, , 3, 0
ST, VENTO PONTE CARICO, 1, ST, TERMICA UNIFORME +, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_6, STEEL, SERVICE, 0, 0, , 3, 0
ST, VENTO PONTE CARICO, 1, ST, TERMICA UNIFORME -, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_7, STEEL, SERVICE, 0, 0, , 3, 0
ST, VENTO PONTE CARICO, 1, ST, TERMICA GRADIENTE +, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_8, STEEL, SERVICE, 0, 0, , 3, 0
ST, VENTO PONTE CARICO, 1, ST, TERMICA GRADIENTE -, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_9, STEEL, SERVICE, 0, 0, , 3, 0
ST, VENTO PONTE SCARICO, 0.6, ST, TERMICA UNIFORME +, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=RARA_10, STEEL, SERVICE, 0, 0, , 3, 0
ST, VENTO PONTE SCARICO, 0.6, ST, TERMICA UNIFORME -, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=RARA_11, STEEL, SERVICE, 0, 0, , 3, 0
ST, VENTO PONTE SCARICO, 0.6, ST, TERMICA GRADIENTE +, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=RARA_12, STEEL, SERVICE, 0, 0, , 3, 0
ST, VENTO PONTE SCARICO, 0.6, ST, TERMICA GRADIENTE -, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=RARA_13, STEEL, SERVICE, 0, 0, , 3, 0
ST, VENTO PONTE CARICO, 0.6, ST, TERMICA UNIFORME +, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=RARA_14, STEEL, SERVICE, 0, 0, , 3, 0
ST, VENTO PONTE CARICO, 0.6, ST, TERMICA UNIFORME -, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=RARA_15, STEEL, SERVICE, 0, 0, , 3, 0
ST, VENTO PONTE CARICO, 0.6, ST, TERMICA GRADIENTE +, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=RARA_16, STEEL, SERVICE, 0, 0, , 3, 0
ST, VENTO PONTE CARICO, 0.6, ST, TERMICA GRADIENTE -, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1

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PROJECT TITLE :

MIDAS	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

```

NAME=FREQ_1, STEEL, SERVICE, 0, 0, , 2, 0
  ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA UNIFORME +, 0.5
  ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=FREQ_2, STEEL, SERVICE, 0, 0, , 2, 0
  ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA UNIFORME -, 0.5
  ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=FREQ_3, STEEL, SERVICE, 0, 0, , 2, 0
  ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA GRADIENTE +, 0.5
  ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=FREQ_4, STEEL, SERVICE, 0, 0, , 2, 0
  ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA GRADIENTE -, 0.5
  ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=FREQ_5, STEEL, SERVICE, 0, 0, , 2, 0
  ST, TERMICA UNIFORME +, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
  CS, Summation, 1
NAME=FREQ_6, STEEL, SERVICE, 0, 0, , 2, 0
  ST, TERMICA UNIFORME -, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
  CS, Summation, 1
NAME=FREQ_7, STEEL, SERVICE, 0, 0, , 2, 0
  ST, TERMICA GRADIENTE +, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
  CS, Summation, 1
NAME=FREQ_8, STEEL, SERVICE, 0, 0, , 2, 0
  ST, TERMICA GRADIENTE -, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
  CS, Summation, 1
NAME=FREQ_9, STEEL, SERVICE, 0, 0, , 2, 0
  ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA UNIFORME +, 0.5
  ST, FRENATURA, 0.75, MV, LM01, 0.75, MV, LM02, 0.75, CS, Summation, 1
NAME=FREQ_10, STEEL, SERVICE, 0, 0, , 2, 0
  ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA UNIFORME -, 0.5
  ST, FRENATURA, 0.75, MV, LM01, 0.75, MV, LM02, 0.75, CS, Summation, 1
NAME=FREQ_11, STEEL, SERVICE, 0, 0, , 2, 0
  ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA GRADIENTE +, 0.5
  ST, FRENATURA, 0.75, MV, LM01, 0.75, MV, LM02, 0.75, CS, Summation, 1
NAME=FREQ_12, STEEL, SERVICE, 0, 0, , 2, 0
  ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA GRADIENTE -, 0.5
  ST, FRENATURA, 0.75, MV, LM01, 0.75, MV, LM02, 0.75, CS, Summation, 1
NAME=FREQ_13, STEEL, SERVICE, 0, 0, , 2, 0
  ST, TERMICA UNIFORME +, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
  MV, LM02, 0.75, CS, Summation, 1
NAME=FREQ_14, STEEL, SERVICE, 0, 0, , 2, 0
  ST, TERMICA UNIFORME -, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
  MV, LM02, 0.75, CS, Summation, 1
NAME=FREQ_15, STEEL, SERVICE, 0, 0, , 2, 0
  ST, TERMICA GRADIENTE +, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
  MV, LM02, 0.75, CS, Summation, 1
NAME=FREQ_16, STEEL, SERVICE, 0, 0, , 2, 0
  ST, TERMICA GRADIENTE -, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
  MV, LM02, 0.75, CS, Summation, 1
NAME=QP_1, STEEL, SERVICE, 0, 0, , 1, 0
  ST, TERMICA UNIFORME +, 0.5, CS, Summation, 1
NAME=QP_2, STEEL, SERVICE, 0, 0, , 1, 0
  ST, TERMICA UNIFORME -, 0.5, CS, Summation, 1
NAME=QP_3, STEEL, SERVICE, 0, 0, , 1, 0
  ST, TERMICA GRADIENTE +, 0.5, CS, Summation, 1
NAME=QP_4, STEEL, SERVICE, 0, 0, , 1, 0
  ST, TERMICA GRADIENTE -, 0.5, CS, Summation, 1
NAME=SLD1, STEEL, SERVICE, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, DX, 1, CS, Summation, 1
NAME=SLD2, STEEL, SERVICE, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, DX, -1, CS, Summation, 1
NAME=SLD3, STEEL, SERVICE, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, DX, 1, CS, Summation, 1

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PROJECT TITLE :

MIDAS	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

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NAME=SLD4, STEEL, SERVICE, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, DX, -1, CS, Summation, 1
NAME=ENVESLU-SLV, STEEL, STRENGTH, 0, 1, , 0, 0
  CBS, SLU1, 1, CBS, SLU2, 1, CBS, SLU3, 1, CBS, SLU4, 1, CBS, SLU5, 1
  CBS, SLU6, 1, CBS, SLU7, 1, CBS, SLU8, 1, CBS, SLU9, 1, CBS, SLU10, 1
  CBS, SLU11, 1, CBS, SLU12, 1, CBS, SLU13, 1, CBS, SLU14, 1
  CBS, SLU15, 1, CBS, SLU16, 1, CBS, SLU17, 1, CBS, SLU18, 1
  CBS, SLU19, 1, CBS, SLU20, 1, CBS, SLU21, 1, CBS, SLU22, 1
  CBS, SLU23, 1, CBS, SLU24, 1, CBS, SLV1, 1, CBS, SLV2, 1, CBS, SLV3, 1
  CBS, SLV4, 1, CBS, SLV5, 1, CBS, SLV6, 1, CBS, SLV7, 1, CBS, SLV8, 1
  CBS, SLV9, 1, CBS, SLV10, 1, CBS, SLV11, 1, CBS, SLV12, 1
  CBS, SLV13, 1, CBS, SLV14, 1, CBS, SLV15, 1, CBS, SLV16, 1
  CBS, SLV17, 1, CBS, SLV18, 1, CBS, SLV19, 1, CBS, SLV20, 1
  CBS, SLV21, 1, CBS, SLV22, 1, CBS, SLV23, 1, CBS, SLV24, 1
  CBS, SLV25, 1, CBS, SLV26, 1, CBS, SLV27, 1, CBS, SLV28, 1
  CBS, SLV29, 1, CBS, SLV30, 1, CBS, SLV31, 1, CBS, SLV32, 1
  CBS, SLV33, 1, CBS, SLV34, 1, CBS, SLV35, 1, CBS, SLV36, 1
  CBS, SLV37, 1, CBS, SLV38, 1, CBS, SLV39, 1, CBS, SLV40, 1
  CBS, SLV41, 1, CBS, SLV42, 1, CBS, SLV43, 1, CBS, SLV44, 1
  CBS, SLV45, 1, CBS, SLV46, 1, CBS, SLV47, 1, CBS, SLV48, 1
  CBS, SLV49, 1, CBS, SLV50, 1, CBS, SLV51, 1, CBS, SLV52, 1
  CBS, SLV53, 1, CBS, SLV54, 1, CBS, SLV55, 1, CBS, SLV56, 1
NAME=ENVE-RARA, STEEL, SERVICE, 0, 1, , 0, 0
  CBS, RARA_1, 1, CBS, RARA_2, 1, CBS, RARA_3, 1, CBS, RARA_4, 1
  CBS, RARA_5, 1, CBS, RARA_6, 1, CBS, RARA_7, 1, CBS, RARA_8, 1
  CBS, RARA_9, 1, CBS, RARA_10, 1, CBS, RARA_11, 1, CBS, RARA_12, 1
  CBS, RARA_13, 1, CBS, RARA_14, 1, CBS, RARA_15, 1, CBS, RARA_16, 1
NAME=ENVE-FREQ, STEEL, SERVICE, 0, 1, , 0, 0
  CBS, FREQ_1, 1, CBS, FREQ_2, 1, CBS, FREQ_3, 1, CBS, FREQ_4, 1
  CBS, FREQ_5, 1, CBS, FREQ_6, 1, CBS, FREQ_7, 1, CBS, FREQ_8, 1
  CBS, FREQ_9, 1, CBS, FREQ_10, 1, CBS, FREQ_11, 1, CBS, FREQ_12, 1
  CBS, FREQ_13, 1, CBS, FREQ_14, 1, CBS, FREQ_15, 1, CBS, FREQ_16, 1
NAME=ENVE-QP, STEEL, SERVICE, 0, 1, , 0, 0
  CBS, QP_1, 1, CBS, QP_2, 1, CBS, QP_3, 1, CBS, QP_4, 1
NAME=ENVE-SLD, STEEL, SERVICE, 0, 1, , 0, 0
  CBS, SLD1, 1, CBS, SLD2, 1, CBS, SLD3, 1, CBS, SLD4, 1
NAME=SLU1, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, VENTO PONTE SCARICO, 1.5, ST, TERMICA UNIFORME +, 0.9
  ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
  MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU2, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, VENTO PONTE SCARICO, 1.5, ST, TERMICA UNIFORME -, 0.9
  ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
  MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU3, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, VENTO PONTE SCARICO, 1.5, ST, TERMICA GRADIENTE +, 0.9
  ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
  MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU4, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, VENTO PONTE SCARICO, 1.5, ST, TERMICA GRADIENTE -, 0.9
  ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
  MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU5, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, VENTO PONTE CARICO, 1.5, ST, TERMICA UNIFORME +, 0.9
  ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
  MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU6, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, VENTO PONTE CARICO, 1.5, ST, TERMICA UNIFORME -, 0.9
  ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
  MV, LM03, 1.0125, CS, Summation, 1.35
NAME=SLU7, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, VENTO PONTE CARICO, 1.5, ST, TERMICA GRADIENTE +, 0.9

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PROJECT TITLE :

MIDAS	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
 MV, LM03, 1.0125, CS, Summation, 1.35
 NAME=SLU8, STLCOMP, STRENGTH, 0, 0, , 0, 0
 ST, VENTO PONTE CARICO, 1.5, ST, TERMICA GRADIENTE -, 0.9
 ST, FRENATURA, 1.0125, MV, LM01, 1.0125, MV, LM02, 1.0125
 MV, LM03, 1.0125, CS, Summation, 1.35
 NAME=SLU9, STLCOMP, STRENGTH, 0, 0, , 0, 0
 ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA UNIFORME +, 0.9
 ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
 NAME=SLU10, STLCOMP, STRENGTH, 0, 0, , 0, 0
 ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA UNIFORME -, 0.9
 ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
 NAME=SLU11, STLCOMP, STRENGTH, 0, 0, , 0, 0
 ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA GRADIENTE +, 0.9
 ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
 NAME=SLU12, STLCOMP, STRENGTH, 0, 0, , 0, 0
 ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA GRADIENTE -, 0.9
 ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
 NAME=SLU13, STLCOMP, STRENGTH, 0, 0, , 0, 0
 ST, VENTO PONTE CARICO, 0.9, ST, TERMICA UNIFORME +, 0.9
 ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
 NAME=SLU14, STLCOMP, STRENGTH, 0, 0, , 0, 0
 ST, VENTO PONTE CARICO, 0.9, ST, TERMICA UNIFORME -, 0.9
 ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
 NAME=SLU15, STLCOMP, STRENGTH, 0, 0, , 0, 0
 ST, VENTO PONTE CARICO, 0.9, ST, TERMICA GRADIENTE +, 0.9
 ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
 NAME=SLU16, STLCOMP, STRENGTH, 0, 0, , 0, 0
 ST, VENTO PONTE CARICO, 0.9, ST, TERMICA GRADIENTE -, 0.9
 ST, FRENATURA, 1.35, MV, LM01, 1.35, CS, Summation, 1.35
 NAME=SLU17, STLCOMP, STRENGTH, 0, 0, , 0, 0
 ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA UNIFORME +, 0.9
 ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
 CS, Summation, 1.35
 NAME=SLU18, STLCOMP, STRENGTH, 0, 0, , 0, 0
 ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA UNIFORME -, 0.9
 ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
 CS, Summation, 1.35
 NAME=SLU19, STLCOMP, STRENGTH, 0, 0, , 0, 0
 ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA GRADIENTE +, 0.9
 ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
 CS, Summation, 1.35
 NAME=SLU20, STLCOMP, STRENGTH, 0, 0, , 0, 0
 ST, VENTO PONTE SCARICO, 0.9, ST, TERMICA GRADIENTE -, 0.9
 ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
 CS, Summation, 1.35
 NAME=SLU21, STLCOMP, STRENGTH, 0, 0, , 0, 0
 ST, VENTO PONTE CARICO, 0.9, ST, TERMICA UNIFORME +, 0.9
 ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
 CS, Summation, 1.35
 NAME=SLU22, STLCOMP, STRENGTH, 0, 0, , 0, 0
 ST, VENTO PONTE CARICO, 0.9, ST, TERMICA UNIFORME -, 0.9
 ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
 CS, Summation, 1.35
 NAME=SLU23, STLCOMP, STRENGTH, 0, 0, , 0, 0
 ST, VENTO PONTE CARICO, 0.9, ST, TERMICA GRADIENTE +, 0.9
 ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
 CS, Summation, 1.35
 NAME=SLU24, STLCOMP, STRENGTH, 0, 0, , 0, 0
 ST, VENTO PONTE CARICO, 0.9, ST, TERMICA GRADIENTE -, 0.9
 ST, FRENATURA, 1.35, MV, LM01, 1.35, MV, LM02, 1.35, MV, LM03, 1.35
 CS, Summation, 1.35

PROJECT TITLE :


MIDAS	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

```

NAME=SLV1, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, EX, 1, RS, EY, 0.3, CS, Summation, 1
NAME=SLV2, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, EX, -1, RS, EY, 0.3, CS, Summation, 1
NAME=SLV3, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, EX, 1, RS, EY, -0.3, CS, Summation, 1
NAME=SLV4, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, EX, -1, RS, EY, -0.3, CS, Summation, 1
NAME=SLV5, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, EX, 0.3, RS, EY, 1, CS, Summation, 1
NAME=SLV6, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, EX, 0.3, RS, EY, -1, CS, Summation, 1
NAME=SLV7, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, EX, -0.3, RS, EY, 1, CS, Summation, 1
NAME=SLV8, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, EX, -0.3, RS, EY, -1, CS, Summation, 1
NAME=SLV9, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, RS, EX, 1, RS, EY, 0.3, CS, Summation, 1
NAME=SLV10, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, RS, EX, -1, RS, EY, 0.3, CS, Summation, 1
NAME=SLV11, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, RS, EX, 1, RS, EY, -0.3, CS, Summation, 1
NAME=SLV12, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, RS, EX, -1, RS, EY, -0.3, CS, Summation, 1
NAME=SLV13, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, RS, EX, 0.3, RS, EY, 1, CS, Summation, 1
NAME=SLV14, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, RS, EX, 0.3, RS, EY, -1, CS, Summation, 1
NAME=SLV15, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, RS, EX, -0.3, RS, EY, 1, CS, Summation, 1
NAME=SLV16, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, RS, EX, -0.3, RS, EY, -1, CS, Summation, 1
NAME=SLV17, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, RS, EX, 1, RS, EY, 0.3, CS, Summation, 1
NAME=SLV18, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, RS, EX, -1, RS, EY, 0.3, CS, Summation, 1
NAME=SLV19, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, RS, EX, 1, RS, EY, -0.3, CS, Summation, 1
NAME=SLV20, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, RS, EX, -1, RS, EY, -0.3
  CS, Summation, 1
NAME=SLV21, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, RS, EX, 0.3, RS, EY, 1, CS, Summation, 1
NAME=SLV22, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, RS, EX, 0.3, RS, EY, -1, CS, Summation, 1
NAME=SLV23, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, RS, EX, -0.3, RS, EY, 1, CS, Summation, 1
NAME=SLV24, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, RS, EX, -0.3, RS, EY, -1
  CS, Summation, 1
NAME=SLV25, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE -, 0.5, RS, EX, 1, RS, EY, 0.3, MV, LM03, 0.75
  CS, Summation, 1
NAME=SLV26, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE -, 0.5, RS, EX, -1, RS, EY, 0.3, MV, LM03, 0.75
  CS, Summation, 1
NAME=SLV27, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE -, 0.5, RS, EX, 1, RS, EY, -0.3, MV, LM03, 0.75
  CS, Summation, 1
NAME=SLV28, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE -, 0.5, RS, EX, -1, RS, EY, -0.3, MV, LM03, 0.75
  CS, Summation, 1

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PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

```

NAME=SLV29, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE -, 0.5, RS, EX, 0.3, RS, EY, 1, MV, LM03, 0.75
  CS, Summation, 1
NAME=SLV30, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE -, 0.5, RS, EX, 0.3, RS, EY, -1, MV, LM03, 0.75
  CS, Summation, 1
NAME=SLV31, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE -, 0.5, RS, EX, -0.3, RS, EY, 1, MV, LM03, 0.75
  CS, Summation, 1
NAME=SLV32, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE -, 0.5, RS, EX, -0.3, RS, EY, -1, MV, LM03, 0.75
  CS, Summation, 1
NAME=SLV33, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, EX, 0.3, RS, EY, 0.3, RS, EZ, 1
  CS, Summation, 1
NAME=SLV34, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, EX, -0.3, RS, EY, 0.3, RS, EZ, 1
  CS, Summation, 1
NAME=SLV35, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, EX, 0.3, RS, EY, -0.3, RS, EZ, 1
  CS, Summation, 1
NAME=SLV36, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, EX, -0.3, RS, EY, -0.3, RS, EZ, 1
  CS, Summation, 1
NAME=SLV37, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, RS, EX, 0.3, RS, EY, 0.3, RS, EZ, 1
  CS, Summation, 1
NAME=SLV38, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, RS, EX, -0.3, RS, EY, 0.3, RS, EZ, 1
  CS, Summation, 1
NAME=SLV39, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, RS, EX, 0.3, RS, EY, -0.3, RS, EZ, 1
  CS, Summation, 1
NAME=SLV40, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, RS, EX, -0.3, RS, EY, -0.3, RS, EZ, 1
  CS, Summation, 1
NAME=SLV41, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, RS, EX, 0.3, RS, EY, 0.3, RS, EZ, 1
  CS, Summation, 1
NAME=SLV42, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, RS, EX, -0.3, RS, EY, 0.3, RS, EZ, 1
  CS, Summation, 1
NAME=SLV43, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, RS, EX, 0.3, RS, EY, -0.3, RS, EZ, 1
  CS, Summation, 1
NAME=SLV44, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA GRADIENTE +, 0.5, RS, EX, -0.3, RS, EY, -0.3, RS, EZ, 1
  CS, Summation, 1
NAME=SLV45, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, EX, 0.3, RS, EY, 0.3, RS, EZ, -1
  CS, Summation, 1
NAME=SLV46, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, EX, -0.3, RS, EY, 0.3, RS, EZ, -1
  CS, Summation, 1
NAME=SLV47, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, EX, 0.3, RS, EY, -0.3, RS, EZ, -1
  CS, Summation, 1
NAME=SLV48, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME +, 0.5, RS, EX, -0.3, RS, EY, -0.3, RS, EZ, -1
  CS, Summation, 1
NAME=SLV49, STLCOMP, STRENGTH, 0, 0, , 0, 0
  ST, TERMICA UNIFORME -, 0.5, RS, EX, 0.3, RS, EY, 0.3, RS, EZ, -1

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PROJECT TITLE :

MIDAS	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

```

CS, Summation, 1
NAME=SLV50, STLCOMP, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, -0.3, RS, EY, 0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV51, STLCOMP, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, 0.3, RS, EY, -0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV52, STLCOMP, STRENGTH, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, RS, EX, -0.3, RS, EY, -0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV53, STLCOMP, STRENGTH, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, 0.3, RS, EY, 0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV54, STLCOMP, STRENGTH, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, -0.3, RS, EY, 0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV55, STLCOMP, STRENGTH, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, 0.3, RS, EY, -0.3, RS, EZ, -1
CS, Summation, 1
NAME=SLV56, STLCOMP, STRENGTH, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, RS, EX, -0.3, RS, EY, -0.3, RS, EZ, -1
CS, Summation, 1
NAME=RARA_1, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 1, ST, TERMICA UNIFORME +, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_2, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 1, ST, TERMICA UNIFORME -, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_3, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 1, ST, TERMICA GRADIENTE +, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_4, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 1, ST, TERMICA GRADIENTE -, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_5, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 1, ST, TERMICA UNIFORME +, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_6, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 1, ST, TERMICA UNIFORME -, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_7, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 1, ST, TERMICA GRADIENTE +, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_8, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 1, ST, TERMICA GRADIENTE -, 0.6
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=RARA_9, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.6, ST, TERMICA UNIFORME +, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=RARA_10, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.6, ST, TERMICA UNIFORME -, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=RARA_11, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.6, ST, TERMICA GRADIENTE +, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=RARA_12, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.6, ST, TERMICA GRADIENTE -, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=RARA_13, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.6, ST, TERMICA UNIFORME +, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=RARA_14, STLCOMP, SERVICE, 0, 0, , 0, 0

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PROJECT TITLE :

MIDAS	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

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ST, VENTO PONTE CARICO, 0.6, ST, TERMICA UNIFORME -, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=RARA_15, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.6, ST, TERMICA GRADIENTE +, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=RARA_16, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE CARICO, 0.6, ST, TERMICA GRADIENTE -, 0.6
ST, FRENATURA, 1, MV, LM01, 1, CS, Summation, 1
NAME=FREQ_1, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA UNIFORME +, 0.5
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=FREQ_2, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA UNIFORME -, 0.5
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=FREQ_3, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA GRADIENTE +, 0.5
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=FREQ_4, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA GRADIENTE -, 0.5
ST, FRENATURA, 0.75, MV, LM01, 0.75, CS, Summation, 1
NAME=FREQ_5, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
CS, Summation, 1
NAME=FREQ_6, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
CS, Summation, 1
NAME=FREQ_7, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
CS, Summation, 1
NAME=FREQ_8, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE -, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
CS, Summation, 1
NAME=FREQ_9, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA UNIFORME +, 0.5
ST, FRENATURA, 0.75, MV, LM01, 0.75, MV, LM02, 0.75, CS, Summation, 1
NAME=FREQ_10, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA UNIFORME -, 0.5
ST, FRENATURA, 0.75, MV, LM01, 0.75, MV, LM02, 0.75, CS, Summation, 1
NAME=FREQ_11, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA GRADIENTE +, 0.5
ST, FRENATURA, 0.75, MV, LM01, 0.75, MV, LM02, 0.75, CS, Summation, 1
NAME=FREQ_12, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, VENTO PONTE SCARICO, 0.2, ST, TERMICA GRADIENTE -, 0.5
ST, FRENATURA, 0.75, MV, LM01, 0.75, MV, LM02, 0.75, CS, Summation, 1
NAME=FREQ_13, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
MV, LM02, 0.75, CS, Summation, 1
NAME=FREQ_14, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
MV, LM02, 0.75, CS, Summation, 1
NAME=FREQ_15, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
MV, LM02, 0.75, CS, Summation, 1
NAME=FREQ_16, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE -, 0.5, ST, FRENATURA, 0.75, MV, LM01, 0.75
MV, LM02, 0.75, CS, Summation, 1
NAME=QP_1, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, TERMICA UNIFORME +, 0.5, CS, Summation, 1
NAME=QP_2, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, TERMICA UNIFORME -, 0.5, CS, Summation, 1
NAME=QP_3, STLCOMP, SERVICE, 0, 0, , 0, 0
ST, TERMICA GRADIENTE +, 0.5, CS, Summation, 1

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PROJECT TITLE :

MIDAS	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

```

NAME=QP_4, STLCOMP, SERVICE, 0, 0, , 0, 0
    ST, TERMICA GRADIENTE -, 0.5, CS, Summation, 1
NAME=SLD1, STLCOMP, SERVICE, 0, 0, , 0, 0
    ST, TERMICA UNIFORME +, 0.5, RS, DX, 1, CS, Summation, 1
NAME=SLD2, STLCOMP, SERVICE, 0, 0, , 0, 0
    ST, TERMICA UNIFORME +, 0.5, RS, DX, -1, CS, Summation, 1
NAME=SLD3, STLCOMP, SERVICE, 0, 0, , 0, 0
    ST, TERMICA UNIFORME +, 0.5, RS, DX, 1, CS, Summation, 1
NAME=SLD4, STLCOMP, SERVICE, 0, 0, , 0, 0
    ST, TERMICA UNIFORME +, 0.5, RS, DX, -1, CS, Summation, 1
NAME=ENVESLU-SLV, STLCOMP, STRENGTH, 0, 1, , 0, 0
    CBSC, SLU1, 1, CBSC, SLU2, 1, CBSC, SLU3, 1, CBSC, SLU4, 1
    CBSC, SLU5, 1, CBSC, SLU6, 1, CBSC, SLU7, 1, CBSC, SLU8, 1
    CBSC, SLU9, 1, CBSC, SLU10, 1, CBSC, SLU11, 1, CBSC, SLU12, 1
    CBSC, SLU13, 1, CBSC, SLU14, 1, CBSC, SLU15, 1, CBSC, SLU16, 1
    CBSC, SLU17, 1, CBSC, SLU18, 1, CBSC, SLU19, 1, CBSC, SLU20, 1
    CBSC, SLU21, 1, CBSC, SLU22, 1, CBSC, SLU23, 1, CBSC, SLU24, 1
    CBSC, SLV1, 1, CBSC, SLV2, 1, CBSC, SLV3, 1, CBSC, SLV4, 1
    CBSC, SLV5, 1, CBSC, SLV6, 1, CBSC, SLV7, 1, CBSC, SLV8, 1
    CBSC, SLV9, 1, CBSC, SLV10, 1, CBSC, SLV11, 1, CBSC, SLV12, 1
    CBSC, SLV13, 1, CBSC, SLV14, 1, CBSC, SLV15, 1, CBSC, SLV16, 1
    CBSC, SLV17, 1, CBSC, SLV18, 1, CBSC, SLV19, 1, CBSC, SLV20, 1
    CBSC, SLV21, 1, CBSC, SLV22, 1, CBSC, SLV23, 1, CBSC, SLV24, 1
    CBSC, SLV25, 1, CBSC, SLV26, 1, CBSC, SLV27, 1, CBSC, SLV28, 1
    CBSC, SLV29, 1, CBSC, SLV30, 1, CBSC, SLV31, 1, CBSC, SLV32, 1
    CBSC, SLV33, 1, CBSC, SLV34, 1, CBSC, SLV35, 1, CBSC, SLV36, 1
    CBSC, SLV37, 1, CBSC, SLV38, 1, CBSC, SLV39, 1, CBSC, SLV40, 1
    CBSC, SLV41, 1, CBSC, SLV42, 1, CBSC, SLV43, 1, CBSC, SLV44, 1
    CBSC, SLV45, 1, CBSC, SLV46, 1, CBSC, SLV47, 1, CBSC, SLV48, 1
    CBSC, SLV49, 1, CBSC, SLV50, 1, CBSC, SLV51, 1, CBSC, SLV52, 1
    CBSC, SLV53, 1, CBSC, SLV54, 1, CBSC, SLV55, 1, CBSC, SLV56, 1
NAME=ENVE-RARA, STLCOMP, SERVICE, 0, 1, , 0, 0
    CBSC, RARA_1, 1, CBSC, RARA_2, 1, CBSC, RARA_3, 1, CBSC, RARA_4, 1
    CBSC, RARA_5, 1, CBSC, RARA_6, 1, CBSC, RARA_7, 1, CBSC, RARA_8, 1
    CBSC, RARA_9, 1, CBSC, RARA_10, 1, CBSC, RARA_11, 1, CBSC, RARA_12, 1
    CBSC, RARA_13, 1, CBSC, RARA_14, 1, CBSC, RARA_15, 1, CBSC, RARA_16, 1
NAME=ENVE-FREQ, STLCOMP, SERVICE, 0, 1, , 0, 0
    CBSC, FREQ_1, 1, CBSC, FREQ_2, 1, CBSC, FREQ_3, 1, CBSC, FREQ_4, 1
    CBSC, FREQ_5, 1, CBSC, FREQ_6, 1, CBSC, FREQ_7, 1, CBSC, FREQ_8, 1
    CBSC, FREQ_9, 1, CBSC, FREQ_10, 1, CBSC, FREQ_11, 1, CBSC, FREQ_12, 1
    CBSC, FREQ_13, 1, CBSC, FREQ_14, 1, CBSC, FREQ_15, 1, CBSC, FREQ_16, 1
NAME=ENVE-QP, STLCOMP, SERVICE, 0, 1, , 0, 0
    CBSC, QP_1, 1, CBSC, QP_2, 1, CBSC, QP_3, 1, CBSC, QP_4, 1
NAME=ENVE-SLD, STLCOMP, SERVICE, 0, 1, , 0, 0
    CBSC, SLD1, 1, CBSC, SLD2, 1, CBSC, SLD3, 1, CBSC, SLD4, 1
    
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*IC-COLOR ; Diagram Color for Load Case

; ANAL, LCNAME, iR1(ALL), iG1(ALL), iB1(ALL), iR2(MIN), iG2(MIN), iB2(MIN), iR3(MAX), iG2(MAX), iB2(MAX)

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CS, Dead Load, 255, 0, 128, 192, 192, 0, 255, 255, 87
CS, Erection Load 1, 255, 87, 128, 0, 128, 192, 255, 192, 160
CS, Erection Load 2, 0, 128, 255, 163, 255, 160, 192, 0, 192
CS, Erection Load 3, 0, 157, 192, 255, 87, 87, 146, 0, 255
CS, Tendon Primary, 192, 128, 0, 192, 128, 0, 0, 128, 57
CS, Tendon Secondary, 0, 128, 192, 163, 160, 255, 85, 192, 0
CS, Creep Primary, 192, 72, 0, 85, 0, 192, 255, 255, 255
CS, Creep Secondary, 210, 210, 210, 255, 0, 128, 255, 87, 128
CS, Shrinkage Primary, 255, 87, 128, 163, 255, 160, 128, 192, 0
CS, Shrinkage Secondary, 0, 128, 128, 255, 192, 160, 0, 192, 192
CS, Summation, 0, 128, 57, 192, 72, 0, 146, 0, 255
ST, PESO PROPRIO ACCIAIO, 163, 255, 160, 146, 0, 255, 255, 0, 192
ST, PESO PROPRIO SOLETTA, 255, 160, 255, 0, 192, 128, 160, 255, 255
    
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PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

ST, PERMANENTE PORTATO, 85, 192, 0, 255, 87, 87, 192, 192, 192
 ST, VENTO PONTE SCARICO, 160, 192, 255, 78, 0, 255, 0, 128, 192
 ST, VENTO PONTE CARICO, 78, 0, 255, 192, 192, 0, 192, 128, 0
 ST, TERMICA UNIFORME +, 128, 192, 0, 160, 192, 255, 78, 0, 255
 ST, TERMICA UNIFORME -, 148, 87, 255, 160, 255, 255, 0, 128, 128
 ST, TERMICA GRADIENTE +, 0, 192, 192, 255, 87, 128, 163, 160, 255
 ST, TERMICA GRADIENTE -, 255, 192, 160, 255, 192, 87, 78, 0, 255
 ST, FRENATURA, 192, 192, 0, 192, 72, 0, 160, 255, 255
 MV, LM01, 192, 128, 0, 148, 87, 255, 85, 192, 0
 MV, LM02, 255, 0, 192, 93, 255, 87, 212, 160, 255
 MV, LM03, 192, 128, 0, 148, 87, 255, 0, 128, 128
 RS, EX, 255, 128, 0, 0, 157, 192, 148, 87, 255
 RS, EY, 0, 192, 128, 255, 0, 192, 85, 192, 0
 RS, EZ, 255, 128, 0, 93, 255, 87, 192, 192, 192
 RS, DX, 163, 255, 160, 210, 210, 210, 192, 192, 0
 RS, CX, 0, 128, 128, 255, 255, 87, 0, 128, 255
 CB, SLU1, 255, 87, 87, 93, 255, 87, 0, 192, 128
 CB, SLU2, 192, 128, 0, 255, 255, 255, 160, 192, 255
 CB, SLU3, 163, 160, 255, 78, 0, 255, 255, 160, 255
 CB, SLU4, 78, 0, 255, 128, 192, 0, 163, 160, 255
 CB, SLU5, 93, 255, 87, 0, 128, 128, 255, 255, 255
 CB, SLU6, 255, 192, 87, 210, 210, 210, 163, 160, 255
 CB, SLU7, 255, 128, 0, 192, 0, 128, 255, 128, 0
 CB, SLU8, 78, 0, 255, 0, 128, 255, 210, 210, 210
 CB, SLU9, 255, 255, 255, 192, 0, 192, 0, 128, 192
 CB, SLU10, 212, 160, 255, 255, 192, 87, 0, 128, 192
 CB, SLU11, 255, 160, 255, 255, 192, 87, 255, 160, 255
 CB, SLU12, 0, 128, 192, 255, 160, 255, 0, 128, 57
 CB, SLU13, 0, 128, 57, 0, 157, 192, 0, 128, 128
 CB, SLU14, 146, 0, 255, 192, 192, 0, 160, 192, 255
 CB, SLU15, 255, 87, 128, 146, 0, 255, 85, 0, 192
 CB, SLU16, 128, 192, 0, 0, 192, 128, 0, 192, 192
 CB, SLU17, 163, 160, 255, 160, 255, 255, 160, 255, 255
 CB, SLU18, 128, 192, 0, 160, 255, 255, 78, 0, 255
 CB, SLU19, 192, 0, 192, 0, 128, 128, 192, 0, 128
 CB, SLU20, 163, 255, 160, 255, 160, 255, 0, 192, 192
 CB, SLU21, 210, 210, 210, 0, 128, 192, 85, 0, 192
 CB, SLU22, 192, 0, 192, 255, 87, 128, 212, 160, 255
 CB, SLU23, 212, 160, 255, 0, 128, 255, 148, 87, 255
 CB, SLU24, 192, 0, 192, 128, 192, 0, 192, 0, 128
 CB, SLV1, 255, 160, 255, 255, 192, 87, 0, 128, 255
 CB, SLV2, 192, 128, 0, 146, 0, 255, 85, 192, 0
 CB, SLV3, 78, 0, 255, 0, 192, 128, 160, 255, 255
 CB, SLV4, 0, 128, 57, 85, 0, 192, 192, 192, 192
 CB, SLV5, 255, 0, 192, 255, 255, 255, 0, 128, 192
 CB, SLV6, 0, 192, 128, 0, 157, 192, 148, 87, 255
 CB, SLV7, 146, 0, 255, 212, 160, 255, 212, 160, 255
 CB, SLV8, 255, 192, 87, 0, 128, 57, 192, 72, 0
 CB, SLV9, 255, 192, 87, 255, 0, 192, 93, 255, 87
 CB, SLV10, 0, 128, 57, 192, 192, 0, 192, 0, 128
 CB, SLV11, 255, 192, 87, 0, 128, 255, 85, 192, 0
 CB, SLV12, 255, 0, 192, 255, 0, 192, 255, 87, 128
 CB, SLV13, 163, 255, 160, 192, 0, 128, 255, 87, 128
 CB, SLV14, 93, 255, 87, 0, 157, 192, 148, 87, 255
 CB, SLV15, 0, 157, 192, 0, 128, 128, 0, 192, 192
 CB, SLV16, 0, 192, 128, 192, 0, 128, 255, 192, 160
 CB, SLV17, 255, 160, 255, 255, 128, 0, 0, 128, 57
 CB, SLV18, 255, 87, 87, 0, 128, 255, 192, 128, 0
 CB, SLV19, 146, 0, 255, 0, 128, 57, 0, 128, 128
 CB, SLV20, 85, 192, 0, 255, 87, 128, 255, 255, 87
 CB, SLV21, 255, 87, 128, 0, 192, 192, 0, 192, 192
 CB, SLV22, 78, 0, 255, 0, 128, 57, 255, 192, 87

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

CB, SLV23, 255, 192, 160, 163, 160, 255, 192, 128, 0
 CB, SLV24, 212, 160, 255, 192, 192, 0, 212, 160, 255
 CB, SLV25, 255, 128, 0, 255, 87, 87, 255, 160, 255
 CB, SLV26, 93, 255, 87, 0, 192, 192, 255, 87, 87
 CB, SLV27, 78, 0, 255, 255, 192, 87, 192, 192, 192
 CB, SLV28, 192, 72, 0, 255, 0, 128, 0, 192, 192
 CB, SLV29, 255, 128, 0, 0, 128, 192, 192, 192, 0
 CB, SLV30, 0, 157, 192, 85, 0, 192, 0, 128, 128
 CB, SLV31, 128, 192, 0, 255, 160, 255, 0, 192, 128
 CB, SLV32, 93, 255, 87, 160, 192, 255, 85, 0, 192
 CB, SLV33, 85, 192, 0, 85, 192, 0, 0, 157, 192
 CB, SLV34, 192, 0, 128, 255, 255, 87, 0, 128, 128
 CB, SLV35, 212, 160, 255, 192, 0, 128, 255, 192, 160
 CB, SLV36, 255, 0, 128, 192, 72, 0, 0, 192, 192
 CB, SLV37, 0, 192, 192, 255, 255, 255, 160, 255, 255
 CB, SLV38, 0, 192, 192, 192, 0, 128, 210, 210, 210
 CB, SLV39, 255, 87, 87, 255, 0, 128, 192, 0, 128
 CB, SLV40, 0, 128, 128, 255, 0, 128, 192, 0, 128
 CB, SLV41, 0, 192, 128, 255, 128, 0, 0, 128, 255
 CB, SLV42, 255, 87, 87, 0, 157, 192, 255, 192, 87
 CB, SLV43, 0, 157, 192, 163, 160, 255, 192, 0, 192
 CB, SLV44, 0, 192, 128, 192, 192, 0, 192, 192, 0
 CB, SLV45, 93, 255, 87, 85, 192, 0, 192, 192, 192
 CB, SLV46, 163, 255, 160, 85, 0, 192, 0, 192, 128
 CB, SLV47, 93, 255, 87, 0, 128, 192, 163, 255, 160
 CB, SLV48, 192, 192, 0, 0, 192, 192, 192, 0, 128
 CB, SLV49, 85, 0, 192, 192, 128, 0, 0, 157, 192
 CB, SLV50, 255, 192, 160, 192, 192, 0, 192, 0, 192
 CB, SLV51, 212, 160, 255, 163, 255, 160, 192, 72, 0
 CB, SLV52, 212, 160, 255, 0, 128, 57, 128, 192, 0
 CB, SLV53, 255, 128, 0, 192, 192, 0, 255, 255, 87
 CB, SLV54, 85, 0, 192, 192, 72, 0, 255, 192, 160
 CB, SLV55, 160, 255, 255, 0, 128, 128, 148, 87, 255
 CB, SLV56, 128, 192, 0, 0, 128, 192, 78, 0, 255
 CB, RARA_1, 85, 192, 0, 255, 87, 87, 0, 157, 192
 CB, RARA_2, 255, 160, 255, 160, 255, 255, 148, 87, 255
 CB, RARA_3, 0, 128, 255, 192, 72, 0, 163, 160, 255
 CB, RARA_4, 0, 128, 128, 210, 210, 210, 0, 128, 128
 CB, RARA_5, 210, 210, 210, 255, 0, 128, 0, 157, 192
 CB, RARA_6, 0, 128, 128, 192, 192, 0, 0, 128, 255
 CB, RARA_7, 255, 0, 128, 192, 0, 128, 255, 255, 87
 CB, RARA_8, 0, 128, 255, 192, 192, 0, 192, 192, 192
 CB, RARA_9, 0, 157, 192, 163, 255, 160, 255, 0, 192
 CB, RARA_10, 0, 157, 192, 0, 128, 192, 212, 160, 255
 CB, RARA_11, 192, 72, 0, 255, 192, 87, 192, 0, 128
 CB, RARA_12, 255, 255, 255, 192, 72, 0, 85, 192, 0
 CB, RARA_13, 192, 192, 192, 160, 192, 255, 255, 192, 160
 CB, RARA_14, 192, 0, 192, 146, 0, 255, 146, 0, 255
 CB, RARA_15, 192, 192, 0, 0, 157, 192, 0, 128, 128
 CB, RARA_16, 93, 255, 87, 85, 0, 192, 255, 255, 87
 CB, FREQ_1, 163, 160, 255, 0, 128, 57, 255, 0, 128
 CB, FREQ_2, 212, 160, 255, 192, 192, 192, 85, 0, 192
 CB, FREQ_3, 85, 192, 0, 192, 192, 0, 78, 0, 255
 CB, FREQ_4, 146, 0, 255, 0, 128, 128, 0, 128, 57
 CB, FREQ_5, 0, 128, 128, 192, 192, 192, 160, 192, 255
 CB, FREQ_6, 128, 192, 0, 255, 128, 0, 255, 192, 160
 CB, FREQ_7, 192, 0, 128, 0, 128, 192, 78, 0, 255
 CB, FREQ_8, 192, 128, 0, 192, 0, 192, 0, 192, 192
 CB, FREQ_9, 78, 0, 255, 0, 192, 128, 192, 72, 0
 CB, FREQ_10, 146, 0, 255, 210, 210, 210, 192, 0, 192
 CB, FREQ_11, 210, 210, 210, 146, 0, 255, 255, 255, 255
 CB, FREQ_12, 210, 210, 210, 0, 192, 192, 85, 192, 0

MIDAS


PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

CB, FREQ_13, 0, 128, 128, 210, 210, 210, 255, 192, 160
 CB, FREQ_14, 160, 255, 255, 255, 192, 160, 210, 210, 210
 CB, FREQ_15, 210, 210, 210, 93, 255, 87, 255, 0, 192
 CB, FREQ_16, 0, 128, 57, 148, 87, 255, 192, 72, 0
 CB, QP_1, 148, 87, 255, 255, 128, 0, 0, 128, 128
 CB, QP_2, 255, 128, 0, 0, 128, 255, 0, 157, 192
 CB, QP_3, 128, 192, 0, 192, 192, 192, 128, 0
 CB, QP_4, 163, 255, 160, 255, 255, 87, 192, 192, 0
 CB, SLD1, 192, 128, 0, 160, 255, 255, 212, 160, 255
 CB, SLD2, 255, 0, 128, 0, 192, 128, 0, 128, 57
 CB, SLD3, 255, 160, 255, 192, 0, 128, 192, 128, 0
 CB, SLD4, 192, 0, 192, 255, 160, 255, 85, 0, 192
 CB, ENVESLU-SLV, 0, 128, 57, 128, 192, 0, 192, 0, 128
 CB, ENVE-RARA, 85, 0, 192, 128, 192, 0, 148, 87, 255
 CB, ENVE-FREQ, 192, 0, 192, 128, 192, 0, 255, 0, 192
 CB, ENVE-QP, 255, 0, 128, 0, 128, 192, 255, 160, 255
 CB, ENVE-SLD, 255, 128, 0, 192, 0, 128, 192, 128, 0
 CBS, SLU1, 255, 192, 160, 192, 72, 0, 0, 128, 192
 CBS, SLU2, 0, 192, 192, 93, 255, 87, 163, 160, 255
 CBS, SLU3, 148, 87, 255, 0, 192, 192, 255, 0, 128
 CBS, SLU4, 0, 157, 192, 192, 192, 192, 160, 255, 255
 CBS, SLU5, 0, 192, 192, 255, 0, 128, 255, 87, 87
 CBS, SLU6, 192, 72, 0, 163, 160, 255, 255, 87, 87
 CBS, SLU7, 255, 0, 128, 255, 255, 87, 192, 192, 192
 CBS, SLU8, 0, 128, 128, 192, 72, 0, 160, 255, 255
 CBS, SLU9, 0, 128, 192, 255, 0, 192, 255, 160, 255
 CBS, SLU10, 255, 192, 87, 160, 192, 255, 255, 192, 87
 CBS, SLU11, 192, 0, 128, 0, 192, 128, 192, 0, 192
 CBS, SLU12, 0, 128, 255, 255, 160, 255, 85, 0, 192
 CBS, SLU13, 255, 128, 0, 192, 192, 0, 163, 160, 255
 CBS, SLU14, 85, 0, 192, 255, 0, 192, 192, 192, 192
 CBS, SLU15, 163, 160, 255, 255, 0, 192, 0, 128, 57
 CBS, SLU16, 255, 255, 255, 255, 0, 192, 160, 192, 255
 CBS, SLU17, 255, 192, 87, 0, 157, 192, 146, 0, 255
 CBS, SLU18, 160, 255, 255, 255, 87, 128, 146, 0, 255
 CBS, SLU19, 85, 192, 0, 255, 87, 87, 192, 128, 0
 CBS, SLU20, 210, 210, 210, 255, 0, 128, 148, 87, 255
 CBS, SLU21, 146, 0, 255, 255, 192, 160, 255, 0, 192
 CBS, SLU22, 255, 0, 192, 255, 128, 0, 128, 192, 0
 CBS, SLU23, 255, 87, 128, 255, 87, 87, 146, 0, 255
 CBS, SLU24, 255, 192, 160, 192, 72, 0, 255, 192, 160
 CBS, SLV1, 255, 128, 0, 148, 87, 255, 148, 87, 255
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 CBS, SLV7, 0, 128, 57, 255, 128, 0, 160, 192, 255
 CBS, SLV8, 255, 87, 128, 192, 0, 128, 85, 192, 0
 CBS, SLV9, 212, 160, 255, 0, 192, 128, 78, 0, 255
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 CBS, SLV11, 0, 128, 57, 85, 192, 0, 192, 0, 128
 CBS, SLV12, 0, 128, 192, 255, 128, 0, 160, 192, 255
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 CBS, SLV15, 255, 128, 0, 192, 0, 128, 192, 128, 0
 CBS, SLV16, 128, 192, 0, 255, 192, 87, 0, 128, 57
 CBS, SLV17, 0, 157, 192, 85, 0, 192, 160, 192, 255
 CBS, SLV18, 192, 192, 192, 163, 255, 160, 93, 255, 87
 CBS, SLV19, 192, 0, 128, 93, 255, 87, 255, 192, 160
 CBS, SLV20, 0, 128, 192, 212, 160, 255, 160, 192, 255
 CBS, SLV21, 0, 128, 57, 212, 160, 255, 160, 255, 255

MIDAS


PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

CBS, SLV22, 85, 0, 192, 192, 192, 192, 255, 192, 87
 CBS, SLV23, 255, 255, 87, 93, 255, 87, 0, 128, 192
 CBS, SLV24, 255, 192, 87, 255, 0, 192, 192, 192, 192
 CBS, SLV25, 192, 128, 0, 0, 157, 192, 128, 192, 0
 CBS, SLV26, 255, 0, 192, 78, 0, 255, 163, 255, 160
 CBS, SLV27, 255, 87, 128, 0, 128, 57, 0, 192, 128
 CBS, SLV28, 255, 192, 87, 192, 192, 0, 163, 255, 160
 CBS, SLV29, 255, 255, 87, 255, 255, 255, 255, 192, 87
 CBS, SLV30, 0, 128, 192, 0, 157, 192, 255, 0, 192
 CBS, SLV31, 0, 128, 192, 0, 128, 128, 160, 192, 255
 CBS, SLV32, 0, 128, 128, 0, 192, 192, 93, 255, 87
 CBS, SLV33, 160, 192, 255, 0, 192, 192, 85, 192, 0
 CBS, SLV34, 212, 160, 255, 210, 210, 210, 148, 87, 255
 CBS, SLV35, 85, 192, 0, 146, 0, 255, 0, 157, 192
 CBS, SLV36, 146, 0, 255, 255, 87, 128, 255, 87, 128
 CBS, SLV37, 163, 160, 255, 146, 0, 255, 255, 87, 87
 CBS, SLV38, 160, 255, 255, 0, 192, 128, 0, 192, 192
 CBS, SLV39, 212, 160, 255, 255, 0, 192, 146, 0, 255
 CBS, SLV40, 210, 210, 210, 160, 255, 255, 255, 87, 128
 CBS, SLV41, 0, 192, 192, 255, 192, 160, 255, 160, 255
 CBS, SLV42, 146, 0, 255, 255, 192, 87, 78, 0, 255
 CBS, SLV43, 146, 0, 255, 192, 0, 192, 255, 87, 128
 CBS, SLV44, 255, 87, 87, 146, 0, 255, 146, 0, 255
 CBS, SLV45, 93, 255, 87, 0, 128, 128, 128, 192, 0
 CBS, SLV46, 255, 255, 255, 0, 128, 57, 160, 255, 255
 CBS, SLV47, 192, 72, 0, 0, 192, 192, 0, 128, 128
 CBS, SLV48, 163, 255, 160, 255, 255, 255, 192, 192, 192
 CBS, SLV49, 148, 87, 255, 210, 210, 210, 0, 128, 57
 CBS, SLV50, 160, 192, 255, 255, 192, 87, 192, 192, 0
 CBS, SLV51, 163, 160, 255, 192, 0, 128, 85, 0, 192
 CBS, SLV52, 255, 0, 128, 192, 192, 192, 0, 192, 128
 CBS, SLV53, 0, 192, 128, 160, 255, 255, 192, 0, 128
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 CBS, SLV55, 192, 0, 192, 163, 255, 160, 0, 128, 57
 CBS, SLV56, 163, 160, 255, 0, 192, 128, 160, 255, 255
 CBS, RARA_1, 255, 87, 128, 128, 192, 0, 148, 87, 255
 CBS, RARA_2, 160, 255, 255, 0, 128, 255, 0, 192, 192
 CBS, RARA_3, 192, 0, 192, 255, 87, 128, 212, 160, 255
 CBS, RARA_4, 0, 128, 255, 192, 0, 192, 0, 128, 255
 CBS, RARA_5, 255, 160, 255, 0, 157, 192, 160, 255, 255
 CBS, RARA_6, 255, 192, 160, 163, 255, 160, 255, 0, 128
 CBS, RARA_7, 0, 128, 192, 192, 128, 0, 255, 160, 255
 CBS, RARA_8, 163, 255, 160, 163, 160, 255, 163, 255, 160
 CBS, RARA_9, 192, 0, 128, 0, 128, 255, 163, 255, 160
 CBS, RARA_10, 163, 255, 160, 255, 87, 128, 148, 87, 255
 CBS, RARA_11, 0, 192, 192, 192, 72, 0, 128, 192, 0
 CBS, RARA_12, 255, 0, 192, 255, 128, 0, 163, 160, 255
 CBS, RARA_13, 0, 192, 192, 0, 128, 255, 192, 192, 0
 CBS, RARA_14, 192, 192, 192, 0, 192, 192, 0, 128, 255
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 CBS, RARA_16, 128, 192, 0, 212, 160, 255, 0, 128, 255
 CBS, FREQ_1, 148, 87, 255, 255, 192, 87, 78, 0, 255
 CBS, FREQ_2, 255, 0, 192, 0, 192, 128, 255, 255, 255
 CBS, FREQ_3, 0, 192, 192, 255, 87, 128, 160, 192, 255
 CBS, FREQ_4, 255, 128, 0, 255, 0, 128, 163, 160, 255
 CBS, FREQ_5, 192, 192, 192, 0, 128, 128, 255, 87, 128
 CBS, FREQ_6, 160, 192, 255, 255, 192, 160, 163, 255, 160
 CBS, FREQ_7, 192, 0, 128, 163, 255, 160, 85, 192, 0
 CBS, FREQ_8, 192, 72, 0, 255, 192, 160, 0, 128, 57
 CBS, FREQ_9, 192, 0, 192, 0, 128, 128, 85, 0, 192
 CBS, FREQ_10, 255, 128, 0, 255, 192, 160, 0, 192, 192
 CBS, FREQ_11, 255, 87, 87, 255, 160, 255, 0, 128, 255


MIDAS

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

CBS, FREQ_12, 255, 0, 128, 255, 0, 128, 255, 87, 87
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 CBS, FREQ_15, 0, 128, 255, 192, 0, 192, 0, 192, 192
 CBS, FREQ_16, 255, 192, 87, 255, 87, 87, 85, 192, 0
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 CBS, QP_2, 160, 255, 255, 255, 255, 255, 0, 192, 192
 CBS, QP_3, 0, 128, 57, 212, 160, 255, 255, 160, 255
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 CBS, SLD2, 0, 128, 57, 255, 255, 87, 255, 192, 160
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 CBS, SLD4, 255, 255, 255, 146, 0, 255, 93, 255, 87
 CBSC, SLU1, 192, 0, 128, 78, 0, 255, 255, 192, 160
 CBSC, SLU2, 160, 192, 255, 192, 192, 192, 0, 128, 255
 CBSC, SLU3, 0, 128, 255, 160, 192, 255, 160, 255, 255
 CBSC, SLU4, 192, 192, 192, 192, 192, 192, 85, 0, 192
 CBSC, SLU5, 192, 72, 0, 0, 128, 192, 146, 0, 255
 CBSC, SLU6, 255, 255, 87, 192, 192, 192, 78, 0, 255
 CBSC, SLU7, 163, 255, 160, 255, 192, 160, 255, 255, 255
 CBSC, SLU8, 163, 255, 160, 0, 128, 192, 255, 192, 87
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 CBSC, SLU12, 0, 192, 192, 0, 128, 255, 128, 192, 0
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 CBSC, SLV25, 255, 0, 128, 192, 192, 0, 212, 160, 255

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

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 CBSC, SLV27, 160, 192, 255, 192, 0, 128, 85, 192, 0
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 CBSC, SLV43, 255, 87, 87, 255, 87, 128, 255, 192, 87
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 CBSC, FREQ_15, 160, 192, 255, 0, 128, 57, 0, 128, 128

MIDAS

PROJECT TITLE :


	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

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ELEM=121, YES
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ELEM=167, YES
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ELEM=170, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=173, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=176, YES

```


PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=179, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
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 ELEM=185, YES
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 ELEM=188, YES
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 ELEM=191, YES
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 ELEM=194, YES
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 ELEM=197, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=200, YES
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 ELEM=203, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=210, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=213, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=216, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=219, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=222, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=225, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=228, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=231, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=234, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=237, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=240, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=243, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=246, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=249, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=252, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=255, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=258, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=261, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=264, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=267, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=274, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=277, YES


MIDAS

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2


I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=280, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=283, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=286, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=289, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=292, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=295, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=298, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=301, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=304, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=307, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=310, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=313, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=316, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=319, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=322, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=325, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=328, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=331, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=338, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=341, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=344, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=347, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=350, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=353, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=356, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=359, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=362, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=365, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=368, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=371, YES
I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=374, YES

PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2

I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=377, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=380, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=383, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=386, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=389, YES
 I, YES, 4, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=391, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=392, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=393, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=394, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=395, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=396, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=397, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=398, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=399, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=400, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=401, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=402, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=403, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=404, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=405, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=406, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=407, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=408, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=409, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=410, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=411, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=412, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=413, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=414, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=415, YES
 I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
 ELEM=416, YES

PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

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I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=417, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=418, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=419, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=420, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=421, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=422, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=423, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=424, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=425, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=426, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=427, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=428, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=429, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=430, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=431, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=432, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=433, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=434, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=435, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=436, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=437, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=438, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=439, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3
ELEM=440, YES
I, YES, 2, 440000, 0.02, 0.15, 0.3, 0.3

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*DGN-POSITION ; Design Position of Element
; ELEM_LIST, iPOS
121 130 356 359, 2

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*DGN-DESIGN OUTPUT ; Composite Position for Design Output
; ELEM_LIST, iPOS
121 130 356 359, 2

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*DGN-PLATEGIRDER ; Composite Plate Girder Design
; idGNCODE, bSERV2, bSERV2, bSTR2, bSTR2, bSTR3, bSTR4, bSTR5, bSTR6 \
; GAMMA_C, GAMMA_S, GAMMA_M0, GAMMA_M2, GAMMA_V, GAMMA_Ff, GAMMA_Mf, GAMMA_Mfs, DL
; GAMMA_M_ser, K1, K2, K3, KS, Phi_y, Phi_u, Phi_c, Phi_f, Phi_v, Phi_se, Phi_b, dCSLc

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PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

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bFactor0, dCSLcbFactor1, dCSLcbFactor2, dCSLcbFactor3, dCSLcbFactor4
; nGirderType, nForceType, bDesignParameter0, bDesignParameter1, bDesignParameter2, bD
esignParameter3, bDesignParameter4, bDesignParameter5, bDesignParameter6, nBridgeType,
bAppendix6
; bDistortion, b1p3RhMy, bPBTFA4SH
; Phi_S_Tension, Phi_S_Torsion, bCHK_CS
1901, YES, YES, YES, YES, NO, NO, YES, YES, \
1.5, 1.15, 1, 1.1, 1.25, 1, 1, 1, 100, 1, 0.6, 0.45, 0.8, 0.75, 0.95, 0.8, 0.9, 1,
1, 0.85, 0.75, 1.25, 1.25, 1.25, 1.25, 1.25, 1, 0, YES, YES, YES, YES, YES, YES, YES,
0, YES, YES, YES, YES, 0.95, 0.9, NO

*SECTION MANAGER-REBAR DESIGN ; Section Manager - Reinforcement Design
; SECT = NO, bMBARSAMEJ, bSBARSAMEJ, bCRACK, dConcFact ; lin
e 1
; MBARISIZE, MBARJSIZE ; lin
e 2
; ..... ;

; LOOP UTIL (MBARISIZE, MBARJSIZE) - LONGITUDINAL ;
; TYPE, REF.Y, REF.Z, NUMorCTC, NUM, CTC, EDGEBAR, BAR, STANDREF, PART ; lin
e n
; INPUTMETHOD, REFY_A, REFZ_A, dREFY_A, dREFZ_A, SPACING ; lin
e n
; START(Y), START(Z), CENTER(Y), CENTER(Z), END(Y), END(Z), RADIUS ; lin
e n
; PASSAGESIZE, PASSAGESIZE(Y), PASSAGESIZE(Z)..... ; lin
e n
; ..... ;


; LOOP I, J - SHEAR ;

; [DR] : bDR, SPITCH, STHETA, SAW ; lin
e n
; [SBW] : bSBW, TPITCH, TTHETA, TAP, TPS, SRF ; lin
e n
; [TR] : bTR, LPITCH, LAWT, LALT ; lin
e n
; [SR] : bSTIR, PITCH, AW ; lin
e n
; [ES] : bES, CT, bIFC ; lin
e n
; ..... ;

SECT=1, YES, YES, NO, 1
2, 2
1, 0, 0, 0, 26, 0, YES, P16, 0, 2, 1, 0, 0, 0, 0, 0
-1.3, 0.8, 0, 0, 1.3, 0.8, 0
1, -1.3, 0.8
1, 0, 0, 0, 26, 0, YES, P16, 0, 2, 1, 0, 0, 0, 0, 0
-1.3, 0.57352, 0, 0, 1.3, 0.57352, 0
1, -1.3, 0.57352
1, 0, 0, 0, 26, 0, YES, P16, 0, 2, 1, 0, 0, 0, 0, 0
-1.3, 0.8, 0, 0, 1.3, 0.8, 0
1, -1.3, 0.8
1, 0, 0, 0, 26, 0, YES, P16, 0, 2, 1, 0, 0, 0, 0, 0
-1.3, 0.57352, 0, 0, 1.3, 0.57352, 0
1, -1.3, 0.57352
NO, 0, 0, 0, NO, 0, 90, 0, 0, 1, NO, 0, 0, 0, NO, 0, 0, NO, 0, NO
NO, 0, 0, 0, NO, 0, 90, 0, 0, 1, NO, 0, 0, 0, NO, 0, 0, NO, 0, NO
SECT=3, YES, YES, NO, 1
2, 2

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PROJECT TITLE :

	Company	Client
	Author	File Name
		L1-CV01_REVISIONE_2


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1, 0, 0, 0, 25, 0, YES, P20, 0, 2, 1, 0, 0, 0, 0, 0
-1.13, 0.18, 0, 0, 1.13, 0.18, 0
1, -1.13, 0.20634
1, 0, 0, 0, 25, 0, YES, P20, 0, 2, 1, 0, 0, 0, 0
-1.13, -0.02, 0, 0, 1.13, -0.02, 0
1, -1.13, -0.04366
1, 0, 0, 0, 25, 0, YES, P20, 0, 2, 1, 0, 0, 0, 0
-1.13, 0.18, 0, 0, 1.13, 0.18, 0
1, -1.13, 0.20634
1, 0, 0, 0, 25, 0, YES, P20, 0, 2, 1, 0, 0, 0, 0
-1.13, -0.02, 0, 0, 1.13, -0.02, 0
1, -1.13, -0.04366
NO, 0, 0, 0, NO, 0, 90, 0, 0, 1, NO, 0, 0, 0, NO, 0, 0, NO, 0, NO
NO, 0, 0, 0, NO, 0, 90, 0, 0, 1, NO, 0, 0, 0, NO, 0, 0, NO, 0, NO
  SECT=7, YES, YES, NO, 1
2, 2
1, 0, 0, 0, 25, 0, YES, P20, 0, 2, 1, 0, 0, 0, 0, 0.1
-1.25, 0.64, 0, 0, 1.25, 0.64, 0
1, -1.13, -0.04366
1, 0, 0, 0, 25, 0, YES, P20, 0, 2, 1, 0, 0, 0, 0, 0.1
-1.25, 0.44, 0, 0, 1.25, 0.44, 0
1, -1.13, -0.04366
1, 0, 0, 0, 25, 0, YES, P20, 0, 2, 1, 0, 0, 0, 0, 0.1
-1.25, 0.64, 0, 0, 1.25, 0.64, 0
1, -1.13, -0.04366
1, 0, 0, 0, 25, 0, YES, P20, 0, 2, 1, 0, 0, 0, 0, 0.1
-1.25, 0.44, 0, 0, 1.25, 0.44, 0
1, -1.13, -0.04366
NO, 0, 0, 0, NO, 0, 90, 0, 0, 1, NO, 0, 0, 0, NO, 0, 0, NO, 0, NO
NO, 0, 0, 0, NO, 0, 90, 0, 0, 1, NO, 0, 0, 0, NO, 0, 0, NO, 0, NO
  SECT=8, YES, YES, NO, 1
2, 2
1, 0, 0, 0, 25, 0, YES, P20, 0, 2, 1, 0, 0, 0, 0, 0.1
-1.25, 0.7, 0, 0, 1.25, 0.7, 0
1, -1.13, -0.04366
1, 0, 0, 0, 25, 0, YES, P20, 0, 2, 1, 0, 0, 0, 0, 0.1
-1.25, 0.51, 0, 0, 1.25, 0.51, 0
1, -1.13, -0.04366
1, 0, 0, 0, 25, 0, YES, P20, 0, 2, 1, 0, 0, 0, 0, 0.1
-1.25, 0.7, 0, 0, 1.25, 0.7, 0
1, -1.13, -0.04366
1, 0, 0, 0, 25, 0, YES, P20, 0, 2, 1, 0, 0, 0, 0, 0.1
-1.25, 0.51, 0, 0, 1.25, 0.51, 0
1, -1.13, -0.04366
NO, 0, 0, 0, NO, 0, 90, 0, 0, 1, NO, 0, 0, 0, NO, 0, 0, NO, 0, NO
NO, 0, 0, 0, NO, 0, 90, 0, 0, 1, NO, 0, 0, 0, NO, 0, 0, NO, 0, NO
  SECT=9, YES, YES, NO, 1
2, 2
1, 0, 0, 0, 25, 0, YES, P20, 0, 2, 0, 0, 0, 0, 0, 0
-1.25, 0.72, 0, 0, 1.25, 0.72, 0
1, -1.13, -0.04366
1, 0, 0, 0, 25, 0, YES, P20, 0, 2, 1, 0, 0, 0, 0, 0.1
-1.25, 0.54, 0, 0, 1.25, 0.54, 0
1, -1.13, -0.04366
1, 0, 0, 0, 25, 0, YES, P20, 0, 2, 0, 0, 0, 0, 0, 0
-1.25, 0.72, 0, 0, 1.25, 0.72, 0
1, -1.13, -0.04366
1, 0, 0, 0, 25, 0, YES, P20, 0, 2, 1, 0, 0, 0, 0, 0.1
-1.25, 0.54, 0, 0, 1.25, 0.54, 0
1, -1.13, -0.04366
NO, 0, 0, 0, NO, 0, 90, 0, 0, 1, NO, 0, 0, 0, NO, 0, 0, NO, 0, NO
NO, 0, 0, 0, NO, 0, 90, 0, 0, 1, NO, 0, 0, 0, NO, 0, 0, NO, 0, NO

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MIDAS

PROJECT TITLE :

	Company		Client	
	Author		File Name	L1-CV01_REVISIONE_2

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*LINK-KEY      ; Link Key
; iKEY, TYPE, LINK KEY
249, RIGD, 6
250, RIGD, 8
251, RIGD, 10
252, RIGD, 12
253, RIGD, 14
254, RIGD, 16
255, RIGD, 18
256, RIGD, 20
257, RIGD, 22
258, RIGD, 33
259, RIGD, 24
260, RIGD, 25
261, RIGD, 26
262, RIGD, 27
263, RIGD, 28
264, RIGD, 29
265, RIGD, 30
266, RIGD, 31
267, RIGD, 32
268, RIGD, 4
269, RIGD, 7
270, RIGD, 9
271, RIGD, 11
272, RIGD, 13
273, RIGD, 15
274, RIGD, 17
275, RIGD, 19
276, RIGD, 21
277, RIGD, 23
278, RIGD, 2
279, RIGD, 1
280, RIGD, 3
281, RIGD, 5
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*ENDDATA