Centrale di San Filippo del Mela

Progetto definitivo per l'installazione di un nuovo ciclo combinato a gas

Note di calcolo – Pipe rack

APPLICA

A2A/DGE/BGT/GEN/ING

LISTA DI DISTRIBUZIONE

A2A/DGE/BGT/GEN/ING
AEF/AMD/ISF

ORDINE DEGLI INGEGNERI DELLA PROVINCIA DI MILANO
DOTT. ING. COLETTI PAOLO ALBERTO
Sez. A Settori:
a) Civile e ambientale
b) Industriale
c) dell'Informazione
n° A 30355

ORDINE DEGLI INGEGNERI DELLA PROVINCIA DI MILANO
DOTT. ING. MORGERA DANIELE
Sez. A Settori:
a) civile e ambientale
b) industriale
c) dell'informazione
n° A 30863

a2a energiefuture

LOGO E CODIFICA DEL FORNITORE

TECHINT Engineering & Construction

0421-TITA-C-CA-000-007

REV	DATA	DESCRIZIONE	REDAZIONE	VERIFICA	APPROVAZIONE
EMISSIONE					
1	10/12/2019	FU = Per Uso	C. Bettoni	D. Morgera	P. Coletti
0	27/11/2019	FA = per approvazione	L. Agostino	C. Bettoni	V. Cusumano

- Il documento approvato e firmato in originale è depositato presso l'archivio tecnico della S.O.-

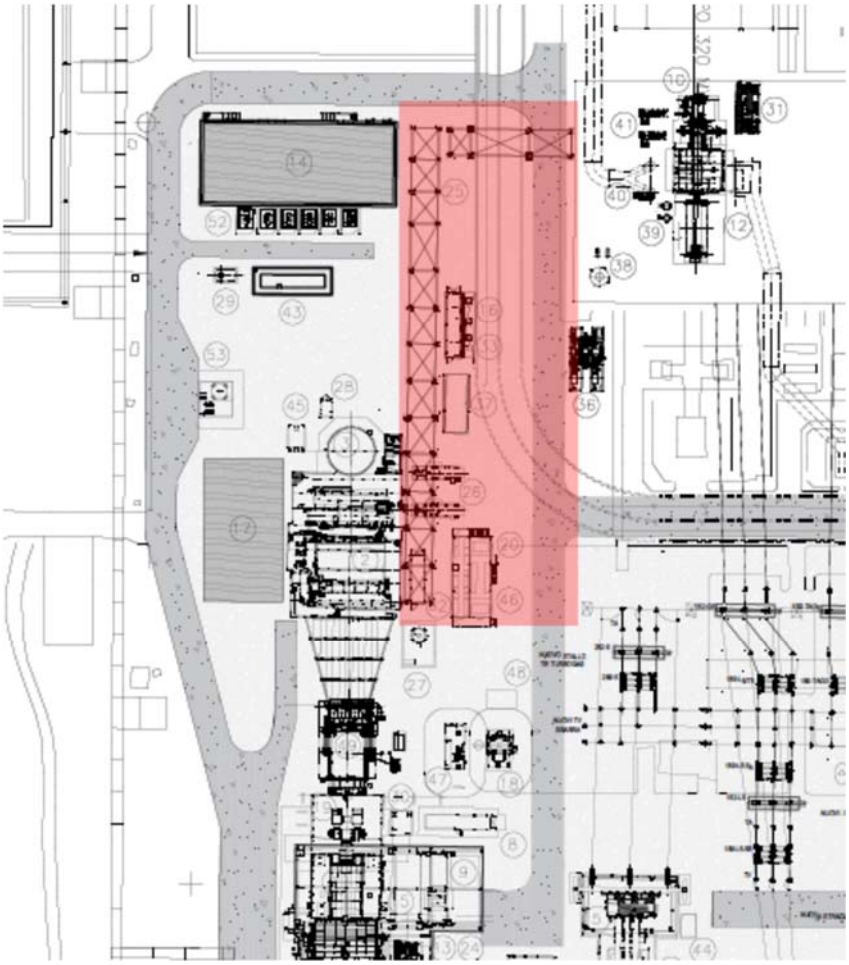
INDICE

1 SCOPO DEL DOCUMENTO

L'ambito di applicazione del presente documento include l'analisi strutturale e la progettazione delle seguenti strutture in acciaio:

- → Pipe Rack da picchetto PR1 a PR14;
- → Pipe Rack da picchetto PRC a PRF.

Si trovano nelle seguenti aree:



2 DOCUMENTI DI RIFERIMENTO

2.1 DOCUMENTI DI RIFERIMENTO

NORMATIVE

1 Decreto ministeriale 17 gennaio 2018 - AGGIORNAMENTO "Norme tecniche per le costruzioni".

2 Circolare 21 gennaio 2019, nr. 7 - "Istruzioni per l'applicazione dell'aggiornamento delle Norme tecniche per le costruzioni".

3 UNI EN 1992-1: Eurocodice 2 – Progettazione delle strutture di calcestruzzo - Parte 1-1: Regole generali e regole per gli edifici

RELAZIONI E SPECIFICHE TECNICHE

4	SFP-RTC-10004-CCGT-00	Relazione Sismica
5	SFP-RTC-10005-CCGT-00	Relazione Geotecnica

2.2 SOFTWARES

→ STAAD Pro

3 CARATTERISTICHE DEI MATERIALI

3.1 CALCESTRUZZO

Calcestruzzo gettato in opera per fondazione – C35/45

• resistenza caratteristica cilindrica	f_{ck} =	35	MPa
• resistenza caratteristica cubica	R_{ck} =	45	MPa
• resistenza media a compressione	f_{cm} =	43	MPa
• resistenza media a trazione	f_{ctm} =	3.20	MPa
• modulo di elasticità secante	E_{cm} =	34077	MPa

3.2 ACCIAIO D'ARMATURA

Acciaio per armatura strutture in c.a.

Barre ad aderenza migliorata, saldabile, tipo B450C dotato delle seguenti caratteristiche meccaniche:

- modulo elastico E_s = 210000 MPa
- Tensione caratteristica di snervamento f_{yk} = 450 MPa
- Tensione caratteristica di rottura f_{tk} = 540 MPa

3.3 ACCIAIO STRUTTURALE

S275

→ f_{yk} = 275 N/mm^2
→ f_{tk} = 370-530 N/mm^2
→ $E_s = 2.1\times10^5$ N/mm^2

3.4 PARAMETRI AZIONE DELLA NEVE

- q_{sk} = 0.6KN/m^2 (si veda Fig. 3.4.1 di [1])
- C_e = 1
- C_t = 1
- μ_1 = 0.8
- q_s = 0.48 = KN/m^2

3.5 PARAMETRI AZIONE DEL VENTO

Considerando zona 4 (si veda Tab. 3.3.I di [1]):
- $v_{b,0}$ = 28 m/s
- a_0 = 500 m
- ks = 0.36

Essendo il sito situato a circa 89 m slm, la velocità base di riferimento sarà pari a:
$v_b = c_a\ v_{b,0}$ = 1 * 28 m/s= 28m/s.
La velocità di riferimento sarà pari a: vr = $v_b\ c_r$ = 28 * 1= 28m/s.

Considerando una categoria di esposizione II (si veda Tab. 3.3.II di [1]):
- kr = 0.19
- z0 = 0.05 m
- zmin = 4 m

Per tanto, la pressione del vento sarà data dalla seguente espressione:

$$p = q_r\ c_e\ c_p\ c_d$$

dove:
- qr = 490 N/m2
- Cd = 1
- Ct = 1
- Ce (z): coefficiente di esposizione.
- Cp: coeff. di pressione (si veda [2])

3.6 PARAMETRI AZIONE SISMICA

- si veda [4]:

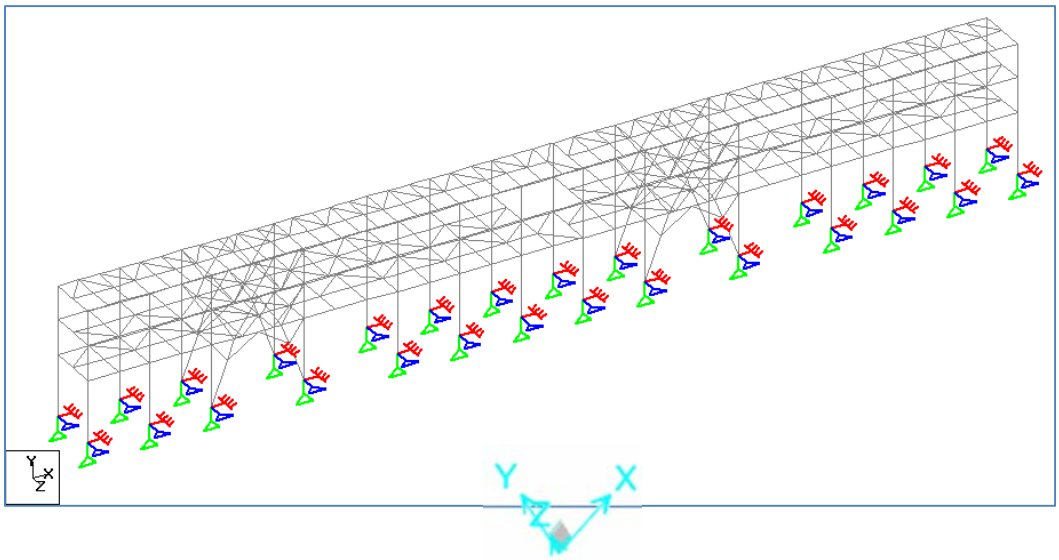
		ag (g)	F0	Tc* (sec)
SLO	30	0.053	2.415	0.277
SLD	50	0.066	2.423	0.301
SLV	476	0.159	2.527	0.374
SLC	976	0.201	2.567	0.404

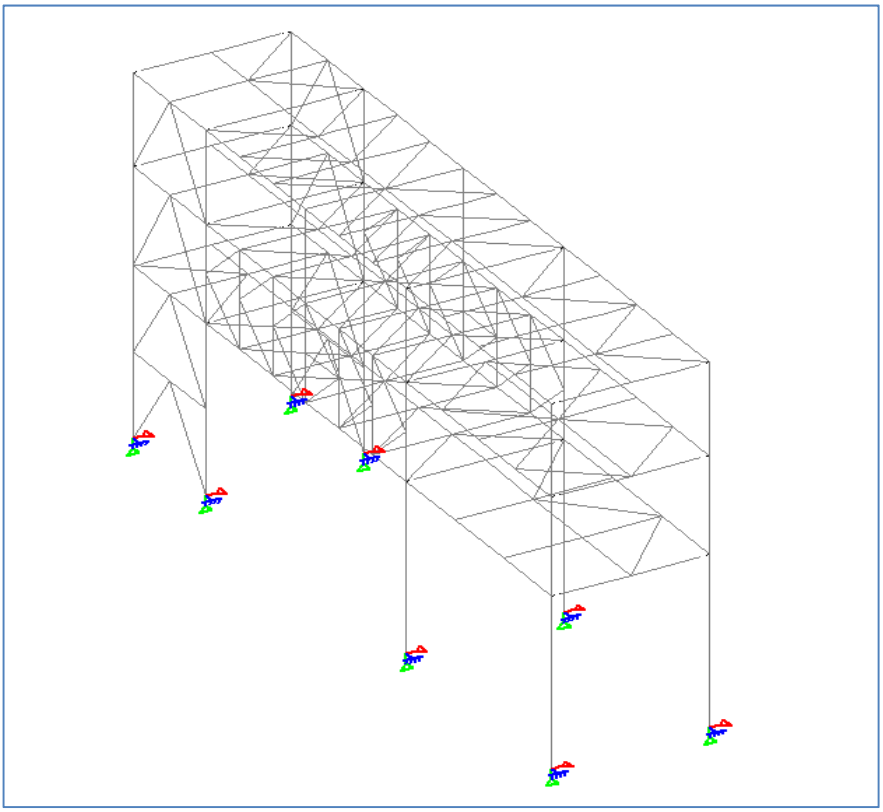
- **Categoria di sottosuolo C**: Depositi di terreni a grana grossa mediamente addensati o terreni a grana fina mediamente consistenti, a cui corrisponde un coefficiente d'amplificazione stratigrafica (S_S) pari a 1.50
- **Categoria topografica T1:** superficie pianeggiante, a cui corrisponde un coefficiente di amplificazione topografica (S_T) pari a 1.00.

4 PIPE RACK

4.1 MODELLO STRUTTURALE

Il piperack è una struttura in acciaio a L larga 5 m. Esso è costituito da tre livelli e l'ultimo di questi supporta le passerelle per i cavi elettrici. Lungo la direzione nord-sud, la lunghezza totale è di 90m con tredici campate e con un giunto di dilatazione in corrispondenza del metro 48 e lungo la direzione est-ovest, la lunghezza totale è di 23m con tre campate.





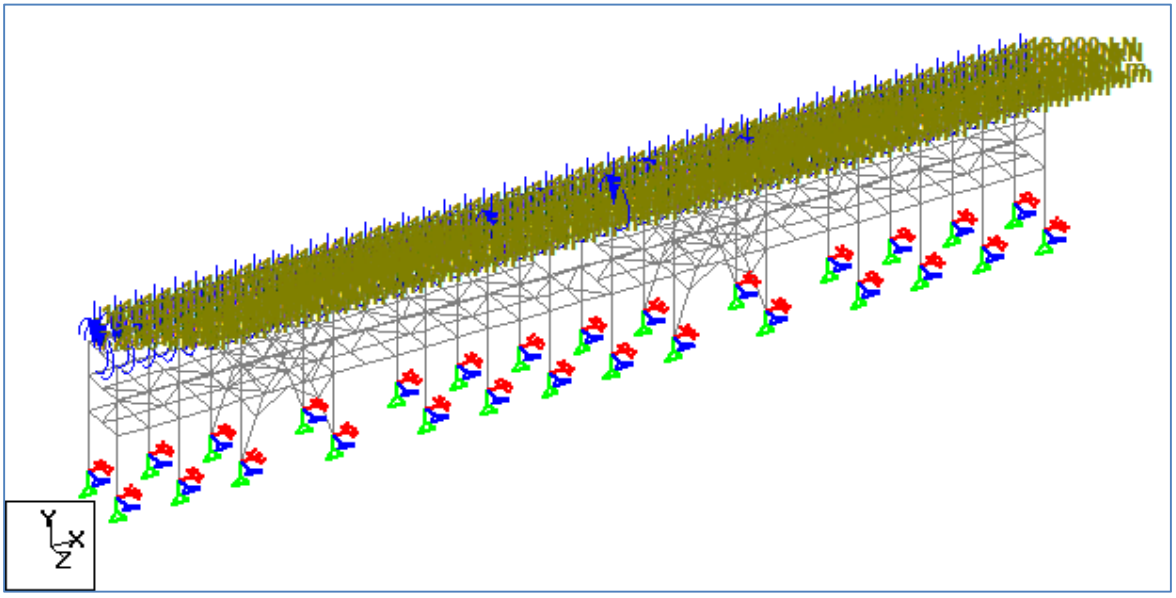
VISTA IN 3D

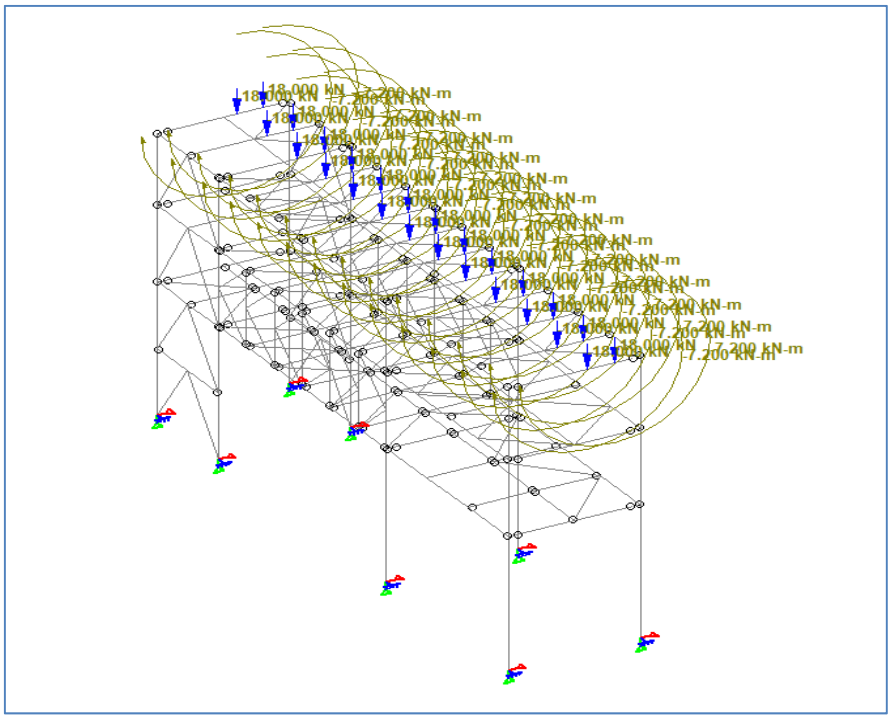
4.2 CARICHI CARATTERISTICI

4.2.1 PESO PROPRIO (DL)

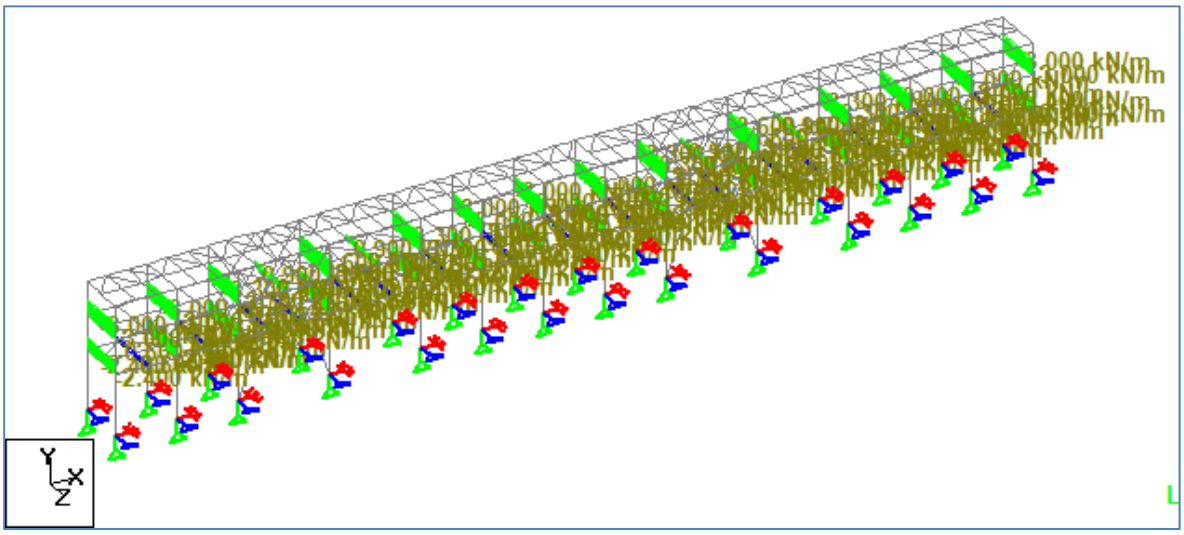
Include:

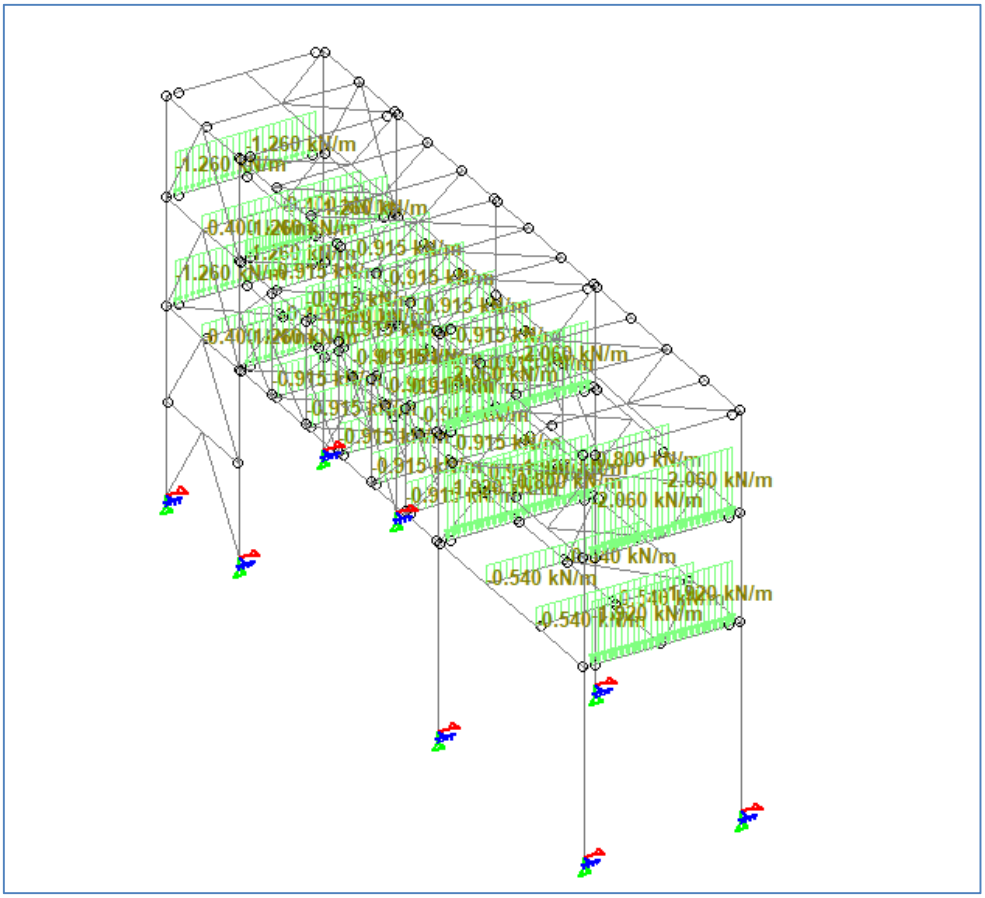
- → Il peso della struttura stessa
- → Il peso del grigliato: si ipotizza essere pari a 50kg/m²
- → Il peso della passerella porta-cavi si ipotizza essere pari a 1,5kN/m per livello.





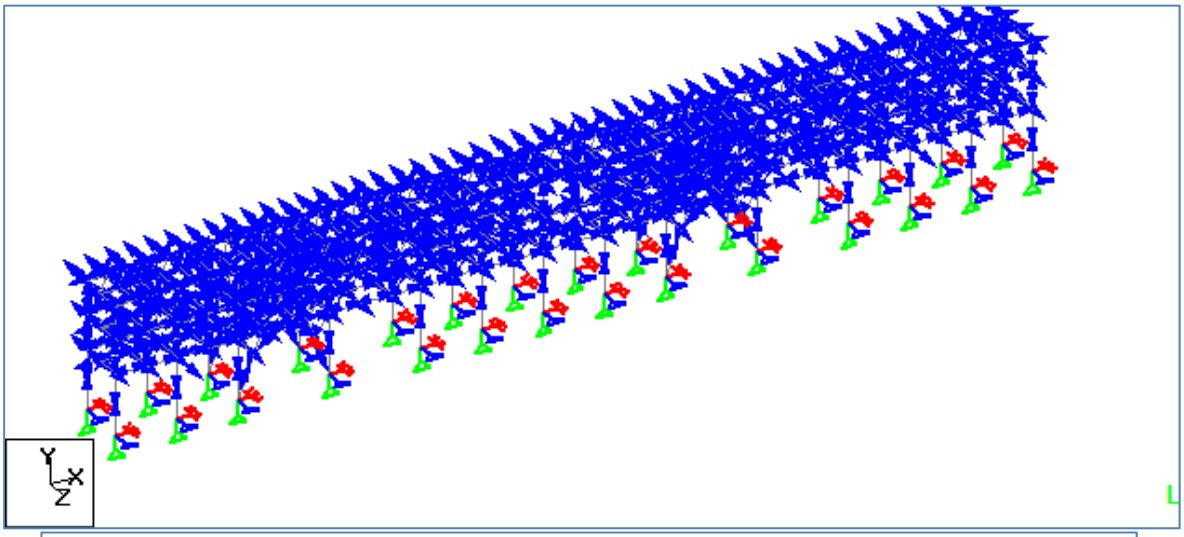
4.2.2 CARICO DELLA NEVE (SL)

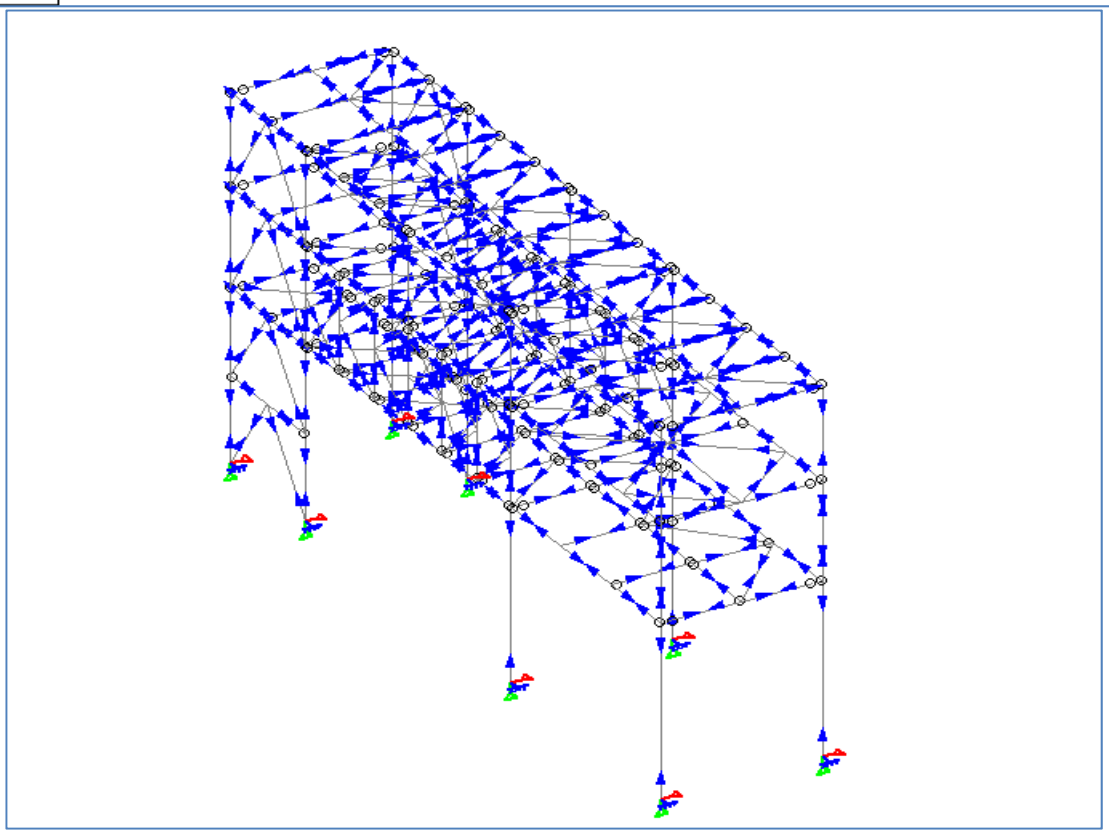




4.2.3 CARICHI DELLA TEMPERATURA (TC/TE)

Il carico della temperatura sulla struttura viene applicato come ±25°C.

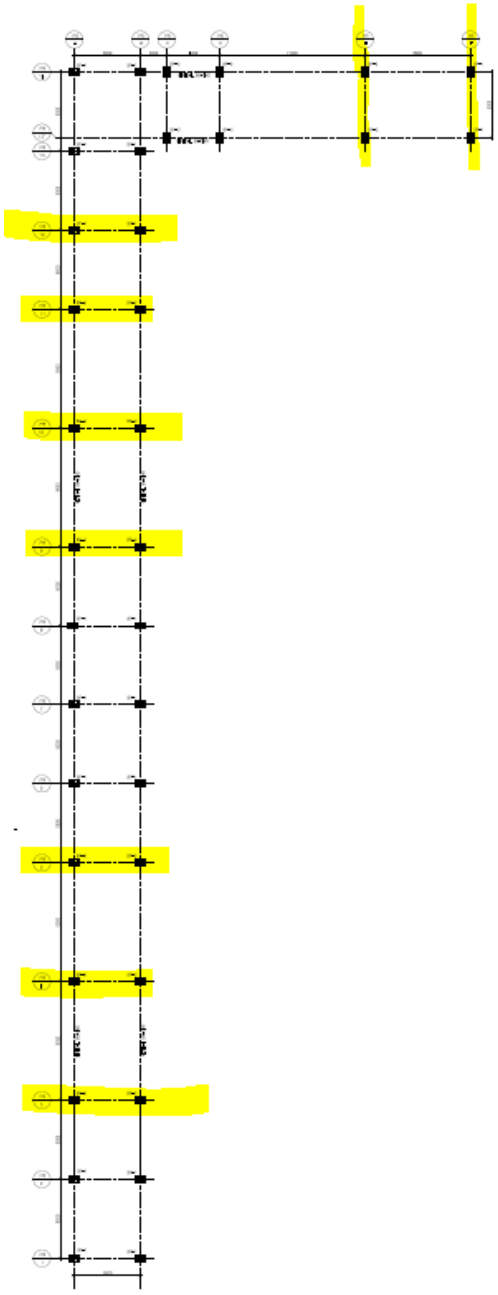




4.2.4 CARICHI DELLE TUBAZIONI (PE/POX/POY/POZ/PCX/PCY/PCZ)

I carichi considerati sono quelli riportati di seguito, facenti riferimento ad un pipe rack di collegamento delle linee del ciclo acqua/vapore da HRSG a TV impiegato in un impianto similare a quello in oggetto.

Si è supposto di considerare carichi per possibili stop assiali delle tubazioni sugli allineamenti indicati in pianta:



Al piano +6.3m:

	Tipo di carico	**Carico assiale [KN]**	**Carico verticale [KN]**	**Carico laterale [KN]**
Su allineamento principale	OPE	-	-150	-
	OCC	±60	-180	±60
	FRICTION or GUIDE	±45	-	±45

	Tipo di carico	**Carico assiale [KN]**	**Carico verticale [KN]**	**Carico laterale [KN]**
Su travi secondarie	OPE	-	-30	-
	OCC	±15	-40	±15
	FRICTION or GUIDE	±10	-	±10

	Tipo di carico	**Carico assiale [KN]**	**Carico verticale [KN]**	**Carico laterale [KN]**
Su allineamento principale con stop assiale	OPE	±120	-150	-
	OCC	-	-180	±60
	FRICTION or GUIDE		-	±45

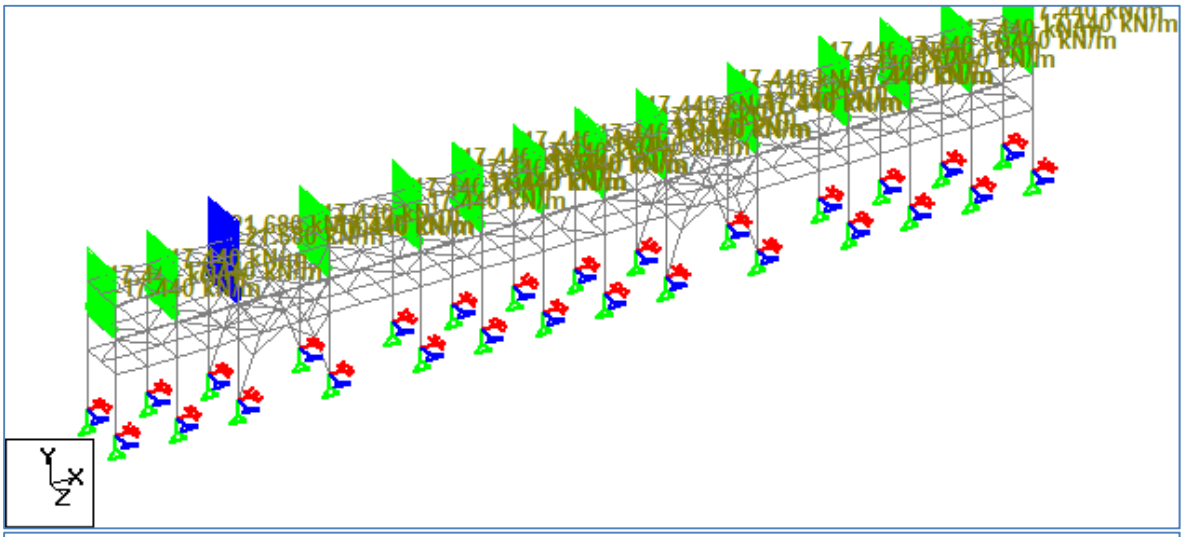
Al piano +9.75m:

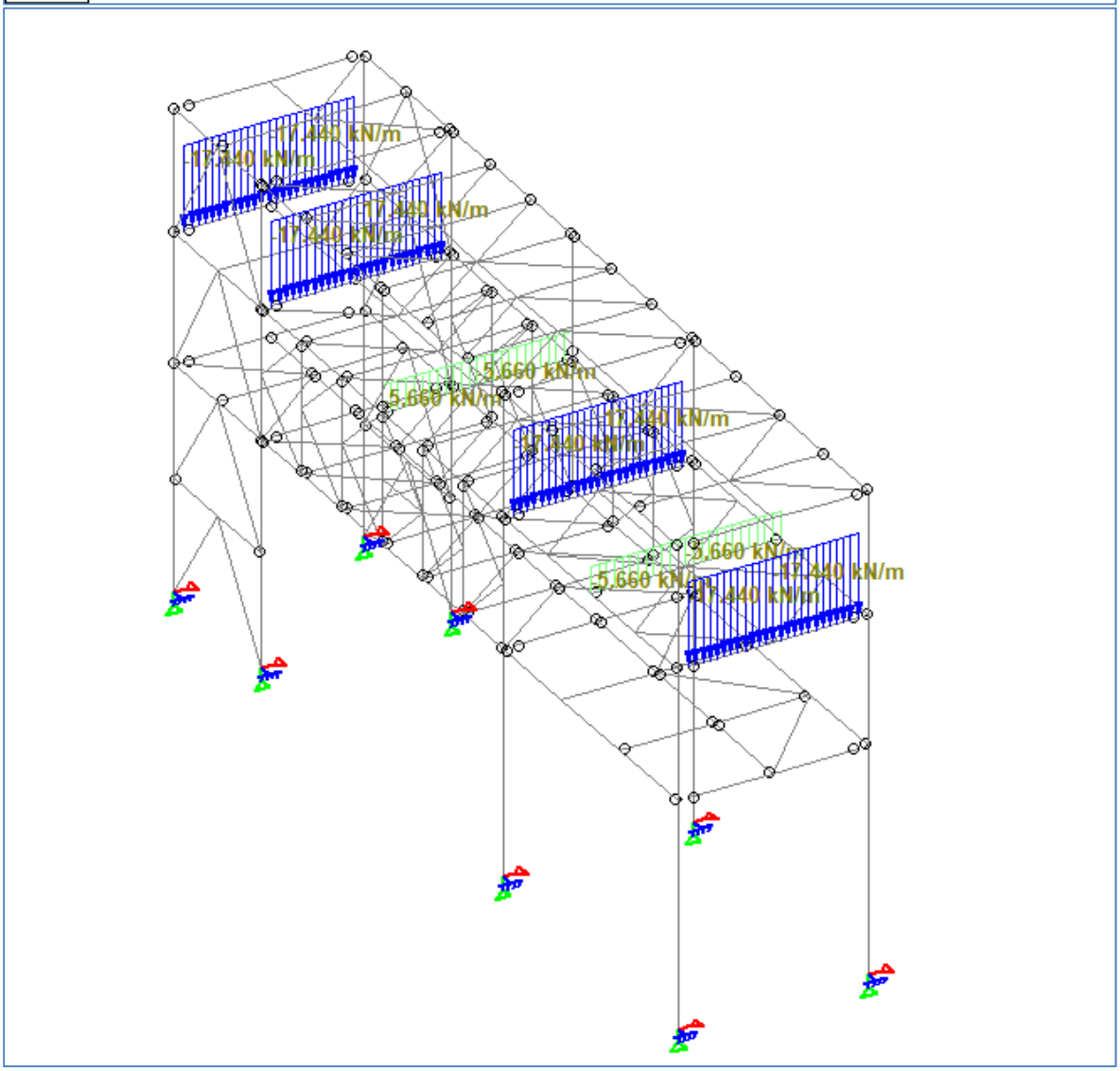
	Tipo di carico	**Carico assiale [KN]**	**Carico verticale [KN]**	**Carico laterale [KN]**
Su allineamento principale	OPE	-	-185	-
	OCC	±70	-240	±70
	FRICTION or GUIDE	±55	-	±55

	Tipo di carico	**Carico assiale [KN]**	**Carico verticale [KN]**	**Carico laterale [KN]**
Su travi secondarie	OPE	-	-60	-
	OCC	±25	-80	±25
	FRICTION or GUIDE	±20	-	±20

	Tipo di carico	**Carico assiale [KN]**	**Carico verticale [KN]**	**Carico laterale [KN]**
Su allineamento principale con stop assiale	OPE	±100	-130	-
	OCC	-	-170	±50
	FRICTION or GUIDE	-	-	±40

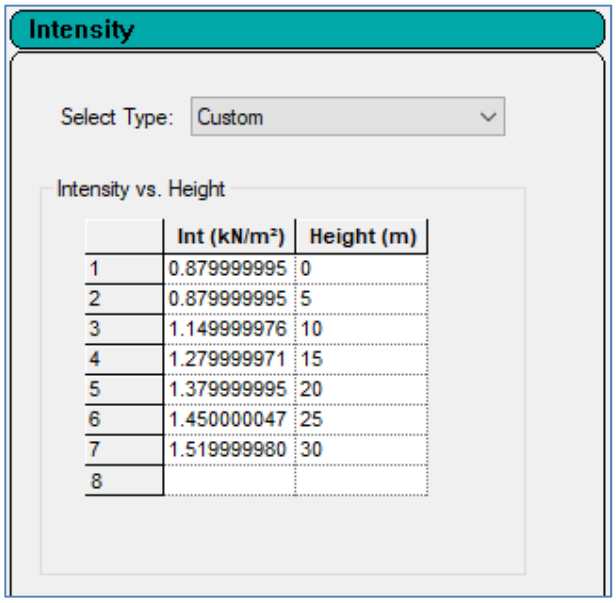
- Carico verticale operativo è stato determinato considerando le tubazioni piene d'acqua.
- Carico verticale occasionale assunto pari a 1,2 * OPE verticale.
- Carichi da Friction assunti pari a 0,3 * OPE verticale.
- Non avendo a disposizione uno studio di piping, è stato assunto che le tubazioni verranno guidate ad ogni allineamento.


Y
X
Z

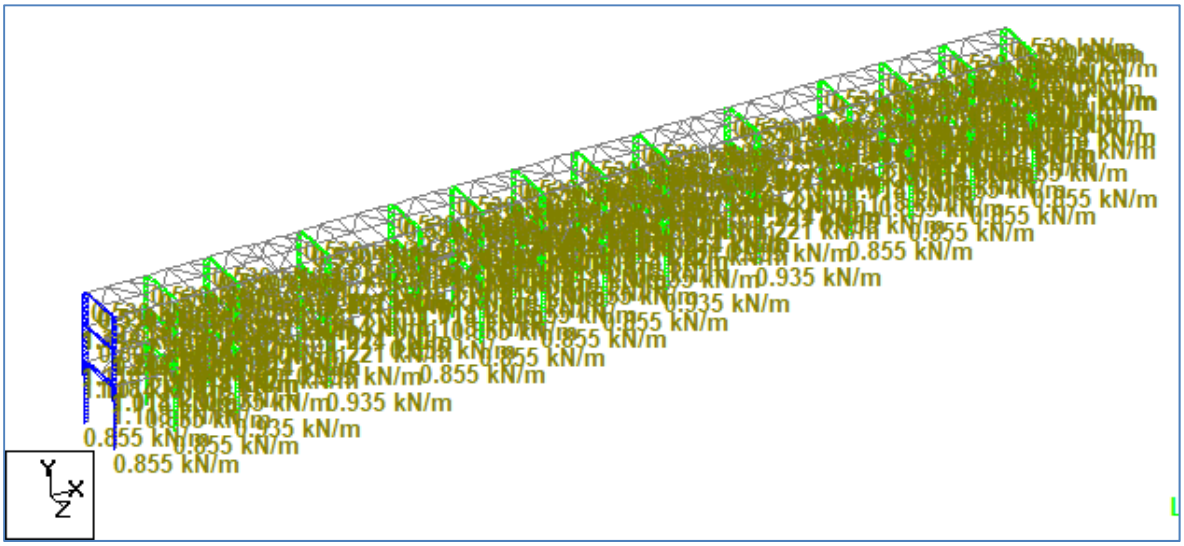

17,440 kN/m
17,440 kN/m
17,440 kN/m
17,440 kN/m
5,660 kN/m
5,660 kN/m
17,440 kN/m
17,440 kN/m
5,660 kN/m
5,660 kN/m
17,440 kN/m
17,440 kN/m

4.2.5 CARICHI DEL VENTO (WX/WZ)

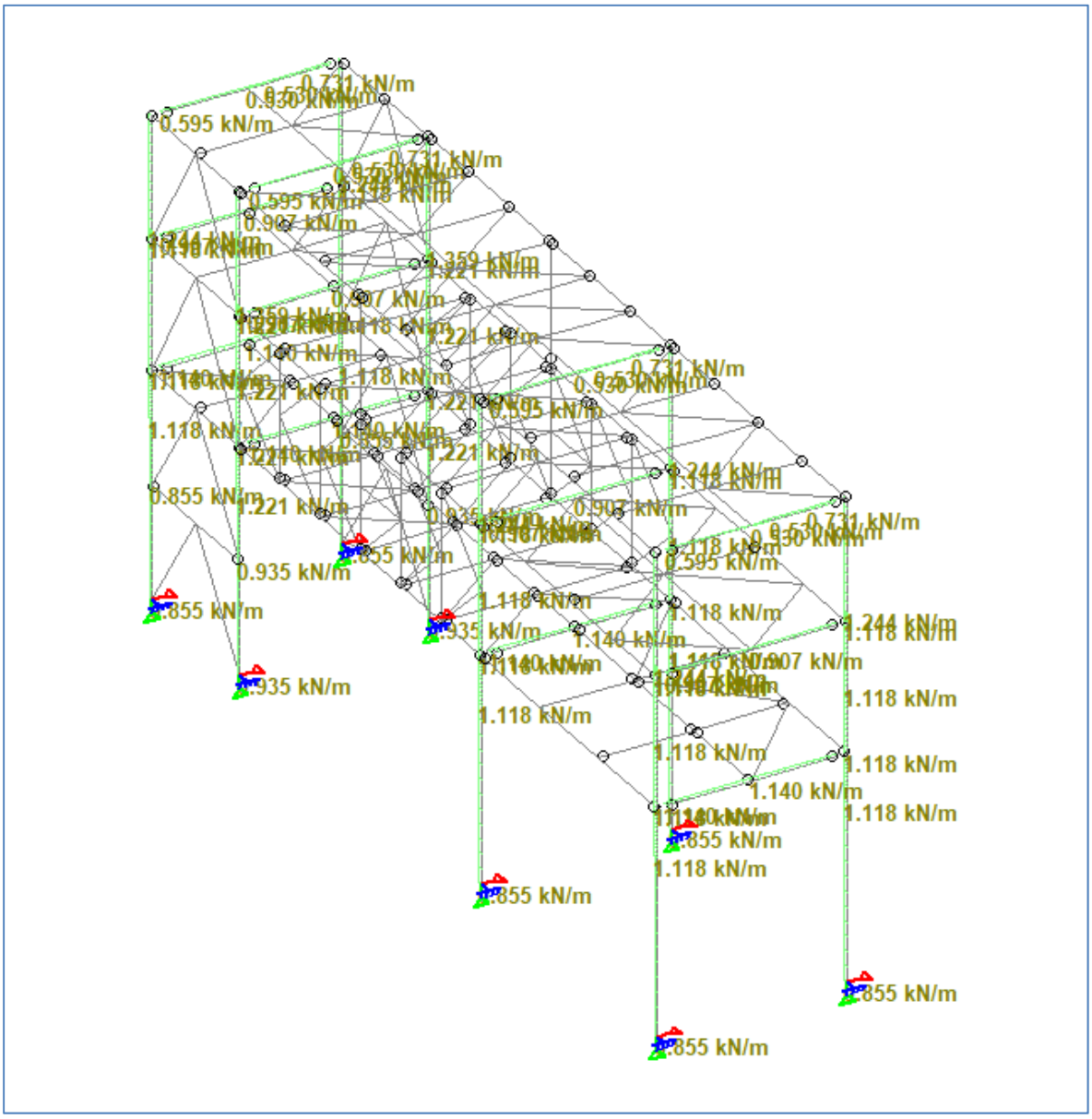
Il carico di vento viene generato utilizzando intensità del vento nel modo seguente:



	Int (kN/m²)	Height (m)
1	0.879999995	0
2	0.879999995	5
3	1.149999976	10
4	1.279999971	15
5	1.379999995	20
6	1.450000047	25
7	1.519999980	30
8		



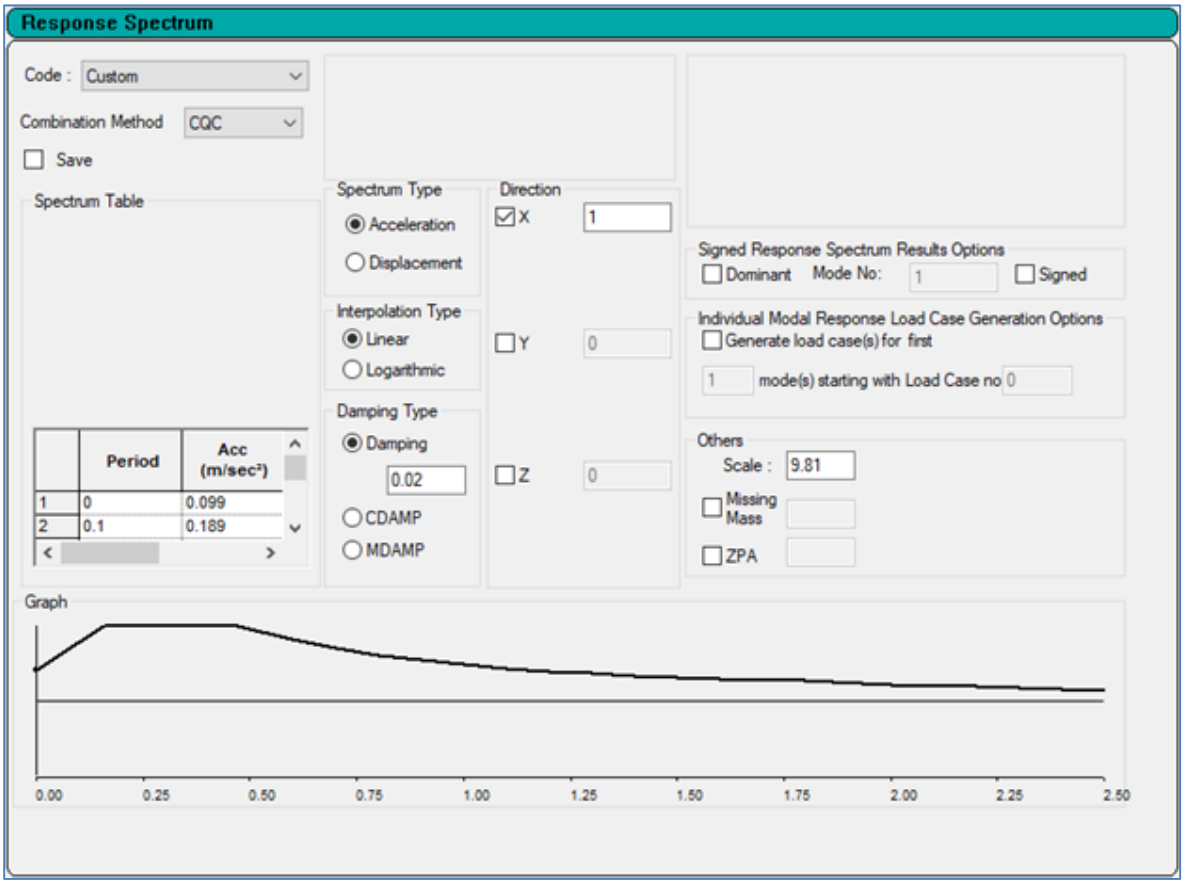
Wind Load X


0.731 kN/m
0.595 kN/m
0.907 kN/m
1.221 kN/m
1.118 kN/m
1.140 kN/m
0.855 kN/m
0.935 kN/m
1.244 kN/m

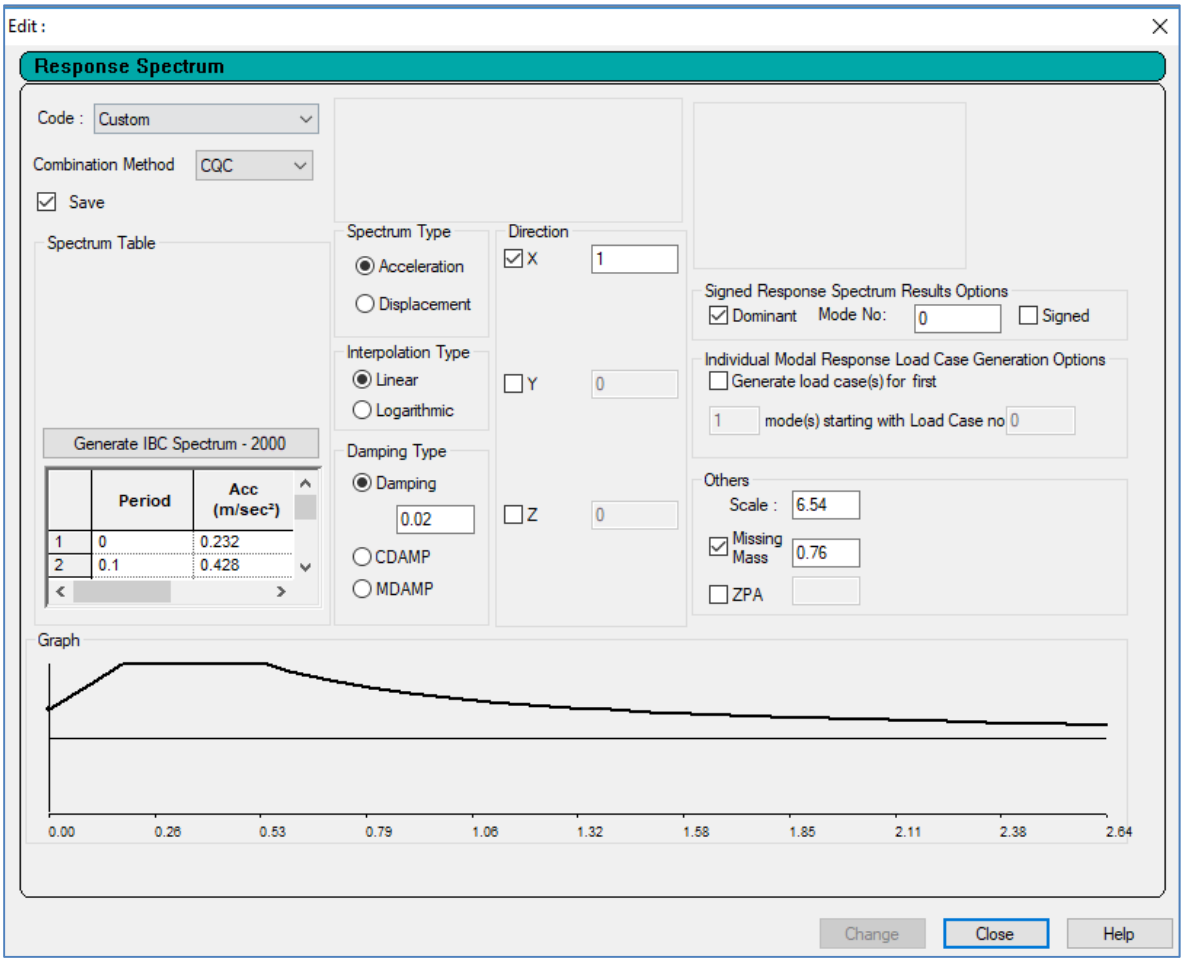
Wind Load Z

4.2.6 CARICHI SISMICI (SXD/SZD/SXV/SZV)

SERVICE – SLD function



Ultimate-SLV function (Si ipotizza q = 1,5)



4.3 COMBINAZIONI DI CARICO

La struttura del piperack è progettata e analizzata per le seguenti combinazioni di carico.

LOAD COMB 1000 DL+WIND X+SNOW+EXPANSION
LOAD COMB 1001 DL+WIND X+SNOW+CONTRACTION
LOAD COMB 1002 DL-WIND X+SNOW+EXPANSION
LOAD COMB 1003 DL-WIND X +SNOW+CONTRACTION
LOAD COMB 1004 DL+WIND Z+EXPANSION
LOAD COMB 1005 DL+WIND Z+CONTRACTION
LOAD COMB 1006 DL-WIND Z+EXPANSION
LOAD COMB 1007 DL-WIND Z+CONTRACTION
LOAD COMB 1008 DL+WIND Z+SNOW+EXPANSION
LOAD COMB 1009 DL+WIND Z+SNOW+CONTRACTION
LOAD COMB 1010 DL-WIND Z+SNOW+EXPANSION
LOAD COMB 1011 DL-WIND Z+SNOW+CONTRACTION
LOAD COMB 1012 DL+WIND Z+EXPANSION
LOAD COMB 1013 DL+WIND Z+CONTRACTION
LOAD COMB 1014 DL-WIND Z+EXPANSION
LOAD COMB 1015 DL-WIND Z+CONTRACTION
LOAD COMB 1016 OP+FRX+WX+FRZ+SNOW+EXP
LOAD COMB 1017 OP+FRX+WX-FRZ+SNOW+EXP
LOAD COMB 1018 OP+FRX+WX+FRZ+SNOW+CONT
LOAD COMB 1019 OP+FRX+WX-FRZ+SNOW+CONT
LOAD COMB 1020 OP-FRX-WX+FRZ+SNOW+EXP
LOAD COMB 1021 OP-FRX-WX-FRZ+SNOW+EXP
LOAD COMB 1022 OP-FRX-X+FRZ+SNOW+CONT
LOAD COMB 1023 OP-RX-WX-FRZ+SNOW+CONT
LOAD COMB 1024 OP+FRZ+WZ+FRX+SNOW+EXP
LOAD COMB 1025 OP+FRZ+WZ-FRX+SNOW+EXP
LOAD COMB 1026 OP+FRZ+WZ+FRX+SNOW+CONT
LOAD COMB 1027 OP+FRZ+WZ-FRX+SNOW+CONT
LOAD COMB 1028 OP-FRZ-WZ+FRX+SNOW+EXP
LOAD COMB 1029 OP-FRZ-WZ-FRX+SNOW+EXP
LOAD COMB 1030 OP-FRZ-WZ+FRX+SNOW+CONT
LOAD COMB 1031 OP-FRZ-WZ-FRX+SNOW+CONT
LOAD COMB 1032 OP+OCCX+WX+OCCZ+SNOW+EXP
LOAD COMB 1033 OP+OCCX+WX-OCCZ+SNOW+EXP

LOAD COMB 1034 OP+OCCX+WX+OCCZ+SNOW+CONT
LOAD COMB 1035 OP+OCCX+WX-OCCZ+SNOW+CONT
LOAD COMB 1036 OP-OCCX-WX+OCCZ+SNOW+EXP
LOAD COMB 1037 OP-OCCX-WX-OCCZ+SNOW+EXP
LOAD COMB 1038 OP-OCCX-WX+OCCZ+SNOW+CONT
LOAD COMB 1039 OP-OCCX-WX-OCCZ+SNOW+CONT
LOAD COMB 1040 OP+OCCZ+WZ+OCCX+SNOW+EXP
LOAD COMB 1041 OP+OCCZ+WZ-OCCX+SNOW+EXP
LOAD COMB 1042 OP+OCCZ+WZ+OCCX+SNOW+CONT
LOAD COMB 1043 OP+OCCZ+WZ-OCCX+SNOW+CONT
LOAD COMB 1044 OP-OCCZ-WZ+OCCX+SNOW+EXP
LOAD COMB 1045 OP-OCCZ-WZ-OCCX+SNOW+EXP
LOAD COMB 1046 OP-OCCZ-WZ+OCCX+SNOW+CONT
LOAD COMB 1047 OP-OCCZ-WZ-OCCX+SNOW+CONT
LOAD COMB 1048 OP+FRX+EQX+FRZ+0.3EQZ+SNOW+EXP
LOAD COMB 1049 OP-FRX-EQX+FRZ+0.3EQZ+SNOW+EXP
LOAD COMB 1050 OP+FRX+EQX-FRZ-0.3EQZ+SNOW+EXP
LOAD COMB 1051 OP-FRX-EQX-FRZ-0.3EQZ+SNOW+EXP
LOAD COMB 1052 OP+FRX+EQX+FRZ+0.3EQZ+SNOW+CONT
LOAD COMB 1053 OP-FRX-EQX+FRZ+0.3EQZ+SNOW+CONT
LOAD COMB 1054 OP+FRX+EQX-FRZ-0.3EQZ+SNOW+CONT
LOAD COMB 1055 OP-FRX-EQX-FRZ-0.3EQZ+SNOW+CONT
LOAD COMB 1056 OP+FRZ+EQZ+FRX+0.3EQX+SNOW+EXP
LOAD COMB 1057 OP-FRZ-EQZ+FRX+0.3EQX+SNOW+EXP
LOAD COMB 1058 OP+FRZ+EQZ-FRX-0.3EQX+SNOW+EXP
LOAD COMB 1059 OP-FRZ-EQZ-FRX-0.3EQX+SNOW+EXP
LOAD COMB 1060 OP+FRZ+EQZ+FRX+0.3EQX+SNOW+CONT
LOAD COMB 1061 OP-FRZ-EQZ+FRX+0.3EQX+SNOW+CONT
LOAD COMB 1062 OP+FRZ+EQZ-FRX-0.3EQX+SNOW+CONT
LOAD COMB 1063 OP-FRZ-EQZ-FRX-0.3EQX+SNOW+CONT
LOAD COMB 1064 OP+FRX+EQX+FRZ+0.3EQZ+SNOW+EXP
LOAD COMB 1065 OP-FRX-EQX+FRZ+0.3EQZ+SNOW+EXP
LOAD COMB 1066 OP+FRX+EQX-FRZ-0.3EQZ+SNOW+EXP
LOAD COMB 1067 OP-FRX-EQX-FRZ-0.3EQZ+SNOW+EXP
LOAD COMB 1068 OP+FRX+EQX+FRZ+0.3EQZ+SNOW+CONT
LOAD COMB 1069 OP-FRX-EQX+FRZ+0.3EQZ+SNOW+CONT
LOAD COMB 1070 OP+FRX+EQX-FRZ-0.3EQZ+SNOW+CONT
LOAD COMB 1071 OP-FRX-EQX-FRZ-0.3EQZ+SNOW+CONT

LOAD COMB 1072 OP+FRZ+EQZ+FRX+0.3EQX+SNOW+EXP

LOAD COMB 1073 OP-FRZ-EQZ+FRX+0.3EQX+SNOW+EXP

LOAD COMB 1074 OP+FRZ+EQZ-FRX-0.3EQX+SNOW+EXP

LOAD COMB 1075 OP-FRZ-EQZ-FRX-0.3EQX+SNOW+EXP

LOAD COMB 1076 OP+FRZ+EQZ+FRX+0.3EQX+SNOW+CONT

LOAD COMB 1077 OP-FRZ-EQZ+FRX+0.3EQX+SNOW+CONT

LOAD COMB 1078 OP+FRZ+EQZ-FRX-0.3EQX+SNOW+CONT

LOAD COMB 1079 OP-FRZ-EQZ-FRX-0.3EQX+SNOW+CONT

LOAD COMB 2000 DL+WIND X+SNOW+EXPANSION

LOAD COMB 2001 DL+WIND X+SNOW+CONTRACTION

LOAD COMB 2002 DL-WIND X+SNOW+EXPANSION

LOAD COMB 2003 DL-WIND X +SNOW+CONTRACTION

LOAD COMB 2004 DL+WIND Z+EXPANSION

LOAD COMB 2005 DL+WIND Z+CONTRACTION

LOAD COMB 2006 DL-WIND Z+EXPANSION

LOAD COMB 2007 DL-WIND Z+CONTRACTION

LOAD COMB 2008 DL+WIND Z+SNOW+EXPANSION

LOAD COMB 2009 DL+WIND Z+SNOW+CONTRACTION

LOAD COMB 2010 DL-WIND Z+SNOW+EXPANSION

LOAD COMB 2011 DL-WIND Z+SNOW+CONTRACTION

LOAD COMB 2012 DL+WIND Z+EXPANSION

LOAD COMB 2013 DL+WIND Z+CONTRACTION

LOAD COMB 2014 DL-WIND Z+EXPANSION

LOAD COMB 2015 DL-WIND Z+CONTRACTION

LOAD COMB 2016 OP+FRX+WX+FRZ+SNOW+EXP

LOAD COMB 2017 OP+FRX+WX-FRZ+SNOW+EXP

LOAD COMB 2018 OP+FRX+WX+FRZ+SNOW+CONT

LOAD COMB 2019 OP+FRX+WX-FRZ+SNOW+CONT

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LOAD COMB 2021 OP-FRX-WX-FRZ+SNOW+EXP

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LOAD COMB 2034 OP+OCCX+WX+OCCZ+SNOW+CONT

LOAD COMB 2035 OP+OCCX+WX-OCCZ+SNOW+CONT

LOAD COMB 2036 OP-OCCX-WX+OCCZ+SNOW+EXP

LOAD COMB 2037 OP-OCCX-WX-OCCZ+SNOW+EXP

LOAD COMB 2038 OP-OCCX-WX+OCCZ+SNOW+CONT

LOAD COMB 2039 OP-OCCX-WX-OCCZ+SNOW+CONT

LOAD COMB 2040 OP+OCCZ+WZ+OCCX+SNOW+EXP

LOAD COMB 2041 OP+OCCZ+WZ-OCCX+SNOW+EXP

LOAD COMB 2042 OP+OCCZ+WZ+OCCX+SNOW+CONT

LOAD COMB 2043 OP+OCCZ+WZ-OCCX+SNOW+CONT

LOAD COMB 2044 OP-OCCZ-WZ+OCCX+SNOW+EXP

LOAD COMB 2045 OP-OCCZ-WZ-OCCX+SNOW+EXP

LOAD COMB 2046 OP-OCCZ-WZ+OCCX+SNOW+CONT

LOAD COMB 2047 OP-OCCZ-WZ-OCCX+SNOW+CONT

LOAD COMB 2048 OP+FRX+EQX+FRZ+0.3EQZ+SNOW+EXP

LOAD COMB 2049 OP-FRX-EQX+FRZ+0.3EQZ+SNOW+EXP

LOAD COMB 2050 OP+FRX+EQX-FRZ-0.3EQZ+SNOW+EXP

LOAD COMB 2051 OP-FRX-EQX-FRZ-0.3EQZ+SNOW+EXP

LOAD COMB 2052 OP+FRX+EQX+FRZ+0.3EQZ+SNOW+CONT

LOAD COMB 2053 OP-FRX-EQX+FRZ+0.3EQZ+SNOW+CONT

LOAD COMB 2054 OP+FRX+EQX-FRZ-0.3EQZ+SNOW+CONT

LOAD COMB 2055 OP-FRX-EQX-FRZ-0.3EQZ+SNOW+CONT

LOAD COMB 2056 OP+FRZ+EQZ+FRX+0.3EQX+SNOW+EXP

LOAD COMB 2057 OP-FRZ-EQZ+FRX+0.3EQX+SNOW+EXP

LOAD COMB 2058 OP+FRZ+EQZ-FRX-0.3EQX+SNOW+EXP

LOAD COMB 2059 OP-FRZ-EQZ-FRX-0.3EQX+SNOW+EXP

LOAD COMB 2060 OP+FRZ+EQZ+FRX+0.3EQX+SNOW+CONT

LOAD COMB 2061 OP-FRZ-EQZ+FRX+0.3EQX+SNOW+CONT

LOAD COMB 2062 OP+FRZ+EQZ-FRX-0.3EQX+SNOW+CONT

LOAD COMB 2063 OP-FRZ-EQZ-FRX-0.3EQX+SNOW+CONT

LOAD COMB 2064 OP+FRX+EQX+FRZ+0.3EQZ+SNOW+EXP

LOAD COMB 2065 OP-FRX-EQX+FRZ+0.3EQZ+SNOW+EXP

LOAD COMB 2066 OP+FRX+EQX-FRZ-0.3EQZ+SNOW+EXP

LOAD COMB 2067 OP-FRX-EQX-FRZ-0.3EQZ+SNOW+EXP

LOAD COMB 2068 OP+FRX+EQX+FRZ+0.3EQZ+SNOW+CONT

LOAD COMB 2069 OP-FRX-EQX+FRZ+0.3EQZ+SNOW+CONT

LOAD COMB 2070 OP+FRX+EQX-FRZ-0.3EQZ+SNOW+CONT

LOAD COMB 2071 OP-FRX-EQX-FRZ-0.3EQZ+SNOW+CONT

LOAD COMB 2072 OP+FRZ+EQZ+FRX+0.3EQX+SNOW+EXP

LOAD COMB 2073 OP-FRZ-EQZ+FRX+0.3EQX+SNOW+EXP

LOAD COMB 2074 OP+FRZ+EQZ-FRX-0.3EQX+SNOW+EXP

LOAD COMB 2075 OP-FRZ-EQZ-FRX-0.3EQX+SNOW+EXP

LOAD COMB 2076 OP+FRZ+EQZ+FRX+0.3EQX+SNOW+CONT

LOAD COMB 2077 OP-FRZ-EQZ+FRX+0.3EQX+SNOW+CONT

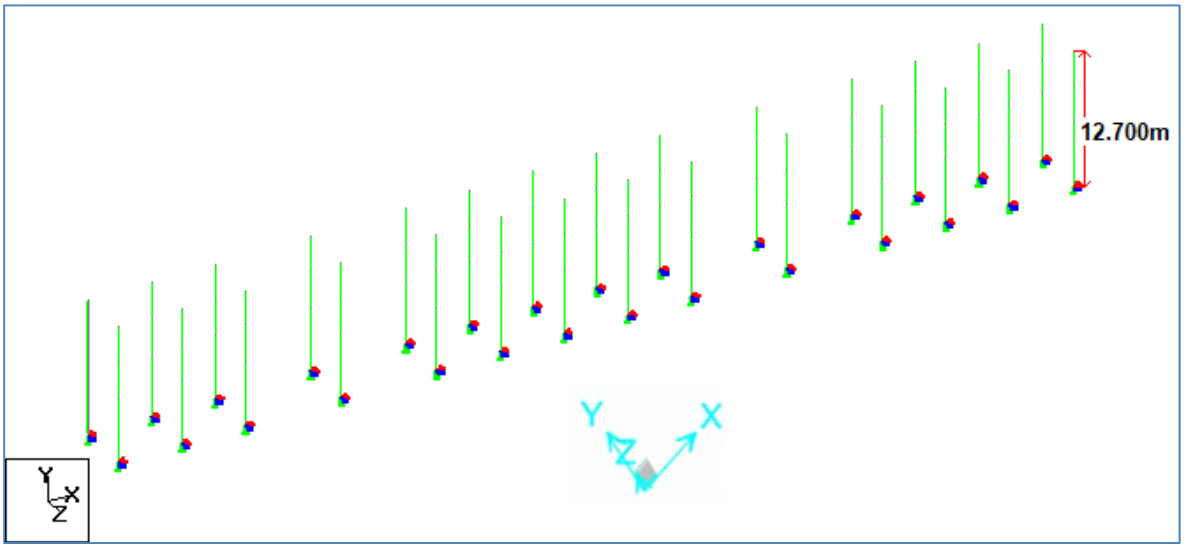
LOAD COMB 2078 OP+FRZ+EQZ-FRX-0.3EQX+SNOW+CONT

LOAD COMB 2079 OP-FRZ-EQZ-FRX-0.3EQX+SNOW+CONT

4.4 CONTROLLO DEGLI SPOSTAMENTI

Questo controllo viene effettuato per combinazioni di carico di servizio (da 1000 a 1079).

4.4.1 COLONNE



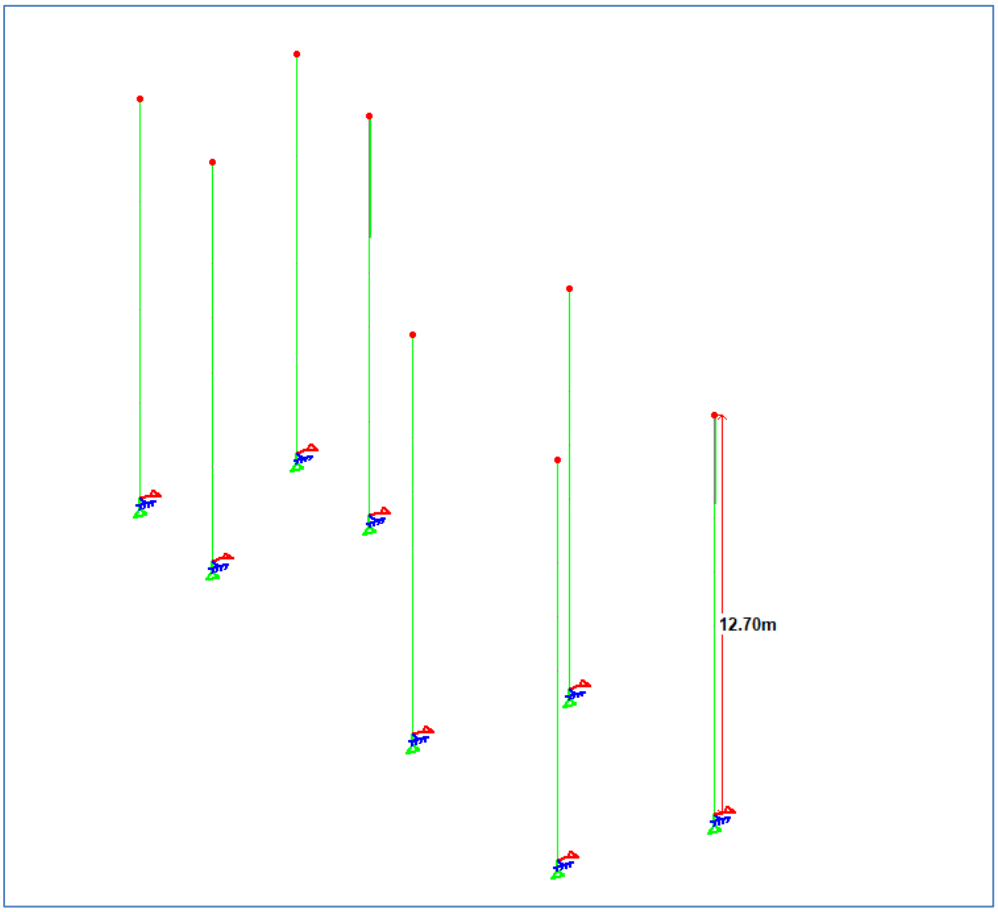
			Horizontal	Vertical	Horizontal
	Node	L/C	X mm	Y mm	Z mm
Max X	107	1066 OP+FR	**20.836**	1.019	-14.323
Min X	111	1071 OP-FRX	**-20.717**	-1.964	-13.965
Max Y	72	1075 OP-FRZ	-9.297	**2.654**	-33.837
Min Y	76	1079 OP-FRZ	-6.887	**-3.604**	-30.489
Max Z	60	1078 OP+FR	-6.810	-2.345	**38.863**
Min Z	60	1073 OP-FRZ	6.950	1.253	**-38.584**

Dalla tabella riportata sopra:

Massimo spostamento orizzontale = 38.86mm

Altezza totale della colonna avente lo spostamento riportato sopra = 12.7m

Spostamento ammissibile = H/300 = 12700/300 = 42.3mm > 38.86mm …..**OK**



			Horizontal	Vertical	Horizontal
	Node	L/C	X mm	Y mm	Z mm
Max X	728	1068 OP+FR	**34.684**	-2.250	5.548
Min X	733	1071 OP-FRX	**-34.990**	-2.405	-7.994
Max Y	493	1072 OP+FR	11.201	**2.695**	12.202
Min Y	514	1068 OP+FR	28.816	**-3.666**	2.894
Max Z	733	1074 OP+FR	-17.147	1.988	**17.138**
Min Z	733	1077 OP-FRZ	16.812	-3.087	**-16.242**

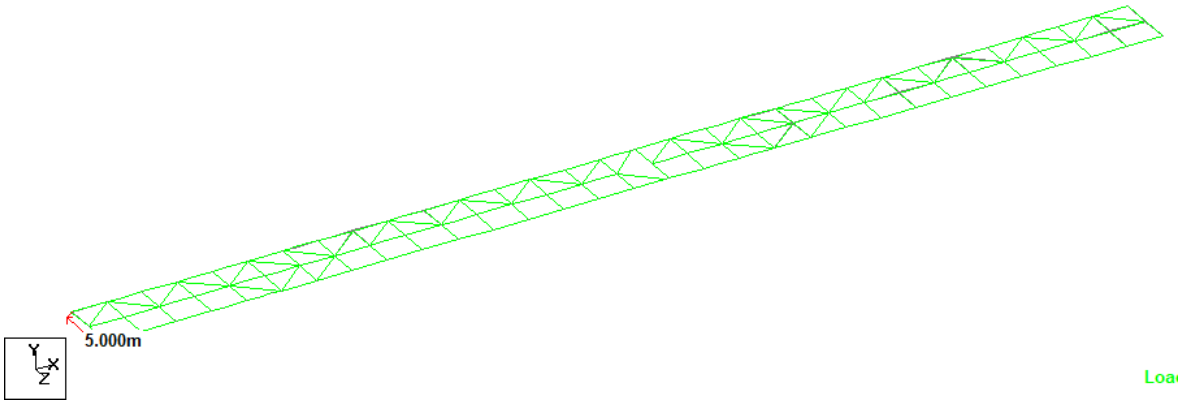
Dalla tabella riportata sopra:

Massimo spostamento orizzontale = 34.99mm

Altezza totale della colonna avente lo spostamento riportato sopra = 12.7m

Spostamento ammissibile = H/300 = 12700/300 = 42.3mm > 34.99mm …..**OK**

4.4.2 TRAVI



			Horizontal	Vertical	Horizontal
	Node	L/C	X mm	Y mm	Z mm
Max X	160	1064 OP+FRX	**19.645**	0.058	9.173
Min X	160	1071 OP-FRX	**-19.769**	-2.197	-9.168
Max Y	140	1066 OP+FRX	10.987	**2.685**	-6.818
Min Y	173	1071 OP-FRX	-12.976	**-22.544**	-9.501
Max Z	117	1078 OP+FRZ	-12.864	-7.152	**19.271**
Min Z	117	1073 OP-FRZ	12.764	-5.720	**-19.304**

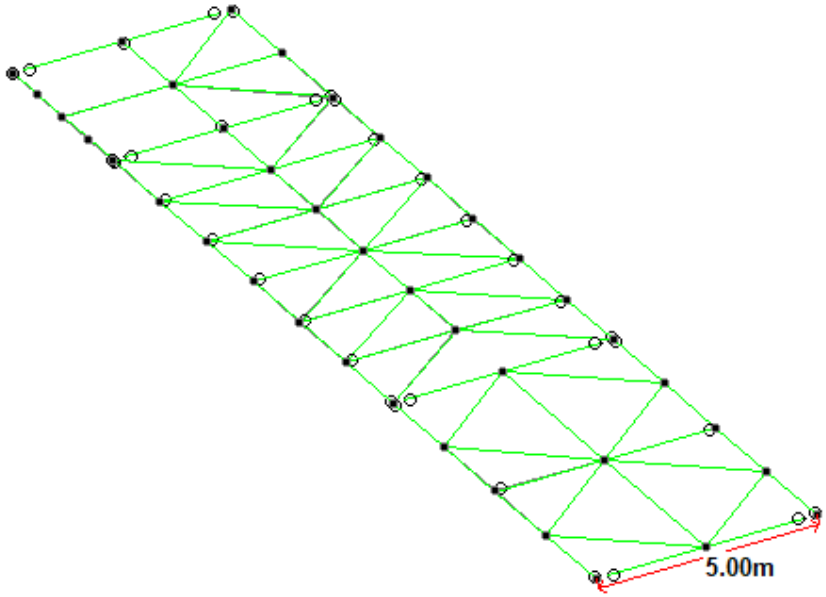
Dalla tabella riportata sopra:

Lo spostamento verticale massimo è per il giunto 173 = 22.544 – 0.5 (15.48+14.63) mm (Combo 1071)

=7.489 m

Lunghezza totale della trave avente lo spostamento riportato sopra = 5m

Spostamento ammissibile = L/500 = 5000/500 = 10mm > 7.489mm …..**OK**



			Horizontal	Vertical	Horizontal
	Node	L/C	X mm	Y mm	Z mm
Max X	727	1068 OP+FR	**28.522**	-1.658	4.508
Min X	727	1067 OP-FRX	**-28.437**	0.755	-4.475
Max Y	491	1072 OP+FR	9.803	**2.114**	10.358
Min Y	762	1069 OP-FRX	-25.787	**-24.212**	4.314
Max Z	741	1074 OP+FR	-10.039	0.350	**15.436**
Min Z	727	1079 OP-FRZ	-17.197	-2.368	**-15.233**

Dalla tabella riportata sopra:

Lo spostamento verticale massimo è per il giunto 762 = 24.212 – 0.5 (14.924+14.206) mm (Combo 1069)

=9.647 m

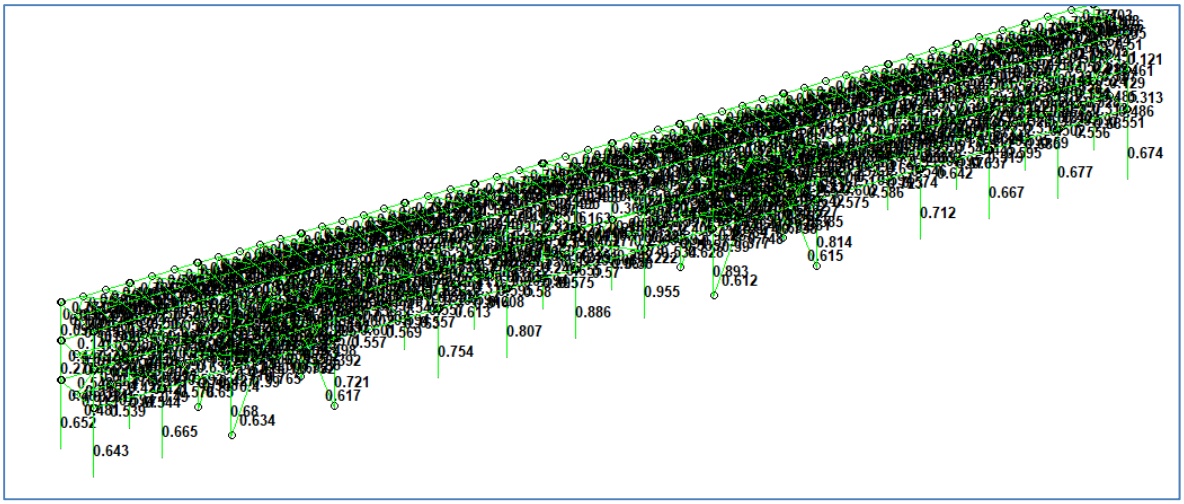
Lunghezza totale della trave avente lo spostamento riportato sopra = 5m

Spostamento ammissibile = L/500 = 5000/500 = 10mm > 9.647mm …..**OK**

4.5 VERIFICA ELEMENTI IN ACCIAIO

Tutti i componenti sono progettati per le combinazioni di carico (da 2000 a 2079).

L'immagine seguente evidenzia il rapporto d'interazione di tutti i componenti.



La tabella seguente fornisce la sintesi dei rapporti d'interazione di tutti gli elementi:

Elemento		Actual ratio	Allowable Ratio		L/C
1	HE550A	0.652	1	EC-6.3.3-662	2045
2	HE550A	0.277	1	EC-6.3.3-662	2046
3	HE550A	0.094	1	EC-6.3.3-662	2036
4	HE550A	0.643	1	EC-6.3.3-662	2040
5	HE550A	0.281	1	EC-6.3.3-662	2043
6	HE550A	0.108	1	EC-6.3.3-662	2037
7	HE550A	0.673	1	EC-6.3.3-662	2044
8	HE550A	0.281	1	EC-6.3.3-662	2047
9	HE550A	0.115	1	EC-6.3.3-662	2044
10	HE550A	0.665	1	EC-6.3.3-662	2041
11	HE550A	0.277	1	EC-6.3.3-662	2043
12	HE550A	0.122	1	EC-6.3.3-662	2041
13	HE600A	0.702	1	EC-6.3.3-662	2044
14	HE600A	0.296	1	EC-6.3.3-662	2046
15	HE600A	0.149	1	EC-6.3.3-662	2075
16	HE600A	0.68	1	EC-6.3.3-662	2040
17	HE600A	0.297	1	EC-6.3.3-662	2042
18	HE600A	0.147	1	EC-6.3.3-662	2041
19	HE600A	0.753	1	EC-6.3.3-662	2045
20	HE600A	0.326	1	EC-6.3.3-662	2047
21	HE600A	0.138	1	EC-6.3.3-662	2057

22	HE600A	0.721	1	EC-6.3.3-662	2041
23	HE600A	0.317	1	EC-6.3.3-662	2043
24	HE600A	0.134	1	EC-6.3.3-662	2040
25	HE550A	0.763	1	EC-6.3.3-662	2075
26	HE550A	0.332	1	EC-6.3.3-662	2047
27	HE550A	0.136	1	EC-6.3.3-662	2057
28	HE550A	0.754	1	EC-6.3.3-662	2072
29	HE550A	0.333	1	EC-6.3.3-662	2043
30	HE550A	0.143	1	EC-6.3.3-662	2040
31	HE550A	0.814	1	EC-6.3.3-662	2075
32	HE550A	0.305	1	EC-6.3.3-662	2079
33	HE550A	0.132	1	EC-6.3.3-662	2057
34	HE550A	0.807	1	EC-6.3.3-662	2072
35	HE550A	0.305	1	EC-6.3.3-662	2040
36	HE550A	0.138	1	EC-6.3.3-662	2056
37	HE550A	0.895	1	EC-6.3.3-662	2073
38	HE550A	0.342	1	EC-6.3.3-662	2079
39	HE550A	0.16	1	EC-6.3.3-662	2061
40	HE550A	0.886	1	EC-6.3.3-662	2074
41	HE550A	0.329	1	EC-6.3.3-662	2078
42	HE550A	0.163	1	EC-6.3.3-662	2056
43	HE550A	0.964	1	EC-6.3.3-662	2073
44	HE550A	0.368	1	EC-6.3.3-662	2077
45	HE550A	0.19	1	EC-6.3.3-662	2059
46	HE550A	0.955	1	EC-6.3.3-662	2074
47	HE550A	0.348	1	EC-6.3.3-662	2076
48	HE550A	0.191	1	EC-6.3.3-662	2056
49	HE600A	0.91	1	EC-6.3.3-662	2073
50	HE600A	0.343	1	EC-6.3.3-662	2077
51	HE600A	0.158	1	EC-6.3.3-662	2057
52	HE600A	0.893	1	EC-6.3.3-662	2072
53	HE600A	0.345	1	EC-6.3.3-662	2076
54	HE600A	0.162	1	EC-6.3.3-662	2058
55	HE600A	0.826	1	EC-6.3.3-662	2075
56	HE600A	0.338	1	EC-6.3.3-662	2047
57	HE600A	0.146	1	EC-6.3.3-662	2059
58	HE600A	0.814	1	EC-6.3.3-662	2074
59	HE600A	0.332	1	EC-6.3.3-662	2078
60	HE600A	0.151	1	EC-6.3.3-662	2056
61	HE550A	0.723	1	EC-6.3.3-662	2045
62	HE550A	0.341	1	EC-6.3.3-662	2047
63	HE550A	0.136	1	EC-6.3.3-662	2045
64	HE550A	0.712	1	EC-6.3.3-662	2040
65	HE550A	0.339	1	EC-6.3.3-662	2043

66	HE550A	0.152	1	EC-6.3.3-662	2040
67	HE550A	0.676	1	EC-6.3.3-662	2045
68	HE550A	0.326	1	EC-6.3.3-662	2047
69	HE550A	0.123	1	EC-6.3.3-662	2044
70	HE550A	0.667	1	EC-6.3.3-662	2040
71	HE550A	0.324	1	EC-6.3.3-662	2040
72	HE550A	0.146	1	EC-6.3.3-662	2040
73	HE550A	0.686	1	EC-6.3.3-662	2045
74	HE550A	0.293	1	EC-6.3.3-662	2047
75	HE550A	0.112	1	EC-6.3.3-662	2045
76	HE550A	0.677	1	EC-6.3.3-662	2040
77	HE550A	0.312	1	EC-6.3.3-662	2040
78	HE550A	0.141	1	EC-6.3.3-662	2040
79	HE500A	0.481	1	EC-6.2.9.1	2041
80	HE500A	0.49	1	EC-6.2.9.1	2041
81	HE500A	0.535	1	EC-6.2.9.1	2040
82	HE500A	0.571	1	EC-6.2.9.1	2040
83	HE500A	0.557	1	EC-6.2.9.1	2072
84	HE500A	0.595	1	EC-6.2.9.1	2072
85	HE500A	0.655	1	EC-6.2.9.1	2072
86	HE500A	0.78	1	EC-6.2.7(5)	2074
87	HE500A	0.738	1	EC-6.2.7(5)	2074
88	HE500A	0.642	1	EC-6.2.9.1	2074
89	HE500A	0.546	1	EC-6.2.9.1	2040
90	HE500A	0.519	1	EC-6.2.9.1	2040
91	HE500A	0.502	1	EC-6.2.9.1	2040
92	HE400A	0.456	1	EC-6.2.9.1	2043
93	HE400A	0.477	1	EC-6.2.9.1	2042
94	HE400A	0.599	1	EC-6.2.9.1	2042
95	HE400A	0.582	1	EC-6.2.9.1	2043
96	HE400A	0.547	1	EC-6.2.9.1	2043
97	HE400A	0.538	1	EC-6.2.9.1	2078
98	HE400A	0.601	1	EC-6.2.9.1	2076
99	HE400A	0.684	1	EC-6.2.9.1	2078
100	HE400A	0.675	1	EC-6.2.9.1	2076
101	HE400A	0.62	1	EC-6.2.9.1	2078
102	HE400A	0.556	1	EC-6.2.9.1	2041
103	HE400A	0.524	1	EC-6.2.9.1	2042
104	HE400A	0.483	1	EC-6.2.9.1	2042
105	HE240A	0.345	1	EC-6.3.3-662	2041
106	HE240A	0.379	1	EC-6.3.3-662	2040
107	HE240A	0.451	1	EC-6.3.3-662	2040
108	HE240A	0.46	1	EC-6.3.3-662	2041
109	HE240A	0.428	1	EC-6.3.3-662	2040

110	HE240A	0.428	1	EC-6.3.3-662	2074
111	HE240A	0.489	1	EC-6.3.3-662	2072
112	HE240A	0.544	1	EC-6.3.3-662	2074
113	HE240A	0.533	1	EC-6.3.3-662	2074
114	HE240A	0.475	1	EC-6.3.3-662	2072
115	HE240A	0.441	1	EC-6.3.3-662	2041
116	HE240A	0.416	1	EC-6.3.3-662	2041
117	HE240A	0.382	1	EC-6.3.3-662	2040
118	HE550A	0.68	1	EC-6.3.3-662	2073
119	HE550A	0.287	1	EC-6.3.3-662	2047
120	HE550A	0.094	1	EC-6.3.3-662	2057
121	HE550A	0.674	1	EC-6.3.3-662	2074
122	HE550A	0.313	1	EC-6.3.3-662	2040
123	HE550A	0.121	1	EC-6.3.3-662	2033
124	HE500A	0.486	1	EC-6.2.9.1	2072
125	HE400A	0.461	1	EC-6.2.9.1	2042
126	HE240A	0.35	1	EC-6.3.3-662	2040
127	IPE270	0.548	1	EC-6.3.3-662	2040
128	IPE270	0.626	1	EC-6.3.3-662	2033
129	IPE360	0.353	1	EC-6.3.3-662	2066
130	IPE360	0.319	1	EC-6.3.3-662	2037
131	IPE270	0.724	1	EC-6.3.3-662	2037
132	IPE270	0.622	1	EC-6.3.3-662	2041
133	IPE270	0.556	1	EC-6.3.3-662	2038
134	IPE270	0.546	1	EC-6.3.3-662	2040
135	IPE360	0.306	1	EC-6.3.3-662	2066
136	IPE360	0.367	1	EC-6.3.3-662	2037
137	IPE270	0.801	1	EC-6.3.3-662	2037
138	IPE270	0.72	1	EC-6.3.3-662	2037
139	IPE270	0.61	1	EC-6.3.3-662	2041
140	IPE270	0.539	1	EC-6.3.3-662	2044
141	IPE270	0.576	1	EC-6.3.3-662	2032
142	IPE360	0.319	1	EC-6.3.3-662	2066
143	IPE360	0.557	1	EC-6.3.3-662	2037
144	IPE270	0.613	1	EC-6.3.3-662	2045
145	IPE270	0.58	1	EC-6.3.3-662	2045
146	IPE270	0.57	1	EC-6.3.3-662	2047
147	IPE270	0.534	1	EC-6.3.3-662	2044
148	IPE360	0.287	1	EC-6.3.3-662	2064
149	IPE360	0.575	1	EC-6.3.3-662	2036
150	IPE270	0.642	1	EC-6.3.3-662	2036
151	IPE270	0.595	1	EC-6.3.3-662	2045
152	IPE270	0.556	1	EC-6.3.3-662	2045
153	IPE270	0.61	1	EC-6.3.3-662	2033

154	IPE270	0.753	1	EC-6.3.3-662	2033
155	IPE270	0.663	1	EC-6.3.3-662	2036
156	IPE270	0.57	1	EC-6.3.3-662	2045
157	IPE270	0.563	1	EC-6.3.3-662	2043
158	IPE270	0.633	1	EC-6.3.3-662	2033
159	IPE270	0.769	1	EC-6.3.3-662	2037
160	IPE270	0.641	1	EC-6.3.3-662	2036
161	IPE270	0.553	1	EC-6.3.3-662	2045
162	IPE270	0.544	1	EC-6.3.3-662	2044
163	IPE270	0.588	1	EC-6.3.3-662	2032
164	IPE270	0.608	1	EC-6.3.3-662	2045
165	IPE270	0.575	1	EC-6.3.3-662	2045
166	IPE270	0.58	1	EC-6.3.3-662	2047
167	IPE270	0.535	1	EC-6.3.3-662	2033
168	IPE270	0.637	1	EC-6.3.3-662	2036
169	IPE270	0.59	1	EC-6.3.3-662	2045
170	IPE270	0.551	1	EC-6.3.3-662	2045
171	IPE360	0.509	1	EC-6.3.3-662	2064
172	IPE360	0.596	1	EC-6.3.3-662	2067
173	IPE360	0.629	1	EC-6.3.3-661	2036
174	IPE360	0.629	1	EC-6.3.3-662	2037
175	IPE360	0.487	1	EC-6.3.3-662	2066
176	IPE360	0.59	1	EC-6.3.3-662	2067
177	IPE360	0.675	1	EC-6.3.3-661	2036
178	IPE360	0.674	1	EC-6.3.3-662	2037
179	IPE360	0.508	1	EC-6.3.3-662	2066
180	IPE360	0.572	1	EC-6.3.3-662	2065
181	IPE360	0.569	1	EC-6.3.3-662	2037
182	IPE360	0.557	1	EC-6.3.3-662	2037
183	IPE360	0.479	1	EC-6.3.3-662	2064
184	IPE360	0.562	1	EC-6.3.3-662	2067
185	IPE360	0.586	1	EC-6.3.3-662	2037
186	IPE360	0.574	1	EC-6.3.3-662	2037
187	IPE240	0.594	1	EC-6.3.3-662	2045
188	IPE240	0.593	1	EC-6.3.3-662	2045
189	IPE240	0.606	1	EC-6.3.3-662	2039
190	IPE240	0.65	1	EC-6.3.3-662	2033
191	IPE240	0.607	1	EC-6.3.3-662	2047
192	IPE240	0.594	1	EC-6.3.3-662	2044
193	IPE240	0.594	1	EC-6.3.3-662	2047
194	IPE240	0.594	1	EC-6.3.3-662	2047
195	IPE240	0.593	1	EC-6.3.3-662	2036
196	IPE240	0.592	1	EC-6.3.3-662	2045
197	IPE240	0.589	1	EC-6.3.3-662	2039

198	IPE240	0.653	1	EC-6.3.3-662	2033
199	IPE240	0.608	1	EC-6.3.3-662	2047
200	IPE240	0.594	1	EC-6.3.3-662	2047
201	IPE240	0.595	1	EC-6.3.3-662	2047
202	IPE240	0.595	1	EC-6.3.3-662	2047
203	IPE240	0.597	1	EC-6.3.3-662	2047
204	HE500A	0.48	1	EC-6.2.9.1	2044
205	HE500A	0.42	1	EC-6.3.3-662	2044
206	HE500A	0.527	1	EC-6.2.9.1	2045
207	HE500A	0.566	1	EC-6.2.9.1	2045
208	HE500A	0.554	1	EC-6.2.9.1	2075
209	HE500A	0.593	1	EC-6.2.9.1	2075
210	HE500A	0.654	1	EC-6.2.9.1	2073
211	HE500A	0.779	1	EC-6.2.7(5)	2073
212	HE500A	0.729	1	EC-6.2.7(5)	2073
213	HE500A	0.636	1	EC-6.2.9.1	2073
214	HE500A	0.542	1	EC-6.2.9.1	2045
215	HE500A	0.445	1	EC-6.3.3-662	2045
216	HE500A	0.499	1	EC-6.2.9.1	2045
217	HE500A	0.485	1	EC-6.2.9.1	2075
218	IPE240	0.594	1	EC-6.3.3-662	2045
219	IPE240	0.593	1	EC-6.3.3-662	2045
220	IPE240	0.606	1	EC-6.3.3-662	2039
221	IPE240	0.669	1	EC-6.3.3-662	2033
222	IPE240	0.601	1	EC-6.3.3-662	2047
223	IPE240	0.594	1	EC-6.3.3-662	2044
224	IPE240	0.594	1	EC-6.3.3-662	2047
225	IPE240	0.594	1	EC-6.3.3-662	2047
226	IPE240	0.608	1	EC-6.3.3-662	2047
227	IPE240	0.592	1	EC-6.3.3-662	2045
228	IPE240	0.589	1	EC-6.3.3-662	2039
229	IPE240	0.663	1	EC-6.3.3-662	2033
230	IPE240	0.602	1	EC-6.3.3-662	2047
231	IPE240	0.594	1	EC-6.3.3-662	2047
232	IPE240	0.595	1	EC-6.3.3-662	2047
233	IPE240	0.595	1	EC-6.3.3-662	2047
234	IPE240	0.597	1	EC-6.3.3-662	2047
235	L100X100X10	0.313	1	EC-6.3.3-661	2044
236	L100X100X10	0.422	1	EC-6.3.3-661	2044
237	L100X100X10	0.519	1	EC-6.3.3-661	2032
238	L100X100X10	0.631	1	EC-6.3.3-661	2032

239	L100X100X10	0.26	1	EC-6.3.3-661	2032
240	L100X100X10	0.344	1	EC-6.3.3-661	2032
241	L100X100X10	0.488	1	EC-6.3.3-661	2036
242	L100X100X10	0.693	1	EC-6.3.3-661	2045
243	L100X100X10	0.602	1	EC-6.3.3-661	2037
244	L100X100X10	0.545	1	EC-6.3.3-661	2037
245	L100X100X10	0.375	1	EC-6.3.3-661	2036
246	L100X100X10	0.319	1	EC-6.3.3-661	2065
247	L100X100X10	0.306	1	EC-6.3.3-661	2037
248	L100X100X10	0.246	1	EC-6.3.3-661	2037
249	L100X100X10	0.125	1	EC-6.3.3-661	2033
251	L100X100X10	0.296	1	EC-6.3.3-661	2032
252	L100X100X10	0.406	1	EC-6.3.3-661	2032
253	L100X100X10	0.141	1	EC-6.3.3-661	2032
254	L100X100X10	0.224	1	EC-6.3.3-661	2032
255	L100X100X10	0.519	1	EC-6.3.3-661	2036
256	L100X100X10	0.827	1	EC-6.3.3-661	2045
257	L100X100X10	0.751	1	EC-6.3.3-661	2037
258	L100X100X10	0.696	1	EC-6.3.3-661	2037
259	L100X100X10	0.599	1	EC-6.3.3-661	2036
260	L100X100X10	0.543	1	EC-6.3.3-661	2036
261	L100X100X10	0.411	1	EC-6.3.3-661	2036
262	L100X100X10	0.353	1	EC-6.3.3-661	2036
263	L100X100X10	0.372	1	EC-6.3.3-661	2037
264	L100X100X10	0.313	1	EC-6.3.3-661	2037

265	L100X100X10	0.515	1	EC-6.3.1.1	2042
266	L100X100X10	0.476	1	EC-6.3.1.1	2036
267	L100X100X10	0.404	1	EC-6.3.1.1	2035
268	L100X100X10	0.715	1	EC-6.3.1.1	2036
269	L100X100X10	0.886	1	EC-6.3.1.1	2042
270	L100X100X10	0.828	1	EC-6.3.1.1	2043
271	L100X100X10	0.602	1	EC-6.3.1.1	2037
272	L100X100X10	0.548	1	EC-6.3.1.1	2040
273	L100X100X10	0.136	1	EC-6.3.1.1	2044
274	L100X100X10	0.581	1	EC-6.3.1.1	2043
275	L100X100X10	0.626	1	EC-6.3.1.1	2032
276	L100X100X10	0.411	1	EC-6.3.1.1	2043
277	L100X100X10	0.417	1	EC-6.3.1.1	2040
278	L100X100X10	0.536	1	EC-6.3.1.1	2043
279	L100X100X10	0.212	1	EC-6.3.1.1	2043
281	L100X100X10	0.313	1	EC-6.3.1.1	2042
282	L100X100X10	0.597	1	EC-6.3.1.1	2036
283	L100X100X10	0.767	1	EC-6.3.1.1	2042
284	L100X100X10	0.567	1	EC-6.3.1.1	2037
285	L100X100X10	0.674	1	EC-6.3.1.1	2043
286	L100X100X10	0.541	1	EC-6.3.1.1	2040
287	L100X100X10	0.233	1	EC-6.3.1.1	2064
288	L100X100X10	0.672	1	EC-6.3.1.1	2043
289	L100X100X10	0.422	1	EC-6.3.1.1	2032
290	L100X100X10	0.617	1	EC-6.3.1.1	2043

291	L100X100X10	0.677	1	EC-6.3.1.1	2040
292	L100X100X10	0.326	1	EC-6.3.1.1	2039
293	L100X100X10	0.464	1	EC-6.3.1.1	2040
294	L100X100X10	0.528	1	EC-6.3.1.1	2043
295	IPE240	0.141	1	EC-6.3.3-662	2070
296	IPE240	0.256	1	EC-6.3.3-662	2070
297	IPE360	0.26	1	EC-6.3.3-662	2035
298	IPE360	0.492	1	EC-6.3.3-662	2039
299	IPE240	0.271	1	EC-6.3.3-662	2071
300	IPE240	0.15	1	EC-6.3.3-662	2071
301	IPE240	0.193	1	EC-6.2.9.1	2024
302	IPE240	0.143	1	EC-6.3.3-662	2070
303	IPE360	0.24	1	EC-6.3.3-662	2068
304	IPE360	0.789	1	EC-6.3.3-662	2043
305	IPE240	0.392	1	EC-6.3.3-662	2069
306	IPE240	0.273	1	EC-6.3.3-662	2069
307	IPE240	0.15	1	EC-6.3.3-662	2069
308	IPE240	0.153	1	EC-6.3.3-662	2070
309	IPE240	0.273	1	EC-6.3.3-662	2070
310	IPE360	0.276	1	EC-6.3.3-662	2068
311	IPE360	0.45	1	EC-6.3.3-662	2038
312	IPE240	0.33	1	EC-6.3.3-662	2069
313	IPE240	0.193	1	EC-6.3.3-662	2047
314	IPE240	0.193	1	EC-6.2.9.1	2024
315	IPE240	0.144	1	EC-6.3.3-662	2070
316	IPE360	0.226	1	EC-6.3.3-662	2070
317	IPE360	0.481	1	EC-6.3.3-662	2038
318	IPE240	0.446	1	EC-6.3.3-662	2038
319	IPE240	0.321	1	EC-6.3.3-662	2038
320	IPE240	0.194	1	EC-6.3.3-662	2047
321	HE400A	0.447	1	EC-6.3.3-662	2046
322	HE400A	0.464	1	EC-6.2.9.1	2047
323	HE400A	0.585	1	EC-6.2.9.1	2047
324	HE400A	0.567	1	EC-6.2.9.1	2046
325	HE400A	0.536	1	EC-6.3.3-662	2046
326	HE400A	0.461	1	EC-6.3.3-662	2079
327	HE400A	0.516	1	EC-6.3.3-662	2079
328	HE400A	0.676	1	EC-6.2.9.1	2077
329	HE400A	0.578	1	EC-6.2.9.1	2079
330	HE400A	0.537	1	EC-6.3.3-662	2077
331	HE400A	0.471	1	EC-6.3.3-662	2046

332	HE400A	0.513	1	EC-6.3.3-662	2047
333	HE400A	0.47	1	EC-6.2.9.1	2047
334	HE400A	0.451	1	EC-6.3.3-662	2047
335	IPE360	0.503	1	EC-6.3.3-662	2067
336	IPE360	0.781	1	EC-6.3.3-662	2039
337	IPE360	0.5	1	EC-6.3.3-662	2069
338	IPE360	0.779	1	EC-6.3.3-662	2039
339	IPE360	0.506	1	EC-6.3.3-662	2065
340	IPE360	0.811	1	EC-6.3.3-662	2038
341	IPE360	0.497	1	EC-6.3.3-662	2067
342	IPE360	0.86	1	EC-6.3.3-662	2039
343	IPE270	0.556	1	EC-6.3.3-662	2041
344	IPE270	0.847	1	EC-6.3.3-662	2040
345	IPE270	0.854	1	EC-6.3.3-662	2040
346	IPE270	0.842	1	EC-6.3.3-662	2041
348	IPE270	0.847	1	EC-6.3.3-662	2044
349	IPE270	0.854	1	EC-6.3.3-662	2044
350	IPE270	0.837	1	EC-6.3.3-662	2046
351	IPE200	0.19	1	EC-6.3.3-662	2042
352	IPE200	0.387	1	EC-6.3.3-662	2035
353	IPE200	0.314	1	EC-6.3.3-662	2079
354	IPE200	0.197	1	EC-6.3.3-662	2038
356	IPE200	0.224	1	EC-6.3.3-662	2035
357	IPE200	0.404	1	EC-6.3.3-662	2039
358	IPE200	0.299	1	EC-6.3.3-662	2039
359	IPE200	0.181	1	EC-6.3.3-662	2038
360	IPE200	0.27	1	EC-6.3.3-662	2035
361	IPE200	0.215	1	EC-6.3.3-662	2071
362	IPE200	0.302	1	EC-6.3.3-662	2071
363	IPE200	0.344	1	EC-6.3.3-662	2071
364	IPE200	0.174	1	EC-6.3.3-662	2077
365	IPE200	0.313	1	EC-6.3.3-662	2039
366	IPE200	0.477	1	EC-6.3.3-662	2043
367	IPE200	0.46	1	EC-6.3.3-662	2043
368	IPE240	0.142	1	EC-6.3.3-662	2070
369	IPE240	0.257	1	EC-6.3.3-662	2070
370	IPE240	0.207	1	EC-6.3.3-662	2046
371	IPE240	0.429	1	EC-6.3.3-662	2032
372	IPE200	0.23	1	EC-6.3.3-662	2042
373	IPE200	0.43	1	EC-6.3.3-662	2035
374	IPE240	0.273	1	EC-6.3.3-662	2071
375	IPE240	0.15	1	EC-6.3.3-662	2071
376	IPE240	0.279	1	EC-6.3.3-662	2069
377	IPE240	0.156	1	EC-6.3.3-662	2069

378	IPE200	0.347	1	EC-6.3.3-662	2039
379	IPE200	0.235	1	EC-6.3.3-662	2038
380	IPE240	0.143	1	EC-6.3.3-662	2070
381	IPE240	0.387	1	EC-6.3.3-662	2069
382	IPE240	0.269	1	EC-6.3.3-662	2069
383	IPE240	0.148	1	EC-6.3.3-662	2069
384	IPE240	0.24	1	EC-6.3.3-662	2032
385	IPE240	0.374	1	EC-6.3.3-662	2038
386	IPE240	0.255	1	EC-6.3.3-662	2069
387	IPE240	0.129	1	EC-6.3.3-662	2043
388	IPE200	0.264	1	EC-6.3.3-662	2035
389	IPE200	0.446	1	EC-6.3.3-662	2039
390	IPE200	0.339	1	EC-6.3.3-662	2039
391	IPE200	0.219	1	EC-6.3.3-662	2038
392	L100X100X10	0.052	1	EC-6.3.1.1	2041
393	L100X100X10	0.052	1	EC-6.3.1.1	2041
394	L100X100X10	0.053	1	EC-6.3.1.1	2041
395	L100X100X10	0.053	1	EC-6.3.1.1	2041
396	L100X100X10	0.33	1	EC-6.3.1.1	2044
397	L100X100X10	0.31	1	EC-6.3.1.1	2039
398	L100X100X10	0.518	1	EC-6.3.1.1	2032
399	L100X100X10	0.499	1	EC-6.3.1.1	2039
400	L100X100X10	0.053	1	EC-6.3.1.1	2040
401	L100X100X10	0.053	1	EC-6.3.1.1	2040
402	L100X100X10	0.052	1	EC-6.3.1.1	2024
403	L100X100X10	0.052	1	EC-6.3.1.1	2040
404	L100X100X10	0.282	1	EC-6.3.1.1	2045
405	L100X100X10	0.266	1	EC-6.3.1.1	2077
406	L100X100X10	0.316	1	EC-6.3.1.1	2036
407	L100X100X10	0.316	1	EC-6.3.1.1	2035
408	L100X100X10	0.052	1	EC-6.3.1.1	2041

409	L100X100X10	0.052	1	EC-6.3.1.1	2041
410	L100X100X10	0.592	1	EC-6.3.1.1	2079
411	L100X100X10	0.501	1	EC-6.3.1.1	2072
412	L100X100X10	0.053	1	EC-6.3.1.1	2040
413	L100X100X10	0.053	1	EC-6.3.1.1	2040
414	L100X100X10	0.44	1	EC-6.3.1.1	2045
415	L100X100X10	0.402	1	EC-6.3.1.1	2076
416	L100X100X10	0.053	1	EC-6.3.1.1	2040
417	L100X100X10	0.053	1	EC-6.3.1.1	2040
418	L100X100X10	0.353	1	EC-6.3.1.1	2036
419	L100X100X10	0.371	1	EC-6.3.1.1	2046
420	L100X100X10	0.052	1	EC-6.3.1.1	2024
421	L100X100X10	0.052	1	EC-6.3.1.1	2040
422	L100X100X10	0.357	1	EC-6.3.1.1	2075
423	L100X100X10	0.358	1	EC-6.3.1.1	2076
424	IPE360	0.42	1	EC-6.3.3-662	2066
425	IPE360	0.815	1	EC-6.3.3-662	2038
426	IPE360	0.364	1	EC-6.3.3-662	2069
427	IPE360	0.477	1	EC-6.3.3-662	2038
428	L100X100X10	0.812	1	EC-6.3.1.1	2033
429	L100X100X10	0.521	1	EC-6.3.1.1	2069
430	L100X100X10	0.38	1	EC-6.3.1.1	2070
431	L100X100X10	0.565	1	EC-6.3.1.1	2069
432	IPE200	0.276	1	EC-6.3.3-662	2035
433	IPE200	0.218	1	EC-6.3.3-662	2071
434	L100X100X10	0.106	1	EC-6.3.1.1	2036
435	L100X100X10	0.09	1	EC-6.3.1.1	2032

436	L100X100X10	0.242	1	EC-6.3.1.1	2077
437	L100X100X10	0.392	1	EC-6.3.1.1	2036
438	L100X100X10	0.174	1	EC-6.3.1.1	2042
439	L100X100X10	0.369	1	EC-6.3.1.1	2045
440	IPE200	0.306	1	EC-6.3.3-662	2071
441	L100X100X10	0.101	1	EC-6.3.1.1	2064
442	IPE200	0.345	1	EC-6.3.3-662	2071
444	IPE360	0.364	1	EC-6.3.3-662	2064
445	L100X100X10	0.649	1	EC-6.3.1.1	2044
446	L100X100X10	0.455	1	EC-6.3.1.1	2043
447	IPE360	0.388	1	EC-6.3.3-662	2071
448	L100X100X10	0.335	1	EC-6.3.1.1	2034
449	L100X100X10	0.655	1	EC-6.3.1.1	2037
450	IPE200	0.178	1	EC-6.3.3-662	2077
451	L100X100X10	0.066	1	EC-6.3.1.1	2074
452	IPE200	0.319	1	EC-6.3.3-662	2039
453	L100X100X10	0.118	1	EC-6.3.1.1	2032
454	IPE360	0.864	1	EC-6.3.3-662	2039
455	L100X100X10	0.347	1	EC-6.3.1.1	2046
456	L100X100X10	0.332	1	EC-6.3.1.1	2036
457	IPE360	0.533	1	EC-6.3.3-662	2038
458	L100X100X10	0.406	1	EC-6.3.1.1	2042
459	L100X100X10	0.462	1	EC-6.3.1.1	2045
460	IPE200	0.484	1	EC-6.3.3-662	2043
461	L100X100X10	0	1	EC-6.3.1.1	2044
462	IPE200	0.464	1	EC-6.3.3-662	2043
464	IPE270	0.777	1	EC-6.3.3-662	2029
465	IPE270	0.786	1	EC-6.3.3-662	2044
466	IPE360	0.079	1	EC-6.3.3-662	2035
467	IPE360	0.179	1	EC-6.3.3-662	2067
468	IPE270	0.778	1	EC-6.3.3-662	2029
469	IPE270	0.79	1	EC-6.3.3-662	2029

470	IPE270	0.774	1	EC-6.3.3-662	2030
471	IPE270	0.778	1	EC-6.3.3-662	2029
472	IPE360	0.068	1	EC-6.3.3-662	2026
473	IPE360	0.183	1	EC-6.3.3-662	2048
474	IPE270	0.777	1	EC-6.3.3-662	2045
475	IPE270	0.789	1	EC-6.3.3-662	2045
476	IPE270	0.782	1	EC-6.3.3-662	2045
477	IPE270	0.768	1	EC-6.3.2 LTB	2028
478	IPE270	0.78	1	EC-6.3.3-662	2044
479	IPE270	0.791	1	EC-6.3.3-661	2033
480	IPE270	0.796	1	EC-6.3.3-662	2044
481	IPE270	0.768	1	EC-6.3.2 LTB	2028
482	IPE270	0.784	1	EC-6.3.3-662	2029
483	IPE270	0.774	1	EC-6.3.3-662	2028
484	IPE270	0.789	1	EC-6.3.3-662	2028
485	IPE270	0.768	1	EC-6.3.2 LTB	2028
486	IPE270	0.764	1	EC-6.3.2 LTB	2028
487	IPE270	0.768	1	EC-6.3.2 LTB	2028
488	IPE270	0.783	1	EC-6.3.3-662	2044
489	IPE270	0.768	1	EC-6.3.2 LTB	2028
490	IPE270	0.776	1	EC-6.3.3-662	2045
491	IPE270	0.768	1	EC-6.3.2 LTB	2028
492	IPE270	0.777	1	EC-6.3.3-662	2028
493	IPE360	0.201	1	EC-6.3.3-662	2035
494	IPE360	0.25	1	EC-6.3.3-662	2026
495	IPE360	0.122	1	EC-6.3.3-662	2071
496	IPE360	0.191	1	EC-6.3.3-662	2055
497	IPE360	0.714	1	EC-6.3.2 LTB	2028
498	IPE360	0.963	1	EC-6.3.2 LTB	2028
499	IPE360	0.962	1	EC-6.3.2 LTB	2028
500	IPE360	0.645	1	EC-6.3.3-662	2029
501	IPE360	0.206	1	EC-6.3.3-662	2026
502	IPE360	0.261	1	EC-6.3.3-662	2027
503	IPE360	0.129	1	EC-6.3.3-662	2052
504	IPE360	0.201	1	EC-6.3.3-662	2052
505	IPE360	0.714	1	EC-6.3.2 LTB	2028
506	IPE360	0.963	1	EC-6.3.2 LTB	2028
507	IPE360	0.962	1	EC-6.3.2 LTB	2028
508	IPE360	0.644	1	EC-6.3.3-662	2045
509	IPE270	0.767	1	EC-6.3.3-662	2030
510	IPE270	0.763	1	EC-6.3.2 LTB	2028
511	IPE270	0.506	1	EC-6.3.3-662	2040
512	IPE270	0.506	1	EC-6.3.3-662	2040
513	IPE360	0.12	1	EC-6.3.3-662	2018

514	IPE360	0.418	1	EC-6.3.2 LTB	2024
515	IPE270	0.494	1	EC-6.3.2 LTB	2024
516	IPE270	0.494	1	EC-6.3.2 LTB	2024
517	IPE270	0.499	1	EC-6.3.2 LTB	2024
518	IPE270	0.494	1	EC-6.3.2 LTB	2024
519	IPE360	0.12	1	EC-6.3.3-662	2027
520	IPE360	0.422	1	EC-6.3.3-662	2041
521	IPE270	0.511	1	EC-6.3.3-662	2041
522	IPE270	0.51	1	EC-6.3.3-662	2041
523	IPE270	0.507	1	EC-6.3.3-662	2041
524	IPE270	0.503	1	EC-6.3.3-662	2040
525	IPE270	0.507	1	EC-6.3.3-662	2040
526	IPE270	0.502	1	EC-6.3.3-662	2040
527	IPE270	0.507	1	EC-6.3.3-662	2040
528	IPE270	0.497	1	EC-6.3.2 LTB	2024
529	IPE270	0.495	1	EC-6.3.2 LTB	2024
530	IPE270	0.497	1	EC-6.3.2 LTB	2024
531	IPE270	0.495	1	EC-6.3.2 LTB	2024
532	IPE270	0.497	1	EC-6.3.2 LTB	2024
533	IPE270	0.495	1	EC-6.3.2 LTB	2024
534	IPE270	0.508	1	EC-6.3.3-662	2041
535	IPE270	0.513	1	EC-6.3.3-662	2041
536	IPE270	0.507	1	EC-6.3.3-662	2041
537	IPE270	0.512	1	EC-6.3.3-662	2041
538	IPE270	0.505	1	EC-6.3.3-662	2041
539	IPE270	0.51	1	EC-6.3.3-662	2041
540	IPE360	0.12	1	EC-6.3.3-662	2018
541	IPE360	0.159	1	EC-6.3.3-662	2027
542	IPE360	0.152	1	EC-6.3.3-662	2069
543	IPE360	0.152	1	EC-6.3.3-662	2053
544	IPE360	0.628	1	EC-6.3.2 LTB	2024
545	IPE360	0.63	1	EC-6.3.2 LTB	2024
546	IPE360	0.628	1	EC-6.3.2 LTB	2024
547	IPE360	0.419	1	EC-6.3.2 LTB	2024
548	IPE360	0.12	1	EC-6.3.3-662	2027
549	IPE360	0.163	1	EC-6.3.3-662	2043
550	IPE360	0.136	1	EC-6.3.3-662	2071
551	IPE360	0.137	1	EC-6.3.3-662	2071
552	IPE360	0.638	1	EC-6.3.3-662	2041
553	IPE360	0.64	1	EC-6.3.3-662	2041
554	IPE360	0.632	1	EC-6.3.3-662	2041
555	IPE360	0.425	1	EC-6.3.3-662	2041
556	IPE270	0.502	1	EC-6.3.2 LTB	2024
557	IPE270	0.499	1	EC-6.3.2 LTB	2024

558	IPE270	0.619	1	EC-6.3.2 LTB	2024
559	IPE270	0.624	1	EC-6.3.2 LTB	2024
560	IPE270	0.619	1	EC-6.3.2 LTB	2024
561	IPE270	0.624	1	EC-6.3.2 LTB	2024
562	IPE270	0.618	1	EC-6.3.2 LTB	2024
563	IPE270	0.628	1	EC-6.3.2 LTB	2024
564	IPE270	0.618	1	EC-6.3.2 LTB	2024
565	IPE270	0.623	1	EC-6.3.2 LTB	2024
566	IPE270	0.618	1	EC-6.3.2 LTB	2024
567	IPE270	0.628	1	EC-6.3.2 LTB	2024
568	IPE270	0.618	1	EC-6.3.2 LTB	2024
569	IPE270	0.623	1	EC-6.3.2 LTB	2024
570	IPE270	0.619	1	EC-6.3.2 LTB	2024
571	IPE270	0.624	1	EC-6.3.2 LTB	2024
572	IPE270	0.619	1	EC-6.3.2 LTB	2024
573	IPE270	0.624	1	EC-6.3.2 LTB	2024
574	IPE270	0.629	1	EC-6.3.2 LTB	2024
575	IPE270	0.625	1	EC-6.3.2 LTB	2024
576	IPE270	0.619	1	EC-6.3.2 LTB	2024
577	IPE270	0.624	1	EC-6.3.2 LTB	2024
578	IPE270	0.618	1	EC-6.3.2 LTB	2024
579	IPE270	0.628	1	EC-6.3.2 LTB	2024
580	IPE270	0.618	1	EC-6.3.2 LTB	2024
581	IPE270	0.623	1	EC-6.3.2 LTB	2024
582	IPE270	0.618	1	EC-6.3.2 LTB	2024
583	IPE270	0.628	1	EC-6.3.2 LTB	2024
584	IPE270	0.618	1	EC-6.3.2 LTB	2024
585	IPE270	0.623	1	EC-6.3.2 LTB	2024
586	IPE270	0.619	1	EC-6.3.2 LTB	2024
587	IPE270	0.624	1	EC-6.3.2 LTB	2024
588	IPE270	0.619	1	EC-6.3.2 LTB	2024
589	IPE270	0.624	1	EC-6.3.2 LTB	2024
590	IPE270	0.619	1	EC-6.3.2 LTB	2024
591	IPE270	0.624	1	EC-6.3.2 LTB	2024
592	IPE270	0.736	1	EC-6.3.2 LTB	2024
593	IPE270	0.74	1	EC-6.3.2 LTB	2024
594	IPE270	0.736	1	EC-6.3.2 LTB	2024
595	IPE270	0.74	1	EC-6.3.2 LTB	2024
596	IPE270	0.735	1	EC-6.3.2 LTB	2024
597	IPE270	0.784	1	EC-6.3.3-662	2024
598	IPE270	0.735	1	EC-6.3.2 LTB	2024
599	IPE270	0.739	1	EC-6.3.2 LTB	2024
600	IPE270	0.735	1	EC-6.3.2 LTB	2024
601	IPE270	0.776	1	EC-6.3.3-662	2026

602	IPE270	0.735	1	EC-6.3.2 LTB	2024
603	IPE270	0.739	1	EC-6.3.2 LTB	2024
604	IPE270	0.736	1	EC-6.3.2 LTB	2024
605	IPE270	0.74	1	EC-6.3.2 LTB	2024
606	IPE270	0.736	1	EC-6.3.2 LTB	2024
607	IPE270	0.74	1	EC-6.3.2 LTB	2024
608	IPE270	0.776	1	EC-6.3.3-662	2025
609	IPE270	0.773	1	EC-6.3.3-662	2042
610	IPE270	0.736	1	EC-6.3.2 LTB	2024
611	IPE270	0.766	1	EC-6.3.3-662	2024
612	IPE270	0.735	1	EC-6.3.2 LTB	2024
613	IPE270	0.785	1	EC-6.3.3-662	2024
614	IPE270	0.735	1	EC-6.3.2 LTB	2024
615	IPE270	0.739	1	EC-6.3.2 LTB	2024
616	IPE270	0.735	1	EC-6.3.2 LTB	2024
617	IPE270	0.785	1	EC-6.3.3-662	2041
618	IPE270	0.735	1	EC-6.3.2 LTB	2024
619	IPE270	0.739	1	EC-6.3.2 LTB	2024
620	IPE270	0.736	1	EC-6.3.2 LTB	2024
621	IPE270	0.74	1	EC-6.3.2 LTB	2024
622	IPE270	0.736	1	EC-6.3.2 LTB	2024
623	IPE270	0.759	1	EC-6.3.3-662	2041
624	IPE270	0.736	1	EC-6.3.2 LTB	2024
625	IPE270	0.74	1	EC-6.3.2 LTB	2024
626	HE240A	0.263	1	EC-6.3.3-662	2040
628	HE240A	0.264	1	EC-6.3.3-662	2040
630	HE240A	0.269	1	EC-6.3.3-662	2040
632	HE240A	0.258	1	EC-6.3.3-662	2040
634	HE240A	0.262	1	EC-6.3.3-662	2041
636	HE240A	0.269	1	EC-6.3.3-662	2041
638	HE240A	0.28	1	EC-6.3.3-662	2040
640	HE240A	0.28	1	EC-6.3.3-662	2040
642	HE240A	0.27	1	EC-6.3.3-662	2041
644	HE240A	0.281	1	EC-6.3.3-662	2041
646	HE240A	0.277	1	EC-6.3.3-662	2041
648	HE240A	0.276	1	EC-6.3.3-662	2041
661	HE240A	0.264	1	EC-6.3.3-662	2041
678	HE240A	0.279	1	EC-6.3.3-662	2041
684	L100X100X10	0.134	1	EC-6.3.1.1	2008
685	L100X100X10	0.069	1	EC-6.3.1.1	2038
686	L100X100X10	0.141	1	EC-6.3.1.1	2043

687	L100X100X10	0.153	1	EC-6.3.1.1	2008
688	L100X100X10	0.102	1	EC-6.3.1.1	2038
689	L100X100X10	0.151	1	EC-6.3.1.1	2043
690	L100X100X10	0.262	1	EC-6.3.1.1	2043
691	L100X100X10	0.223	1	EC-6.3.1.1	2008
692	L100X100X10	0.169	1	EC-6.3.1.1	2044
693	L100X100X10	0.096	1	EC-6.3.1.1	2076
694	L100X100X10	0.123	1	EC-6.3.1.1	2008
695	L100X100X10	0.196	1	EC-6.3.1.1	2043
696	L100X100X10	0.23	1	EC-6.3.1.1	2008
697	L100X100X10	0.089	1	EC-6.3.1.1	2044
698	L100X100X10	0.074	1	EC-6.3.1.1	2061
699	L100X100X10	0.127	1	EC-6.3.1.1	2008
700	L100X100X10	0.118	1	EC-6.3.1.1	2063
701	L100X100X10	0.115	1	EC-6.3.1.1	2056
702	L100X100X10	0.166	1	EC-6.3.1.1	2008
703	L100X100X10	0.118	1	EC-6.3.1.1	2042
704	L100X100X10	0.099	1	EC-6.3.1.1	2073
705	L100X100X10	0.12	1	EC-6.3.1.1	2025
706	L100X100X10	0.161	1	EC-6.3.1.1	2008
707	L100X100X10	0.12	1	EC-6.3.1.1	2078
708	L100X100X10	0.12	1	EC-6.3.1.1	2078
709	L100X100X10	0.242	1	EC-6.3.1.1	2041
710	L100X100X10	0.15	1	EC-6.3.1.1	2046
711	L100X100X10	0.097	1	EC-6.3.1.1	2056

712	L100X100X10	0.112	1	EC-6.3.1.1	2042
713	L100X100X10	0.211	1	EC-6.3.1.1	2042
714	L100X100X10	0.165	1	EC-6.3.1.1	2009
715	L100X100X10	0.103	1	EC-6.3.1.1	2074
716	L100X100X10	0.105	1	EC-6.3.1.1	2077
717	L100X100X10	0.159	1	EC-6.3.1.1	2041
718	L100X100X10	0.262	1	EC-6.3.1.1	2041
719	L100X100X10	0.123	1	EC-6.3.1.1	2059
720	L100X100X10	0.154	1	EC-6.3.1.1	2041
721	L100X100X10	0.119	1	EC-6.3.1.1	2056
722	L100X100X10	0.139	1	EC-6.3.1.1	2043
723	L100X100X10	0.098	1	EC-6.3.1.1	2008
724	L100X100X10	0.081	1	EC-6.3.1.1	2056
725	L100X100X10	0.123	1	EC-6.3.1.1	2042
726	L100X100X10	0.114	1	EC-6.3.1.1	2008
727	L100X100X10	0.103	1	EC-6.3.1.1	2073
728	IPE270	0.427	1	EC-6.3.3-662	2031
729	IPE270	0.438	1	EC-6.3.3-662	2044
730	IPE270	0.426	1	EC-6.3.3-662	2031
731	IPE270	0.442	1	EC-6.3.3-662	2044
732	IPE270	0.426	1	EC-6.3.3-662	2029
733	IPE270	0.397	1	EC-6.3.2 LTB	2028
734	IPE270	0.428	1	EC-6.3.3-662	2029
735	IPE270	0.457	1	EC-6.3.3-662	2031
736	IPE270	0.424	1	EC-6.3.3-662	2044
737	IPE270	0.397	1	EC-6.3.2 LTB	2028
738	IPE270	0.424	1	EC-6.3.3-662	2028
739	IPE270	0.479	1	EC-6.3.3-662	2031
740	IPE270	0.426	1	EC-6.3.3-662	2028
741	IPE270	0.447	1	EC-6.3.3-662	2030
742	IPE270	0.425	1	EC-6.3.3-662	2028
743	IPE270	0.432	1	EC-6.3.3-662	2030

744	IPE270	0.397	1	EC-6.3.2 LTB	2028
745	IPE270	0.401	1	EC-6.3.3-662	2034
746	IPE270	0.428	1	EC-6.3.3-662	2029
747	IPE270	0.42	1	EC-6.3.3-662	2044
748	IPE270	0.426	1	EC-6.3.3-662	2029
749	IPE270	0.397	1	EC-6.3.2 LTB	2028
750	IPE270	0.427	1	EC-6.3.3-662	2029
751	IPE270	0.469	1	EC-6.3.3-662	2045
752	IPE270	0.426	1	EC-6.3.3-662	2044
753	IPE270	0.397	1	EC-6.3.2 LTB	2028
754	IPE270	0.427	1	EC-6.3.3-662	2044
755	IPE270	0.493	1	EC-6.3.3-662	2046
756	IPE270	0.428	1	EC-6.3.3-662	2030
757	IPE270	0.449	1	EC-6.3.3-662	2046
758	IPE270	0.428	1	EC-6.3.3-662	2030
759	IPE270	0.421	1	EC-6.3.3-662	2030
760	IPE270	0.429	1	EC-6.3.3-662	2030
761	IPE270	0.431	1	EC-6.3.3-662	2030
762	HE240A	0.399	1	EC-6.3.3-662	2044
763	HE240A	0.431	1	EC-6.3.3-662	2045
764	HE240A	0.508	1	EC-6.3.3-662	2045
765	HE240A	0.513	1	EC-6.3.3-662	2044
766	HE240A	0.461	1	EC-6.3.3-662	2045
767	HE240A	0.503	1	EC-6.3.2 LTB	2075
768	HE240A	0.571	1	EC-6.3.3-662	2077
769	HE240A	0.558	1	EC-6.3.3-662	2073
770	HE240A	0.527	1	EC-6.3.3-662	2045
771	HE240A	0.493	1	EC-6.3.3-662	2046
772	HE240A	0.435	1	EC-6.3.3-662	2045
773	HE240A	0.403	1	EC-6.3.3-662	2045
774	HE240A	0.481	1	EC-6.3.3-662	2045
775	HE240A	0.469	1	EC-6.3.3-662	2044
778	IPE270	0.596	1	EC-6.3.3-662	2031
779	IPE270	0.613	1	EC-6.3.3-662	2033
780	IPE270	0.595	1	EC-6.3.3-662	2031
781	IPE270	0.622	1	EC-6.3.3-662	2033
782	IPE270	0.593	1	EC-6.3.3-662	2029
783	IPE270	0.619	1	EC-6.3.3-662	2024
784	IPE270	0.594	1	EC-6.3.3-662	2045
785	IPE270	0.624	1	EC-6.3.3-662	2031
786	IPE270	0.588	1	EC-6.3.3-662	2046
787	IPE270	0.611	1	EC-6.3.3-662	2026
788	IPE270	0.589	1	EC-6.3.3-662	2028
789	IPE270	0.648	1	EC-6.3.3-662	2031

790	IPE270	0.592	1	EC-6.3.3-662	2028
791	IPE270	0.616	1	EC-6.3.3-662	2030
792	IPE270	0.592	1	EC-6.3.3-662	2030
793	IPE270	0.601	1	EC-6.3.3-662	2030
794	IPE270	0.611	1	EC-6.3.3-662	2025
795	IPE270	0.608	1	EC-6.3.3-662	2042
796	IPE270	0.598	1	EC-6.3.3-662	2031
797	IPE270	0.598	1	EC-6.3.3-662	2024
798	IPE270	0.594	1	EC-6.3.3-662	2029
799	IPE270	0.619	1	EC-6.3.3-662	2024
800	IPE270	0.593	1	EC-6.3.3-662	2029
801	IPE270	0.637	1	EC-6.3.3-662	2045
802	IPE270	0.592	1	EC-6.3.3-662	2044
803	IPE270	0.619	1	EC-6.3.3-662	2041
804	IPE270	0.596	1	EC-6.3.3-662	2046
805	IPE270	0.668	1	EC-6.3.3-662	2046
806	IPE270	0.6	1	EC-6.3.3-662	2046
807	IPE270	0.623	1	EC-6.3.3-662	2046
808	IPE270	0.6	1	EC-6.3.3-662	2030
809	IPE270	0.594	1	EC-6.3.3-662	2030
810	IPE270	0.6	1	EC-6.3.3-662	2030
811	IPE270	0.606	1	EC-6.3.3-662	2030
812	HE240A	0.178	1	EC-6.3.3-662	2041
813	HE240A	0.189	1	EC-6.3.3-662	2040
814	HE240A	0.241	1	EC-6.3.3-662	2072
815	HE240A	0.251	1	EC-6.3.3-662	2074
816	HE240A	0.241	1	EC-6.3.3-662	2072
817	HE240A	0.292	1	EC-6.3.3-662	2072
818	HE240A	0.326	1	EC-6.3.3-662	2074
819	HE240A	0.307	1	EC-6.3.3-662	2074
820	HE240A	0.287	1	EC-6.3.3-662	2074
821	HE240A	0.239	1	EC-6.3.3-662	2072
822	HE240A	0.197	1	EC-6.3.3-662	2074
823	HE240A	0.188	1	EC-6.3.3-662	2074
824	HE240A	0.245	1	EC-6.3.3-662	2074
825	HE240A	0.211	1	EC-6.3.3-662	2072
826	IPE360	0.565	1	EC-6.3.3-662	2067
827	IPE360	0.395	1	EC-6.3.3-662	2064
828	IPE360	0.375	1	EC-6.3.3-662	2071
829	IPE360	0.523	1	EC-6.3.3-662	2066
831	IPE360	0.527	1	EC-6.3.3-662	2067
833	HE200B	0.33	1	EC-6.3.1.1	2037
834	HE200B	0.849	1	EC-6.3.1.1	2067
835	HE200B	0.846	1	EC-6.3.1.1	2064

836	HE200B	0.335	1	EC-6.3.1.1	2033
837	HE400A	0.65	1	EC-6.3.3-662	2067
838	HE400A	0.632	1	EC-6.3.3-662	2064
839	IPE360	0.165	1	EC-6.3.3-662	2035
841	IPE360	0.196	1	EC-6.3.3-662	2071
843	IPE360	0.251	1	EC-6.3.3-662	2026
845	L120X120X12	0.573	1	EC-6.3.1.1	2048
846	L120X120X12	0.933	1	EC-6.3.1.1	2051
847	L120X120X12	0.932	1	EC-6.3.1.1	2052
848	L120X120X12	0.594	1	EC-6.3.1.1	2067
849	HE400A	0.401	1	EC-6.3.3-662	2067
850	HE400A	0.391	1	EC-6.3.3-662	2064
851	HE180A	0.406	1	EC-6.3.1.1	2067
852	HE180A	0.778	1	EC-6.3.1.1	2067
853	HE180A	0.76	1	EC-6.3.1.1	2064
854	HE180A	0.396	1	EC-6.3.1.1	2064
855	IPE360	0.501	1	EC-6.3.3-662	2066
856	HE200B	0.289	1	EC-6.3.1.1	2036
857	HE200B	0.833	1	EC-6.3.1.1	2065
858	IPE360	0.498	1	EC-6.3.3-662	2065
859	HE200B	0.832	1	EC-6.3.1.1	2066
860	HE200B	0.285	1	EC-6.3.1.1	2032
861	HE400A	0.634	1	EC-6.3.3-662	2065
862	HE400A	0.617	1	EC-6.3.3-662	2066
863	L120X120X12	0.433	1	EC-6.3.1.1	2066
864	IPE360	0.17	1	EC-6.3.3-662	2069
865	L120X120X12	0.659	1	EC-6.3.1.1	2065
866	L120X120X12	0.661	1	EC-6.3.1.1	2070
867	L120X120X12	0.464	1	EC-6.3.1.1	2065
868	HE400A	0.39	1	EC-6.3.3-662	2065
869	HE400A	0.38	1	EC-6.3.3-662	2066
870	HE180A	0.4	1	EC-6.3.1.1	2065
871	IPE360	0.555	1	EC-6.3.3-662	2065
872	HE180A	0.765	1	EC-6.3.1.1	2065
873	HE180A	0.752	1	EC-6.3.1.1	2066
874	HE180A	0.392	1	EC-6.3.1.1	2066
875	IPE360	0.5	1	EC-6.3.3-662	2066
876	HE200B	0.325	1	EC-6.3.1.1	2037

877	HE200B	0.834	1	EC-6.3.1.1	2065
878	IPE360	0.542	1	EC-6.3.3-662	2065
879	HE200B	0.839	1	EC-6.3.1.1	2066
880	HE200B	0.331	1	EC-6.3.1.1	2033
881	HE400A	0.628	1	EC-6.3.3-662	2065
882	HE400A	0.634	1	EC-6.3.3-662	2066
883	IPE360	0.384	1	EC-6.3.3-662	2066
884	L120X120X12	0.537	1	EC-6.3.1.1	2066
885	IPE360	0.264	1	EC-6.3.3-662	2027
886	L120X120X12	0.872	1	EC-6.3.1.1	2053
887	IPE360	0.374	1	EC-6.3.3-662	2069
888	L120X120X12	0.875	1	EC-6.3.1.1	2050
889	L120X120X12	0.512	1	EC-6.3.1.1	2049
890	HE400A	0.388	1	EC-6.3.3-662	2065
891	HE400A	0.394	1	EC-6.3.3-662	2066
892	HE180A	0.396	1	EC-6.3.1.1	2065
893	IPE360	0.578	1	EC-6.3.3-662	2067
894	HE180A	0.76	1	EC-6.3.1.1	2065
895	HE180A	0.75	1	EC-6.3.1.1	2066
896	HE180A	0.392	1	EC-6.3.1.1	2066
897	IPE360	0.374	1	EC-6.3.3-662	2032
898	HE200B	0.289	1	EC-6.3.1.1	2065
899	HE200B	0.811	1	EC-6.3.1.1	2067
900	IPE360	0.527	1	EC-6.3.3-662	2067
901	HE200B	0.816	1	EC-6.3.1.1	2064
902	HE200B	0.265	1	EC-6.3.1.1	2064
903	HE400A	0.612	1	EC-6.3.3-662	2067
904	HE400A	0.615	1	EC-6.3.3-662	2064
905	L120X120X12	0.346	1	EC-6.3.1.1	2064
906	IPE360	0.169	1	EC-6.3.3-662	2043
907	L120X120X12	0.545	1	EC-6.3.1.1	2071
908	L120X120X12	0.546	1	EC-6.3.1.1	2064
909	L120X120X12	0.308	1	EC-6.3.1.1	2067
910	HE400A	0.377	1	EC-6.3.3-662	2067
911	HE400A	0.381	1	EC-6.3.3-662	2064
912	HE180A	0.39	1	EC-6.3.1.1	2067
913	IPE360	0.565	1	EC-6.3.3-662	2065
914	HE180A	0.748	1	EC-6.3.1.1	2067

915	HE180A	0.738	1	EC-6.3.1.1	2064
916	HE180A	0.385	1	EC-6.3.1.1	2064
917	L100X100X10	0.714	1	EC-6.3.1.1	2046
918	L100X100X10	0.636	1	EC-6.3.1.1	2036
919	L100X100X10	0.68	1	EC-6.3.1.1	2047
920	L100X100X10	0.824	1	EC-6.3.1.1	2046
921	L100X100X10	0.602	1	EC-6.3.1.1	2036
922	L100X100X10	0.862	1	EC-6.3.1.1	2047
1014	L100X100X10	0.341	1	EC-6.3.3-661	2044
1016	IPE270	0.442	1	EC-6.3.3-662	2033
1018	L100X100X10	0.55	1	EC-6.3.3-661	2032
1020	IPE270	0.582	1	EC-6.3.3-662	2033
1022	IPE360	0.448	1	EC-6.3.3-662	2066
1023	L100X100X10	0.372	1	EC-6.3.3-661	2032
1025	L100X100X10	0.288	1	EC-6.3.3-661	2032
1027	IPE360	0.509	1	EC-6.3.3-662	2067
1029	L100X100X10	0.518	1	EC-6.3.3-661	2036
1030	IPE360	0.629	1	EC-6.3.3-662	2037
1032	L100X100X10	0.634	1	EC-6.3.3-661	2037
1034	IPE360	0.465	1	EC-6.3.3-662	2037
1036	L100X100X10	0.404	1	EC-6.3.3-661	2036
1038	IPE270	0.497	1	EC-6.3.3-662	2036
1040	L100X100X10	0.334	1	EC-6.3.3-661	2037
1042	IPE270	0.406	1	EC-6.3.3-662	2045
1044	L100X100X10	0.151	1	EC-6.3.3-661	2033
1045	IPE270	0.413	1	EC-6.3.3-662	2043
1047	L100X100X10	0.325	1	EC-6.3.3-661	2032
1049	IPE270	0.465	1	EC-6.3.3-662	2033
1051	L100X100X10	0.166	1	EC-6.3.3-661	2032
1053	IPE360	0.404	1	EC-6.3.3-662	2066

1054	L100X100X10	0.251	1	EC-6.3.3-661	2032
1056	IPE360	0.527	1	EC-6.3.3-662	2065
1058	L100X100X10	0.55	1	EC-6.3.3-661	2036
1059	IPE360	0.676	1	EC-6.3.3-662	2037
1061	L100X100X10	0.785	1	EC-6.3.3-661	2037
1063	IPE360	0.507	1	EC-6.3.3-662	2037
1065	L100X100X10	0.632	1	EC-6.3.3-661	2036
1067	IPE270	0.597	1	EC-6.3.3-662	2037
1069	L100X100X10	0.441	1	EC-6.3.3-661	2036
1071	IPE270	0.476	1	EC-6.3.3-662	2036
1073	L100X100X10	0.401	1	EC-6.3.3-661	2037
1077	IPE240	0.137	1	EC-6.3.3-662	2070
1078	IPE200	0.214	1	EC-6.3.3-662	2042
1080	IPE240	0.19	1	EC-6.3.3-662	2034
1083	IPE200	0.229	1	EC-6.3.3-662	2042
1086	IPE200	0.427	1	EC-6.3.3-662	2035
1088	IPE360	0.4	1	EC-6.3.3-662	2038
1089	IPE200	0.342	1	EC-6.3.3-662	2071
1091	IPE360	0.433	1	EC-6.3.3-662	2038
1093	IPE240	0.267	1	EC-6.3.3-662	2071
1094	IPE200	0.331	1	EC-6.3.3-662	2079
1096	IPE240	0.268	1	EC-6.3.3-662	2069
1098	IPE200	0.236	1	EC-6.3.3-662	2038
1100	IPE200	0.346	1	EC-6.3.3-662	2039
1103	IPE200	0.286	1	EC-6.3.3-662	2071
1105	IPE240	0.172	1	EC-6.2.9.1	2024
1107	IPE240	0.172	1	EC-6.2.9.1	2024
1109	IPE200	0.263	1	EC-6.3.3-662	2035
1112	IPE360	0.428	1	EC-6.3.3-662	2043
1113	IPE200	0.458	1	EC-6.3.3-662	2043
1115	IPE360	0.483	1	EC-6.3.3-662	2038
1117	IPE200	0.444	1	EC-6.3.3-662	2039
1119	IPE200	0.456	1	EC-6.3.3-662	2043
1121	IPE240	0.382	1	EC-6.3.3-662	2069
1122	IPE200	0.427	1	EC-6.3.3-662	2039
1124	IPE240	0.357	1	EC-6.3.3-662	2038
1126	IPE200	0.338	1	EC-6.3.3-662	2039
1129	IPE240	0.264	1	EC-6.3.3-662	2069
1130	IPE200	0.322	1	EC-6.3.3-662	2039

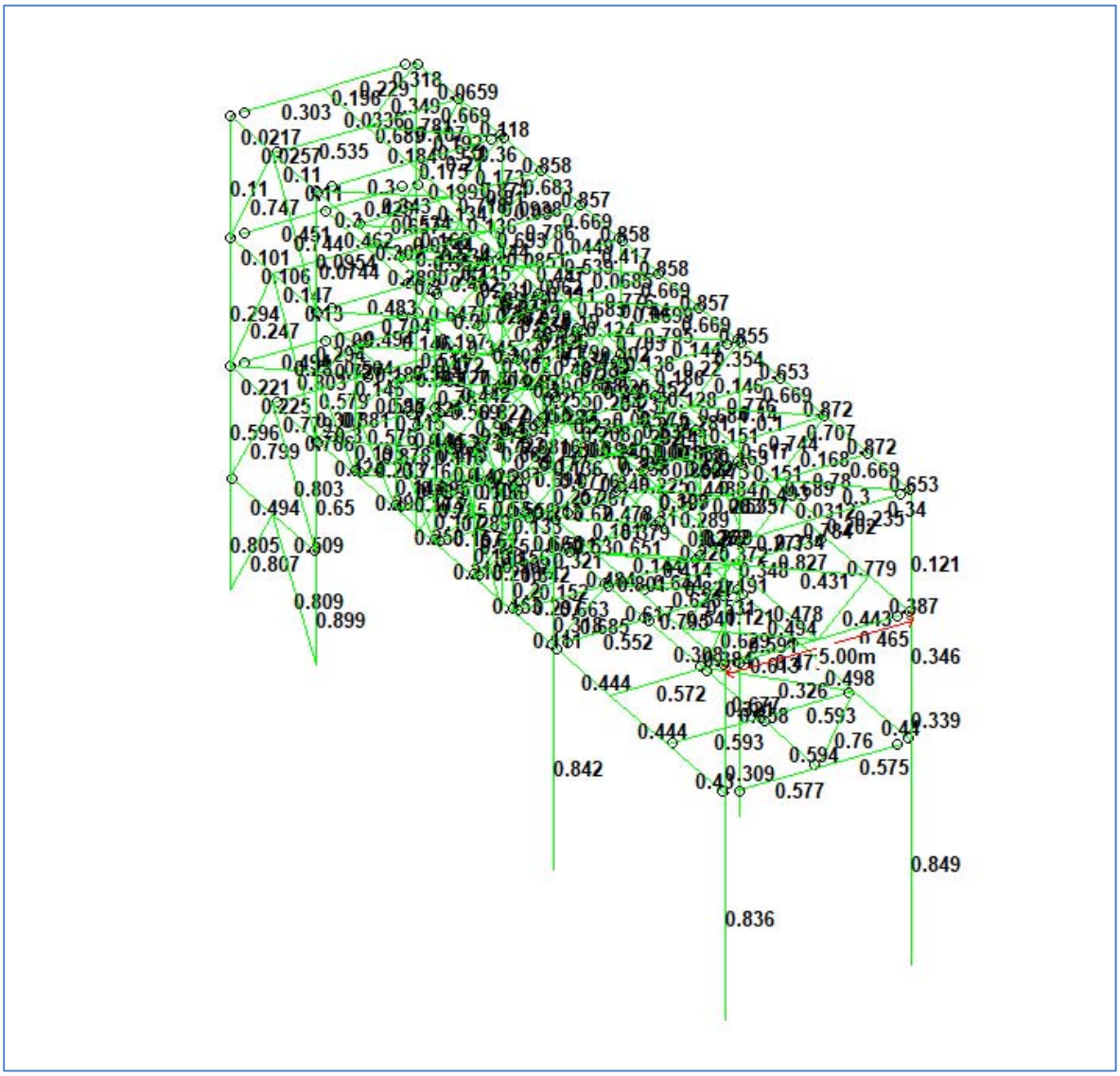
1132	IPE240	0.245	1	EC-6.3.3-662	2069
1134	IPE200	0.22	1	EC-6.3.3-662	2038
1137	IPE240	0.423	1	EC-6.3.3-662	2032
1139	IPE200	0.372	1	EC-6.3.3-662	2035
1141	IPE360	0.284	1	EC-6.3.3-662	2068
1143	IPE200	0.246	1	EC-6.3.3-662	2035
1145	IPE200	0.424	1	EC-6.3.3-662	2035
1147	IPE200	0.276	1	EC-6.3.3-662	2035
1149	IPE360	0.487	1	EC-6.3.3-662	2069
1151	IPE200	0.198	1	EC-6.3.3-662	2071
1153	IPE360	0.534	1	EC-6.3.3-662	2038
1156	IPE200	0.219	1	EC-6.3.3-662	2071
1158	IPE200	0.306	1	EC-6.3.3-662	2071
1160	IPE240	0.236	1	EC-6.3.3-662	2032
1162	IPE200	0.213	1	EC-6.3.3-662	2077
1164	IPE360	0.234	1	EC-6.3.3-662	2070
1166	IPE200	0.158	1	EC-6.3.3-662	2077
1168	IPE200	0.26	1	EC-6.3.3-662	2035
1170	IPE200	0.178	1	EC-6.3.3-662	2077
1172	IPE360	0.5	1	EC-6.3.3-662	2071
1174	IPE200	0.289	1	EC-6.3.3-662	2039
1176	IPE360	0.57	1	EC-6.3.3-662	2038
1179	IPE200	0.319	1	EC-6.3.3-662	2039
1181	IPE200	0.487	1	EC-6.3.3-662	2043
1272	IPE270	0.768	1	EC-6.3.2 LTB	2028
1275	IPE270	0.406	1	EC-6.3.3-662	2044
1277	IPE270	0.791	1	EC-6.3.3-661	2033
1279	IPE360	0.169	1	EC-6.3.3-662	2035
1282	IPE360	0.206	1	EC-6.3.3-662	2035
1285	IPE360	0.172	1	EC-6.3.3-662	2071
1287	IPE360	0.961	1	EC-6.3.2 LTB	2028
1290	IPE360	0.642	1	EC-6.3.2 LTB	2028
1293	IPE360	0.857	1	EC-6.3.2 LTB	2028
1296	IPE360	0.366	1	EC-6.3.3-662	2029
1298	IPE270	0.768	1	EC-6.3.2 LTB	2028
1301	IPE270	0.411	1	EC-6.3.3-662	2029
1303	IPE270	0.773	1	EC-6.3.3-662	2028
1306	IPE270	0.401	1	EC-6.3.3-662	2042
1308	IPE270	0.768	1	EC-6.3.2 LTB	2028
1311	IPE360	0.187	1	EC-6.3.3-662	2026
1314	IPE360	0.176	1	EC-6.3.3-662	2026
1316	IPE360	0.205	1	EC-6.3.3-662	2027
1319	IPE360	0.642	1	EC-6.3.2 LTB	2028
1322	IPE360	0.961	1	EC-6.3.2 LTB	2028

1324	IPE360	0.857	1	EC-6.3.2 LTB	2028
1326	IPE360	0.365	1	EC-6.3.3-662	2045
1329	IPE270	0.768	1	EC-6.3.2 LTB	2028
1331	IPE270	0.41	1	EC-6.3.3-662	2044
1334	IPE270	0.768	1	EC-6.3.2 LTB	2028
1336	IPE270	0.402	1	EC-6.3.3-662	2045
1343	IPE270	0.427	1	EC-6.3.3-662	2032
1346	IPE360	0.415	1	EC-6.3.3-662	2066
1348	IPE270	0.375	1	EC-6.3.3-662	2044
1351	IPE360	0.384	1	EC-6.3.3-662	2064
1401	IPE270	0.469	1	EC-6.3.3-662	2045
1500	L100X100X10	0.062	1	EC-6.3.3-661	2011
1501	L100X100X10	0.061	1	EC-6.3.3-661	2011
1502	L100X100X10	0.084	1	EC-6.3.3-661	2076
1503	L100X100X10	0.109	1	EC-6.3.3-661	2034
1504	L100X100X10	0.108	1	EC-6.3.3-661	2034
1505	L100X100X10	0.141	1	EC-6.3.3-661	2038
1506	L100X100X10	0.154	1	EC-6.3.3-661	2015
1507	L100X100X10	0.153	1	EC-6.3.3-661	2015
1508	L100X100X10	0.189	1	EC-6.3.3-661	2011
1509	L100X100X10	0.188	1	EC-6.3.3-661	2011
1510	L100X100X10	0.178	1	EC-6.3.3-661	2063
1511	L100X100X10	0.176	1	EC-6.3.3-661	2063
1512	L100X100X10	0.177	1	EC-6.3.3-661	2063
1513	L100X100X10	0.15	1	EC-6.3.3-661	2063
1514	L100X100X10	0.151	1	EC-6.3.3-661	2063
1515	L100X100X10	0.146	1	EC-6.3.3-661	2063
1516	L100X100X10	0.124	1	EC-6.3.3-661	2062
1517	L100X100X10	0.125	1	EC-6.3.3-661	2062

1518	L100X100X10	0.117	1	EC-6.3.3-661	2062
1519	L100X100X10	0.111	1	EC-6.3.3-661	2058
1520	L100X100X10	0.111	1	EC-6.3.3-661	2058
1521	L100X100X10	0.102	1	EC-6.3.3-661	2058
1522	L100X100X10	0.114	1	EC-6.3.3-661	2008
1523	L100X100X10	0.218	1	EC-6.3.3-661	2059
1525	L100X100X10	0.079	1	EC-6.3.3-661	2031
1526	L100X100X10	0.078	1	EC-6.3.3-661	2031
1527	L100X100X10	0.099	1	EC-6.3.3-661	2031
1528	L100X100X10	0.151	1	EC-6.3.3-661	2015
1529	L100X100X10	0.15	1	EC-6.3.3-661	2015
1530	L100X100X10	0.201	1	EC-6.3.3-661	2015
1531	L100X100X10	0.2	1	EC-6.3.3-661	2015
1532	L100X100X10	0.194	1	EC-6.3.3-661	2063
1533	L100X100X10	0.216	1	EC-6.3.3-661	2063
1534	L100X100X10	0.217	1	EC-6.3.3-661	2063
1535	L100X100X10	0.207	1	EC-6.3.3-661	2063
1536	L100X100X10	0.207	1	EC-6.3.3-661	2063
1537	L100X100X10	0.211	1	EC-6.3.3-661	2063
1538	L100X100X10	0.193	1	EC-6.3.3-661	2063
1539	L100X100X10	0.194	1	EC-6.3.3-661	2063
1540	L100X100X10	0.168	1	EC-6.3.3-661	2063
1541	L100X100X10	0.166	1	EC-6.3.3-661	2078
1542	L100X100X10	0.167	1	EC-6.3.3-661	2078
1543	L100X100X10	0.139	1	EC-6.3.3-661	2078

1544	L100X100X10	0.084	1	EC-6.3.3-661	2078
1545	L100X100X10	0.085	1	EC-6.3.3-661	2078
1546	L100X100X10	0.056	1	EC-6.3.3-661	2031
1611	IPE240	0.193	1	EC-6.2.9.1	2024
1612	IPE240	0.193	1	EC-6.2.9.1	2024
1613	L100X100X10	0.107	1	EC-6.3.1.1	2064
1614	L100X100X10	0	1	EC-6.3.1.1	2016
1671	IPE270	0.406	1	EC-6.2.9.1	2074
1672	IPE270	0.288	1	EC-6.2.9.1	2075
1673	L100X100X10	0.202	1	EC-6.3.1.1	2075
1674	L100X100X10	0.362	1	EC-6.3.1.1	2059
1675	L100X100X10	0.307	1	EC-6.3.1.1	2061
1676	L100X100X10	0.319	1	EC-6.3.1.1	2058
1679	L100X100X10	0.106	1	EC-6.3.1.1	2036
1680	L100X100X10	0.09	1	EC-6.3.1.1	2032
1681	IPE360	0.444	1	EC-6.3.3-662	2038
1682	L100X100X10	0.107	1	EC-6.3.1.1	2064
1683	IPE360	0.785	1	EC-6.3.3-662	2039
1684	L100X100X10	0.101	1	EC-6.3.1.1	2064
1685	L100X100X10	0.7	1	EC-6.3.1.1	2040
1686	L100X100X10	0.46	1	EC-6.3.1.1	2047
1687	L100X100X10	0.318	1	EC-6.3.1.1	2076
1688	L100X100X10	0.459	1	EC-6.3.1.1	2039
1689	L100X100X10	0.217	1	EC-6.3.1.1	2078
1690	L100X100X10	0.38	1	EC-6.3.1.1	2075
1691	L100X100X10	0.168	1	EC-6.3.1.1	2046
1692	L100X100X10	0.406	1	EC-6.3.1.1	2041
1696	HE400A	0.523	1	EC-6.3.3-662	2076

1697	HE400A	0.586	1	EC-6.2.9.1	2076
1698	HE400A	0.545	1	EC-6.3.3-662	2078
1699	HE400A	0.479	1	EC-6.3.3-662	2043
1700	HE400A	0.594	1	EC-6.2.9.1	2079
1701	HE400A	0.666	1	EC-6.2.9.1	2079
1702	HE400A	0.61	1	EC-6.2.9.1	2077
1703	HE400A	0.544	1	EC-6.3.3-662	2046
1704	HE400A	0.491	1	EC-6.3.3-662	2043
1705	HE400A	0.468	1	EC-6.3.3-662	2076
1706	HE400A	0.53	1	EC-6.2.9.1	2077
1707	HE500A	0.421	1	EC-6.3.3-662	2041
1708	HE500A	0.487	1	EC-6.2.9.1	2044
1709	HE500A	0.445	1	EC-6.2.9.1	2040
1710	HE500A	0.517	1	EC-6.2.9.1	2045
1711	L100X100X10	0.708	1	EC-6.3.1.1	2040
1712	L100X100X10	0.503	1	EC-6.3.1.1	2078
1713	L100X100X10	0.557	1	EC-6.3.1.1	2077
1714	L100X100X10	0.722	1	EC-6.3.1.1	2074
1715	L100X100X10	0.118	1	EC-6.3.1.1	2032
1716	L100X100X10	0.066	1	EC-6.3.1.1	2074
1717	IPE270	0.222	1	EC-6.2.9.1	2047
1718	IPE270	0.21	1	EC-6.2.9.1	2038
1719	L100X100X10	0.282	1	EC-6.3.1.1	2040
1720	L100X100X10	0.277	1	EC-6.3.1.1	2033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Beam	Analysis Property	Actual Ratio	Allowable Ratio	Clause	L/C
930	HE400A	0.451	1	EC-6.3.3-662	2038
931	HE500A	0.494	1	EC-6.2.9.1	2036
939	HE400A	0.483	1	EC-6.2.9.1	2039
940	HE500A	0.576	1	EC-6.2.9.1	2037
941	IPE270	0.221	1	EC-6.3.3-662	2076
942	IPE270	0.197	1	EC-6.3.3-662	2078
943	IPE240	0.101	1	EC-6.3.3-662	2076
944	IPE240	0.134	1	EC-6.3.3-662	2074
950	IPE270	0.779	1	EC-6.3.3-662	2075
951	IPE270	0.804	1	EC-6.3.3-662	2073
952	IPE240	0.579	1	EC-6.3.3-662	2035
953	IPE240	0.584	1	EC-6.3.3-662	2036
961	HE400A	0.478	1	EC-6.2.9.1	2039
962	HE500A	0.552	1	EC-6.2.9.1	2036
963	IPE240	0.096	1	EC-6.2.3 (T)	2032
964	IPE240	0.09	1	EC-6.2.3 (T)	2036
965	IPE240	0.424	1	EC-6.3.3-662	2075
966	IPE240	0.455	1	EC-6.3.3-662	2073
967	IPE240	0.19	1	EC-6.3.3-662	2039
968	IPE240	0.402	1	EC-6.3.3-662	2039
969	IPE240	0.452	1	EC-6.3.3-662	2039
970	IPE240	0.281	1	EC-6.3.3-662	2039
971	IPE240	0.163	1	EC-6.3.3-662	2079
972	IPE240	0.187	1	EC-6.3.3-662	2035
973	IPE240	0.326	1	EC-6.3.3-662	2035
974	IPE240	0.373	1	EC-6.3.3-662	2035
975	IPE240	0.291	1	EC-6.3.3-662	2035
976	IPE240	0.213	1	EC-6.3.3-662	2035
977	IPE240	0.29	1	EC-6.3.3-662	2073
978	IPE240	0.258	1	EC-6.2.3 (T)	2043
979	IPE240	0.218	1	EC-6.2.3 (T)	2043
980	IPE240	0.153	1	EC-6.2.3 (T)	2043
981	IPE240	0.111	1	EC-6.3.3-662	2073
982	IPE240	0.307	1	EC-6.2.3 (T)	2042
983	IPE240	0.349	1	EC-6.2.3 (T)	2042
984	IPE240	0.31	1	EC-6.2.3 (T)	2042
985	IPE240	0.225	1	EC-6.2.3 (T)	2042
986	IPE240	0.191	1	EC-6.3.3-662	2045
1387	HE400A	0.477	1	EC-6.3.3-662	2038
1388	HE500A	0.577	1	EC-6.2.9.1	2067
1392	IPE360	0.387	1	EC-6.3.3-662	2047

1393	IPE360	0.44	1	EC-6.3.3-662	2032
1395	IPE360	0.384	1	EC-6.3.3-662	2039
1396	IPE360	0.43	1	EC-6.3.3-662	2032
1402	IPE360	0.498	1	EC-6.3.3-662	2037
1403	IPE360	0.494	1	EC-6.3.3-662	2037
1404	IPE360	0.444	1	EC-6.3.3-662	2033
1405	IPE360	0.444	1	EC-6.3.3-662	2045
1406	IPE240	0.593	1	EC-6.3.3-662	2033
1407	IPE240	0.572	1	EC-6.3.3-662	2032
1408	IPE240	0.663	1	EC-6.3.3-662	2033
1409	IPE240	0.642	1	EC-6.3.3-662	2034
1410	IPE240	0.62	1	EC-6.3.3-662	2032
1411	IPE240	0.7	1	EC-6.3.3-662	2034
1412	IPE240	0.716	1	EC-6.3.3-662	2032
1413	HE500A	0.494	1	EC-6.2.9.1	2033
1414	HE500A	0.569	1	EC-6.2.9.1	2032
1415	HE500A	0.541	1	EC-6.2.9.1	2033
1416	HE500A	0.575	1	EC-6.2.9.1	2064
1417	IPE240	0.593	1	EC-6.3.3-662	2033
1418	IPE240	0.613	1	EC-6.3.3-662	2038
1419	IPE240	0.644	1	EC-6.3.3-662	2037
1420	IPE240	0.651	1	EC-6.3.3-662	2043
1421	IPE240	0.62	1	EC-6.3.3-662	2036
1422	IPE240	0.694	1	EC-6.3.3-662	2038
1423	IPE240	0.723	1	EC-6.3.3-662	2036
1424	L100X100X10	0.594	1	EC-6.3.3-661	2035
1425	L100X100X10	0.677	1	EC-6.3.3-661	2035
1426	L100X100X10	0.308	1	EC-6.3.3-661	2070
1427	L100X100X10	0.617	1	EC-6.3.3-661	2046
1428	L100X100X10	0.484	1	EC-6.3.3-661	2044
1429	L100X100X10	0.521	1	EC-6.3.3-661	2073
1430	L100X100X10	0.556	1	EC-6.3.3-661	2073
1431	L100X100X10	0.426	1	EC-6.3.3-661	2075
1432	L100X100X10	0.453	1	EC-6.3.3-661	2038
1433	L100X100X10	0.17	1	EC-6.3.3-661	2038
1434	L100X100X10	0.564	1	EC-6.3.3-661	2040
1435	L100X100X10	0.803	1	EC-6.3.3-661	2039
1436	L100X100X10	0.881	1	EC-6.3.3-661	2041
1440	L100X100X12	0.685	1	EC-6.2.9.2/3	2036
1441	L100X100X12	0.626	1	EC-6.2.9.2/3	2032
1442	L100X100X12	0.152	1	EC-6.3.3-661	2038
1443	L100X100X12	0.144	1	EC-6.3.3-661	2077
1444	L100X100X12	0.156	1	EC-6.3.3-661	2075
1445	L100X100X12	0.181	1	EC-6.3.3-661	2073

1446	L100X100X12	0.878	1	EC-6.3.3-661	2045
1447	L100X100X12	0.964	1	EC-6.3.3-661	2033
1448	L100X100X12	0.395	1	EC-6.3.3-661	2047
1449	L100X100X12	0.39	1	EC-6.3.3-661	2035
1450	L100X100X12	0.289	1	EC-6.3.3-661	2045
1451	L100X100X12	0.257	1	EC-6.3.3-661	2033
1452	IPE240	0.146	1	EC-6.3.3-662	2032
1453	IPE240	0.127	1	EC-6.3.3-662	2032
1454	IPE270	0.822	1	EC-6.3.3-662	2032
1455	IPE240	0.082	1	EC-6.3.2 LTB	2016
1456	IPE240	0.078	1	EC-6.3.2 LTB	2016
1457	IPE360	0.784	1	EC-6.3.3-662	2039
1458	IPE360	0.801	1	EC-6.3.3-662	2035
1459	IPE240	0.147	1	EC-6.3.3-662	2079
1460	IPE240	0.144	1	EC-6.2.3 (T)	2043
1461	IPE270	0.827	1	EC-6.3.3-662	2034
1462	HE400A	0.429	1	EC-6.2.9.1	2035
1463	HE400A	0.462	1	EC-6.3.3-662	2034
1464	HE400A	0.448	1	EC-6.3.3-662	2034
1465	HE400A	0.465	1	EC-6.2.9.1	2068
1466	IPE240	0.132	1	EC-6.3.3-662	2036
1467	IPE240	0.121	1	EC-6.3.3-662	2036
1468	IPE270	0.818	1	EC-6.3.3-662	2037
1469	IPE240	0.086	1	EC-6.3.3-662	2037
1470	IPE240	0.079	1	EC-6.3.3-662	2021
1471	IPE270	0.827	1	EC-6.3.3-662	2038
1472	IPE180	0.462	1	EC-6.3.3-662	2043
1473	IPE180	0.289	1	EC-6.3.3-662	2034
1474	L100X100X10	0.074	1	EC-6.3.1.1	2017
1475	L100X100X10	0.074	1	EC-6.3.1.1	2036
1476	L100X100X10	0.657	1	EC-6.3.1.1	2035
1477	L100X100X10	0.552	1	EC-6.3.1.1	2036
1478	L100X100X10	0.647	1	EC-6.3.1.1	2034
1479	L100X100X10	0.345	1	EC-6.3.1.1	2032
1480	L100X100X10	0.245	1	EC-6.3.1.1	2033
1481	L100X100X10	0.292	1	EC-6.3.1.1	2044
1482	L100X100X10	0.194	1	EC-6.3.1.1	2044
1485	L100X100X10	0.478	1	EC-6.3.1.1	2046
1488	L100X100X10	0.569	1	EC-6.3.1.1	2033
1489	L100X100X10	0.704	1	EC-6.3.1.1	2037
1490	L100X100X10	0.511	1	EC-6.3.1.1	2039
1491	L100X100X10	0.467	1	EC-6.3.1.1	2035
1492	L100X100X10	0.442	1	EC-6.3.1.1	2039
1493	L100X100X10	0.437	1	EC-6.3.1.1	2035

1494	L100X100X10	0.194	1	EC-6.3.1.1	2068
1495	L100X100X10	0.234	1	EC-6.3.1.1	2042
1496	L100X100X10	0.177	1	EC-6.3.1.1	2039
1497	L100X100X10	0.202	1	EC-6.3.1.1	2034
1498	L100X100X10	0.267	1	EC-6.3.1.1	2037
1499	L100X100X10	0.266	1	EC-6.3.1.1	2033
1641	IPE270	0.225	1	EC-6.3.3-662	2076
1642	IPE240	0.106	1	EC-6.3.3-662	2076
1645	IPE270	0.766	1	EC-6.3.3-662	2075
1646	IPE240	0.13	1	EC-6.3.3-662	2079
1693	L100X100X10	0.327	1	EC-6.3.1.1	2043
1698	IPE360	0.779	1	EC-6.3.3-662	2039
1699	IPE360	0.795	1	EC-6.3.3-662	2035
1700	IPE360	0.493	1	EC-6.3.3-662	2039
1701	IPE360	0.53	1	EC-6.3.3-662	2035
1702	L100X100X10	0.379	1	EC-6.3.1.1	2042
1703	L100X100X10	0.414	1	EC-6.3.1.1	2033
1704	L100X100X10	0.531	1	EC-6.3.1.1	2038
1705	L100X100X10	0.591	1	EC-6.3.1.1	2033
1706	L100X100X10	0.443	1	EC-6.3.1.1	2039
1707	L100X100X10	0.431	1	EC-6.3.1.1	2032
1708	L100X100X10	0.277	1	EC-6.3.1.1	2039
1709	L100X100X10	0.283	1	EC-6.3.1.1	2041
1710	L100X100X10	0.629	1	EC-6.3.1.1	2033
1711	L100X100X10	0.326	1	EC-6.3.1.1	2034
1712	L100X100X10	0.76	1	EC-6.3.1.1	2037

4.6 PROGETTAZIONE DI PALI

La progettazione del palo descritta qui di seguito indica la quantità minima di pali necessari.

Reazioni massime – Campate non controventate

			Horizontal	Vertical	Horizontal	
	Node	L/C	Fx kN	Fy kN	Fz kN	Mx kN-m
Max Fx	105	2039 OP-OC	**7.948**	536.348	79.346	279.630
Min Fx	105	2032 OP+OC	**-7.728**	270.947	-64.588	-251.888
Max Fy	81	2046 OP-OC	-1.284	**810.430**	120.978	440.602
Min Fy	61	2073 OP-FRZ	-0.815	**-182.598**	170.129	653.418
Max Fz	57	2075 OP-FRZ	1.349	674.395	**186.139**	694.686
Min Fz	61	2072 OP+FR	-1.195	647.334	**-185.619**	-692.569
Max Mx	57	2075 OP-FRZ	1.349	674.395	186.139	**694.686**
Min Mx	61	2072 OP+FR	-1.195	647.334	-185.619	**-692.569**
Max My	1	2000 DL+WIN	-2.891	226.526	9.097	25.774
Min My	1	2000 DL+WIN	-2.891	226.526	9.097	25.774
Max Mz	1	2000 DL+WIN	-2.891	226.526	9.097	25.774
Min Mz	1	2000 DL+WIN	-2.891	226.526	9.097	25.774

Check for Pile Group System :

Column MKD : -

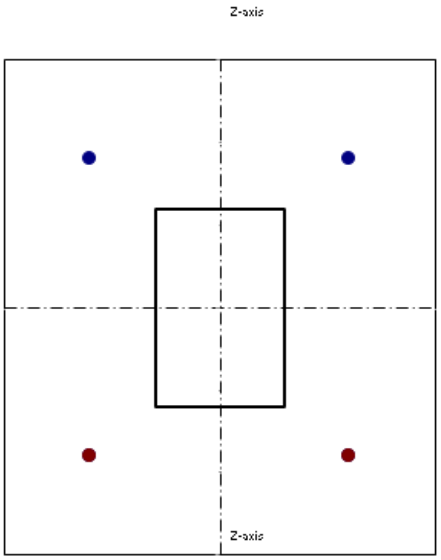
Total no.of pile = 4 Nos
C/c Dist bet extreme piles along -z a: 1.80 m
C/c Dist bet extreme piles along -x a: 1.80 m

c/c dist bet piles (m) = 1.8
diam of pile (m) = 0.6

Select Pile cap

Pile configration about 0,0 as c.g. of pile system

	X-Coor	Z-Coor	X'	Z'		X-Coor	Z-Coor	X'	Z'
Pile 1	-0.300	0.900	0.810	0.810					
Pile 2	0.300	0.900	0.810	0.810					
Pile 3	0.300	-0.300	0.810	0.810					
Pile 4	-0.300	-0.300	0.810	0.810					



Zx of Pile System = 3.600 m³ Ix = 3.24
Zz of Pile System = 3.60 m³ Iz = 3.24

Pile Cap and soil weight calculation

Column Size Dcx = 0 m
Column Size Dcz = 0 m

Pedestal Size Dpx = 0.3 m
Pedestal Size Dpz = 1.2 m
Pedestal height = 0.65 m

Wall length = 0 m
Wall height = 0 m

Pile Cap bottom from GL = 1.4 m
Pile Cap Edge Dist. along X = 0.5 m
Pile Cap Edge Dist. along Z = 0.5 m

Pile Cap Length Lx = 2.80 m
Pile Cap Width Lz = 2.80 m
Depth of Pile Cap assume D = 1 m
Grade slab thickness if any = 0 m

Pedestal Self Weight = 17.55 kN
Pile Cap Self weight = 196.00 kN
Soil Weight = 45.16 kN

DL from GF(slab) = 0.00 kN
Surcharge = 0.00 kN
Buyoancy pressure = 0 kN/m2
Total DL on Pile cap 258.71 kN

Load From SAP Output

Critical Load Case	2073	Max	**Critical Load Case**	2075	Max Shear	**Pile capacity**	as per geotechinal report	
Max Comp. Load	623.26	OK	**Max Shear Load**	46.54	OK	Compression =	1235 kN	0.5
						Tension =	800 kN	0.19
Critical L	2075	Max Tension				Shear =	104 kN	0.45
Max Tens	-155.87	OK						

Moments Clockwise Positive

Distance Between Forces at support & Pile Bottom = 1.5 m

Load From SAP Output 2075

forces from SAP

Column MKD	Distance From C.G. Of System X - Dir	Distance From C.G. Of System Z - Dir	Joint No (Support	LC	FX kN	FY kN	FZ kN	MX kN-m	MY kN-m	MZ kN-m	P (Tot) kN	MX kN-m	MZ kN-m	Mxvert due to P	Mzvert due to
-	0.00	0.00	57	2075	1.35	674.40	186.14	694.69	0.00	0.00	674.40	973.89	2.02	0.00	0.0
				Σ =	**1.35**	**674.40**	**186.14**	**694.69**	**0.00**	**0.00**	**674.40**	**973.89**	**2.02**	**0.00**	**0.0**

Load At C.G. of Pile System Group

Total Vertical Load ; P = 933.10 kN

Total Moment @ X - Dir ; Mx = **1398.89** kN-m **Additional moment on column due to eccentricity of dead load of L-beam**

Total Moment @ Z - Dir ; Mz = 2.02 kN-m

Max Compressive load per pil = **622.42** kN

Max Tensile load per pile = **-155.87** kN

Max Shear Force on pile Σ Fx = 1.35 kN

Σ Fz = 186.14 kN

Resultant shear on pile = **46.54** kN

Dato che il taglio sul palo è pari a 46 KN, il plinto dovrà avere min. 3 pali.

Reazioni massime – Campate controventate

	Node	L/C	Horizontal Fx kN	Vertical Fy kN	Horizontal Fz kN	Mx kN-m
Max Fx	17	2067 OP-FRX	**646.439**	1691.934	67.866	253.870
Min Fx	73	2066 OP+FR	**-630.864**	1739.497	86.579	329.814
Max Fy	73	2066 OP+FR	-630.864	**1739.497**	86.579	329.814
Min Fy	21	2066 OP+FR	-533.347	**-893.509**	54.109	220.575
Max Fz	65	2073 OP-FRZ	-317.657	87.661	**184.233**	717.662
Min Fz	69	2074 OP+FR	311.021	1209.039	**-184.653**	-719.364
Max Mx	65	2073 OP-FRZ	-317.657	87.661	184.233	**717.662**
Min Mx	69	2074 OP+FR	311.021	1209.039	-184.653	**-719.364**
Max My	17	2000 DL+WIN	-39.755	183.564	10.087	29.002
Min My	17	2000 DL+WIN	-39.755	183.564	10.087	29.002
Max Mz	17	2000 DL+WIN	-39.755	183.564	10.087	29.002
Min Mz	17	2000 DL+WIN	-39.755	183.564	10.087	29.002

Check for Pile Group System :

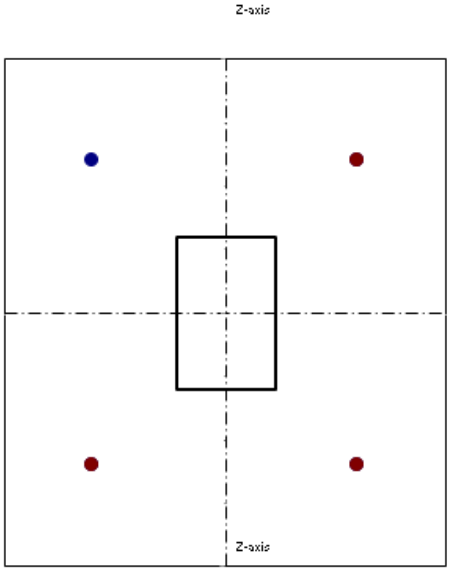
Column MKD : -

Total no.of pile = 4 Nos c/c dist bet piles (m) = 2.4
C/c Dist bet extreme piles along -z a 2.40 m diam of pile (m) = 0.6
C/c Dist bet extreme piles along -x a 2.40 m

Select Pile cap

Pile configration about 0,0 as c.g. of pile system

	X-Coor	Z-Coor	X'	Z'
Pile 1	-1.200	1.200	1.440	1.440
Pile 2	1.200	1.200	1.440	1.440
Pile 3	1.200	-1.200	1.440	1.440
Pile 4	-1.200	-1.200	1.440	1.440



Zx of Pile System = 4.800 m³ **Zz of Pile System = 4.80 m³**
Ix = 5.76 Iz = 5.76

Pile Cap and soil weight calculation

Column Size Dcx = 0 m
Column Size Dcz = 0 m
Pedestal Size Dpx = 0.9 m
Pedestal Size Dpz = 1.2 m
Pedestal height = 0.65 m
Wall length = 0 m
Wall height = 0 m

Pile Cap bottom from GL = 1.4 m
Pile Cap Edge Dist. along X = 0.6 m
Pile Cap Edge Dist. along Z = 0.6 m
Pile Cap Length Lx = 3.60 m
Pile Cap Width Lz = 3.60 m
Depth of Pile Cap assume D = 1 m
Grade slab thickness if any 0 m

Pedestal Self Weight = 17.55 kN
Pile Cap Self weight = 324.00 kN
Soil Weight = 79.36 kN
DL from GF(slab) = 0.00 kN
Surcharge = 0.00 kN
Buyoancy pressure = 0 kN/m2
Total DL on Pile cap **420.91** kN

Pile Cap and soil weight calculation

Column Size Dcx =	0 m	Pile Cap bottom from GL =	1.4 m	Pedestal Self Weight =	17.55 kN		
Column Size Dcz =	0 m	Pile Cap Edge Dist. along X =	0.6 m	Pile Cap Self weight =	324.00 kN		
		Pile Cap Edge Dist. along Z =	0.6 m	Soil Weight =	79.36 kN		
Pedestal Size Dpx =	0.9 m						
Pedestal Size Dpz =	1.2 m	Pile Cap Length Lx =	3.60 m	DL from GF(slab) =	0.00 kN		
Pedestal height =	0.65 m	Pile Cap Width Lz =	3.60 m	Surcharge =	0.00 kN		
		Depth of Pile Cap assume D =	1 m	Buyoancy pressure =	0 kN/m2		
Wall length =	0 m	Grade slab thickness if any	0 m	**Total DL on Pile cap**	**420.91** kN		
Wall height =	0 m						

Load From SAP Output

Critical Load Case	2067	Max	**Critical Load Case**	2067	Max Shear
Max Comp. Load	892.86	OK	**Max Shear Load**	162.50	OK
Critical L	2066	Max Tension			
Max Tens	-356.53	OK			

Pile capacity	as per geotechinal report		
Compression =	1815 kN	0.49	
Tension =	1064 kN	0.34	
Shear =	203 kN	0.8	

Moments Clockwise Positive

Distance Between Forces at support & Pile Bottom = 1.5 m

Load From SAP Output 2067

forces from SAP

Column MKD	Distance From C.G. Of System X - Dir	Distance From C.G. Of System Z - Dir	Joint No (Support	LC	FX kN	FY kN	FZ kN	MX kN-m	MY kN-m	MZ kN-m	P (Tot) kN	MX kN-m	MZ kN-m	Mxvert due to P	Mzvert due to
-	0.00	0.00	17	2067	646.44	1691.93	67.87	253.87	0.00	0.00	1691.93	355.67	969.66	0.00	0.0
				Σ =	**646.44**	**1691.93**	**67.87**	**253.87**	**0.00**	**0.00**	**1691.93**	**355.67**	**969.66**	**0.00**	**0.0**

Load At C.G. of Pile System Group

Total Vertical Load ; P = 2112.84 kN

Total Moment @ X - Dir ; Mx = **780.67** kN-m **Additional moment on column due to eccentricity of dead load of L-beam**

Total Moment @ Z - Dir ; Mz = 969.66 kN-m

Max Compressive load per pil = 892.86 kN

Max Tensile load per pile = 163.56 kN

Max Shear Force on pile Σ Fx = 646.44 kN

Σ Fz = 67.87 kN

Resultant shear on pile = 162.50 kN