B03b
Liquifaction

SPA WNP Ingenieurs
Constructieberekening
2. Liquifaction

22000596.B03b
Yara Sluiskil - Project CCS

Plant Description		
Carbon Capture Storage Plant, Sluiskil		
Linde Project No. **3710 A3T8**	Client Project No. **16471**	
Linde Project Code **Sluiskil**	Client Project Code **CACTUS**	
Linde Doc. No. **0542FA4650 2001 N-CS 1002 (EN)**	Client Doc. No. **16471-Y16-00009**	Client Revision **00**

STRUCTURAL PRE-CALCULATION for EQUIPMENT STRUCTURE SK5101

IFD	1	18.11.2022	[5.1.2.e]	[5.1.2.e]	[5.1.2.e]	
Status	**Issue**	**Date**	**Prepared**	**Reviewed**	**Approved**	**Remarks**

CONTENT

1 GENERAL DATA & BASIS FOR DESIGN CALCULATIONS

1.1 INTRODUCTION

This preliminary calculation report consists of two parts.

Part-1 consists of Analysis & design of steel structure for equipment structure SK5101 (Refer Section 3.0 to Section 7.0)

Part-2 consists of design of pile foundation and pile cap for combined SK5101 and equipment surrounding the SK5101 supported on pedestal at +0.300 level (Refer Section 8.0 to Section 10.0)

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Structure SK5101 mainly provides support for equipment V605, V602, E606, E617, E610, E608, S601 and piping on different floors as shown in figure 1.1.

Structure consists of two bays of 6m each in E-W direction and one bay of 5m in N-S direction.

Also consists of staircase of 3m wide connected to main structure on N-W side.

It consists of grating supported floors at +5.00, +8.200, +12.800, +17.400, 20.400, 23.800 for operational purpose and to support pipes.

This document forms the part of Feed engineering for the project of “Carbon capture storage plant, Sluiskil”.

The site is located in industrial area of YARA Sluiskil. The industrial site is on the Ghent- Terneuzen channel on the opposite bank of the village of Sluiskil in the province of Zeelnad in the Netherlands.

"Dimensions, Geometry and the section sizes are as per this preliminary static calculation and subject to verification during further design stages.

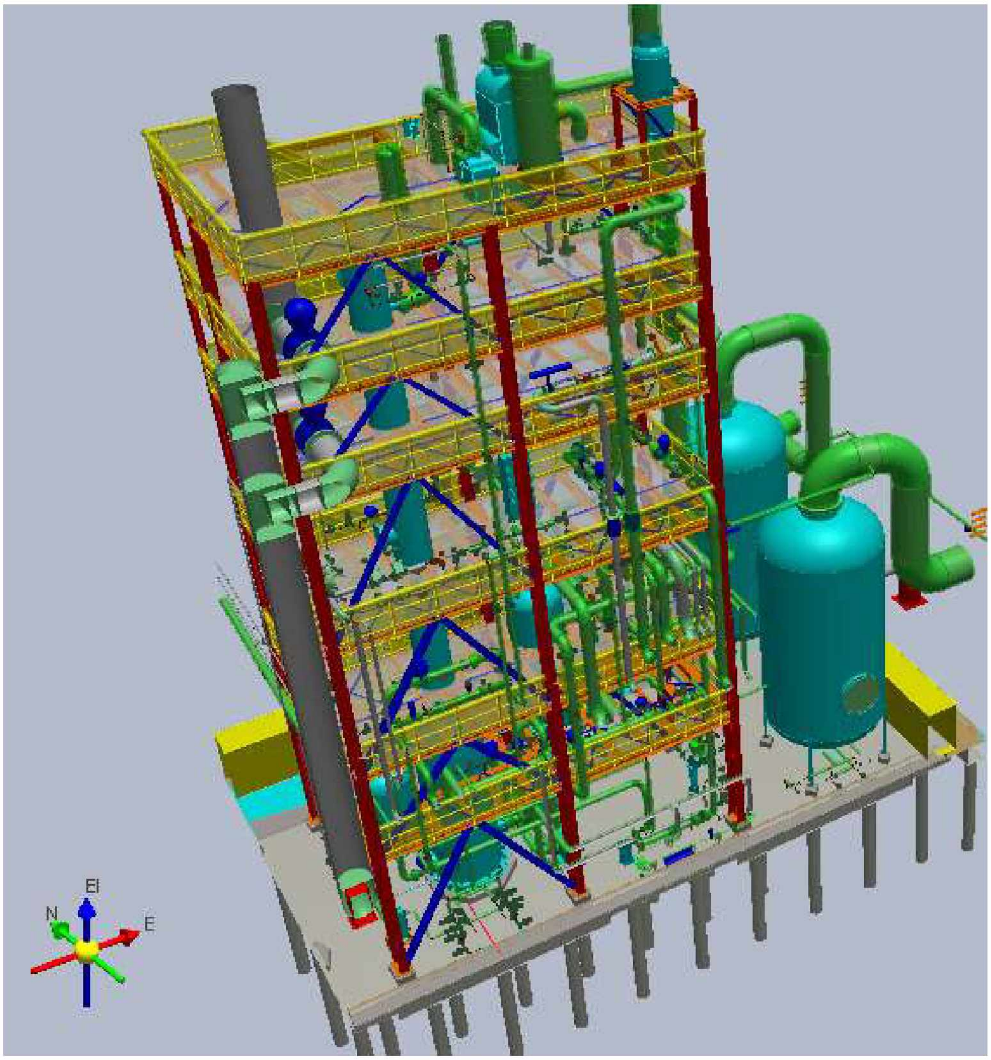


Figure 1.1: 3D model view of Structure SK5101

1.2 REFERENCE DOCUMENTS:

1.2.1 PROJECT SPECIFICATIONS

Owner Document no.	Linde Document no.	Description
16471-B45-00005	-	APP 2 Att 5-Civil specification
16471-Y85-00001	&AE 0000 N-SP 1001 (EN)	Steel Structure and Civil Design basis & General description
16471-C02-00001	-	Appendix 2 att 1 annex 1 – Design Basis
16471-C50-00001	-	Appendix 2 att 1 annex 2 - Site specification

1.2.2 CODES & STANDARDS

Netherlands Standard: Issue Date	Title
NEN-EN 1990:2019	Basis of structural design
NEN-EN 1991-1-1:2009	Part 1-1: General actions - Densities, self-weight, imposed loads for buildings
NEN-EN 1991-1-3:2015	Part 1-3: General Actions - Snow loads
NEN-EN 1991-1-4:2010	Part 1-4: General Actions - Wind actions
NEN-EN 1991-1-7:2014	Part 1-7: General actions - Accidental actions
NEN-EN-1998-1:2005	Design of structures for earthquake resistance
NEN-EN 1993-1-1:2014	Design of Steel structures: General rules and rules for buildings
NEN-EN-1992-1-1:2016	Design of concrete structures: General rules and rules for buildings

1.2.3 REFERENCE DRAWINGS

Linde Doc. Number	Owner Doc. Number	Description
&AE 2001 N-ZB 1001 (EN)	16471-Y56-00004	Steel structure layout drawings Structure SK5101 Level Views Part-1
&AE 2001 N-ZB 1002 (EN)	16471-Y56-00013	Steel structure layout drawings Structure SK5101 Level Views Part-2
&AE 2001 N-ZB 1003 (EN)	16471-Y56-00014	Steel structure layout drawings Structure SK5101 Elevations
&AE 2001 C-ZA 1001 (EN)	16471-Y56-00007	General arrangement drawings – Foundation/Piling. CO2 Liquification

1.3 DESIGN CRITERIA

- All steel columns have pin connection at top of the pedestal level. Base plates are designed accordingly.
- Loads in various load cases are considered as per document no. 16471-B45-00005.
- All steel members are designed as per NEN-EN 1993-1-1:2014.
- Additional horizontal load of value 0.5% of the vertical load (Dead Load + Live Load + Operating Load) is applied in both horizontal directions (X and Z) to take care of the imperfections of the columns.
- Lateral deflection check is carried out from nodal displacements.

1.4 DESCRIPTION OF GEOMETRY.

- H.P.P elevation is 1.700 m N.A.P, which is considered as base datum +0.000m
- Structure comprises of RCC Pedestals up to EL +0.300 m & Steel structures from EL +0.300 m to +26.400 m.
- This structure is 5.0 m wide in N-S direction and 12.00m wide in E-W direction. Structure has staircase of 3m width connected on north side. Structure has moment frame in N-S direction and braced frame E-W direction.

1.5 COMPUTERISED ANALYSIS CRITERIA

- Three-dimensional mathematical model is analysed by using STAAD Pro CONNECT Edition 22.10.00.153. 3D analysis model considers nodes at centre line of column and beam for simplicity.
- All the horizontal beam members are modelled at TOS level.
- The structural steel columns are modelled up to EL (BOBP) In STAAD.
- At some places Hangers, cantilever beams and brackets are not included in static model, but the reactions of the same are transferred to the main frame to get equivalent effect.
- All other assumptions have been mentioned as and where applicable.
- The general system of the computer model is with global axis system:

X = Horizontal axis in computer model along East - West direction.

Y = Vertical axis in computer model (positive upward direction)

Z = Horizontal axis in computer model along North - South direction.

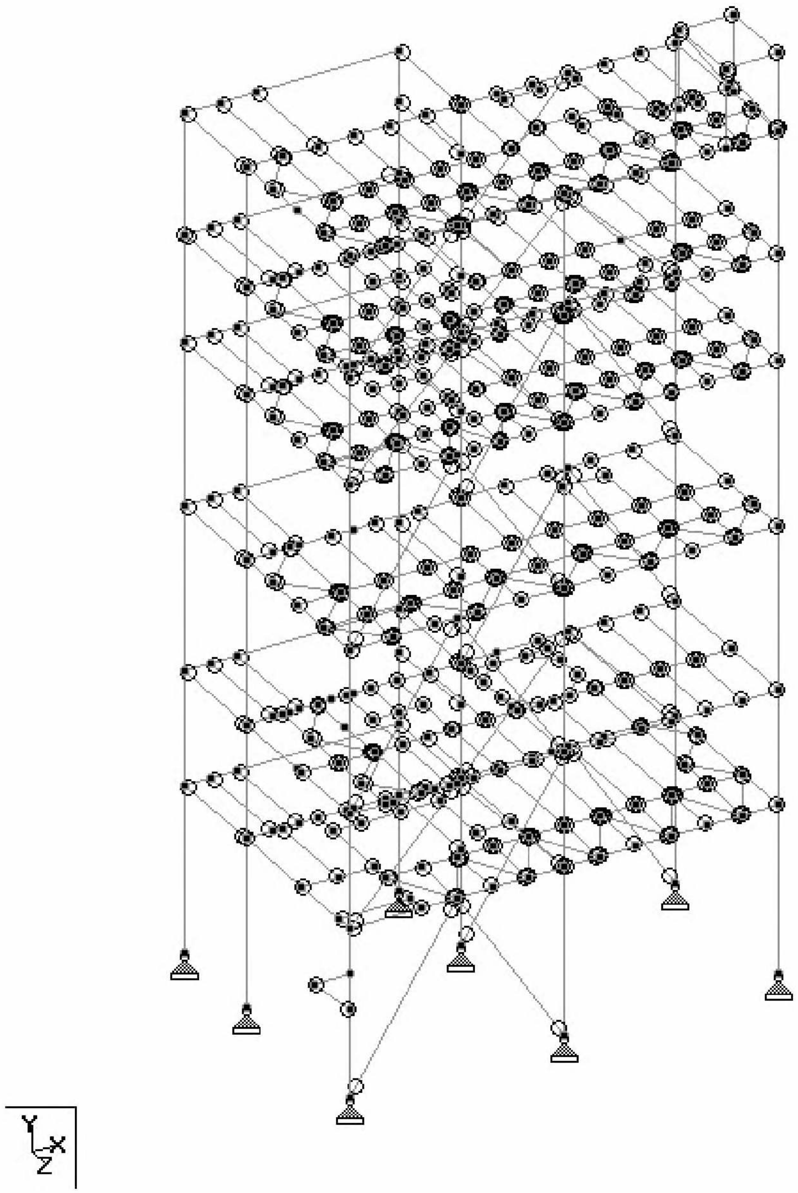


Figure 1.2 : 3-D STAAD model view of Equipment Structure SK5101

2 PRIMARY LOAD CASES AND LOAD COMBINATIONS

2.1 PRIMARY LOAD CASES

The equipment structure SK5101 is designed for following primary load cases.

Basic Load Cases and Load Description

Basic Load Case No	Load Description
STRUCTURAL DEAD LOAD	
101	Modelled Structural/ Foundation Self Weight
102	Node/ Connection weight/Lifting Lug/ pad-eye weight
100	**Primary Structural Steel (Sum of LC 101 to 102)**
111	Grating/ Chequered plate /Equipment supports / Secondary platforms/ Staircase stringer /ladder /Handrail
112	Pipe Supports/ Monorails, runway beams, Material handling items
113	Rigging weight/Sea fastening/ lashing/ securing weights
110	**Secondary & Tertiary Structural Steel (Unmodeled Part) (Sum of LC 111 to 113)**
120	**Additional Load to Match the WCR Structural weight**
131	Painting load
132	Fire Proofing loads
130	**Miscellaneous Loads (Sum of LC 131 and LC 132)**
140	**Hook up Loads**
10	**Total Structural Dead Load (Sum of LC 100, 110, 120, 130,140,150)**
LIVE LOADS	
201	Open Area Live Loads/ operating Platforms (5 kN/m^2)
202	Live Load on Service Platforms, pedestals, Walkways (3 kN/m^2)
203	Live Load on Stairways (5kN/m^2)
20	**Total Live Load (Sum of LC 201 to 203) (LL)**
Piping Dry Weights	
301	Empty weight of pipe (UDL)/pipe area load
302	Empty weight of pipe valves, Supports (Point Load)
303	Empty weight of pipe valves, Supports on Hook up steel
300	**Piping Dry Weights (Sum of LC 301 to 303)**
Mechanical Equipment Dry Weights	

311	Equipment Dry Weight (> 5mT)
312	Equipment Dry Weight (<5 mT) /Area load
310	**Mechanical Dry Weights (Sum of LC 311 to 312)**
Electrical Dry Weights	
321	Electrical Equipment Dry Weight
322	Electrical Cables, Cable ducts/ trays
320	**Electrical Dry Weights (Sum of LC 321 to 322)**
Instrumentation Dry Weights	
331	Instrumentation Equipment Dry Weight
332	Instrumentation Cables, Cable ducts/ trays
330	**Instrumentation Dry Weights (Sum of LC 331 to 332)**
30	**Total Empty Weight of Piping/ Equipment/ E&I (Sum of LC 300, 310, 320, 330)**
Operating Pipe (Empty +Content) Weights (EQLO)	
401	Operating weight of pipe (UDL)/ Area Load
402	Operating weight of pipe support (Point load)
400	**Operating Pipe Weights (Sum of LC 401 to 402)**
Mechanical Equipment Operating Weights (Empty + Content)	
411	Equipment Operating Weight (> 5mT)
412	Equipment Operating Weight (<5 mT)
410	**Mechanical Equipment Weights (Sum of LC 411 to 412)**
Electrical Item Weight for Operating Condition	
421	Electrical Equipment Weight/ Bulk Items/Cables, Cable ducts/ trays
420	**Electrical Item Weights in Operating Condition(LC 421)**
Instrumentation Item Weights in Operating Condition	
431	Instrumentation Equipment Weight/ Bulk Items/Cables, Cable ducts/ trays
430	**Instrumentation Item Weights in Operating Condition (LC 431)**
40	**Total Operating Weight of Piping/ Equipment/ E&I (Sum of LC 400, 410, 420, 430)**
Piping Hydrotest Weights	
501	Hydrotest weight of piping (UDL)
502	Hydrotest weight of pipe supports (Point load)
500	**Piping Hydrotest Weights (Sum of LC 501 to 502)**
Mechanical Equipment Hydrotest Weights	
511	Equipment Hydrotest Weight (> 5mT)

512	Equipment Hydrotest Weight (<5 mT)
510	**Mechanical Hydrotest Weights (Sum of LC 511 to 512)**
50	**Total Hydrotest Weight of Piping/ Equipment/ E&I (Sum of LC 500, 510, 420 ,430)**
Wind loads due to structure self obstruction [W-E] -ve X direction	
6110	Wind loads due to structure self obstruction [W-E] -ve X direction
Wind loads due to structure self obstruction [S-N] -ve Z direction	
6310	Wind loads due to structure self obstruction [S-N] -ve Z direction
In-service Wind Load in +ve X-Direction [WLX:E-W]	
611	Wind Load on Structure due to self obstruction in +ve X-(E-W) Direction
612	Wind load on Piping in +ve X-(E-W) Direction
613	Wind load on equipment +ve X-(E-W) Direction
614	Wind load on cable tray +ve X-(E-W) Direction
61	**Total Wind Load in +ve X-(E-W) Direction (LC 611+LC612+LC613+LC614)**
In-service Wind Load in +ve Z-Direction [WLZ:N-S]	
621	Wind Load on Structure due to self obstruction in +ve Z-(N-S) Direction
622	Wind load on Piping in +ve Z-(N-S) Direction
623	Wind load on equipment +ve Z-(N-S) Direction
624	Wind load on cable tray +ve Z-(N-S) Direction
62	**Total Wind Load in +ve Z-(N-S) Direction (LC 621+LC622+LC623+LC624)**
In-service Wind Load in -ve X- Direction [WLX:W-E]	
631	Wind Load on Structure due to self obstruction in -ve X-(W-E) Direction
632	Wind load on Piping in -ve X-(W-E) Direction
633	Wind load on equipment -ve X-(W-E) Direction
634	Wind load on cable tray -ve X-(W-E) Direction
63	**Total Wind Load in -ve X-(W-E) Direction (LC 631+LC632+LC633+LC634)**
In-service Wind Load in -ve Z-Direction [WLZ:S-N]	
641	Wind Load on Structure due to self obstruction in -ve Z-(S-N) Direction
642	Wind load on Piping in -ve Z-(S-N) Direction
643	Wind load on equipment -ve Z-(S-N) Direction
644	Wind load on cable tray -ve Z-(S-N) Direction
64	**Total Wind Load in -ve Z-(S-N) Direction (LC 641+LC642+LC643+LC644)**
Thermal Load	
81	**Piping Thermal Load In E-W Direction (FDN/GLOBAL DESIGN) (TLE)**

82	**Piping Thermal Load In N-S Direction (FDN/GLOBAL DESIGN) (TLN)**
Friction Loads	
83	**Pipe/Equipment Friction Load In E-W Direction (FLE)**
84	**Pipe/Equipment Friction Load In N-S Direction (FLN)**
Structural Thermal Loads	
85	**Structural Thermal Load on Structure in Warm Condition (ENT+)**
86	**Structural Thermal Load on Structure in Cold Condition (ENT-)**
Local Wind Loads	
87	**Local Wind Load on Pipe/Equipment in X -(E-W) Direction (Local Design) ($WindX_{Local}$)**
88	**Local Wind Load on Pipe/Equipment in Z -(N-S) Direction (Local Design) ($WindZ_{Local}$)**
Local Piping Loads	
89	**Local Pipe Horizontal Load in E-W Direction (Local Design) (TLE_{Local})**
90	**Local Pipe Horizontal Load in N-S Direction (Local Design) (TLN_{Local})**
Maintenance Load	
911	Vertical Load Due to Crane, Monorail and Bundle Pull Loads
912	Horizontal Load Due to Crane, Monorail and Bundle Pull Loads
91	**Maintenance Load (Sum of LC 911 & LC 912) (ML)**
PSV Load	
92	**Horizontal Loads of PSV (LOCAL DESIGN) (PSV)**
Minimum Vertical load	
93	**Minimum Vertical Load For Beam Design (V_{MIN})**
Buoyancy load	
94	**Snow Load**
Notional Loads	
1001	**Notional Load for Dead Load in X -(E-W) Direction (NLDE)**
1002	**Notional Load for Dead Load in Z -(N-S) Direction (NLDN)**
1003	**Notional Load for Empty Load of Piping & Equipment in X-(E-W) (NLEE)**
1004	**Notional Load for Empty Load of Piping & Equipment in Z-(N-S)(NLEN)**
1005	**Notional Load for Operating Load of Piping & Equipmnt in X(E-W)(NLOE)**
1006	**Notional Load for Operating Load of Piping & Equipmnt in Z(N-S)(NLON)**
1007	**Notional Load for Live Load in X -(E-W) Direction (NLLE)**
1008	**Notional Load for Live Load in Z -(N-S) Direction (NLLN)**
10001	**Blast load in X (E-W) Direction**

10002	**Blast load in -X (E-W) Direction**
10003	**Blast load in Z (N-S) Direction**
10004	**Blast load in -Z (N-S) Direction**

2.2 MAIN LOAD COMBINATIONS

The various load combinations used for member design of steel structure and foundation design are tabulated in Annexure F.

3 DETAILED LOAD CALCULATIONS

The Equipment structure is subjected to primary load cases as follows. Loads which are not applicable for this structure are not included here.

3.1 DEAD LOAD (L/C :10)

Dead load consists of self weight of structure, dead load of grating. Satir flight is not modelled however equivalent load is applied in applicable load cases.

3.1.1 SELF WEIGHT OF STRUCTURE (L/C 101)

Dead load due to self-weight of structure is applied using "SELFWEIGHT Y -1.15 " command in STAAD pro using density of 78.5 kN/m^3 for steel.

Self-weight of members is calculated automatically as per the member properties assigned to members and density provided.

This 15% additional self weight is for taking into consideration connection weight

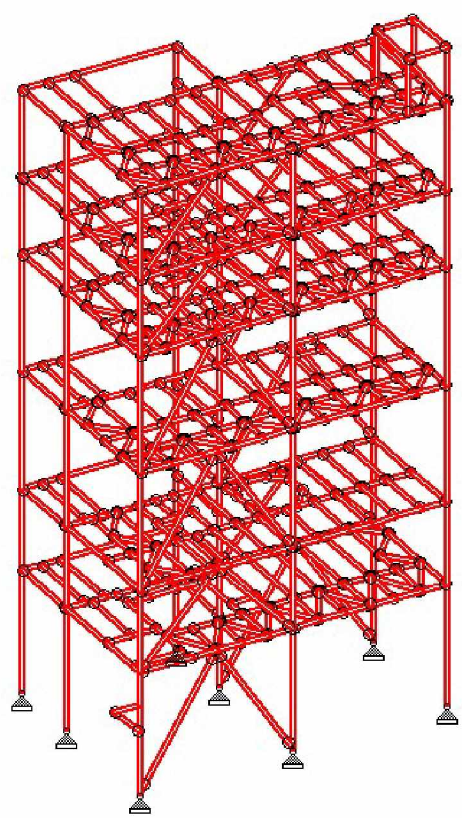


Figure 3.1.1: Self weight of structure

3.1.3 DEAD LOAD OF GRATING, HANDRAIL & LADDER (L/C:111)

Dead load for 30mm thickness GRP Grating = 0.250 kN/m^2

Dead load for Handrail/ Ladder = 0.06 kN/m

Dead load of staircase (including tread, stringer & handrail)= 2 kN/m^2 plan length of each stringer.

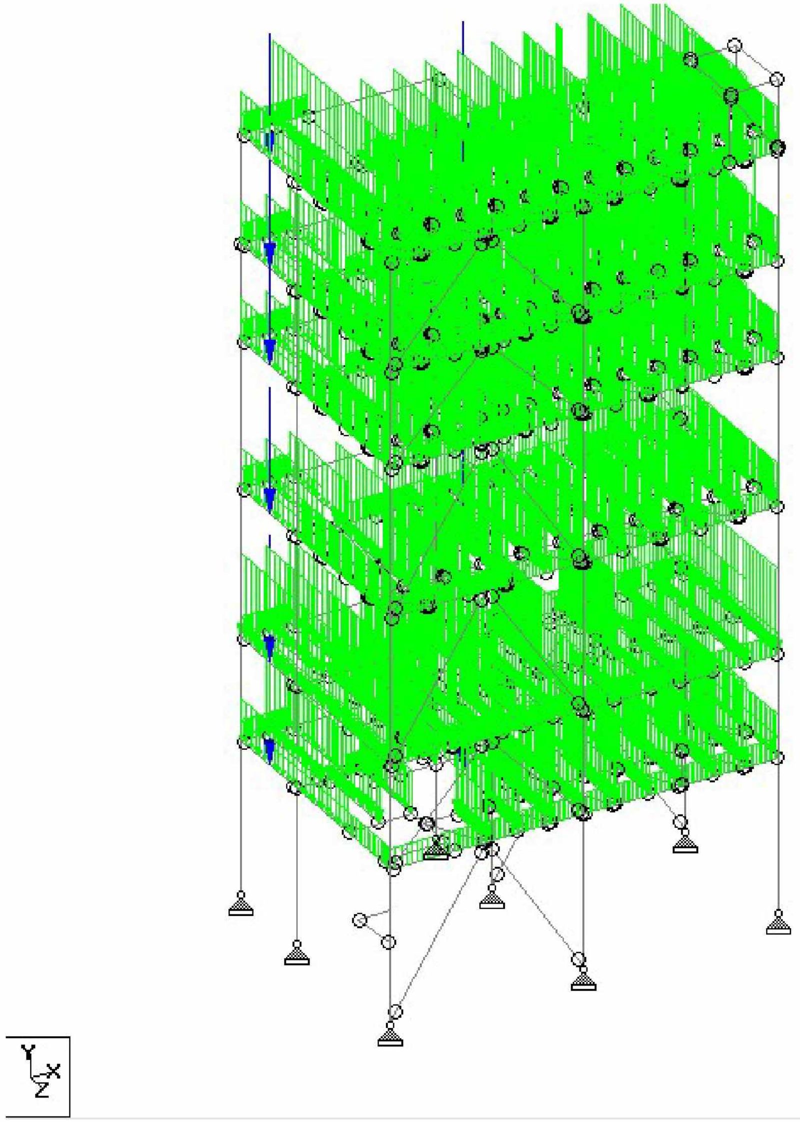


Figure 3.1.3: Dead load of Grating, handrail and staircase

3.2 LIVE LOAD (L/C 201) :

Live load on the platforms and staircase are applied as $3kN/m^2$ as per load input as shown below.

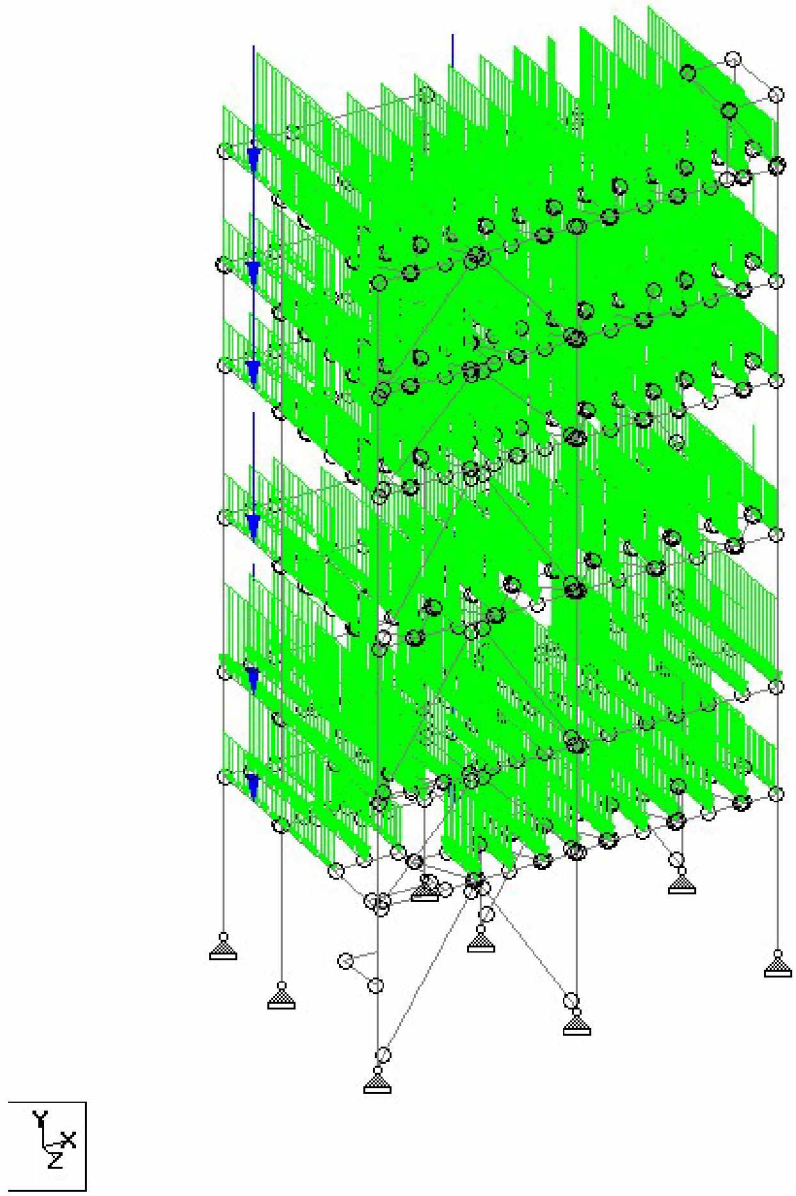


Figure 3.2: Live load on platform and staircase

3.3 EMPTY WEIGHT (L/C 30)

3.3.1 EMPTY WEIGHT OF PIPING UDL (L/C 301) :

The empty weight of piping (UDL) is applied as per piping input drawings attached in Annexure A.

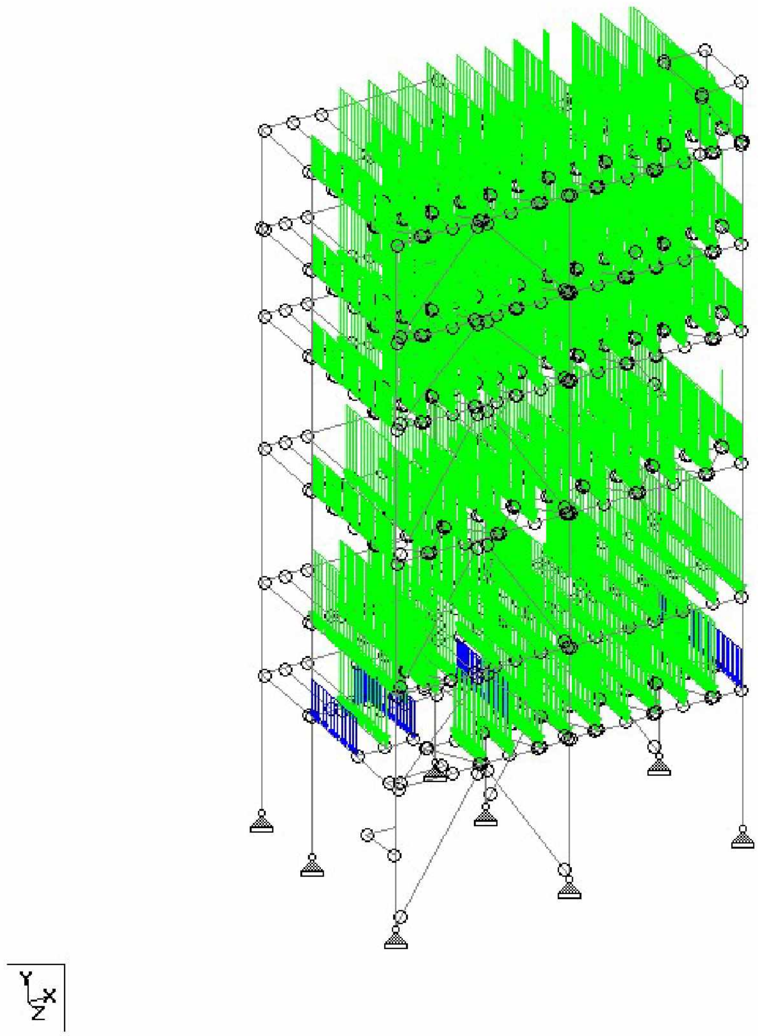


Figure 3.4: Empty weight of piping (UDL)

3.3.2 EMPTY WEIGHT OF PIPING (CONC) (L/C:302)

Empty weight of piping (concentrated) is taken as per load table given in input drawings (Annexure A).

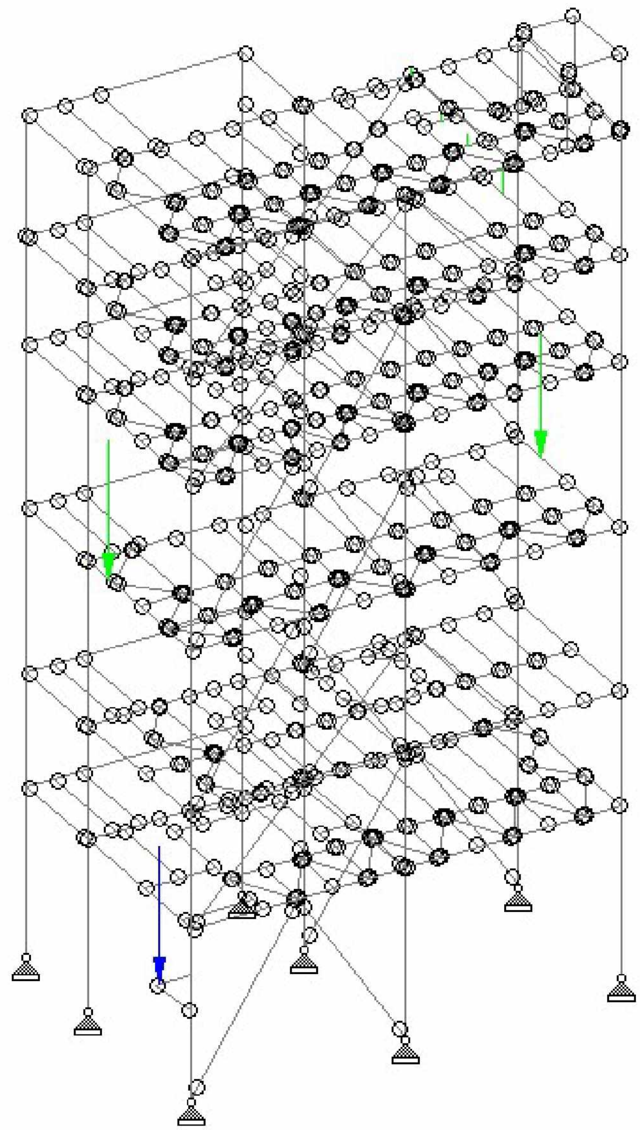


Figure 3.3.2: Empty weight of piping (CONCENTRATED)

3.3.3 EMPTY WEIGHT OF EQUIPMENT (L/C:312)

Empty weight of equipment is taken as per load table given in input drawings (Annexure A).

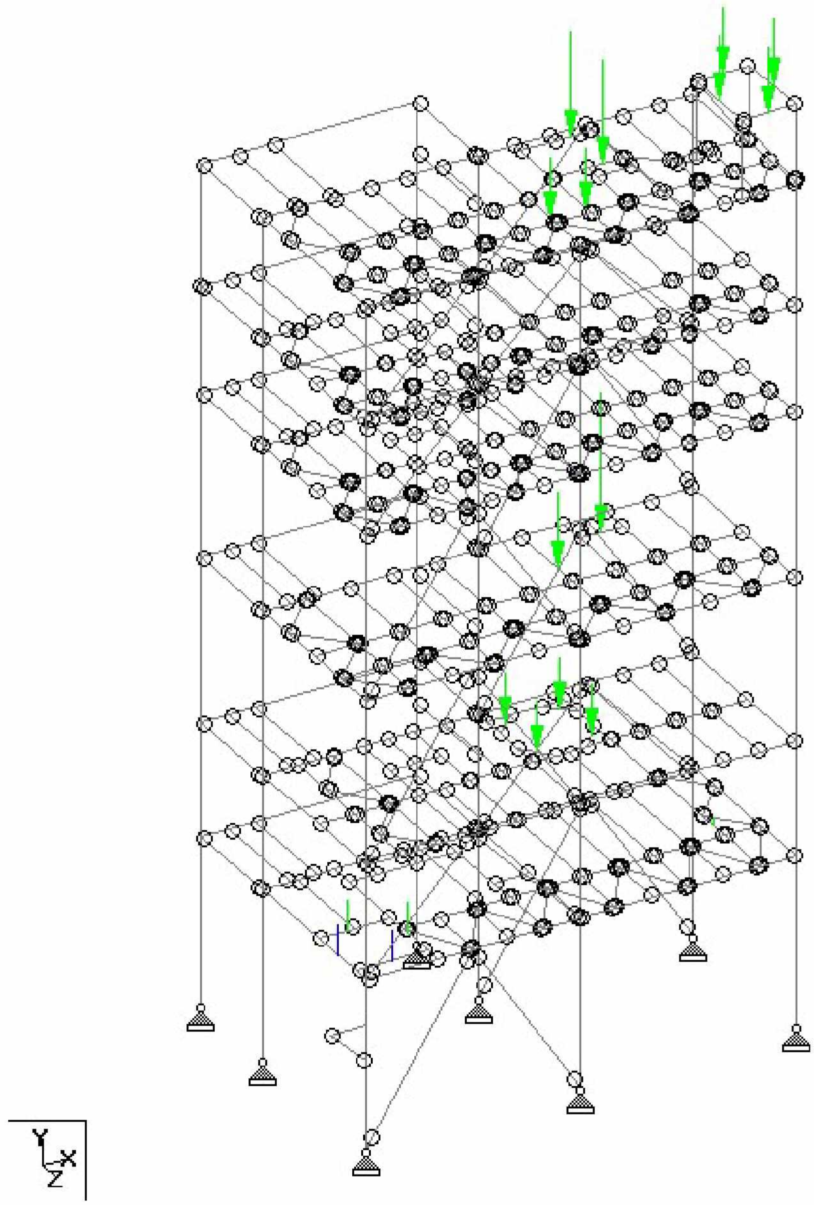


Figure 3.3.3: Empty weight of equipment

3.4 OPERATING LOAD :

3.4.1 OPERATING WEIGHT OF PIPING (UDL) (L/C:401)

The operating weight of piping (UDL) is applied as per piping input drawings attached in ANNEXURE A.

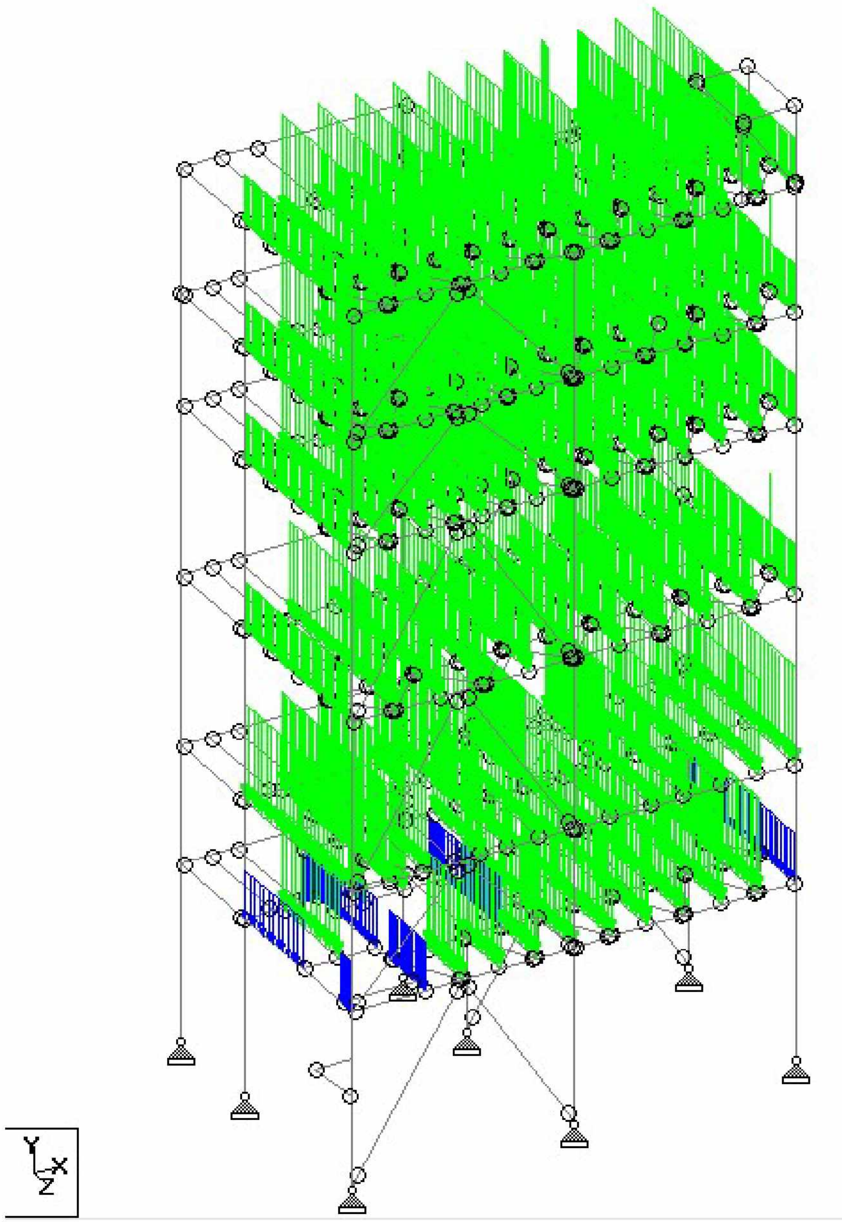


Figure 3.4.1: Operating weight of piping (UDL)

3.4.2 OPERATING WEIGHT OF PIPING (CONC) (L/C:402)

The operating weight of piping (CONCENTRATED) is applied as per piping input drawings attached in ANNEXURE A.

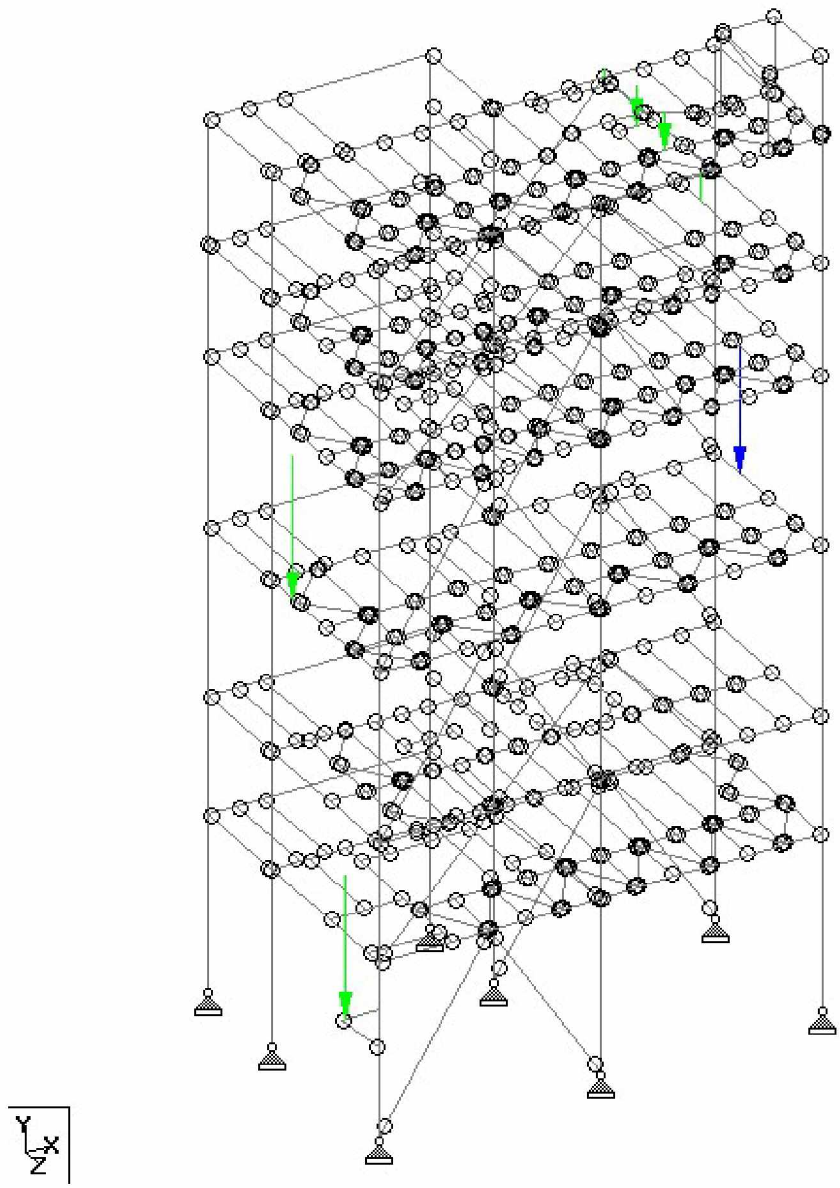


Figure 3.4.2: Operating weight of piping (CONCENTRATED)

3.4.3 OPERATING WEIGHT OF EQUIPMNET (L/C:412)

The operating weight of equipment is applied as per piping input drawings attached in ANNEXURE A.

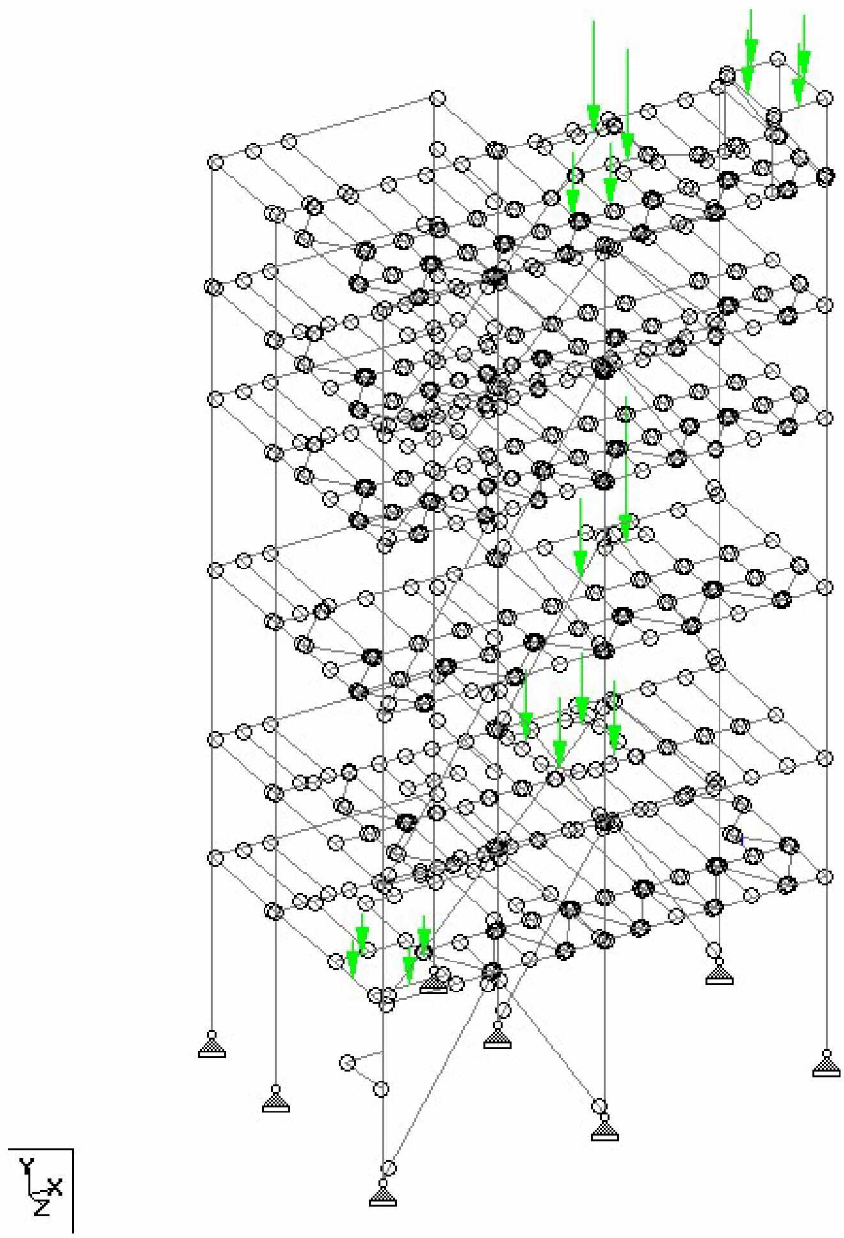


Figure 3.4.3: Operating weight of equipment

3.4.4 TEST WEIGHT OF PIPING (CONCENTRATED) (L/C:502)

The test weight of piping (CONCENTRATED) is applied as per piping input drawings attached in ANNEXURE A.

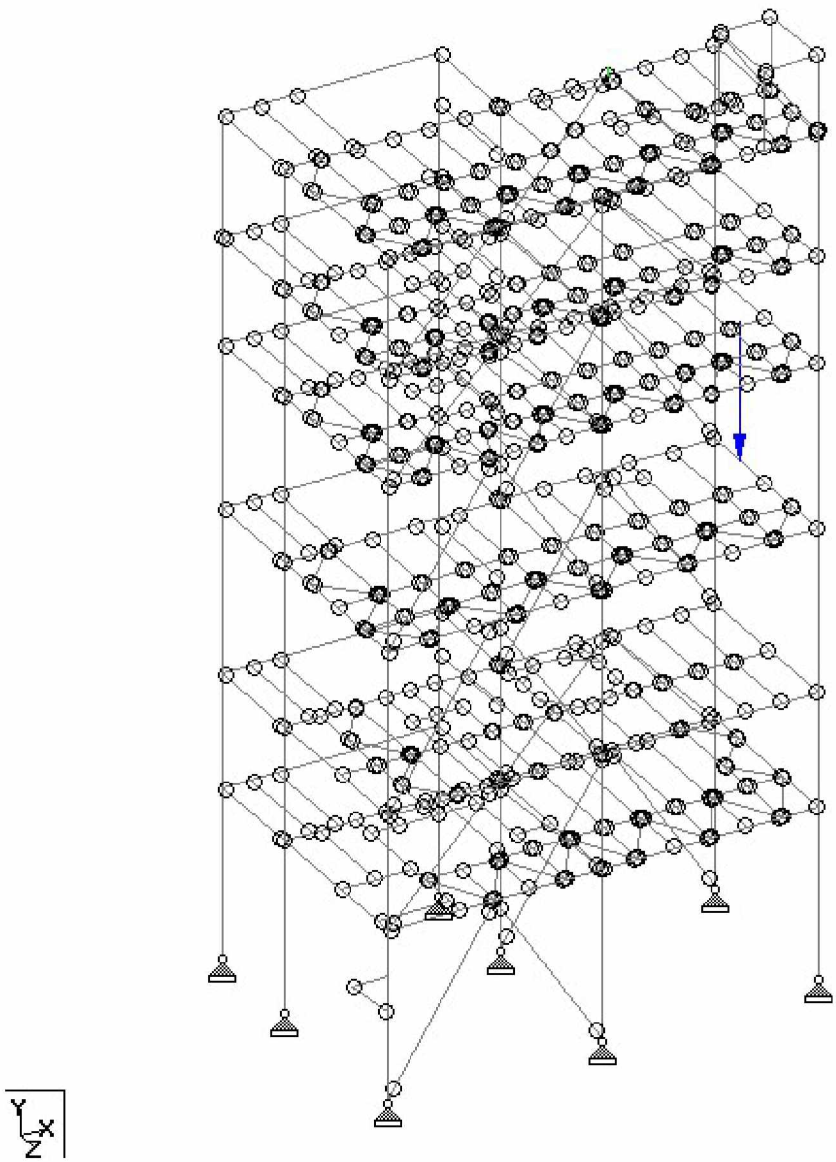


Figure 3.4.4: Test weight of piping (Concentrated)

3.4.5 TEST WEIGHT OF EQUIPMENT (L/C 512)

The test weight of equipment is applied as per piping input drawings attached in ANNEXURE A.

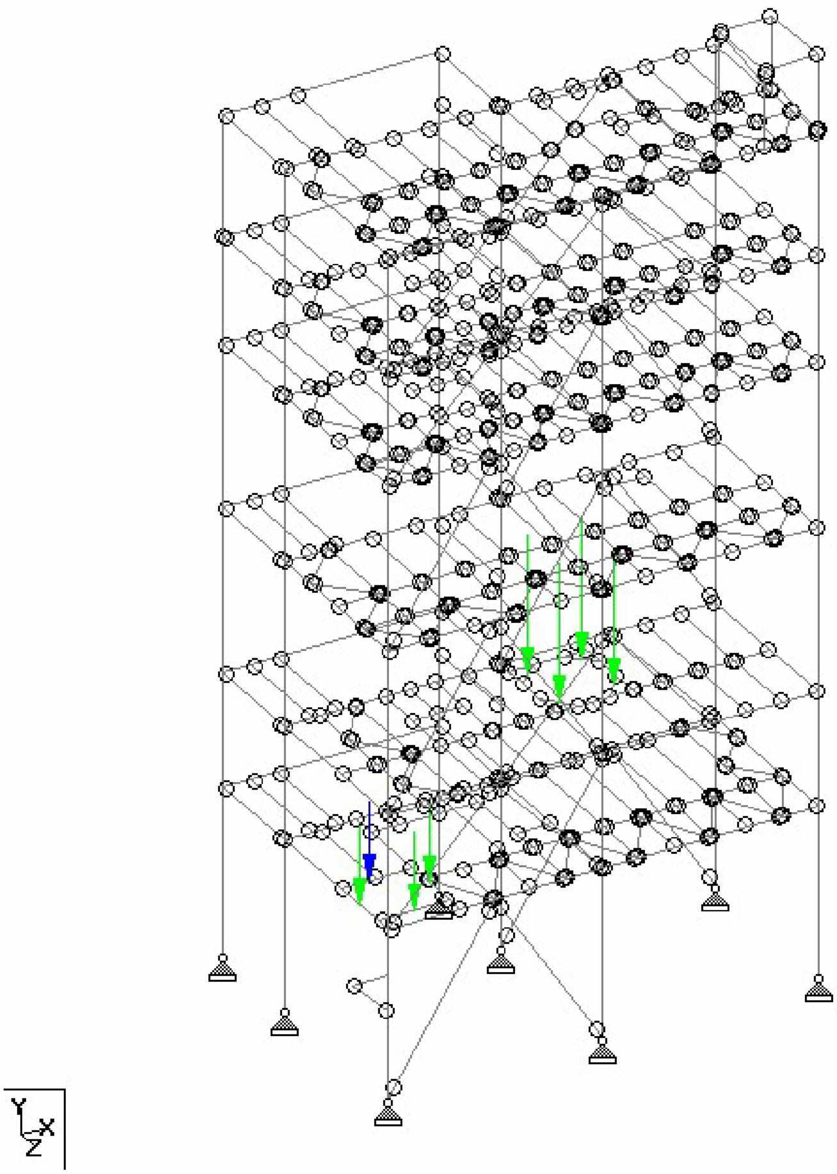


Figure 3.4.5: Test weight of equipment

3.5 WIND LOAD CALCULATION (L/C 61 to L/C 64)

Wind load cases are divided in following three cases. Wind load is calculated as per NEN-EN 1991-1-4:2010 for the site parameters given in 16741-C50-00001.

Wind load calculation involves:

Wind load on structure due to self-obstruction

Wind on piping

Wind on equipment

As per Doc. 16741-C50-00001 following parameters are considered for the wind load calculation

Wind zone: II

Wind speed = 27m/s

Terrain type: II

Wind load is calculated in X and Z direction as per the of NEN-EN 1991-1-4:2010 For detailed wind load calculations, refer Annexure C.

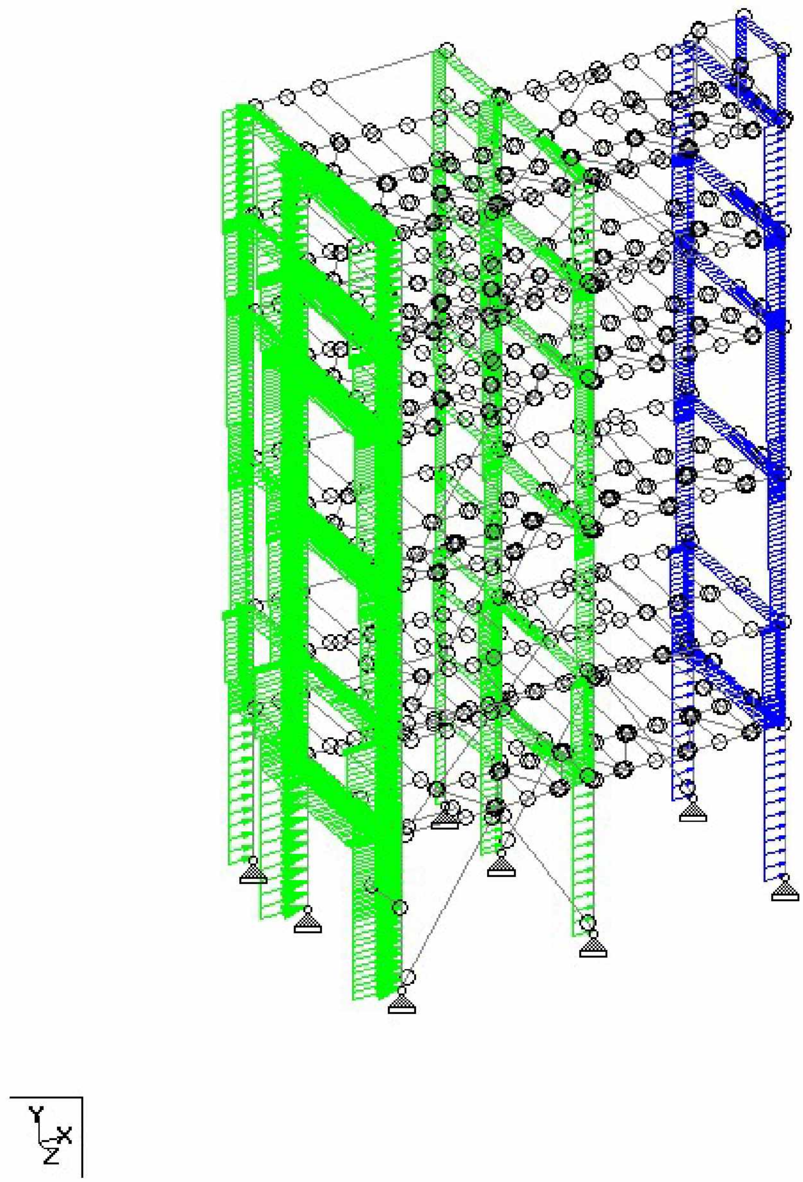


Figure 3.5.1: Wind load on structure in E-W direction due to self -obstruction (L/C 611).

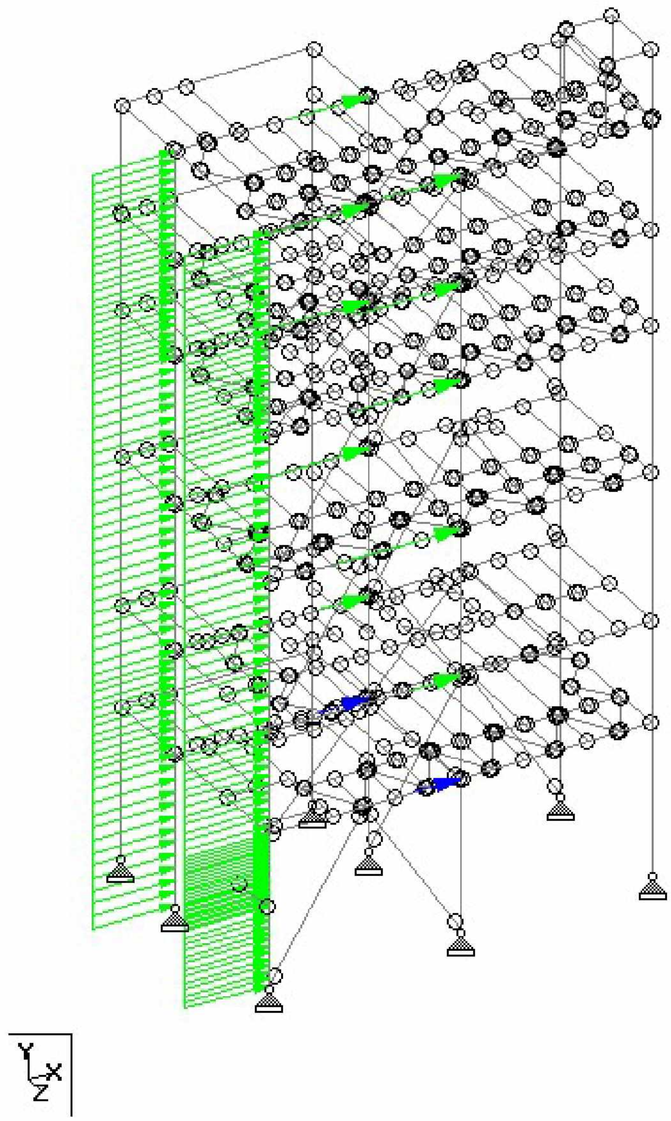


Figure 3.5.2: Wind load on piping in E-W direction (L/C 612).

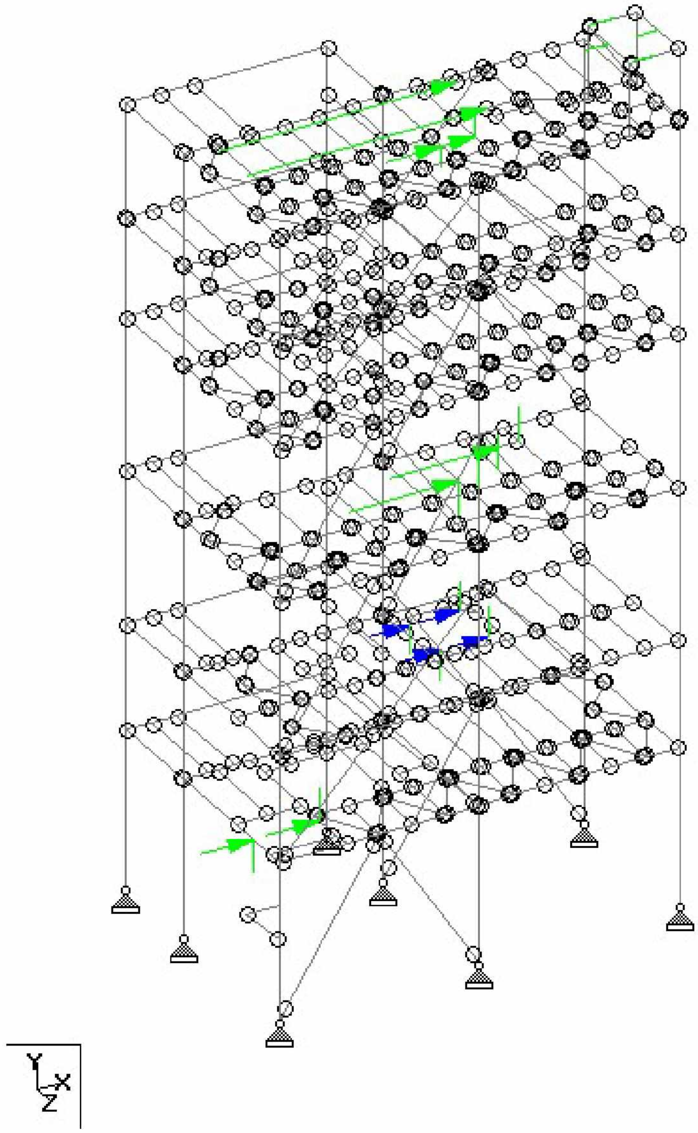


Figure 3.5.3: Wind load on equipment in E-W direction (L/C 613).

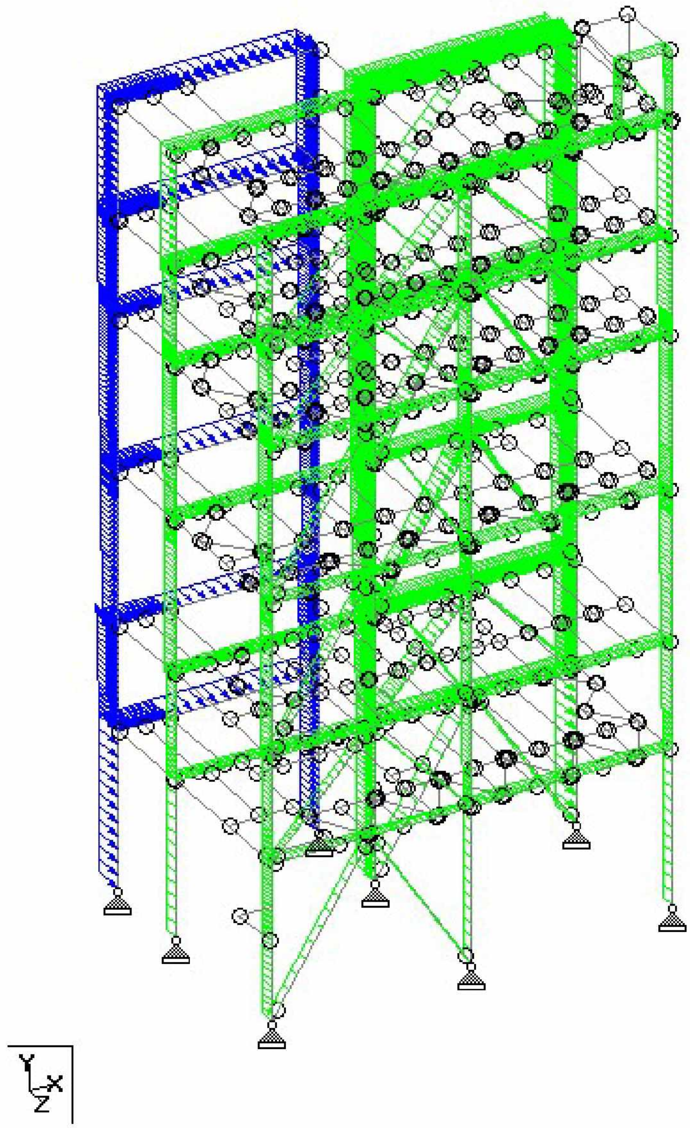


Figure 3.5.4: Wind load on structure in N-S direction due to self -obstruction (L/C 621).

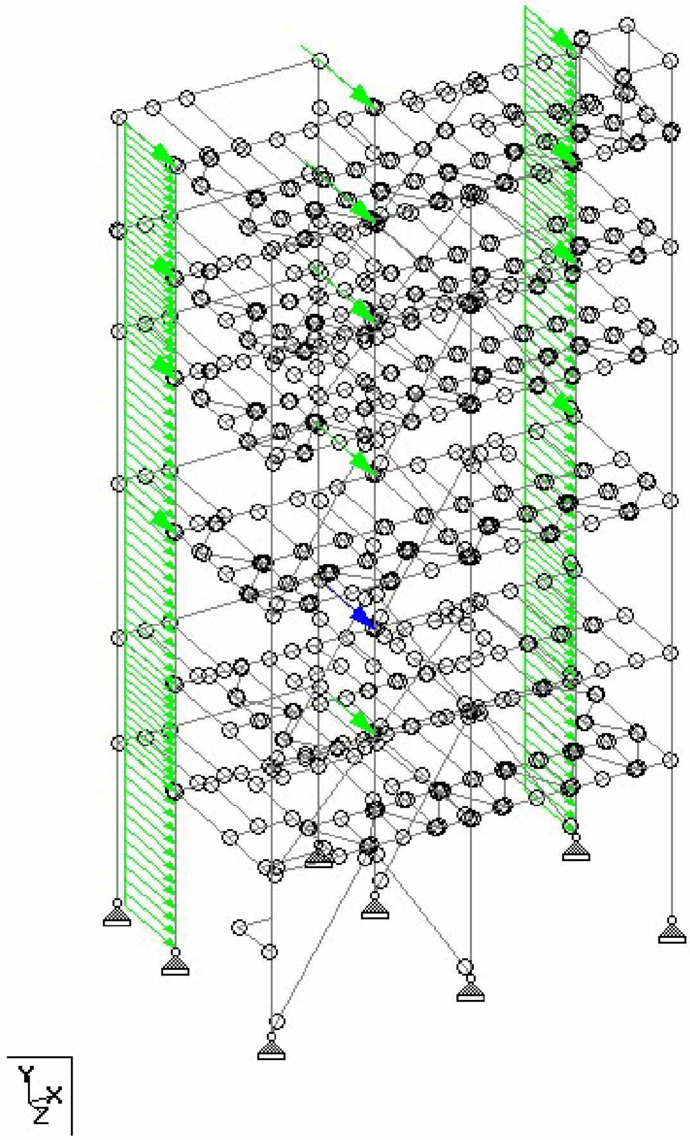


Figure 3.5.5: Wind load on piping in N-S direction (L/C 622).

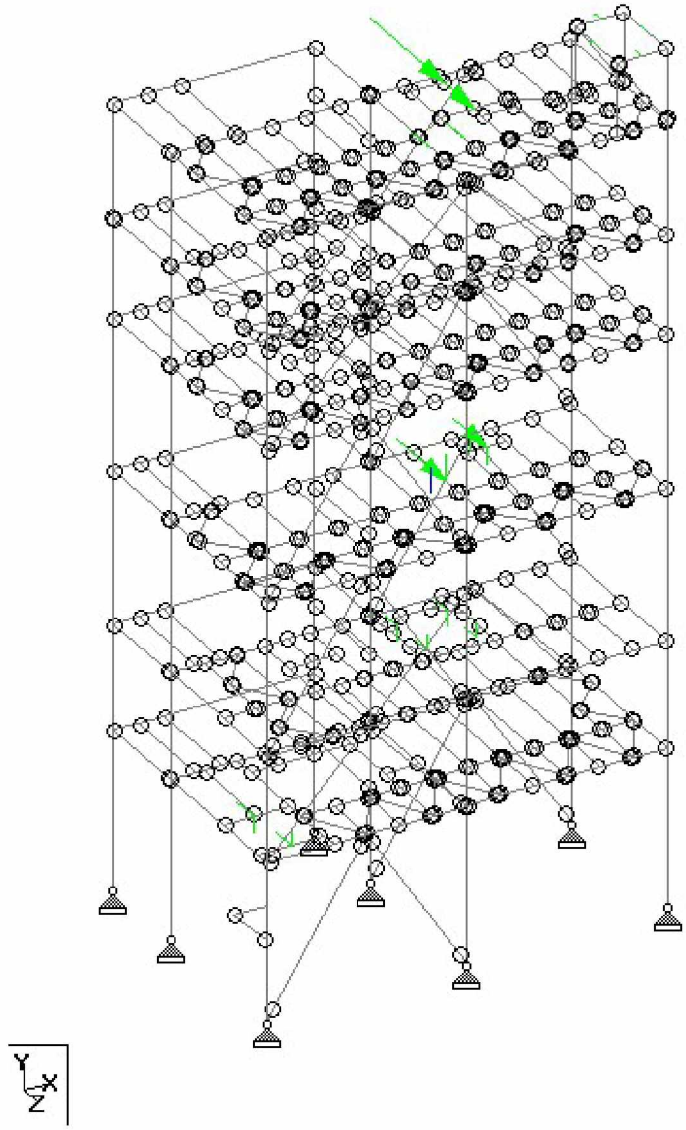


Figure 3.5.6: Wind load on equipment in N-S direction (L/C 623).

3.6 PIPE THERMAL LOAD IN X (E-W) DIRECTION (FDN/GLOBAL DESIGN) (L/C:81)

Pipe thermal load in +X (E-W) (UDL) is applied as per load table given in load input.

(Annexure A).

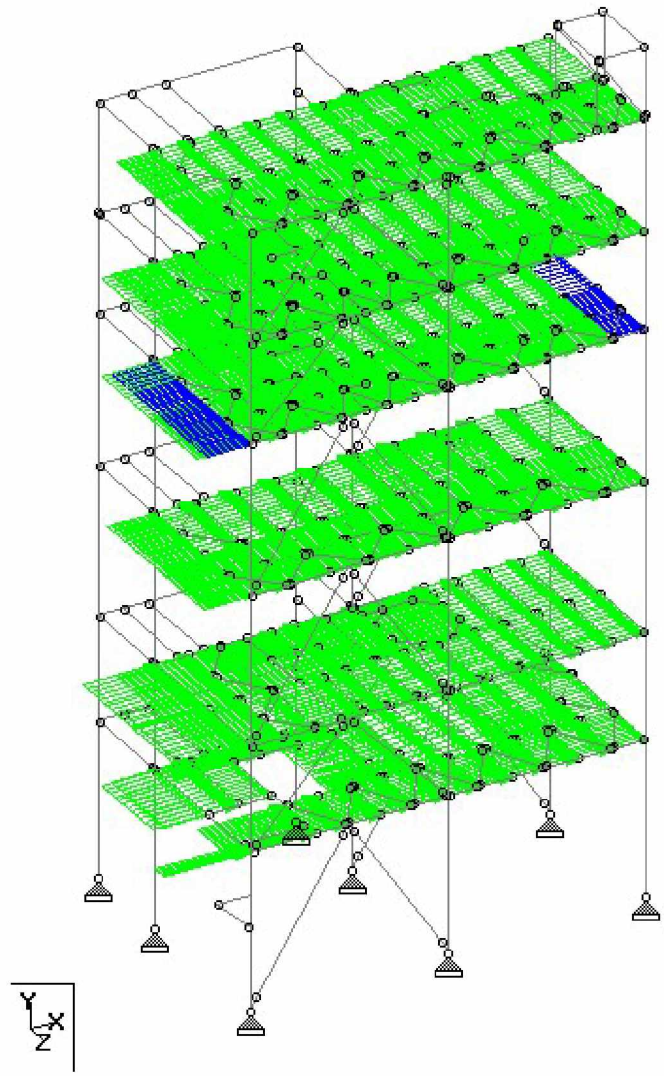


Figure 3.6: Pipe thermal load in E-W direction

3.7 PIPE THERMAL LOAD IN +Z (N-S) DIRECTION (FDN/GLOBAL DESIGN) (L/C:82)

Pipe thermal load in +Z (N-S) (UDL) is applied as per load table given in load input.

(Annexure A)

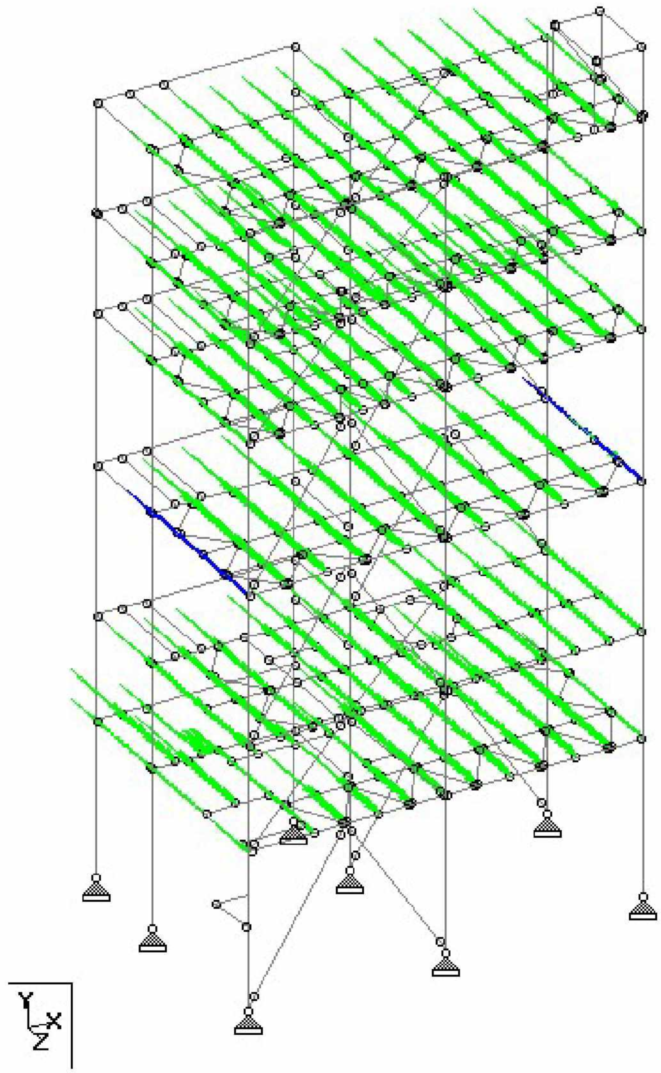


Figure 3.7: Pipe thermal load in N-S direction

3.8 TEMPERATURE LOAD (+VE &-VE) (L/C: 85 & L/C:86)

Extreme ambient air temperatures as per 16471-C50-00001 as below.

Minimum temperature: -20^{0}c

Maximum temperature: +40^{0}c

Erection temperature considered: +10^{0}c

Differential temperature for structural steel in Warm Condition: (Tmax – T0) = 40 – 10 = 30^{0}C

Differential temperature for structural steel in Cold Condition: (T0 – Tmin) = 10 – (-20) = (-) 30^{0}C

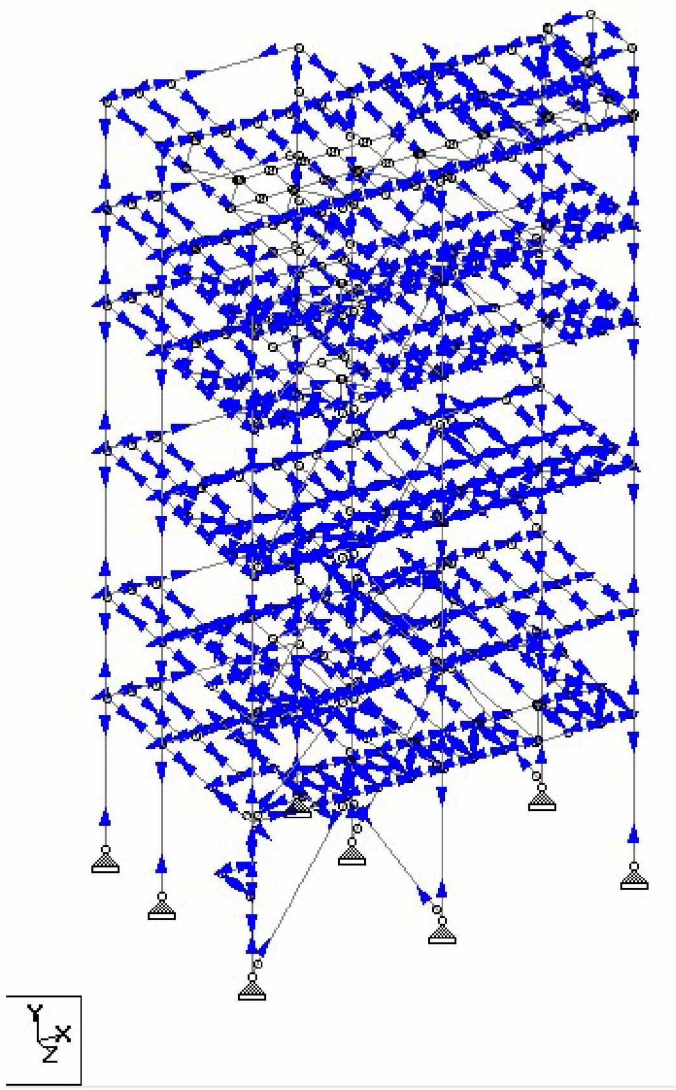


Figure 3.8.1: Temperature load in warm condition (L/C: 85)

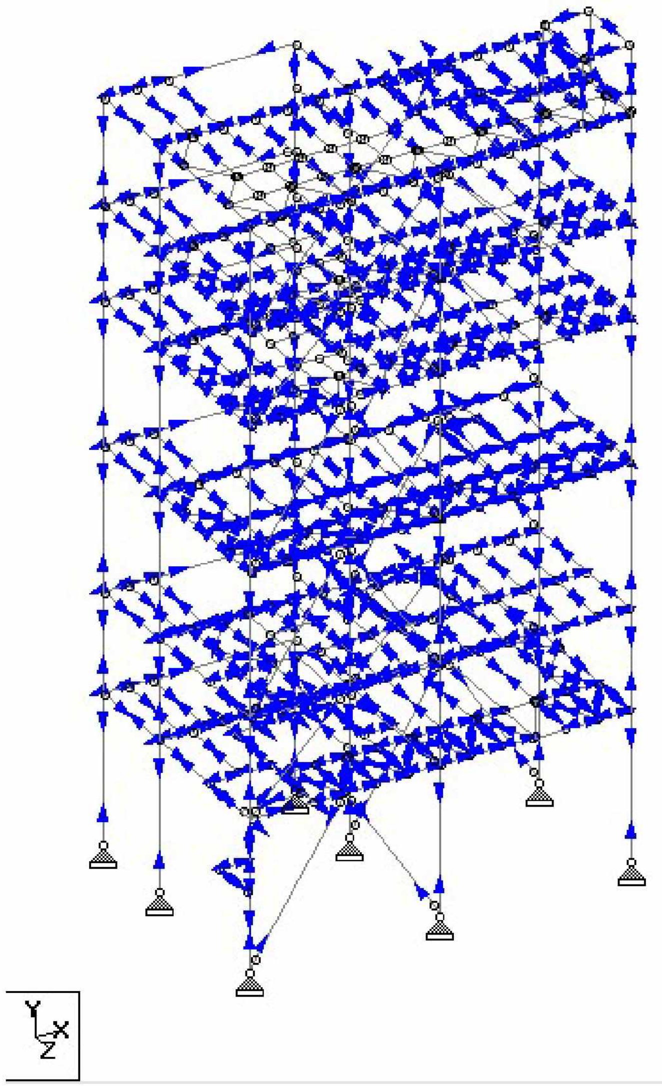


Figure 3.8.2: Temperature load in cold condition (L/C: 86)

3.9 SNOW LOAD (L/C : 94)

The characteristic snow load, Sk = 0.7kN/m2. (As per section 2.4.9 of 16471-C50-00001)

Shape coefficient μi = 0.8 (for flat roof)

Exposure coefficient Ce = 1.0

Heat Coefficient Ct = 1.0

Snow load on roof S =sk * μi* Ce* Ct = 0.7*0.8*1.0*1.0 = 0.56 kN/m2

100% snow load of 0.56kN/m2 is applied on top floor level, 50% snow load of 0.28kN/m2 is applied on all lower floor levels.

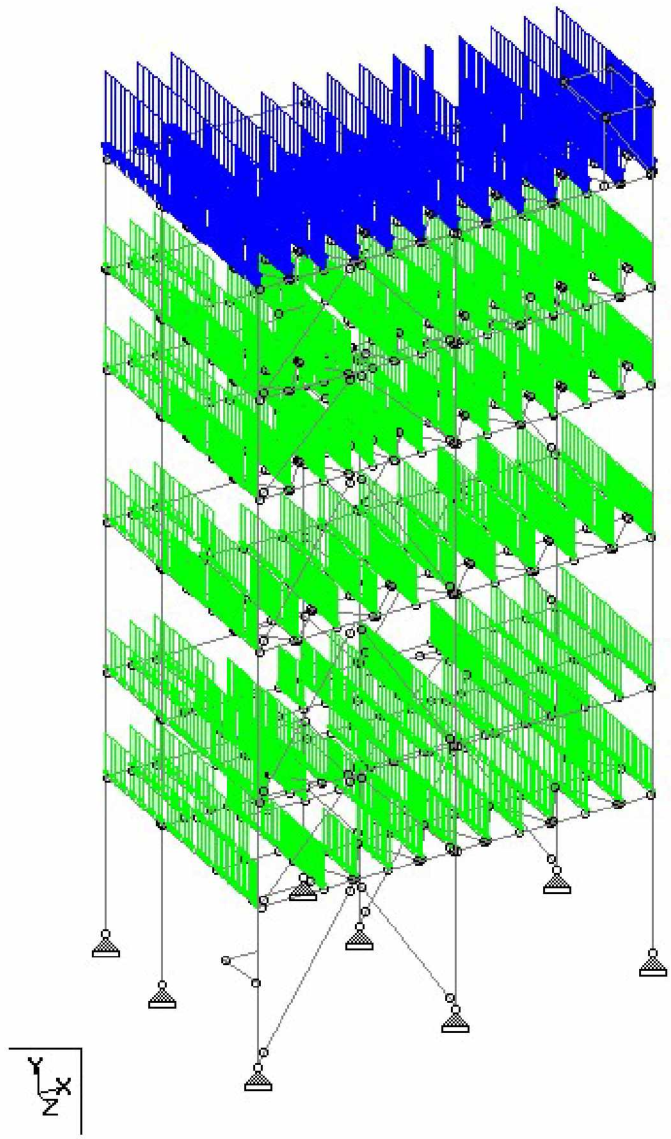


Figure 3.9: Snow load L/C: 94)

3.10 NOTIONAL LOADS (L/C 1001 TO 1008)

Notional loads of 0.5% vertical loads are applied to take into effect of imperfections in the structure. Vertical loads are dead loads, live loads, empty and operating loads. These loads are applied using load combinations in load case 1001 to 1008.

3.11 BLAST LOADS

Structure is designed for explosive loads for the parameters given below,

Over pressure = 30 mbar = 3 kN/m^2

Positive duration = 15 ms = 0.015 seconds

Blast loads are calculated as per ACSE guideline “Design of Blast resistant Buildings for Petrochemical facilities”.

Since it is open structure blast load is considered to act on one frame only at time in the direction of blast, and effect of blast load on side frames are considered at the same time.

Blast loads on structure, pipes, equipment are considered for analysis.

Drag / force coefficient is considered as "1.0" for calculation of blast loads on members, and 0.8 for blast loads on pipes and equipment.

Detailed calculations for blast loads are shown in annexure D.

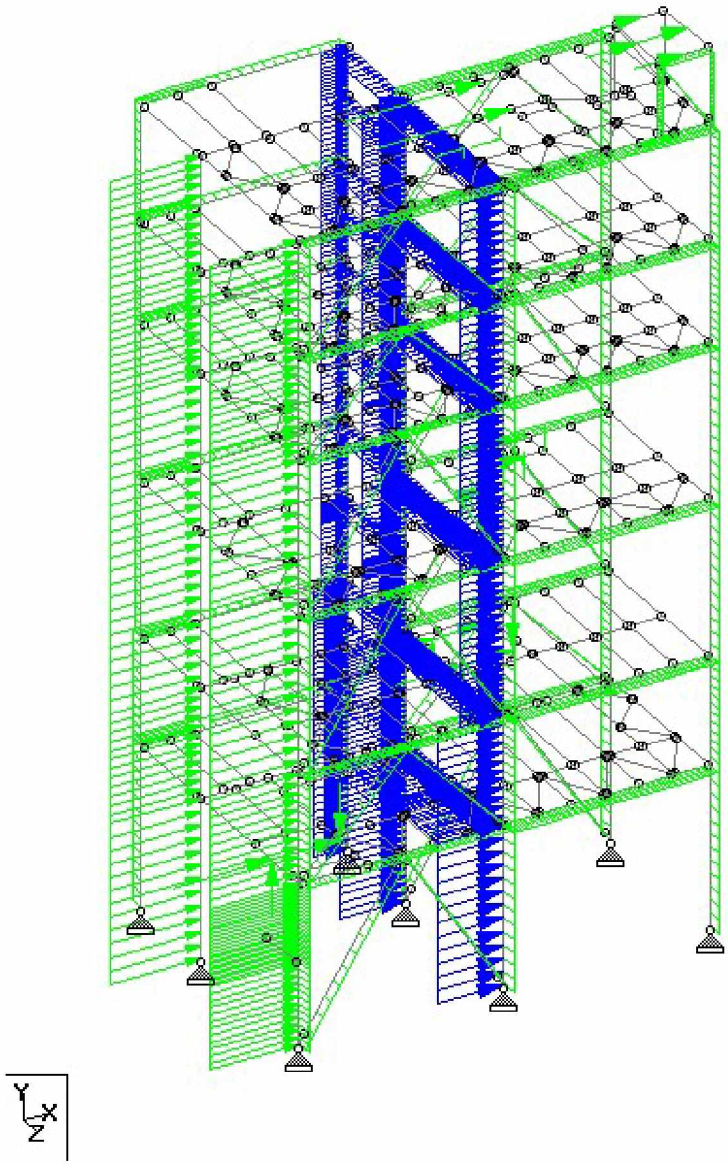


Figure 3.11.1: Blast load in +X (E-W) direction on middle frame.

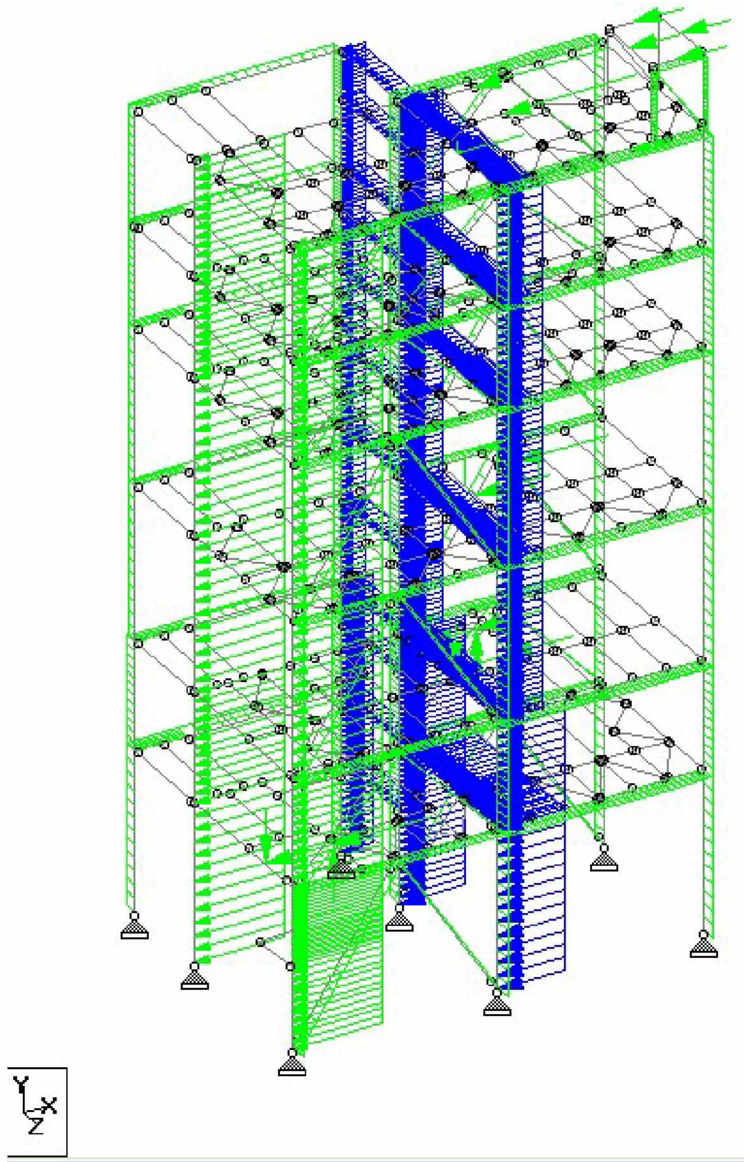


Figure 3.11.2: Blast load in -X (W-E) direction on middle frame.

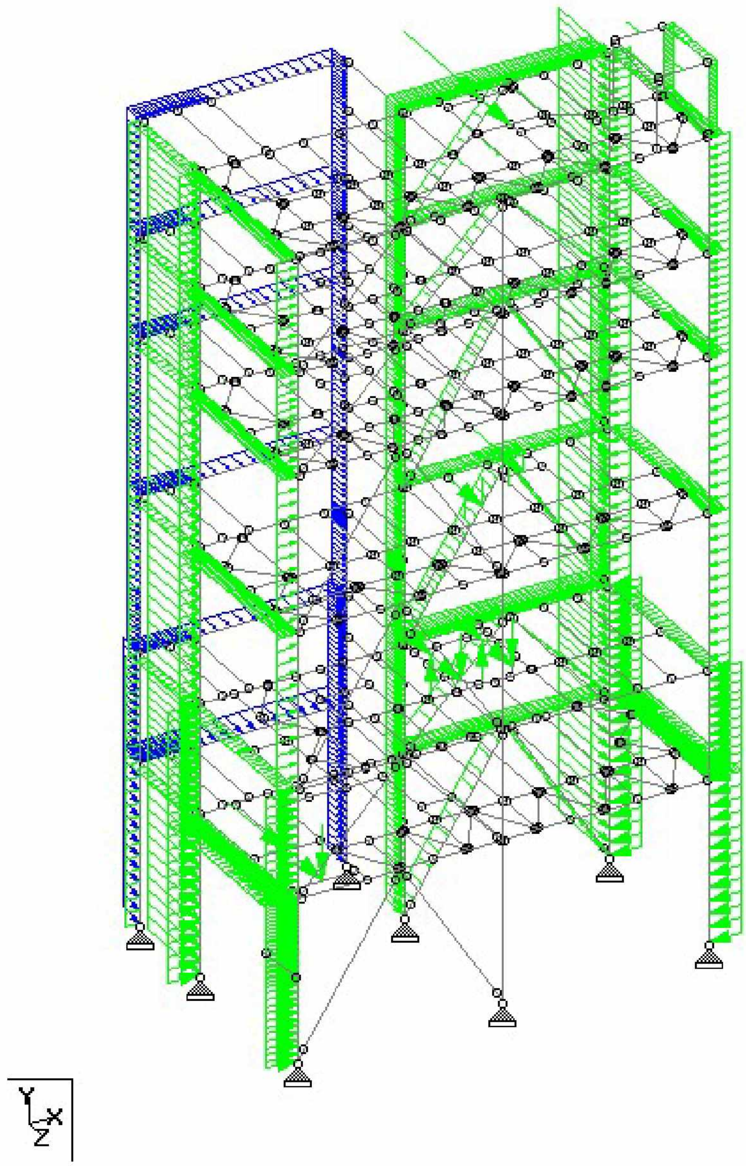


Figure 3.11.3: Blast load in +Z (N-S) direction

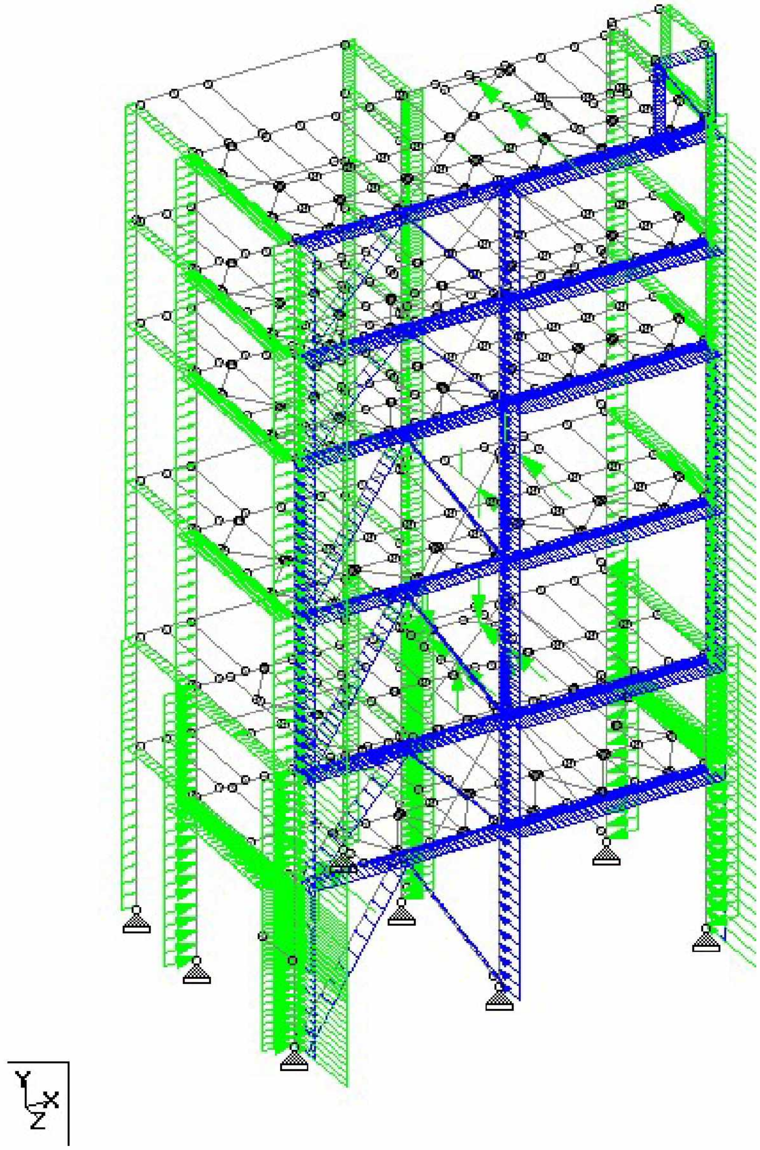


Figure 3.11.4: Blast load in -Z (S-N) direction

3.12 EARTHQUAKE LOAD

As per specification 16471-C50-00001 seismic parameters for the Sluiskil site is as below.

Spectrum Type 2

• Importance class II

• Ground type D

• PGA (Peak Ground Acceleration) ag= 0.05 g (0.50 m/s)

T=Ct.H^3/4 = 0.085*26^0.75 = 0.978....... (4.6)

for type 2, and ground type D, as per table 3.3, the different values are

S=1.8, Ta=0.1, Tc=0.3, TD=1.2,

q= qo*kw= 3.6

hence T > Tc, T < TD, hence Sd(t) = ag.S.2.5/q*Tc/T... (3.15)

Sd(t) = 0.05*1.8*2.5/3.6*(0.3/0.978) (ag in terms of g, ag=0.05)

Sd(t) 0.0192

Base shear = Fb = Sd(t)*m*ʎ

ʎ= 1, m is mass of the structure

Base shear = 0.019*m....

means the base shear is 1.9 % of the mass.

Weight of the structure = 710 KN

Seismic base shear = 0.019*710 = 13.5 KN.

Where as the load due to wind in in minimum of X & Z direction is 245 kN

As earthquake load (13.5 kN) is very much less than wind load (245 kN) , earth quake analysis is ignored for structure and foundation design.

4 STAIC CHECK

Load case	Load title	Calculated	Staad	Difference (%)
101	SW OF STRUCTURE	817	817	0.000
111	DEAD LOAD OF GRATING, LADDER, STAIR	320	320	0.000
10	Total dead Load	1137	1138	-0.088
20	Live load	1350	1442	-6.815
301	EMPTY PIPING UDL LOAD	340	343	-0.882
302	EMPTY PIPING CONCENTRATED LOAD	265	265	0.000
312	EMPTY EQUIPMNET LOAD	332	332	0.000
30	TotaL Empty LOAD	937	940	-0.320
401	OPERATING PIPING UDL LOAD	680	688	-1.176
402	OPERATING PIPING CONCENTRATED LOAD	336	336	0.000
403	OPERATING EQUIPMNET LOAD	403	403	0.000
40	TOTAL Operating load	1419	1427	-0.564
502	Test Piping concentrated load	215	215	0.000
512	Test weight of equipment	220	220	0.000
50	Total test load	435	435	0.000
611	Wind load on structure due to self obstruction in E-W	115	120.211	-4.531
612	Wind load on PIPING in E-W	90	90	0.000
613	Wind load on equipment in E-W	36	36	0.000
61	Total wind load in E-W	241	246	-2.075
621	Wind load on structure due to self obstruction in N-S	146	146	0.000
622	Wind load on PIPING in N-S	102	102	0.000
623	Wind load on equipment in N-S	37	37	0.000
62	Total wind load in N-S	284	285	-0.352
63	Total wind load in W-E	267	265	0.749
64	Total wind load in S-N	275	280	-1.818
81	Thermal load in E-W	77	78	-1.299
82	Thermal load in N-S	77	79	-2.597
94	Snow Load	120	139	-15.833

5 MEMBER DESIGN AND POST PROCESSING

5.1 MEMBER DESIGN

Structural analysis and member design have been carried out using STAAD Pro connect edition -version 22.10.00.153.

Various parameters for member design are assigned as per Doc.10000-Y50-026 and EN1993-1-1:2005. Deflection check for the columns has been provided in section 5.3.

5.2 UTILIZATION RATIO

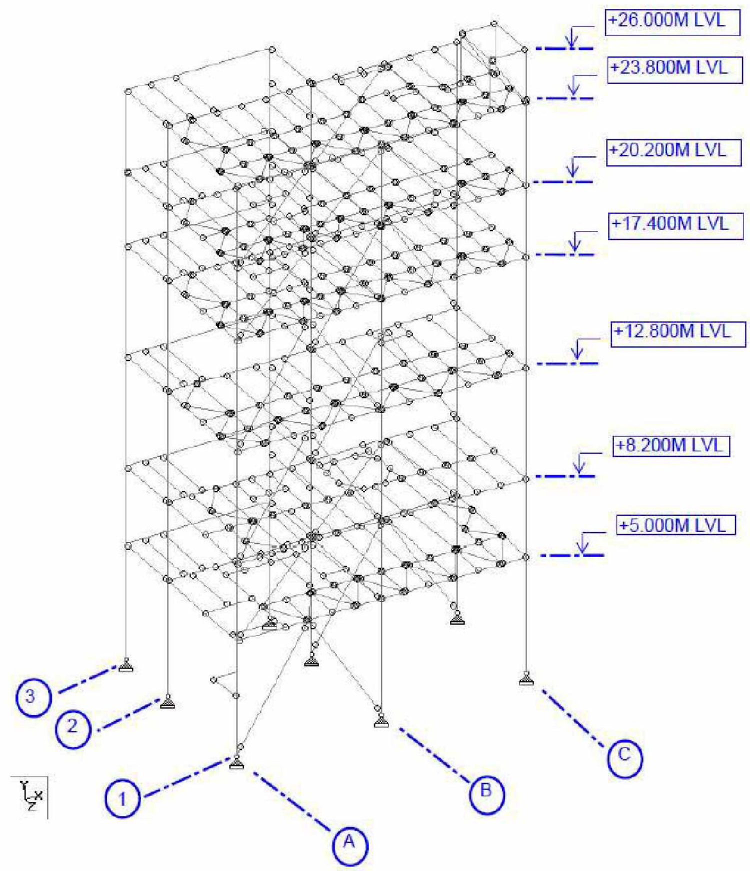
Utilization of all members are within unity.

Maximum actual Utilization Ratio for column = 0.732

Maximum actual Utilization Ratio for beam and bracing = 0.835

Utilization ratio of members for strength load combinations are shown as below.

Member utilization snaps:



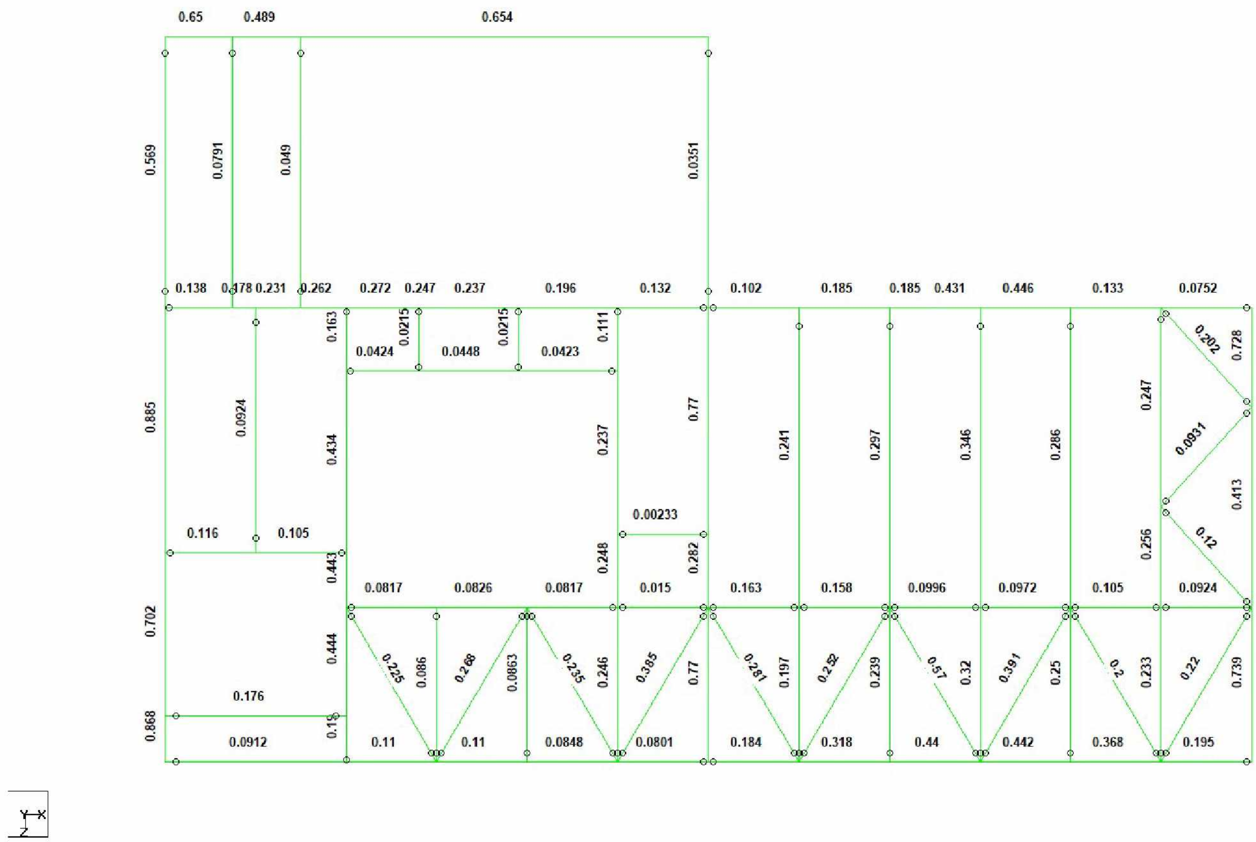


Figure 5.2.1:. Utilization ratios at EL.+5.000m LVL

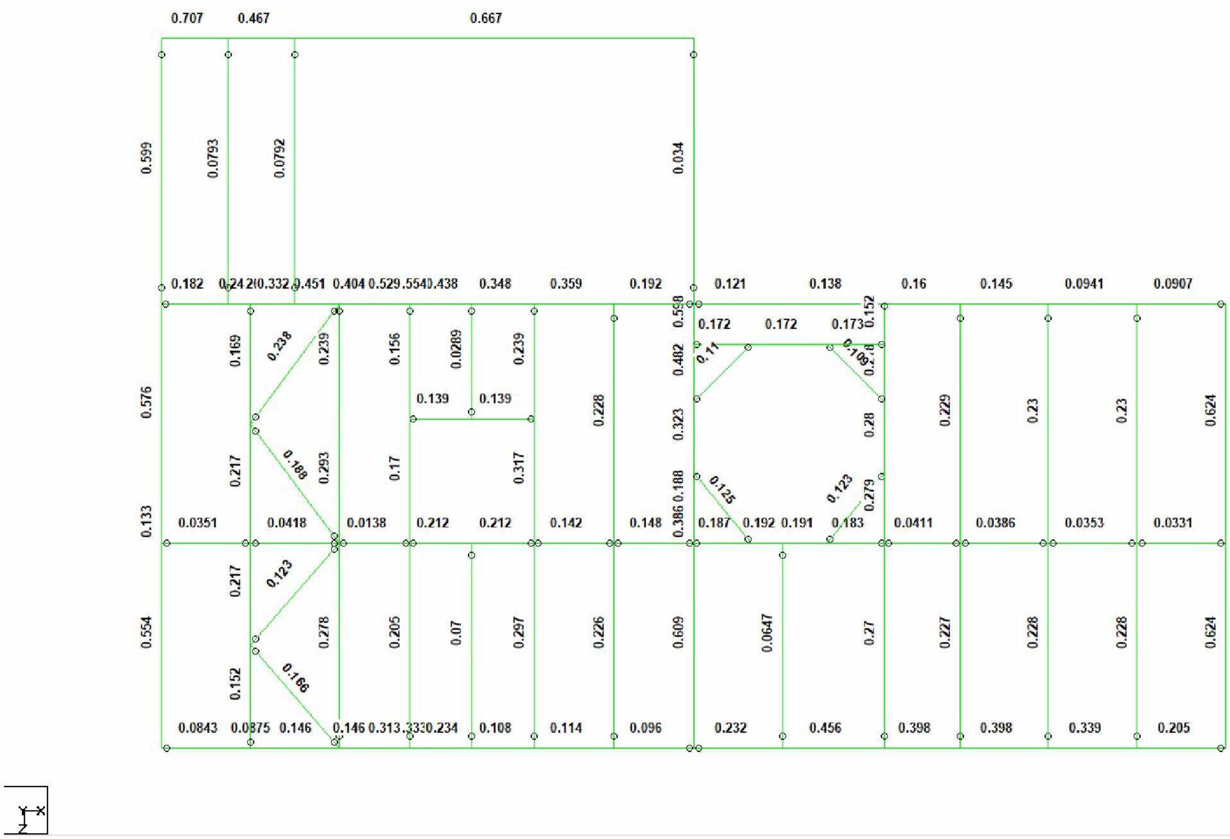


Figure 5.2.2. Utilization ratios at EL.+8.200m LVL

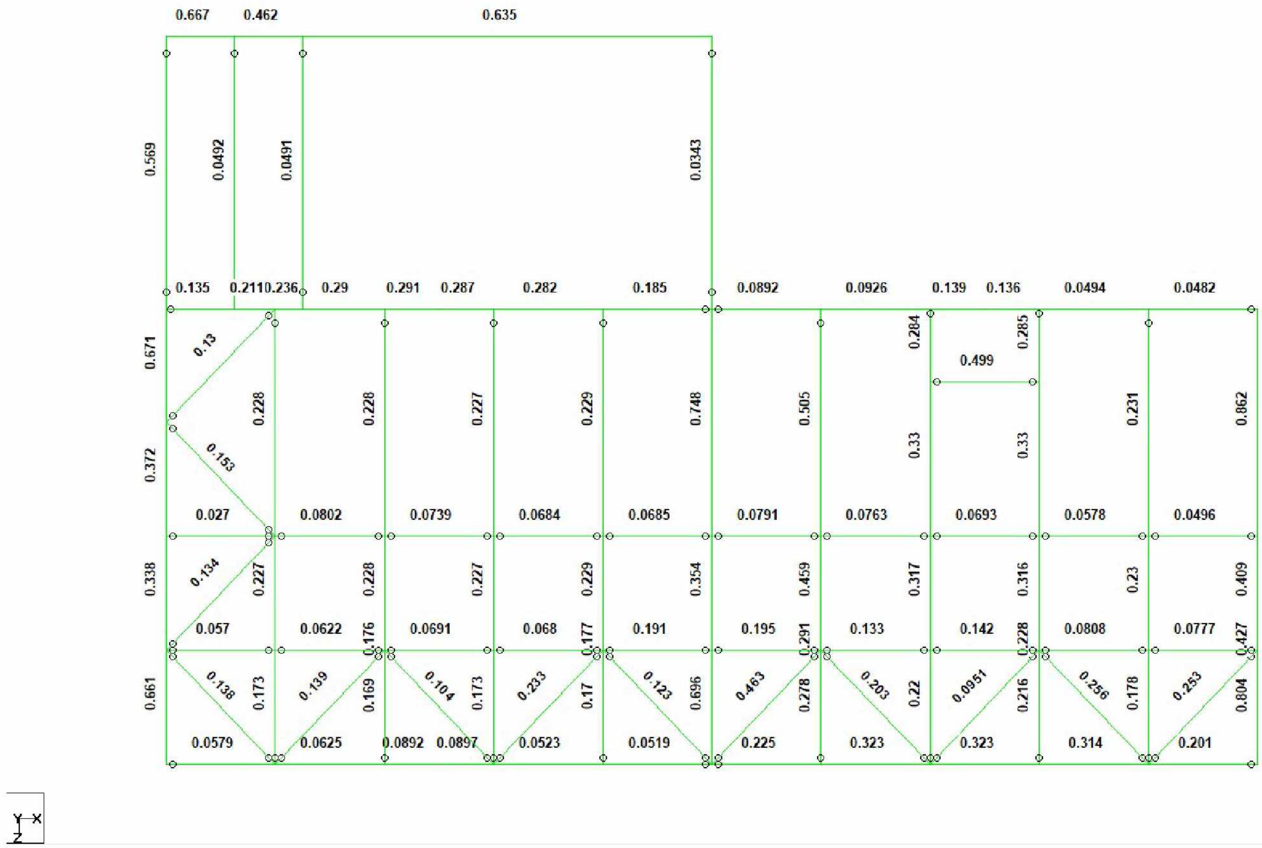


Figure 5.2.3. Utilization ratios at EL.+12.800m LVL

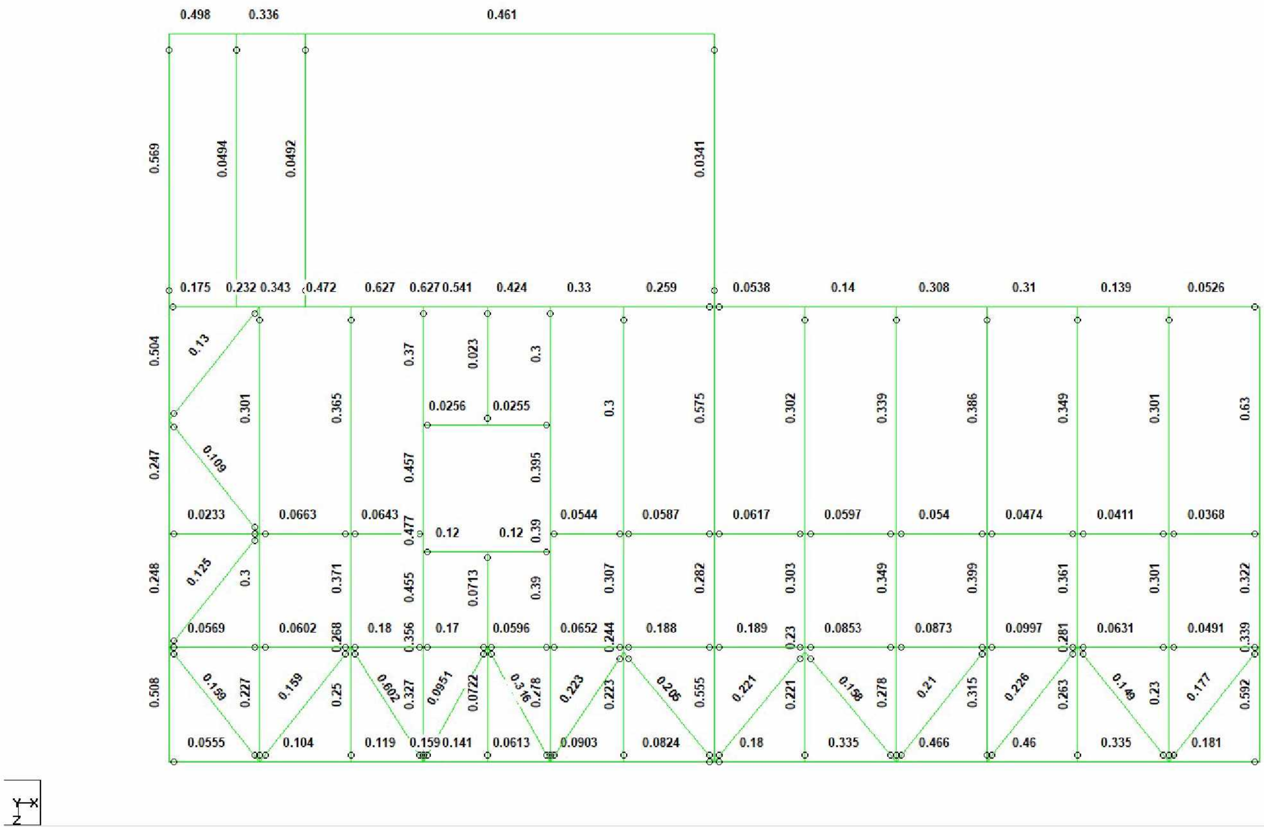


Figure 5.2.4: Utilization ratios at EL.+17.400m LVL

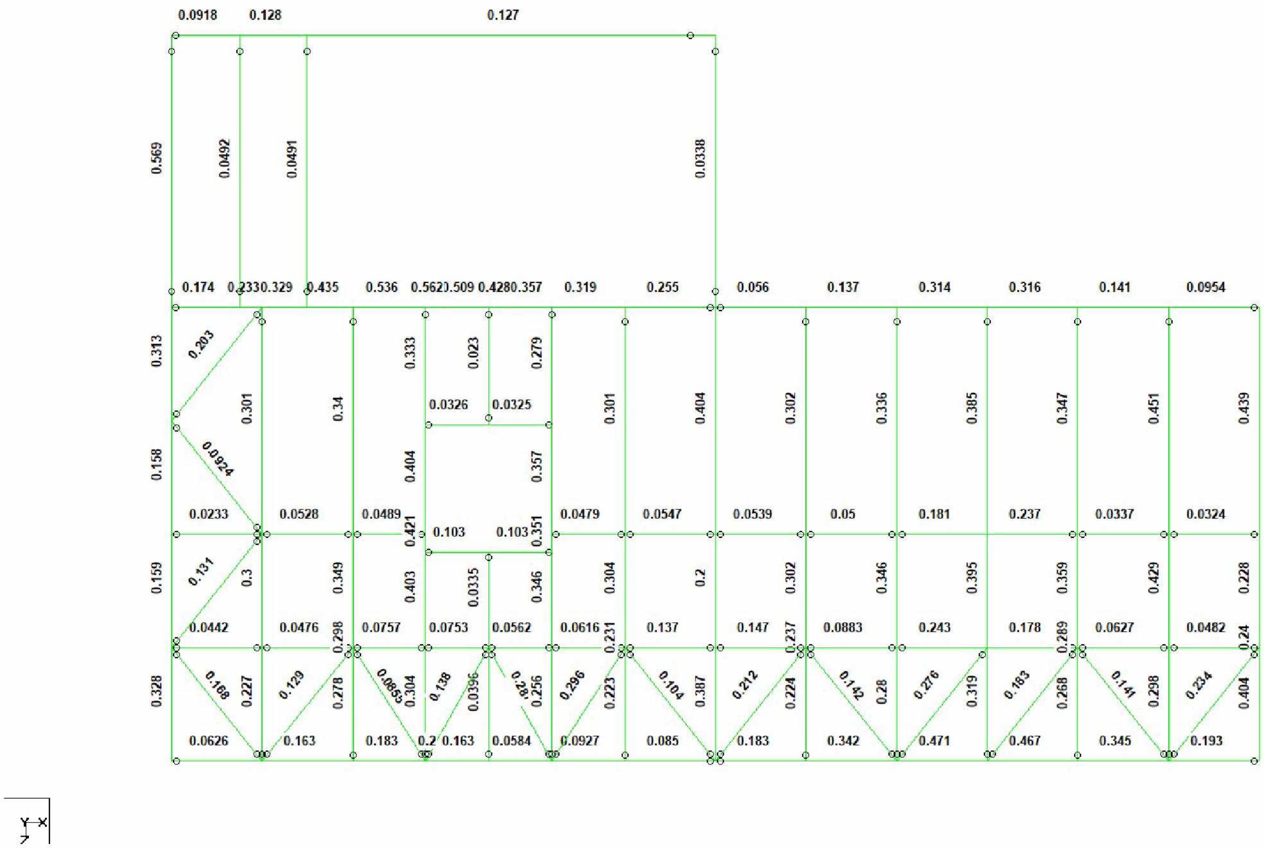


Figure 5.2.5. Utilization ratios at EL.+20.400m LVL

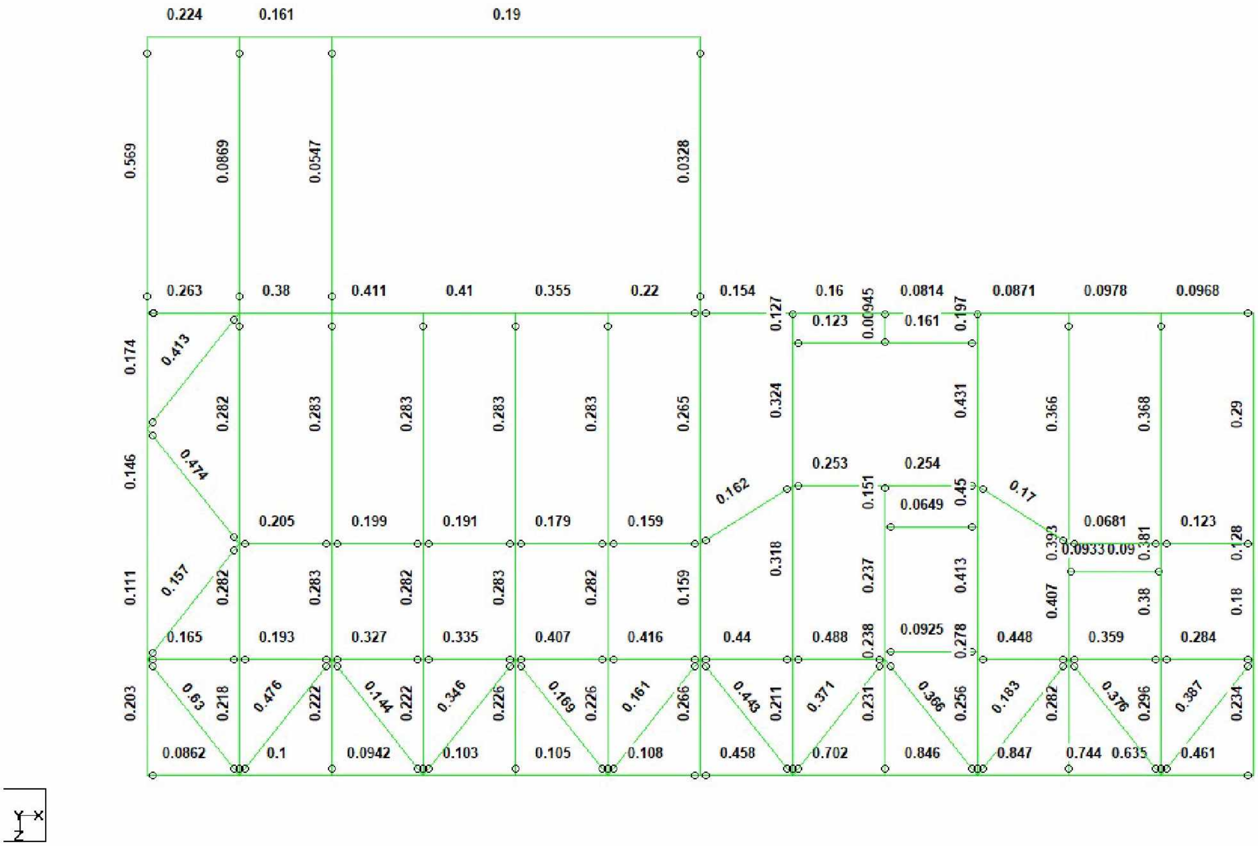


Figure 5.26 . Utilization ratios at EL.+23.800m LVL

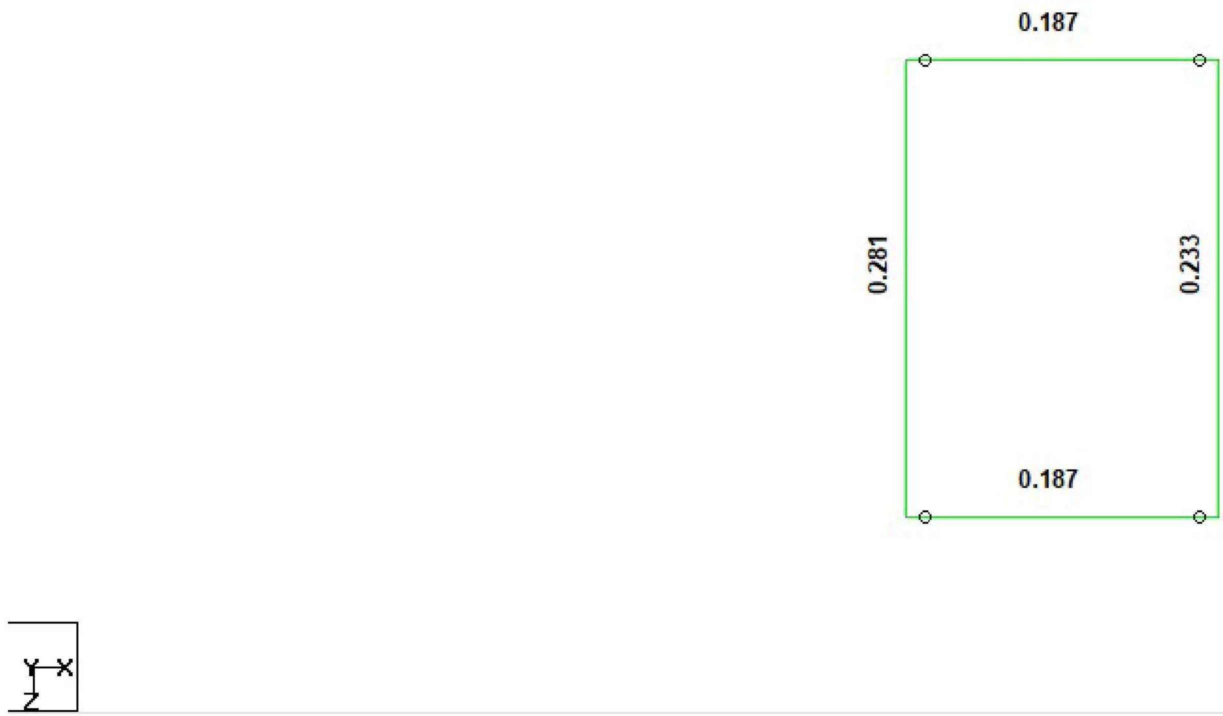


Figure 5.2.7 . Utilization ratios at EL.+26.000m LVL

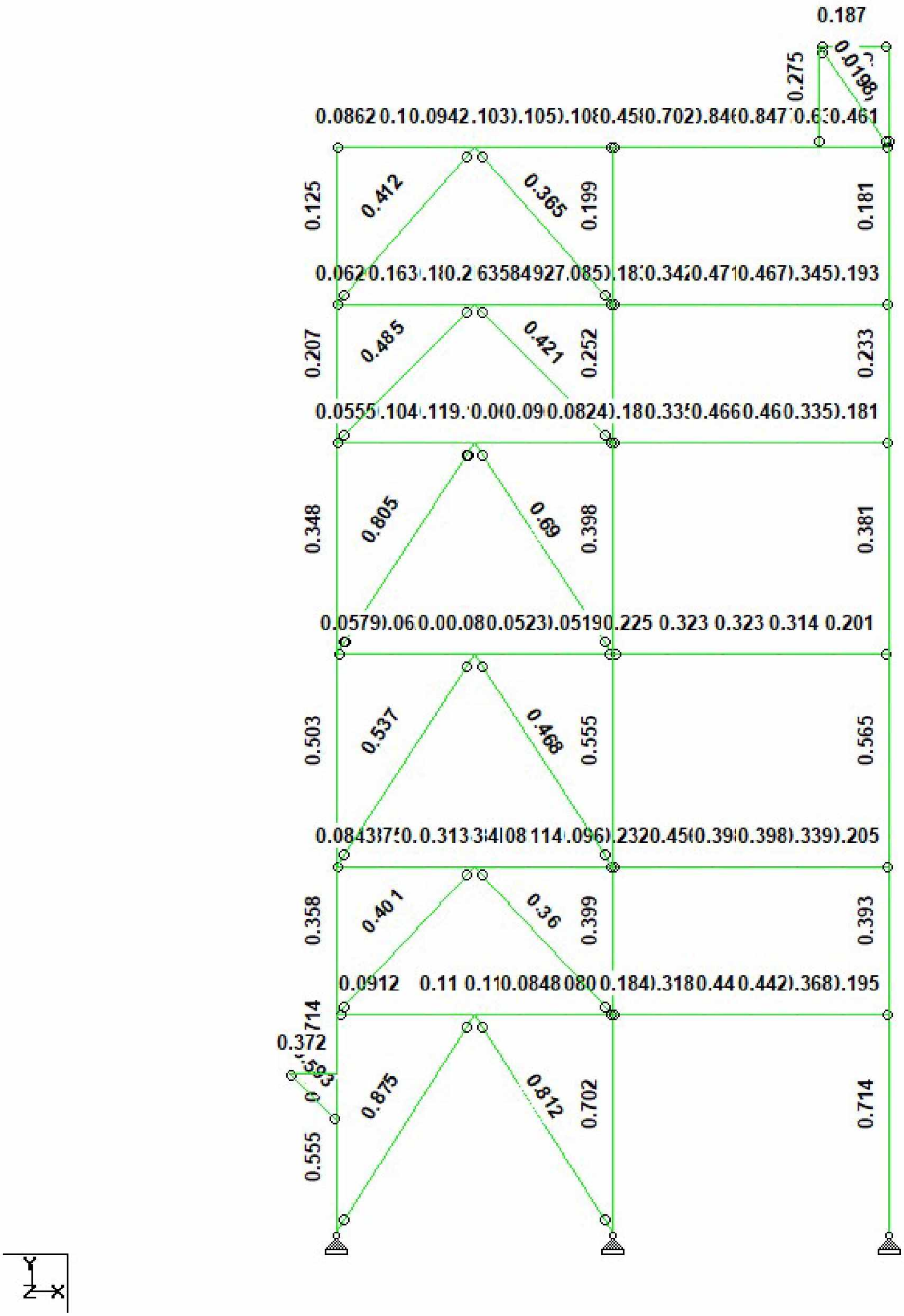


Figure 5.2.8 . Utilization ratios at Grid 1

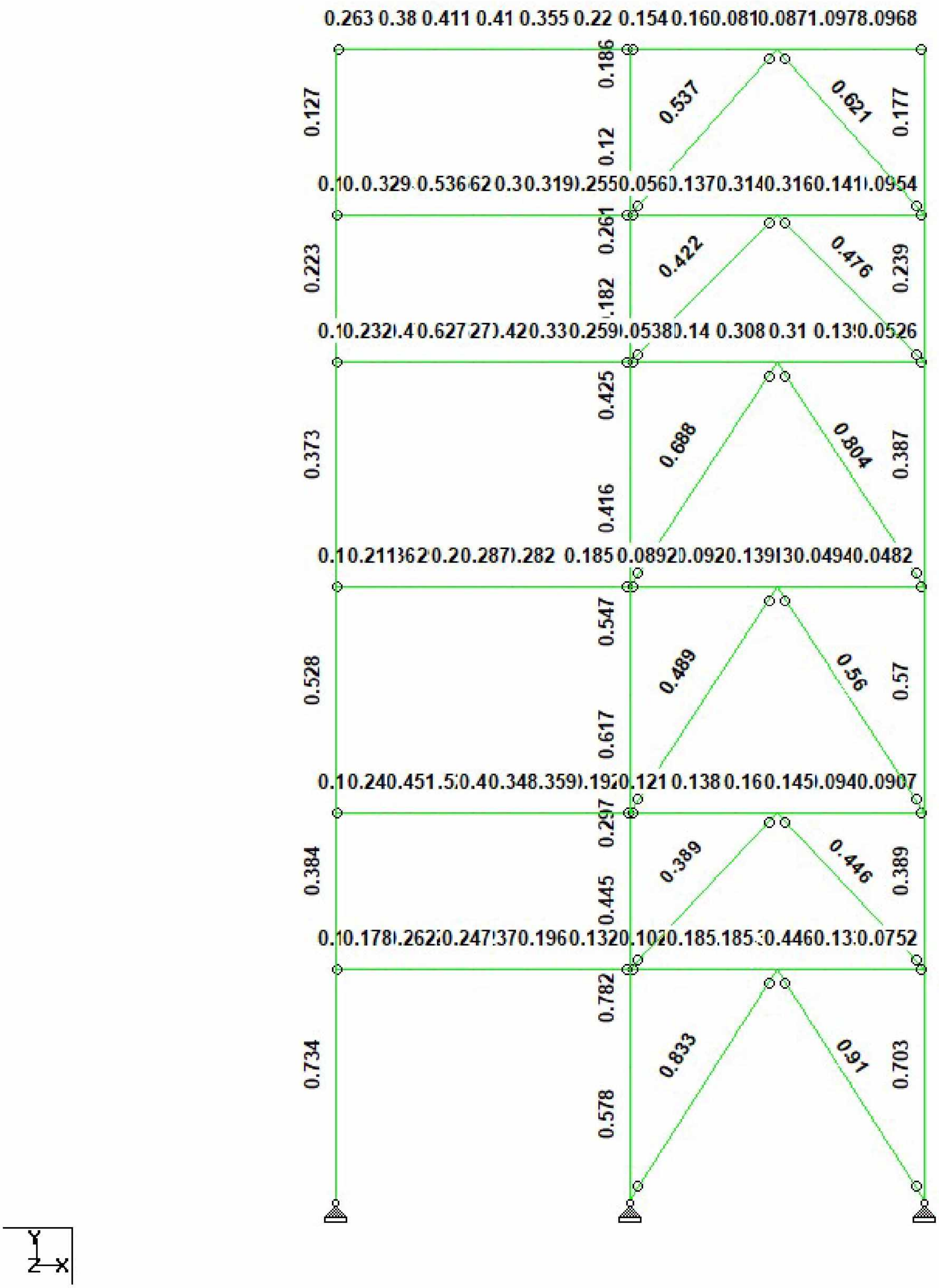


Figure 5.2.9. Utilization ratios at Grid 2

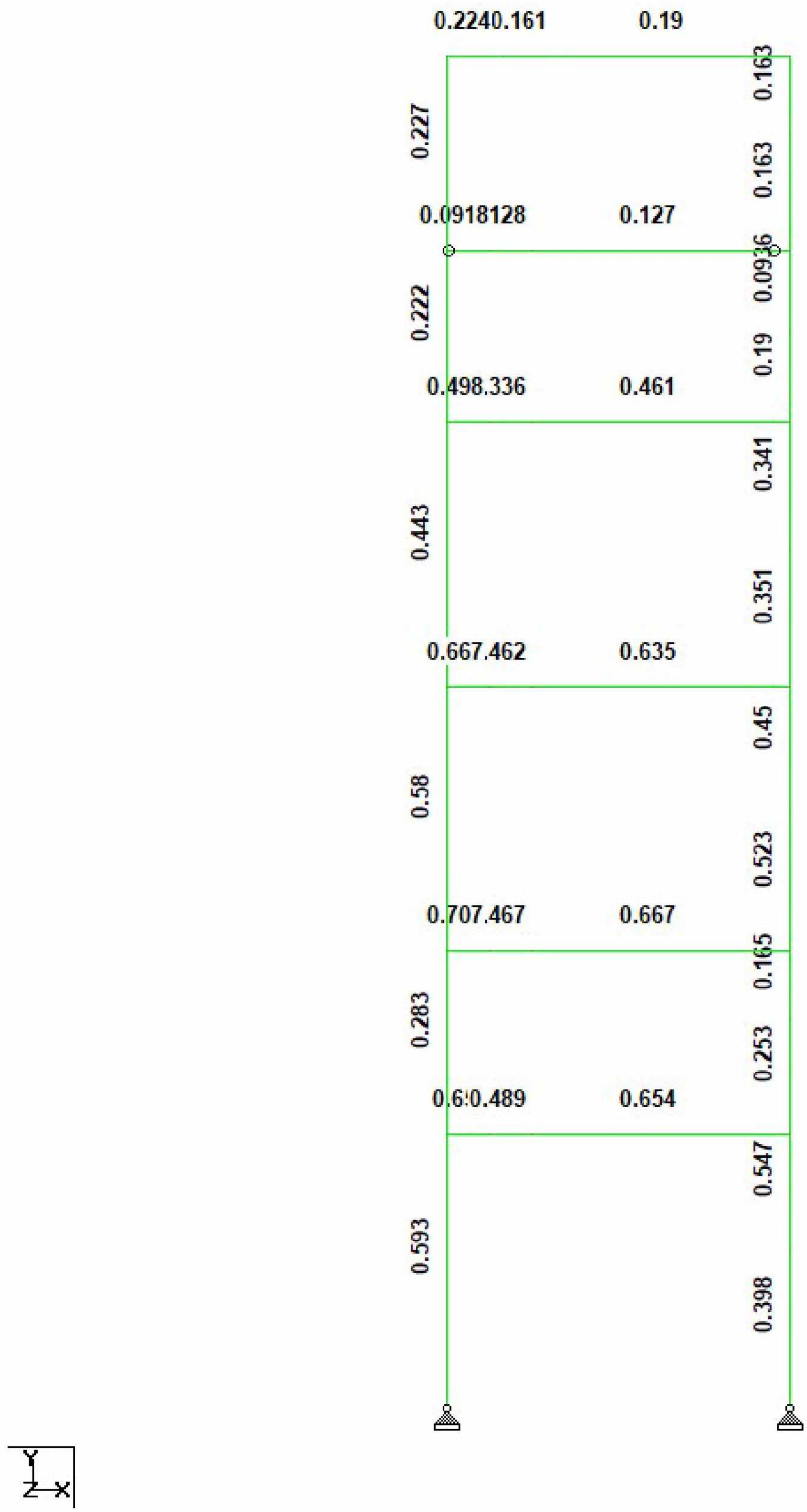


Figure 5.2.10. Utilization ratios at Grid 3

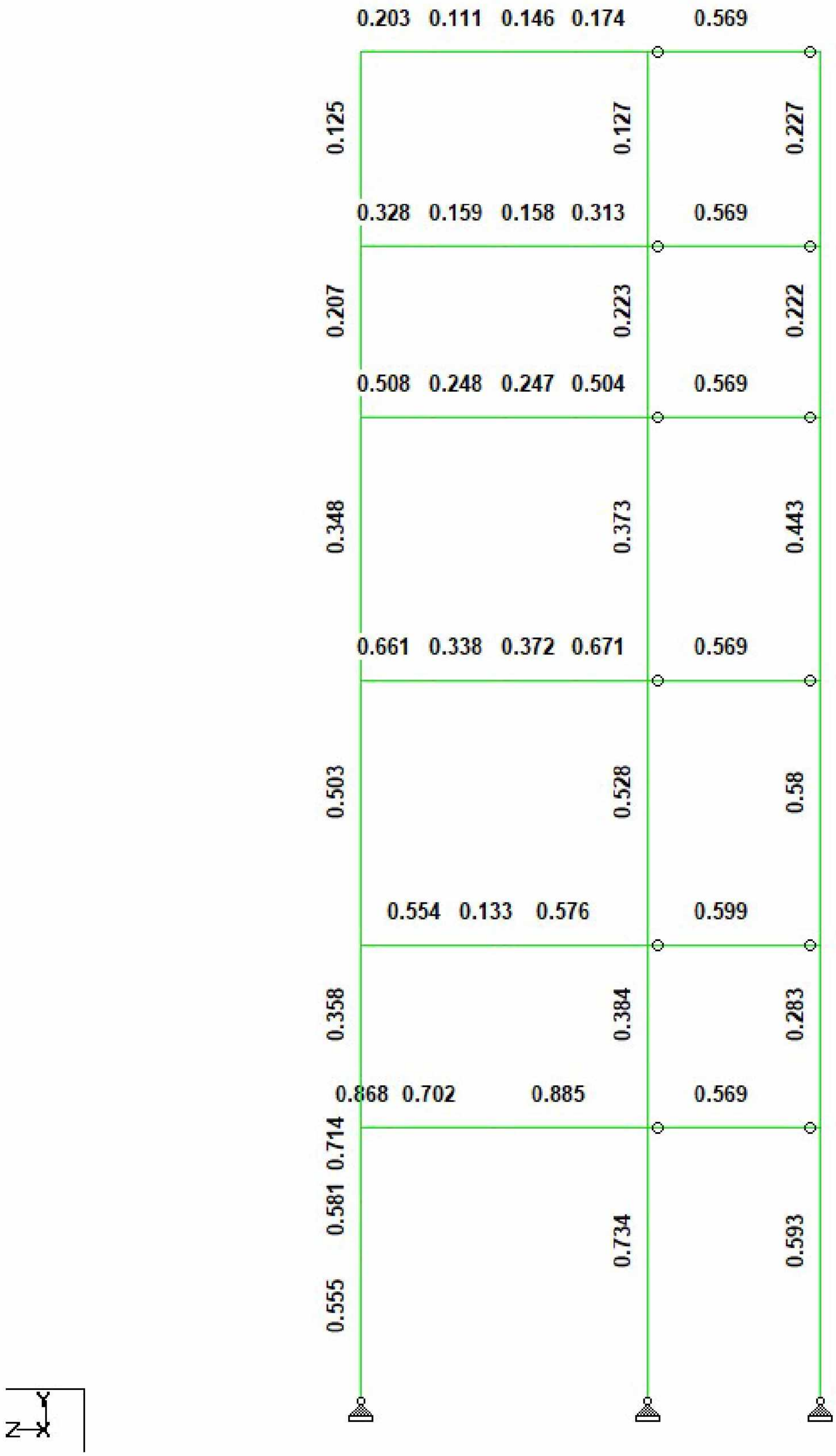


Figure 5.2.11. Utilization ratios at Grid A

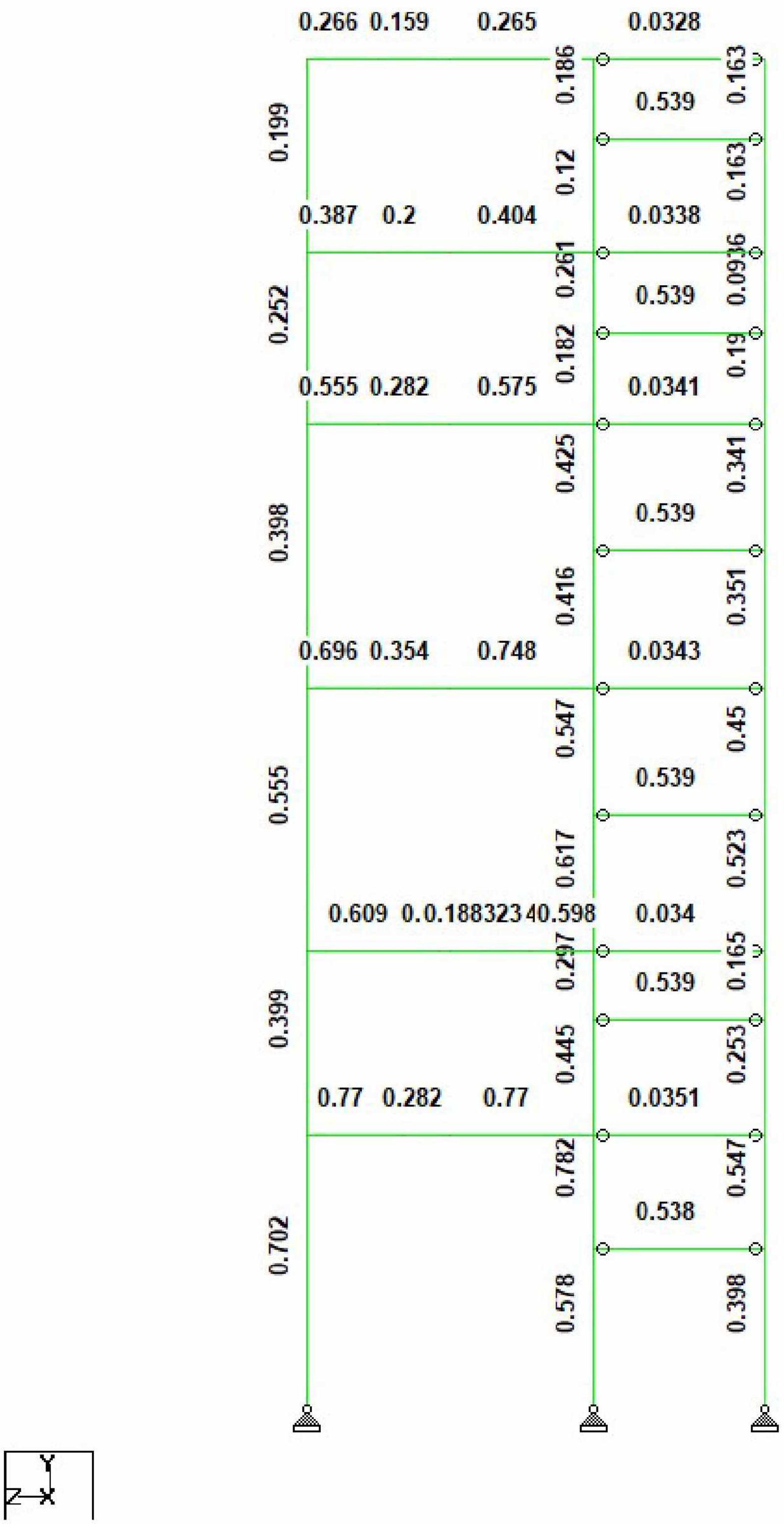


Figure 5.2.12. Utilization ratios at Grid B

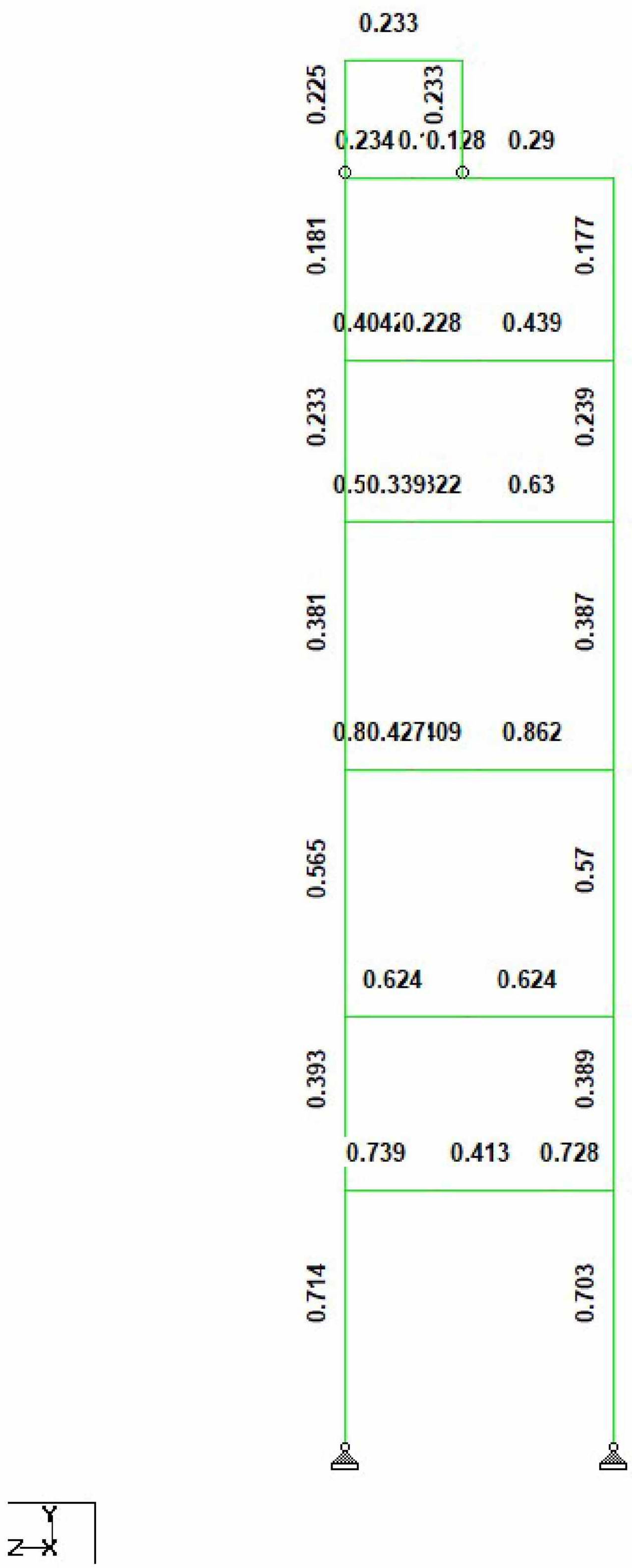


Figure 5.2.13. Utilization ratios at Grid C

5.3 DEFLCTION AND DRIFT CHECK

Drift check for column is shown on following pages.

Permissible value of drift for column is considered as H/200 as per doc. No. 10000-Y50-026 for columns with wind.

Whereas for deflection for columns in Blast condition is allowed as H/100 by engineering judgement.

Deflection check for beams has been carried out in STAAD Pro by defining DFF values and DJ1 &

DJ2 nodes for all beam members.

DFF values are considered as per section 6.0 of doc. No. 10000-Y50-026.

Summary of Node deflection from STAAD:-

Permissible deflection as per per section 6.0 of doc. No. 10000-Y50-026.

Deflection in X-direction with out blast load:

Maximum deflection in X-direction at node 55 , L/C 30041 = 96.7 at +23.800

Staad snap of axis-3 showing maximum deflection in X-direction

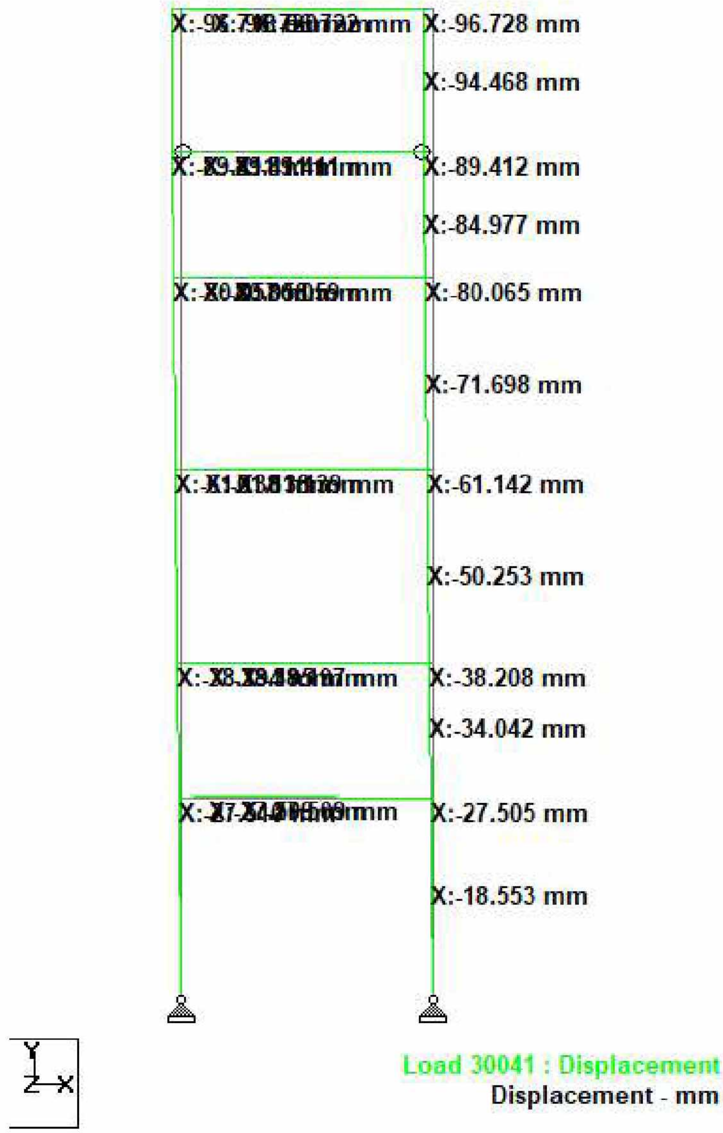


Figure 5.3.1: Maximum displacement in X (E-W) direction (L/C 30041)

Permissible deflection at +23.800 = 23.800 /200 = 119 mm > 96.7mm Hence safe.

Deflection in X-direction with blast load:

Maximum deflection in X-direction at node 55 , L/C 30041 = 162mm at +23.800

Staad snap of axis-3 showing maximum deflection in X-direction

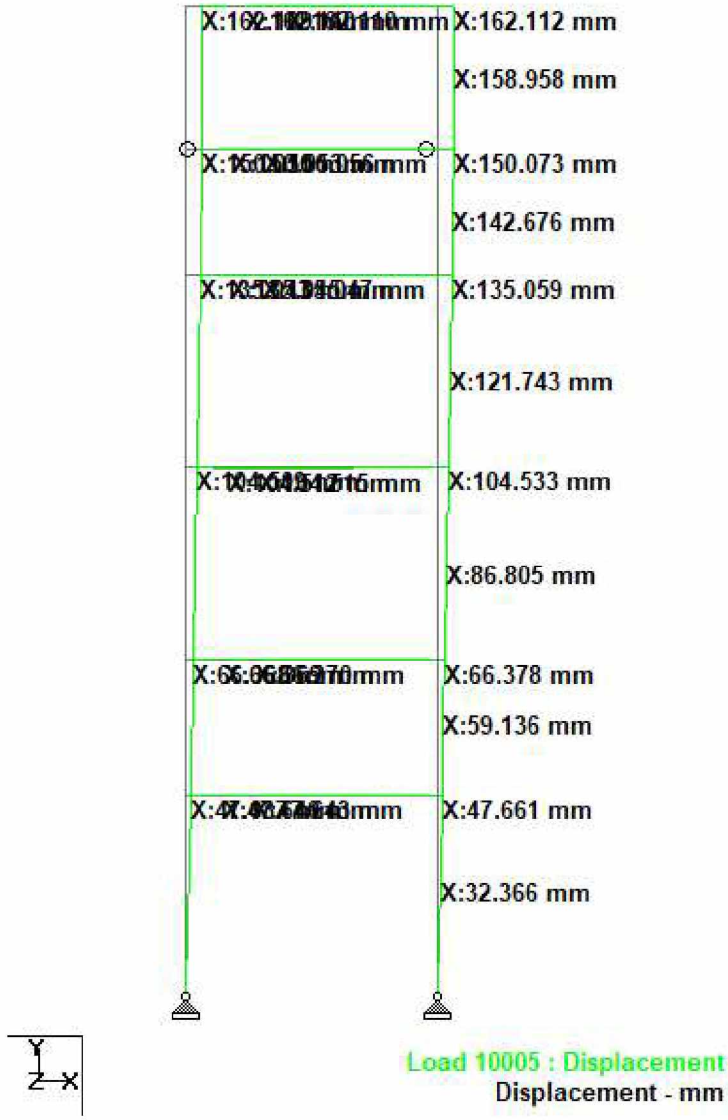


Figure 5.3.2: Maximum displacement in X (E-W) direction (L/C 10005)

Permissible deflection at +23.800 = 23.800 /100 = 238 mm > 162 mm .

Since the L/C 10005 is the blast load combination, and node 55 is on stair column, deflection till H/100 allowed as per engineering judgement.

Deflection in Z-direction with out blast load:

Maximum deflection in Z-direction at node 222 , L/C 30038 = 75.45 at +26.00

Staad snap of axis-C showing maximum deflection in Z-direction.

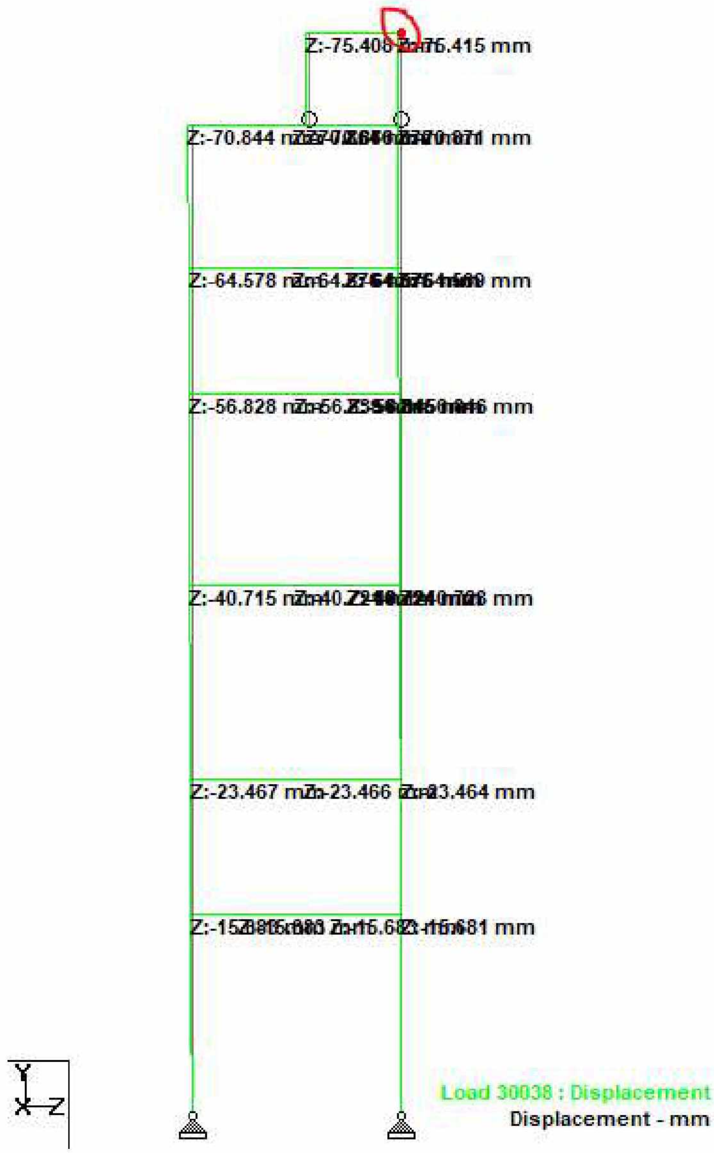


Figure 5.3.4: Maximum displacement in X (E-W) direction (L/C 30038)

Permissible deflection at +26.000 = 26.000 /200 = 130 mm > 75.4 mm Hence safe.

Deflection in Z-direction with blast load:

Maximum deflection in Z-direction at node 222 , L/C 10008 = 119.50 at +26.00

Staad snap of axis-C showing maximum deflection in Z-direction

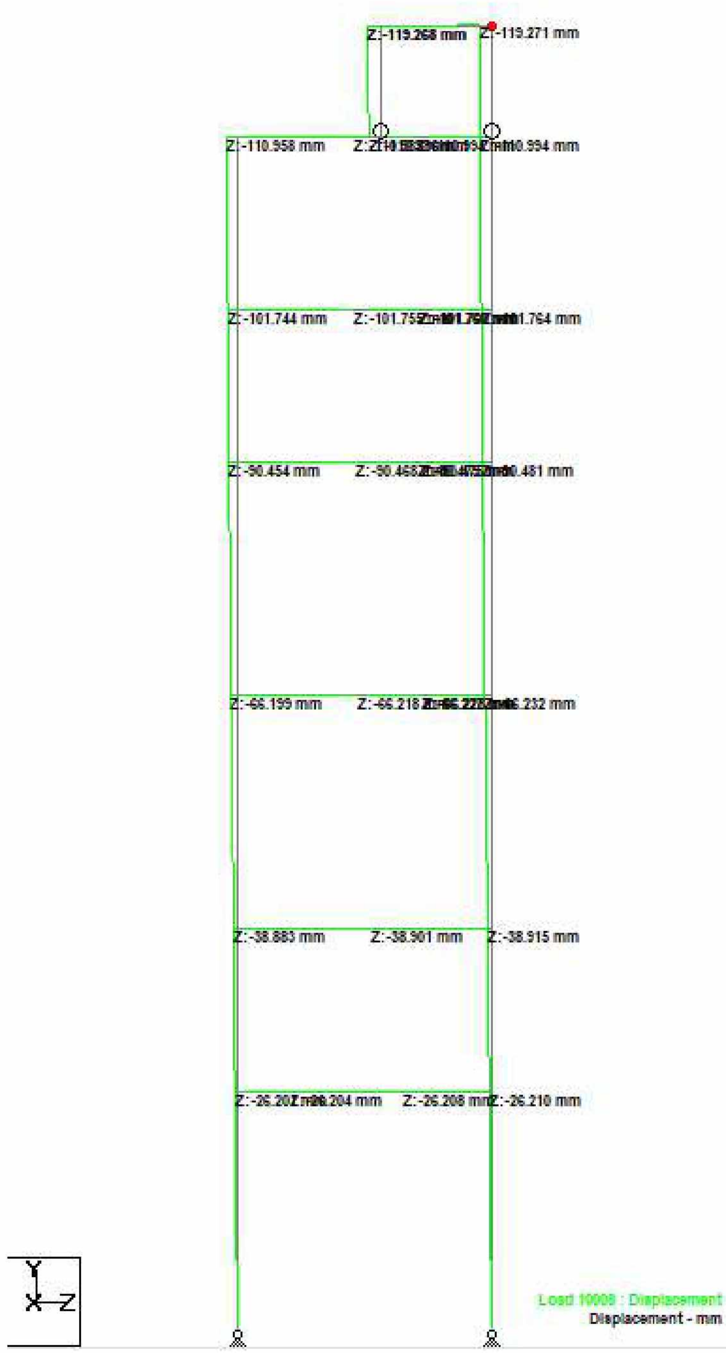


Figure 5.3.5: Maximum displacement in X (E-W) direction (L/C 10008)

Permissible deflection at +26.000 = 26.000 /200 = 130 mm >119 mm Hence safe.

Vertical deflection of beams checked using staad DFF command for serviceability load combinations.

5.4 MEMBER PROFILES

Member profiles obtained as per steel structure design are shown as below.

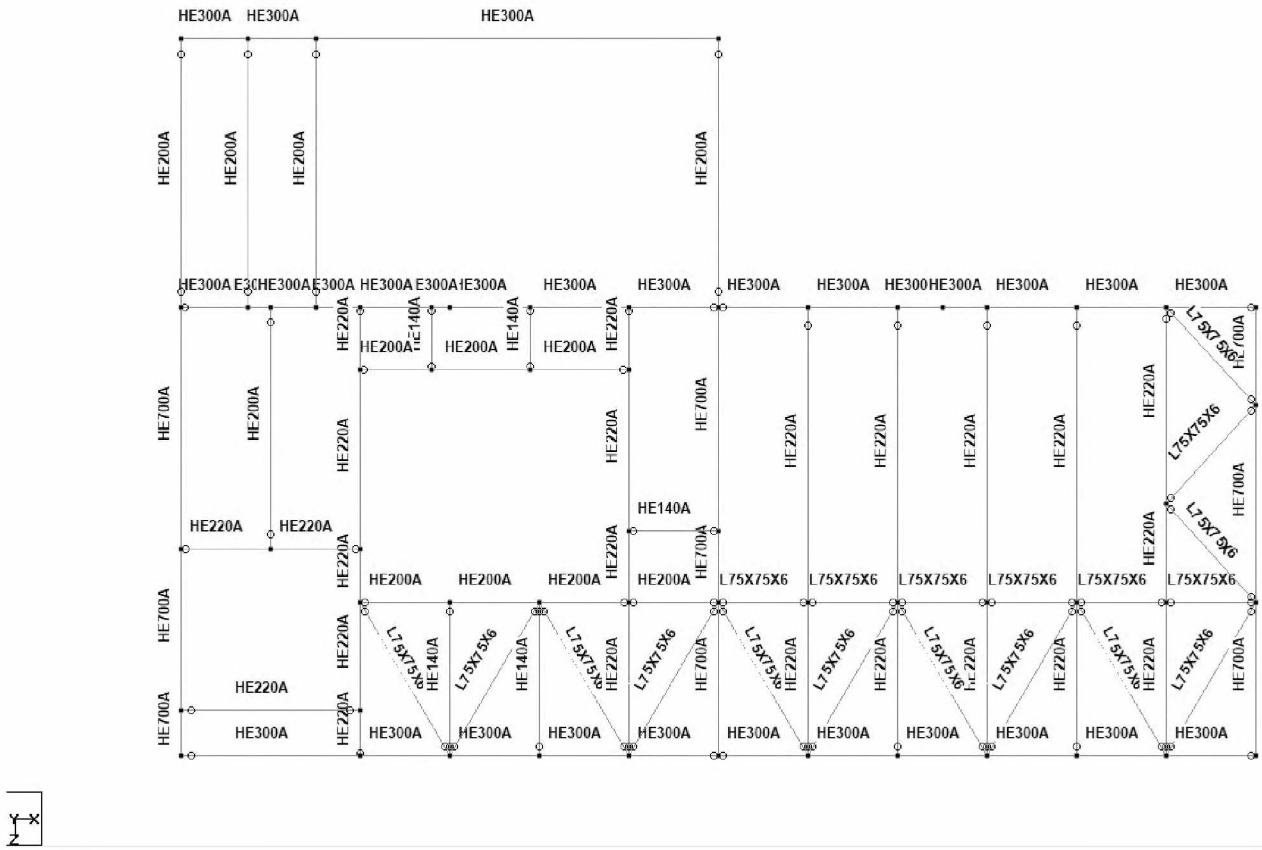


Figure 5.4.1 . Section sizes at EL.+5.000m Level

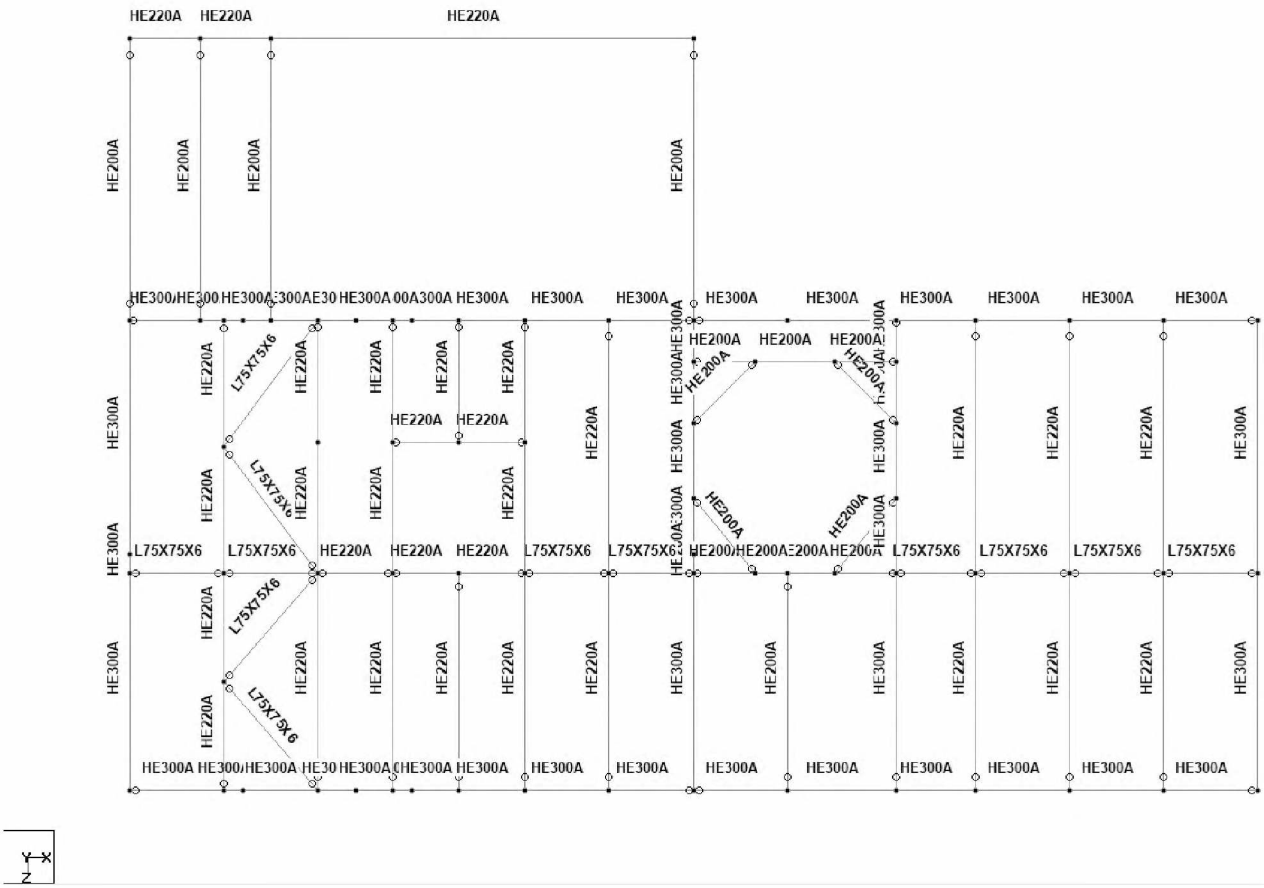


Figure 5.4.2. Section sizes at EL.+8.200m Level

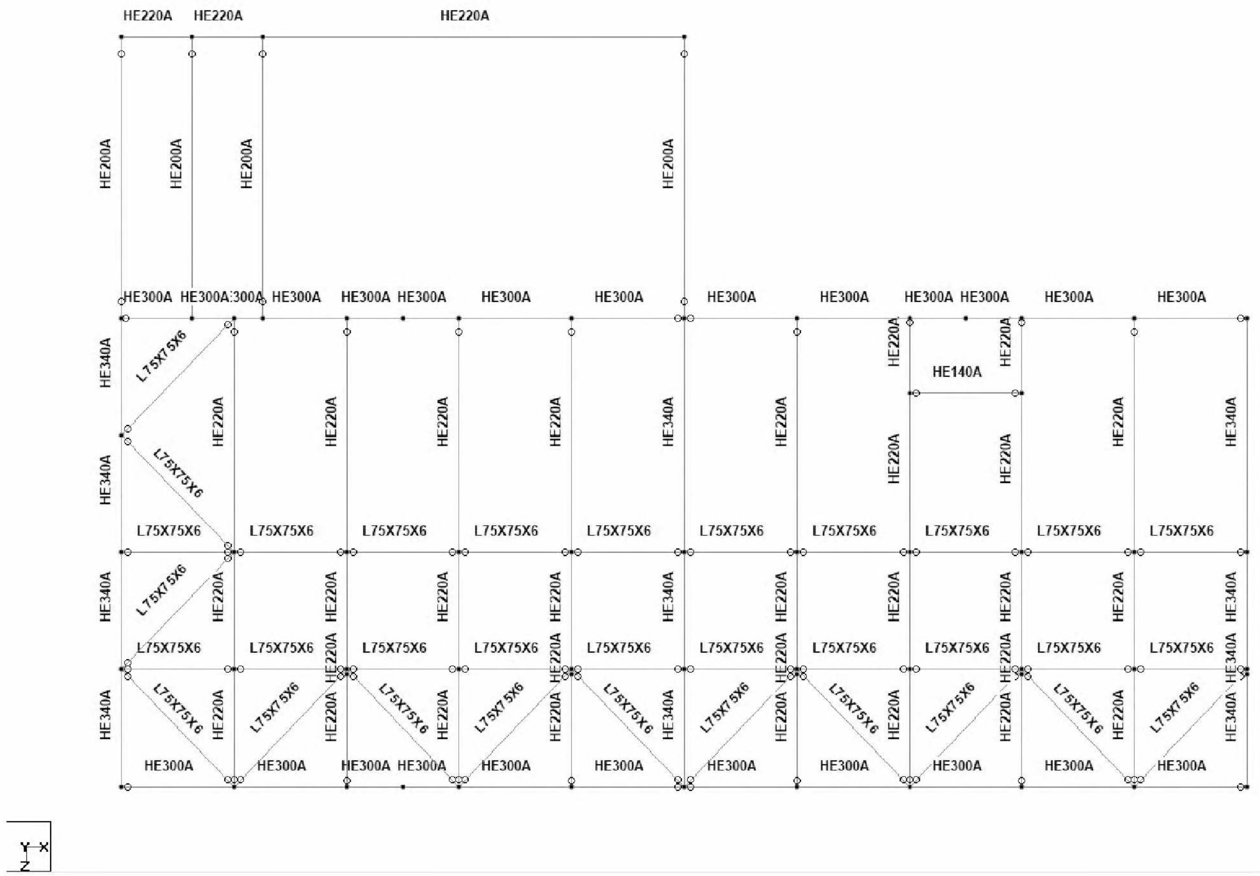


Figure 5.4.3 Section sizes at EL.+12.800m Level

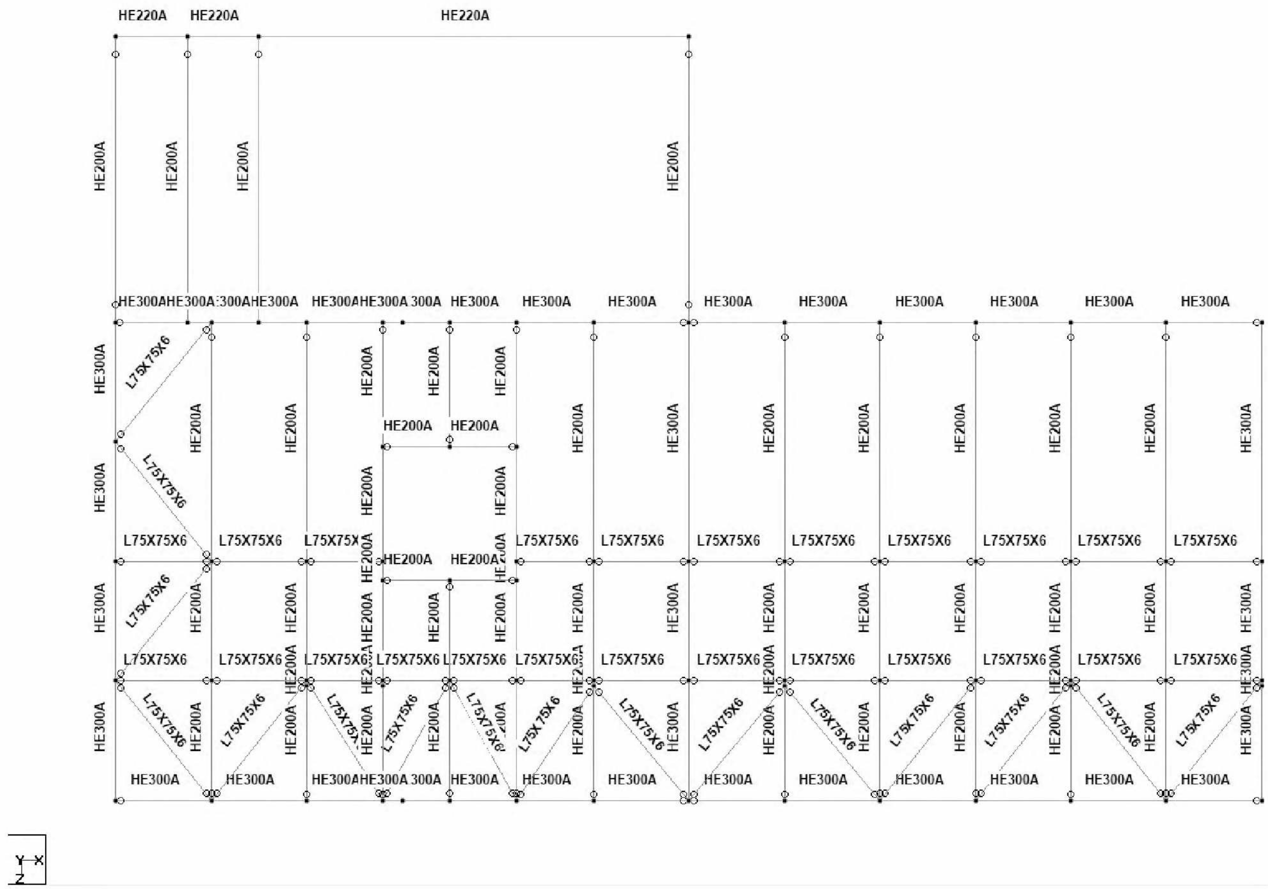


Figure 5.4.4. Section sizes at EL.+17.400m Level

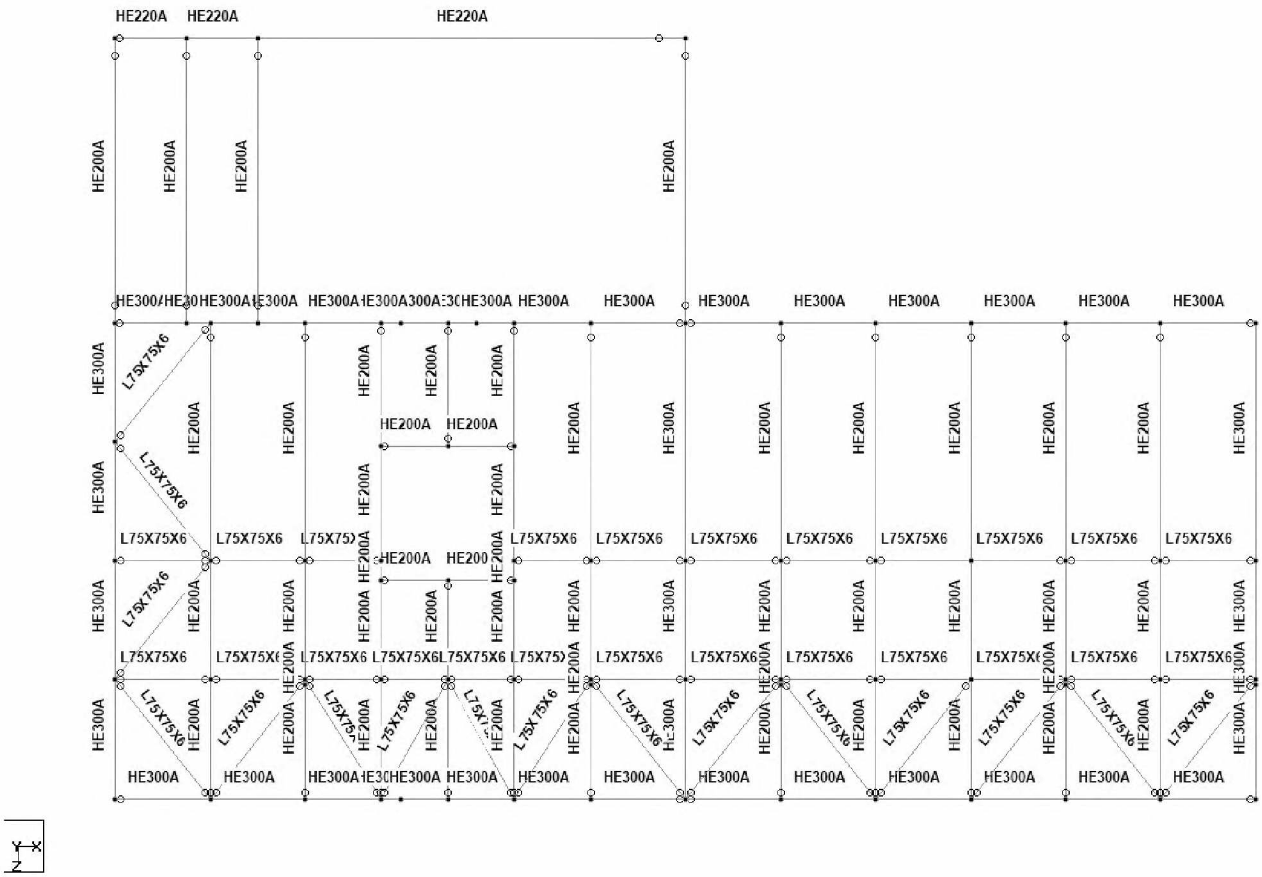


Figure 5.4.5. Section sizes at EL.+20.400m Level

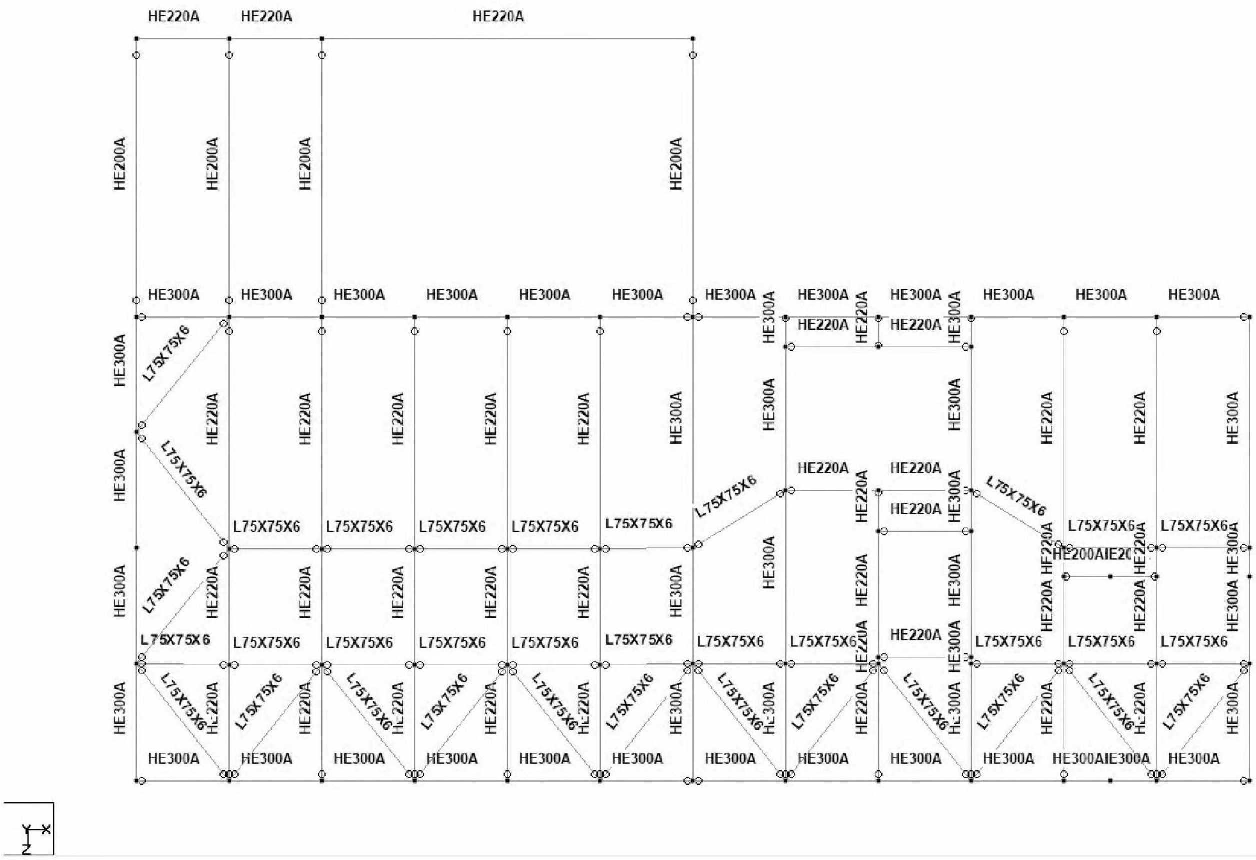


Figure 5.4.6. Section sizes at EL.+23.800m Level

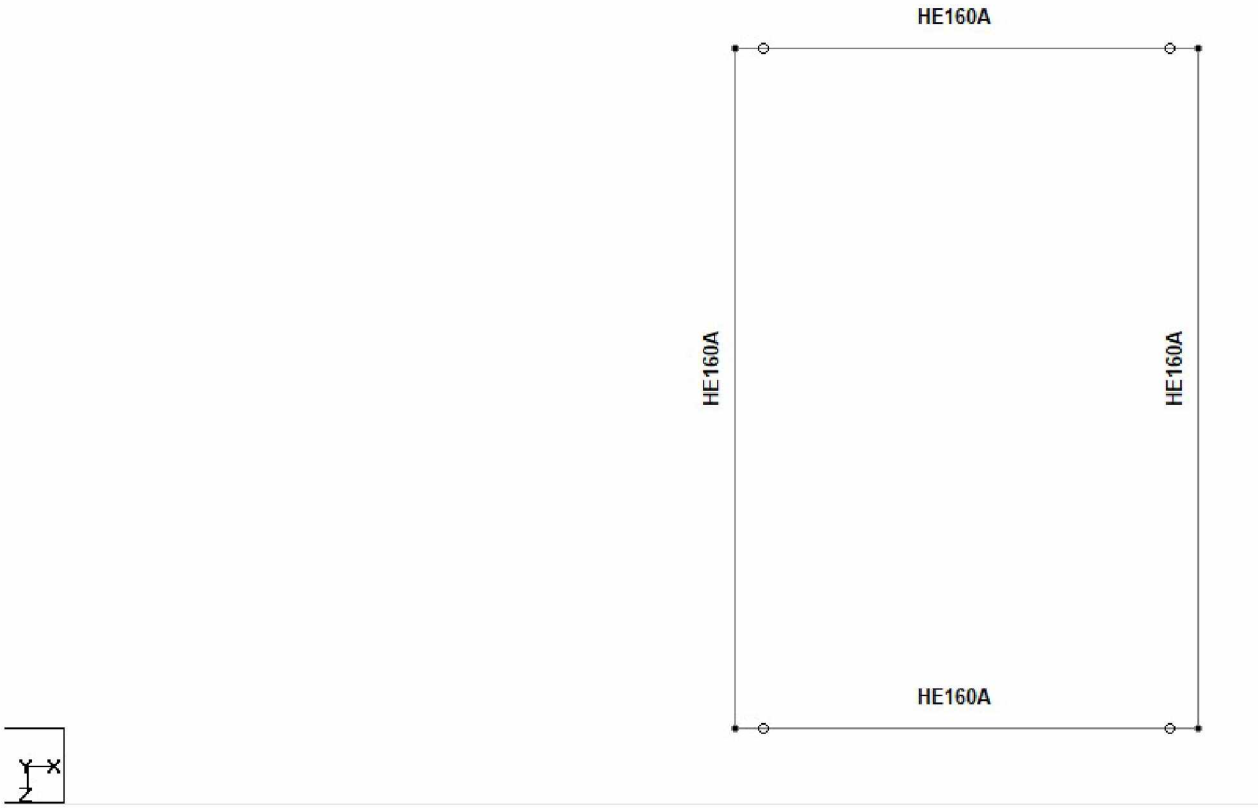


Figure 5.4.7. Section sizes at EL.+26.000m Level

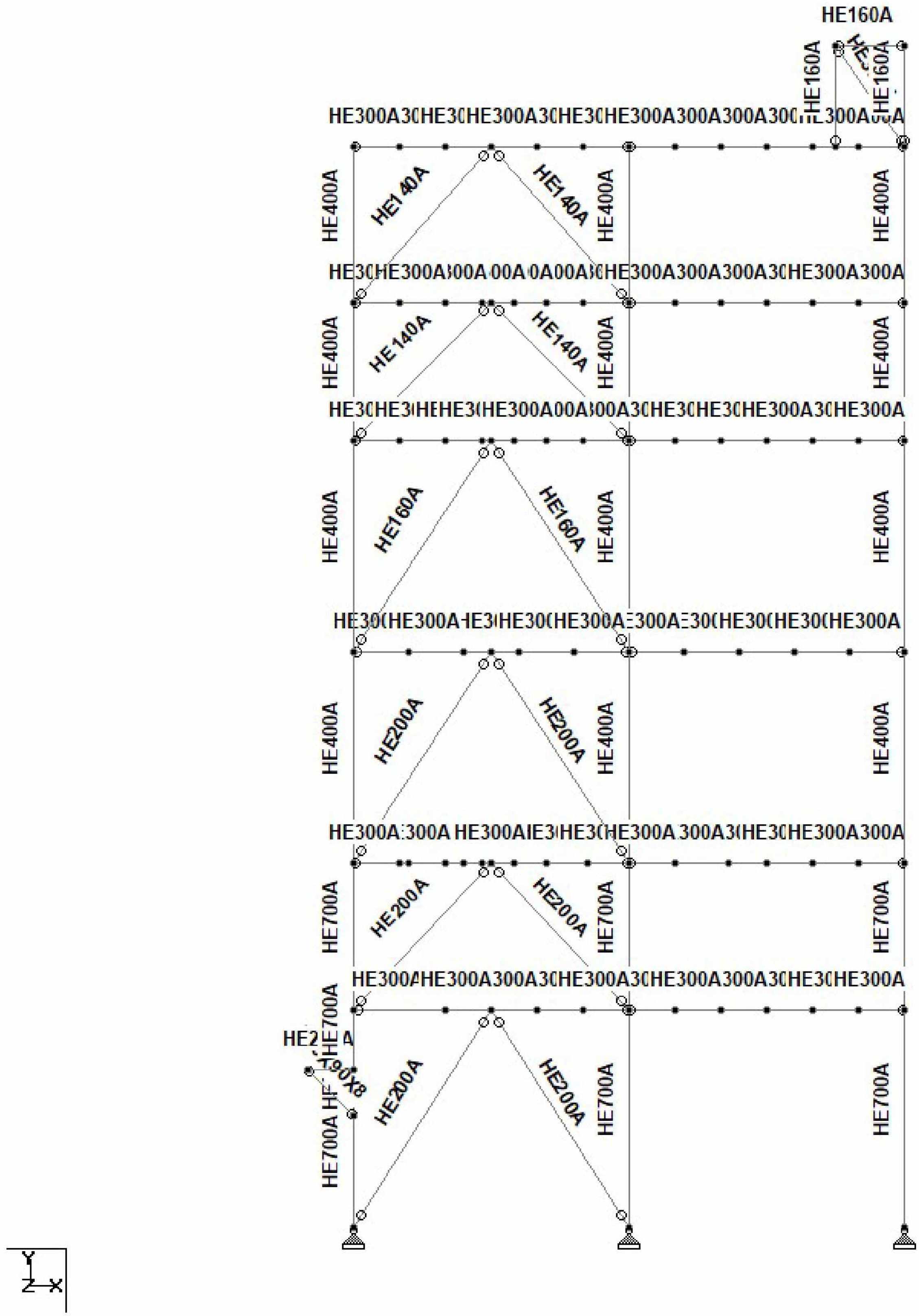


Figure 5.4.8. Section sizes at Grid 1

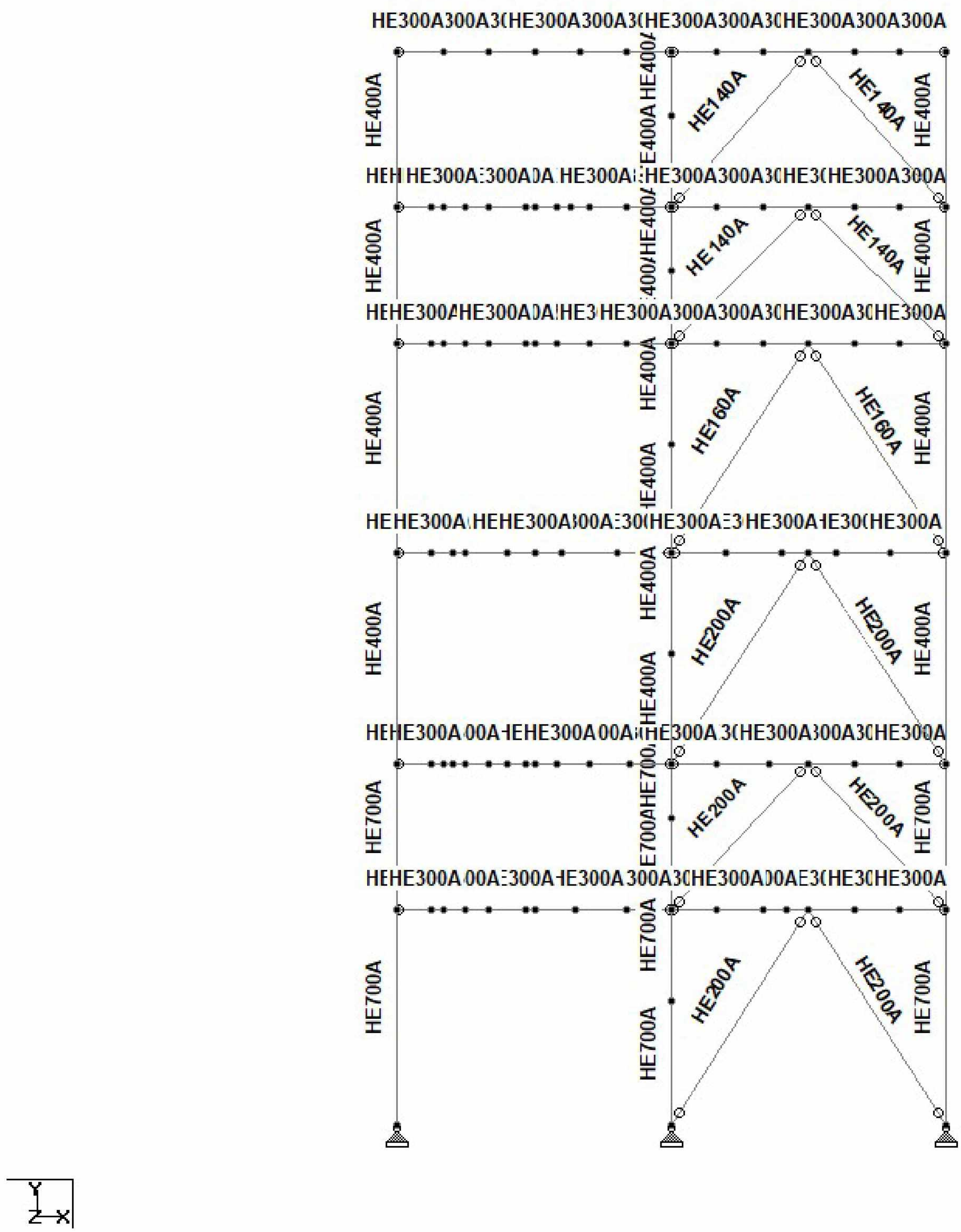


Figure 5.4.9. Section sizes at Grid 2

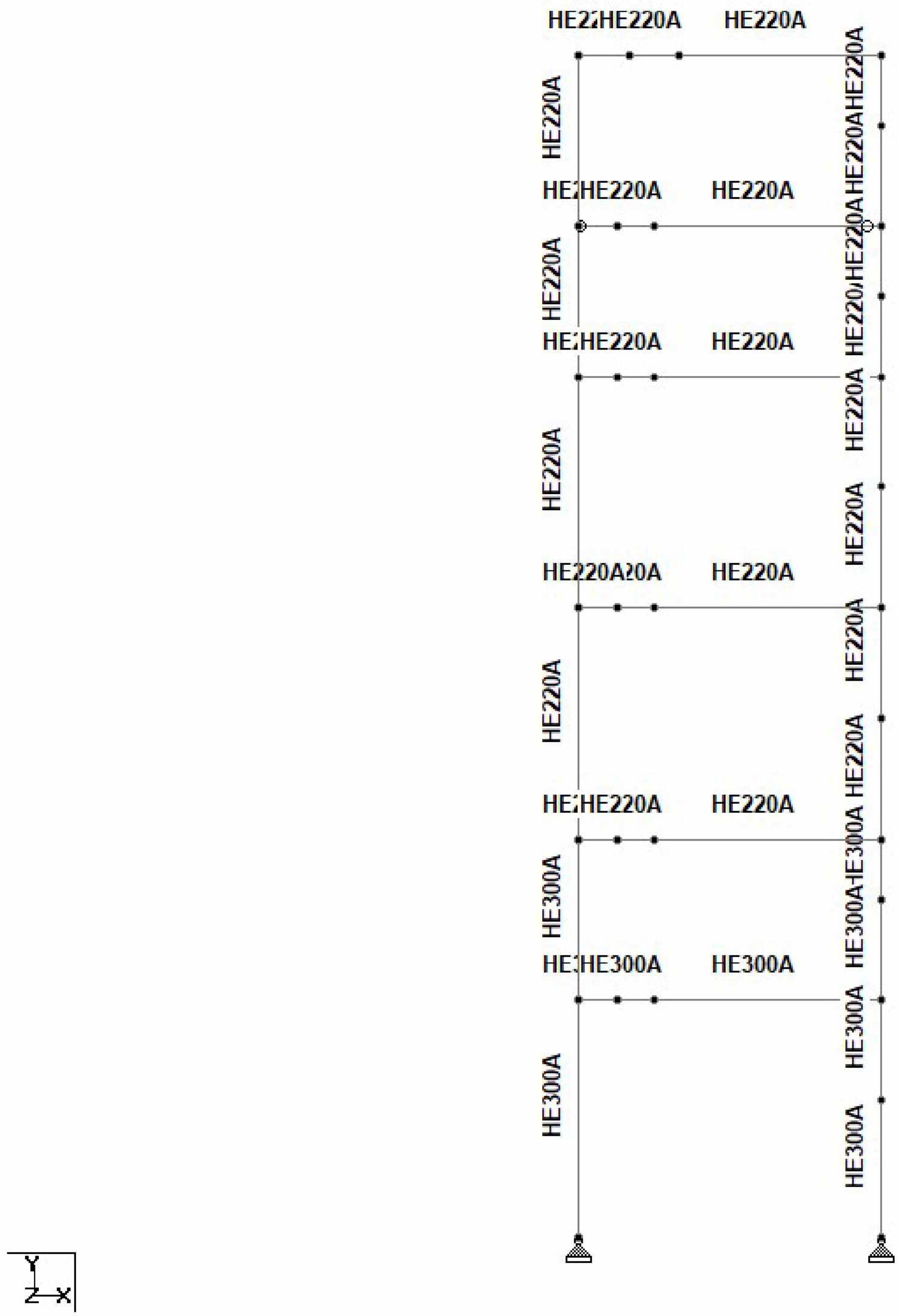


Figure 5.4.10. Section sizes at Grid 3

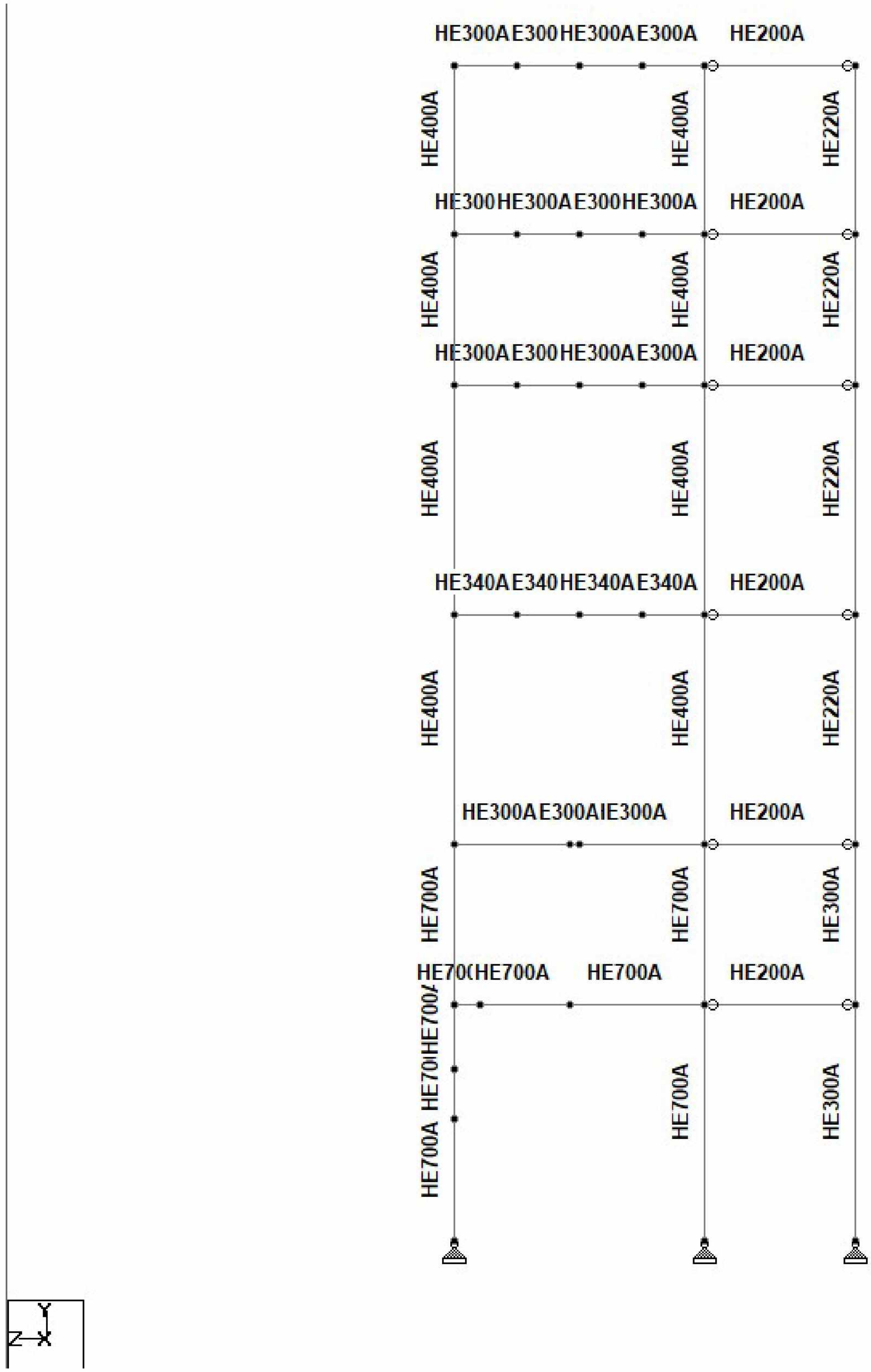


Figure 5.4.11. Section sizes at Grid A

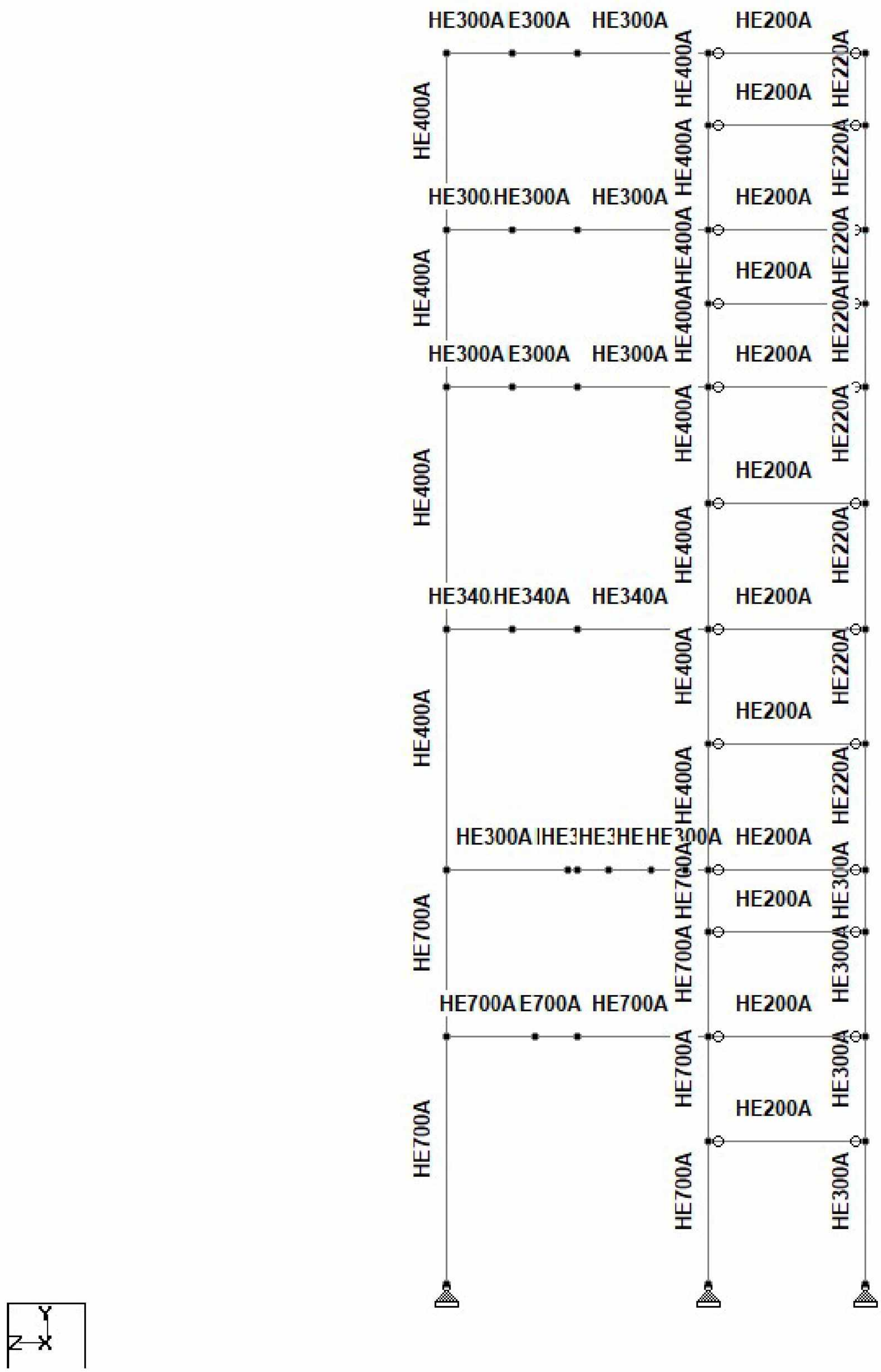


Figure 5.4.12. Section sizes at Grid B

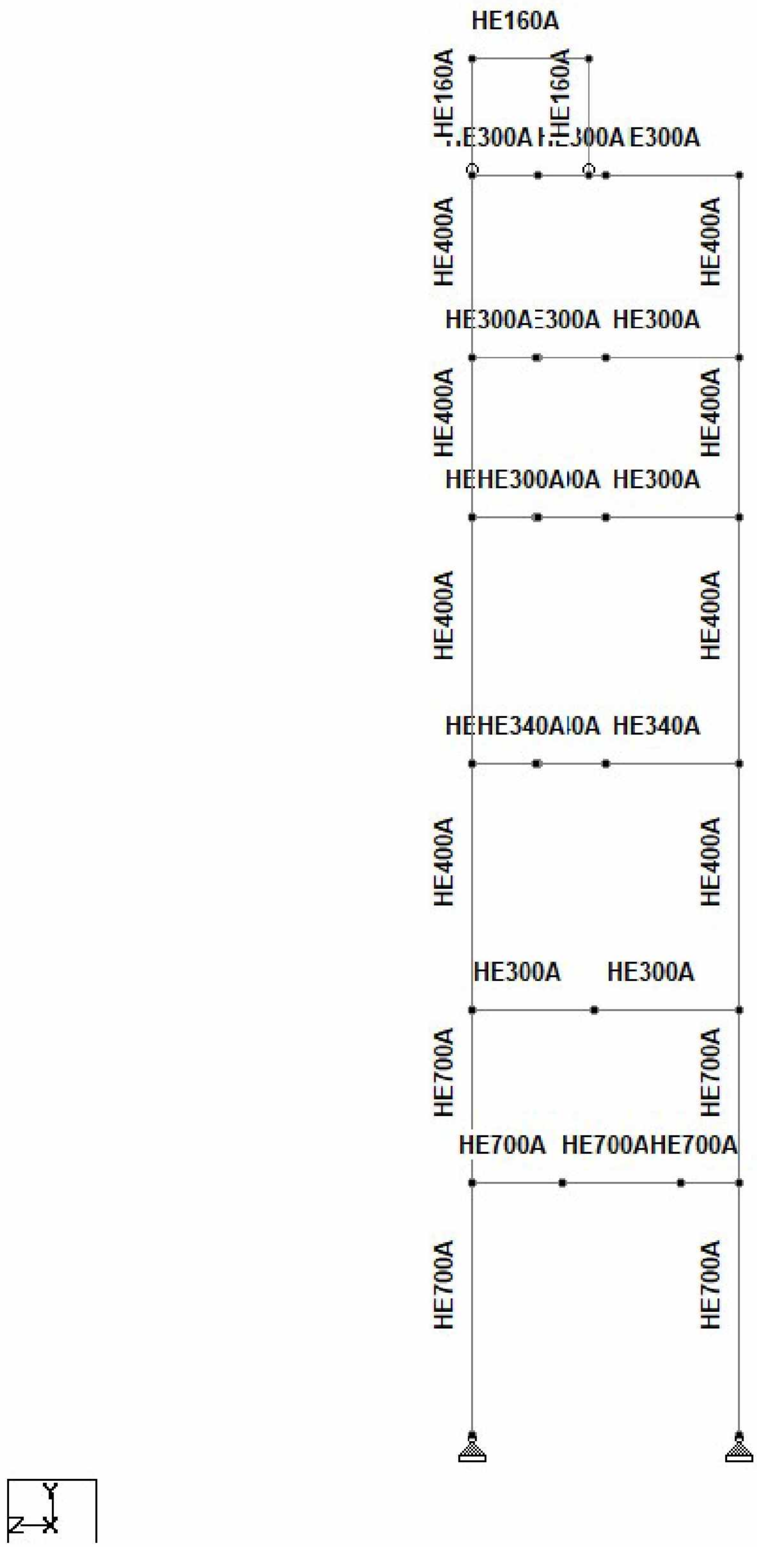
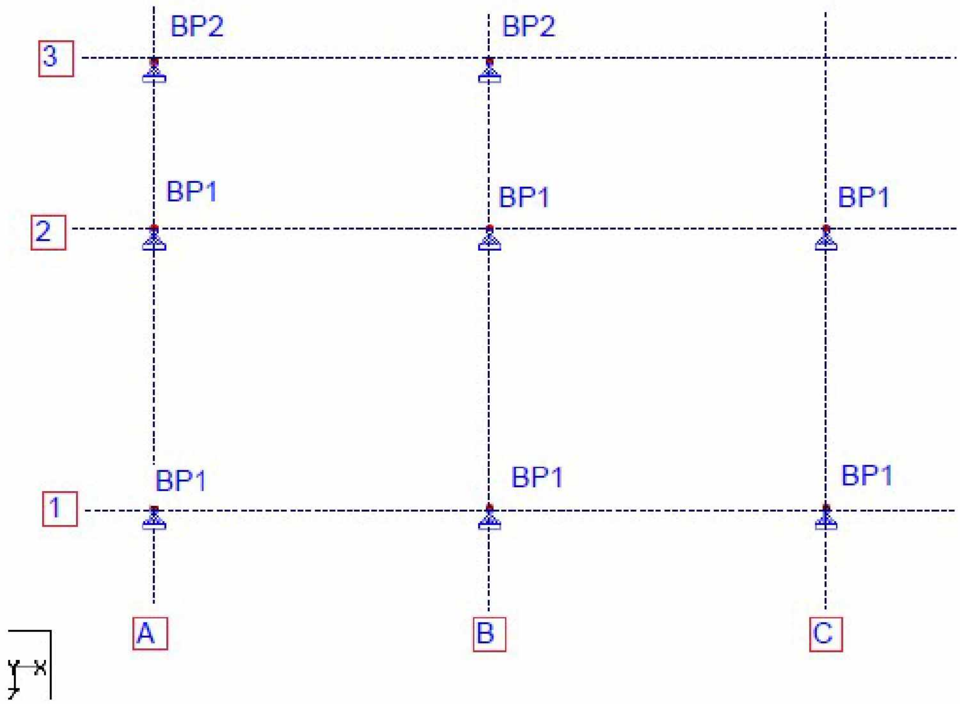


Figure 5.4.13. Section sizes at Grid C

6 BASE PLATE DESIGN

Two types of base plates used for SK5101 structure. BP1 for main columns and BP2 for stair columns as shown below.



Factored loads at the support level (Base plate) are obtained from staad model as below and used for base plate design.

Base plate reactions for main columns (BP1)

			Horizontal	Vertical	Horizontal	Moment		
	Node	L/C	Fx kN	Fy kN	Fz kN	Mx kN-m	My kN-m	Mz kN-m
Max Fx	5	40047	**175.376**	1700.926	-16.989	0.000	0.000	0.000
Min Fx	8	10005 COMBI	**-161.234**	920.318	-8.451	0.000	0.000	0.000
Max Fy	5	40044	74.770	**1912.848**	82.100	0.000	0.000	0.000
Min Fy	8	40063	135.307	**-401.934**	-8.630	0.000	0.000	0.000
Max Fz	1	10008 COMBI	-0.210	-305.668	**123.066**	0.000	0.000	0.000
Min Fz	8	10007 COMBI	-34.067	-178.167	**-126.269**	0.000	0.000	0.000
Max Mx	1	10005 COMBI	-125.836	-286.154	6.592	**0.000**	0.000	0.000
Min Mx	1	10005 COMBI	-125.836	-286.154	6.592	**0.000**	0.000	0.000
Max My	1	10005 COMBI	-125.836	-286.154	6.592	0.000	**0.000**	0.000
Min My	1	10005 COMBI	-125.836	-286.154	6.592	0.000	**0.000**	0.000
Max Mz	1	10005 COMBI	-125.836	-286.154	6.592	0.000	0.000	**0.000**
Min Mz	1	10005 COMBI	-125.836	-286.154	6.592	0.000	0.000	**0.000**

Base plate reactions for Stair columns (BP2)

			Horizontal	Vertical	Horizontal	Moment		
	Node	L/C	Fx kN	Fy kN	Fz kN	Mx kN-m	My kN-m	Mz kN-m
Max Fx	6	10006 COMBI	**31.717**	64.636	-1.195	0.000	0.000	0.000
Min Fx	6	10005 COMBI	**-29.945**	294.090	-0.937	0.000	0.000	0.000
Max Fy	3	40047	22.648	**417.676**	0.110	0.000	0.000	0.000
Min Fy	6	40063	24.722	**-28.544**	-0.901	0.000	0.000	0.000
Max Fz	6	10008 COMBI	4.068	168.683	**5.678**	0.000	0.000	0.000
Min Fz	6	10007 COMBI	-11.222	226.845	**-7.420**	0.000	0.000	0.000
Max Mx	3	10005 COMBI	-27.713	107.073	-1.557	**0.000**	0.000	0.000
Min Mx	3	10005 COMBI	-27.713	107.073	-1.557	**0.000**	0.000	0.000
Max My	3	10005 COMBI	-27.713	107.073	-1.557	0.000	**0.000**	0.000
Min My	3	10005 COMBI	-27.713	107.073	-1.557	0.000	**0.000**	0.000
Max Mz	3	10005 COMBI	-27.713	107.073	-1.557	0.000	0.000	**0.000**
Min Mz	3	10005 COMBI	-27.713	107.073	-1.557	0.000	0.000	**0.000**

Refer ANNEXURE F for base plate designs.

7 OVERVIEW OF SECTIONS

Over view of sections used are as below.

S.No.	Section Profile	Minimum Steel grade
1.0	HE300A	S235
2.0	HE220A	S235
3.0	HE200A	S235
4.0	L75X75X6	S235
5.0	L90X90X8	S235
6.0	HE140A	S235
7.0	HE160A	S235
8.0	HE160A	S235
9.0	HE600A	S235
10	HE340A	S235
11	HE400A	S235

8 DESIGN OF MAT FOUNDATION

Design of mat foundation consists combined pile foundation for SK5101 structure and equipment surrounding SK5101 structure supported on ground.

Combined pile cap foundation consists of foundation for SK5101 structure and equipment T601, V604, V603A/B, V601, V606, E607, SK2101 and test weight of pipe supports for CD6001 and CD6010 lines as shown in the figure 8.1.

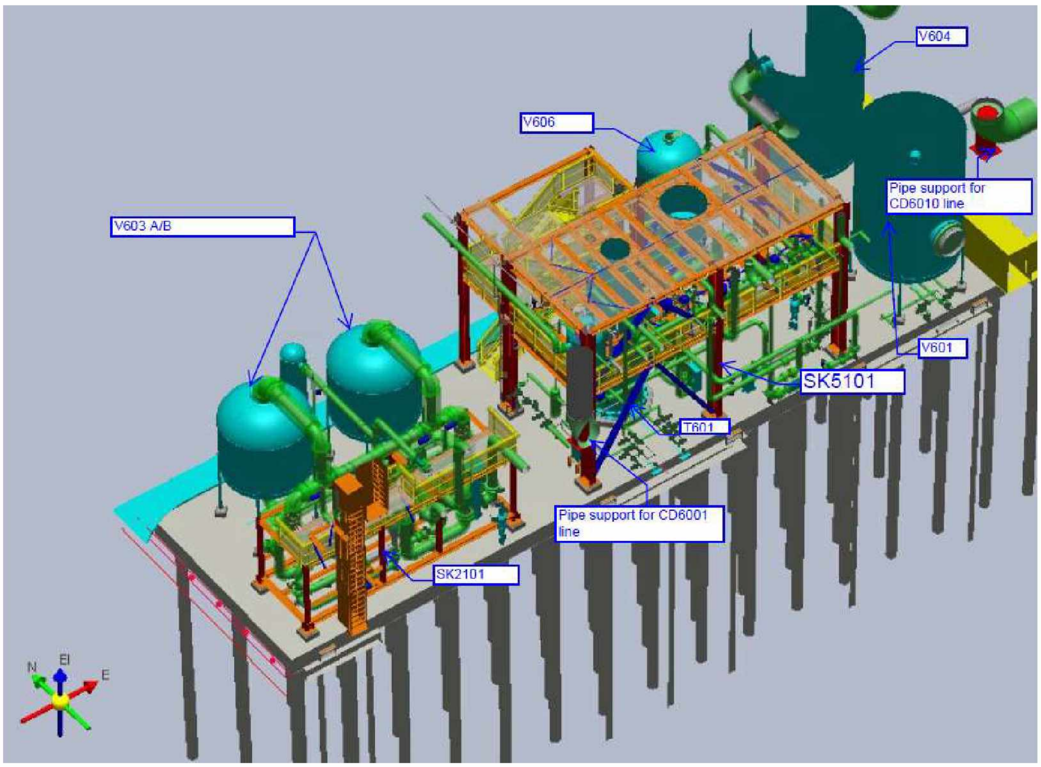


Fig.8.1: 3D model showing combined pile cap, pile and supporting structures.

Plan view of pile cap is shown in figure 8.2

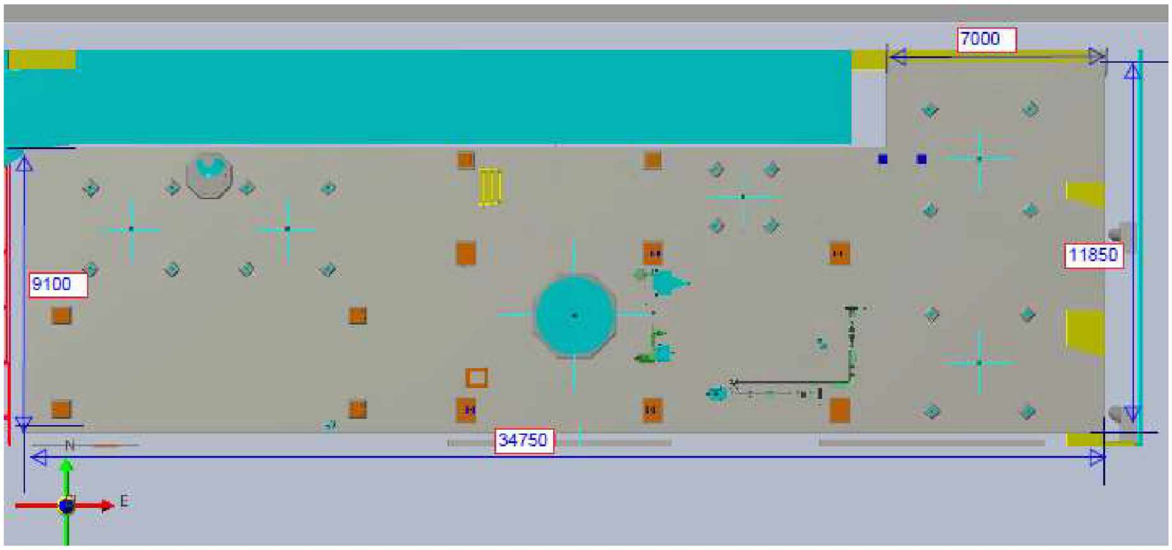


Fig.8.2: Plan view of combined pile cap.

Location of piles is shown in fig.8.3

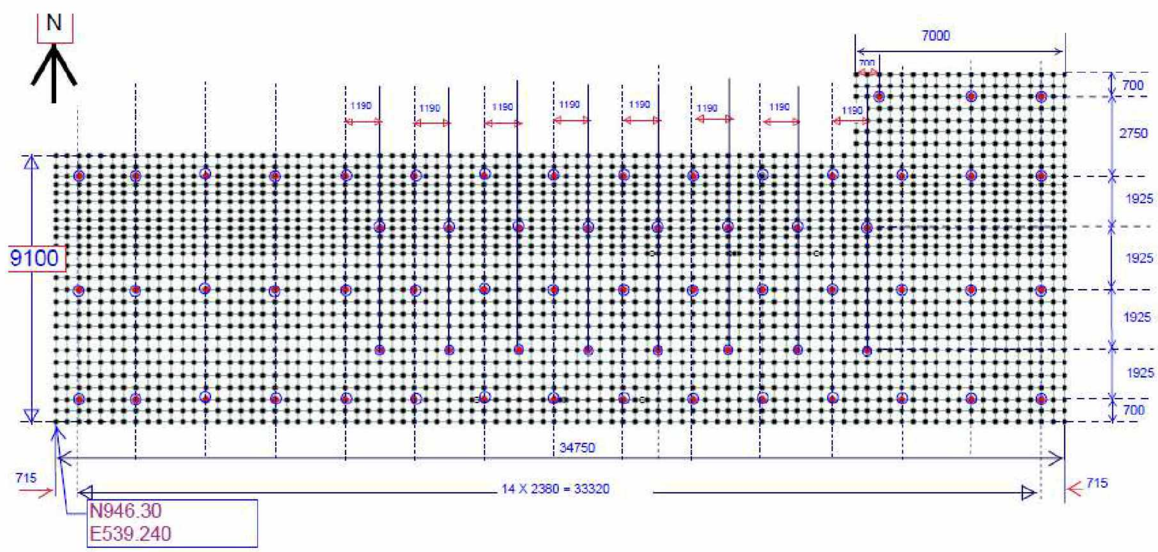


Fig.8.3: Layout of Piles.

8.1 DESIGN PHILOSOPHY

- Piles and pile cap are designed for loads acting on SK5101 structure as described in section 3.0, and loads due to equipment described in section 8.3
- Pile layout is finalized based on the unfactored (serviceability) load combination described in section 2.2
- Plie cap and pedestals are designed for factored (strength) load combinations described in section 2.2
- Bottom of the pile cap is considered at 0.8m below the HPP (High point of paving)

8.2 PILE DESCRIPTION AND PILE CAPACITY

Fundex piles of diameter ø460 -560 mm of length 15.0 m long as per M/S BAUGRUND DRESDEN recommendations as attached in Annexure B are considered for pile foundation design.

Piles are placed at minimum spacing of 5times diameter of piles as shown in fig.8.3

Capacity of piles as per Annexure B considered for foundation design are as below.

S.No.	Characteristics	Pile type and capacities
1.0	Type of pile	Fundex pile 15m-CPT1426
2.0	Pile diameter	ø460 -560 mm
3.0	Compression capacity	650kN
4.0	Tension capacity	450kN
5.0	Shear capacity for 12.5 mm deflection	45kN
6.0	Shear capacity for 25 mm deflection	70kN

Shear capacity corresponding to 12.5 mm deflection are considered for load combinations without blast load case. And Shear capacity corresponding to 25 mm deflection are considered for load combinations with blast load case as per engineering judgement.

As per section 7.2 of Annexure -B, Shear capacity of pile with 12.5mm and 25mm deflection can be increased by 25% and 50 % respectively, for transient load case like wind, blast etc.

Group effect of piles: As per section 7.3.2 of Annexure -B, reduction factor of 0.4 considered for pile groups of more than 16 piles.

Therefore,

Shear capacity of pile for non blast load case = 45*1.25*0.4 = 22.5 kN

Shear capacity for blast load case = 70*1.5*0.4 = 42 kN

8.3 COMPUTER ANALYSIS AND DESIGN CRITERIA

- Three dimensional staad model described in section 1.5 is improved by modelling pedestals at columns and equipment locations as beam element and pile cap as plate element.
- Plate elements nodes are considered at the bottom of the pile cap.
- Pedestals are modelled as beam element from bottom of base plate level to top of pile cap level.
- Pile cap is designed using inhouse developed excel sheet (refer Annexure G).
- The pile is checked for compression, tension and lateral forces due to vertical loads & lateral loads.

  The serviceability (un-factored) load combinations are used for checking pile capacity.
- All other assumptions have been mentioned as and where applicable.

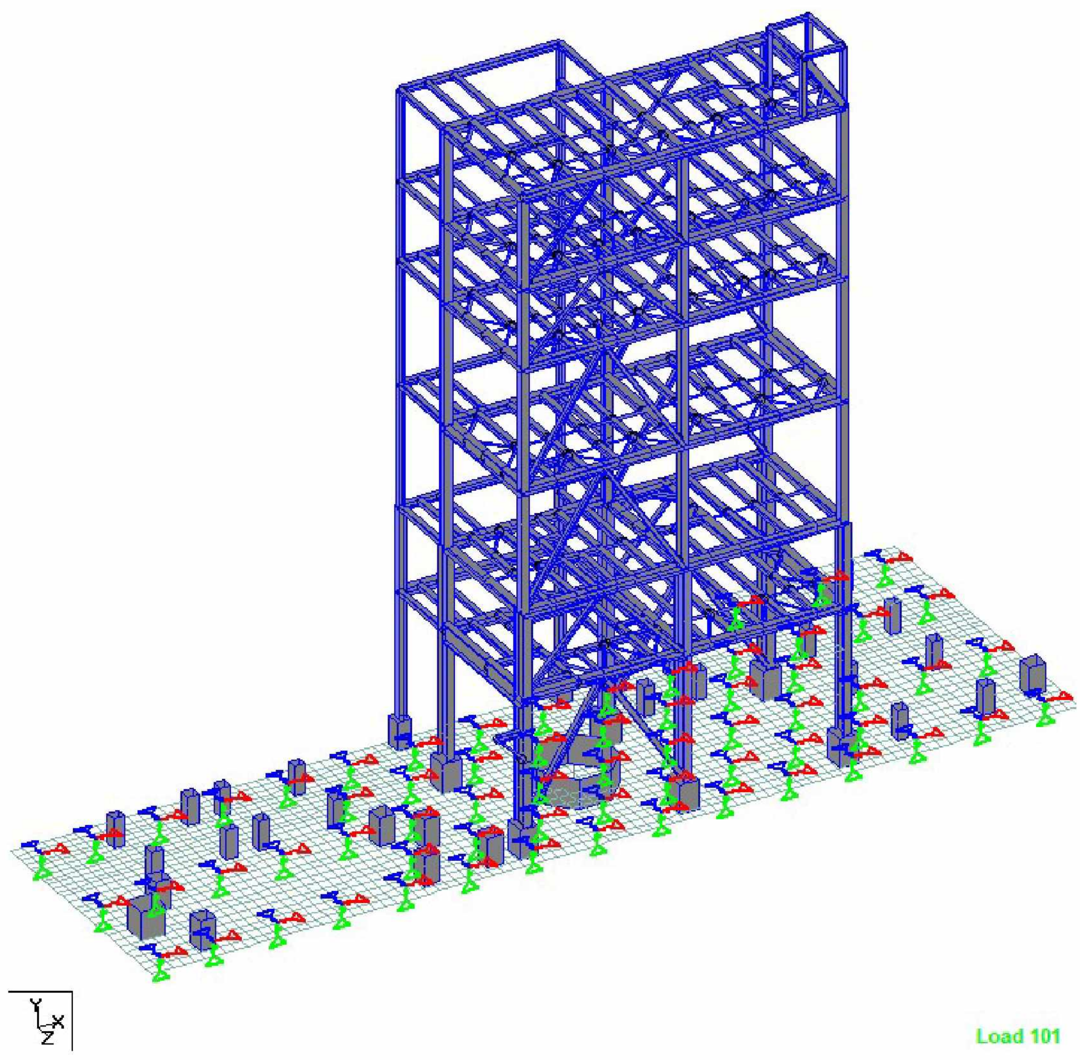


Fig.8.3.1: 3-D Staad model view of structure for foundation design.

Pedestals for structure and equipment are modelled from pile cap to +0.300 level above HPP.

8.4 SPRING CONSTANTS

Spring constants assigned at each pile location are applies as per Annexure B are shown below.

Vertical support constant = 102000 kN/m

Horizontal spring constant = 3500 kN/m

Above spring stiffness are applied at all pile locations shown in fig.8.3 as shown in figure 8.4

8.5 DESIGN LOADS AND LOAD COMBINATIONS

Loads acting on structure SK5101 are considered as described in section 3.0 Load combinations are considered as shown in Annexure F.

8.5.1 WEIGHT OF PAVING

Load due to weight of paving of 200mm thick is applied as (0.25*25kN/m^3) 5kN/M^2 is applied as uniform pressure on top of pile cap in load case 111.

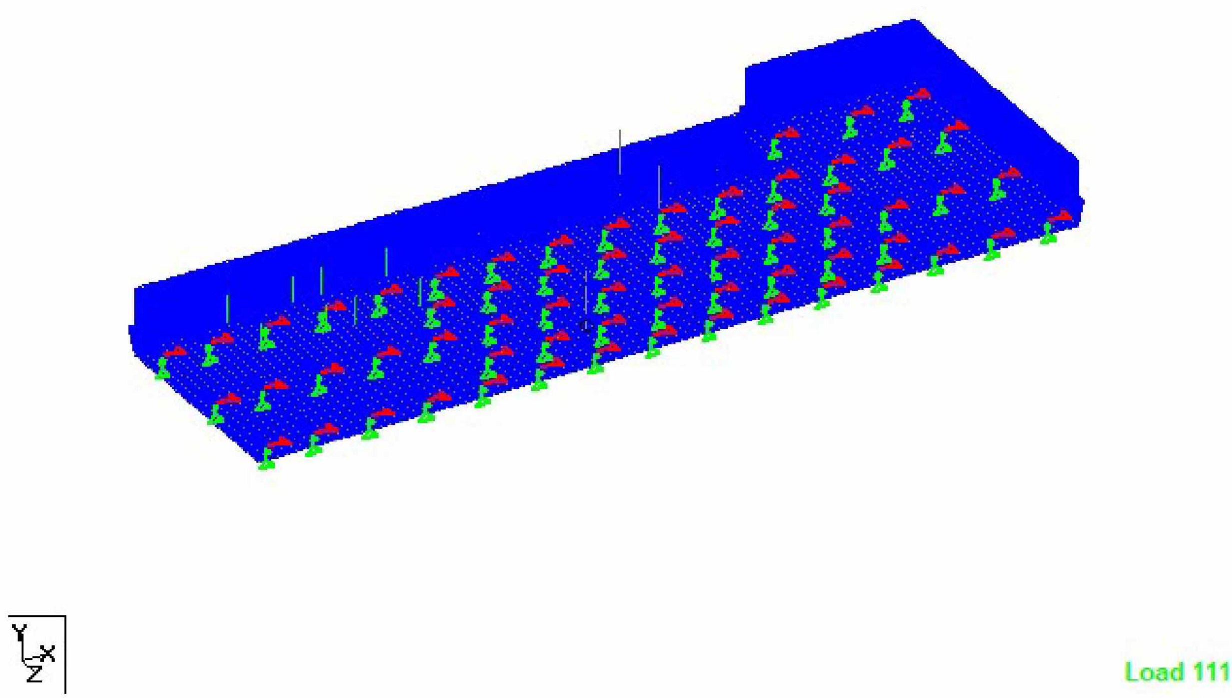


Fig.8.5: Weight of paving on pile cap foundation (L/C 111)

8.5.2 LOAD DUE TO TRAFFIC

Load due to traffic is applied as 20kN/m^2 in Live load case as per the foundation input.

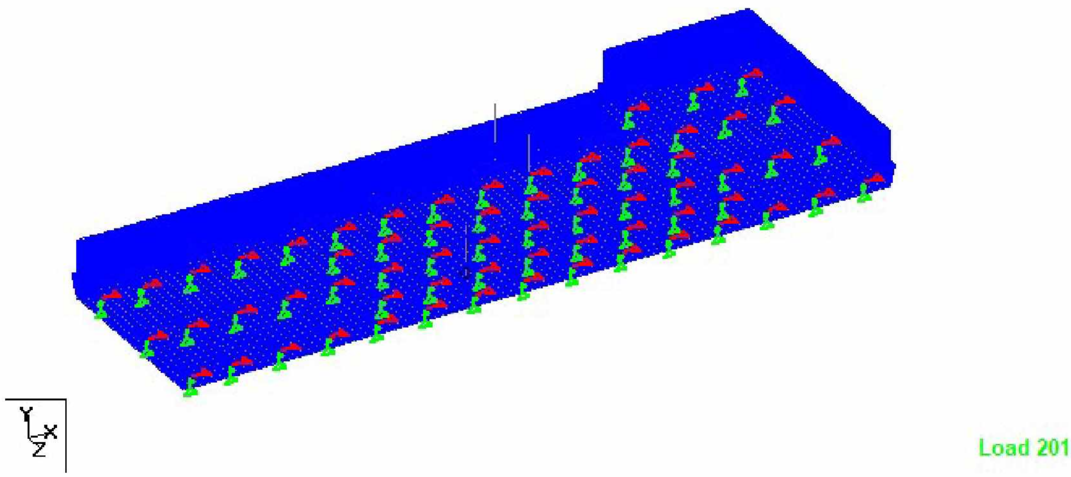


Fig.8.6: Load due to traffic on pile cap foundation (L/C 201)

8.5.3 LOAD DUE TO WEIGHT OF EMPTY, OPERATING, TEST WEIGHT OF EQUIPMENT

Loads acting on equipment as per equipment list (Annexure A) are summarised below.

S.No.	Equipment name	Dead load	Operating load	Test load
1.0	T601	220 kN	617 kN	617 kN
2.0	V603 A/B	185 kN	323 kN	350 kN
3.0	V606	168 kN	168 kN	168 kN
4.0	V604	615 kN	734 kN	1978 kN
5.0	V601	133 kN	296 kN	1365 kN
6.0	SK2101	40 kN (at each support location)	70 kN (at each support location)	70 kN (at each support location)
7.0	E607	5 kN	10 kN	10 kN
8.0	CD6001	-	-	280 kN
9.0	CD6010	-	-	200 kN

Load due to equipment are applied on top of corresponding equipment pedestals as shown below.

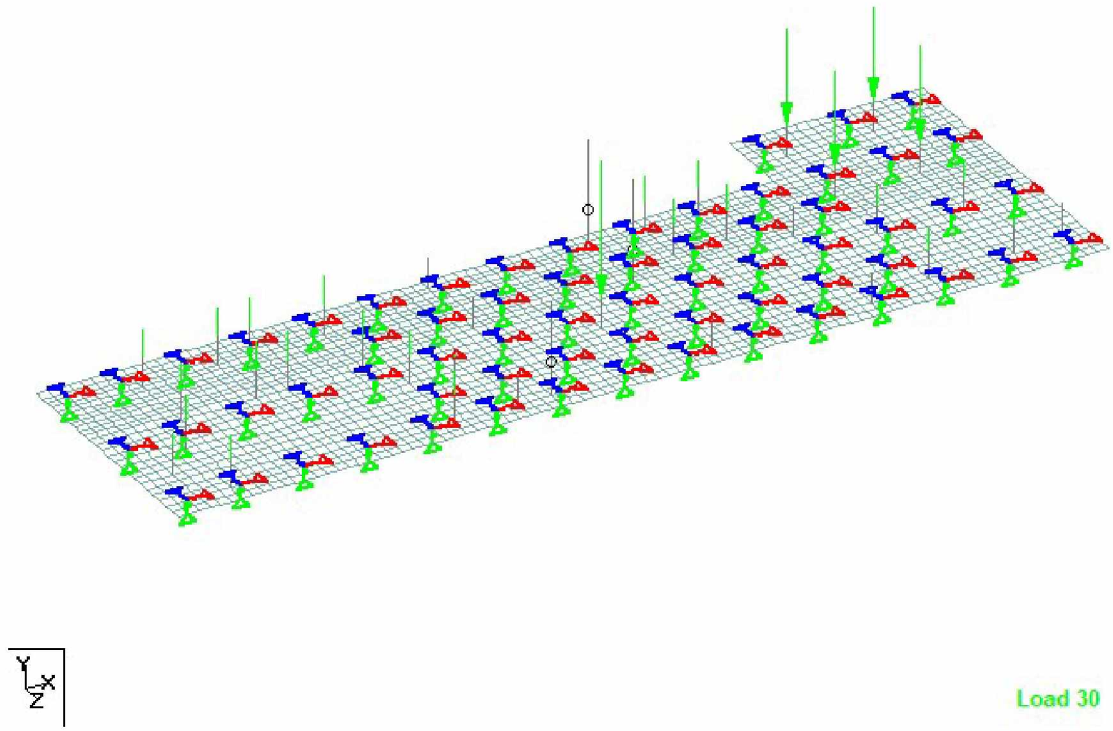


Fig.8.7: Empty weight of the equipment (L/C 30)

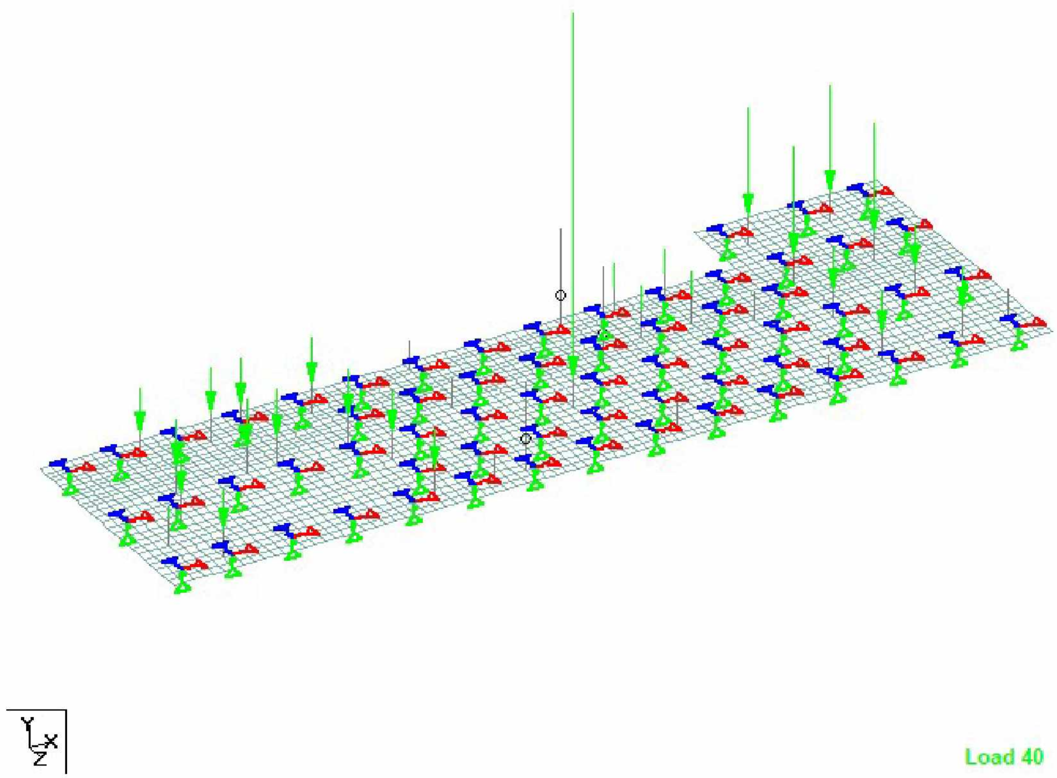


Fig.8.8: Operating weight of the equipment (L/C 40)

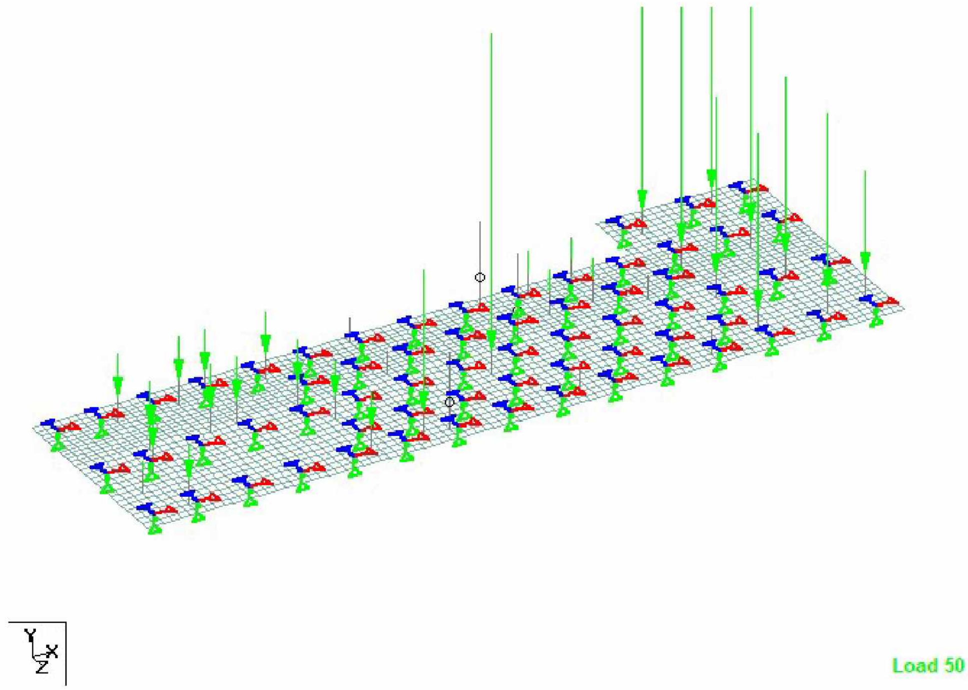


Fig.8.9: Test weight of the equipment (L/C 50)

8.5.4 WIND LOAD ON EQUIPMENT

Wind load is calculated in X and Z direction as per the of NEN-EN 1991-1-4:2010 For detailed wind load calculations, refer Annexure C.

Wind load on equipment is applied as point load on top of pedestals for foundation design.

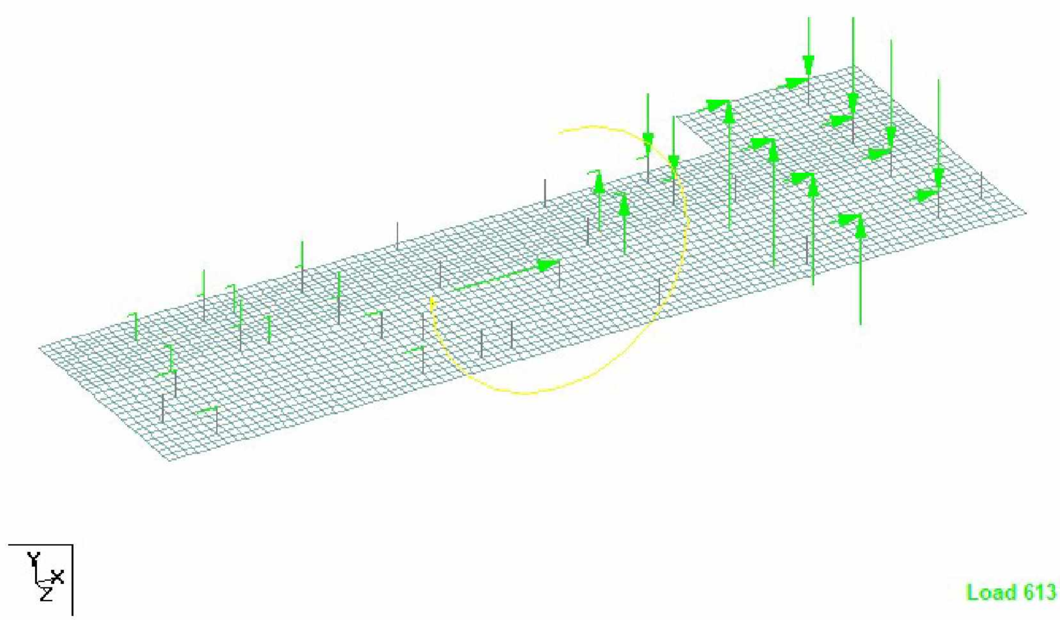


Fig.8.10: Wind load on equipment in E-W direction (L/C 613)

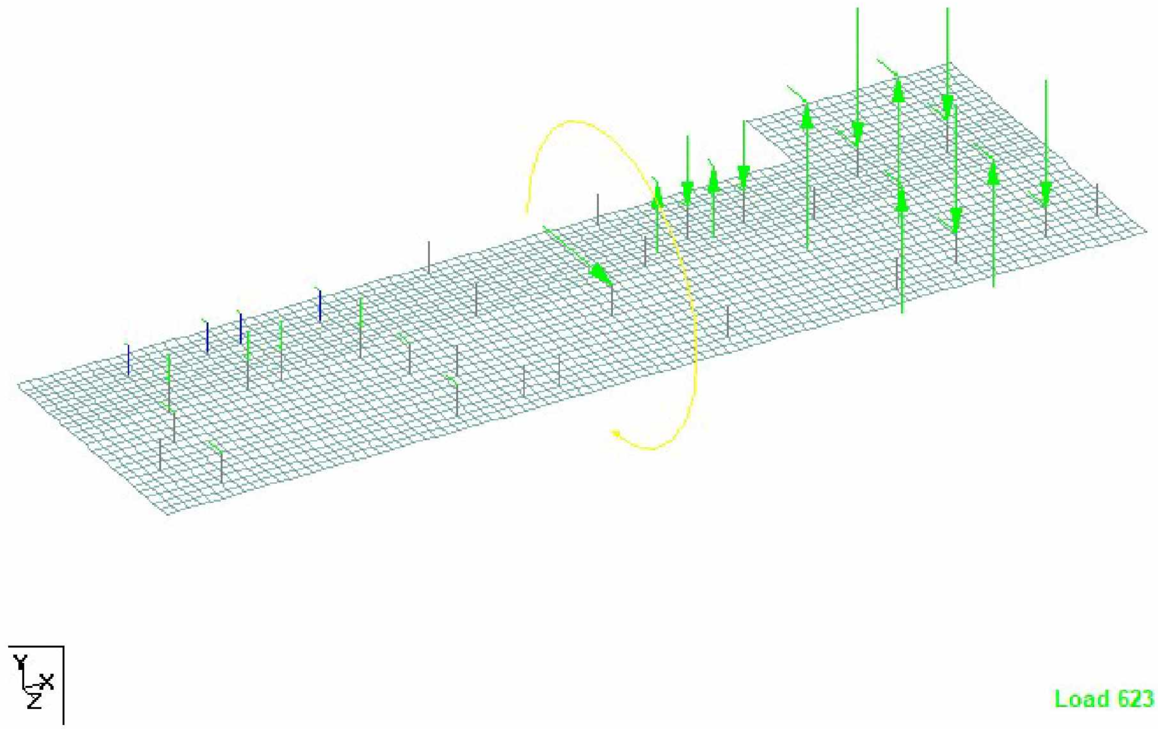


Fig.8.11: Wind load on equipment in N-S direction (L/C 623)

8.5.5 BLAST LOAD ON EQUIPMENT

Detailed calculations for blast loads are shown in Annexure D.

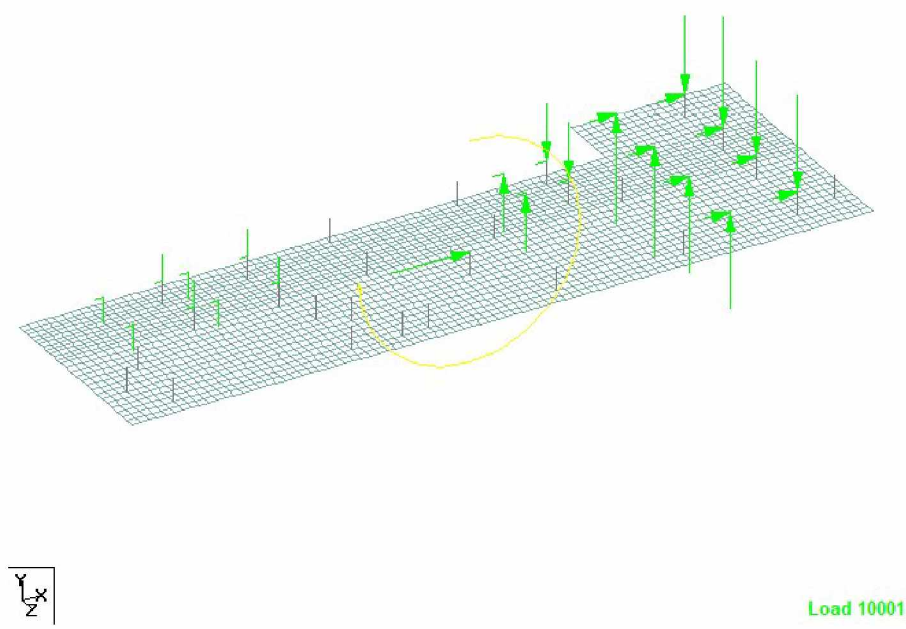


Fig.8.12: Blast load on equipment in E-W direction (L/C 10001)

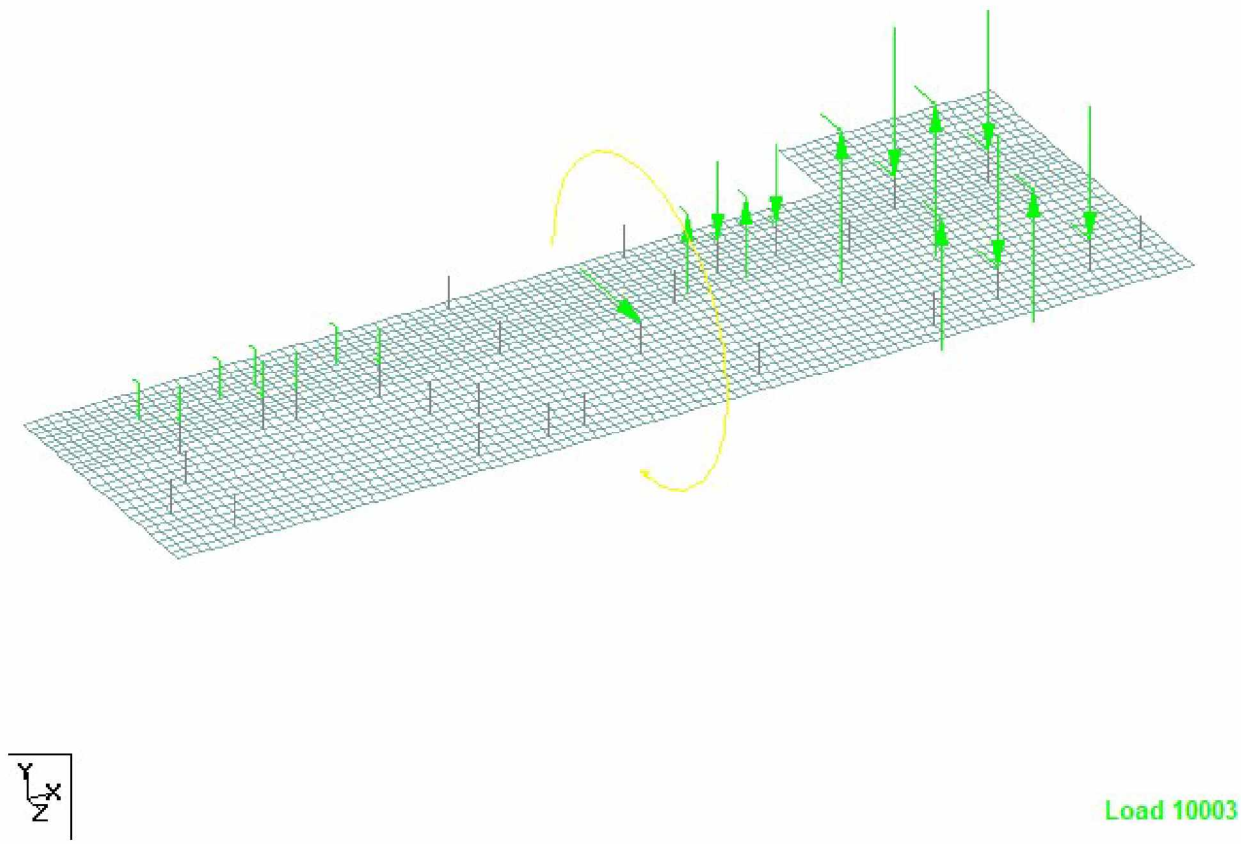


Fig.8.13: Blast load on equipment in N-S direction (L/C 10003)

Load combination for pile and pile cap are considered as shown in annexure F

8.6 DESIGN OF PILE AND PILE CAP

Pile design performed by comparing the reaction from analysis using serviceability load combinations against pile capacities listed in section 8.2

Support reactions at piles for load combinations without blast loads

			Horizontal	Vertical	Horizontal	Moment		
	Node	L/C	Fx kN	Fy kN	Fz kN	Mx kN-m	My kN-m	Mz kN-m
Max Fx	1755	30041	**8.932**	456.869	-1.535	0	0	0
Min Fx	1755	30055	**-7.688**	135.378	2.627	0	0	0
Max Fy	2492	30063	-2.973	**522.936**	0.869	0	0	0
Min Fy	1816	30054	2.207	**76.656**	8.963	0	0	0
Max Fz	2498	30042	-2.515	389.23	**10.382**	0	0	0
Min Fz	2498	30056	2.662	220.734	**-10.529**	0	0	0
Max Mx	533	30001	0	147.83	0.002	0	0	0
Min Mx	533	30001	0	147.83	0.002	0	0	0
Max My	533	30001	0	147.83	0.002	0	0	0
Min My	533	30001	0	147.83	0.002	0	0	0
Max Mz	533	30001	0	147.83	0.002	0	0	0
Min Mz	533	30001	0	147.83	0.002	0	0	0

Maximum compression = 522.936 kN (Node 2492, L/C 30036) < 650 kN

Maximum tension = 0

Maximum shear = 10.53 kN (Node 2498, L/C 30056) < 22.5 kN

Hence safe.

Support reactions at piles for load combinations with blast loads

			Horizonta	Vertical	Horizonta	Moment		
	Node	L/C	Fx kN	Fy kN	Fz kN	Mx kN-m	My kN-m	Mz kN-m
Max Fx	2771	10006 COM	24.466	264.341	0.082	0	0	0
Min Fx	2771	10005 COM	-23.457	159.338	-0.519	0	0	0
Max Fy	2492	30063	-2.973	522.936	0.869	0	0	0
Min Fy	2669	10008 COM	-2.753	43.011	31.138	0	0	0
Max Fz	2498	10008 COM	0.335	329.984	37.003	0	0	0
Min Fz	2498	10007 COM	-0.062	334.931	-38.044	0	0	0
Max Mx	533	10005 COM	-23.161	227.937	0.895	0	0	0
Min Mx	533	10005 COM	-23.161	227.937	0.895	0	0	0
Max My	533	10005 COM	-23.161	227.937	0.895	0	0	0
Min My	533	10005 COM	-23.161	227.937	0.895	0	0	0
Max Mz	533	10005 COM	-23.161	227.937	0.895	0	0	0
Min Mz	533	10005 COM	-23.161	227.937	0.895	0	0	0

Maximum compression = 522.936 kN (Node 2492, L/C 30063) < 650 kN

Maximum tension = 0

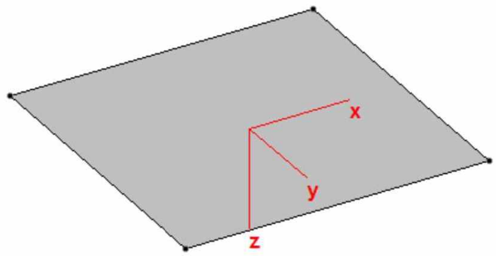
Maximum shear = 38 kN (Node 2498, L/C 10007) < 42 kN

Hence safe.

Hence arranged pile layout shown in figure 8.3 is safe against loads.

9 PILE CAP DESIGN

Footing is designed for factored moment which is derived from Plate centre stress summary out of STAAD.Pro. The design of footing is done to fulfil the requirements of EN1992-1-1.



Mx (+ ve) = Footing bottom moment along East-West direction

Mx (- ve) = Footing top moment along East-West direction

My (+ ve) = Footing bottom moment along North-South direction

My (- ve) = Footing top moment along North-South direction

The final moments from the summary along each direction is obtained using the equations as follows.

For the Bottom Reinforcement (+ve Z Surface)

Mx1 = Mx+abs(Mxy)

My1 = My+abs(Mxy)

Mx2 = Mx+abs(Mxy2/My)

My2 = My+abs(Mxy2/Mx)

If both Mx1 & My1 are +ve, Mxd=Mx1 and Myd=My1

If both Mx1 & My1 are –ve, Mxd=0 and Myd=0

If Mx1 is –ve & My1 is +ve, Mxd=0 and Myd=My2

If Mx1 is +ve & My1 is -ve, Mxd=Mx2 and Myd=0

For the Top Reinforcement (-ve Z Surface)

Mx1 = Mx-abs(Mxy)

My1 = My-abs(Mxy)

Mx2 = Mx-abs(Mxy2/My)

My2 = My-abs(Mxy2/Mx)

If both Mx1 & My1 are +ve, Mxd=0 and Myd=0

If both Mx1 & My1 are –ve, Mxd=Mx1 and Myd=My1

If Mx1 is –ve & My1 is +ve, Mxd=Mx2 and Myd=0

If Mx1 is +ve & My1 is -ve, Mxd=0 and Myd=My2

Plate Centre Stress Summary

Plate center stress summary has been taken at the face of pedestals (plates which lying below pedestal are not considered) to get maximum bending moment (top and bottom). Average moments are calculated where required. Footings having less moment are designed for minimum reinforcement requirement as per EN 1992-1-1.

Check for two way shear

Two way shear is checked at a distance ‘d/2’ or more from face of pedestal where‘d’ is effective depth of footing. The maximum factored punching shear stress at a distance of ‘d/2’ from face of pedestal for most critical perimeter around pedestal is considered.

Check for one way shear

One way shear is checked at a distance ‘d’ from face of pedestal where ‘d’ is effective depth of footing. The average factored shear stress along critical strip of footing is checked with shear capacity of footing if the maximum stress in the plate is exceeded.

Pile cap foundation is performed using inhouse developed spread sheets as shown Annexure G.

10 DESIGN OF PEDESTALS

Lay out of pedestals are shown in the below figures. Pedestals.

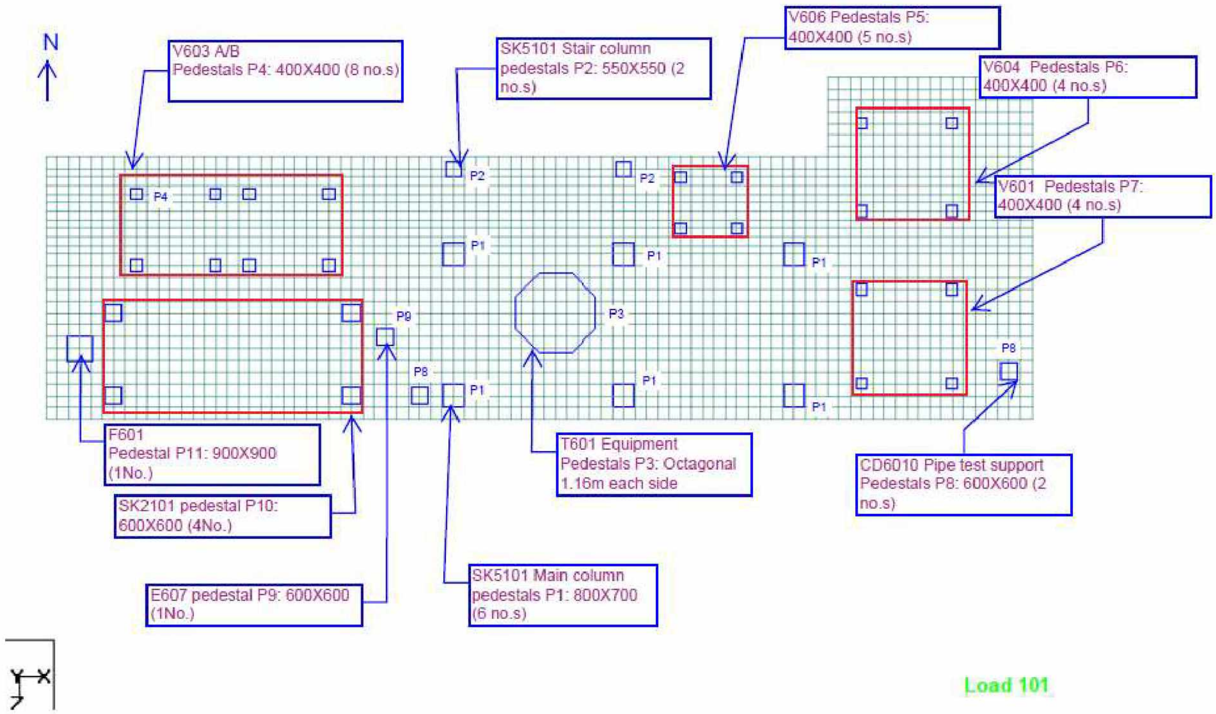


Figure 10: Pedestal layout

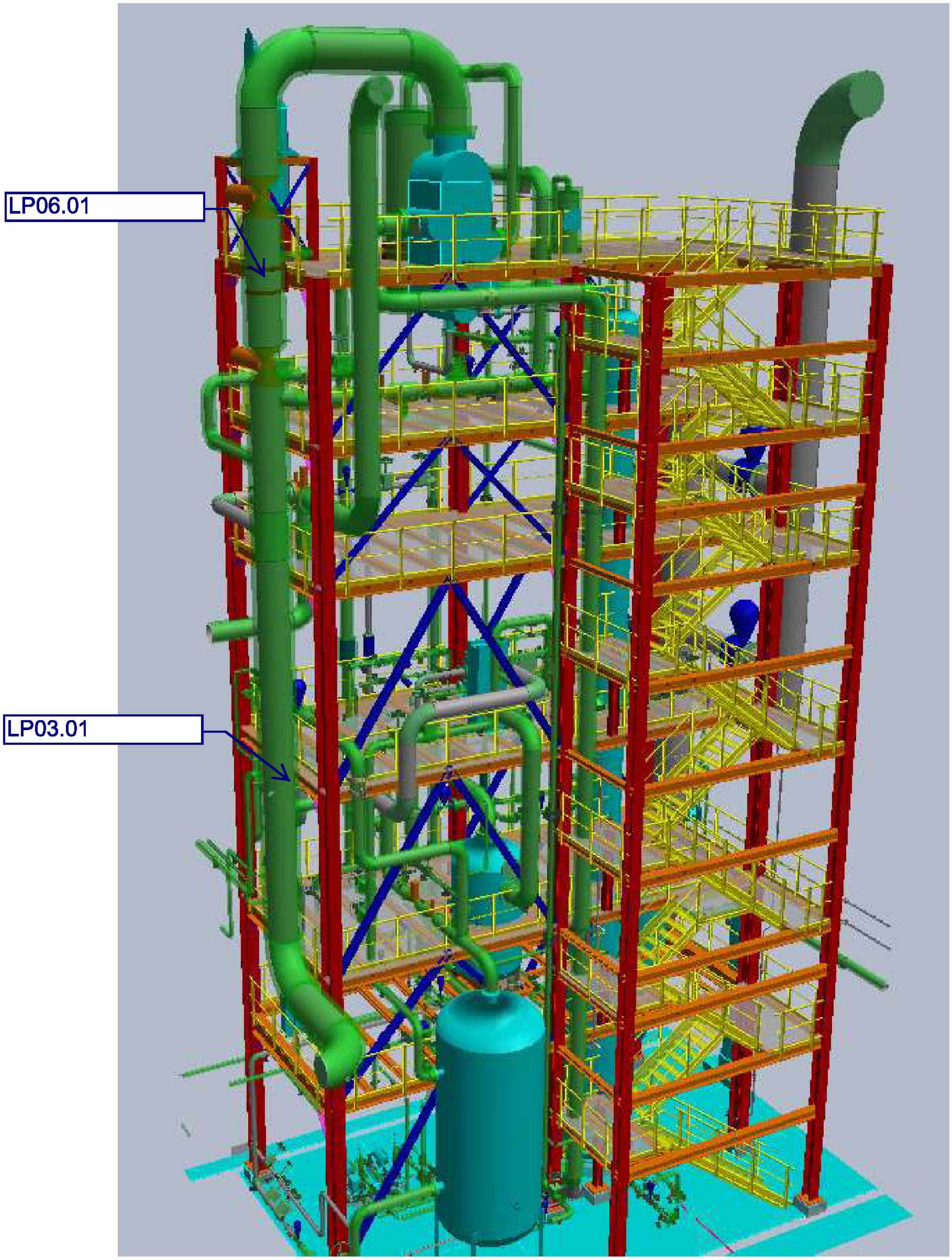
Design of RC pedestals includes pedestals for SK5101 structure and pedestal for various equipment as shown in fig 10.

Pedestal design is performed using Staad pro connect series , Advanced concrete design .Results of which is listed below.

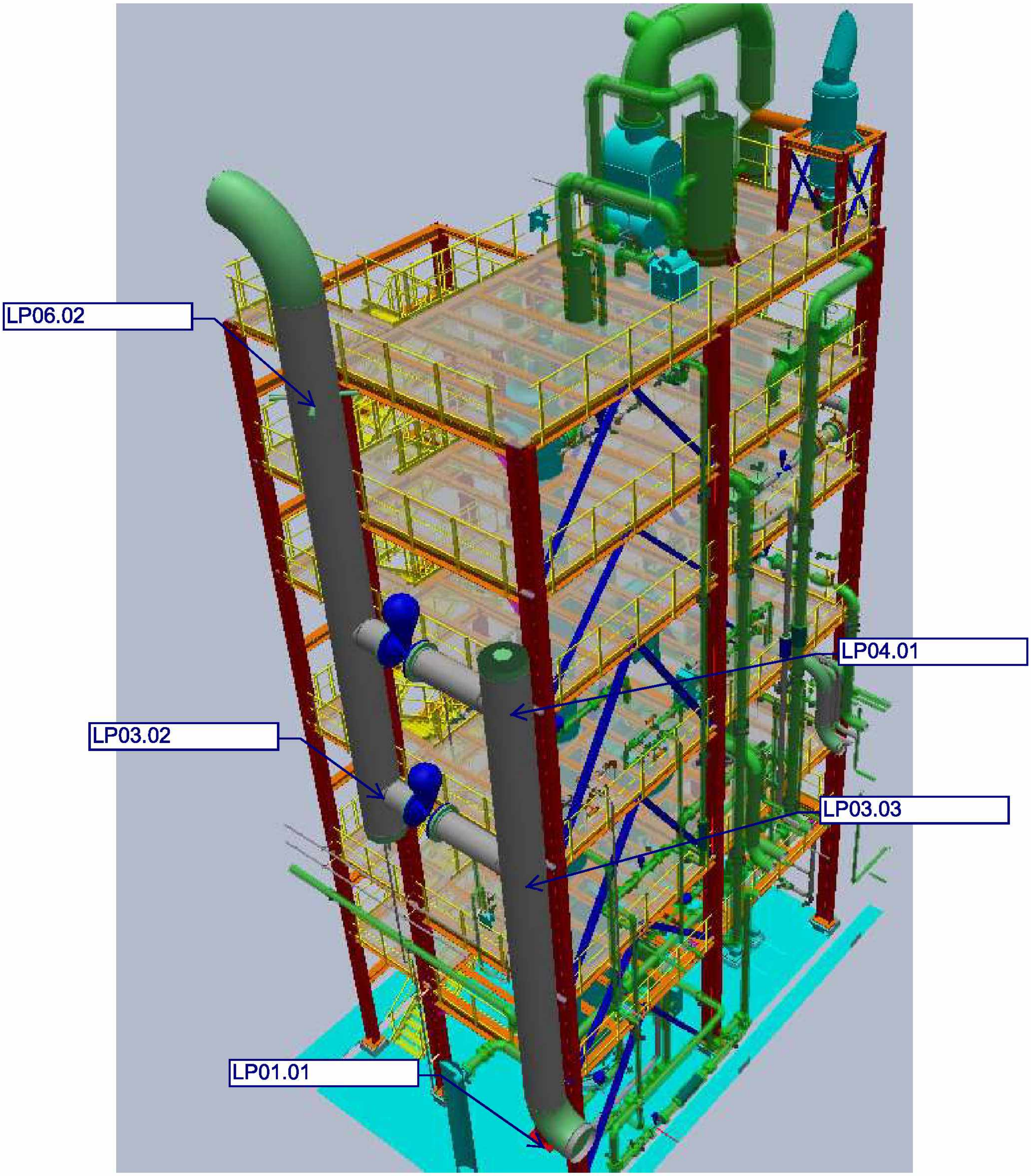
Pedestal no. as per figure 10.	Pedestal no. as per software	level	Size	Material	Designed As	Capacity Ratio Axial	Capacity Ratio Flexure	Pt prv (%)	Main reinforcement	links	Ductile / End links
P2	C1	-0.8 m TO 0.3 m	550 X 550	C35/45 : Fy500	COL - E	0.094	0.19	0.3	8-T12	T8 @ 225	T8 @ 125
P2	C2	-0.8 m TO 0.3 m	550 X 550	C35/45 : Fy500	COL - E	0.071	0.286	0.3	8-T12	T8 @ 225	T8 @ 125
P1	C3	-0.8 m TO 0.3 m	700 X 800	C35/45 : Fy500	COL - E	0.162	0.645	0.26	4-T16 + 6-T12	T8 @ 225	T8 @ 125
P1	C4	-0.8 m TO 0.3 m	700 X 800	C35/45 : Fy500	COL - E	0.225	0.882	0.2	10-T12	T8 @ 225	T8 @ 125
P1	C5	-0.8 m TO 0.3 m	700 X 800	C35/45 : Fy500	COL - E	0.173	0.774	0.39	4-T16 + 12-T12	T8 @ 225	T8 @ 125
P1	C6	-0.8 m TO 0.3 m	700 X 800	C35/45 : Fy500	COL - E	0.177	0.675	0.31	4-T16 + 8-T12	T8 @ 225	T8 @ 125
P1	C7	-0.8 m TO 0.3 m	700 X 800	C35/45 : Fy500	COL - E	0.178	0.712	0.26	4-T16 + 6-T12	T8 @ 225	T8 @ 125
P1	C8	-0.8 m TO 0.3 m	700 X 800	C35/45 : Fy500	COL - E	0.137	0.754	0.31	4-T16 + 8-T12	T8 @ 225	T8 @ 125
P6	C9	-0.8 m TO 0.3 m	400 X 400	C35/45 : Fy500	COL - E	0.249	0.921	0.79	4-T16 + 4-T12	T8 @ 225	T8 @ 125
P6	C10	-0.8 m TO 0.3 m	400 X 400	C35/45 : Fy500	COL - E	0.249	0.921	0.79	4-T16 + 4-T12	T8 @ 225	T8 @ 125
P5	C11	-0.8 m TO 0.3 m	400 X 400	C35/45 : Fy500	COL - E	0.05	0.519	0.5	4-T16	T8 @ 250	T8 @ 175
P5	C12	-0.8 m TO 0.3 m	400 X 400	C35/45 : Fy500	COL - E	0.05	0.519	0.5	4-T16	T8 @ 250	T8 @ 175
P4	C13	-0.8 m TO 0.3 m	400 X 400	C35/45 : Fy500	COL - E	0.063	0.535	0.28	4-T12	T8 @ 225	T8 @ 125
P4	C14	-0.8 m TO 0.3 m	400 X 400	C35/45 : Fy500	COL - E	0.063	0.535	0.28	4-T12	T8 @ 225	T8 @ 125
P4	C15	-0.8 m TO 0.3 m	400 X 400	C35/45 : Fy500	COL - E	0.063	0.535	0.28	4-T12	T8 @ 225	T8 @ 125
P4	C16	-0.8 m TO 0.3 m	400 X 400	C35/45 : Fy500	COL - E	0.063	0.535	0.28	4-T12	T8 @ 225	T8 @ 125
P6	C17	-0.8 m TO 0.3 m	400 X 400	C35/45 : Fy500	COL - E	0.249	0.922	0.79	4-T16 + 4-T12	T8 @ 225	T8 @ 125
P6	C18	-0.8 m TO 0.3 m	400 X 400	C35/45 : Fy500	COL - E	0.249	0.922	0.79	4-T16 + 4-T12	T8 @ 225	T8 @ 125
P5	C19	-0.8 m TO 0.3 m	400 X 400	C35/45 : Fy500	COL - E	0.05	0.519	0.5	4-T16	T8 @ 250	T8 @ 175
P5	C20	-0.8 m TO 0.3 m	400 X 400	C35/45 : Fy500	COL - E	0.05	0.519	0.5	4-T16	T8 @ 250	T8 @ 175
P4	C21	-0.8 m TO 0.3 m	400 X 400	C35/45 : Fy500	COL - E	0.063	0.535	0.28	4-T12	T8 @ 225	T8 @ 125
P4	C22	-0.8 m TO 0.3 m	400 X 400	C35/45 : Fy500	COL - E	0.063	0.535	0.28	4-T12	T8 @ 225	T8 @ 125
P4	C23	-0.8 m TO 0.3 m	400 X 400	C35/45 : Fy500	COL - E	0.063	0.535	0.28	4-T12	T8 @ 225	T8 @ 125
P4	C24	-0.8 m TO 0.3 m	400 X 400	C35/45 : Fy500	COL - E	0.063	0.535	0.28	4-T12	T8 @ 225	T8 @ 125
P7	C25	-0.8 m TO 0.3 m	400 X 400	C35/45 : Fy500	COL - E	0.175	0.794	0.79	4-T16 + 4-T12	T8 @ 225	T8 @ 125
P7	C26	-0.8 m TO 0.3 m	400 X 400	C35/45 : Fy500	COL - E	0.175	0.794	0.79	4-T16 + 4-T12	T8 @ 225	T8 @ 125
P11	C27	-0.8 m TO 0.3 m	600 X 600	C35/45 : Fy500	COL - E	0.02	0.068	0.25	8-T12	T8 @ 225	T8 @ 125
P11	C28	-0.8 m TO 0.3 m	600 X 600	C35/45 : Fy500	COL - E	0.02	0.068	0.25	8-T12	T8 @ 225	T8 @ 125
P3	C29	-0.8 m TO 0.3 m	POLY 8 X 1160	C35/45 : Fy500	COL - E	0.012	0.204	0.22	72-T16	T16 @ 150	T16 @ 150
P9	C30	-0.8 m TO 0.3 m	600 X 600	C35/45 : Fy500	COL - E	0.005	0.006	0.25	8-T12	T8 @ 225	T8 @ 125
P11	C31	-0.8 m TO 0.3 m	900 X 900	C35/45 : Fy500	COL - E	0.005	0.006	0.22	16-T12	T8 @ 225	T8 @ 125
P8	C32	-0.8 m TO 0.3 m	600 X 600	C35/45 : Fy500	COL - E	0.053	0.038	0.25	8-T12	T8 @ 225	T8 @ 125
P7	C33	-0.8 m TO 0.3 m	400 X 400	C35/45 : Fy500	COL - E	0.175	0.794	0.79	4-T16 + 4-T12	T8 @ 225	T8 @ 125
P7	C34	-0.8 m TO 0.3 m	400 X 400	C35/45 : Fy500	COL - E	0.175	0.794	0.79	4-T16 + 4-T12	T8 @ 225	T8 @ 125
P11	C35	-0.8 m TO 0.3 m	600 X 600	C35/45 : Fy500	COL - E	0.02	0.068	0.25	8-T12	T8 @ 225	T8 @ 125
P11	C36	-0.8 m TO 0.3 m	600 X 600	C35/45 : Fy500	COL - E	0.02	0.068	0.25	8-T12	T8 @ 225	T8 @ 125
P8	C37	-0.8 m TO 0.3 m	600 X 600	C35/45 : Fy500	COL - E	0.073	0.046	0.25	8-T12	T8 @ 225	T8 @ 125

ANNEXURE A

LOADING INPUT



LP06.01
LP03.01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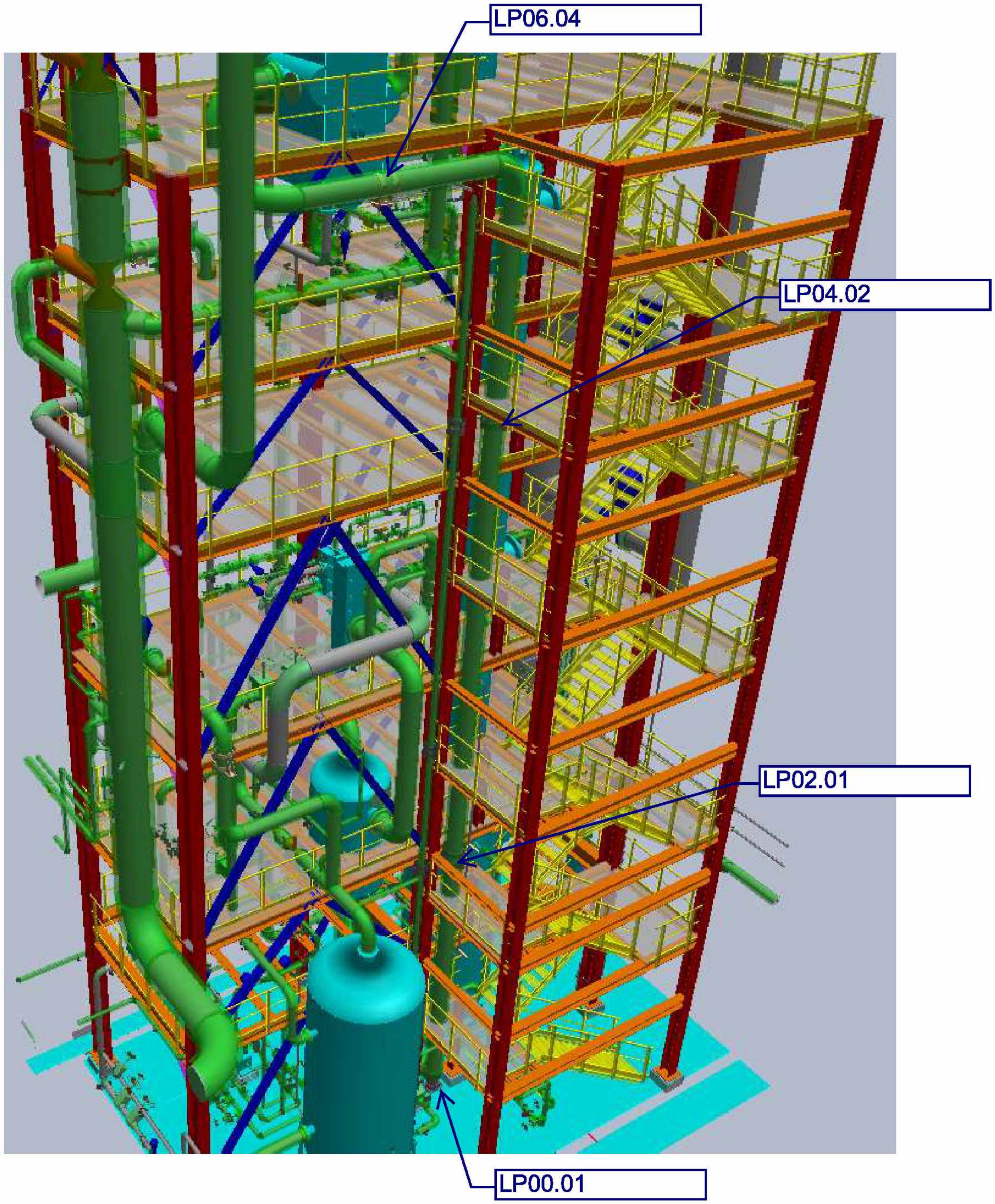
LP04.01
LP03.02
LP03.03
LP01.01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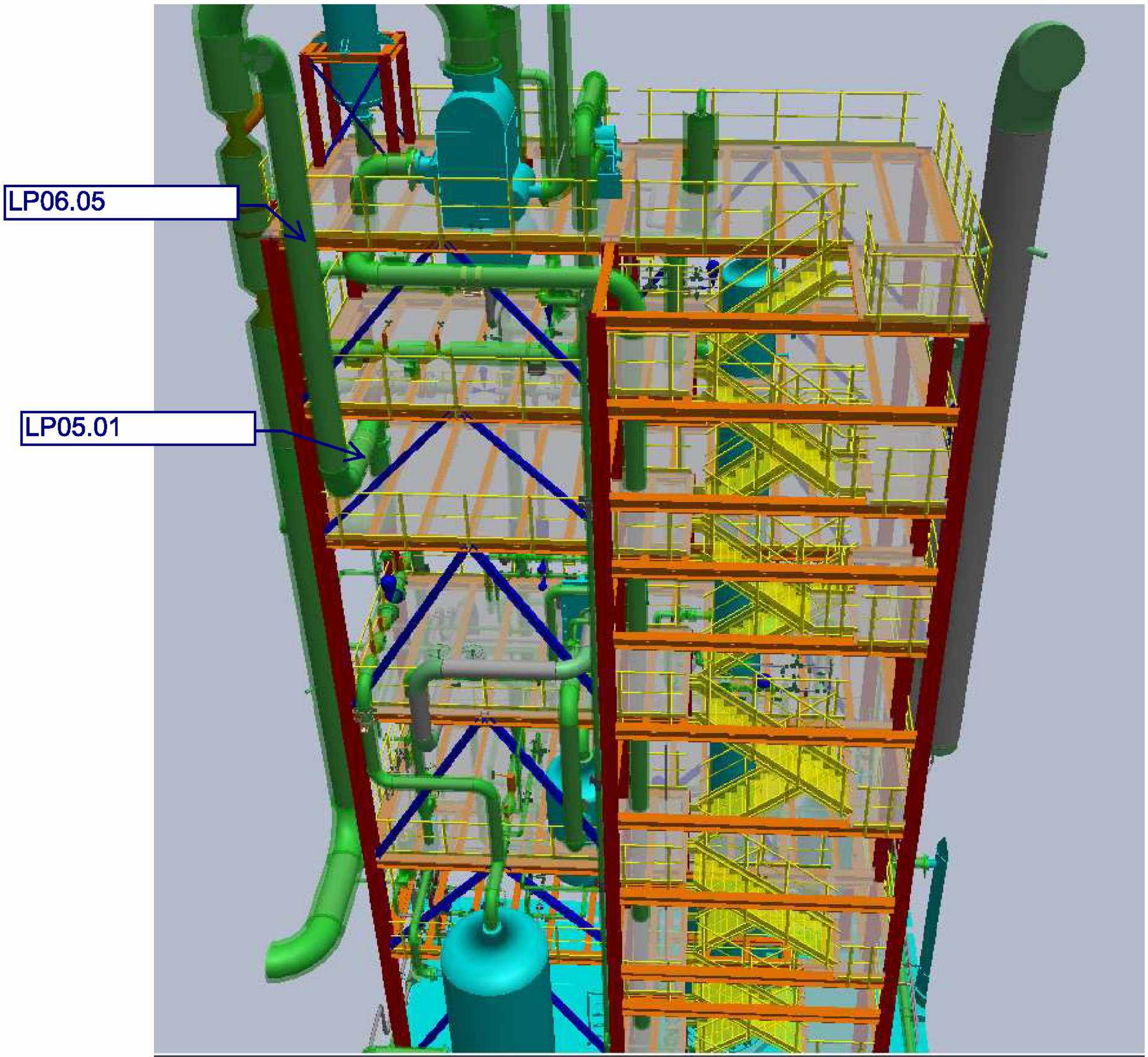
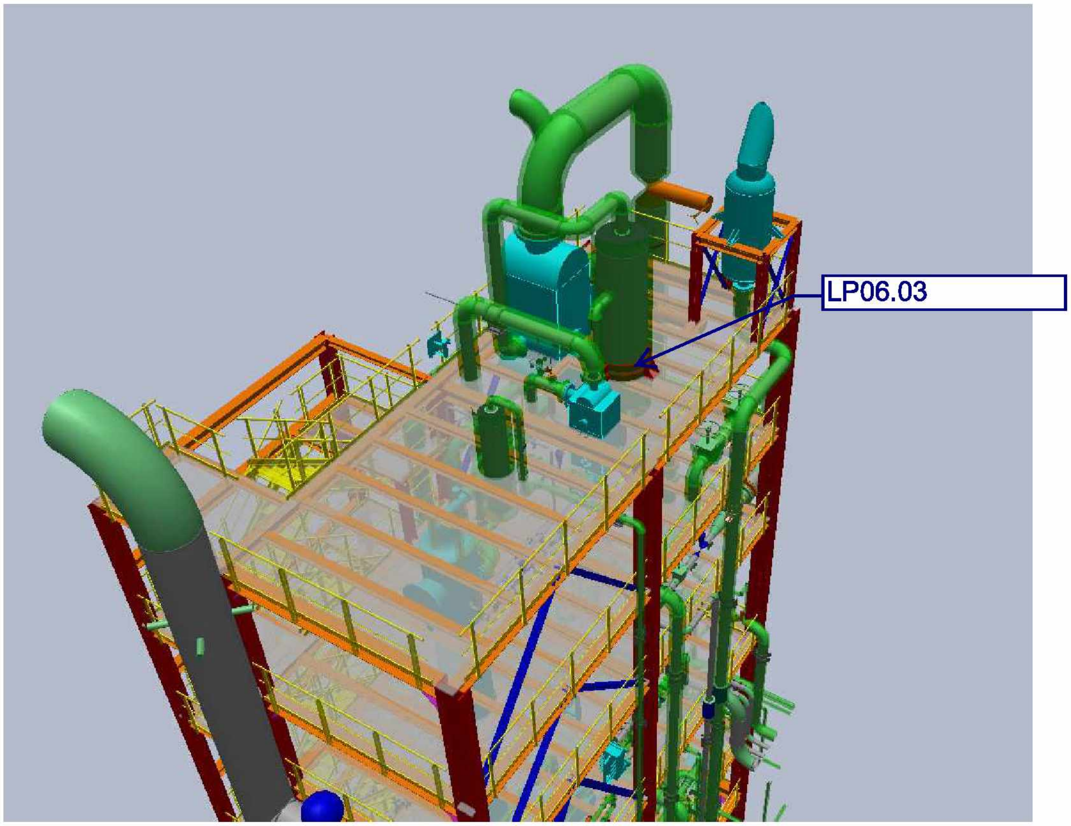

LP06.05
LP05.01


LP06.03

Issue 1.0
14.09.2022

CONCENTRATED LOADS (LOCATION SEE DRAWING)										
LOADS RESULTING FROM CONNECTED PIPING ARE INCLUDED										
+H	MARKED LOAD POINT NO. OR EQP NO.	-V / +V			$+H_N$ / $+H_E$		GLOBAL ('X' - MARK)	REMARKS		
		VERTICAL LOAD			HORIZONTAL LOAD					
ELEVATION [m]		V_D [KN]	V_O [KN]	V_T [KN]	H_N [KN]	H_E [KN]				
+5.000	V605	+ 35.0	+ 50.0	+ 80.0	only wind	only wind	X	Refrigerant Receiver, 4 SUPPORTS		
+5.000	E616	+ 2.0	+ 3.0		only wind	only wind	X	Export Ammonia HEX		
+8.200	V602	+ 60.0	+ 90.0	+ 140.0	only wind	only wind	X	Water Separator, 4 SUPPORTS		
+12.800	E606	+ 22.0	+ 25.0		only wind	only wind	X	CO2 Gas Pre-Cooler		
+12.800	E617	+ 40.0	+ 45.0		only wind	only wind	X	Export CO2 Gas Heater		
+23.800	E608	+ 60.0	+ 70.0		only wind	only wind	X	CO2 Liquefier, 2 SUPPORTS		
+23.800	E610	+ 35.0	+ 40.0	+ 12.5	only wind	only wind	X	CO2 Condenser, 2 SUPPORTS		
+26.000	S601	+ 73.0	+ 80.0		only wind	only wind	X	Vent Gas Silencer, 4 SUPPORTS		
+0.675	LP00.01	+ 20.0	+ 25.0	+ 50.0	only wind	only wind	X	Elbow support on paving		
+3.720	LP01.01	+ 80.0	+ 90.0	+ 20.0	only wind	only wind	X	Elbow support		
+8.200	LP02.01				only wind	only wind	X	Horizontal guide support		
+12.800	LP03.01	+ 70.0	+ 80.0	+ 200.0	only wind	only wind	X	Vertical support		
+12.800	LP03.02	+ 80.0	+ 90.0		only wind	only wind	X	Vertical support		
+12.800	LP03.03				only wind	only wind	X	Horizontal guide support		
+17.400	LP04.01				only wind	only wind	X	Horizontal guide support		
+18.630	LP04.02				only wind	only wind	X	Horizontal guide support		
+20.400	LP05.01	+ 15.0	+ 20.0		only wind	only wind	X	Horizontal guide support		
+23.800	LP06.01				only wind	only wind	X	Horizontal guide support		
+23.800	LP06.02				only wind	only wind	X	Horizontal guide support		
+23.800	LP06.03	+ 15.0	+ 50.0		only wind	only wind	X	Fixed Support; 2		
+22.970	LP06.04	+ 5.0	+ 6.0	+ 15.0	only wind	only wind	X	Horizontal guide support		
+23.800	LP06.05				only wind	only wind	X	Horizontal guide support		

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AREA LOADS (AS MARKED IN THE DRAWING)

LEVEL	PIPING LOADS					LIVE LOADS VERTICAL	CONCEN-TRATED LOAD	Remarks
	VERTICAL			HORIZONTAL				
ELEVATION [m]	g_R [kN/m²]	p_R [kN/m²]	q_R [kN/m²]	h_N [kN/m²]	h_E [kN/m²]	q [kN/m²]	P [KN]	
+3.000						+ 3.0	+ 3.0	Walkway platform, movable single load, applied on area with grating only
+5.000	+ 1.0	+ 2.0		+/-0,2	+/-0,2	+ 3.0	+ 10.0	Walkway platform, movable single load, applied on area with grating only
+7.000						+ 3.0	+ 3.0	Walkway platform, movable single load, applied on area with grating only
+8.200	+ 1.0	+ 2.0		+/-0,2	+/-0,2	+ 3.0	+ 10.0	Walkway platform, movable single load, applied on area with grating only
+10.600						+ 3.0	+ 3.0	Walkway platform, movable single load, applied on area with grating only
+12.800	+ 1.0	+ 2.0		+/-0,2	+/-0,2	+ 3.0	+ 10.0	Walkway platform, movable single load, applied on area with grating only
+15.200						+ 3.0	+ 3.0	Walkway platform, movable single load, applied on area with grating only
+17.400	+ 1.0	+ 2.0		+/-0,2	+/-0,2	+ 3.0	+ 10.0	Walkway platform, movable single load, applied on area with grating only
+19.000						+ 3.0	+ 3.0	Walkway platform, movable single load, applied on area with grating only
+20.400	+ 1.0	+ 2.0		+/-0,2	+/-0,2	+ 3.0	+ 10.0	Walkway platform, movable single load, applied on area with grating only
+22.200						+ 3.0	+ 3.0	Walkway platform, movable single load, applied on area with grating only
+23.800	+ 1.0	+ 2.0		+/-0,2	+/-0,2	+ 3.0	+ 10.0	Walkway platform, movable single load, applied on area with grating only
Explosion Load								acc. to YARA Specification

NOTE 1 : CONSIDER CABLE TRAY SUPPORTING PORTION FULLY OCCUPIED

V_D = DEAD LOAD (EMPTY WEIGHT WITH INSULATION AND ATTACHMENTS)

V_O = OPERATING LOAD (V_D + OPERATING, FILLING WITH OPERATING MEDIUM)

V_T = PRESSURE TEST LOAD (V_D + FILLING WITH WATER)

H_N / H_E = HORIZONTAL LOAD IN OPERATION (N= NORTH, E=EAST) FOR LOCAL DESIGN IF NOT MARKED AS GLOBAL

gR = DEAD LOAD - PIPELINE

PR = LIVE LOAD + gR

qR = TEST LOAD = gR + PRESSURE TEST LOAD (WITHOUT INSULATION)

hN = PIPE THRUST NORTH

hE = PIPE THRUST SOUTH

q = LIVE LOAD IN AREAS WITH GRATING

P = CONCENTRADED SINGLE LIVE LOAD ON PLATFORM FOR LOCAL DESIGN

ENVIRONMENTAL LOADS ON EQUIPMENT, STRUCTURE, PIPES, CABLE TRAYS AND SO ON ARE NOT INCLUDED IN THIS TABLE AND SHALL BE ADDED PROPERLY BY THE ENGINEER WHO PREPARES THE STATIC CALCULATION

SINGLE LOADS, WHICH ARE PLACED IN ADDITON TO AREA LOADS, ARE REDUCED WITH THE OVERLAPPING AREA LOAD

ALL OTHER LOADS SHALL BE ADDED DIRECTLY TO THE DRAWING AT THEIR ASSUMED POSITION WITH VALUES

EQUIPMENT LIST
PROCESS PLANT

CO2 Purification and Liquefaction

Item No.

Proj. No. **3710A3T8**
Code **SLUISKIL**

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CONTRACTOR		Contractor Doc. No.	**&AE-2000-P-LE 1001 (EN)**
CLIENT	**YARA**	Client Project No.	**16471**
		Client Code	**CACTUS**
		Client Document No.	**16471-C19-00007**
ITEM		Plant ID	
		Item Service	

REMARKS

IFD	04	07.09.22	5.1.2.e	5.1.2.e / 5.1.2.e	5.1.2.e	First Issue FEED
IFD	03	17.12.21	5.1.2.e	5.1.2.e	5.1.2.e	Final for Concept Selection Study
IFD	02	03.11.21	5.1.2.e	5.1.2.e	5.1.2.e	
IFD	01	08.09.21	5.1.2.e	5.1.2.e	5.1.2.e	
Status	Issue	Date	Prepared	Checked	Approved	Remarks

	EQUIPMENT LIST **PROCESS PLANT**	Process Plant:
	Project / Plant **CO2 Purification and Liquefaction**	Proj. No. **3710A3T8** Code **SLUISKIL**
	Service **Process Plant**	Doc. No. **&AE-2000-P-LE 1001 (EN)** Status IFD Issue 04 Page 2 of 16

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Linde	**EQUIPMENT LIST** **PROCESS PLANT**	Process Plant: **PP125**
	Project/Plant: CO2 Purification and Liquefaction	Proj. No. **3710A3T8** Code **SLUISKIL**
	Service: **Process Plant**	Doc. No. &AE-2000-P-LE 1001 (EN) Issue **04** Page 3 of 16 Status IFD

A ADSORBER

Item No.	Service	Type	Qty	Tangent Length	Diameter	Material (major)	Adsorbent Vol. / Adsorbent Type	Op. Press.	Op. Temp.	1)	Design Press.	Design Temp. (min/max)	Weight Dry/Unit	Remarks	
				m	mm		m³	bar(a)	°C		bar(g)	°C	kg		
V603 A/B	Dryer	ADSORBER VERTICAL	2	2.20	3600	LTCS	15.6	19.8	7.9	A	23.500	-40 / 280	18500		04
							Silicagel			R	-0.4	-20 / 60			04

1) A: Adsorption, R: Regeneration

EQUIPMENT LIST
PROCESS PLANT

Process Plant: **PP125**

Project/Plant: CO2 Purification and Liquefaction

Service: **Process Plant**

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C COMPRESSOR/BLOWER

Item No.	Service	Type	Qty	Type of Driver	Normal Shaft Power	Suction Temp.	Stage	Normal Flow	Suction Press.	Discharge Press.	Design Press.	Design Temp. (min/max)	Weight / Unit	Remarks	
					kW	°C		m^3/h	bar(a)	bar(a)	bar(g)	°C	kg		
CA603	Vacuum Pump	CENTRIFUGAL	1				1								04
CR601	CO2 Compressor	CENTRIFUGAL	1	E-MOTOR	8234	55	1	84117	1.04	2.4		-20 / 150	34300.0	Part of Package Unit Y601. Weight from SE	04
							2	30332	2.34	5.4		5 / 150			04
							3	12969	5.3	10.8		5 / 150			04
							4	6574	10.6	20	23.500	5 / 150			04
CR602	Refrigerant Compressor	CENTRIFUGAL	1	E-MOTOR	5226	-24	1	38997	1.04	3.5	25.000	-40 / 150	76670.0	Part of Package Unit Y602; weight + dimensions from BH and L x W = baseframe	04
											-1.000	-40 / 80			04
							2	17772	3.26	10.8	25.000	-33 / 150			04
											-1.000	-33 / 80			04

Linde	**EQUIPMENT LIST** **PROCESS PLANT**	Process Plant: **PP125**
	Project/Plant CO2 Purification and Liquefaction	Proj. No. **3710A3T8** Code **SLUISKIL**
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D1 DECANTER/VESSEL/DEAERATOR

Item No.	Service	Type Orientation	Qty	Tangent Length OPVolume m m^3	Dia -meter mm	Material (major)	Internals	Op. Press. bar(a)	Op. Temp. °C	Design Press. bar(g)	Design Temp. (min/max) °C	Weight Dry / Unit kg	Remarks	
SR601 A-F	Storage Tanks	VESSEL HORIZONTAL	6	50.00	8300	LTCS		14	-30.6	20.000	-40 / 60	598000	Operating Weight with LCO2: 3955300 kg	04
V601	Compressor Knock Out Drum	VESSEL VERTICAL	1	7.05	4300	SS	WIRE MESH	1.07	31	3.000	-20 / 100	13300		04
V602	Water Separator	VESSEL VERTICAL	1	2.80	1800	SS	WIRE MESH	19.8	8	23.500	-20 / 80	5800		04
V604	Suction Drum	VESSEL VERTICAL	1	7.00	4500	LTCS		1.09	-23.7	25.000 -1.000	-40 / 60 -40 / 60	61400		04
V605	Refrigerant Receiver	VESSEL VERTICAL	1	2.90	1300	LTCS		10.6	26.6	25.000 -1.000	-33 / 80 -33 / 80	3400		04 02
V606	Refrigerant Economizer	VESSEL VERTICAL	1	5.10	2600	LTCS		4.8	3	25.000 -1.000	-33 / 60 -33 / 60	16600		04
V607	Cooling Water Expansion Vessel	VESSEL VERTICAL	1	1.60 1.8	1200	CS		4	25	17.500	-20 / 80	1500		04
V608	Seal Gas NH3 Sparge Vessel	VESSEL VERTICAL	1	1.50	1016	SS		1.01	27.4	0.500	-20 / 70	900		04

EQUIPMENT LIST
PROCESS PLANT

Process Plant: **PP125**

Project/Plant: CO2 Purification and Liquefaction

Service: **Process Plant**

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E2 PLATE FIN HEAT EXCHANGER

Item No.	Service	Type	Qty	Block No./Volume m³	Length / Width Height m	Fluid	Op.Temp. (In/Out) °C	Design Press. bar(g)	Design Temp. (min/max) °C	Weight Dry / Unit kg	Remarks	
E608	CO2 Liquefier	PLATE FIN	1	1 4.45	2.6 / 1.2 1.43	Ammonia Liquid	-31.00 / -23.00	25	-40 / 60	5800	Phase separator near the Core, minimize length of liquid piping and vapor piping without low point. DIA 1000 mm x TL-TL 3450 mm	04
						Ammonia Liquid	-31.00 / -23.00	-1	-40 / 60			04
						Carbon Dioxide Raw Gas	-6.82 / -23.05	23.5	-40 / 60			04
						Carbon Dioxide Raw Gas	-6.82 / -23.05	4.2	-57 / 60			04

1) If not otherwise noted, all geometric dimensions (length, area, etc.) relate to a single shell/unit and all process dimensions (duty, flowrate, temperature, etc.) relate to the whole processing unit

	EQUIPMENT LIST **PROCESS PLANT**	Process Plant: **PP125**
	Project/Plant: CO2 Purification and Liquefaction	Proj. No. **3710A3T8** Code **SLUISKIL**
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E4 AIR COOLER/HEATER / COOLING TOWER

Item No.	Service	Type	Qty	Length/Width Height (m)	No. Cells Drivers/ Cell	Power/ Driver (kW)	Tube Material	Heat Duty (kW)	Op.Temp. (In/Out) (°C)	Design Press. (bar(g))	Design Temp. (min/max) (°C)	Weight Dry / Unit (kg)	Remarks	
E605	Cooling Water Cooler	AIR COOLER	1	35.4 / 12 9.5	6 2	45	SA-179	19599	35/25	17.5	-20/80	186400	Weight Empty / Full of Water: 186400 / 204800 kg/Unit	04 04
E613	Refrigerant Condenser	AIR COOLER	1	33.6 / 12 9.5	6 2	45	SA-179	14019	50/26.6	-1	-33/80	175400	Weight Empty / Full of Water: 175400 / 187200 kg/Unit	04 04

1) If not otherwise noted, all geometric dimensions (length, area, etc.) relate to a single shell/unit and all process dimensions (duty, flowrate, temperature, etc.) relate to the whole processing unit

Linde	**EQUIPMENT LIST** **PROCESS PLANT**	Process Plant: **PP125**
	Project/Plant: CO2 Purification and Liquefaction	Proj. No. **3710A3T8** Code **SLUISKIL**
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E5 ELECTRICAL HEATER

Item No.	Service	Type	Qty	Length m	Diameter mm	Material	Heat Duty kW	Op. Press. bar(a)	Op.Temp. (In/Out) °C	Design Press. bar(g)	Design Temp. (min/max) °C	Weight Dry/Unit kg	Remarks	
EH607	Regeneration Gas Heater	WITH SHELL	1	4.5	1000	LTCS	233	1.5	-5.5/160	23.500	-60/300	500		04

1) If not otherwise noted, all geometric dimensions (length, area, etc.) relate to a single shell/unit and all process dimensions (duty, flowrate, temperature, etc.) relate to the whole processing unit

EQUIPMENT LIST
PROCESS PLANT

Process Plant: **PP125**

Project/Plant: CO2 Purification and Liquefaction

Service: **Process Plant**

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E6 PLATE&FRAME / WELDED PLATE HEAT EXCHANGER

Item No.	Service	Type	Qty	Block No.	Length / Width Heigth (m)	Fluid	Op. Temp. (In/Out) °C	Design Press. bar(g)	Design Temp. (min/max) °C	Weight Dry/Unit kg	Remarks	
E606	CO2 Gas Pre-Cooler	PLATE & FRAME	1	1	1.68 / 0.85	Carbon Dioxide Raw Gas	39 / 8	23.500	-33 / 80	2143	SIGMASHELL SP7- 374 L 11	04
					1.5	Ammonia Liquid	4.1 / 3.6	25.000	-33 / 80			04
						Ammonia Liquid	4.1 / 3.6	-1.000	-33 / 80			04
E609	CO2 Reboiler	PLATE & FRAME	1	1	0.76 / 0.85	Carbon Dioxide Raw Gas	9.7 / -6.8	23.500	-40 / 80	1581	SIGMASHELL SP7- 120 L 11	04
					1.5	Carbon Dioxide Raw Gas	9.7 / -6.8	4.200	-57 / 80			04
						Carbon Dioxide Liquid	-21 / -21	23.500	-40 / 80			04
						Carbon Dioxide Liquid	-21 / -21	4.200	-57 / 80			04
E610	CO2 Condenser	PLATE & FRAME	1	1	1.5 / 1.05	Carbon Dioxide Raw Gas	-23 / -29	23.500	-40 / 60	3452	SIGMASHELL SP7- 420 H 33	04
					2.1	Carbon Dioxide Raw Gas	-23 / -29	4.200	-57 / 60			04
						Ammonia Liquid	-31 / -26	25.000	-40 / 60			04
						Ammonia Liquid	-31 / -26	-1.000	-40 / 60			04
E611	CO2 Subcooler	PLATE & FRAME	1	1	1.15 / 0.84	Carbon Dioxide Liquid	-21 / -28	23.500	-40 / 60	1989	SIGMASHELL SP7- 210 H 11	04
					1.5	Carbon Dioxide Liquid	-21 / -28	4.200	-57 / 60			04
						Ammonia Liquid	-31 / -32	25.000	-40 / 60			04
						Ammonia Liquid	-31 / -32	-1.000	-40 / 60			04
E612	Vent Gas Heater	PLATE & FRAME	1	1	0.7 / 0.61	Carbon Dioxide Vent Gas	-45 / 21.6	23.500	-60 / 60	1989	SIGMASHELL SP5- 102 H 11	04
					0.12	Ammonia Liquid	26.6 / 25.5	25.000	-60 / 60			04
						Ammonia Liquid	26.6 / 25.5	-1.000	-40 / 60			04

1) If not otherwise noted, all geometric dimensions (length, area, etc.) relate to a single shell/unit and all process dimensions (duty, flowrate, temperature, etc.) relate to the whole processing unit

Linde	**EQUIPMENT LIST** **PROCESS PLANT**	Process Plant: **PP125**
	Project/Plant: CO2 Purification and Liquefaction	Proj. No. **3710A3T8** Code **SLUISKIL**
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E6 PLATE&FRAME / WELDED PLATE HEAT EXCHANGER

Item No.	Service	Type	Qty	Block No.	Length / Width Heigth (m)	Fluid	Op. Temp. (In/Out) (°C)	Design Press. (bar(g))	Design Temp. (min/max) (°C)	Weight Dry/Unit (kg)	Remarks	
E616	Export Ammonia Heat Exchanger	PLATE & FRAME	1	1	0.68 / 0.38	Ammonia Liquid	38 / 15	25.000	-33 / 60	143	SIGMASHELL SP3- 110 H 11	04
					0.9	Ammonia Liquid	4.1 / 3.6	25.000	-33 / 60			04
E617	Export CO2 Gas Heater	PLATE & FRAME	1	1	1.54 / 0.85	Carbon Dioxide Raw Gas	-12.7 / 15	7.500	-40 / 80	4058	SIGMADUAL	04
					2.3	Water/PGlycol Mixture	35 / 33.7	17.500	-40 / 80			04

1) If not otherwise noted, all geometric dimensions (length, area, etc.) relate to a single shell/unit and all process dimensions (duty, flowrate, temperature, etc.) relate to the whole processing unit

EQUIPMENT LIST
PROCESS PLANT

Process Plant: **PP125**

Project/Plant: CO2 Purification and Liquefaction

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N SILENCER

Item No.	Service	Type	Qty	Length m	Width m	Height m	Material	Elev. a. Ground m	Op. Press. bar(a)	Op. Temp. °C	Design Press. bar(g)	Design Temp. (min/max) °C	Weight Dry/Unit kg	Remarks	
S601	Vent Gas Silencer	BLOW-OFF	1						1.01	140	0.5	-80/280	7300	Flow (norm/max): 5500 kg/h / 80000 kg/h	04
S602	Silencer Storage	BLOW-OFF	1						1.05	-60	0.5	-80/60	1000	Flow (norm/max): 3750 kg/6000 kg/h	04

Linde	**EQUIPMENT LIST** **PROCESS PLANT**	Process Plant: **PP125**
	Project/Plant CO2 Purification and Liquefaction	Proj. No. **3710A3T8** Code **SLUISKIL**
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P PUMP

Item No.	Service	Type	Qty Op. 1)	Type of Driver	Fluid P vap / H sr 2) bar(a) m	Material	norm./rat. Flow p. U. m³/h	norm./rat. Head p. U. m	norm./rat. Pow. p. U. kW	Op. Temp. Density °C / kg/m³	Weight Dry / Unit kg	Remarks	
P601 **A/R**	Condensate Pump	CENTRIFUGAL	2 1	E-MOTOR	Process Condensate 1.07	SS	8.8 / 10	50 / 50	2.5 /	31 943	200	2 x 100% installed. Automatic switch over.	04 04 04
P603 **A/B/R**	CO2 Loading Pump	CENTRIFUGAL	3 2	E-MOTOR	Carbon Dioxide Liquid 14	CS	400 / 400	85 / 85	170 /	-30.6 1077	4300	3 x 50% installed. Automatic switch over.	04 04 04
P604 **A/B**	Ammonia Water Pump	CENTRIFUGAL	2 1	E-MOTOR	Ammonia Water 1.1	SS	0.4 / 2.5	/ 50	/	27.4 991	200	2 x 100% installed. Manual switch over.	04 04 04
P605 **A/B/R**	Cooling Water Pump	CENTRIFUGAL	3 2	E-MOTOR	Water/PGlycol Mixture 0.026	CS	850 / 1000	27.5 / 27.5	180 /	25 1028	4675	3 x 50% installed. Automatic switch over	04 04 04
P606 **A/B**	Refrigerant Pump	CENTRIFUGAL	2 1	E-MOTOR	Ammonia Liquid 7.3	CS	8.1 / 9	20 / 30	0.9 / 1	15 618	120	2 x 100% installed. Manual switch over.	04 04 04

1) Op.: No. in Operation 2) Vapour pressure in suction drum / Required suction (sr) drum liquid level height above pump

EQUIPMENT LIST
PROCESS PLANT

Process Plant: **PP125**

Project/Plant: CO2 Purification and Liquefaction

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S FILTER

Item No.	Service	Type	Qty	Tangent Length (m)	Dia -meter (mm)	Material (major)	Orientation / Filter Elements	Op. Press. (bar(a))	Op. Temp. (°C)	Design Press. (bar(g))	Design Temp. (min/max) (°C)	Weight Dry / Unit (kg)	Remarks	
FI601	Particle Filter	FILTER (CARTRIDGE)	1	2	1500	CS	VERTICAL	19.4	9.8	23.500	-40 / 80	3200		04

EQUIPMENT LIST
PROCESS PLANT

Process Plant: **PP125**

Project/Plant: CO2 Purification and Liquefaction

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T COLUMN

Item No.	Service	Type	Qty	T.L.-T.L. T/B 1) m	Diameter T/M/B 1) mm	Material (major)	Pack. Vol.(m^3)/Type Trays No./Type	Op. Press. bar(a)	Op. Temp. T/M/B 1) °C	Design Press. bar(g)	Design Temp. (min/max) °C	Weight Dry / Unit kg	Remarks	
T601	CO2 Column	PACKING COLUMN	1	19.72	1100 1100	LTCS	8.7 / RANDOM PACKING	19	-23	23.500	-40 / 60	22000	Weight with Water: 61700 kg	04
				4.30	2200		/ RANDOM PACKING		-21	4.200	-57 / 60			04

1) T: Top, M: Middle, B:Bottom

Linde	**EQUIPMENT LIST** **PROCESS PLANT**	Process Plant: **PP125**	
	Project/Plant: CO2 Purification and Liquefaction	Proj. No. **3710A3T8**	Code **SLUISKIL**
	Service: **Process Plant**	Doc. No. 8AE-2000-P-LE 1001 (EN) Issue **04**	Page 15 of 16 Status IFD

Y5 PACKAGE UNIT

Item No.	Service	Type	Qty	Length m	Height m	Width m		Weight Dry / Unit kg	Remarks	
Y601	CO2 Compressor Unit	COMPRESSOR UNIT	1	17.8	10	12		120000	weight + dimensions from SE	04
Y602	Refrigerant Compressor Unit	COMPRESSOR UNIT	1	12.2	8	13.2		154000	weight + dimensions per BH drawing; width with LO skid although separately installed; weight incl. motor + LO console and 10 t for piping (estimated)	04
Y603	Oil Unit	OIL UNIT	1	8.1	3.5	5.8		15000	Part of Package Unit Y601. Separate installation beside compressor train	04
Y604	Oil Unit	OIL UNIT	1	6.6	3	4.3		13000	Part of Package Unit Y602; separate installation	04
Y605	Air Purger		1							

Linde	**EQUIPMENT LIST** **PROCESS PLANT**	Process Plant: **PP125**
	Project/Plant **CO2 Purification and Liquefaction**	Proj. No. **3710A3T8** Code **SLUISKIL**
		Doc. No. **&AE-2000-P-LE 1001 (EN)** Status IFD Issue 04 Page 16 of 16

Z SPECIAL PIPING EQUIPMENT

Proc. Unit	Item No.	Service	Main Type	Type	Qty	Part of Pack. Unit	Act. Stat.	Final Stat.	Criti-cality	Remarks
261	**BC602**	Liquid Loading Arm	OTHER EQUIPMENT	LOADING ARM	1					Capacity: 800 m³/h, in combination with the gas return arm BC603. Weight: 13200 kg
261	**BC603**	Gas Return Arm	OTHER EQUIPMENT	LOADING ARM	1					Gas return: 800 m³/h, in combination with the liquid loading arm BC602. Weight: 13200 kg

ProCorr - Email Internal (Sent)
https://procorr.linde-le.com/Correspondence/View/40625955

Project: **Sluiskil (3710A3T8)**
Subject: **RE: RE: Action item list requested**
Date: **2022-10-07 07:45:01 UTC**

Answer Req.: No

From: SLUISKIL.CIVIL&STEEL@PROCORR.LINDE.COM
To: 5.1.2.e
Cc: 5.1.2.e 5.1.2.e
Originator: 5.1.2.e
Int. Readers: 5.1.2.e 5.1.2.e

Dear 5.1.2.e

please find ansers below in blue colour.

Mit freundlichen Grüßen / With best regards

5.1.2.e
CSA Lead Engineer
Fachgebiet Bau & Stahlbau / Department Civil & Steel Structures

Linde GmbH
Linde Engineering
Bodenbacher Str. 80, 01277 Dresden, Germany

Phone +49.351.250-3630, Fax + 49.351.250-4821, Mobile +49.171.5384246
5.1.2.e @linde.com, www.linde-engineering.com

Previous E-Mail:

Date:	2022-10-06 05:10 UTC
Subject:	RE: Action item list requested
From:	SLUISKIL.CIVIL&STEEL@PROCORR.LINDE.COM
To:	5.1.2.e
Cc:	5.1.2.e 5.1.2.e

Dear 5.1.2.e

On last meeting on 4-10-22,we have discussed below points.

1. LEI has few queries on geotechnical details received from BGD. For which today meeting arranged by 5.1.2.e with BGD.
Closed with BGD-meeting, outstanding information will be given as agreed.

2. As discussed with 5.1.2.e sublocation-2 is belongs to process area. So LEI shall use CPT1426 details for design.
Closed as described. Changes if any will be comunicated to LEI.

3. Equipment loads in document &AE 2000 P-LE 1001 (EN) only dry weights. Operating and test weights shall be considered same as dry weights ? please confirm the same.
I asked EQR once again according to operation and test weight and got folowing table, Please consider given data for V601; V605 and V603A/B.

Page 5 of 16 Status IFD

D1 DECANTER/VESSEL/DEAERATOR

Item No.	Service	Type Orientation	Qty	Tangent Length OPVolume m m³	Dia -meter mm	Material (major)	Internals	Op. Press. bar(a)	Op. Temp. °C	Design Press. bar(g)	Design Temp (min/max) °C	Weight Dry / Unit kg	Remarks	
SR601 A-F	Storage Tanks	VESSEL HORIZONTAL	6	50.00	8300	LTCS		14	-30.6	20.000	-40 / 60	598000	Operating Weight with LCO2: 3955300 kg	04
V601	Compressor Knock Out Drum	VESSEL VERTICAL	1	7.05	4300	SS	WIRE MESH	1.07	31	3.000	-20 / 100	13300	Weight with Water: 136500 kg; Operating Weight: 29510 kg	*
V602	Water Separator	VESSEL VERTICAL	1	2.80	1800	SS	WIRE MESH	19.8	8	23.500	-20 / 80	5800		04
V604	Suction Drum	VESSEL VERTICAL	1	7.00	4500	LTCS		1.09	-23.7	25.000 -1.000	-40 / 60 -40 / 60	61400	Weight with Water: 197750 kg; Operating Weight: 73350 kg	*
V605	Refrigerant Receiver	VESSEL	1	2.90	1300	LTCS		10.6	26.6	25.000	-33 / 80	3400		04

Linde

EQUIPMENT LIST
PROCESS PLANT

Process Plant: PP125

Project/Plant: CO2 Purification and Liquefaction

Service: Process Plant

Proj. No. 3710A3T8
Code SLUISKIL
Doc. No. &AE-2000-P-LE 1001 (EN) Issue 04
Page 3 of 16 Status IFD

A ADSORBER

Item No.	Service	Type	Qty	Tangent Length m	Diameter mm	Material (major)	Adsorbent Vol. Adsorbent Type m³	Op. Press. bar(a)	Op. Temp. °C	1)	Design Press. bar(g)	Design Temp. (min/max) °C	Weight Dry/Unit kg	Remarks	
V603 A/B	Dryer	ADSORBER VERTICAL	2	2.20	3600	LTCS	15.6 Silicagel	19.8	7.9	A R	23.500 -0.4	-40 / 280 -20 / 60	18500	Weight with Water: 34650 kg; Operating Weight: 32230 kg	* 04

4. Please provide sample report, for preparation of reports for foundation and super structure design as discussed.
You will get YARA templete as promissed but no sample of a calculation. Content of calculation is defined in specification &AE 0000 N-SD 1001_1.0 (EN).

5. Founding depth of pile cap shall be based thickness of pile cap arrived as per design. LEI was informed to design such a way that top of pile cap shall be same as HPP.
Closed as decribed. Post meeting note: BOP = - 0,8 m below grade

6. LEI will update about the super structure member profiles in next weekly meeting.
Noted

Also please note that Purchase order for Foundation design is not received.
PO is in appoval cycle and will released soon.

Best regards

5.1.2.e

Previous E-Mail:

Date:	2022-10-05 09:11 UTC
Subject:	Action item list requested
From:	SLUISKIL.CIVIL&STEEL@PROCORR.LINDE.COM
To:	5.1.2.e
Cc:	5.1.2.e 5.1.2.e

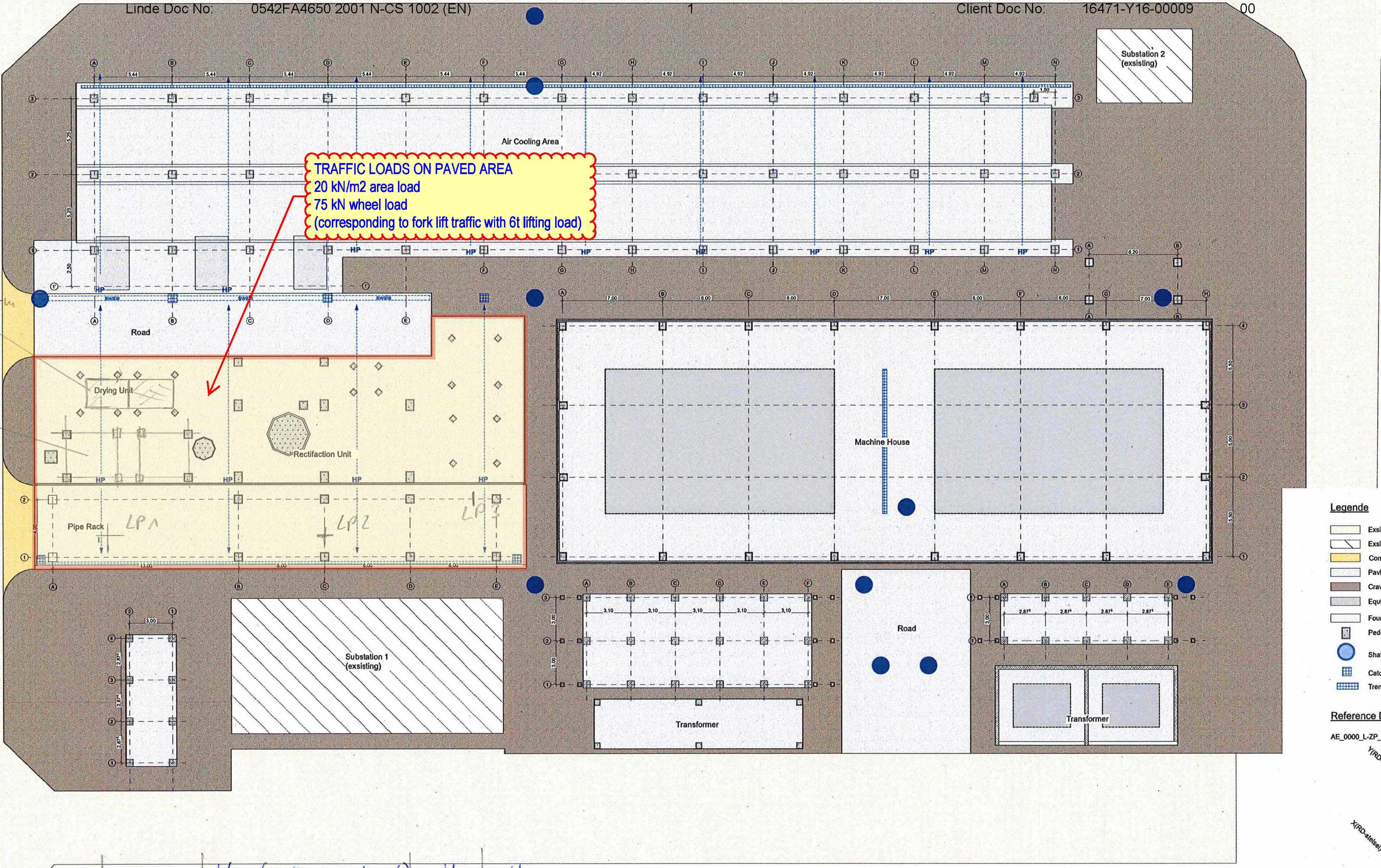
Dear 5.1.2.e

I coundn't take part at the meeting yesterday.
So, please send to me your list with action items for Linde.

Mit freundlichen Grüßen / With best regards

5.1.2.e
CSA Lead Engineer
Fachgebiet Bau & Stahlbau / Department Civil & Steel Structures

Linde GmbH
Linde Engineering
Bodenbacher Str. 80, 01277 Dresden, Germany



	V dead	V op (incl. dead load)	H_x	H_y	
4101 each point	20 kN	35 kN	± 3,0	± 3,0	windload not considered, need to be added
P 1	–	300 kN	Testloadcase		
P 2	–	300 kN	-u-		

ProCorr - Email Internal (Sent)
https://procorr.linde-le.com/Correspondence/View/40615726

Project: **Sluiskil (3710A3T8)**
Subject: **Additional input for foundation design**
Date: **2022-10-03 08:20:25 UTC**

Answer Req.: No

From: SLUISKIL.CIVIL&STEEL@PROCORR.LINDE.COM
To: 5.1.2.e
Cc: 5.1.2.e 5.1.2.e
Originator: 5.1.2.e
Int. Readers: 5.1.2.e 5.1.2.e

Attachments: &AE-2000-C-ZR- 1001.pdf, Sluiskil_R3D_Foundations.ifc, Sluiskil_R3D_Roads_Paving.ifc

---

Dear 5.1.2.e

I'm sharing a load scheme sketch to be considered for foundation design.
Foundation loads of steel structures are calculated by LEI itself.
Equipment loads to be obtained from Equipment list (&AE 2000 P-LE 1001 (EN)) handed over after Kick-off.

Geometrical information on the current foundation design is to be obtained from the 3D model, which corresponds to the civil *.IFC files attached.

Mit freundlichen Grüßen/With best regards

5.1.2.e
Principal Engineer Civil
Fachgebiet Bau und Stahlbau / Department Civil and Steel Structures

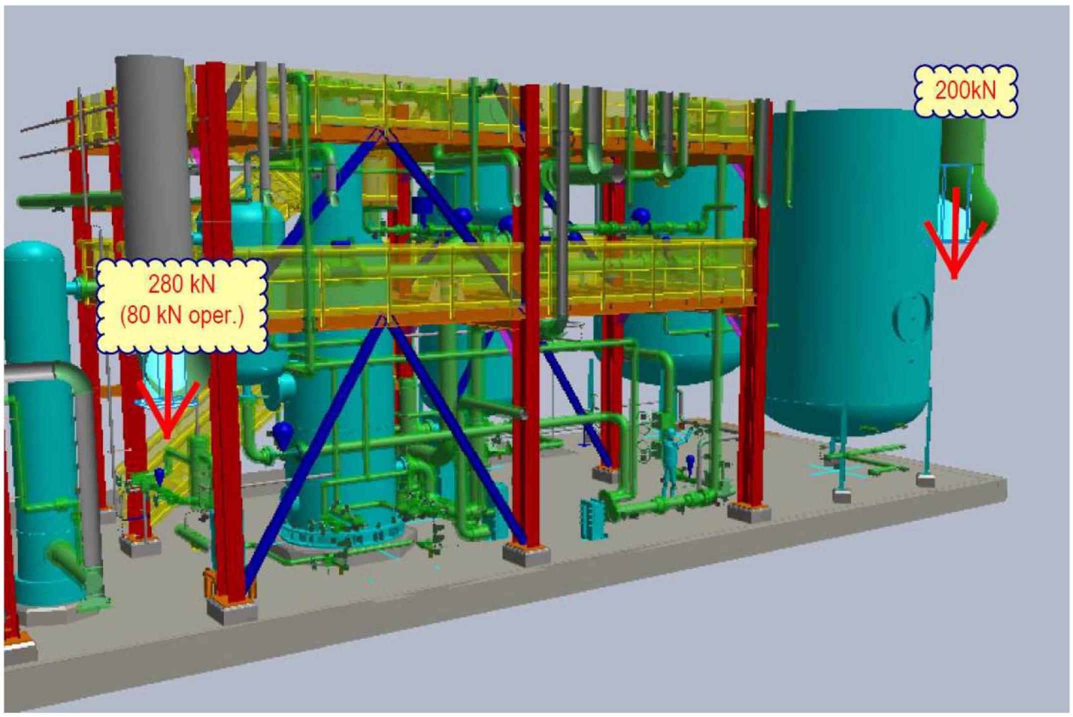
Linde GmbH
Linde Engineering
Bodenbacher Str. 80, 01277 Dresden, Germany
Phone +49 351 250 3137, Fax + 5.1.2.e 4821, Mobile + 5.1.2.e
5.1.2.e @linde.com, www.linde-engineering.com

Quick Notes:

• 2022-10-04 12:58:29 UTC - 5.1.2.e

5.1.2.e

additional point load (temp. Hydrotest) are to be considered in foundation / piling design.



Reagrds, 5.1.2.e

ANNEXURE B
GEOTECHINAL DETAILS

Plant Description	
Carbon Capture Storage Plant, Sluiskil	
BGD Project No.	Linde Project No.
22-3008-1	**3710A3T8**

Letter 01

Preliminary pile calculation based on CPT results

02	10.10.2022	for changes see next page	5.1.2.e	5.1.2.e	
01	30.09.2022	first issue	5.1.2.e	5.1.2.e	
Issue	**Date**	**Reason for Issue**	**Prepared**	**Reviewed**	**Approved**

Record of Revisions

Issue	Date	Description of Changes
01	30.09.2022	First Issue
02	10.10.2022	- updated: calculated pile bearing, with enlarged pile length CPT 1407 values with NSF - updated: calculated pile bearing according EA Pfähle considering base and skin friction for Fundex respectively ATLAS Pile - recalculation of horizontal pile capacity for BoF 0.5 NAP - additional calculation of horizontal pile capacity for inclined / raking piles (9.5 °) - added pile calculation for CPT 1435 - added chapter 2 with basic project information - added Table 8 - horizontal spring stiffness - added chapter 7.2 - transient loads - added chapter 7.3 - pile group effect - added chapter 8 with remarks on konstruktis report

Contents

1 Scope of work

BAUGRUND RESDEN was requested to provided geotechnical consultancy for Sluiskil Project in Netherlands. In a first step existing soil profile and pile bearing capacity calculations should be reviewed and comprehensive calculations should be executed further pile settlement values (single pile)and pile spring stiffnesses should be provided.

The construction site is characterised by two locations, sublocation 1 with Tanks and sublocation 2 with process structures inside of an existing chemical complex, see Figure 1.

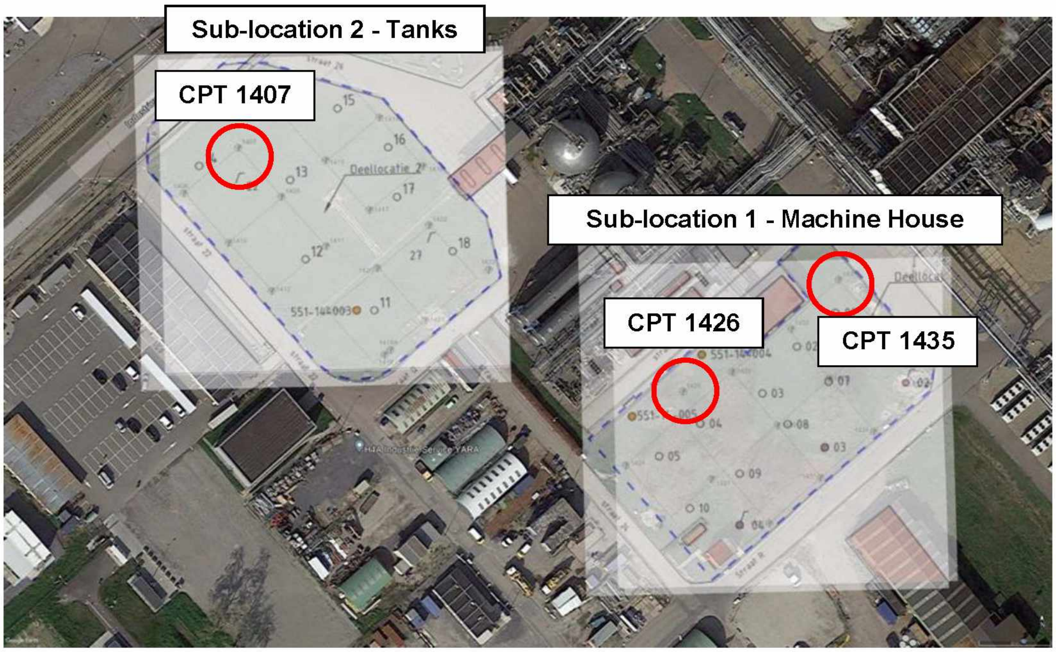


Figure 1: Location plan with sub-location 1 and 2

2 Basics

Construction area:	Netherlands, Sluiskil
General dimensions plant:	2 sub locations each ca. 100 x 50 m
Existing elevation:	ca. 1.5 m NAP (Normaal Amsterdams Peil)
Bottom of foundation (BoF):	ca. 1 m below ground elevation

3 Calculated pile capacities

3.1 Sub location 1 - Machine House

3.1.1 Sub location 1 - Machine House - CPT 1426 - Fundex pile 15 m

Table 1: Pile bearing capacity **vertical Fundex pile 15 m - CPT 1426 (BoF 0.5 m NAP)**

Line No.	characteristics	pile type and pile bearing information
1	Pile diameter	**∅ 460-560 mm**
2	Bottom of Pile (BoP) in m NAP	-14.5 m NAP
3a	Pile capacity horizontal for 12.5 mm deflection in kN	45 kN (vertical pile)
3b	Pile capacity horizontal for 25 mm deflection in kN	70 kN (vertical pile)
4a	Tension action characteristic values $V_{g,t}$ in kN (char)	450 kN
4b	Pile capacity tension $R_{d,t}$ in kN (Design)	610 kN
5a	Compression characteristic action $V_{g,c}$ in kN (char) [1]	**650 kN from structure NSF already considered [2)3)]** 1,200 kN total no NSF
5b	**Pile capacity compression. $R_{d,c}$,in kN (Design) [1]**	**880 kN [2) 4)]NSF already subtracted** 1,650 kN total no NSF

1) settlement of single pile is smaller than 25 mm
2) values with consideration of down drag (NSF)
3) characteristic action from structure NSF already considered 2
4) to compare with design action values from structure, NSF action already subtracted
5) no down drag (NSF) consideration for Tension

Table 2: Horizontal pile bearing capacity **inclined (9.5°) Fundex pile 15 m - CPT 1426 (BoF 0.5 m NAP)**

Line No.	characteristics	pile type and pile bearing information
1	Pile diameter	**∅ 460-560 mm**
2	Bottom of Pile (BoP) in m NAP	-14.5 m NAP
3a	Pile capacity horizontal for 12.5 mm deflection in kN	125 kN (9.5° inclined pile)
3b	Pile capacity horizontal for 25 mm deflection in kN	145 kN (9.5° inclined pile)

3.1.2 Sub location 1 - Machine House CPT 1435 - Fundex pile 15 m and 28 m

Table 3: Pile bearing capacity **Fundex pile 15 m and 28 m - CPT 1435 (BoF 0.5 m NAP)**

Line No.	characteristics	pile type and pile bearing information	
1	Pile diameter	**∅ 460-560 mm**	
2	Bottom of Pile (BoP) in m NAP	-14.5 m NAP	-27.5 m NAP
3a	Pile capacity horizontal for 12.5 mm deflection in kN	45 kN (vertical pile)	
3b	Pile capacity horizontal for 25 mm deflection in kN	70 kN (vertical pile)	
4a	Tension action characteristic values $V_{g,t}$ in kN (char)	450 kN	1,450 kN
4b	Pile capacity tension $R_{d,t}$ in kN (Design)	600 kN	1,950 kN
5a	Compression characteristic action $V_{g,c}$ in kN (char) 1)	**630 kN by structure** 2) 3) 1,180 kN total no NSF	**1,700 kN by structure** 2) 3) 2,300 kN total no NSF
5b	**Pile capacity compression. $R_{d,c}$,in kN (Design)** 1)	**850 kN** 2) 4) 1,600 kN total no NSF	**2,300 kN** 2) 4) 3,100 kN total no NSF

1) settlement of single pile is smaller than 25 mm
2) bold marked values with consideration of down drag,
3) characteristic action from structure NSF already considered 2
4) to compare with design action values from structure, NSF action already subtracted
5) no down drag (NSF) consideration for Tension

Table 4: Pile bearing capacity **inclined (9.5°) Fundex pile 15 m and 28 m - CPT 1435 (BoF 0.5 m NAP)**

Line No.	characteristics	pile type and pile bearing information	
1	Pile diameter	**∅ 460-560 mm**	
2	Bottom of Pile (BoP) in m NAP	-14.5 m NAP	-27.5 m NAP
3a	Pile capacity horizontal for 12.5 mm deflection in kN	125 kN (9.5° inclined pile)	
3b	Pile capacity horizontal for 25 mm deflection in kN	145 kN (9.5° inclined pile)	

3.2 Sub location 2 - Fundex pile 28 m - Tanks

Table 5: Pile bearing capacity **Fundex pile 28 m - CPT 1407 (BoF 0.5 m NAP)**

Line No.	characteristics	pile type and pile bearing information
1	Pile diameter	**∅ 460-560 mm**
2	Bottom of Pile (BoP) in m NAP	-27.5 m NAP
3a	Pile capacity horizontal for 12.5 mm deflection in kN	60 kN (vertical pile)
3b	Pile capacity horizontal for 25 mm deflection in kN	85 kN (vertical pile)
4a	Tension action characteristic values $V_{g,t}$ in kN (char)	1,550 kN
4b	Pile capacity tension $R_{d,t}$ in kN (Design)	2,100 kN
5a	Compression characteristic action $V_{g,c}$ in kN (char) [1]	**1,770 kN** [2) 3)] 2,350 kN total no NSF
5b	**Pile capacity compression. $R_{d,c}$,in kN (Design)** [1]	**2,350 kN** [2) 4)] 3,200 kN total no NSF

[1] settlement of single pile smaller than 25 mm
[2] bold marked values with consideration of down drag
[3] characteristic action from structure NSF already considered 2
[4] to compare with design action values from structure, NSF action already subtracted
[5] no down drag (NSF) consideration for Tension

Table 6: Pile bearing capacity **inclined (9.5°) Fundex pile 28 m - CPT 1407 (BoF 0.5 m NAP)**

Line No.	characteristics	pile type and pile bearing information
1	Pile diameter	**∅ 460-560 mm**
2	Bottom of Pile (BoP) in m NAP	-27.5 m NAP
3a	Pile capacity horizontal for 12.5 mm deflection in kN	135 kN (9.5° inclined pile)
3b	Pile capacity horizontal for 25 mm deflection in kN	155 kN (9.5° inclined pile)

3.3 CPT 1426 - Sublocation 1 - Machine House

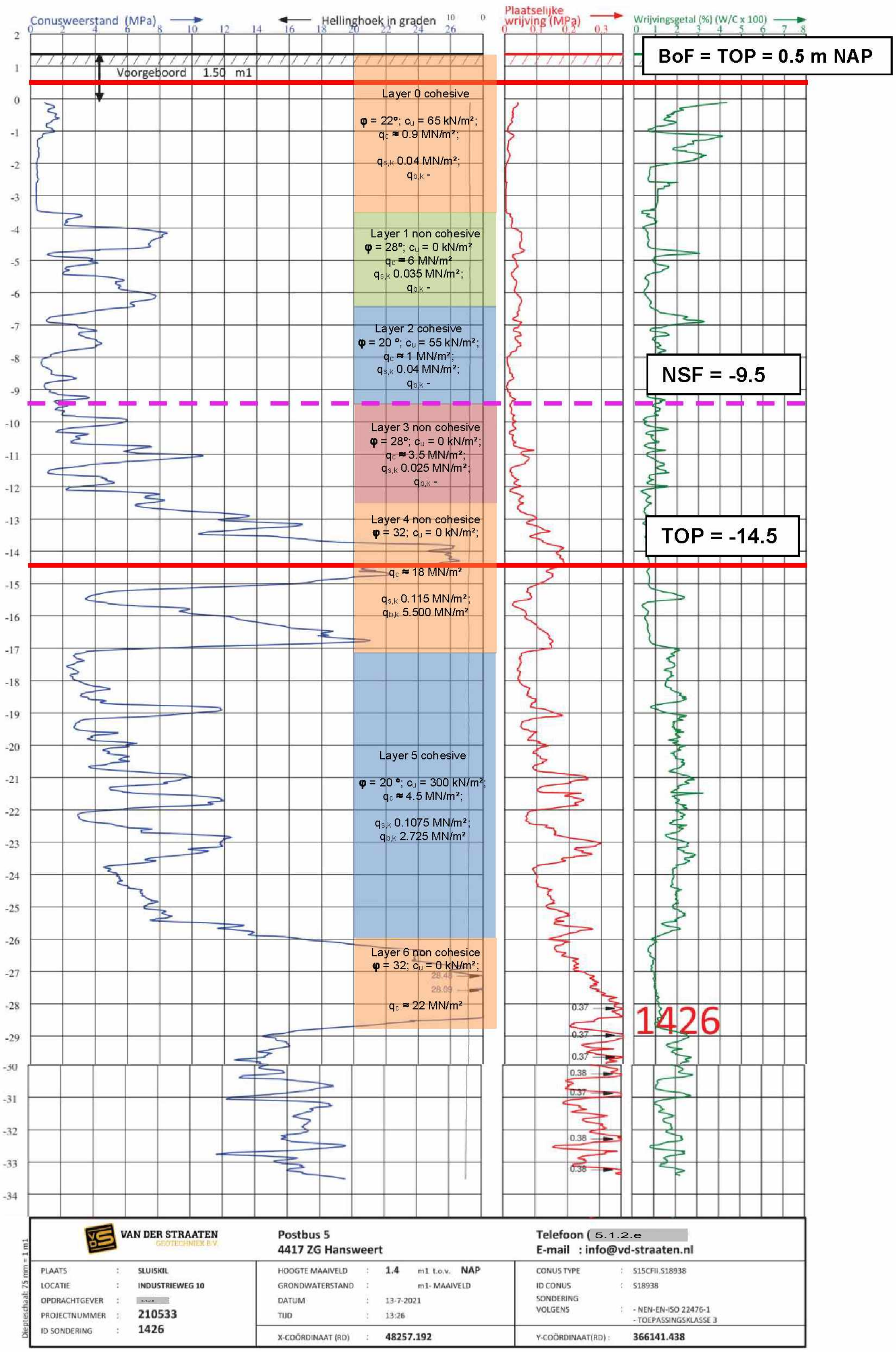


Figure 2: Sounding diagram CPT 1426 - sublocation 1 Machine house, $q_{s,k}$ & $q_{b,k}$ & q_c in MN/m²

3.4 CPT 1435 - Sublocation 1 - Machine House

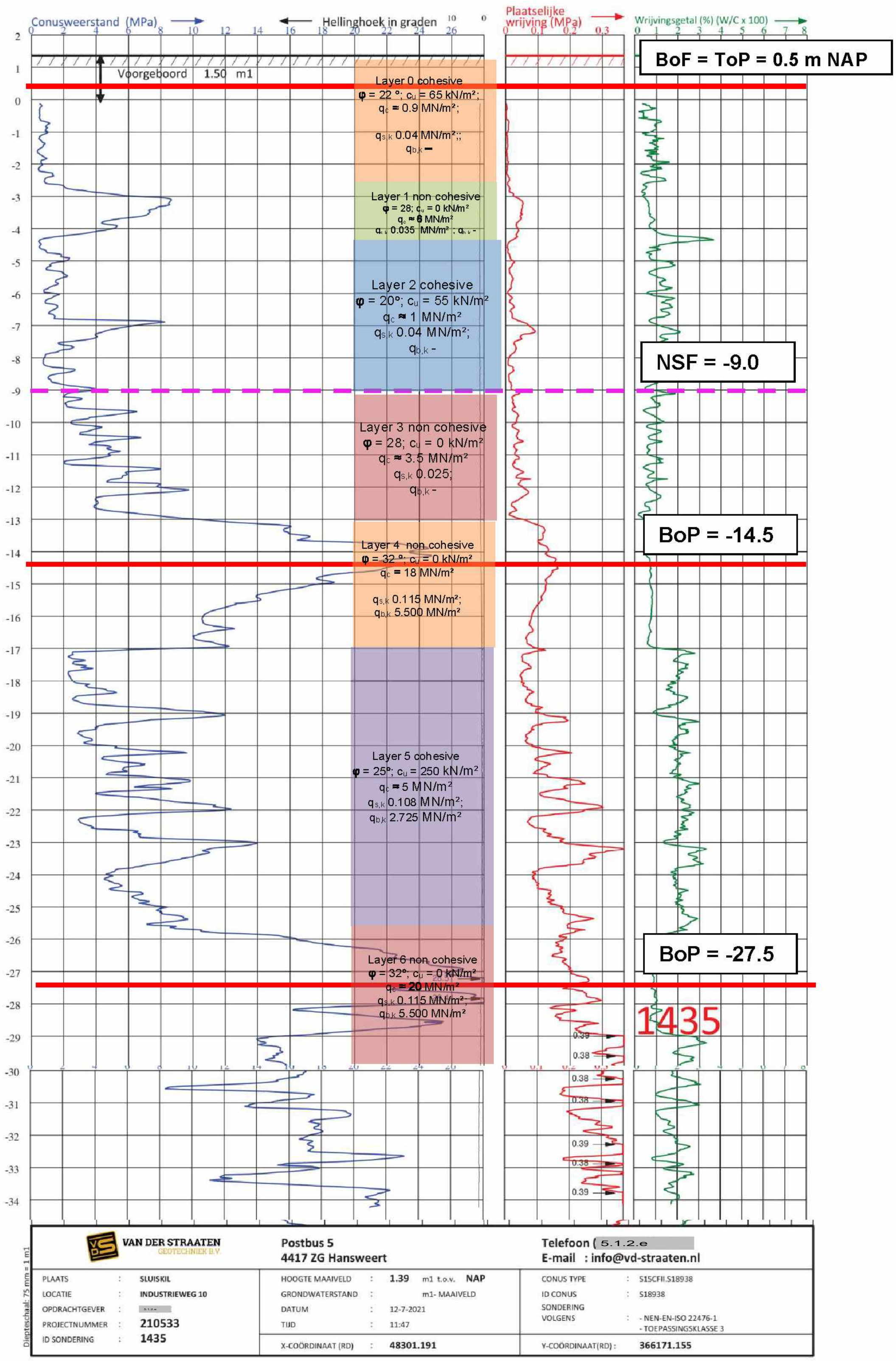


Figure 3: Sounding diagram CPT 1435 - sublocation 1 Machine house, $q_{s,k}$ & $q_{b,k}$ & q_c in MN/m²

CPT 1407 - Sublocation 2 - Tanks

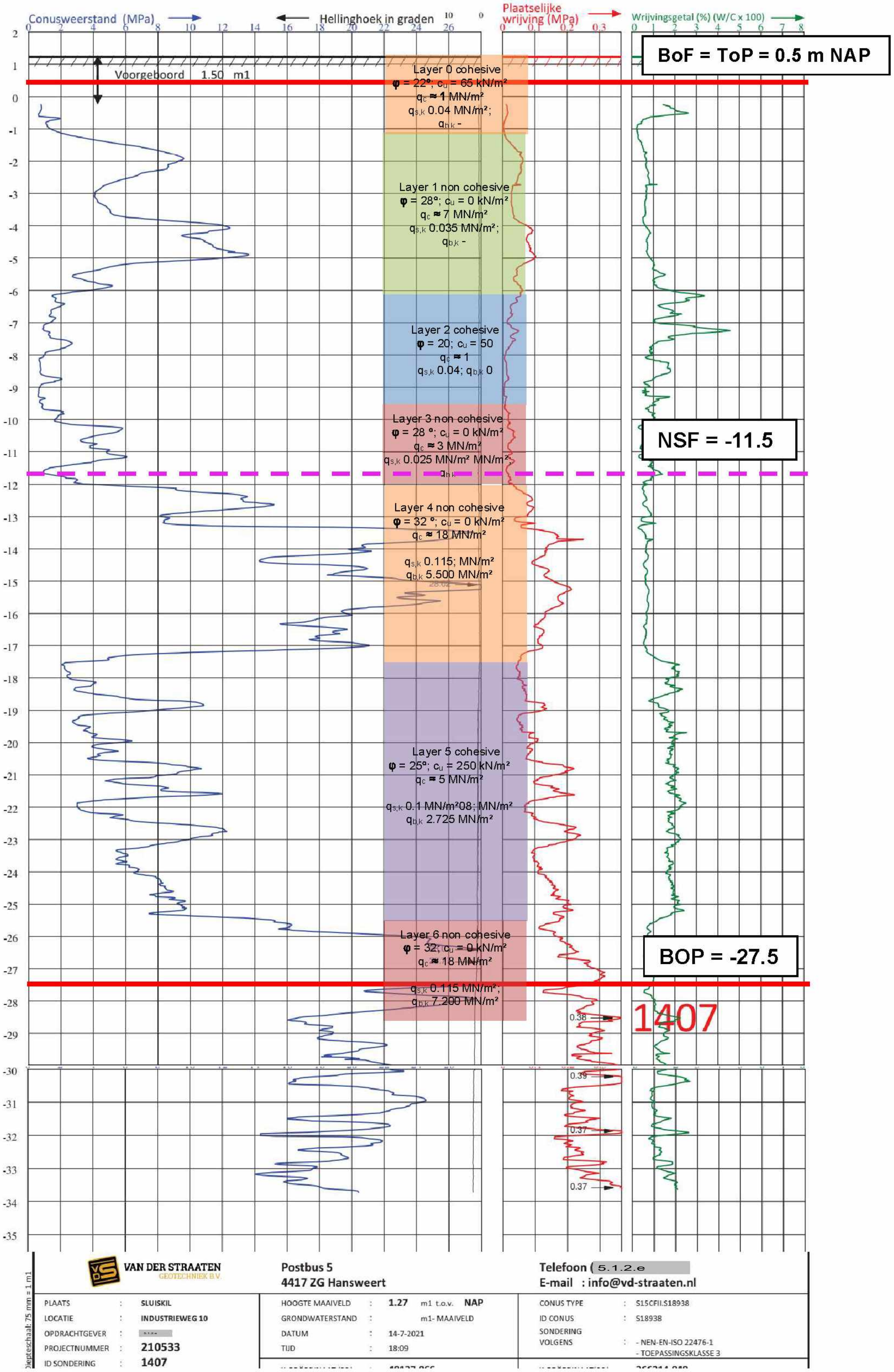


Figure 4: Sounding diagram CPT 1407 - sublocation 2 Tanks, $q_{s,k}$ & $q_{b,k}$ & q_c in MN/m²

4 Recommended preliminary pile capacities

4.1 Recommended preliminary pile capacities for sub-location 1

Table 7: Recommended preliminary pile bearing capacity **sub-location 1 - Fundex pile 15 m and 28 m**

Line No.	characteristics	pile type and pile bearing information	
1	Pile diameter	**∅ 460-560 mm**	
2	Bottom of Pile (BoP) in m NAP	-14.5 m NAP	-27.5 m NAP
3a	Pile capacity horizontal for 12.5 mm deflection in kN	45 kN (no inclination)	
3b	Pile capacity horizontal for 25 mm deflection in kN	70 kN (no inclination)	
3c	Pile capacity horizontal for 12.5 mm deflection in kN **inclined**	125 kN (9.5° inclination)	
3d	Pile capacity horizontal for 25 mm deflection in kN **inclined**	145 kN (9.5° inclination)	
4a	Tension action characteristic values $V_{g,t}$ in kN (char)	450 kN	1,450 kN
4b	Pile capacity tension $R_{d,t}$ in kN (Design)	600 kN	1,950 kN
5a	Compression characteristic action $V_{g,c}$ in kN (char) [1) 2)]	630 kN	1,700 kN
5b	**Pile capacity compression. $R_{d,c}$,in kN (Design)** [1) 2)]	**850 kN**	**2,300 kN**

1) settlement of single pile is smaller than 25 mm
2) with consideration of down drag

4.2 Recommended preliminary pile capacities for sub-location 2 Tanks

Table 8: Recommended preliminary pile bearing capacity **sub-location 2 - Fundex pile 28 m**

Line No.	**characteristics**	**pile type and pile bearing information**
1	Pile diameter	**∅ 460-560 mm**
2	Bottom of Pile (BoP) in m NAP	-27.5 m NAP
3a	Pile capacity horizontal for 12.5 mm deflection in kN	60 kN
3b	Pile capacity horizontal for 25 mm deflection in kN	85 kN
3c	Pile capacity horizontal for 12.5 mm deflection in kN **inclined**	135 kN (9.5° inclination)
3d	Pile capacity horizontal for 25 mm deflection in kN **inclined**	155 kN (9.5° inclination)
4a	Tension action characteristic values $V_{g,t}$ in kN (char)	1,550 kN
4b	Pile capacity tension $R_{d,t}$ in kN (Design)	2,100 kN
5a	Compression characteristic action $V_{g,c}$ in kN (char) [1) 2)]	1,770 kN
5b	**Pile capacity compression. $R_{d,c}$,in kN (Design)** [1) 2)]	**2,350 kN**

[1)] settlement of single pile smaller than 25 mm
[2)] with consideration of down drag

5 Recommended preliminary pile spring stiffness

5.1 Calculation basis

According to recommendation given with EA-Pfähle (R 6) the spring stiffnesses of piles should be calculated with characteristic values of loads. So, the spring stiffness $c_{p,k}$ should be calculated with equation $\boldsymbol{c_{p,k} = \frac{R_k\,(SLS)}{s_k}}$.
In R 6 it is also stated in chapter 6.4 that for spring stiffness calculation the characteristic resistance-settlement curve should be used (see Figure 5).

For the consideration of the ground-foundation-structure interaction, spring constants may be adopted for the piles, which are derived from the secant on the characteristic resistance-settlement or -heave curve, or from empirical data.

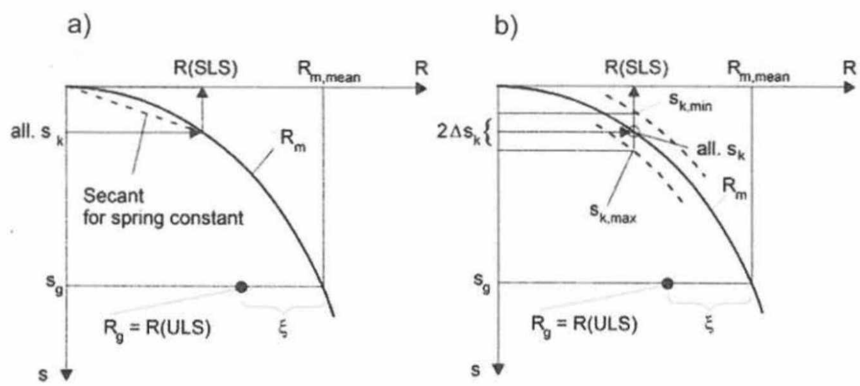


Figure 6.1 Possible method for derivation of characteristic resistances of isolated piles R(SLS) in the serviceability limit state from test data and data from resistance-settlement curves a) for anticipated minor differential settlements between isolated piles; b) for anticipated substantial differential settlements between isolated piles

Figure 5: scheme of spring stiffness calculation for single pile (R 6)

5.2 Vertical spring stiffness sub-loaction1 and sub-location 2

Table 9: vertical spring stiffness for single piles Fundex 460-560

Characteristic pile load compression $V_{g,c}$ in kN	vertical spring stiffness in MN/m
BoP -14.5 m NAP	
100 – 350 kN	100 – 102 MN/m
350 – 630 kN	102 – 104 MN/m
BoP -27.5 m NAP	
100 – 750 kN	165 – 170 MN/m
750 – 1,800 kN	170 – 175 MN/m

BoP: Bottom of pile m bgl (m below ground level)

5.3 horizontal spring stiffness sub-loaction1

Table 10: horizontal spring stiffness for single piles Fundex 460-560 - **sub-location 1**

horizontal spring stiffness in MN/m for 12.5 mm deflection	horizontal spring stiffness in MN/m for 25 mm deflection
vertical pile	
3.5 MN/m	3.0 MN/m
inclined pile (9.5°)	
10 MN/m	5.5 MN/m

5.4 horizontal spring stiffness sub-location 2

Due to slightly better soil conditions at the depth range up to 5 m below ground given with the CPTs executed in sub-location 2 a slightly higher horizontal bearing capacity can be assumed.

Table 11: horizontal spring stiffness for single piles Fundex 460-560 - **sub-location 2**

horizontal spring stiffness in MN/m for 12.5 mm deflection	horizontal spring stiffness in MN/m for 25 mm deflection
vertical pile	
5.0 MN/m	3.5 MN/m
inclined pile (9.5°)	
11.0 MN/m	6.0 MN/m

6 Comparison of pile bearing capacity

Table 12: comparison of compression pile capacity

pile type	konstruktis (R 3)	BGD
Fundex 460-560	CPT 1426 **14 m bgl** 978 kN	CPT 1426 -**14.5 m NAP** 880 kN
Fundex 460-560	CPT 1407 **25 m bgl** 2,244 kN	CPT 1407 -**27.5 m NAP** 2,350 kN

7 Remarks

7.1 Notes on downdrag

According to internationally acknowledged understanding if fill is placed on the site, the underlying compressible soils could consolidate, resulting in surface settlement. As the compressible **soils consolidate, "negative skin friction" or downdrag may be imparted on deep foundation. This** could result in an extraneous load, additive to any structural load, on the foundations and could increase settlements of the structure. Drag load is dependent on the thickness of the fill, compressibility of the soils, time rate of the consolidation and pile or shaft length. If fill is placed on the project site, some drag load may result. It is recommended that this fill will be placed as soon as practical prior construction. If more than 30 cm of new fill is required, further consideration should be given to the effect of drag load.

Table 5.24 Empirical data ranges for the characteristic base resistance $q_{b,k}$ for Fundex piles in non-cohesive soils

Relative pile head settlement s/D_b	Pile base resistance $q_{b,k}$ [kN/m²]		
	for a mean CPT cone resistance q_c [MN/m²]		
	7,5	15	25
0,02	1 300–1 900	2 500–3 100	3 650–4 350
0,03	1 650–2 500	3 250–3 950	4 650–5 550
0,10 ($\hat{=}$ s_g)	3 800–5 500	7 200–8 800	8 300–10 000
Intermediate values may be linearly interpolated. D_b: Diameter of base plate			

Table 5.25 Empirical data ranges for the characteristic skin friction $q_{s,k}$ for Fundex piles in non-cohesive soils

Mean CPT cone resistance q_c [MN/m²]	Ultimate limit state value $q_{s,k}$ of pile skin friction [kN/m²]
7,5	35–50
15	85–115
≥ 25	115–145
Intermediate values may be linearly interpolated.	

Figure 6: used values for characteristic pile resistance for non-cohesive soils (R 6)

Table 5.22 Empirical data ranges for the characteristic base resistance $q_{b,k}$ for Atlas piles in cohesive soils

Relative pile head settlement s/Ds	Pile base resistance $q_{b,k}$ [kN/m²]		
	Shear strength $c_{u,k}$ of the undrained soil [kN/m²]		
	100	150	250
0,02	600–800	900–1 250	1 300–1 950
0,03	750–950	1 050–1 500	1 650–2 350
0,10 ($\hat{=}$ s_g)	1 350–1 750	1 800–2 500	2 200–3 250
Intermediate values may be linearly interpolated. D_s: relative to external helix diameter			

Table 5.23 Empirical data ranges for the characteristic skin friction $q_{s,k}$ for Atlas piles in cohesive soils

Shear strength $c_{u,k}$ of the undrained soil [kN/m²]	Ultimate limit state value $q_{s,k}$ of pile skin friction [kN/m²]
60	40–60
150	75–95
≥ 250	95–120
Intermediate values may be linearly interpolated. Pile shaft area A_{si}: relative to the external helix diameter D_s.	

Figure 7: used values for characteristic pile resistance for cohesive soils (R 6)

7.2 Pile bearing capacities in case of transient loads

Following document R 5 the recommended horizontal pile bearing capacity values refer to allowable deflection of appr. 10 mm and may be increased by 25% for short-term transient loads e.g., blast, EQ, etc.
For an allowable deflection of appr. 25 mm the horizontal pile bearing capacity values may be increased by 50% for short-term transient loads e.g., blast, EQ, etc.

2.3.2.4.3 Wind loading

Where the foundation loading beneath a structure due to wind is a relatively small proportion of the total loading, it may be permissible to ignore the wind loading in the assessment of the allowable bearing pressure, provided the overall factor of safety against shear failure is adequate. For example, where individual foundation loads due to wind are less than 25% of the loadings due to dead and live loads, the wind loads may be ignored in this assessment. Where this ratio exceeds 25%, foundations may be so proportioned that the pressure due to combined dead, live and wind loads does not exceed the allowable bearing pressure by more than 25%.

Figure 7-8: information on pile bearing capacities in case of transient loads (R 5)

In other sources like IBC 2018 (R 4) for transient loads like earthquake, wind etc. it is possible to increase the values of lateral bearing capacity by one-third.

7.3 Pile group effect

7.3.1 Pile group effect in case of compression loads

According to FHWA (1998) and "Foundation Engineering Handbook", edited by Manjriker Gunaratne Tampa 2006

No loss in resistance due to pile group will occur for:

- **"stiff cohesive soils" or**
- **"cohesionless soils"**

For both provided pile length it is ensured that the pile tip will rest in a sand layer.

7.3.2 Pile group effect in case of horizontal loads

The ability of a pile group to resist lateral loads from vessel impact, debris, wind, or wave loading, seismic events, and other sources is a significant design issue. The deflection of a pile group under a lateral load is typically 2 to 3 times larger than the deflection of a single pile loaded to the same intensity.

The pile-soil-pile interaction results in the lateral resistance of a pile group being less than the sum of the lateral resistance of the individual piles comprising the group. Hence, laterally loaded pile groups have a group efficiency of less than 1.

For pile groups < 3x3 pile group effect is negligible.

In a lateral load test of a 3 by 3 pile group with a center to center pile spacing of 3b, Brown found the leading row of piles had a Pm of 0.8 times that of an individual pile. The Pm values for the middle and back row of the group were 0.4 and 0.3, respectively.

In case of 6.5b to 8b spacing no group effect will occur, i.e. 6.5b for front row piles and 7b to 8b for trailing row piles.

For pile groups between spacing 3b and 6,5 b the following pile group factors can be used:
- 4b --> 0.55
- 5b --> 0.75

Pile group from 4 up to 16 piles reduction factor Pm of 0.5 times that of an individual pile should be used.

For Pile groups of more than 16 piles reduction factor Pm of 0.4 times that of an individual pile should be used.

Remarks:
Settlements should be determined using the SLS-load combination which includes characteristic loads without safety factors.
If the pile foundation is supported in or on cohesive deposits subject to time dependent consolidation settlement, transient loads may be excluded from the settlement analysis.

7.4 Fundex pile Design and pile settlement of single Fundex piles

Provided Pile bearing capacity do consider settlement criteria according EC7 and EA Pfähle which is less than 2.5 cm for single pile of analyzed Fundex pile 460-560.

s_{sg} limit settlement for the settlement-dependent, characteristic pile shaft resistance ($s_{sg} = s_g$).

(4) When mobilising the ultimate limit state the characteristic settlement for $R_{s,k}$ (s_{sg*}) applies; use MN as dimension of $R_{s,k}$ (s_{sg*}):

$$s_{sg*}\,[\text{cm}] = 0{,}5 \cdot R_{s,k}\left(s_{sg*}\right)[\text{MN}] \leq 1\,[\text{cm}] \tag{5.7}$$

(5) The characteristic axial pile resistance of Simplex piles shall be determined from:

$$R_{c,k}(s) = R_{b,k}(s) + R_{s,k}(s) = q_{b,k} \cdot A_b + \sum_i q_{s,k,i} \cdot A_{s,i} \tag{5.8}$$

where:

- A_b nominal pile base area; governing is the diameter of the base plate D_b;
- $A_{s,i}$ nominal pile shaft area in stratum i; governing is the diameter of the drive tube D_s;
- $q_{b,k}$ characteristic value of the tip resistance, derived from Table 5.6;
- $q_{s,k,i}$ characteristic value of the pile skin friction in stratum i, derived from Tables 5.7 and 5.8;
- $R_{c,k}(s)$ settlement-dependent, characteristic compressive pile resistance;
- $R_{b,k}(s)$ settlement-dependent, characteristic pile base resistance;
- $R_{s,k}(s)$ settlement-dependent, characteristic shaft resistance;
- s_{sg*} characteristic settlement for mobilising the ultimate skin friction for the settlement-dependent characteristic pile shaft resistance, where $R_{s,k}(s_{sg*}) = R_{s,k}(s_{sg})$;

Figure 9: Pile bearing capacity calculation for Fundex pile according EA Pfähle (R 6)

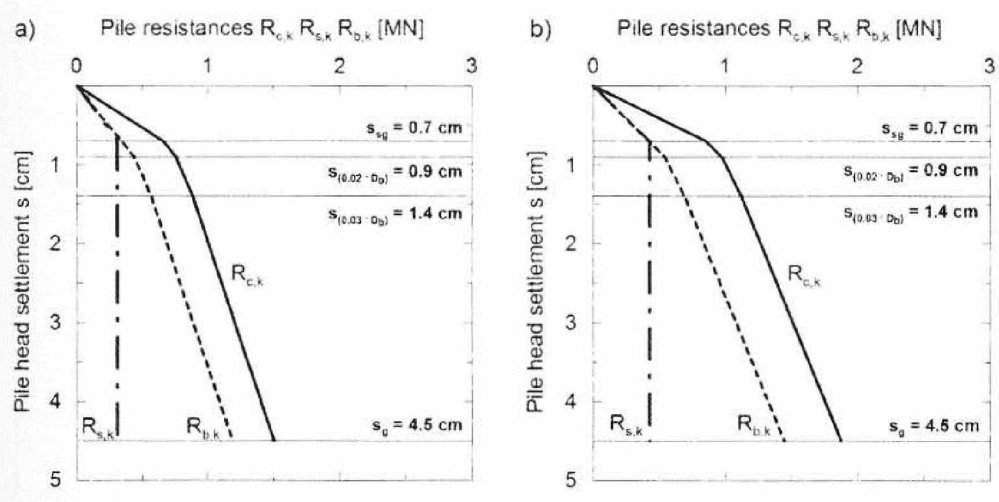


Figure B5.2 Resistance-settlement curve; a) Lower values, b) Upper values

Figure 10: Design Example for Fundex pile including pile settlement curve according EA Pfähle (R 6)

8 Comments on konstruktis pile calculation (R 3)

With R 3 a pile calculation based on CPT results is given. During review of the documentation 2 issues were discovered:

1) With the report no values for the pile skin friction $q_{s,k}$ and pile base resistance $q_{b,k}$ are given. For a better comparison of pile bearing capacities such values should be provided.

2) The given values for pile spring stiffnesses are calculated with design load values. Such calculation should be executed with characteristic load values as described in chapter 5.1

9 Remarks and Limitations

Detailed soil investigation is required including:

- Determination of consolidation rate respectively rate of under consolidation, for NSF
- Soil parameter determination from bore holes including undisturbed sampling
- Pile load test are recommended to verify assumed pile bearing capacities especially for vertical and horizontal pile capacities

APPENDICES

A 1. Example of technical details for Fundex piling rig

A 2. Summary of executed CPTs (R 2)

REFERENCES

R 1. Scope of Work. received via e-mail

R 2. Report geotechnical soil investigation, Sluiskil, van der Straaten Geotechniek B.V., 26.07.2021

R 3. Constructieve uitgangspunten / Geotechnisch Advies **“Carbon Capture Storage (CSS)”konstruktis industrial engineering, 17.08.2021**

R 4. International Building Code 2018, International Code Council (ICC)

R 5. Singapore Standard CP 4:2003, Code for practice for foundations, August 2003

R 6. Recommendations on Piling (EA-Pfähle), German Geotechnical Society, 2013

Prepared by 10.10.2022

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ANNEXURE C

WIND LOAD CALCULATIONS

Wind Pressure Calculation as per EN 1991-1-4 and NA to NEN EN 1991-1-4

Terrain Category	2		*Table NB. 3-4.1 NEN EN 1991-1-4*
Fundamental Basic Wind Velocity V_{b0}	27.00	m/s	*Table NB. 1 NEN EN 1991-1-4*
Directional Factor (C_{dir})	1		*clause 4.2 (2P) NEN EN 1991-1-4 - NB*
Seasonal Factor (C_{season})	1		*clause 4.2 (2P) NEN EN 1991-1-4 - NB*
Basic Wind velocity $V_b = V_{b0} \times C_{dir} \times C_{season}$	27	m/s	*clause 4.2 EN 1991-1-4*
Orographic Factor C_o	1		*clause 4.3.3 EN 1991-1-4 - NB*
Z_0	0.2	m	*Table NB. 3-4.1 NEN EN 1991-1-4*
Air Density ρ	1.25	kg/m^3	*clause 4.5 NEN EN 1991-1-4 - NB*
$k_r = 0.19 (Z_0/0.05)^{0.07}$	0.2094		
Maximum Structure Height	50	m	
Turbulence factor k_I	1		*clause 4.4 NEN EN 1991-1-4 - NB*

Terrain roughness

C_r - Roughness Factor	$k_r \times \ln(z/z_0)$	*equ. 4.4 EN 1991-1-4*
V_m - Mean Wind Velocity	$C_r \times C_0 \times V_b$	*equ. 4.3 EN 1991-1-4*
I_v - Turbulence Intensity	$k_I/(c_0 \times \ln(z/z_0))$	*equ. 4.7EN 1991-1-4*
q_p - Peak Velocity Pressure	$(1+7xI_v) \times 0.5 \times \rho \times V_m^2$	*equ. 4.8 EN 1991-1-4*

Height z (m)	C_r	V_m (m/s)	I_v (m/s)	q_p (N/m^2)	q_p (kN/m^2)
6	0.71	19.23	0.29	707	0.71
8	0.77	20.85	0.27	787	0.79
10	0.82	22.11	0.26	853	0.85
12	0.86	23.14	0.24	907	0.91
14	0.889	24.02	0.24	954	0.95
16	0.917	24.77	0.23	996	1.00
18	0.942	25.44	0.22	1033	1.03
20	0.964	26.03	0.22	1067	1.07
25	1.011	27.29	0.21	1141	1.14
30	1.049	28.32	0.20	1202	1.20
35	1.081	29.20	0.19	1255	1.25
40	1.109	29.95	0.19	1301	1.30
50	1.156	31.21	0.18	1381	1.38

Structural Factor CsCd shall be determined as per EN 1991-1-4 section 6.3.1 and Annex C of NEN 1991-1-4 NB.

Force Cofficient (C_f) Calculation As Per ASCE 7

Ref 1 : WIND LOADS FOR PETROCHEMICAL AND OTHER INDUSTRIAL FACILITIES

Input Cells

Force Cofficient For Wind in N-S Direction ($C_{f\ N\text{-}S}$)

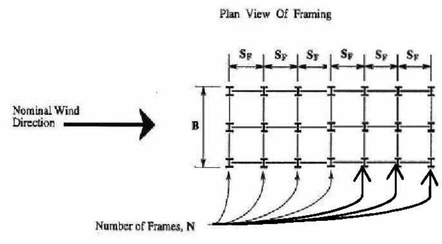


Figure 5.1 Force Coefficients, C_{Df}, for Open Frame Structures

Width of Frame	B	=	12.00	m
Height of Frame	H	=	24.00	m
Gross Area of Frame	A_g	=	288.00	m^2
No of Frames	N	=	3	
Spacing between frames	Sf	=	4.00	m
	$\eta = S_F / B =$	=	0.333	

Calculation of Solid Area of Frame-Grid-2

Member	Geometry				A_f	Remark
Mark	Face	L (m)	B (m)	Nos	m²	
HE500B	b	23.500	0.300	3	21.15	MainColumn
HE300A	d	12.000	0.300	6	21.60	Beam(Avg. Depth)
HE120A	d	60.000	0.140	1	8.40	Bracings
					51.15	

Solid Area of Frame	A_f	=	51.15	m^2	
Solidity Ratio	ε	=	0.178		$\varepsilon = A_f/A_g$
Angle of attack	α_{max}	=	20.30	degrees	Eq 5A.1 & 5A.2 of Ref 1

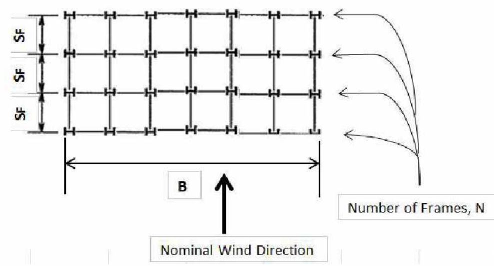
$$\alpha_{max} = (10 + 58\varepsilon)^\circ \quad \text{for } 3 \le N \le 5$$
$$\alpha_{max} = (16 + 52\varepsilon)^\circ \quad \text{for } 6 \le N \le 10$$

Solid Area of Frame	$C_{f\ E\text{-}W}$		3.51	
Force Coeff. ($C_{f\ E\text{-}W}$) on first frame		=	**1.80**	
Force Coeff. ($C_{f\ N\text{-}S}$) per frame	$C_{f\ N\text{-}S}$	=	**0.85**	(If N <= 2, cf=1.8) ε *As per Cl. C5.1.3 of Ref 1*

For N = 2 and SF/B >0.5, Shielding effect shall not be considered and Cf = 1.8 shall be applied on individual frames.
Using above calculated force coeffients , wind load applied on structure through Staad Pro software.

Input Cells

Force Cofficient For Wind in E-W Direction ($C_{f\ E\text{-}W}$)



Width of Frame	B	=	8.00	m
Height of Frame	H	=	24.00	m
Gross Area of Frame	A_g	=	192	m^2
No of Frames	N	=	3	
Spacing between frames	Sf	=	6.00	m
	$\eta = S_F / B =$	=	0.750	

Calculation of Solid Area of Frame

Member	Geometry				A_f	Remark
Mark	Face	L (m)	B (m)	Nos	m²	
HE500B	d	23.500	0.500	2	23.50	MainColumn
HE500A	d	23.500	0.300	1	7.05	MainColumn
HE300A	d	5.000	0.300	6	9.00	Beam(Avg. Depth)
HE200A	d	3.000	0.220	6	3.96	Beam(Avg. Depth)
				Total	**43.51**	m^2

Solid Area of Frame	A_f	=	43.510	m^2	
Solidity Ratio	ε	=	0.227		$\varepsilon = A_f/A_g$
Angle of attack	α_{max}	=	23.14	degrees	*Eq 5A.1 & 5A.2 of Ref 1.*

$$\alpha_{max} = (10 + 58\varepsilon)^\circ \qquad \text{for } 3 \le N \le 5$$
$$\alpha_{max} = (16 + 52\varepsilon)^\circ \qquad \text{for } 6 \le N \le 10$$

Force Coeff. ($C_{f\ E\text{-}W}$)	$C_{f\ E\text{-}W}$	=	3.29	*As per Figure 5A.3 of Ref 1*
Force Coeff. ($C_{f\ E\text{-}W}$) on first frame		=	**1.800**	
Force Coeff. ($C_{f\ E\text{-}W}$) per frame		=	**0.75**	

For N = 2 and SF/B >0.5, Shielding effect shall not be considered and Cf = 1.8 shall be applied on individual frames.
Using above calculated force coeffients , wind load applied on structure through Staad Pro software.

Wind Force Calculation On Pipes (E-W Direction)

Sr No.	Discription	Height From Ground	q_h	Pipes			Af	No. of pipes	∑m	Wind Force $F = q_h \times \sum m \times C_f \times A_f$
		(m)	(kN/m^2)	Cf Value	L (m)	B (m)	(m^2)			(kN)
1	**Load on EL +5m**	5.00	0.71	0.8	7.000	1.000	7.000	1	1.00	3.976
	(bandwidth = 1.0m)									
2	**Load on EL +8.0m**	8.00	0.71	0.8	7.000	1.000	7.000	1	1.00	3.976
	(bandwidth = 1.0m)									
3	**Load on EL +12.80**	12.80	0.91	0.8	7.000	2.000	14.000	1	1.00	10.192
	(bandwidth = 2.0m)									
4	**Load on EL +17.40m**	17.40	1.05	0.8	7.000	1.500	10.500	1	1.00	8.820
	(bandwidth = 1.5m)									
5	**Load on EL +20.4m**	20.40	1.07	0.8	7.000	1.500	10.500	1	1.00	8.988
	(bandwidth = 1.50m)									
6	**Load on EL +23.80m**	23.80	1.14	0.8	7.000	1.000	7.000	1	1.00	6.384
	(bandwidth = 1.0m)									

The above calculated loads suitably distributed between the beam column joints and applied in staad.

Wind Force Calculation On Pipes (N-S Direction)

Sr No.	Discription	Height From Ground (m)	q_h (kN/m^2)	Pipes			Af (m^2)	No. of pipes	∑m	Wind Force $F = q_h \times \sum m \times C_f \times A_f$ (kN)
				Cf Value	L (m)	B (m)				
1	**Load on EL +5.00m (bandwidth = 1.0m)**	5.00	0.707	0.8	6.000	1.000	6.000	1	1.00	3.394
2	**Load on EL +8.2m (bandwidth = 1.0m)**	8.20	0.787	0.8	6.000	1.000	6.000	1	1.00	3.778
3	**Load on EL +12.8m (bandwidth = 1.0m)**	12.80	0.91	0.8	6.000	1.000	6.000	1	1.00	4.368
4	**Load on EL +17.4m (bandwidth = 1.0m)**	17.40	1.033	0.8	6.000	1.000	6.000	1	1.00	4.958
5	**Load on EL +20.4m (bandwidth = 1.0m)**	20.40	1.1	0.8	6.000	1.000	6.000	1	1.00	5.280
6	**Load on EL +23.8m (bandwidth = 1.0m)**	23.80	1.15	0.8	6.000	1.000	6.000	1	1.00	5.520

The above calculated loads suitably distributed between the beam column joints and applied in staad.

Wind Force Calculation On Equipment resting on structure (E-W Direction)

Support level.	Discription	Height From Ground [m]	q_h (kN/m^2)	Equipment Cf Value	L (m)	B (m)	Af (m^2)	Wind Force F = q x C_f x A_f (kN)	Lever arm [m]	Moment [kN-m]	Lever arm for push pull [m]	Push Pull Force [kN]
5.00	V605	5.00	0.707	0.8	3.250	1.500	5.9	3.3	0.500	1.7	1.72	0.96
8.00	V602	8.00	0.787	0.8	3.650	1.800	7.9	5.0	0.500	2.5	1.35	0.92
12.80	E606	12.80	0.91	2	1.500	1.000	1.8	3.3	0.750	2.5	1.200	1.02
12.80	E617	12.80	0.91	2	1.500	1.000	1.8	3.3	0.750	2.5	1.200	1.02
23.80	E608	23.80	1.141	2	3.500	1.500	6.3	14.4	0.000	0.0	0.50	0.00
23.80	E610	23.80	1.141	2	1.650	0.750	1.5	3.4	0.200	0.7	1.00	0.68
26.00	S601	26.00	1.141	0.8	2.500	1.000	3.0	2.7	0.000	0.0	1.00	0.00
Wind Force Calculation On Equipment resting on grade (E-W Direction)												
0.30	V603	6.50	0.707	0.8	3.600	4.200	15.1	**8.6**	4.000	34.2	2.60	**6.58**
0.30	T601	22.30	1	0.8	22.300	1.500	33.5	**26.8**	11.150	**298.374**		
0.30	V606	7.80	0.787	0.8	7.800	2.600	20.3	**12.8**	4.450	56.8	1.80	**15.78**
0.30	V601	10.50	0.853	0.8	10.500	4.300	45.2	**30.8**	5.500	169.457	3.000	**28.24**
0.30	V604	11	0.853	0.8	11.000	4.500	49.50	**33.8**	6.100	206.05	3.200	**32.20**

The above calculated loads suitably applied in staad, as per the equipmnet supporting level

Wind Force Calculation On Equipment resting on structure (N-S Direction)

Support level.	Discription	Height From Ground	q_h	Equipment			Af	Wind Force F = q_h x C_f x A_f	Lever arm [m]	Moment [kN-m]	Lever arm for push pull	Push Pull Force
		[m]	(kN/m^2)	Cf Value	L (m)	B (m)	(m^2)	(kN)			[m]	[kN]
5.00	V605	5.00	0.707	0.8	3.250	1.500	5.9	3.3	0.500	1.7	1.72	0.96
8.00	V602	8.00	0.787	0.8	3.650	1.800	7.9	5.0	0.500	2.5	1.35	0.92
12.80	E606	12.80	0.91	2	2.200	1.000	2.6	4.8	0.750	3.6	1.200	1.50
12.80	E617	12.80	0.91	2	1.500	1.000	1.8	3.3	0.750	2.5	1.200	1.02
23.80	E608	23.80	1.141	2	3.500	1.500	6.3	14.4	0.000	0.0	0.50	0.00
23.80	E610	23.80	1.141	2	1.650	0.750	1.5	3.4	0.200	0.7	1.00	0.68
26.00	S601	26.00	1.141	0.8	2.500	1.000	3.0	2.7	0.000	0.0	1.00	0.00
Wind Force Calculation On Equipment resting on grade (N-S Direction)												
0.30	V603	6.50	0.707	0.8	3.600	4.200	15.1	**8.6**	4.000	34.2	2.60	**6.58**
0.30	T601	22.30	1	0.8	22.300	1.500	33.5	**26.8**	11.150	**298.374**		
0.30	V606	7.80	0.787	0.8	7.800	2.600	20.3	**12.8**	4.450	56.8	1.80	**15.78**
0.30	V601	10.50	0.853	0.8	10.500	4.300	45.2	**30.8**	5.500	169.457	3.000	**28.24**
0.30	V604	11	0.853	0.8	11.000	4.500	49.50	**33.8**	6.100	206.05	3.200	**32.20**

The above calculated loads suitably applied in staad, as per the equipmnet supporting level

ANNEXURE D

BLAST LOAD CALCULATIONS

Refrence: ASCE-"Design of Blast Resistant Buildings for Petrochemical Faciilities" (Referred here as ASCE-BLAST)

1. Blast Load Parameters

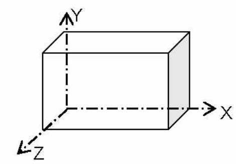
Over Pressure, P_{so} =	3	kPa	=	3	kN/m^2	Cl. 12.1.3 -BGS-CU-033
Positive Duration, t_d =	15	ms	=	0.015	s	Cl. 12.1.3 -BGS-CU-033

2. Shock Wave Parameters

Velocity, U = $345(1+0.0083P_{so})^{0.5}$	=	349.3	m/s	Eq. 3.5 ASCE-BLAST
Wave Length, Lw = t_d.U	=	5.239	m	Eq. 3.6 ASCE-BLAST
Peak dynamic wind pressure, $q_o = 0.0032P_{so}^2$	=	0.03	kN/m^2	Eq. 3.4 ASCE-BLAST

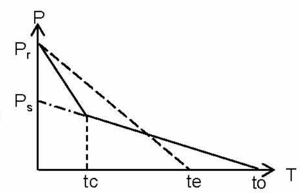
3. Buiding dimensions

Length along X-axis =	Lx	=	12	m
Length along Z-axis =	Lz	=	8	m
Height along Y-axis =	Ly	=	24	m



4. Blast load in + Z direction

Width of building , B = Lx	=	12	m	
Length of Building, L = Lz	=	8	m	
Height of Building , H = Ly	=	24	m	

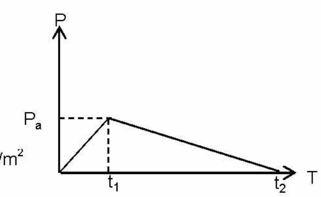


Front Wall Loading

Reflection Coefficient, C_r = (2 +0.0073Pso)	=	2.02		Eq. 3.3 ASCE-BLAST
Reflected Pressure, $P_r = C_r P_{so}$	=	6.07	kN/m^2	Eq. 3.2 ASCE-BLAST
Clearing Distance. S = Minimum of (H, B/2)	=	6	m	Eq. 3.8 ASCE-BLAST
Reflected Overpressure Clearing Time, tc = 3S/U	=	0.052	s	Eq. 3.8 ASCE-BLAST
Drag Coefficient for front wall, C_d = 1.0	=	1.0		Sec 3.3.3 ASCE-BLAST
Stagnation Pressure, $P_s = P_{so} + C_d q_o$	=	3.0288	kN/m^2	Eq. 3.7 ASCE-BLAST
Effective Pressure Impulse, $I_w = 0.5(P_r\text{-}P_s)t_c + 0.5P_s t_d$	=	0.10	kN/m^2 -s	Eq. 3.9 ASCE-BLAST
Effective Duration, te = $2I_w / P_r$	=	0.033	s	Eq. 3.10 ASCE-BLAST

Side Wall Loading

Side wall is designed as one-way, spanning vertically.



Hence consider , Length , L = 1m	=	1	m	
Therefore L_w/L =	=	5.239		
Equivalent Load Factor, From Figure 3.9 of ASCE, C_e	=	1.0		Figure 3.9 of ASCE-BLAST
Drag Coefficient for front wall, C_d = -0.4	=	-0.4		Sec 3.3.3 ASCE-BLAST
Side wall Pressure, $P_a = C_e P_{so} + C_d q_o$	=	2.99	kN/m^2	Eq. 3.11 ASCE-BLAST
The Rise Time, t_1 = L/U	=	0.0029	s	Figure 3.8 of ASCE-BLAST
Positive Time Duration , $t_2 = t_1 + t_d$	=	0.0179	s	Figure 3.8 of ASCE-BLAST

From above calculations, Blast pressure on front face = 6.07kN/m^2, and blast pressure on side face = 2.99kN/m^2 is used to calculate blast load on frame members.

Blast load is appplied similar to wind load using staad pro software.

5. Blast load in + X direction

Width of building , B = Lz	=	8	m	
Length of Building, L = Lx	=	12	m	
Height of Building , H = Ly	=	24	m	

Front Wall Loading

Reflection Coefficient, C_r = (2 +0.0073Pso)	=	2.02		Eq. 3.3 ASCE-BLAST
Reflected Pressure, $P_r = C_r P_{so}$	=	6.07	kN/m^2	Eq. 3.3 ASCE-BLAST
Clearing Distance. S = Minimum of (H, B/2)	=	4	m	Eq. 3.8 ASCE-BLAST
Reflected Overpressure Clearing Time, tc = 3S/U	=	0.034	s	Eq. 3.8 ASCE-BLAST
Drag Coefficient for front wall, C_d = 1.0	=	1.0		Sec 3.3.3 ASCE-BLAST
Stagnation Pressure, $P_s = P_{so} + C_d q_o$	=	3.0288	kN/m^2	Eq. 3.7 ASCE-BLAST
Effective Pressure Impulse, $I_w = 0.5(P_r\text{-}P_s)t_c + 0.5P_s t_d$	=	0.07	kN/m^2 -s	Eq. 3.9 ASCE-BLAST
Effective Duration, te = $2I_w / P_r$	=	0.025	s	Eq. 3.10 ASCE-BLAST

Side Wall Loading

Side wall is designed as one-way, spanning vertically.

Hence consider , Length , L = 1m	=	1	m	
Therefore L_w/L =	=	5.239		
Equivalent Load Factor, From Figure 3.9 of ASCE, C_e	=	1.0		Figure 3.9 of ASCE-BLAST
Drag Coefficient for front wall, C_d = -0.4	=	-0.4		Sec 3.3.3 ASCE-BLAST
Side wall Pressure, $P_a = C_e P_{so} + C_d q_o$	=	2.99	kN/m^2	Eq. 3.11 ASCE-BLAST

Support level.	Discription	Height From Ground [m]	q_h (kN/m^2)	Equipment Cf Value	L (m)	B (m)	Af (m^2)	Blast load F = q x C_f x A_f (kN)	Lever arm [m]	Moment [kN-m]	Lever arm for push pull [m]	Push Pull Force [kN]
Blast load On Equipment resting on structure (E-W Direction)												
5.00	V605	5.00	6.07	0.8	3.250	1.500	4.9	23.7	0.500	11.8	1.72	6.88
8.00	V602	8.00	6.07	0.8	3.650	1.800	6.6	31.9	0.500	16.0	1.35	5.91
12.80	E606	12.80	6.07	1	1.500	1.000	1.5	9.1	0.750	6.8	1.200	2.85
12.80	E617	12.80	6.07	1	1.500	1.000	1.5	9.1	0.750	6.8	1.200	2.85
23.80	E608	23.80	6.07	1	3.500	1.500	5.3	31.9	0.000	0.0	0.50	0.00
23.80	E610	23.80	6.07	1	1.650	0.750	1.2	7.5	0.200	1.5	1.00	1.50
26.00	S601	26.00	6.07	0.8	2.500	1.000	2.5	12.1	0.000	0.0	1.00	0.00
Blast load On Equipment resting on grade (E-W Direction)												
0.30	V603	6.50	6.07	0.8	3.600	4.200	15.1	**73.4**	4.000	293.7	2.60	**56.48**
0.30	T601	22.30	6.07	0.8	22.300	1.500	33.5	**162.4**	11.150	1811.130		
0.30	V606	7.80	6.07	0.8	7.800	2.600	20.3	**98.5**	4.450	438.2	1.80	**121.73**
0.30	V601	10.50	6.07	0.8	10.500	4.300	45.2	**219.2**	5.500	1205.866	3.000	**200.98**
0.30	V604	11	6.07	0.8	11.000	4.500	49.50	**240.4**	6.100	1466.27	3.200	**229.10**

The above calculated loads suitably applied in staad, as per the equipmnet supporting level

Blast load On Equipment resting on structure (N-S Direction)

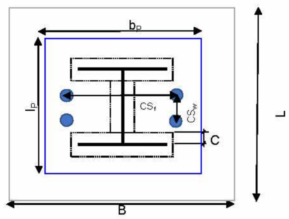
Support level.	Discription	Height From Ground	q_h	Equipment			Af	Blast load F = $q_h \times C_f \times A_f$	Lever arm [m]	Moment [kN-m]	Lever arm for push pull	Push Pull Force
		[m]	(kN/m^2)	Cf Value	L (m)	B (m)	(m^2)	(kN)			[m]	[kN]
5.00	V605	5.00	6.07	0.8	3.250	1.500	4.9	23.7	0.500	11.8	1.72	6.88
8.00	V602	8.00	6.07	0.8	3.650	1.800	6.6	31.9	0.500	16.0	1.35	5.91
12.80	E606	12.80	6.07	1	2.200	1.000	2.2	13.4	0.750	10.0	1.200	4.17
12.80	E617	12.80	6.07	1	1.500	1.000	1.5	9.1	0.750	6.8	1.200	2.85
23.80	E608	23.80	6.07	1	3.500	1.500	5.3	31.9	0.000	0.0	0.50	0.00
23.80	E610	23.80	6.07	1	1.650	0.750	1.2	7.5	0.200	1.5	1.00	1.50
26.00	S601	26.00	6.07	0.8	2.500	1.000	2.5	12.1	0.000	0.0	1.00	0.00
Blast load On Equipment resting on grade (N-S Direction)												
0.30	V603	6.50	6.07	0.8	3.600	4.200	15.1	**73.4**	4.000	293.7	2.60	**56.48**
0.30	T601	22.30	6.07	0.8	22.300	1.500	33.5	**162.4**	11.150	**1811.130**		
0.30	V606	7.80	6.07	0.8	7.800	2.600	20.3	**98.5**	4.450	438.2	1.80	**121.73**
0.30	V601	10.50	6.07	0.8	10.500	4.300	45.2	**219.2**	5.500	1205.866	3.000	**200.98**
0.30	V604	11	6.07	0.8	11.000	4.500	49.50	**240.4**	6.100	1466.27	3.200	**229.10**

The above calculated loads suitably applied in staad, as per the equipmnet supporting level

ANNEXURE E

BASE PLATE AND ANCHOR BOLT DESIGN

Design of Base Plate (Pinned Support at Base - With Shear key):



Reference
DIN EN 1993-1-1:2008
DIN EN 1993-1-8:2010
DIN EN 1992-1-1:2008
SCI-P398
SCI-P363

Structure No:	=	SK5101
Base Plate No:	=	BP1
Column on grid	=	A1,B1,C1,A2,B2,C2

Base Plate Details:

Length of base plate (l_P)	=	700	mm	>=	690 mm	Clash free
Width of base plate (b_P)	=	600	mm	>=	550 mm	Clash free
Thickness of Base Plate (t_P)	=	25	mm			
Area of Base Plate Provided (A_P)	=	420000	mm^2			

Utilization Ratios:

Base plate in Compression	0.99
Base plate in Tension	0.45
Anchor Bolt in Tension	0.66
Shear Stub	0.67

Pedestal Details:

Length of Pedestal (L)	=	800	mm	>=	800 mm	Clash free
Width of base plate (B)	=	700	mm	>=	700 mm	Clash free
Area of Pedestal (A_P)	=	560000	mm^2			

Design Actions on Base Plate(ULS load combination):

Max.Compressive Force (P_C)	=	1912	kN
Max.Tensile Force (P_T)	=	-401	kN
Max. shear parallel to column flange (V_{flange})	=	176	kN
Max. shear parallel to column web (V_{web})	=	125	kN

Structural steel Column Details:

Column Section		HE 600 A	
Width of Flange (b_f)	=	300	mm
Depth of Column (h)	=	590	mm
Flange thickness (t_f)	=	25	mm
Web thickness (t_w)	=	13	mm
Root radius (r)	=	27	mm
Column Area (A_{COL})	=	22650	mm^2
Column Perimeter (P_{COL})	=	2354	mm

Material Strengths:

Steel Grade for Base Plate Design	=	S235JR		
Yield Stress of Steel Plate (f_{YB})	=	225	N/mm^2	EN 10025-2, Table 7
Tensile Stress of Steel Plate (f_{UB})	=	360	N/mm^2	EN 10025-2, Table 7
Partial factor for steel (γ_{M0})	=	1.00		NEN EN 1993-1-1:2010, NA.2.15
Characteristic Strength of Concrete (f_{CK})	=	30	N/mm^2	
Coefficient taking account of long term effects on the compressive strength and of unfavourable effects resulting from the way the load is applied, α_{cc}	=	1		NEN-EN 1992-1-1:2020, 3.1.6
Concrete Material Factor for Ultimate limit state, γ_c	=	1.5		NEN-EN 1992-1-1:2020, Table 2.1N
Design Compressive strength of concrete, $f_{CD} = \alpha_{CC} * f_{CK} / \gamma_C$	=	20		DIN EN 1992-1-1:2011, CL 3.1.6 (1)
Coefficient accounts for diffusion of the forces in the foundation, α	=	1.5		Assumed Refer SCI_P358 page 241
Foundation joint material coefficient, β_J	=	0.67		DIN EN 1993-1-8:2010, CL 6.2.5 (7)
Joint Bearing strength at baseplate and concrete interface, $f_{JD} = \beta_J * \alpha * f_{CD}$ =		20	N/mm^2	DIN EN 1993-1-8:2010, CL 6.2.5 (7)

Anchor bolt Details:

Material:		Grade S355					
Diameter of anchor bolt	=	30	mm				
Capacity of bolt in axial tension	=	152.14	kN				
Flange direction c/c distance between bolts, CS_f	=	350	mm	>	300	mm	OK
Web direction c/c distance between bolts, CS_w	=	350	mm	>	300	mm	OK
No. of anchor bolts provided	=	4					
Edge Dist.From Base Plate (In Flange Dir.)	=	125	mm	>	70	mm	OK
Edge Dist. From Pocket (In Flange Dir.)	=	50	mm	>	50	mm	OK
Edge Dist. From Base Plate (In Web Dir.)	=	175	mm	>	70	mm	OK
Edge Dist. From Pocket (In Web Dir.)	=	50	mm	>	50	mm	OK
Shim Plate size	=	100	mm				
Distance of Shim from Column flange	=	45	mm	<	50	mm	N.A
Distance of Shim from Column web	=	118.5	mm	>	50	mm	OK

Check for Anchor Bolts Tension Resistance:

Tensile force on column	=	401	kN			
Tensile Force in each Anchor bolt	=	401	/	4		
	=	100.25	kN	<	152.1	kN

Utilization Ratio = **0.66** **Anchor bolts are safe in tension**

1. Baseplate Design:

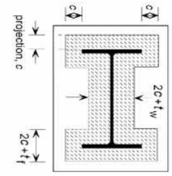
Required Area of Base plate:

Self weight of the Baseplate, DL_P = 0.8 kN

Area required ($A_{P,req}$) = (P_C + DL_P)/ f_{JD} = 95641 mm^2 **< Baseplate Area Provided, O.K**

Effective Area of Base plate:

Maximum bearing width c = $t_P * \left(\frac{f_{YB}}{3 * f_{jd} * Y_{M0}} \right)^{0.5}$ = **48.4 mm** DIN EN 1993-1-8:2010, CL 6.2.5(4)



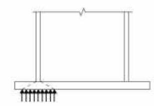
Check for effective area overlap: (h - 2 t_f) / 2 = 270 mm **> c , No Overlap of Effective Area between flanges**

Effective length of the base plate, L_{eff} = h+2*c	=	687	mm	<	700	mm	**OK**
Effective width of the base plate, B_{eff} = bf+2*c	=	397	mm	<	600	mm	**OK**

Effective bearing area of Base plate ($A_{P,eff}$) = 4 c^2 + c * P_{col} + A_{col} = **145988** mm^2

Resistance in Compression: DIN EN 1993-1-8:2010, CL 6.2.5(3)

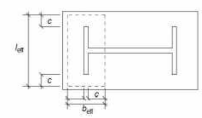
A. Compressive Resistance of Baseplate:



Design Compressive Resistance of Base plate, $F_{C,Rd,1}$ = f_{JD} * $A_{P,eff}$ = 2920 kN

Design action on Base plate in compression, F_{d1} = (P_C + DL_P) = 1913 kN < 2920 kN **Satisfactory**

B. Compressive Resistance of Concrete below Column Flange: DIN EN 1993-1-8:2010 ,CL 6.2.5 (3)



Design Compressive Resistance of effective T-Stub flange, $F_{C,Rd,2}$ = f_{JD} * b_{eff} * l_{eff} = 966.9 kN

Where, l_{eff} = Effective length of Compression T-Stub = b_f + 2 * c = 396.82458 mm

b_{eff} = Effective width of Compression T-Stub = t_f + 2 * c = 121.82458 mm

Design Compressive action in effective T-Stub, $F_{d,2}$ = P_c / 2 = 956 kN < 967 kN **Satisfactory**

Resistance in Tension:

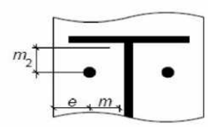
Design Resistance of baseplate T-stub in tension together with the associated anchor bolts, $F_{T,Rd}$ = 2 $M_{pl,1,Rd}$ / m DIN EN 1993-1-8:2010, CL 6.2.4.1 (6), Table 6.2

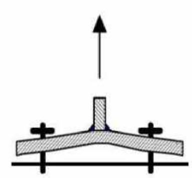
Bending Moment, $M_{pl,1,Rd}$ = 0.25 * l_{Teff} * t_P * t_P * f_{YB} / γ_{M0} DIN EN 1993-1-8:2010, Table 6.2

Where, l_{Teff} = Effective length of Tension T-Stub = MIN((2πm),(α m))

l_{Teff} = 1008 mm

$M_{pl,1,Rd}$ = 35.45 kN-m





m = (CS_f - t_w - 2 s)/2 = 161 mm $\lambda_1 = \frac{m}{m+e}$ = 0.56

m_2 = (h - CS_w - 2 t_f - 2s)/2 = 87 mm

e = (b_P - CS_f)/2 = 125 mm $\lambda_2 = \frac{m_2}{m+e}$ = 0.30

α = $\boxed{8.00}$ Based on λ1 and λ2 from Figure 6.11 of DIN EN 1993-1-8-2010 , Fig 6.11

$F_{T,Rd}$ = 2 $M_{pl,1,Rd}$ / m = 441.8 kN

No. of Anchor Bolts in effective T-Stub = 2

Design tensile action in effective T-Stub, F_d = 200.5 kN < 441.8 kN **Satisfactory**

Weld Design of Column and Base plate joint : DIN EN 1993-1-8:2010, CL 4.5.3.2 (6)

Weld leg length, s = $\boxed{8}$ mm < tw= 13 mm **Satisfactory**

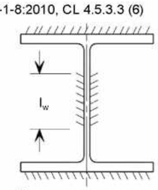
Weld throat, a = 0.707 * s = 5.656 mm SCI-P398, Page 158

Appropriate correlation factor, β_w = 0.80 DIN EN 1993-1-8:2010, CL 4.5.3.2 (6), Table 4.1

Partial safety factor for welded joint, γ_{M2} = 1.30 DNVGL-ST-N001, CL 5.9.8.4 (5)

Ultimate Tensile Stress of the weaker part joined (f_U) = 360 N/mm^2 NEN-EN 1993-1-8:2010, CL 4.5.3.2 (6)

Design Shear Strength of the weld, $f_{vw,d}$ = (f_U / √3) / (β_w * γ_{M2}) = 200 N/mm^2 DIN-EN 1993-1-8:2010, CL 4.5.3.3 (6)



Length of weld along column web, $l_{w,web}$ = 2 *(h-2*tf-2*r - 2 s) = 940 mm (Double Fillet Weld)

Length of weld along column flange, $l_{w,flange}$ = 2 *b = 600 mm (full Pen Weld)

Design throat area of weld along Column web, $A_{w,web}$ = a * $l_{w,web}$ = 5316.64 mm^2

Design throat area of weld along Column flange, $A_{w,flange}$ = t_f * $l_{w,flange}$ = 15000 mm^2

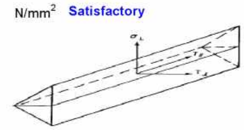
5.1.2.6 **for Directional Method**

$\tau_\perp$ = Shear stress (in the plane of the throat) perpendicular to the axis of the weld = (V_{flange} / $A_{w,web}$) + (V_{web} / $A_{w,flange}$) = **41.4** N/mm^2

$\tau_\parallel$ = Shear stress (in the plane of the throat) parallel to the axis of the weld = (V_{flange} / $A_{w,flange}$) + (V_{web} / $A_{w,web}$) = **35.2** N/mm^2

$\sigma_\perp$ = Normal stress perpendicular to the throat = P_T / ($A_{w,flange}$ + $A_{w,web}$) = **19.74** N/mm^2 < 0.9 f_U / γ_{M2} = 249.2 N/mm^2 **Satisfactory**

$[\sigma_\perp^2 + 3(\tau_\perp^2 + \tau_\parallel^2)]^{0,5}$ = 96.3 N/mm^2 < f_U / (β_w * γ_{M2}) = 346.2 N/mm^2 **Satisfactory**



B. Shear Check for Column Web Weld:

Design Resistance due to shear force, $F_{w.Rd} = f_{vw.d} * A_{w.web}$ = 1062.54 kN — DIN EN 1993-1-8, CL 4.5.3.3 (2)

Design Shear force, V_{Ed} = 125 kN < 1063 kN **Satisfactory**

C. Shear Check for Column Flange weld:

Column flanges shall be connected to baseplate with full penetration butt weld.

2. Shear Stub:

Note :- Whole shear force is resisted by the shear stub.

Shear stub Orientation w.r.t Main Column= 0

Design value of shear parallel to stub web = 125 kN

Design value of shear parallel to stub flange = 176 kN

Shear Stub Section: HE 200 A

	Sh	Sb	Stw	Stf	Sr	SA
I section Properties =	190 mm	200 mm	7 mm	10 mm	18 mm	5380 mm^2

Depth of shear stub below base plate, ds = 200 mm

Thickness of grout, tg = 50 mm

Shear Resistance of Stub web:

Shear resisting area of stub, A_{vw} = SA - 2 * Sb *Stf + (Stw + 2 * Sr) *Stf > = η * (Sh-2*Stf) * Stw — DIN EN 1993-1-1:2010, CL 6.2.6 (3)

Where, η = 1.0 — NA to SS EN 1993-1-5:2009, NA 2.4

A_{vw} = 1805 mm^2

Design Shear Resistance of Stub web, $V_{Rd,w} = A_{vw} (f_{YT} / \sqrt{3})/\gamma_{M0}$ — DIN EN 1993-1-1:2010, CL 6.2.6 (2)

Yield Stress of Steel Plate (f_{YTW}) = 235 N/mm^2 — EN 10025-2, Table 7

Tensile Stress of Steel Plate (f_{UTW}) = 360 N/mm^2 — EN 10025-2, Table 7

Design Shear Resistance of Stub web, $V_{Rd,w}$ = 245 kN > 125 kN **Satisfactory**

Shear Resistance of Stub flanges:

Shear resisting area of stub, A_{vf} = SA - (Sh-2*Stf) * Stw = 4275 mm^2 — DIN EN 1993-1-1:2010, CL 6.2.6 (3)

Design Shear Resistance of Stub flanges, $V_{Rd,f} = A_{vf} (f_Y / \sqrt{3})/\gamma_{M0}$ — DIN EN 1993-1-1:2010, CL 6.2.6 (2)

Yield Stress of Steel Plate (f_{YTF}) = 235 N/mm^2 — EN 10025-2, Table 7

Tensile Stress of Steel Plate (f_{UTF}) = 360 N/mm^2 — EN 10025-2, Table 7

Design Shear Resistance of Stub flanges, $V_{Rd,f}$ = 580 kN > 176 kN **Satisfactory**

Weld Design of Base plate and Shear stub joint:

A. Shear Stub Web Weld

Weld leg length, s = 6 mm < Stw= 6.5 mm **Satisfactory**

Weld throat, a = 0.707 * s = 4.2 mm

Appropriate correlation factor, β_w = 0.80 — DIN EN 1993-1-8:2010, CL 4.5.3.2 (6), Table 4.1

Partial safety factor for welded joint, γ_{M2} = 1.25 — NEN-EN 1993-1-8:2011, CL 2.2(2)

Design Shear Strength of the weld, $f_{vw,d} = (f_U / \sqrt{3}) / (\beta_w * \gamma_{M2})$ = 207.85 N/mm^2 — DIN EN 1993-1-8:2010, CL 4.5.3.3 (3)

Effective length of weld in web of shear stub, $l_{w,eff}$ = 2(Sh-2*Stf-2Sr-2s) = 244 mm

Design Resistance due to shear force, $F_{w,Rd} = f_{vw,d} * a * l_{w,eff}$ = 215.13 kN — DIN EN 1993-1-8:2010, CL 4.5.3.3 (2)

Design Shear force, V_{Ed} = 125 kN < 215 kN **Satisfactory**

B. Shear Stub flanges Weld

Weld leg length, s = 6 mm < Stf= 10 mm **Satisfactory**

Weld throat, a = 0.707 * s = 4.2 mm

Appropriate correlation factor, β_w = 0.80 — DIN EN 1993-1-8:2010, CL4.5.3.2 (6), Table 4.1

Partial safety factor for welded joint, γ_{M2} = 1.25 — NEN-EN 1993-1-8:2011, CL 2.2(2)

Design Shear Strength of the weld, $f_{vw,d} = (f_U / \sqrt{3}) / (\beta_w * \gamma_{M2})$ = 207.85 N/mm^2 — DIN-EN 1993-1-8:2010, CL 4.5.3.3 (3)

Effective length of weld in flange of shear stub, $l_{f,eff}$ = ((Sb-2s)+(Sb-Stw-4s-2Sr)) = 321.5 mm

Design Resistance due to shear force, $F_{w,Rd} = f_{vw,d} * a * l_{f,eff}$ = 283.46 kN — DIN EN 1993-1-8:2010, CL 4.5.3.3 (2)

Design Shear force parallel to weld per flange, V_{EdP} = 88 kN

Design Transverse force per flange , V_{EdT} = $(M_{y,Ed}$ /(Sh - Stf)) + (($M_{z,Ed}$ /2)/ (Stw + 2 Sr + ((Sb - Stw -2 Sr)/2))) = 178 kN — DIN EN 1993-1-8:2010, CL 4.5.3.3 (6)

Design Shear force, $V_{Ed} = \sqrt{(V_{EdP}\text{^}2 + (V_{EdT} / K)\text{^}2}$ = 170 kN < 283 kN **Satisfactory** — DIN EN 1993-1-8:2010, CL 4.5.3.3 (6)

where K = 1.23 — SCI-P363, Page A-44

Joint bearing resistance parallel to Shear stub web:

Effective bearing area of Shear stub web (A_{sw}) = $l_{w,eff}$ * (ds-tg) = 36600 mm^2

Design Resistance of bearing at joint, $F_{C,Rd,2} = f_{JD} * A_{sw}$ = 732 kN

Design value of bearing at joint , F_{d2} = 125 kN < 732 kN **Satisfactory**

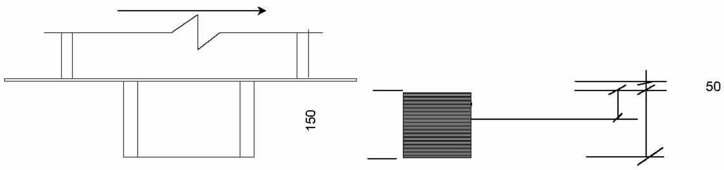
Joint bearing resistance parallel to Shear stub flange:

Effective bearing area of Shear stub web (A_{sf}) = $l_{f,eff}$ *(ds-tg) = 48225 mm^2

Design Resistance of bearing at joint, $F_{C,Rd,3} = f_{JD} * A_{sw}$ = 964.5 kN

Design value of bearing at joint , F_{d3} = 176 kN < 965 kN **Satisfactory**

Interaction Ratio of shear stub:



Moment in shear lug @ major axis, $M_{y, Ed}$ = 125 x (75 + 50) = 16 kN-m

Moment in shear lug @ minor axis, $M_{z, Ed}$ = 176 x (75 + 50) = 22 kN-m

Plastic section modulus about major axis, $W_{pl,y}$ = 429500 mm^3

Plastic section modulus about minor axis, $W_{pl,z}$ = 203800 mm^3

Design Resistance for bending about major axis, $M_{y, Rd}$ = $W_{pl,y} * f_{YTF} / \gamma_{M0}$ = 101 kN-m DIN EN 1993-1-1:2010, CL 6.2.5 (2)

Design Resistance for bending about minor axis, $M_{z, Rd}$ = $W_{pl,z} * f_{YTW} / \gamma_{M0}$ = 47.9 kN-m DIN EN 1993-1-1:2010, CL 6.2.5 (2)

Compressive force on Shear stub, $N_{c, Ed} = (P_C + DL_p) * SA / A_{P,eff}$ = 70 kN

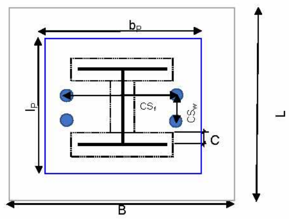
Design Resistance of cross-section for uniform compression, $N_{c, Rd} = SA * f_{YTW} / \gamma_{M0}$ = 1264 kN DIN EN 1993-1-1:2010, CL 6.2.4 (2)

Interaction ratio = $\frac{N_{c, Ed}}{N_{c, Rd}} + \frac{M_{y, Ed}}{M_{y, Rd}} + \frac{M_{z, Ed}}{M_{z, Rd}}$ = 0.67 < 1 **Satisfactory** DIN EN 1993-1-1:2010, CL 6.2.1 (7)

Pocket Size Required For shear lug: 290 x 300 x 200 Deep

Provide Pocket Size: 250 x 250 x 200 Deep

Design of Base Plate (Pinned Support at Base - With Shear key):



Reference
DIN EN 1993-1-1:2008
DIN EN 1993-1-8:2010
DIN EN 1992-1-1:2008
SCI-P398
SCI-P363

Structure No:	=	**SK5101**
Base Plate No:	=	**BP2**
Column on grid	=	**A3 & B3**

Base Plate Details:

Length of base plate (l_P)	=	**450** mm	>=	430 mm	**Clash free**	Base plate in Compression	**0.30**
Width of base plate (b_P)	=	**450** mm	>=	430 mm	**Clash free**	Base plate in Tension	**0.05**
Thickness of Base Plate (t_P)	=	**20** mm				Anchor Bolt in Tension	**0.11**
Area of Base Plate Provided (A_P)	=	202500 mm^2				Shear Stub	**0.40**

(**Utilization Ratios**: right-hand columns)

Pedestal Details:

Length of Pedestal (L)	=	**550** mm	>=	550 mm	**Clash free**
Width of base plate (B)	=	**550** mm	>=	550 mm	**Clash free**
Area of Pedestal (A_P)	=	302500 mm^2			

Design Actions on Base Plate(ULS load combination):

Max.Compressive Force (P_C)	=	**420**	kN
Max.Tensile Force (P_T)	=	**-30**	kN
Max. shear parallel to column flange (V_{flange})	=	**32**	kN
Max. shear parallel to column web (V_{web})	=	**10**	kN

Structural steel Column Details:

Column Section		**HE 300 A**	
Width of Flange (b_f)	=	300	mm
Depth of Column (h)	=	290	mm
Flange thickness (t_f)	=	14	mm
Web thickness (t_w)	=	8.5	mm
Root radius (r)	=	27	mm
Column Area (A_{COL})	=	11250	mm^2
Column Perimeter (P_{COL})	=	1763	mm

Material Strengths:

Steel Grade for Base Plate Design	=	**S235JR**		
Yield Stress of Steel Plate (f_{YB})	=	225	N/mm^2	EN 10025-2, Table 7
Tensile Stress of Steel Plate (f_{UB})	=	360	N/mm^2	EN 10025-2, Table 7
Partial factor for steel (γ_{M0})	=	1.00		NEN EN 1993-1-1:2010, NA.2.15
Characteristic Strength of Concrete (f_{CK})	=	30	N/mm^2	
Coefficient taking account of long term effects on the compressive strength and of unfavourable effects resulting from the way the load is applied, α_{cc}	=	1		NEN-EN 1992-1-1:2020, 3.1.6
Concrete Material Factor for Ultimate limit state, γ_c	=	1.5		NEN-EN 1992-1-1:2020, Table 2.1N
Design Compressive strength of concrete, $f_{CD} = \alpha_{CC} * f_{CK} / \gamma_C$	=	20		DIN EN 1992-1-1:2011, CL 3.1.6 (1)
Coefficient accounts for diffusion of the forces in the foundation, α	=	1.5		Assumed Refer SCI_P358 page 241
Foundation joint material coefficient, β_J	=	0.67		DIN EN 1993-1-8:2010, CL 6.2.5 (7)
Joint Bearing strength at baseplate and concrete interface, $f_{JD} = \beta_J * \alpha * f_{CD}$ =		20	N/mm^2	DIN EN 1993-1-8:2010, CL 6.2.5 (7)

Anchor bolt Details:

Material:		**Grade S355**					
Diameter of anchor bolt	=	**20**	mm				
Capacity of bolt in axial tension	=	66.33	kN				
Flange direction c/c distance between bolts, CS_f	=	**250**	mm	>	200	mm	**OK**
Web direction c/c distance between bolts, CS_w	=	**250**	mm	>	200	mm	**OK**
No. of anchor bolts provided	=	**4**					
Edge Dist.From Base Plate (In Flange Dir.)	=	100	mm	>	60	mm	**OK**
Edge Dist. From Pocket (In Flange Dir.)	=	50	mm	>	**50**	mm	**OK**
Edge Dist. From Base Plate (In Web Dir.)	=	100	mm	>	60	mm	**OK**
Edge Dist. From Pocket (In Web Dir.)	=	50	mm	>	**50**	mm	**OK**
Shim Plate size	=	80	mm				
Distance of Shim from Column flange	=	34	mm	<	**50**	mm	**N.A**
Distance of Shim from Column web	=	80.75	mm	>	**50**	mm	**OK**

Check for Anchor Bolts Tension Resistance:

Tensile force on column	=	30	kN			
Tensile Force in each Anchor bolt	=	30	/	4		
	=	7.5	kN	<	66.33	kN
Utilization Ratio	=	0.11	Anchor bolts are safe in tension			

1. Baseplate Design:

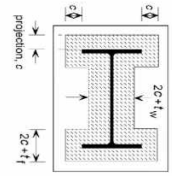
Required Area of Base plate:

Self weight of the Baseplate, DL_P = 0.3 kN

Area required ($A_{P,req}$) = (P_C + DL_P)/ f_{JD} = 21016 mm^2 < Baseplate Area Provided, O.K

Effective Area of Base plate:

Maximum bearing width c = $t_P * \left(\frac{f_{YB}}{3 * f_{jd} * \gamma_{M0}} \right)^{0.5}$ = **38.7 mm** DIN EN 1993-1-8:2010, CL 6.2.5(4)



Check for effective area overlap: (h - 2 t_f) / 2 = 131 mm > c , No Overlap of Effective Area between flanges

Effective length of the base plate, L_{eff} = h+2*c = 367 mm < 450 mm OK

Effective width of the base plate, B_{eff} = bf+2*c = 377 mm < 450 mm OK

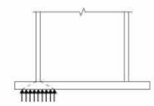
Effective bearing area of Base plate ($A_{P,eff}$) = 4 c^2 + c * P_{col} + A_{col} = **85531** mm^2

Resistance in Compression: DIN EN 1993-1-8:2010, CL 6.2.5(3)

A. Compressive Resistance of Baseplate:

Design Compressive Resistance of Base plate, $F_{C,Rd,1}$ = f_{JD} * $A_{P,eff}$ = 1711 kN

Design action on Base plate in compression, F_{d1} = (P_C + DL_P) = 420 kN < 1711 kN Satisfactory

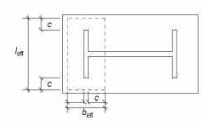


B. Compressive Resistance of Concrete below Column Flange: DIN EN 1993-1-8:2010 ,CL 6.2.5 (3)

Design Compressive Resistance of effective T-Stub flange, $F_{C,Rd,2}$ = f_{JD} * b_{eff} * l_{eff} = 690.4 kN

Where, l_{eff} = Effective length of Compression T-Stub = b_f + 2 * c = 377.45967 mm

b_{eff} = Effective width of Compression T-Stub = t_f + 2 * c = 91.459667 mm



Design Compressive action in effective T-Stub, $F_{d,2}$ = P_c / 2 = 210 kN < 690 kN Satisfactory

Resistance in Tension:

Design Resistance of baseplate T-stub in tension together with the associated anchor bolts, $F_{T,Rd}$ = 2 $M_{pl,1,Rd}$ / m DIN EN 1993-1-8:2010, CL 6.2.4.1 (6), Table 6.2

Bending Moment, $M_{pl,1,Rd}$ = 0.25 * l_{Teff} * t_P * t_P * f_{YB} / γ_{M0} DIN EN 1993-1-8:2010, Table 6.2

Where, l_{Teff} = Effective length of Tension T-Stub = MIN((2πm),(α m))

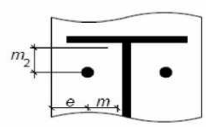
l_{Teff} = 708 mm

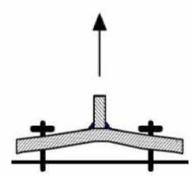
$M_{pl,1,Rd}$ = 15.94 kN-m

m = (CS_f - t_w - 2 s)/2 = 113 mm $\lambda_1 = \frac{m}{m+e}$ = 0.53

m_2 = (h - CS_w - 2 t_f - 2s)/2 = -2 mm

e = (b_P - CS_f)/2 = 100 mm $\lambda_2 = \frac{m_2}{m+e}$ = -0.01





α = 8.00 Based on λ1 and λ2 from Figure 6.11 of DIN EN 1993-1-8-2010 , Fig 6.11

$F_{T,Rd}$ = 2 $M_{pl,1,Rd}$ / m = 282.7 kN

No. of Anchor Bolts in effective T-Stub = 2

Design tensile action in effective T-Stub, F_d = 15 kN < 282.7 kN Satisfactory

Weld Design of Column and Base plate joint : DIN EN 1993-1-8:2010, CL 4.5.3.2 (6)

Weld leg length, s = 8 mm < tw= 8.5 mm Satisfactory

Weld throat, a = 0.707 * s = 5.656 mm SCI-P398, Page 158

Appropriate correlation factor, β_w = 0.80 DIN EN 1993-1-8:2010, CL 4.5.3.2 (6), Table 4.1

Partial safety factor for welded joint, γ_{M2} = 1.30 DNVGL-ST-N001, CL 5.9.8.4 (5)

Ultimate Tensile Stress of the weaker part joined (f_U) = 360 N/mm^2 NEN-EN 1993-1-8:2010, CL 4.5.3.2 (6)

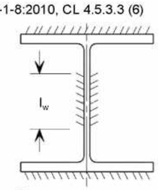
Design Shear Strength of the weld, $f_{vw,d}$ = (f_U / √3) / (β_w * γ_{M2}) = 200 N/mm^2 DIN-EN 1993-1-8:2010, CL 4.5.3.3 (6)

Length of weld along column web, $l_{w,web}$ = 2 *(h-2*tf-2*r - 2 s) = 384 mm (Double Fillet Weld)

Length of weld along column flange, $l_{w,flange}$ = 2 *b = 600 mm (full Pen Weld)

Design throat area of weld along Column web, $A_{w,web}$ = a * $l_{w,web}$ = 2171.90 mm^2

Design throat area of weld along Column flange, $A_{w,flange}$ = t_f * $l_{w,flange}$ = 8400 mm^2



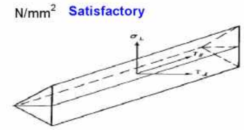
5.1.2.e for Directional Method

$\tau\perp$ = Shear stress (in the plane of the throat) perpendicular to the axis of the weld = (V_{flange} / $A_{w,web}$) + (V_{web} / $A_{w,flange}$) = **15.9** N/mm^2

$\tau\|$ = Shear stress (in the plane of the throat) parallel to the axis of the weld = (V_{flange} / $A_{w,flange}$) + (V_{web} / $A_{w,web}$) = **8.4** N/mm^2

$\sigma\perp$ = Normal stress perpendicular to the throat = P_T / ($A_{w,flange}$ + $A_{w,web}$) = **2.838** N/mm^2 < 0.9 f_U / γ_{M2} = 249.2 N/mm^2 Satisfactory

$[\sigma\perp^2 + 3(\tau\perp^2 + \tau\|^2)]^{0,5}$ = 31.3 N/mm^2 < f_U / (β_w * γ_{M2}) = 346.2 N/mm^2 Satisfactory



B. Shear Check for Column Web Weld:

Design Resistance due to shear force, $F_{w,Rd} = f_{vw,d} * A_{w,web}$ = 434.06 kN — DIN EN 1993-1-8, CL 4.5.3.3 (2)

Design Shear force, V_{Ed} = 10 kN < 434 kN **Satisfactory**

C. Shear Check for Column Flange weld:

Column flanges shall be connected to baseplate with full penetration butt weld.

2. Shear Stub:

Note :- Whole shear force is resisted by the shear stub.

Shear stub Orientation w.r.t Main Column= **0**

Design value of shear parallel to stub web = 10 kN

Design value of shear parallel to stub flange = 32 kN

Shear Stub Section **HE 100 A**

	Sh	Sb	Stw	Stf	Sr	SA
I section Properties =	96 mm	100 mm	5 mm	8 mm	12 mm	2120 mm^2

Depth of shear stub below base plate, ds = **150** mm

Thickness of grout, tg = **50** mm

Shear Resistance of Stub web:

Shear resisting area of stub, A_{vw} = SA - 2 * Sb *Stf + (Stw + 2 * Sr) *Stf > = η * (Sh-2*Stf) * Stw — DIN EN 1993-1-1:2010, CL 6.2.6 (3)

Where, η = 1.0 — NA to SS EN 1993-1-5:2009, NA 2.4

A_{vw} = 752 mm^2

Design Shear Resistance of Stub web, $V_{Rd,w} = A_{vw} (f_{YT} / \sqrt{3})/\gamma_{M0}$ — DIN EN 1993-1-1:2010, CL 6.2.6 (2)

Yield Stress of Steel Plate (f_{YTW}) = 235 N/mm^2 — EN 10025-2, Table 7

Tensile Stress of Steel Plate (f_{UTW}) = 360 N/mm^2 — EN 10025-2, Table 7

Design Shear Resistance of Stub web, $V_{Rd,w}$ = 102 kN > 10 kN **Satisfactory**

Shear Resistance of Stub flanges:

Shear resisting area of stub, A_{vf} = SA - (Sh-2*Stf) * Stw = 1720 mm^2 — DIN EN 1993-1-1:2010, CL 6.2.6 (3)

Design Shear Resistance of Stub flanges, $V_{Rd,f} = A_{vf} (f_Y / \sqrt{3})/\gamma_{M0}$ — DIN EN 1993-1-1:2010, CL 6.2.6 (2)

Yield Stress of Steel Plate (f_{YTF}) = 235 N/mm^2 — EN 10025-2, Table 7

Tensile Stress of Steel Plate (f_{UTF}) = 360 N/mm^2 — EN 10025-2, Table 7

Design Shear Resistance of Stub flanges, $V_{Rd,f}$ = 233 kN > 32 kN **Satisfactory**

Weld Design of Base plate and Shear stub joint:

A. Shear Stub Web Weld

Weld leg length, s = **5** mm <= Stw= 5 mm **Satisfactory**

Weld throat, a = 0.707 * s = 3.5 mm

Appropriate correlation factor, β_w = 0.80 — DIN EN 1993-1-8:2010, CL 4.5.3.2 (6), Table 4.1

Partial safety factor for welded joint, γ_{M2} = 1.25 — NEN-EN 1993-1-8:2011, CL 2.2(2)

Design Shear Strength of the weld, $f_{vw,d} = (f_U / \sqrt{3}) / (\beta_w * \gamma_{M2})$ = 207.85 N/mm^2 — DIN EN 1993-1-8:2010, CL 4.5.3.3 (3)

Effective length of weld in web of shear stub, $l_{w,eff}$ = 2(Sh-2*Stf-2Sr-2s) = 92 mm

Design Resistance due to shear force, $F_{w,Rd} = f_{vw,d} * a * l_{w,eff}$ = 67.60 kN — DIN EN 1993-1-8:2010, CL 4.5.3.3 (2)

Design Shear force, V_{Ed} = 10 kN < 68 kN **Satisfactory**

B. Shear Stub flanges Weld

Weld leg length, s = **6** mm < Stf= 8 mm **Satisfactory**

Weld throat, a = 0.707 * s = 4.2 mm

Appropriate correlation factor, β_w = 0.80 — DIN EN 1993-1-8:2010, CL4.5.3.2 (6), Table 4.1

Partial safety factor for welded joint, γ_{M2} = 1.25 — NEN-EN 1993-1-8:2011, CL 2.2(2)

Design Shear Strength of the weld, $f_{vw,d} = (f_U / \sqrt{3}) / (\beta_w * \gamma_{M2})$ = 207.85 N/mm^2 — DIN-EN 1993-1-8:2010, CL 4.5.3.3 (3)

Effective length of weld in flange of shear stub, $l_{f,eff}$ = ((Sb-2s)+(Sb-Stw-4s-2Sr)) = 135 mm

Design Resistance due to shear force, $F_{w,Rd} = f_{vw,d} * a * l_{f,eff}$ = 119.03 kN — DIN EN 1993-1-8:2010, CL 4.5.3.3 (2)

Design Shear force parallel to weld per flange, V_{EdP} = 16 kN

Design Transverse force per flange , V_{EdT} = $(M_{y,Ed} /(Sh - Stf)) + ((M_{z,Ed} /2)/ (Stw + 2\,Sr + ((Sb - Stw - 2\,Sr)/2)))$ = 36 kN — DIN EN 1993-1-8:2010, CL 4.5.3.3 (6)

Design Shear force, $V_{Ed} = \sqrt{(V_{EdP}\text{^}2 + (V_{EdT} / K)\text{^}2}$ = 34 kN < 119 kN **Satisfactory** — DIN EN 1993-1-8:2010, CL 4.5.3.3 (6)

where K = 1.23 — SCI-P363, Page A-44

Joint bearing resistance parallel to Shear stub web:

Effective bearing area of Shear stub web (A_{sw}) = $l_{w,eff}$ * (ds-tg) = 9200 mm^2

Design Resistance of bearing at joint, $F_{C,Rd,2} = f_{JD} * A_{sw}$ = 184 kN

Design value of bearing at joint , F_{d2} = 10 kN < 184 kN **Satisfactory**

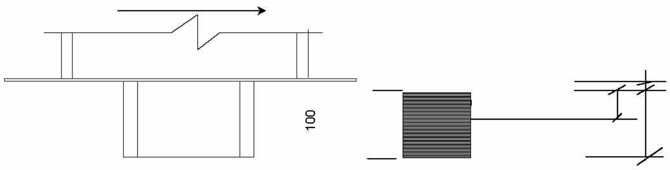
Joint bearing resistance parallel to Shear stub flange:

Effective bearing area of Shear stub web (A_{sf}) = $l_{f,eff}$ *(ds-tg) = 13500 mm^2

Design Resistance of bearing at joint, $F_{C,Rd,3} = f_{JD} * A_{sw}$ = 270 kN

Design value of bearing at joint , F_{d3} = 32 kN < 270 kN **Satisfactory**

Interaction Ratio of shear stub:



Moment in shear lug @ major axis, $M_{y, Ed}$ = 10 x (50 + 50) = 1 kN-m

Moment in shear lug @ minor axis, $M_{z, Ed}$ = 32 x (50 + 50) = 3 kN-m

Plastic section modulus about major axis, $W_{pl,y}$ = 83010 mm^3

Plastic section modulus about minor axis, $W_{pl,z}$ = 41140 mm^3

Design Resistance for bending about major axis, $M_{y, Rd}$ = $W_{pl,y} * f_{YTF} / \gamma_{M0}$ = 19.5 kN-m DIN EN 1993-1-1:2010, CL 6.2.5 (2)

Design Resistance for bending about minor axis, $M_{z, Rd}$ = $W_{pl,z} * f_{YTW} / \gamma_{M0}$ = 9.67 kN-m DIN EN 1993-1-1:2010, CL 6.2.5 (2)

Compressive force on Shear stub, $N_{c, Ed} = (P_C + DL_p) * SA / A_{P,eff}$ = 10 kN

Design Resistance of cross-section for uniform compression, $N_{c, Rd} = SA * f_{YTW} / \gamma_{M0}$ = 498 kN DIN EN 1993-1-1:2010, CL 6.2.4 (2)

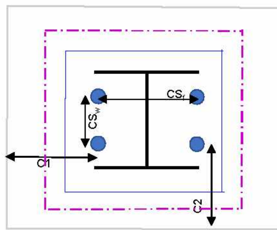
Interaction ratio = $\frac{N_{c, Ed}}{N_{c, Rd}} + \frac{M_{y, Ed}}{M_{y, Rd}} + \frac{M_{z, Ed}}{M_{z, Rd}}$ = 0.40 < 1 **Satisfactory** DIN EN 1993-1-1:2010, CL 6.2.1 (7)

Pocket Size Required For shear lug: 196 x 200 x 150 Deep

Provide Pocket Size: 150 x 150 x 150 Deep

Design Resistance of Anchor Bolts with sleeve:

Reference
EN 1993-1-1:2005
EN 1993-1-8:2005
EN 1992-1-1:2005
ETAG-001, Annex C



Column on grid = **A-1, B-1,C-1 & A-2, B-2, C-2**

Anchor bolt Details:

Material:		**S355JR**	for -10 to +300°C Temperature range			
Bolt Class:		**8.8**				
Diameter of anchor bolt, ϕ	=	**30**	mm			
Tensile stress Area, A_s	=	561	mm^2			
Sleeve Diameter, Sd	=	208	mm			
Flange direction c/c distance between bolts, CS_f	=	**350**	mm	>	250 mm	**OK**
Web direction c/c distance between bolts, CS_w	=	**350**	mm	>	250 mm	**OK**
No. of anchor bolts provided	=	**4**				
Edge distance from pedestal in Flange direction, C_1	=	175	mm			
Edge distance from pedestal in Web direction, C_2	=	225	mm			
Thickness of Base Plate (t_P)	=	**25**	mm			
Thickness of Sole Plate (t_s)	=	**0**	mm			
Thickness of Grout (t_g)	=	**50**	mm			
Projection of Anchor Bolt above ungrounded concrete	=	**190**	mm	<	190 mm	**OK**

Pedestal Details:

Length of Pedestal (L)	=	**800**	mm
Width of Pedestal (B)	=	**700**	mm
Height of Pedestal (H)	=	**500**	mm

Design Actions on Base Plate:

Max.Compressive Force (F_C)	=	**1912**	kN
Max.Tensile Force (F_T)	=	**-401**	kN
Max. shear parallel to column flange (V_{UY})	=	**176**	kN
Max. shear parallel to column web (V_{UZ})	=	**125**	kN

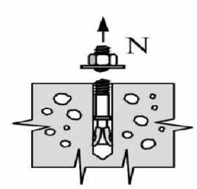
Material Strengths:

Anchor Bolt Yield Strength (f_{yb})	=	640	N/mm^2	EN 1993-1-8, Table 3.1
Anchor Bolt Ultimate Strength (f_{ub})	=	800	N/mm^2	EN 1993-1-8, Table 3.1
Partial safety factor for bolt (γ_{M2})	=	1.25		NA to NEN EN 1993-1-8, 2.2
Partial safety factor for taking account of the installation safety of an anchor system (γ_2)	=	1.00		ETAG-001, Annex C - cl 3.2.2.1
Concrete Material Factor for Ultimate limit state, γ_c	=	1.5		NA to NEN EN 1992 1-1, Table 2.1N
Partial safety factor for concrete cone failure, $\gamma_{Mc} = \gamma_c * \gamma_2$	=	1.5		NA.1 ETAG-001, Annex C - cl
Partial safety factor for pull-out failure, $\gamma_{Mp} = \gamma_{Mc}$	=	1.5		3.2.2.1 ETAG-001, Annex C - cl
Partial safety factor for splitting failure, $\gamma_{Msp} = \gamma_{Mc}$	=	1.5		3.2.2.1 ETAG-001, Annex C - cl
Characteristic Cylindrical Strength of Concrete (f_{ck})	=	30	N/mm^2	3.2.2.1
Characteristic Cube Strength of Concrete ($f_{ck,cube}$)	=	37	N/mm^2	

1. Steel Failure Resistance:

Design Tensile Resistance of Anchor Bolt, $N_{Rd,s} = 0.85 * k_2 * f_{ub} * A_s / \gamma_{M2}$ = 275 kN

EN 1993-1-8, cl 3.6.1 (3), Table 3.4

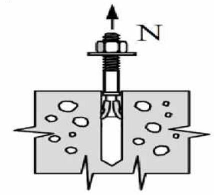


where, k_2 = 0.9

Design tensile force in Anchor Bolt, N_{Sd} = 100 kN < 275 kN **Satisfactory**

2. Pull-out Failure Resistance:

Design Resistance of Anchor Bolt in case of pull-out Failure, $N_{Rd,s} = k_1 * f_{ck} * A_h \ / \gamma_{Mp}$ = 192 kN — ETAG-001, Annex C - cl 5.2.2.3



Where, Ah = Load bearing area of the head of the fastener = $\pi\ (\phi_h^2 - \phi^2)/4$ = 1336 mm^2

ϕ_h = External Diameter of the anchor stud = 51 mm

ϕ = External Diameter of the anchor shaft = 30 mm

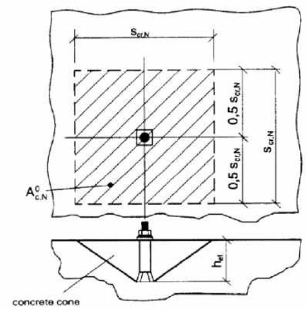
k_1 = Coefficient dependent on concrete condition, for cracked concrete = 7.2

Design tensile force in Anchor Bolt, N_{Sd} = 100 kN < 192 kN **Satisfactory**

3. Concrete Cone Failure Resistance: — EN 1992-1-1, cl 2.7 (1)

The characteristic resistance of Anchor Bolt in case of Concrete Cone Failure: $N_{Rk,c} = N^0_{Rk,c} \cdot \frac{A_{c,N}}{A^0_{c,N}} \cdot \psi_{s,N} \cdot \psi_{re,N} \cdot \psi_{ec,N}$ — ETAG-001, Annex C - cl 5.2.2.4

Initial value of characteristic resistance $N^0_{Rk,c} = k_1 \cdot \sqrt{f_{ck,cube}} \cdot h_{ef}^{1.5}$ = **148** kN



where, k1 for cracked concrete = 7.2

h_{ef} = length of the anchor in concrete = **225** mm

$S_{cr,N}$ = Spacing for ensuring the transmission of the characteristic tensile resistance of a single anchor without spacing and edge effects in case of concrete cone failure = 3 $_{hef}$ = 675 mm

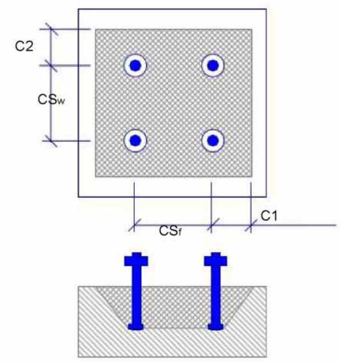
$C_{cr,N}$ = Edge distance for ensuring the transmission of the characteristic tensile resistance of a single anchor without spacing and edge effects in case of concrete cone failure = 1.5 $_{hef}$ = 337.5 mm

$A^0_{c,N}$ = Area of concrete of an individual anchor with large spacing and edge distance at the concrete surface

= $S_{cr,N} * S_{cr,N}$ = 455625 mm^2

$A_{c,N}$ = Actual area of concrete cone of the anchorage at the concrete surface, as the concrete cones of four anchor bolts are overlapping,

$A_{c,N} = (2*C_1+CSf) * (2*C_2 + CS_w)$ = 560000 mm^2



$\Psi_{s,N}$ = factor accounts disturbance of the stresses in the concrete due to edges of the member, $(0.7 + 0.3\ .C / C_{cr,N}) <= 1$ = 0.9

$\Psi_{re,N}$ = The shell spalling factor, accounts the effect of Reinforcement, $(0.5 + (h_{ef} / 200)) <=1$ = 1.0

$\Psi_{ec,N}$ = factor accounts group effect when different tension loads acting on the individual anchors of a group = 1.0

The characteristic resistance of Anchor Bolt in case of Concrete Cone Failure, $N_{Rk,c}$ = 155.4 kN

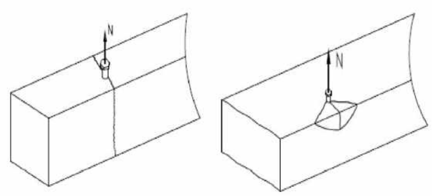
Design resistance of Anchor Bolt in case of Concrete Cone Failure, $N_{Rd,c} = N_{Rk,c} / \gamma_{Mc}$ = 103.6 kN

Design tensile force in Anchor Bolt, N_{Sd} = 100 kN < 104 kN **Satisfactory**

4. Splitting Failure due to loading Resistance:

The characteristic resistance of Anchor Bolt in case of Concrete Cone Failure: $N_{Rk,sp} = N^0_{Rk,c} \cdot \frac{A_{c,N}}{A^0_{c,N}} \cdot \psi_{s,N} \cdot \psi_{re,N} \cdot \psi_{ec,N} \cdot \psi_{h,sp}$ — ETAG-001, Annex C - cl 5.2.2.6

where, $\Psi_{h,sp}$ = factor to account for the influence of the actual member depth, H, on the splitting resistance for anchors = $(H/h_{ef})^{(2/3)} <= 1.5$ = 1.5

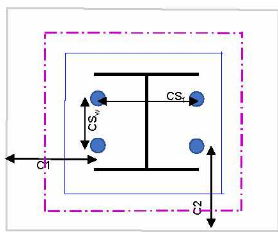


The characteristic resistance of Anchor Bolt in case of Splitting Failure, $N_{Rk,sp}$ = 233 kN

Design resistance of Anchor Bolt in case of Splitting Failure, $N_{Rd,c} = N_{Rk,sp} / \gamma_{Msp}$ = 155 kN

Design tensile force in Anchor Bolt, N_{Sd} = 100 kN < 155 kN **Satisfactory**

Design Resistance of Anchor Bolts with sleeve:



Reference
EN 1993-1-1:2005
EN 1993-1-8:2005
EN 1992-1-1:2005
ETAG-001, Annex C

Column on grid = **A3 & B3**

Anchor bolt Details:

Material:		**S355JR**	for -10 to +300°C Temperature range			
Bolt Class:		**8.8**				
Diameter of anchor bolt, ϕ	=	**20**	mm			
Tensile stress Area, A_s	=	245	mm^2			
Sleeve Diameter, Sd	=	133	mm			
Flange direction c/c distance between bolts, CS_f	=	**250**	mm	>	160 mm	**OK**
Web direction c/c distance between bolts, CS_w	=	**250**	mm	>	160 mm	**OK**
No. of anchor bolts provided	=	**4**				
Edge distance from pedestal in Flange direction, C_1	=	150	mm			
Edge distance from pedestal in Web direction, C_2	=	150	mm			
Thickness of Base Plate (t_P)	=	**20**	mm			
Thickness of Sole Plate (t_s)	=	**0**	mm			
Thickness of Grout (t_g)	=	**50**	mm			
Projection of Anchor Bolt above ungrounded concrete	=	**190**	mm	>	150 mm	**OK**

Pedestal Details:

Length of Pedestal (L)	=	**550**	mm
Width of Pedestal (B)	=	**550**	mm
Height of Pedestal (H)	=	**1100**	mm

Design Actions on Base Plate:

Max.Compressive Force (F_C)	=	**420**	kN
Max.Tensile Force (F_T)	=	**-30**	kN
Max. shear parallel to column flange (V_{UY})	=	**32**	kN
Max. shear parallel to column web (V_{UZ})	=	**10**	kN

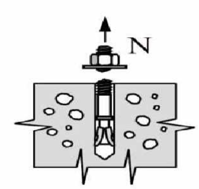
Material Strengths:

Anchor Bolt Yield Strength (f_{yb})	=	640	N/mm^2	EN 1993-1-8, Table 3.1
Anchor Bolt Ultimate Strength (f_{ub})	=	800	N/mm^2	EN 1993-1-8, Table 3.1
Partial safety factor for bolt (γ_{M2})	=	1.25		NA to NEN EN 1993-1-8, 2.2
Partial safety factor for taking account of the installation safety of an anchor system (γ_2)	=	1.00		ETAG-001, Annex C - cl 3.2.2.1
Concrete Material Factor for Ultimate limit state, γ_c	=	1.5		NA to NEN EN 1992 1-1, Table 2.1N
Partial safety factor for concrete cone failure, $\gamma_{Mc} = \gamma_c * \gamma_2$	=	1.5		ETAG-001, Annex C - cl 3.2.2.1
Partial safety factor for pull-out failure, $\gamma_{Mp} = \gamma_{Mc}$	=	1.5		ETAG-001, Annex C - cl 3.2.2.1
Partial safety factor for splitting failure, $\gamma_{Msp} = \gamma_{Mc}$	=	1.5		ETAG-001, Annex C - cl 3.2.2.1
Characteristic Cylindrical Strength of Concrete (f_{ck})	=	30	N/mm^2	
Characteristic Cube Strength of Concrete ($f_{ck,cube}$)	=	37	N/mm^2	

1. Steel Failure Resistance:

Design Tensile Resistance of Anchor Bolt, $N_{Rd,s} = 0.85 * k_2 * f_{ub} * A_s / \gamma_{M2}$ = 120 kN — EN 1993-1-8, cl 3.6.1 (3), Table 3.4

where, k_2 = 0.9



Design tensile force in Anchor Bolt, N_{Sd} = 8 kN < 120 kN **Satisfactory**

2. Pull-out Failure Resistance:

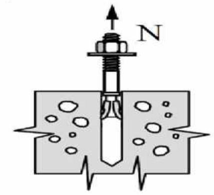
Design Resistance of Anchor Bolt in case of pull-out Failure, $N_{Rd,s} = k_1 * f_{ck} * A_h / \gamma_{Mp}$ = 86 kN — ETAG-001, Annex C - cl 5.2.2.3

Where, Ah = Load bearing area of the head of the fastener = $\pi (\phi_h^2 - \phi^2)/4$ = 594 mm^2

ϕ_h = External Diameter of the anchor stud = 34 mm

ϕ = External Diameter of the anchor shaft = 20 mm

k_1 = Coefficient dependent on concrete condition, for cracked concrete = 7.2

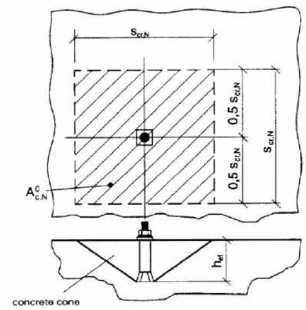


Design tensile force in Anchor Bolt, N_{Sd} = 8 kN < 86 kN **Satisfactory**

3. Concrete Cone Failure Resistance: — EN 1992-1-1, cl 2.7 (1)

The characteristic resistance of Anchor Bolt in case of Concrete Cone Failure: $N_{Rk,c} = N^0_{Rk,c} \cdot \frac{A_{c,N}}{A^0_{c,N}} \cdot \psi_{s,N} \cdot \psi_{re,N} \cdot \psi_{ec,N}$ — ETAG-001, Annex C - cl 5.2.2.4

Initial value of characteristic resistance $N^0_{Rk,c} = k_1 \cdot \sqrt{f_{ck,cube}} \cdot h_{ef}^{1.5}$ = **163** kN



where, k1 for cracked concrete = 7.2

h_{ef} = length of the anchor in concrete = **240** mm

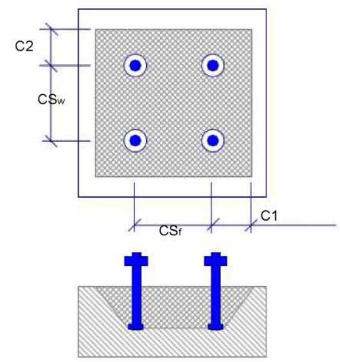
$S_{cr,N}$ = Spacing for ensuring the transmission of the characteristic tensile resistance of a single anchor without spacing and edge effects in case of concrete cone failure = 3 h_{ef} = 720 mm

$C_{cr,N}$ = Edge distance for ensuring the transmission of the characteristic tensile resistance of a single anchor without spacing and edge effects in case of concrete cone failure = 1.5 h_{ef} = 360 mm

$A^0_{c,N}$ = Area of concrete of an individual anchor with large spacing and edge distance at the concrete surface
= $S_{cr,N} * S_{cr,N}$ = 518400 mm^2

$A_{c,N}$ = Actual area of concrete cone of the anchorage at the concrete surface, as the concrete cones of four anchor bolts are overlapping,

$A_{c,N} = (2*C_1+CSf) * (2*C_2 + CS_w)$ = 302500 mm^2



$\Psi_{s,N}$ = factor accounts disturbance of the stresses in the concrete due to edges of the member, $(0.7 + 0.3 .C / C_{cr,N}) <= 1$ = 0.8

$\Psi_{re,N}$ = The shell spalling factor, accounts the effect of Reinforcement, $(0.5 + (h_{ef} / 200)) <=1$ = 1.0

$\Psi_{ec,N}$ = factor accounts group effect when different tension loads acting on the individual anchors of a group = 1.0

The characteristic resistance of Anchor Bolt in case of Concrete Cone Failure, $N_{Rk,c}$ = 78.39 kN

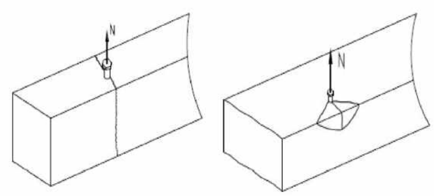
Design resistance of Anchor Bolt in case of Concrete Cone Failure, $N_{Rd,c} = N_{Rk,c} / \gamma_{Mc}$ = 52.26 kN

Design tensile force in Anchor Bolt, N_{Sd} = 8 kN < 52 kN **Satisfactory**

4. Splitting Failure due to loading Resistance:

The characteristic resistance of Anchor Bolt in case of Concrete Cone Failure: $N_{Rk,sp} = N^0_{Rk,c} \cdot \frac{A_{c,N}}{A^0_{c,N}} \cdot \psi_{s,N} \cdot \psi_{re,N} \cdot \psi_{ec,N} \cdot \psi_{h,sp}$ — ETAG-001, Annex C - cl 5.2.2.6

where, $\Psi_{h,sp}$ = factor to account for the influence of the actual member depth, H, on the splitting resistance for anchors = $(H/h_{ef})^{(2/3)} <= 1.5$ = 1.5



The characteristic resistance of Anchor Bolt in case of Splitting Failure, $N_{Rk,sp}$ = 118 kN

Design resistance of Anchor Bolt in case of Splitting Failure, $N_{Rd,c} = N_{Rk,sp} / \gamma_{Msp}$ = 78.4 kN

Design tensile force in Anchor Bolt, N_{Sd} = 8 kN < 78 kN **Satisfactory**

ANNEXURE F
LOAD COMBINATIONS

COMBINATIONS BASED ON CONSEQUENCE CLASS 2 : CC2
ULS: LOAD COMBINATIONS FOR MEMBER DESIGN OF STEEL AND CONCRETE STRUCTURES

	Condition	Table NA.A1.2(B) / Equation	Leading variable load	Design Purpose	Load Descr.	DL	NLDE	NLDN	DLempty	NLEE	NLEN	DLop	NLOE	NLON	DLtest	LL	NLLE	NLLN
					Notional Load	N	N	N	N	N	N	N	N	N	N	N	N	N
					Load Comb	10	1001	1002	30	1003	1004	40	1005	1006	50	20	1007	1008
Empty	Empty+WL+ENT 0.8 : Factor considered on empty weights to account for the effect of diiference between net weight and gross weight of structure	6.10(b)	ENT	For Global Design	40001	1.00	1.00		1.00	1.00								
					40002	1.00		1.00	1.00		1.00							
					40003	1.00	-1.00		1.00	-1.00								
					40004	1.00		-1.00	1.00		-1.00							
					40005	1.00	1.00		1.00	1.00								
					40006	1.00		1.00	1.00		1.00							
					40007	1.00	-1.00		1.00	-1.00								
					40008	1.00		-1.00	1.00		-1.00							
	Empty+WL+ENT 0.8 : Factor considered on empty weights to account for the effect of diiference between net weight and gross weight of structure	6.10(b)	WL	For Global Design	40009	1.00	1.00		1.00	1.00								
					40010	1.00		1.00	1.00		1.00							
					40011	1.00	-1.00		1.00	-1.00								
					40012	1.00		-1.00	1.00		-1.00							
					40013	1.00	1.00		1.00	1.00								
					40014	1.00		1.00	1.00		1.00							
					40015	1.00	-1.00		1.00	-1.00								
					40016	1.00		-1.00	1.00		-1.00							
Operating	Operating+ LL+WL+ENT+SL	6.10 (a)	LL	For Global Design	40017	1.35	1.35					1.35	1.35			1.50	1.50	
					40018	1.35		1.35				1.35		1.35		1.50		1.50
					40019	1.35	-1.35					1.35	-1.35			1.50	-1.50	
					40020	1.35		-1.35				1.35		-1.35		1.50		-1.50
					40021	1.35	1.35					1.35	1.35			1.50	1.50	
					40022	1.35		1.35				1.35		1.35		1.50		1.50
					40023	1.35	-1.35					1.35	-1.35			1.50	-1.50	
					40024	1.35		-1.35				1.35		-1.35		1.50		-1.50
Operating	Operating+ LL+WL+ENT+SL	6.10(b)	ENT	For Global Design	40025	1.20	1.20					1.20	1.20			1.50	1.50	
					40026	1.20		1.20				1.20		1.20		1.50		1.50
					40027	1.20	-1.20					1.20	-1.20			1.50	-1.50	
					40028	1.20		-1.20				1.20		-1.20		1.50		-1.50
					40029	1.20	1.20					1.20	1.20			1.50	1.50	
					40030	1.20		1.20				1.20		1.20		1.50		1.50
					40031	1.20	-1.20					1.20	-1.20			1.50	-1.50	
					40032	1.20		-1.20				1.20		-1.20		1.50		-1.50
					40033	1.20	1.20					1.20	1.20			1.50	1.50	
					40034	1.20		1.20				1.20		1.20		1.50		1.50
					40035	1.20	-1.20					1.20	-1.20			1.50	-1.50	
					40036	1.20		-1.20				1.20		-1.20		1.50		-1.50
					40037	1.20	1.20					1.20	1.20			1.50	1.50	
					40038	1.20		1.20				1.20		1.20		1.50		1.50
					40039	1.20	-1.20					1.20	-1.20			1.50	-1.50	
					40040	1.20		-1.20				1.20		-1.20		1.50		-1.50
Operating	Operating+ LL+WL+ENT+SL	6.10(b)	WL	For Global Design	40041	1.20	1.20					1.20	1.20			1.50	1.50	
					40042	1.20		1.20				1.20		1.20		1.50		1.50
					40043	1.20	-1.20					1.20	-1.20			1.50	-1.50	
					40044	1.20		-1.20				1.20		-1.20		1.50		-1.50
					40045	1.20	1.20					1.20	1.20			1.50	1.50	
					40046	1.20		1.20				1.20		1.20		1.50		1.50
					40047	1.20	-1.20					1.20	-1.20			1.50	-1.50	
					40048	1.20		-1.20				1.20		-1.20		1.50		-1.50
Operating	Operating+ LL+WL+ENT+SL	6.10(b)	SL	For Global Design	40049	1.20	1.20					1.20	1.20			1.50	1.50	
					40050	1.20		1.20				1.20		1.20		1.50		1.50
					40051	1.20	-1.20					1.20	-1.20			1.50	-1.50	
					40052	1.20		-1.20				1.20		-1.20		1.50		-1.50
					40053	1.20	1.20					1.20	1.20			1.50	1.50	
					40054	1.20		1.20				1.20		1.20		1.50		1.50
					40055	1.20	-1.20					1.20	-1.20			1.50	-1.50	
					40056	1.20		-1.20				1.20		-1.20		1.50		-1.50
Operating	Operating+WL+ENT **0.8 : Factor considered on dead loads to account for the effect of diiference between net weight and gross weight of module	6.10(b)	WL	For Global Design	40057	0.80	0.80					0.80	0.80					
					40058	0.80		0.80				0.80		0.80				
					40059	0.80	-0.80					0.80	-0.80					
					40060	0.80		-0.80				0.80		-0.80				
					40061	0.80	0.80					0.80	0.80					
					40062	0.80		0.80				0.80		0.80				
					40063	0.80	-0.80					0.80	-0.80					
					40064	0.80		-0.80				0.80		-0.80				
Test	Test +50%LL+ 50%WL+ENT	6.10(a)	LL	For Global Design	40065	1.35	1.35								1.35	0.75	0.75	
					40066	1.35		1.35							1.35	0.75		0.75
					40067	1.35	-1.35								1.35	0.75	-0.75	
					40068	1.35		-1.35							1.35	0.75		-0.75
	Test +50%LL+ 50%WL+ENT	6.10(b)	WL	For Global Design	40069	1.20	1.20								1.20	0.75	0.75	
					40070	1.20		1.20							1.20	0.75		0.75
					40071	1.20	-1.20								1.20	0.75	-0.75	
					40072	1.20		-1.20							1.20	0.75		-0.75
					40073	1.20	1.20								1.20	0.75	0.75	
					40074	1.20		1.20							1.20	0.75		0.75
					40075	1.20	-1.20								1.20	0.75	-0.75	
					40076	1.20		-1.20							1.20	0.75		-0.75
	Test +50%LL+ 50%WL+ENT	6.10 (b)	ENT	For Global Design	40077	1.20	1.20								1.20	0.75	0.75	
					40078	1.20		1.20							1.20	0.75		0.75
					40079	1.20	-1.20								1.20	0.75	-0.75	
					40080	1.20		-1.20							1.20	0.75		-0.75
					40081	1.20	1.20								1.20	0.75	0.75	
					40082	1.20		1.20							1.20	0.75		0.75
					40083	1.20	-1.20								1.20	0.75	-0.75	
					40084	1.20		-1.20							1.20	0.75		-0.75
Maintanance	Maintenance + LL+WL+ENT	6.10 (a)	ML	For Global Design	40085	1.35	1.35		1.35	1.35						1.50	1.50	
					40086	1.35		1.35	1.35		1.35					1.50		1.50
					40087	1.35	-1.35		1.35	-1.35						1.50	-1.50	
					40088	1.35		-1.35	1.35		-1.35					1.50		-1.50
		6.10 (b)	WL		40089	1.20	1.20		1.20	1.20						1.50	1.50	
					40090	1.20		1.20	1.20		1.20					1.50		1.50
					40091	1.20	-1.20		1.20	-1.20						1.50	-1.50	
					40092	1.20		-1.20	1.20		-1.20					1.50		-1.50
					40093	1.20	1.20		1.20	1.20						1.50	1.50	
					40094	1.20		1.20	1.20		1.20					1.50		1.50
					40095	1.20	-1.20		1.20	-1.20						1.50	-1.50	
					40096	1.20		-1.20	1.20		-1.20					1.50		-1.50
		6.10 (b)	ENT		40097	1.20	1.20		1.20	1.20						1.50	1.50	
					40098	1.20		1.20	1.20		1.20					1.50		1.50
					40099	1.20	-1.20		1.20	-1.20						1.50	-1.50	
					40100	1.20		-1.20	1.20		-1.20					1.50		-1.50
					40101	1.20	1.20		1.20	1.20						1.50	1.50	
					40102	1.20		1.20	1.20		1.20					1.50		1.50
					40103	1.20	-1.20		1.20	-1.20						1.50	-1.50	
					40104	1.20		-1.20	1.20		-1.20					1.50		-1.50

Load Descr.	WLEs +	WLNs+	WLEs -	WLNs-	WLE +	WLN +	WLE -	WLN -	TLE	TLN	FLE	FLN	ENT+	ENT-	WLELocal	WLNLocal	TLELocal	TLNLocal	ML	PSV	VMIN	Snow
Notional Load	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Load Comb	611	631	6110	6310	61	62	63	64	81	82	83	84	85	86	87	88	89	90	91	92	93	94
40001													1.50									
40002													1.50									
40003													1.50									
40004													1.50									
40005														1.50								
40006														1.50								
40007														1.50								
40008														1.50								
40009		0.75			1.50																	
40010	0.75					1.50																
40011				0.75			1.50															
40012			0.75					1.50														
40013				0.75	1.50																	
40014			0.75			1.50																
40015		0.75					1.50															
40016	0.75							1.50														
40017									1.35	1.35												
40018									1.35	1.35												
40019									-1.35	-1.35												
40020									-1.35	-1.35												
40021									1.35	-1.35												
40022									-1.35	1.35												
40023									-1.35	1.35												
40024									1.35	-1.35												
40025									1.20	1.20			1.50									
40026									1.20	1.20			1.50									
40027									-1.20	-1.20			1.50									
40028									-1.20	-1.20			1.50									
40029									1.20	-1.20			1.50									
40030									-1.20	1.20			1.50									
40031									-1.20	1.20			1.50									
40032									1.20	-1.20			1.50									
40033									1.20	1.20				1.50								
40034									1.20	1.20				1.50								
40035									-1.20	-1.20				1.50								
40036									-1.20	-1.20				1.50								
40037									1.20	-1.20				1.50								
40038									-1.20	1.20				1.50								
40039									-1.20	1.20				1.50								
40040									1.20	-1.20				1.50								
40041		0.75			1.50				1.20	1.20												
40042	0.75					1.50			1.20	1.20												
40043				0.75			1.50		-1.20	-1.20												
40044			0.75					1.50	-1.20	-1.20												
40045				0.75	1.50				1.20	-1.20												
40046			0.75			1.50			-1.20	1.20												
40047		0.75					1.50		-1.20	1.20												
40048	0.75							1.50	1.20	-1.20												
40049									1.20	1.20												1.50
40050									1.20	1.20												1.50
40051									-1.20	-1.20												1.50
40052									-1.20	-1.20												1.50
40053									1.20	-1.20												1.50
40054									-1.20	1.20												1.50
40055									-1.20	1.20												1.50
40056									1.20	-1.20												1.50
40057		0.75			1.50				1.00	1.00												
40058	0.75					1.50			1.00	1.00												
40059				0.75			1.50		-1.00	-1.00												
40060			0.75					1.50	-1.00	-1.00												
40061				0.75	1.50				1.00	-1.00												
40062			0.75			1.50			-1.00	1.00												
40063		0.75					1.50		-1.00	1.00												
40064	0.75							1.50	1.00	-1.00												
40065																						
40066																						
40067																						
40068																						
40069		0.38			0.75																	
40070	0.38					0.75																
40071				0.38			0.75															
40072			0.38					0.75														
40073				0.38	0.75																	
40074			0.38			0.75																
40075		0.38					0.75															
40076	0.38							0.75														
40077													1.50									
40078													1.50									
40079													1.50									
40080													1.50									
40081														1.50								
40082														1.50								
40083														1.50								
40084														1.50								
40085																			1.50			
40086																			1.50			
40087																			1.50			
40088																			1.50			
40089		0.75			1.50														1.50			
40090	0.75					1.50													1.50			
40091				0.75			1.50												1.50			
40092			0.75					1.50											1.50			
40093				0.75	1.50														1.50			
40094			0.75			1.50													1.50			
40095		0.75					1.50												1.50			
40096	0.75							1.50											1.50			
40097													1.50						1.50			
40098													1.50						1.50			
40099													1.50						1.50			
40100													1.50						1.50			
40101														1.50					1.50			
40102														1.50					1.50			
40103														1.50					1.50			
40104														1.50					1.50			

COMBINATIONS BASED ON CONSEQUENCE CLASS 2 : CC2
ULS: LOAD COMBINATIONS FOR MEMBER DESIGN OF STEEL AND CONCRETE STRUCTURES

	Condition	Table NA.A1.2(B) / Equation	Leading variable load	Design Purpose	Load Descr.	DL	NLDE	NLDN	DLempty	NLEE	NLEN	DLop	NLOE	NLON	DLtest	LL	NLLE	NLLN	WLEs +	WLNs+	WLEs -	WLNs-	WLE +	WLN +	WLE -	WLN -	TLE	TLN	FLE	FLN	ENT+	ENT-	WLELocal	WLNLocal	TLELocal	TLNLocal	ML	PSV	VMIN	Snow
					Notional Load	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
					Load Comb	10	1001	1002	30	1003	1004	40	1005	1006	50	20	1007	1008	611	631	6110	6310	61	62	63	64	81	82	83	84	85	86	87	88	89	90	91	92	93	94
Operating	Operating+ LL+FL+ENT+SL	6.10(a)		For Local Design	40105	1.35	1.35					1.35	1.35			1.50	1.50										1.35	1.35	1.35	1.35					1.35	1.35			1.35	
					40106	1.35		1.35				1.35		1.35		1.50		1.50									1.35	1.35	1.35	1.35					1.35	1.35			1.35	
					40107	1.35	-1.35					1.35	-1.35			1.50	-1.50										-1.35	-1.35	-1.35	-1.35					-1.35	-1.35			1.35	
					40108	1.35		-1.35				1.35		-1.35		1.50		-1.50									-1.35	-1.35	-1.35	-1.35					-1.35	-1.35			1.35	
					40109	1.35	1.35					1.35	1.35			1.50	1.50										1.35	-1.35	1.35	-1.35					1.35	-1.35			1.35	
					40110	1.35		1.35				1.35		1.35		1.50		1.50									-1.35	1.35	-1.35	1.35					-1.35	1.35			1.35	
					40111	1.35	-1.35					1.35	-1.35			1.50	-1.50										-1.35	1.35	-1.35	1.35					-1.35	1.35			1.35	
					40112	1.35		-1.35				1.35		-1.35		1.50		-1.50									1.36	-1.35	1.35	-1.35					1.35	-1.35			1.35	
	Operating+ LL+FL+ENT+SL	6.10(b)	ENT	For Local Design	40113	1.20	1.20					1.20	1.20			1.50	1.50										1.20	1.20	1.20	1.20	1.50				1.20	1.20			1.20	
					40114	1.20		1.20				1.20		1.20		1.50		1.50									1.20	1.20	1.20	1.20	1.50				1.20	1.20			1.20	
					40115	1.20	-1.20					1.20	-1.20			1.50	-1.50										-1.20	-1.20	-1.20	-1.20	1.50				-1.20	-1.20			1.20	
					40116	1.20		-1.20				1.20		-1.20		1.50		-1.50									-1.20	-1.20	-1.20	-1.20	1.50				-1.20	-1.20			1.20	
					40117	1.20	1.20					1.20	1.20			1.50	1.50										1.20	-1.20	1.20	-1.20	1.50				1.20	-1.20			1.20	
					40118	1.20		1.20				1.20		1.20		1.50		1.50									-1.20	1.20	-1.20	1.20	1.50				-1.20	1.20			1.20	
					40119	1.20	-1.20					1.20	-1.20			1.50	-1.50										-1.20	1.20	-1.20	1.20	1.50				-1.20	1.20			1.20	
					40120	1.20		-1.20				1.20		-1.20		1.50		-1.50									1.20	-1.20	1.20	-1.20	1.50				1.20	-1.20			1.20	
					40121	1.20	1.20					1.20	1.20			1.50	1.50										1.20	1.20	1.20	1.20		1.50			1.20	1.20			1.20	
					40122	1.20		1.20				1.20		1.20		1.50		1.50									1.20	1.20	1.20	1.20		1.50			1.20	1.20			1.20	
					40123	1.20	-1.20					1.20	-1.20			1.50	-1.50										-1.20	-1.20	-1.20	-1.20		1.50			-1.20	-1.20			1.20	
					40124	1.20		-1.20				1.20		-1.20		1.50		-1.50									-1.20	-1.20	-1.20	-1.20		1.50			-1.20	-1.20			1.20	
					40125	1.20	1.20					1.20	1.20			1.50	1.50										1.20	-1.20	1.20	-1.20		1.50			1.20	-1.20			1.20	
					40126	1.20		1.20				1.20		1.20		1.50		1.50									-1.20	1.20	-1.20	1.20		1.50			-1.20	1.20			1.20	
					40127	1.20	-1.20					1.20	-1.20			1.50	-1.50										-1.20	1.20	-1.20	1.20		1.50			-1.20	1.20			1.20	
					40128	1.20		-1.20				1.20		-1.20		1.50		-1.50									1.20	-1.20	1.20	-1.20		1.50			1.20	-1.20			1.20	
Operating	Operating+ LL+FL+ENT+SL	6.10(b)	SL	For Local Design	40129	1.20	1.20					1.20	1.20			1.50	1.50										1.20	1.20	1.20	1.20					1.20	1.20			1.20	1.50
					40130	1.20		1.20				1.20		1.20		1.50		1.50									1.20	1.20	1.20	1.20					1.20	1.20			1.20	1.50
					40131	1.20	-1.20					1.20	-1.20			1.50	-1.50										-1.20	-1.20	-1.20	-1.20					-1.20	-1.20			1.20	1.50
					40132	1.20		-1.20				1.20		-1.20		1.50		-1.50									-1.20	-1.20	-1.20	-1.20					-1.20	-1.20			1.20	1.50
					40133	1.20	1.20					1.20	1.20			1.50	1.50										1.20	-1.20	1.20	-1.20					1.20	-1.20			1.20	1.50
					40134	1.20		1.20				1.20		1.20		1.50		1.50									-1.20	1.20	-1.20	1.20					-1.20	1.20			1.20	1.50
					40135	1.20	-1.20					1.20	-1.20			1.50	-1.50										-1.20	1.20	-1.20	1.20					-1.20	1.20			1.20	1.50
					40136	1.20		-1.20				1.20		-1.20		1.50		-1.50									1.20	-1.20	1.20	-1.20					1.20	-1.20			1.20	1.50
Operating	Operating+ LL+WL+ENT+SL	6.10(b)	WL	For Local Design	40137	1.20	1.20					1.20	1.20			1.50	1.50			0.75			1.50				1.20	1.20					1.50		1.20	1.20			1.20	
					40138	1.20		1.20				1.20		1.20		1.50		1.50	0.75					1.50			1.20	1.20						1.50	1.20	1.20			1.20	
					40139	1.20	-1.20					1.20	-1.20			1.50	-1.50					0.75			1.50		-1.20	-1.20					-1.50		-1.20	-1.20			1.20	
					40140	1.20		-1.20				1.20		-1.20		1.50		-1.50			0.75					1.50	-1.20	-1.20						-1.50	-1.20	-1.20			1.20	
					40141	1.20	1.20					1.20	1.20			1.50	1.50					0.75	1.50				1.20	-1.20					1.50		1.20	-1.20			1.20	
					40142	1.20		1.20				1.20		1.20		1.50		1.50			0.75			1.50			-1.20	1.20						1.50	-1.20	1.20			1.20	
					40143	1.20	-1.20					1.20	-1.20			1.50	-1.50			0.75					1.50		-1.20	1.20					-1.50		-1.20	1.20			1.20	
					40144	1.20		-1.20				1.20		-1.20		1.50		-1.50	0.75							1.50	1.20	-1.20						-1.50	1.20	-1.20			1.20	
	Operating+ LL+WL+ENT+SL	6.10(b)	SL	For Local Design	40145	1.20	1.20					1.20	1.20			1.50	1.50										1.20	1.20							1.20	1.20			1.20	1.50
					40146	1.20		1.20				1.20		1.20		1.50		1.50									1.20	1.20							1.20	1.20			1.20	1.50
					40147	1.20	-1.20					1.20	-1.20			1.50	-1.50										-1.20	-1.20							-1.20	-1.20			1.20	1.50
					40148	1.20		-1.20				1.20		-1.20		1.50		-1.50									-1.20	-1.20							-1.20	-1.20			1.20	1.50
					40149	1.20	1.20					1.20	1.20			1.50	1.50										1.20	-1.20							1.20	-1.20			1.20	1.50
					40150	1.20		1.20				1.20		1.20		1.50		1.50									-1.20	1.20							-1.20	1.20			1.20	1.50
					40151	1.20	-1.20					1.20	-1.20			1.50	-1.50										-1.20	1.20							-1.20	1.20			1.20	1.50
					40152	1.20		-1.20				1.20		-1.20		1.50		-1.50									1.20	-1.20							1.20	-1.20			1.20	1.50
	Operating+ LL+WL+ENT+SL	6.10(b)	ENT	For Local Design	40153	1.20	1.20					1.20	1.20			1.50	1.50										1.20	1.20			1.50				1.20	1.20			1.20	
					40154	1.20		1.20				1.20		1.20		1.50		1.50									1.20	1.20			1.50				1.20	1.20			1.20	
					40155	1.20	-1.20					1.20	-1.20			1.50	-1.50										-1.20	-1.20			1.50				-1.20	-1.20			1.20	
					40156	1.20		-1.20				1.20		-1.20		1.50		-1.50									-1.20	-1.20			1.50				-1.20	-1.20			1.20	
					40157	1.20	1.20					1.20	1.20			1.50	1.50										1.20	-1.20			1.50				1.20	-1.20			1.20	
					40158	1.20		1.20				1.20		1.20		1.50		1.50									-1.20	1.20			1.50				-1.20	1.20			1.20	
					40159	1.20	-1.20					1.20	-1.20			1.50	-1.50										-1.20	1.20			1.50				-1.20	1.20			1.20	
					40160	1.20		-1.20				1.20		-1.20		1.50		-1.50									1.20	-1.20			1.50				1.20	-1.20			1.20	
					40161	1.20	1.20					1.20	1.20			1.50	1.50										1.20	1.20				1.50			1.20	1.20			1.20	
					40162	1.20		1.20				1.20		1.20		1.50		1.50									1.20	1.20				1.50			1.20	1.20			1.20	
					40163	1.20	-1.20					1.20	-1.20			1.50	-1.50										-1.20	-1.20				1.50			-1.20	-1.20			1.20	
					40164	1.20		-1.20				1.20		-1.20		1.50		-1.50									-1.20	-1.20				1.50			-1.20	-1.20			1.20	
					40165	1.20	1.20					1.20	1.20			1.50	1.50										1.20	-1.20				1.50			1.20	-1.20			1.20	
					40166	1.20		1.20				1.20		1.20		1.50		1.50									-1.20	1.20				1.50			-1.20	1.20			1.20	
					40167	1.20	-1.20					1.20	-1.20			1.50	-1.50										-1.20	1.20				1.50			-1.20	1.20			1.20	
					40168	1.20		-1.20				1.20		-1.20		1.50		-1.50									1.20	-1.20				1.50			1.20	-1.20			1.20	
Test	Test +50%LL+ 50%WL+ENT	6.10(b)	LL	For Local Design	40169	1.35	1.35								1.35	0.75	0.75																						1.20	
					40170	1.35		1.35							1.35	0.75		0.75																					1.20	
					40171	1.35	-1.35								1.35	0.75	-0.75																						1.20	
					40172	1.35		-1.35							1.35	0.75		-0.75																					1.20	
	Test +50%LL+ 50%WL+ENT	6.10(b)	WL	For Local Design	40173	1.20	1.20								1.20	0.75	0.75			0.38			0.75										0.75						1.20	
					40174	1.20		1.20							1.20	0.75		0.75	0.38					0.75										0.75					1.20	
					40175	1.20	-1.20								1.20	0.75	-0.75					0.38			0.75								-0.75						1.20	
					40176	1.20		-1.20							1.20	0.75		-0.75			0.38					0.75								-0.75					1.20	
					40177	1.20	1.20								1.20	0.75	0.75					0.38	0.75										0.75						1.20	
					40178	1.20		1.20							1.20	0.75		0.75			0.38			0.75										0.75					1.20	
					40179	1.20	-1.20								1.20	0.75	-0.75			0.38					0.75								-0.75						1.20	
					40180	1.20		-1.20							1.20	0.75		-0.75	0.38							0.75								-0.75					1.20	
	Test +50%LL+ 50%WL+ENT	6.10(b)	ENT	For Local Design	40181	1.20	1.20								1.20	0.75	0.75														1.50								1.20	
					40182	1.20		1.20							1.20	0.75		0.75													1.50								1.20	
					40183	1.20	-1.20								1.20	0.75	-0.75														1.50								1.20	
					40184	1.20		-1.20							1.20	0.75		-0.75													1.50								1.20	
					40185	1.20	1.20								1.20	0.75	0.75															1.50							1.20	
					40186	1.20		1.20							1.20	0.75		0.75														1.50							1.20	
					40187	1.20	-1.20								1.20	0.75	-0.75															1.50							1.20	
					40188	1.20		-1.20							1.20	0.75		-0.75														1.50							1.20	
PSV	Operating+PSV Loads+LL+ ENT	6.10 (a)	PSV	For Local Design	40189	1.35	1.35					1.35	1.35			1.50	1.50										1.35	1.35							1.35	1.35		1.35	1.35	
					40190	1.35		1.35				1.35		1.35		1.50		1.50									1.35	1.35							1.35	1.35		1.35	1.35	
					40191	1.35	-1.35					1.35	-1.35			1.50	-1.50										-1.35	-1.35							-1.35	-1.35		1.35	1.35	
					40192	1.35		-1.35				1.35		-1.35		1.50		-1.50									-1.35	-1.35							-1.35	-1.35		1.35	1.35	
					40193	1.35	1.35					1.35	1.35			1.50	1.50										1.35	-1.35							1.35	-1.35		1.35	1.35	
					40194	1.35		1.35				1.35		1.35		1.50		1.50									-1.35	1.35							-1.35	1.35		1.35	1.35	
					40195	1.35	-1.35					1.35	-1.35			1.50	-1.50										-1.35	1.35							-1.35	1.35		1.35	1.35	
					40196	1.35		-1.35				1.35		-1.35		1.50		-1.50									1.35	-1.35							1.35	-1.35		1.35	1.35	
	Operating+PSV Loads+LL+ ENT	6.10(b)	PSV + ENT		40197	1.20	1.20					1.20	1.20			1.50	1.50										1.20	1.20			1.50				1.20	1.20		1.20	1.20	
					40198	1.20		1.20				1.20		1.20		1.50		1.50									1.20	1.20			1.50				1.20	1.20		1.20	1.20	
					40199	1.20	-1.20					1.20	-1.20			1.50	-1.50										-1.20	-1.20			1.50				-1.20	-1.20		1.20	1.20	
					40200	1.20		-1.20				1.20		-1.20		1.50		-1.50									-1.20	-1.20			1.50				-1.20	-1.20		1.20	1.20	
					40201	1.20	1.20					1.20	1.20			1.50	1.50										1.20	-1.20				1.50			1.20	-1.20		1.20	1.20	
					40202	1.20		1.20				1.20		1.20		1.50		1.50									-1.20	1.20				1.50			-1.20	1.20		1.20	1.20	
					40203	1.20	-1.20					1.20	-1.20			1.50	-1.50										-1.20	1.20				1.50			-1.20	1.20		1.20	1.20	
					40204	1.20		-1.20				1.20		-1.20		1.50		-1.50									1.20	-1.20				1.50			1.20	-1.20		1.20	1.20	

Load combinations with Blast loads for ULS & SLS							
Comb. No.	Load Combination	DL	LL	BL+X	BL-X	BL+Z	BL-Z
		10	20	10001	10002	10003	10004
10005	1.0DL + 1.0LL + 1.0BL+X	1.0	1.0	1.0			
10006	1.0DL + 1.0LL + 1.0BL-X	1.0	1.0		1.0		
10007	1.0DL + 1.0LL + 1.0BL+Z	1.0	1.0			1.0	
10008	1.0DL + 1.0LL + 1.0BL-Z	1.0	1.0				1.0

COMBINATIONS BASED ON CONSEQUENCE CLASS 2 : CC2
SLS: LOAD COMBINATIONS FOR MEMBER DESIGN OF STEEL STRUCTURES

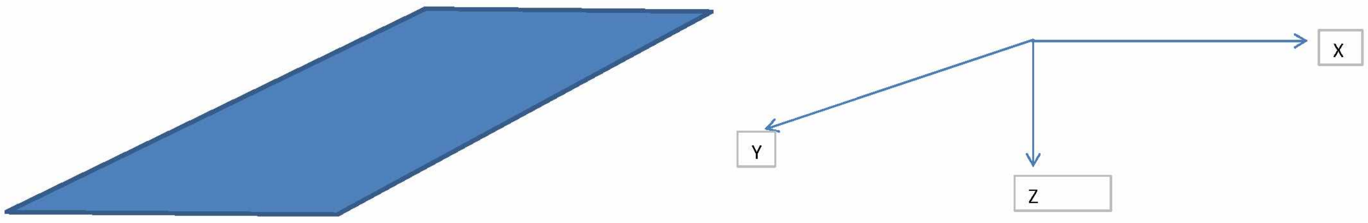
	Condition	Table NA.A1.2(B) / Equation	Leading variable load	Design Purpose	Load Descr.	DL	DLempty	DLop	DLtest	LL	WLEs+	WLNs+	WLEs-	WLNs-	WLE+	WLN+	WLE-	WLN-	TLE	TLN	FLE	FLN	ENT+	ENT-	WLELocal	WLNLocal	TLELocal	TLNLocal	ML	PSV	VMIN	Snow
					Notional Load	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
					Load Comb	10	30	40	50	20	611	631	6110	6310	61	62	63	64	81	82	83	84	85	86	87	88	89	90	91	92	93	94
Empty	Empty+WL+ENT	6.14(a)	ENT	For Global Design	30001	1.00	1.00																1.00									
					30002	1.00	1.00																	1.00								
	Empty+WL+ENT	6.14(a)	WL	For Global Design	30003	1.00	1.00					0.50			1.00																	
					30004	1.00	1.00				0.50					1.00																
					30005	1.00	1.00							0.50			1.00															
					30006	1.00	1.00						0.50					1.00														
					30007	1.00	1.00							0.50	1.00																	
					30008	1.00	1.00						0.50			1.00																
					30009	1.00	1.00					0.50					1.00															
					30010	1.00	1.00				0.50							1.00														
Operating	Operating+ LL+WL+ENT+SL	6.14 (a)	LL	For Global Design	30011	1.00		1.00		1.00									1.00	1.00												
					30012	1.00		1.00		1.00									-1.00	-1.00												
					30013	1.00		1.00		1.00									1.00	-1.00												
					30014	1.00		1.00		1.00									-1.00	1.00												
					30015	1.00		1.00		1.00									1.00	1.00												
					30016	1.00		1.00		1.00									-1.00	-1.00												
					30017	1.00		1.00		1.00									1.00	-1.00												
					30018	1.00		1.00		1.00									-1.00	1.00												
	Operating+ LL+WL+ENT+SL	6.14(a)	ENT	For Global Design	30019	1.00		1.00		1.00									1.00	1.00			1.00									
					30020	1.00		1.00		1.00									-1.00	-1.00			1.00									
					30021	1.00		1.00		1.00									1.00	-1.00			1.00									
					30022	1.00		1.00		1.00									-1.00	1.00			1.00									
					30023	1.00		1.00		1.00									1.00	1.00			1.00									
					30024	1.00		1.00		1.00									-1.00	-1.00			1.00									
					30025	1.00		1.00		1.00									1.00	-1.00			1.00									
					30026	1.00		1.00		1.00									-1.00	1.00			1.00									
					30027	1.00		1.00		1.00									1.00	1.00				1.00								
					30028	1.00		1.00		1.00									-1.00	-1.00				1.00								
					30029	1.00		1.00		1.00									1.00	-1.00				1.00								
					30030	1.00		1.00		1.00									-1.00	1.00				1.00								
					30031	1.00		1.00		1.00									1.00	1.00				1.00								
					30032	1.00		1.00		1.00									-1.00	-1.00				1.00								
					30033	1.00		1.00		1.00									1.00	-1.00				1.00								
					30034	1.00		1.00		1.00									-1.00	1.00				1.00								
	Operating+ LL+WL+ENT+SL	6.14(a)	WL	For Global Design	30035	1.00		1.00		1.00		0.50			1.00				1.00	1.00												
					30036	1.00		1.00		1.00	0.50					1.00			1.00	1.00												
					30037	1.00		1.00		1.00				0.50			1.00		-1.00	-1.00												
					30038	1.00		1.00		1.00			0.50					1.00	-1.00	-1.00												
					30039	1.00		1.00		1.00				0.50	1.00				1.00	-1.00												
					30040	1.00		1.00		1.00			0.50			1.00			-1.00	1.00												
					30041	1.00		1.00		1.00		0.50					1.00		-1.00	1.00												
					30042	1.00		1.00		1.00	0.50							1.00	1.00	-1.00												
	Operating+ LL+WL+ENT+SL	6.14(a)	SL	For Global Design	30043	1.00		1.00		1.00									1.00	1.00												1.00
					30044	1.00		1.00		1.00									1.00	1.00												1.00
					30045	1.00		1.00		1.00									-1.00	-1.00												1.00
					30046	1.00		1.00		1.00									-1.00	-1.00												1.00
					30047	1.00		1.00		1.00									1.00	-1.00												1.00
					30048	1.00		1.00		1.00									-1.00	1.00												1.00
					30049	1.00		1.00		1.00									-1.00	1.00												1.00
					30050	1.00		1.00		1.00									1.00	-1.00												1.00
	Operating+WL+ENT	6.14(a)	WL	For Global Design	30051	1.00		1.00				0.50			1.00				1.00	1.00												
					30052	1.00		1.00			0.50					1.00			1.00	1.00												
					30053	1.00		1.00						0.50			1.00		-1.00	-1.00												
					30054	1.00		1.00					0.50					1.00	-1.00	-1.00												
					30055	1.00		1.00						0.50	1.00				1.00	-1.00												
					30056	1.00		1.00					0.50			1.00			-1.00	1.00												
					30057	1.00		1.00				0.50					1.00		-1.00	1.00												
					30058	1.00		1.00			0.50							1.00	1.00	-1.00												
Test	Test +50%LL+ 50%WL+ENT	6.14(a)	WL	For Global Design	30059	1.00			1.00	0.50		0.25			0.50																	
					30060	1.00			1.00	0.50	0.25					0.50																
					30061	1.00			1.00	0.50				0.25			0.50															
					30062	1.00			1.00	0.50			0.25					0.50														
					30063	1.00			1.00	0.50				0.25	0.50																	
					30064	1.00			1.00	0.50			0.25			0.50																
					30065	1.00			1.00	0.50		0.25					0.50															
					30066	1.00			1.00	0.50	0.25							0.50														
	Test +50%LL+ 50%WL+ENT	6.14(a)	ENT	For Global Design	30067	1.00			1.00	0.50													1.00									
					30068	1.00			1.00	0.50														1.00								
Maintenance	Maintenance + LL+WL+EN	6.14(a)	WL	For Global Design	30069	1.00	1.00			1.00		0.50			1.00														1.00			
					30070	1.00	1.00			1.00	0.50					1.00													1.00			
					30071	1.00	1.00			1.00				0.50			1.00												1.00			
					30072	1.00	1.00			1.00			0.50					1.00											1.00			
					30073	1.00	1.00			1.00				0.50	1.00														1.00			
					30074	1.00	1.00			1.00			0.50			1.00													1.00			
					30075	1.00	1.00			1.00		0.50					1.00												1.00			
					30076	1.00	1.00			1.00	0.50							1.00											1.00			
		6.14(a)	ENT		30077	1.00	1.00			1.00													1.00						1.00			
					30078	1.00	1.00			1.00														1.00					1.00			

COMBINATIONS BASED ON CONSEQUENCE CLASS 2 : CC2
SLS: LOAD COMBINATIONS FOR MEMBER DESIGN OF STEEL STRUCTURES

	Condition	Table NA.A1.2(B) / Equation	Leading variable load	Design Purpose	Load Descr.	DL	DLempty	DLop	DLtest	LL	WLEs+	WLNs+	WLEs-	WLNs-	WLE +	WLN +	WLE -	WLN -	TLE	TLN	FLE	FLN	ENT+	ENT-	WLELocal	WLNLocal	TLELocal	TLNLocal	ML	PSV	VMIN	Snow
					Notional Load	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
					Load Comb	10	30	40	50	20	611	631	6110	6310	61	62	63	64	81	82	83	84	85	86	87	88	89	90	91	92	93	94
Operating	Operating+ LL+FL+ENT+SL	6.14(a)	FL	For Local Design	30079	1.00		1.00		1.00									1.00	1.00	1.00	1.00					1.00	1.00			1.00	
					30080	1.00		1.00		1.00									1.00	1.00	1.00	1.00					1.00	1.00			1.00	
					30081	1.00		1.00		1.00									-1.00	-1.00	-1.00	-1.00					-1.00	-1.00			1.00	
					30082	1.00		1.00		1.00									-1.00	-1.00	-1.00	-1.00					-1.00	-1.00			1.00	
					30083	1.00		1.00		1.00									1.00	-1.00	1.00	-1.00					1.00	-1.00			1.00	
					30084	1.00		1.00		1.00									-1.00	1.00	-1.00	1.00					-1.00	1.00			1.00	
					30085	1.00		1.00		1.00									-1.00	1.00	-1.00	1.00					-1.00	1.00			1.00	
					30086	1.00		1.00		1.00									1.00	-1.00	1.00	-1.00					1.00	-1.00			1.00	
	Operating+ LL+FL+ENT+SL	6.14(a)	ENT	For Local Design	30087	1.00		1.00		1.00									1.00	1.00	1.00	1.00	1.00				1.00	1.00			1.00	
					30088	1.00		1.00		1.00									1.00	1.00	1.00	1.00	1.00				1.00	1.00			1.00	
					30089	1.00		1.00		1.00									-1.00	-1.00	-1.00	-1.00	1.00				-1.00	-1.00			1.00	
					30090	1.00		1.00		1.00									-1.00	-1.00	-1.00	-1.00	1.00				-1.00	-1.00			1.00	
					30091	1.00		1.00		1.00									1.00	-1.00	1.00	-1.00	1.00				1.00	-1.00			1.00	
					30092	1.00		1.00		1.00									-1.00	1.00	-1.00	1.00	1.00				-1.00	1.00			1.00	
					30093	1.00		1.00		1.00									-1.00	1.00	-1.00	1.00	1.00				-1.00	1.00			1.00	
					30094	1.00		1.00		1.00									1.00	-1.00	1.00	-1.00	1.00				1.00	-1.00			1.00	
					30095	1.00		1.00		1.00									1.00	1.00	1.00	1.00		1.00			1.00	1.00			1.00	
					30096	1.00		1.00		1.00									1.00	1.00	1.00	1.00		1.00			1.00	1.00			1.00	
					30097	1.00		1.00		1.00									-1.00	-1.00	-1.00	-1.00		1.00			-1.00	-1.00			1.00	
					30098	1.00		1.00		1.00									-1.00	-1.00	-1.00	-1.00		1.00			-1.00	-1.00			1.00	
					30099	1.00		1.00		1.00									1.00	-1.00	1.00	-1.00		1.00			1.00	-1.00			1.00	
					30100	1.00		1.00		1.00									-1.00	1.00	-1.00	1.00		1.00			-1.00	1.00			1.00	
					30101	1.00		1.00		1.00									-1.00	1.00	-1.00	1.00		1.00			-1.00	1.00			1.00	
					30102	1.00		1.00		1.00									1.00	-1.00	1.00	-1.00		1.00			1.00	-1.00			1.00	
Operating	Operating+ LL+FL+ENT+SL	6.14(a)	SL	For Local Design	30103	1.00		1.00		1.00									1.00	1.00	1.00	1.00					1.00	1.00			1.00	1.00
					30104	1.00		1.00		1.00									1.00	1.00	1.00	1.00					1.00	1.00			1.00	1.00
					30105	1.00		1.00		1.00									-1.00	-1.00	-1.00	-1.00					-1.00	-1.00			1.00	1.00
					30106	1.00		1.00		1.00									-1.00	-1.00	-1.00	-1.00					-1.00	-1.00			1.00	1.00
					30107	1.00		1.00		1.00									1.00	-1.00	1.00	-1.00					1.00	-1.00			1.00	1.00
					30108	1.00		1.00		1.00									-1.00	1.00	-1.00	1.00					-1.00	1.00			1.00	1.00
					30109	1.00		1.00		1.00									-1.00	1.00	-1.00	1.00					-1.00	1.00			1.00	1.00
					30110	1.00		1.00		1.00									1.00	-1.00	1.00	-1.00					1.00	-1.00			1.00	1.00
Operating	Operating+ LL+WL+ENT+SL	6.14(a)	WL	For Local Design	30111	1.00		1.00		1.00		0.50			1.00				1.00	1.00					1.00		1.00	1.00			1.00	
					30112	1.00		1.00		1.00	0.50					1.00			1.00	1.00						1.00	1.00	1.00			1.00	
					30113	1.00		1.00		1.00				0.50			1.00		-1.00	-1.00					-1.00		-1.00	-1.00			1.00	
					30114	1.00		1.00		1.00			0.50					1.00	-1.00	-1.00						-1.00	-1.00	-1.00			1.00	
					30115	1.00		1.00		1.00				0.50	1.00				1.00	-1.00					1.00		1.00	-1.00			1.00	
					30116	1.00		1.00		1.00			0.50			1.00			-1.00	1.00						1.00	-1.00	1.00			1.00	
					30117	1.00		1.00		1.00		0.50					1.00		-1.00	1.00					-1.00		-1.00	1.00			1.00	
					30118	1.00		1.00		1.00	0.50							1.00	1.00	-1.00						-1.00	1.00	-1.00			1.00	
	Operating+ LL+WL+ENT+SL	6.14(a)	SL	For Local Design	30119	1.00		1.00		1.00									1.00	1.00							1.00	1.00			1.00	1.00
					30120	1.00		1.00		1.00									1.00	1.00							1.00	1.00			1.00	1.00
					30121	1.00		1.00		1.00									-1.00	-1.00							-1.00	-1.00			1.00	1.00
					30122	1.00		1.00		1.00									-1.00	-1.00							-1.00	-1.00			1.00	1.00
					30123	1.00		1.00		1.00									1.00	-1.00							1.00	-1.00			1.00	1.00
					30124	1.00		1.00		1.00									-1.00	1.00							-1.00	1.00			1.00	1.00
					30125	1.00		1.00		1.00									-1.00	1.00							-1.00	1.00			1.00	1.00
					30126	1.00		1.00		1.00									1.00	-1.00							1.00	-1.00			1.00	1.00
	Operating+ LL+WL+ENT+SL	6.14(a)	ENT	For Local Design	30127	1.00		1.00		1.00									1.00	1.00			1.00				1.00	1.00			1.00	
					30128	1.00		1.00		1.00									1.00	1.00			1.00				1.00	1.00			1.00	
					30129	1.00		1.00		1.00									-1.00	-1.00			1.00				-1.00	-1.00			1.00	
					30130	1.00		1.00		1.00									-1.00	-1.00			1.00				-1.00	-1.00			1.00	
					30131	1.00		1.00		1.00									1.00	-1.00			1.00				1.00	-1.00			1.00	
					30132	1.00		1.00		1.00									-1.00	1.00			1.00				-1.00	1.00			1.00	
					30133	1.00		1.00		1.00									-1.00	1.00			1.00				-1.00	1.00			1.00	
					30134	1.00		1.00		1.00									1.00	-1.00			1.00				1.00	-1.00			1.00	
					30135	1.00		1.00		1.00									1.00	1.00				1.00			1.00	1.00			1.00	
					30136	1.00		1.00		1.00									1.00	1.00				1.00			1.00	1.00			1.00	
					30137	1.00		1.00		1.00									-1.00	-1.00				1.00			-1.00	-1.00			1.00	
					30138	1.00		1.00		1.00									-1.00	-1.00				1.00			-1.00	-1.00			1.00	
					30139	1.00		1.00		1.00									1.00	-1.00				1.00			1.00	-1.00			1.00	
					30140	1.00		1.00		1.00									-1.00	1.00				1.00			-1.00	1.00			1.00	
					30141	1.00		1.00		1.00									-1.00	1.00				1.00			-1.00	1.00			1.00	
					30142	1.00		1.00		1.00									1.00	-1.00				1.00			1.00	-1.00			1.00	
	Test +50%LL+ 50%WL+ENT	6.14(a)	WL	For Local Design	30143	1.00			1.00	0.50		0.25			0.50										0.50						1.00	
					30144	1.00			1.00	0.50	0.25					0.50										0.50					1.00	
					30145	1.00			1.00	0.50				0.25			0.50								-0.50						1.00	
					30146	1.00			1.00	0.50			0.25					0.50								-0.50					1.00	
					30147	1.00			1.00	0.50				0.25	0.50										0.50						1.00	
					30148	1.00			1.00	0.50			0.25			0.50										0.50					1.00	
					30149	1.00			1.00	0.50		0.25					0.50								-0.50						1.00	
					30150	1.00			1.00	0.50	0.25							0.50								-0.50					1.00	
	Test +50%LL+ 50%WL+ENT	6.14(a)	ENT	For Local Design	30151	1.00			1.00	0.50													1.00								1.00	
					30152	1.00			1.00	0.50														1.00							1.00	
	Operating+PSV Loads+LL+ ENT	6.14(a)	PSV + ENT	For Local Design	30153	1.00		1.00		1.00									1.00	1.00			1.50				1.00	1.00		1.00	1.00	
					30154	1.00		1.00		1.00									1.00	1.00			1.50				1.00	1.00		1.00	1.00	
					30155	1.00		1.00		1.00									-1.00	-1.00			1.50				-1.00	-1.00		1.00	1.00	
					30156	1.00		1.00		1.00									-1.00	-1.00			1.50				-1.00	-1.00		1.00	1.00	
					30157	1.00		1.00		1.00									1.00	-1.00				1.50			1.00	-1.00		1.00	1.00	
					30158	1.00		1.00		1.00									-1.00	1.00				1.50			-1.00	1.00		1.00	1.00	
					30159	1.00		1.00		1.00									-1.00	1.00				1.50			-1.00	1.00		1.00	1.00	
					30160	1.00		1.00		1.00									1.00	-1.00				1.50			1.00	-1.00		1.00	1.00	

ANNEXURE G
MAT FOUNDATION DESIGN

Design of Foundation by FEM for EN 1992 1-1 For Footing Slab / Pile cap



References :

1) VOID
2) EN 1992 Part 1-1: General Rules and rules for Buildings (Including NA to NEN EN 1992 Part 1-1)
3) EN 1992 Part 1-2: General Rules Structural Fire design (Including NA to NEN EN 1992 Part 1-2)

1) Basic Input data:

Cylindrical compressive strength of concrete, f_{ck} =	35	N/mm^2	
Yield strength of steel (Grade of steel), f_{yk} =	500	N/mm^2	
Depth of Pile Cap, D =	600	mm	
Width of Column in X Direction, l_x	750	mm	
Width of Column in Y Direction, l_y	750	mm	
Diameter / width of pile in X direction d_{px}	460	mm	
Diameter / width of pile in Y direction d_{py}	460	mm	
Embeddment of Pile inside pilecap e_1	75	mm	
Axial tensile strength of concrete fctm	2.9	N/mm^2	

2) Design Input Data:

Max net bending moment at bottom of pile cap in X direction, M_{uxb}	146	kN-m	average Is considered
Max net bending moment at bottom of pile cap in Y direction, M_{uyb}	151	kN-m	average Is considered
Max net bending moment at top of pile cap in X direction, M_{uxt}	165	kN-m	average Is considered
Max net bending moment at top of pile cap in Y direction, M_{uyt}	56	kN-m	average Is considered
Maximum net Shear force at top of pile cap in X direction, $N_{Ed,x}$	176	kN	
Maximum net Shear force at top of pile cap in Y direction, $N_{Ed,y}$	176	kN	
Maximum net Vertical Load at top of Pile cap N_{ed}	1861	kN	
Maximum net Shear force at top of pile head in X direction, $N_{Edp,x}$	25	kN	
Maximum net Shear force at top of pile head in Y direction, $N_{Edp,y}$	39	kN	
Maximum net Vertical reaction from Pile N_{edp}	523	kN	
Clear cover for bottom bars, C_{cb}	75	mm	
Clear cover for top bars, C_{ct}	50	mm	
Clear cover for side bars, C_{cs}	50	mm	
Minimum diameter of bar φ	10	mm	*As per Clause 9.8.1(3) of Ref 2*

Bar diameter to be provided @	Bar Dia		Spacing	
At bottom in X direction, d_{bxb}	16	@	150	mm c/c
At top in X direction, d_{bxt}	16	@	150	mm c/c
At bottom in Y direction, d_{byb}	16	@	150	mm c/c
At top in Y direction, d_{byt}	16	@	150	mm c/c

Check For Diameter of bar for main tensile reinforcement φ as per Clause 9.8.1(3) of Ref 2

Diameter of Bar provided φ = 16 mm O.K.

Check For Spacing of reinforcement at tension reinforcement as per Cl. 9.3.1.1 (3) of ref-2

Allowable maximum spacing of tension reinforcement in Slabs / Pile cap

S_{max} Pile cap = min. of the following:

For Principal (Main) reinforcement = 3D < = 400 mm For Secondary (Distribution) reinforcement = 3.5D < = 450 mm

In areas with concentrated loads or areas of maximum moment the above values of S_{max} become respectively: *(As per Clause 9.3.1.1 (3) of ref 2*

For Principal (Main) reinforcement = 2D < = 200 mm For Secondary (Distribution) reinforcement = 3D < = 400 mm

Smax = 200.0 mm O.K.

3) Design of Slabs / Pile Cap :

3.1 Effective depth of Slabs / Pile Cap, Deff :

For bottom rebars,

Deff in X direction = $Deff_{xb}$ = D - C_{cb} - d_{bxb}/2 = 517 mm

Deff in Y direction = $Deff_{yb}$ = D- C_{cb} - d_{bxb} - d_{byb}/2 = 501 mm

For top rebars,

Deff in X direction = $Deff_{xt}$ = D - C_{ct} - d_{bxt}/2 = 542 mm

Deff in Y direction = $Deff_{yt}$ = D - C_{ct} - d_{bxt} - d_{byt}/2 = 526 mm

3.2 Calculations for Effective depth of Slabs / Pile Cap, d1 and d2 : (considering Balanced Section - Singly reinforced Section)

Check for D_{eff} d1 = D/2*(1+SQRT(1-(3.53*K))) where K = Mu/(f_{ck}*b*d^2)

K = 0.0156 d1 = 591.62 mm

Check for D_{eff} d2 = 0.9*D d2 = 540 mm

Governing Effective Depth $Deff_{xb}$ and $Deff_{yb}$ = 501.00 mm

Governing Effective Depth $Deff_{xt}$ and $Deff_{yt}$ = 526.00 mm

3.3 Area of Reinforcement required A_{st} :

A_{st}(required) = Mu/(f_{yk}*D_{eff})

%P_t (required) = A_{st}(required)*100/(bXDeff)

As per Clause 9.2.1 (1) of ref 2 Longitudinal reinforcement shall not be less than

$A_{s,min}$	=	(0.26*b*Deff*(f_{ctm}/f_{yk}))	Total required minimum longitudinal reinforcement	$A_{s,min}$	=	755.508	mm^2/m
$A_{s,min}$	=	0.0013* b * D	For each top & Bottom Reinforcement	$A_{s,min}$	=	780	mm^2/m
$A_{s,max}$	=	0.04A_c	Where Ac is the area of concrete cross section	$A_{s,max}$	=	24000	mm^2/m

3.4 Reinforcement at bottom of Slabs / Pile cap in X direction :

A_{stxb} (required) = $M_{uxb}/(f_{yk}$*Deffb) = 582.834 mm^2/m

Check for $A_{s,min}$ (required) = 780.000 mm^2/m

A_{stxb} (provided) = 1340.000 mm^2/m O.K

3.5 Reinforcement at bottom of Slabs / Pile cap in Y direction :

A_{styb} (required) = $M_{uyb}/(f_{yk}$*Deffb) = 602.794 mm^2/m

Check for $A_{s,min}$ (required) = 780.000 mm^2/m

A_{styb} (provided) = 1340.000 mm^2/m O.K

3.6 Reinforcement at top of Slabs / Pile cap in X direction :

A_{stxt} (required) = $M_{uxt}/(f_{yk}$*Defft) = 627.376 mm^2/m

Check for $A_{s,min}$ (required) = 780.000 mm^2/m

A_{stxt} (provided) = 1340.000 mm^2/m O.K

3.7 Reinforcement at top of Slabs / Pile cap in Y direction :

A_{styt} (required) = $M_{uyt}/(f_{yk}$*Defft) = 212.928 mm^2/m

Check for $A_{s,min}$ (required) = 780.000 mm^2/m

A_{styb} (provided) = 1340.000 mm^2/m O.K

3.8a Check for one way shear in X Direction :

Comparison of Design Value of applied Shear Force V_{Ed} with the Design Shear Resistance of the cross section without reinforcement $V_{Rd,c}$ in N/mm^2 as per Clause 6.2.1(3) and 6.2.2 of Ref 2

$V_{Rd,c}$ = $[C_{Rd,c}*k*(100*\rho_1*f_{ck})^{1/3}+k_1*\sigma_{cp}]*b_w*Deff_x$ KN However, shear is checked in terms of stress (N/mm^2) in place of kN as below as the STAAD output gives shear in terms of stress.

$V_{Rd,c}$ (Minimum) = $(v_{min}+k_1*\sigma_{cp})*b_w*Deff_x$ kN However, shear is checked in terms of stress (N/mm^2) in place of kN as below as the STAAD output gives shear in terms of stress.

Where: f_{ck} is in N/mm^2,

k = 1+SQRT(200/$Deff_x$) < = 2.0 = 1.632

$k1$ = As per NA to SS EN 1992-1-1:2008 = 0.150

ρ_1 = $A_{stxb}/(b_w*Deff_x)$ < = 0.02 = 0.002

σ_{cp} = $0.2*f_{cd}$ = = 3.96667 N/mm^2

where f_{cd} is design compressive strength of Concrete = $(\alpha_{cc}*f_{ck})/\gamma_c$ = 19.8333 N/mm^2 α_{cc} = 0.85 γ_c = 1.5 *Refer Clause 3.1.6(1)P of ref 2*

where α_{cc} and γ_c are coefficients as defined in Clause 3.1.6 of ref 2.

$C_{Rd,c}$ = $0.18/\gamma_c$ = 0.12

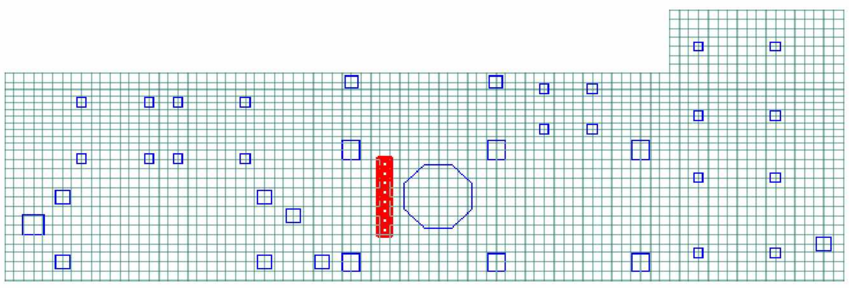
v_{min} = $0.035*k^{3/2}*f_{ck}^{1/2}$ = 0.450

$V_{Rd,c}$ = Design Shear Resistance of the Cross section without reinforcement = 0.9507 N/mm^2

$V_{Rd,c}$ = Minimum Design Shear Resistance of the Cross Section = 1.0449 N/mm^2

Check for one way shear in X direction

Plate strips considered for one way shear in X direction from STAAD model.



Actual Design Value of applied Shear Force V_{Ed} = 0.054 N/mm^2 OK

3.8b Check for one way shear in Y Direction :

Comparison of Design Value of applied Shear Force V_{Ed} with the Design Shear Resistance of the cross section without reinforcement $V_{Rd,c}$ in N/mm^2 as per Clause 6.2.1(3) and 6.2.2 of Ref 2

$V_{Rd,c}$ = $[C_{Rd,c}*k*(100*\rho_1*f_{ck})^{1/3}+k_1*\sigma_{cp}]*b_w*Deff_y$ kN However, shear is checked in terms of stress (N/mm^2) in place of kN as below as the STAAD output gives shear in terms of stress.

$V_{Rd,c}$ (Minimum) = $(v_{min}+k_1*\sigma_{cp})*b_w*Deff_y$ kN However, shear is checked in terms of stress (N/mm^2) in place of kN as below as the STAAD output gives shear in terms of stress.

Where: f_{ck} is in N/mm^2,

k = 1+SQRT(200/Deffy) < = 2.0 = 1.632

$k1$ = Coefficient fo Abrasion Class XM1 = 0.150

ρ_1 = $A_{styb}/(b_w*Deff_y)$ < = 0.02 = 0.003

σ_{cp} = $0.2*f_{cd}$ = = 3.96667 N/mm^2

where f_{cd} is design compressive strength of Concrete = $(\alpha_{cc}*f_{ck})/\gamma_c$ = 19.8333 N/mm^2 α_{cc} = 0.85 γ_c = 1.5 *Refer Clause 3.1.6(1)P of ref 2*

where α_{cc} and γ_c are coefficients as defined in Clause 3.1.6 of ref 2.

$C_{Rd,c}$ = $0.18/\gamma_c$ = 0.12

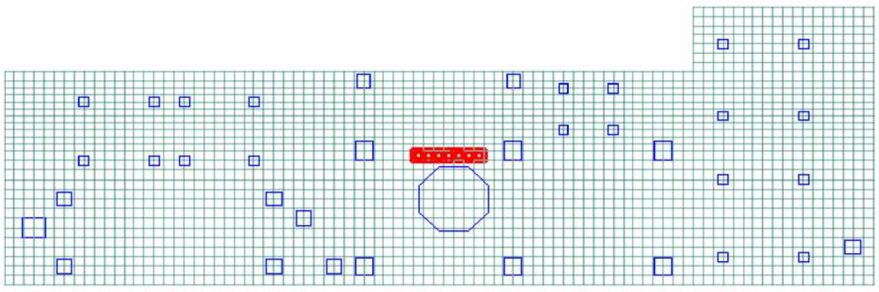
v_{min} = $0.035*k^{3/2}*f_{ck}^{1/2}$ = 0.450

$V_{Rd,c}$ = Design Shear Resistance of the Cross section withour reinforcement = 1.2060 N/mm^2

$V_{Rd,c}$ = Minimum Design Shear Resistance of the Cross Section = 1.0449 N/mm^2

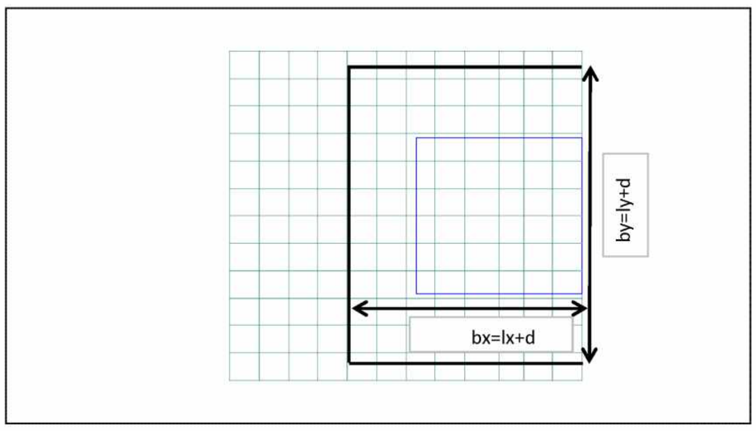
Check for one way shear in Y direction

Plate strips considered for one way shear in Y direction from STAAD model.



Actual Design Value of applied Shear Force V_{Ed} = 0.113 N/mm^2 **OK**

3.9a Check for Punching shear in slabs / Pile cap from Column :



Punching shear resistance of slabs / pile caps without shear reinforcement as per Cl 6.4.4 ref 2

$V_{Rd,c}$ = $[C_{Rd,c}*k*(100*\rho_l*f_{ck})^{1/3}+k_1*\sigma_{cp}]$ in N/mm^2

Where Values for $C_{Rd,c}$, v_{min}, k, f_{ck} remain same as in 3.8a and 3.8b above

k_1 = As per NA to SS EN 1992-1-1 : 2008 = 0.1

ρ_l = SQRT(ρ_{lx} , ρ_{ly}) <= 0.02

ρ_{lx} = $A_{stxb}/(b_x*Deffx)$ <= 0.02 = 0.001 where b_x = width of Column $l_x+2(2*Deff_{xt})$ = 2854 mm *Refer Cl 6.4.2 of ref 2*

ρ_{ly} = $A_{styb}/(b_y*Deffy)$ <= 0.02 = 0.001 where b_y = width of Column $l_y+2(2*Deff_{yt})$ = 2854 mm *Refer Cl 6.4.2 of ref 2*

$\sigma_{c,x}$, $\sigma_{c,y}$ = Normal Concrete Stresses in the critical sections in X and Y directions (in N/mm^2, positive if compression)

N_{Edx}, N_{Edy} = Longitudinal forces across the full bay for internal columns and the longitudinal force across the control section for edge columns. The force may be from a load action

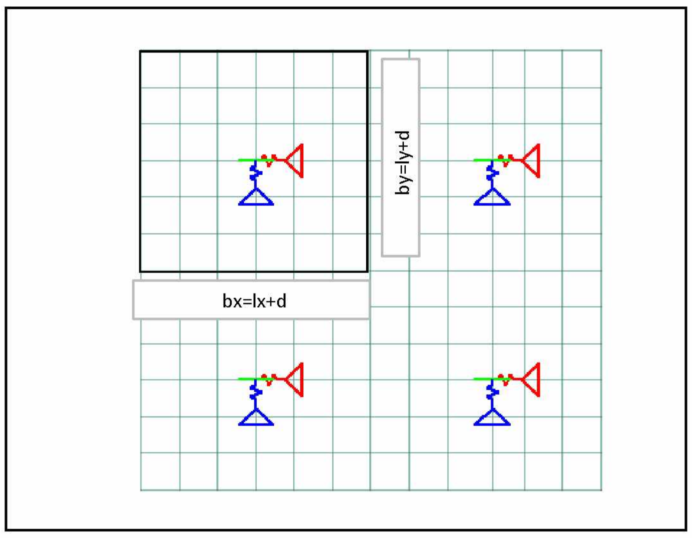
$\sigma_{c,x}$ = N_{Edx}/A_{cx} = 0.1231 N/mm^2 $\sigma_{c,y}$ = N_{Edy}/A_{cy} = 0.1172 N/mm^2

σ_{cp} = $(\sigma_{c,x}+\sigma_{c,y})/2$ = 0.1202 N/mm^2

$V_{Rd,c}$ = 4.581 N/mm^2

$V_{Ed,c}$ = $N_{Ed}/((2b_x+2b_y)*Defft)$ = 0.3099 N/mm^2 **OK**

3.9b Check for Punching shear in slabs / Pile cap from Piles (Internal) :



Punching shear resistance of slabs / pile caps withour shear reinforcement as per Cl 6.4.4 ref 2

$V_{Rd,c}$ = $[C_{Rd,c} * k * (100 * \rho_l * f_{ck})^{1/3} + k_1 * \sigma_{cp}]$ in N/mm^2

Where Values for $C_{Rd,c}$, v_{min}, k, f_{ck} remain same as in 3.8a and 3.8b above

k_1 = As per NA to SS EN 1992-1-1 : 2008 = 0.1

ρ_l = SQRT(ρ_{lx} , ρ_{ly}) < = 0.02

ρ_{lx} = $A_{stxb}/(b_x*Deffx)$ < = 0.02 = 0.001 where b_x = width of pile $d_{px}+2(2*Deff_{xb})$ = 2464 mm *Refer Cl 6.4.2 of ref 2*

ρ_{ly} = $A_{styb}/(b_y*Deffy)$ < = 0.02 = 0.001 where b_y = width of pile $d_{py}+2(2*Deff_{yb})$ = 2464 mm *Refer Cl 6.4.2 of ref 2*

$\sigma_{c,x}$, $\sigma_{c,y}$ = Normal Concrete Stresses in the critical sections in X and Y directions (in N/mm^2, positive if compression)

N_{Edpx}, N_{Edpy} = Longitudinal forces across the full bay for internal columns and the longitudinal force across the control section for edge columns. The force may be from a load action

$\sigma_{c,x}$ = N_{Edpx}/A_{cx} = 0.0203 N/mm^2 $\sigma_{c,y}$ = N_{Edpy}/A_{cy} = 0.0301 N/mm^2

σ_{cp} = $(\sigma_{c,x}+\sigma_{c,y})/2$ = 0.0252 N/mm^2

$V_{Rd,c}$ = 4.572 N/mm^2

$V_{Ed,c}$ = $N_{Edp}/((2b_x+2b_y)*Defft)$ = 0.1059 N/mm^2 **OK**

Summary for Maximum Pedestal Load from STAAD for Punching shear						
	Beam	**L/C**	**Node**	**Fx kN**	**Fy kN**	**Fz kN**
Max Fx	3146	40044	447	1861.85	81.535	73.303
Min Fx	3150	10008 COMBINA	7	-410.971	122.286	3.475
Max Fy	3173	10005 COMBINA	1658	205.411	163	0
Min Fy	3173	10006 COMBINA	1658	205.411	-163	0
Max Fz	3146	10006 COMBINA	447	1191.842	-12.248	175.887
Min Fz	3149	10005 COMBINA	450	970.412	-6.891	-164.654
Max Mx	3147	40048	443	-48.683	92.086	-28.571
Min Mx	3147	40046	443	1502.781	-89.423	65.237
Max My	3173	10007 COMBINA	1658	205.411	0	-163
Min My	3173	10008 COMBINA	1658	205.411	0	163
Max Mz	3173	10005 COMBINA	1658	205.411	163	0
Min Mz	3173	10006 COMBINA	1658	205.411	-163	0

Summary for Maximum Pile reaction from STAAD for Punching shear					
			Horizontal	**Vertical**	**Horizontal**
	Node	**L/C**	**Fx kN**	**Fy kN**	**Fz kN**
Max Fx	2771	10006 COMBINA	24.466	264.341	0.082
Min Fx	2771	10005 COMBINA	-23.457	159.338	-0.519
Max Fy	2492	30063	-2.973	522.936	0.869
Min Fy	2669	10008 COMBINA	-2.753	43.011	31.138
Max Fz	2498	10008 COMBINA	0.335	329.984	37.003
Min Fz	2498	10007 COMBINA	-0.062	334.931	-38.044
Max Mx	533	10005 COMBINA	-23.161	227.937	0.895
Min Mx	533	10005 COMBINA	-23.161	227.937	0.895
Max My	533	10005 COMBINA	-23.161	227.937	0.895
Min My	533	10005 COMBINA	-23.161	227.937	0.895
Max Mz	533	10005 COMBINA	-23.161	227.937	0.895
Min Mz	533	10005 COMBINA	-23.161	227.937	0.895

Wood armer distribution for plate moments

a) Bottom moments

	Plate	L/C	Shear (Local) SQX N/mm2	SQY N/mm2	Membrane (Local) SX N/mm2	SY N/mm2	SXY N/mm2	Bending Moment MX kN-m/m	MY kN-m/m	MXY kN-m/m	Bending Moment Mx1	My1	Mx2	My2	Mxd	Myd
Max Qx	1975	10006 CC	2.752	2.459	-0.201	-0.024	-0.094	1003.869	291.553	516.865	1520.73	808.42	1920.17	557.67	1520.73	808.42
Min Qx	1991	10005 CC	-2.668	-2.471	-0.104	-0.019	-0.108	1000.798	264.307	421.877	1422.68	686.18	1674.18	442.15	1422.68	686.18
Max Qy	1975	10008 CC	2.581	2.783	-0.032	-0.165	-0.116	274.817	1098.051	484.508	759.33	1582.56	488.60	1952.25	759.33	1582.56
Min Qy	1991	10007 CC	-2.508	-2.806	0.002	-0.147	-0.088	246.49	952.179	467.372	713.86	1419.55	475.90	1838.37	713.86	1419.55
Max Sx	2491	10005 CC	0.599	0.626	0.227	0.017	0.125	70.214	216.761	-51.959	122.17	268.72	82.67	255.21	122.17	268.72
Min Sx	1906	10006 CC	1.397	1.278	-0.251	0.008	-0.12	322.159	308.996	44.844	367.00	353.84	328.67	315.24	367.00	353.84
Max Sy	1975	10007 CC	-2.092	-2.356	0.032	0.163	0.117	-193.907	-980.119	-468.551	274.64	-511.57	30.09	152.07	30.09	0.00
Min Sy	1975	10008 CC	2.581	2.783	-0.032	-0.165	-0.116	274.817	1098.051	484.508	759.33	1582.56	488.60	1952.25	759.33	1582.56
Max Sxy	2491	10005 CC	0.599	0.626	0.227	0.017	0.125	70.214	216.761	-51.959	122.17	268.72	82.67	255.21	122.17	268.72
Min Sxy	2477	10006 CC	-0.773	0.804	0.153	0.023	-0.135	108.076	261.47	62.933	171.01	324.40	123.22	298.12	171.01	324.40
Max Mx	1976	10005 CC	-2.665	2.461	-0.098	-0.021	0.093	1004.405	261.06	-499.839	1504.24	760.90	1961.42	509.80	1504.24	760.90
Min Mx	1990	10005 CC	-2.282	2.053	0.191	0.022	-0.109	-923.383	-171.128	427.712	-495.67	256.58	145.63	26.99	0.00	26.99
Max My	1975	10008 CC	2.581	2.783	-0.032	-0.165	-0.116	274.817	1098.051	484.508	759.33	1582.56	488.60	1952.25	759.33	1582.56
Min My	1976	10007 CC	2.134	-2.382	0.031	0.158	-0.087	-188.98	-980.436	472.124	283.14	-508.31	38.37	199.06	38.37	0.00
Max Mxy	1976	10006 CC	2.345	-2.107	0.097	0.019	-0.091	-901.245	-143.292	517.51	-383.74	374.22	967.78	153.87	0.00	153.87
Min Mxy	1975	10005 CC	-2.259	-2.034	0.199	0.023	0.095	-922.261	-173.621	-500.781	-421.48	327.16	522.16	98.30	0.00	98.30
															1520.73	**1582.56**

Mxb = Design moment along X-direction (for bottom rebar)

= 1520.73 kNm/m (load case 10006 COMBI plate no. 1975) Plates used for design are highlighted.

Myb = Design moment along Z-direction (for bottom rebar)

= 1582.56 kNm/m (load case 10008 COMBI plate no. 1975)

b) Top moments

	Plate	L/C	Shear SQX (local) kN/mm2	SQY (local) kN/mm2	Membrane SX (local) kN/mm2	SY (local) kN/mm2	SXY (local) kN/mm2	Bending Moment Mx kNm/m	My kNm/m	Mxy kNm/m	Bending Moment Mx1	My1	Mx2	My2	Mxd'	Myd'
Max Qx	1975	10006 CC	2.752	2.459	-0.201	-0.024	-0.094	1003.869	291.553	516.865	487.00	-225.31	87.57	25.43	0.00	25.43
Min Qx	1991	10005 CC	-2.668	-2.471	-0.104	-0.019	-0.108	1000.798	264.307	421.877	578.92	-157.57	327.41	86.47	0.00	86.47
Max Qy	1975	10008 CC	2.581	2.783	-0.032	-0.165	-0.116	274.817	1098.051	484.508	-209.69	613.54	61.03	243.85	61.03	0.00
Min Qy	1991	10007 CC	-2.508	-2.806	0.002	-0.147	-0.088	246.49	952.179	467.372	-220.88	484.81	17.08	65.99	17.08	0.00
Max Sx	2491	10005 CC	0.599	0.626	0.227	0.017	0.125	70.214	216.761	-51.959	18.26	164.80	57.76	178.31	0.00	0.00
Min Sx	1906	10006 CC	1.397	1.278	-0.251	0.008	-0.12	322.159	308.996	44.844	277.32	264.15	315.65	302.75	0.00	0.00
Max Sy	1975	10007 CC	-2.092	-2.356	0.032	0.163	0.117	-193.907	-980.119	-468.551	-662.46	-1448.67	-417.90	-2112.31	-662.46	-1448.67
Min Sy	1975	10008 CC	2.581	2.783	-0.032	-0.165	-0.116	274.817	1098.051	484.508	-209.69	613.54	61.03	243.85	61.03	0.00
Max Sxy	2491	10005 CC	0.599	0.626	0.227	0.017	0.125	70.214	216.761	-51.959	18.26	164.80	57.76	178.31	0.00	0.00
Min Sxy	2477	10006 CC	-0.773	0.804	0.153	0.023	-0.135	108.076	261.47	62.933	45.14	198.54	92.93	224.82	0.00	0.00
Max Mx	1976	10005 CC	-2.665	2.461	-0.098	-0.021	0.093	1004.405	261.06	-499.839	504.57	-238.78	47.39	12.32	0.00	12.32
Min Mx	1990	10005 CC	-2.282	2.053	0.191	0.022	-0.109	-923.383	-171.128	427.712	-1351.10	-598.84	-1992.39	-369.24	-1351.10	-598.84
Max My	1975	10008 CC	2.581	2.783	-0.032	-0.165	-0.116	274.817	1098.051	484.508	-209.69	613.54	61.03	243.85	61.03	0.00
Min My	1976	10007 CC	2.134	-2.382	0.031	0.158	-0.087	-188.98	-980.436	472.124	-661.10	-1452.56	-416.33	-2159.93	-661.10	-1452.56
Max Mxy	1976	10006 CC	2.345	-2.107	0.097	0.019	-0.091	-901.245	-143.292	517.51	-1418.76	-660.80	-2770.27	-440.45	-1418.76	-660.80
Min Mxy	1975	10005 CC	-2.259	-2.034	0.199	0.023	0.095	-922.261	-173.621	-500.781	-1423.04	-674.40	-2366.68	-445.54	-1423.04	-674.40
															-1423.04	**-1452.56**

Mxt = Design moment along Z-direction (for top rebar)

= 1423.04 kNm/m (load case 10005 C plate no. 1975)

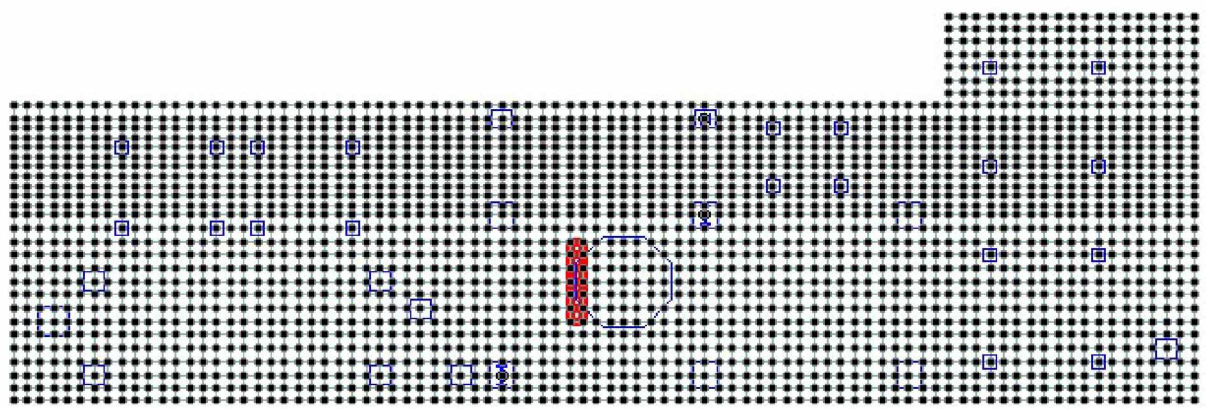
Myt = Design moment along Z-direction (for top rebar)

= 1452.56 kNm/m (load case 10007 C plate no. 1976)

Note : Out of plate moments are converted to equivalent inplane moments considering reinforcement distribution at 90 degrees. This worksheet is not applicable to circular rafts.

Plates Considered for Averaging in Momentsr Along X-Direction At Bottom

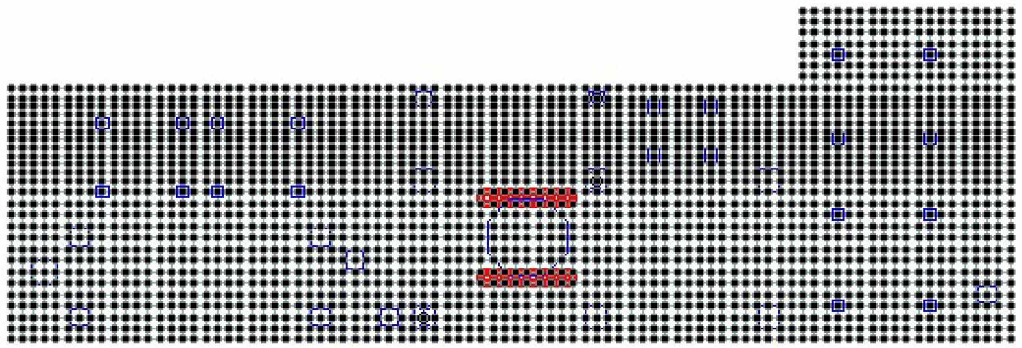
		Shear		Membrane			Bending Moment								
Plate	L/C	SQX (local) kN/mm2	SQY (local) kN/mm2	SX (local) kN/mm2	SY (local) kN/mm2	SXY (local) kN/mm2	Mx kNm/m	My kNm/m	Mxy kNm/m	Mx1	My1	Mx2	My2	Mxd	Myd
1987	10006 COI	0.309	-0.093	-0.092	0.015	0.013	131.275	130.183	40.89	172.165	171.073	144.118	142.9196	172.165	171.073
1942	10006 COI	-0.003	0.142	-0.07	0.002	-0.001	103.225	60.136	9.494	112.719	69.63	104.724	61.0092	112.719	69.63
1957	10006 COI	0.111	0.168	-0.079	0.008	-0.008	120.978	92.134	2.921	123.899	95.055	121.071	92.20453	123.899	95.055
2002	10006 COI	0.252	-0.234	-0.081	0.008	0.023	127.763	84.182	55.627	183.39	139.809	164.521	108.4016	183.39	139.809
1942	10006 COI	-0.003	0.142	-0.07	0.002	-0.001	103.225	60.136	9.494	112.719	69.63	104.724	61.0092	112.719	69.63
1972	10006 COI	0.266	0.1	-0.092	0.018	-0.002	130.286	132.522	15.465	145.751	147.987	132.091	134.3577	145.751	147.987
1972	10006 COI	0.266	0.1	-0.092	0.018	-0.002	130.286	132.522	15.465	145.751	147.987	132.091	134.3577	145.751	147.987
1942	10006 COI	-0.003	0.142	-0.07	0.002	-0.001	103.225	60.136	9.494	112.719	69.63	104.724	61.0092	112.719	69.63
2002	10006 COI	0.252	-0.234	-0.081	0.008	0.023	127.763	84.182	55.627	183.39	139.809	164.521	108.4016	183.39	139.809
1957	10006 COI	0.111	0.168	-0.079	0.008	-0.008	120.978	92.134	2.921	123.899	95.055	121.071	92.20453	123.899	95.055
1987	10006 COI	0.309	-0.093	-0.092	0.015	0.013	131.275	130.183	40.89	172.165	171.073	144.118	142.9196	172.165	171.073
1942	10006 COI	-0.003	0.142	-0.07	0.002	-0.001	103.225	60.136	9.494	112.719	69.63	104.724	61.0092	112.719	69.63
1972	10006 COI	0.266	0.1	-0.092	0.018	-0.002	130.286	132.522	15.465	145.751	147.987	132.091	134.3577	145.751	147.987
2017	10006 COI	0.189	-0.208	-0.071	0.006	0.02	115.758	19.651	62.778	178.536	82.429	316.312	53.69683	178.536	82.429
2017	10006 COI	0.189	-0.208	-0.071	0.006	0.02	115.758	19.651	62.778	178.536	82.429	316.312	53.69683	178.536	82.429
1957	10006 COI	0.111	0.168	-0.079	0.008	-0.008	120.978	92.134	2.921	123.899	95.055	121.071	92.20453	123.899	95.055
								86.409					Average	145.5005	112.1418



Plates Considered for Averaging

Plates Considered for Averaging in Momentsr Along Y-Direction At Bottom

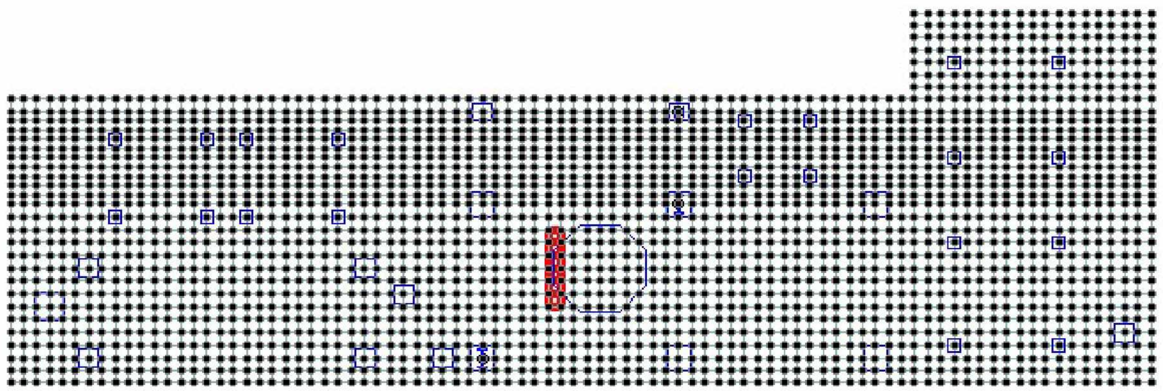
Plate	L/C	Shear		Membrane			Bending Moment								
		SQX (local) kN/mm2	SQY (local) kN/mm2	SX (local) kN/mm2	SY (local) kN/mm2	SXY (local) kN/mm2	Mx kNm/m	My kNm/m	Mxy kNm/m	Mx1	My1	Mx2	My2	Mxd	Myd
2037	10008 COI	0.291	0.275	-0.049	-0.001	-0.016	-53.407	-69.087	15.013	-38.394	-54.074	-50.145	-64.8668	0	0
2034	10008 COI	-0.13	0.136	-0.049	0.028	-0.02	-44.177	-55.457	-10.463	-33.714	-44.994	-42.203	-52.9789	0	0
2036	10008 COI	-0.076	0.346	-0.056	0.011	0.007	-80.229	-74.638	6.796	-73.433	-67.842	-79.61	-74.0623	0	0
1934	10008 COI	0.029	-0.171	0.002	-0.006	0.004	76.972	241.085	45.462	122.434	286.547	85.5449	267.9362	122.434	286.547
1930	10008 COI	0.152	0.25	0.021	-0.049	-0.019	106.725	233.772	-11.966	118.691	245.738	107.337	235.1136	118.691	245.738
2036	10008 COI	-0.076	0.346	-0.056	0.011	0.007	-80.229	-74.638	6.796	-73.433	-67.842	-79.61	-74.0623	0	0
2035	10008 COI	-0.095	0.209	-0.053	0.035	-0.013	-67.542	-66.277	-5.108	-62.434	-61.169	-67.148	-65.8907	0	0
1931	10008 COI	0.021	0.282	0.021	-0.053	-0.006	123.598	239.619	16.077	139.675	255.696	124.677	241.7102	139.675	255.696
1933	10008 COI	-0.079	0.016	0.012	-0.026	0.009	88.479	242.95	51.914	140.393	294.864	99.5721	273.4099	140.393	294.864
1929	10008 COI	0.18	0.117	0.011	-0.034	-0.026	58.954	225.531	-23.801	82.755	249.332	61.4658	235.14	82.755	249.332
1931	10008 COI	0.021	0.282	0.021	-0.053	-0.006	123.598	239.619	16.077	139.675	255.696	124.677	241.7102	139.675	255.696
2036	10008 COI	-0.076	0.346	-0.056	0.011	0.007	-80.229	-74.638	6.796	-73.433	-67.842	-79.61	-74.0623	0	0
1932	10008 COI	-0.07	0.186	0.017	-0.043	0.003	111.06	243.089	40.026	151.086	283.115	117.651	257.5144	151.086	283.115
2036	10008 COI	-0.076	0.346	-0.056	0.011	0.007	-80.229	-74.638	6.796	-73.433	-67.842	-79.61	-74.0623	0	0
1933	10008 COI	-0.079	0.016	0.012	-0.026	0.009	88.479	242.95	51.914	140.393	294.864	99.5721	273.4099	140.393	294.864
1929	10008 COI	0.18	0.117	0.011	-0.034	-0.026	58.954	225.531	-23.801	82.755	249.332	61.4658	235.14	82.755	249.332
								102.79831					Average	69.86606	150.949



Plates Considered for Averaging

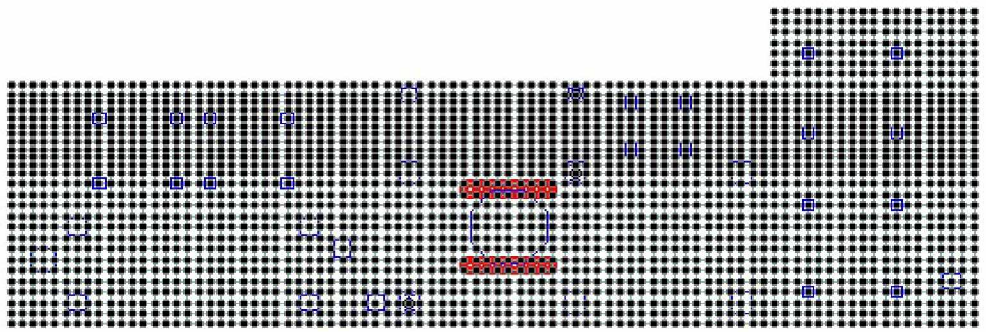
Plates Considered for Averaging in Moments Along X-Direction At Top

		Shear		Membrane			Bending Moment								
Plate	L/C	SQX (local) kN/mm2	SQY (local) kN/mm2	SX (local) kN/mm2	SY (local) kN/mm2	SXY (local) kN/mm2	Mx kNm/m	My kNm/m	Mxy kNm/m	Mx1	My1	Mx2	My2	Mxd	Myd
2017	10005 COME	0.003	0.115	0.07	-0.006	-0.021	-122.429	-36.607	-53.612	-176.041	-90.219	-200.945	-60.0838	-176.041	-90.219
1972	10005 COME	-0.28	-0.056	0.09	-0.018	0.002	-137.359	-75.759	-40.374	-177.733	-116.133	-158.875	-87.6262	-177.733	-116.133
2017	10005 COME	0.003	0.115	0.07	-0.006	-0.021	-122.429	-36.607	-53.612	-176.041	-90.219	-200.945	-60.0838	-176.041	-90.219
1942	10005 COME	-0.151	-0.175	0.067	-0.002	0.002	-111.777	-18.888	-24.198	-135.975	-43.086	-142.778	-24.1265	-135.975	-43.086
1987	10005 COME	-0.245	0.045	0.09	-0.015	-0.012	-140.399	-75.707	-51.566	-191.965	-127.273	-175.522	-94.6463	-191.965	-127.273
1942	10005 COME	-0.151	-0.175	0.067	-0.002	0.002	-111.777	-18.888	-24.198	-135.975	-43.086	-142.778	-24.1265	-135.975	-43.086
1942	10005 COME	-0.151	-0.175	0.067	-0.002	0.002	-111.777	-18.888	-24.198	-135.975	-43.086	-142.778	-24.1265	-135.975	-43.086
1972	10005 COME	-0.28	-0.056	0.09	-0.018	0.002	-137.359	-75.759	-40.374	-177.733	-116.133	-158.875	-87.6262	-177.733	-116.133
1957	10005 COME	-0.239	-0.155	0.076	-0.008	0.008	-127.341	-56.045	-29.661	-157.002	-85.706	-143.039	-62.9538	-157.002	-85.706
2002	10005 COME	-0.129	0.1	0.08	-0.008	-0.022	-134.25	-56.504	-59.291	-193.541	-115.795	-196.465	-82.6896	-193.541	-115.795
1942	10005 COME	-0.151	-0.175	0.067	-0.002	0.002	-111.777	-18.888	-24.198	-135.975	-43.086	-142.778	-24.1265	-135.975	-43.086
1987	10005 COME	-0.245	0.045	0.09	-0.015	-0.012	-140.399	-75.707	-51.566	-191.965	-127.273	-175.522	-94.6463	-191.965	-127.273
1942	10005 COME	-0.151	-0.175	0.067	-0.002	0.002	-111.777	-18.888	-24.198	-135.975	-43.086	-142.778	-24.1265	-135.975	-43.086
1972	10005 COME	-0.28	-0.056	0.09	-0.018	0.002	-137.359	-75.759	-40.374	-177.733	-116.133	-158.875	-87.6262	-177.733	-116.133
1942	10005 COME	-0.151	-0.175	0.067	-0.002	0.002	-111.777	-18.888	-24.198	-135.975	-43.086	-142.778	-24.1265	-135.975	-43.086
2002	10005 COME	-0.129	0.1	0.08	-0.008	-0.022	-134.25	-56.504	-59.291	-193.541	-115.795	-196.465	-82.6896	-193.541	-115.795
								-45.892875					Average	-164.322	-84.9497



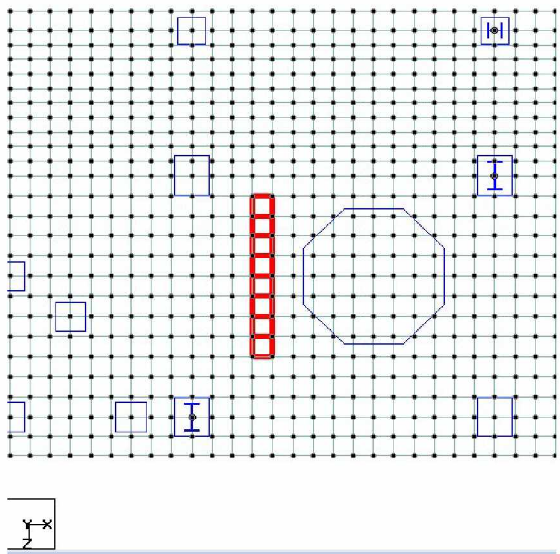
Plates Considered for Averaging

Plates Considered for Averaging in Momentsr Along Y-Direction At Top															
		Shear		Membrane			Bending Moment								
Plate	L/C	SQX (local) kN/mm2	SQY (local) kN/mm2	SX (local) kN/mm2	SY (local) kN/mm2	SXY (local) kN/mm2	Mx kNm/m	My kNm/m	Mxy kNm/m	Mx1	My1	Mx2	My2	Mxd	Myd
2032	10007 COME	0.207	-0.036	0.038	-0.007	0.016	-5.817	5.319	24.76	-30.577	-19.441	-121.075	-100.072	-30.577	-19.441
2036	10007 COME	-0.33	-0.007	0.059	-0.012	-0.009	55.469	14.138	-24.49	30.979	-10.352	13.04715	3.325472	0	3.325472
2037	10007 COME	0.164	0.084	0.052	-0.001	0.014	36.457	7.353	-32.182	4.275	-24.829	-104.395	-21.0553	0	-21.0553
2035	10007 COME	-0.033	-0.292	0.056	-0.036	0.012	82.134	32.665	-6.501	75.633	26.164	80.84017	32.15044	0	0
2036	10007 COME	-0.33	-0.007	0.059	-0.012	-0.009	55.469	14.138	-24.49	30.979	-10.352	13.04715	3.325472	0	3.325472
1931	10007 COME	0.068	-0.253	-0.023	0.053	0.007	-89.453	-160.989	-8.241	-97.694	-169.23	-89.8749	-161.748	-97.694	-169.23
1931	10007 COME	0.068	-0.253	-0.023	0.053	0.007	-89.453	-160.989	-8.241	-97.694	-169.23	-89.8749	-161.748	-97.694	-169.23
2035	10007 COME	-0.033	-0.292	0.056	-0.036	0.012	82.134	32.665	-6.501	75.633	26.164	80.84017	32.15044	0	0
1929	10007 COME	-0.12	-0.239	-0.013	0.033	0.026	-82.516	-155.151	7.089	-89.605	-162.24	-82.8399	-155.76	-89.605	-162.24
2036	10007 COME	-0.33	-0.007	0.059	-0.012	-0.009	55.469	14.138	-24.49	30.979	-10.352	13.04715	3.325472	0	3.325472
2035	10007 COME	-0.033	-0.292	0.056	-0.036	0.012	82.134	32.665	-6.501	75.633	26.164	80.84017	32.15044	0	0
1930	10007 COME	-0.023	-0.277	-0.023	0.048	0.02	-94.902	-160.865	-1.392	-96.294	-162.257	-94.914	-160.885	-96.294	-162.257
2034	10007 COME	0.118	-0.226	0.052	-0.029	0.019	60.838	40.101	14.448	46.39	25.653	55.63253	36.66984	0	0
1931	10007 COME	0.068	-0.253	-0.023	0.053	0.007	-89.453	-160.989	-8.241	-97.694	-169.23	-89.8749	-161.748	-97.694	-169.23
2032	10007 COME	0.207	-0.036	0.038	-0.007	0.016	-5.817	5.319	24.76	-30.577	-19.441	-121.075	-100.072	-30.577	-19.441
2037	10007 COME	0.164	0.084	0.052	-0.001	0.014	36.457	7.353	-32.182	4.275	-24.829	-104.395	-21.0553	0	-21.0553
								-37.070563					Average	-33.7584	-56.4502

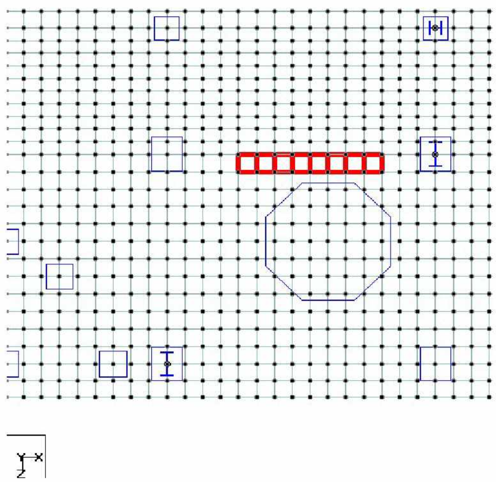


Plates Considered for Averaging

Plates Considered for Averaging in One-Way Shear Along X-Direction									
		Shear (Local)		Membrane (Local)			Bending Moment		
Plate	L/C	SQX N/mm2	SQY N/mm2	SX N/mm2	SY N/mm2	SXY N/mm2	MX kN-m/m	MY kN-m/m	MXY kN-m/m
1970	10006 COI	0.149	0.007	-0.08	0.012	0.003	79.134	71.636	22.67
2015	10006 COI	-0.221	-0.34	-0.04	0.012	0.023	52.794	-8.561	68.506
1955	10006 COI	0.136	0.035	-0.08	0.011	0.003	80.743	62.719	3.909
2015	10006 COI	-0.221	-0.34	-0.04	0.012	0.023	52.794	-8.561	68.506
2015	10006 COI	-0.221	-0.34	-0.04	0.012	0.023	52.794	-8.561	68.506
1955	10006 COI	0.136	0.035	-0.08	0.011	0.003	80.743	62.719	3.909
2015	10006 COI	-0.221	-0.34	-0.04	0.012	0.023	52.794	-8.561	68.506
1925	10006 COI	0.034	0.033	-0.071	0.005	0.006	65.81	59.339	-13.853
2015	10006 COI	-0.221	-0.34	-0.04	0.012	0.023	52.794	-8.561	68.506
1955	10006 COI	0.136	0.035	-0.08	0.011	0.003	80.743	62.719	3.909
1955	10006 COI	0.136	0.035	-0.08	0.011	0.003	80.743	62.719	3.909
2015	10006 COI	-0.221	-0.34	-0.04	0.012	0.023	52.794	-8.561	68.506
1970	10006 COI	0.149	0.007	-0.08	0.012	0.003	79.134	71.636	22.67
2015	10006 COI	-0.221	-0.34	-0.04	0.012	0.023	52.794	-8.561	68.506
2015	10006 COI	-0.221	-0.34	-0.04	0.012	0.023	52.794	-8.561	68.506
1925	10006 COI	0.034	0.033	-0.071	0.005	0.006	65.81	59.339	-13.853
	Average	-0.053625							



Plates Considered for Averaging in One-Way Shear Along Y-Direction									
		Shear (Local)		Membrane (Local)			Bending Moment		
Plate	L/C	SQX N/mm2	SQY N/mm2	SX N/mm2	SY N/mm2	SXY N/mm2	MX kN-m/m	MY kN-m/m	MXY kN-m/m
1918	10007 COI	0.077	-0.096	-0.017	0.025	0.002	-41.17	-112.192	-9.78
1913	10007 COI	-0.083	-0.114	-0.014	0.024	0.02	-46.069	-110.311	12.515
1912	10007 COI	-0.076	-0.062	-0.013	0.022	0.019	-28.645	-104.471	10.474
1915	10007 COI	-0.02	-0.174	-0.023	0.04	0.014	-75.339	-115.358	-0.032
1912	10007 COI	-0.076	-0.062	-0.013	0.022	0.019	-28.645	-104.471	10.474
1916	10007 COI	0.029	-0.16	-0.026	0.043	0.008	-72.946	-115.955	-7.449
1916	10007 COI	0.029	-0.16	-0.026	0.043	0.008	-72.946	-115.955	-7.449
1912	10007 COI	-0.076	-0.062	-0.013	0.022	0.019	-28.645	-104.471	10.474
1913	10007 COI	-0.083	-0.114	-0.014	0.024	0.02	-46.069	-110.311	12.515
1918	10007 COI	0.077	-0.096	-0.017	0.025	0.002	-41.17	-112.192	-9.78
1912	10007 COI	-0.076	-0.062	-0.013	0.022	0.019	-28.645	-104.471	10.474
1915	10007 COI	-0.02	-0.174	-0.023	0.04	0.014	-75.339	-115.358	-0.032
1912	10007 COI	-0.076	-0.062	-0.013	0.022	0.019	-28.645	-104.471	10.474
1916	10007 COI	0.029	-0.16	-0.026	0.043	0.008	-72.946	-115.955	-7.449
1913	10007 COI	-0.083	-0.114	-0.014	0.024	0.02	-46.069	-110.311	12.515
1917	10007 COI	0.066	-0.129	-0.024	0.038	0.003	-58.946	-115.195	-10.176
		Average	-0.11256						



ANNEXURE H
STAAD INPUT FILE FOR STEEL STRUCTURE DESIGN

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JOB NAME SK5101
JOB CLIENT SHELL/WORLEY
JOB NO SUILSKIL
JOB REV 00 for Steel Structure Design
JOB PART Status F/G/H
ENGINEER NAME Murthy
CHECKER NAME KHushal
APPROVED NAME JS
END JOB INFORMATION
SET NL 1050
UNIT INCHES KIP
SET DISPLACEMENT 0.001
***-------------------------------------------------------------------------
*------------------------- JOINT COORDINATES -----------------------------
***-------------------------------------------------------------------------
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115 60 138; 116 18 60; 117 60 21; 118 61 433; 119 26 61; 120 61 29;
121 62 418; 122 34 62; 123 62 37; 124 63 191; 125 42 63; 126 63 45;
127 64 327; 128 65 339; 129 66 139; 130 67 434; 131 68 419; 132 69 192;
133 5 183; 134 183 8; 135 14 106; 136 106 17; 137 22 184; 138 184 25;
139 30 185; 140 185 33; 141 38 186; 142 186 41; 144 182 49; 145 70 99;
146 71 16; 147 99 74; 148 72 75; 149 73 76; 150 74 77; 151 73 74;
152 74 72; 153 75 440; 154 76 441; 155 77 442; 156 76 77; 157 77 75;
158 78 81; 159 79 82; 160 80 83; 161 79 80; 162 80 78; 163 81 16;
164 82 17; 165 83 71; 166 82 329; 167 83 81; 168 84 58; 169 85 326;
170 85 92; 171 86 13; 172 87 14; 173 87 93; 174 88 364; 175 89 94;
176 88 91; 177 90 322; 178 91 89; 179 90 91; 180 92 89; 181 93 100;
182 92 324; 183 94 365; 184 95 86; 185 94 96; 186 96 97; 187 97 95;
188 96 58; 189 98 86; 190 97 98; 191 99 13; 192 95 99; 193 100 95;
194 100 70; 195 101 103; 196 102 104; 198 103 105; 199 104 106;
200 104 343; 201 105 107; 202 106 108; 203 106 355; 204 107 109;
205 108 110; 206 108 356; 207 109 24; 208 110 25; 209 110 357;
210 111 21; 211 112 101; 212 113 103; 213 111 347; 214 112 351;
215 114 333; 216 115 332; 217 115 353; 218 116 331; 219 117 330;
221 118 360; 224 119 111; 227 120 59; 228 121 65; 229 117 336;
230 122 124; 231 123 125; 232 123 337; 233 124 21; 234 125 22;
235 125 354; 236 126 128; 237 127 129; 238 127 302; 239 128 130;
240 129 184; 241 129 378; 242 130 132; 243 131 133; 244 131 379;
245 132 32; 246 133 33; 247 133 305; 248 134 136; 249 135 288;
250 136 60; 251 137 66; 252 138 140; 253 139 141; 254 140 29;
255 141 30; 256 135 290; 257 137 298; 258 139 299; 259 141 300;
260 142 292; 263 143 306; 266 144 146; 267 145 147; 268 146 421;
269 147 185; 270 148 150; 271 149 151; 272 150 40; 273 151 41;
274 152 154; 275 153 284; 276 154 424; 277 155 425; 278 156 158;
279 157 159; 280 158 37; 281 159 38; 282 160 258; 283 161 272;
284 145 268; 285 147 269; 286 149 270; 287 151 271; 288 153 256;
289 155 264; 290 157 432; 291 159 266; 296 162 164; 297 163 165;
298 164 403; 299 165 186; 300 166 168; 301 167 169; 302 168 48;
303 169 49; 304 170 172; 305 171 244; 306 172 407; 307 173 408;
308 174 176; 309 175 177; 310 176 45; 311 177 46; 312 178 228;
313 179 246; 314 163 238; 315 165 239; 316 167 240; 317 169 241;
318 171 226; 319 173 234; 320 175 414; 321 177 236; 327 182 201;
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354 203 57; 355 197 207; 356 199 208; 357 182 209; 358 201 215;
359 203 216; 360 204 397; 361 205 380; 362 206 381; 363 207 204;
365 209 206; 366 207 208; 367 208 209; 368 204 205; 369 205 206;
370 210 211; 371 210 188; 372 211 55; 373 211 190; 374 212 386;
376 213 391; 380 214 218; 381 215 219; 382 216 220; 383 213 204;
384 206 215; 385 215 216; 386 216 214; 387 217 202; 388 218 399;
389 219 400; 390 220 401; 391 219 221; 392 221 220; 393 221 225;
394 217 223; 395 218 224; 396 56 222; 397 225 224; 398 223 222;
399 224 222; 400 225 223; 401 225 218; 402 223 56; 403 226 247;
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415 250 45; 416 231 162; 417 45 252; 418 252 164; 419 232 166;
420 164 405; 421 254 168; 422 233 48; 423 168 251; 424 178 226;
425 234 248; 426 226 234; 427 235 412; 428 234 410; 429 236 250;
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435 240 254; 436 241 255; 437 179 238; 438 238 239; 439 239 404;
440 240 241; 441 241 237; 442 242 171; 443 243 245; 444 243 242;
445 244 173; 446 245 47; 447 245 244; 448 246 45; 449 247 170;
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475 263 40; 476 264 274; 477 265 430; 478 266 276; 479 267 277;
480 268 278; 481 269 279; 482 270 280; 483 271 281; 484 272 37;
485 273 152; 486 274 259; 487 275 156; 488 276 260; 489 277 263;
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495 257 256; 496 256 258; 497 258 152; 498 152 274; 499 274 424;
500 156 260; 501 260 37; 502 37 261; 503 261 146; 504 146 423;
505 280 150; 506 150 277; 507 160 256; 508 256 264; 509 264 427;
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515 270 271; 516 271 267; 517 258 273; 518 273 274; 519 274 428;
520 275 276; 521 276 272; 522 272 278; 523 278 279; 524 279 423;
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545 296 130; 546 297 32; 547 298 308; 548 299 309; 549 300 310;
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560 311 297; 561 312 295; 562 313 128; 563 314 296; 564 315 132;
565 135 291; 566 291 290; 567 290 292; 568 292 134; 569 134 308;
570 308 138; 571 138 310; 572 310 29; 573 29 312; 574 312 128;
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585 303 304; 586 304 305; 587 305 301; 588 292 307; 589 307 308;
590 308 309; 591 309 310; 592 310 306; 593 306 312; 594 312 313;
595 313 314; 596 314 315; 597 315 311; 598 316 115; 599 317 319;
600 317 316; 601 318 117; 602 319 23; 603 319 318; 604 94 58; 605 58 97;
606 97 86; 607 86 99; 608 99 72; 609 72 77; 610 77 440; 611 71 81;
612 80 81; 613 320 90; 614 321 323; 615 321 320; 616 322 85; 617 323 15;
618 323 322; 619 324 325; 620 325 93; 621 326 64; 622 327 87;

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633 333 116; 634 334 116; 635 335 122; 636 334 438; 637 336 334;
638 337 335; 640 338 122; 641 339 123; 642 340 335; 643 341 337;
644 339 341; 645 340 338; 646 342 345; 647 343 346; 648 342 344;
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654 349 119; 655 350 113; 656 351 113; 657 345 344; 658 349 347;
659 348 346; 660 351 350; 661 352 114; 662 116 352; 663 352 334;
664 353 359; 665 334 353; 666 353 117; 667 354 124; 668 335 354;
669 354 111; 670 355 105; 671 113 355; 672 356 107; 673 355 356;
674 357 109; 675 356 357; 676 358 24; 677 357 358; 678 359 352;
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684 363 361; 685 362 363; 686 364 10; 687 365 84; 688 364 365;
689 46 163; 690 46 182; 691 366 14; 692 367 15; 693 367 366; 694 368 22;
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700 372 38; 701 373 39; 702 373 372; 703 374 46; 704 375 47;
705 375 374; 706 376 54; 707 377 55; 708 377 376; 709 378 303;
710 379 304; 711 378 379; 712 380 382; 713 381 383; 714 380 381;
715 382 398; 716 383 402; 717 382 383; 718 384 212; 719 188 384;
720 385 392; 721 384 385; 722 386 50; 723 385 386; 724 386 187;
725 387 393; 726 388 394; 727 389 395; 728 390 396; 729 385 387;
730 387 388; 731 388 389; 732 389 390; 733 390 213; 734 391 53;
735 392 187; 736 393 189; 737 394 63; 738 395 191; 739 396 193;
740 392 393; 741 393 394; 742 394 395; 743 395 396; 744 396 391;
745 386 392; 746 187 393; 747 391 193; 748 193 395; 749 395 63;
750 63 393; 751 397 196; 752 391 397; 753 398 198; 754 397 398;
755 391 196; 756 196 398; 757 399 56; 758 400 200; 759 401 202;
760 400 401; 761 401 399; 762 402 195; 763 402 400; 764 398 195;
765 195 400; 766 400 202; 767 202 399; 768 403 166; 769 404 240;
770 405 254; 771 186 404; 772 404 405; 773 405 403; 774 403 254;
775 406 175; 776 407 62; 777 408 68; 778 413 416; 779 411 417;
781 408 415; 782 411 407; 783 410 413; 784 412 249; 785 413 411;
787 414 235; 788 415 410; 789 415 420; 790 416 412; 791 417 249;
792 416 417; 793 418 174; 794 417 418; 795 419 406; 796 420 414;
797 419 420; 798 248 407; 799 407 417; 800 417 174; 801 421 148;
802 422 270; 803 423 280; 804 185 422; 805 422 423; 806 423 421;
807 421 280; 808 424 61; 809 425 67; 810 429 436; 811 428 435;
812 425 431; 813 426 424; 814 427 429; 815 428 426; 816 429 428;
817 430 275; 818 431 427; 819 432 265; 820 431 437; 821 433 156;
822 434 157; 823 435 275; 824 436 430; 825 437 432; 826 434 437;
827 435 433; 828 436 435; 829 424 435; 830 435 156; 831 438 340;
832 439 341; 833 121 439; 834 439 438; 835 438 120; 836 440 78;
837 441 183; 838 442 80; 839 183 442; 840 442 440; 841 440 80;
START GROUP DEFINITION
MEMBER
_BEAMS_STEEL 9 TO 18 27 TO 36 45 TO 54 63 TO 72 81 TO 83 85 TO 90 99 -
100 TO 109 112 115 118 121 124 127 TO 132 145 TO 196 198 TO 219 221 -
224 227 TO 260 263 266 TO 291 296 TO 321 327 329 TO 363 365 TO 374 -
376 380 TO 382 385 TO 392 397 TO 400 403 404 407 410 413 416 419 422 -
424 TO 493 507 TO 564 578 TO 603 613 TO 625 627 630 TO 638 -
640 TO 656 661 664 667 TO 681 683 686 TO 689 693 696 699 702 705 708 -
709 TO 718 720 722 725 TO 728 734 TO 739 751 753 757 TO 763 -

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768 TO 773 775 TO 779 781 TO 785 787 TO 791 793 795 TO 797 -
801 TO 806 808 TO 828 831 832 836 TO 840
_COLUMNS_STEEL 1 TO 8 19 TO 26 37 TO 44 55 TO 62 73 TO 80 91 TO 98 -
393 TO 396 682 684 691 692 694 695 697 698 700 701 703 704 706 707
_VERTICAL-BRACINGS_STEEL 110 111 113 114 116 117 119 120 122 123 125 -
126 133 TO 142 144 401 402 685 690
_HORIZONTAL-BRACINGS_STEEL 383 384 405 406 408 409 411 414 415 417 -
418 420 421 423 494 TO 506 565 TO 577 604 TO 612 626 628 629 -
657 TO 660 662 663 665 666
END GROUP DEFINITION
***------------------------------------------------------------------------
*------------------------- MATERIAL SPECIFICATION -----------------------------
***------------------------------------------------------------------------
***------------------------------------------------------------------------
DEFINE MATERIAL START
ISOTROPIC STEEL
***------------------------------------------------------------------------
E 2.1e+08
POISSON 0.3
DENSITY 78.5
ALPHA 1.2e-05
DAMP 0.03
TYPE STEEL
STRENGTH FY 355000 FU 470000 RY 1.5 RT 1.2
G 8.1e+07
***------------------------------------------------------------------------
ISOTROPIC CONCRETE
***------------------------------------------------------------------------
E 3.3e+07
POISSON 0.2
DENSITY 25
ALPHA 1e-05
DAMP 0.05
TYPE CONCRETE
STRENGTH FCU 30000
***------------------------------------------------------------------------
****RIGID MATERIAL
***------------------------------------------------------------------------
ISOTROPIC RIGID
E 9.99e+08
POISSON 0.3
DENSITY 1e-09
ALPHA 1.2e-05
DAMP 0.03
TYPE STEEL
STRENGTH FY 355000 FU 470000 RY 1.5 RT 1.2
G 8.1e+07
END DEFINE MATERIAL
CONSTANTS
BETA 90 MEMB 2 3 5 TO 8 20 21 23 TO 26 38 39 41 TO 44 56 57 59 TO 62 -
74 75 77 TO 80 92 93 95 TO 98 393 TO 396 682 684 691 694 697 700 703 -
706
```

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MATERIAL STEEL ALL
*MATERIAL STEEL MEMB INCIDENCES
***-------------------------------------------------------------------------
START USER TABLE
*UNIT METER KN
*TABLE 1
***-------------------------------------------------------------------------
***-------------------------------------------------------------------------
***-------------------------------------------------------------------------
*TABLE 2
***-------------------------------------------------------------------------
***-------------------------------------------------------------------------
END
***-------------------------------------------------------------------------
*----------------------- MEMBER PROPERTIES ------------------------------
***-------------------------------------------------------------------------
*MATERIAL STEEL MEMB 2 3 5
MEMBER PROPERTY EUROPEAN
1 4 10 11 13 19 22 28 TO 30 33 35 36 46 47 64 65 69 71 72 82 83 87 -
89 90 100 TO 102 105 107 108 127 TO 132 148 153 158 163 169 172 177 -
195 196 198 TO 202 204 205 207 208 210 212 216 219 221 228 231 234 -
236 239 242 245 249 251 253 255 266 268 270 272 275 277 279 -
281 TO 283 296 298 300 302 305 307 309 311 TO 313 327 334 337 341 -
344 346 TO 355 357 360 362 363 365 374 376 380 387 388 404 407 422 -
432 442 445 448 453 469 470 475 479 484 489 527 530 533 535 598 601 -
613 614 616 617 621 622 630 632 641 646 647 650 651 654 655 676 679 -
692 695 713 716 718 722 734 751 757 762 768 775 777 795 801 809 822 -
836 TABLE ST HE300A
9 12 27 31 37 40 45 48 49 55 58 63 66 67 73 76 81 85 91 94 99 103 109 -
112 115 118 121 124 149 151 152 154 156 157 159 161 162 164 -
166 TO 168 170 171 173 175 176 178 180 181 183 184 189 193 203 206 -
209 215 217 218 227 229 230 232 233 235 237 238 240 241 243 244 246 -
247 TO 248 250 252 254 256 TO 259 267 269 271 273 274 276 278 280 297 -
299 301 303 304 306 308 310 329 TO 333 335 336 338 TO 340 342 343 -
345 356 358 359 361 366 TO 370 372 381 382 389 390 443 446 528 531 -
534 536 539 542 TO 545 547 TO 549 551 TO 554 556 TO 559 561 TO 564 -
599 602 627 631 633 TO 638 640 642 TO 645 661 664 667 670 672 674 -
678 687 TO 689 698 701 704 707 709 710 712 714 715 717 720 -
725 TO 728 735 TO 739 753 758 759 776 793 808 821 831 TO 835 837 839 -
840 TABLE ST HE220A
14 16 32 34 50 52 68 70 86 88 104 106 110 111 113 114 116 117 -
133 TO 138 179 182 185 TO 187 192 211 213 214 224 284 TO 291 -
314 TO 321 371 373 391 392 403 410 413 416 419 425 427 429 -
433 TO 436 444 447 449 TO 452 454 TO 457 468 471 TO 474 476 TO 478 -
480 TO 483 485 TO 488 490 TO 493 529 532 537 538 600 603 615 -
618 TO 620 648 649 652 653 656 TO 660 683 693 696 699 702 705 708 -
771 TO 773 778 781 TO 785 787 TO 790 792 794 796 797 804 TO 806 810 -
812 TO 820 824 TO 828 TABLE ST HE200A
147 150 155 160 165 383 TO 386 405 406 408 409 411 414 415 417 418 -
420 421 423 424 426 428 430 431 437 TO 441 458 TO 467 494 TO 526 565 -
566 TO 597 604 TO 612 626 628 629 662 663 665 666 668 669 671 673 675 -
677 680 681 719 721 723 724 729 TO 733 740 TO 750 752 754 TO 756 760 -
```

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761 763 TO 767 769 770 774 779 791 798 TO 800 802 803 807 811 823 -
829 830 838 841 TABLE ST L75X75X6
401 402 685 TABLE ST L90X90X8
122 123 125 126 141 142 144 188 190 194 623 624 690 711 TABLE ST HE140A
119 120 139 140 393 TO 400 TABLE ST HE160A
2 3 5 TO 8 15 17 18 20 21 23 TO 26 145 146 174 191 625 682 684 686 -
691 694 TABLE ST HE600A
51 53 54 260 263 540 541 546 550 555 560 TABLE ST HE340A
38 39 41 TO 44 56 57 59 TO 62 74 75 77 TO 80 92 93 95 TO 98 697 700 -
703 706 TABLE ST HE400A
***---------------------------------------------------------------------
*----------------- SUPPORT CONDITION --------------------------------------
***---------------------------------------------------------------------
****BASE CONDITION TO BE SIMULATED AS PINNED CONNECTION
SUPPORTS
1 TO 8 PINNED
***---------------------------------------------------------------------
*----------------- MEMEBER SPECIFICATION ----------------------------------
***---------------------------------------------------------------------
MEMBER RELEASE
9 TO 12 14 16 27 TO 30 32 34 45 TO 48 50 52 63 TO 66 68 70 81 TO 83 -
85 86 88 99 TO 102 104 106 110 111 113 114 116 117 119 120 122 123 -
125 126 133 TO 142 144 147 150 151 155 156 160 161 165 166 170 173 -
176 179 182 185 188 190 192 194 200 203 206 209 211 213 217 229 232 -
235 238 241 244 247 256 TO 259 284 TO 291 314 TO 321 335 338 339 342 -
345 355 TO 359 361 366 368 371 373 383 TO 386 391 393 TO 398 401 402 -
405 406 408 409 411 414 415 417 418 420 421 423 424 426 428 430 431 -
437 TO 441 444 447 458 TO 467 494 TO 526 529 532 537 538 565 TO 597 -
600 603 TO 612 615 618 623 624 626 628 629 636 644 645 648 -
657 TO 660 662 663 665 666 668 669 671 673 675 677 680 681 685 688 -
689 TO 690 693 696 699 702 705 708 711 714 717 719 721 723 724 729 -
730 TO 733 740 TO 750 752 754 TO 756 760 761 763 TO 767 771 774 778 -
779 781 789 791 792 797 TO 800 802 TO 804 807 810 TO 812 820 823 826 -
828 TO 833 838 839 841 START MY MZ
14 16 32 34 50 52 68 70 86 88 104 106 110 111 113 114 116 117 119 120 -
122 123 125 126 133 TO 142 144 147 150 152 155 157 160 162 TO 165 -
167 171 172 178 179 184 187 188 190 192 194 207 208 211 212 233 234 -
245 246 254 255 272 273 280 281 302 303 310 311 343 344 353 354 356 -
367 369 371 373 383 TO 386 392 397 398 401 402 405 406 408 TO 411 -
413 TO 421 423 424 426 428 430 431 437 438 440 441 444 446 447 449 -
451 455 457 TO 464 466 467 471 TO 474 485 487 491 493 TO 526 529 532 -
537 538 542 TO 545 556 558 562 564 TO 597 600 603 TO 612 615 618 620 -
623 624 626 628 629 634 TO 636 642 TO 645 653 656 TO 663 665 TO 675 -
677 680 681 685 687 688 690 693 696 699 702 705 708 711 714 717 719 -
721 723 724 729 TO 733 735 TO 756 758 TO 767 769 770 773 774 779 782 -
790 791 794 796 TO 800 802 803 806 807 811 813 823 TO 827 829 830 -
835 838 840 841 END MY MZ
DEFINE WIND LOAD
TYPE 1 WIND 1
<! STAAD PRO GENERATED DATA DO NOT MODIFY !!!
CUSTOM:PARAMS
!> END GENERATED DATA BLOCK
```

```
INT 0.71 0.79 0.85 0.91 0.95 1 1.03 1.07 1.14 1.2 1.25 1.3 1.38 HEIG 6 8 10 -
12 14 16 18 20 25 30 35 40 50
TYPE 2 BLAST LOAD
<! STAAD PRO GENERATED DATA DO NOT MODIFY !!!
CUSTOM:PARAMS
!> END GENERATED DATA BLOCK
INT 2.99 2.99 2.99 2.99 HEIG 0 5 25 30
TYPE 3 BLAST LOAD
<! STAAD PRO GENERATED DATA DO NOT MODIFY !!!
CUSTOM:PARAMS
!> END GENERATED DATA BLOCK
INT 6.07 6.07 6.07 6.07 6.07 6.07 HEIG 0 5 10 15 25 30
***-----------------------------------------------------------------------
*------------------------------- WIND LOAD DEFINITION ----------------------
***-----------------------------------------------------------------------
LOAD 101 MODELLED STRUCTURAL/ FOUNDATION SELF WEIGHT
***-----------------------------------------------------------------------
SELFWEIGHT Y -1.15
***-----------------------------------------------------------------------
LOAD 102 NODE/ CONNECTION WEIGHT/LIFTING LUG/ PAD-EYE WEIGHT
***-----------------------------------------------------------------------
LOAD 100 PRIMARY STRUCTURAL STEEL (SUM OF LC 101 TO 102)
***-----------------------------------------------------------------------
REPEAT LOAD
101 1.0 102 1.0
***-----------------------------------------------------------------------
LOAD 111 GRATING/ CHEQUERED PLATE /EQUIPMENT SUPPORTS /  SECONDARY
PLATFORMS/
MEMBER LOAD
*grating load 0.25kN/m2 at +5.0 level
17 145 151 152 156 157 161 162 166 167 179 184 188 190 191 615 623 -
624 627 839 840 UNI GY -0.25
14 15 18 146 170 173 180 181 193 618 625 UNI GY -0.125
*grating load 0.5kN/m2 at +8.20 level for 1m spacing
32 33 35 36 200 203 206 209 TO 212 217 221 224 229 232 235 600 603 -
634 635 637 638 644 TO 647 650 651 654 655 661 664 667 670 672 674 -
676 678 679 833 TO 835 UNI GY -0.25
*grating load 0.5kN/m2 at +12.80 level
53 238 241 244 247 256 TO 259 263 539 542 TO 545 547 TO 549 -
551 TO 559 561 TO 564 709 710 UNI GY -0.25
50 51 54 260 537 538 540 541 546 550 560 UNI GY -0.125
*grating load 0.5kN/m2 at +17.40 level
71 283 TO 291 468 471 TO 474 476 TO 478 480 TO 488 490 TO 493 -
804 TO 806 812 TO 819 826 TO 828 UNI GY -0.25
68 69 72 282 469 470 475 479 489 529 532 UNI GY -0.125
*grating load 0.5kN/m2 at +20.40 level
89 313 TO 321 403 410 413 416 419 425 427 429 433 TO 436 448 TO 457 -
771 TO 773 781 TO 785 787 788 797 UNI GY -0.25
86 87 90 312 404 407 422 432 444 447 453 UNI GY -0.125
*grating load 0.5kN/m2 at +23.80 level
107 335 338 339 342 345 355 TO 363 365 371 376 381 382 389 390 712 -
713 715 716 720 725 TO 728 734 TO 739 751 753 758 759 -
```

762 UNI GY -0.25
****HANDRAIL WEIGHT***0.06KN/M
9 10 12 TO 15 18 27 28 30 TO 33 36 45 46 48 TO 51 54 63 64 66 TO 69 -
72 81 82 85 TO 87 90 99 100 102 TO 105 108 109 112 115 118 121 124 -
127 TO 132 146 148 149 153 154 158 159 163 164 168 169 171 172 174 -
189 195 196 198 199 201 202 204 205 207 208 215 218 219 227 228 230 -
231 233 234 236 237 239 240 242 243 245 246 248 250 TO 255 260 266 -
267 TO 274 276 TO 282 296 TO 304 306 TO 312 327 329 TO 333 336 337 -
340 341 343 344 346 TO 354 370 374 380 387 388 404 407 422 432 443 -
445 453 469 470 475 479 489 528 530 534 535 540 541 546 550 560 599 -
601 614 616 621 622 625 630 631 633 640 641 676 679 686 689 693 696 -
699 702 705 708 718 722 757 768 775 TO 777 793 795 801 808 809 821 -
822 836 837 UNI GY -0.06
*Staircase stringer /ladder /Handrail
*weight of stair = 2kN/m2 assumed
*width of stair = 1.0m length of stringer = 4m total area =4m2
*width of landing= 1.6m length of landing =3m Area =3*1.6= 4.8m2
*total area= 4+4.8 =8.8 m2
*Load due to stair = 8.8*2 = 17.6 kN
14 32 50 68 86 104 693 696 699 702 705 708 CON GY -17.6
104 105 108 374 380 388 718 722 757 UNI GY -0.125
****GRATING LOAD
****SECONDARY BEAMS WEIGHT
***--
LOAD 112 PIPE SUPPORTS/ MONORAILS, RUNWAY BEAMS, MATERIAL HANDLING ITEMS
***--
LOAD 113 RIGGING WEIGHT/SEA FASTENING/ LASHING/ SECURING WEIGHTS
***--
LOAD 110 SECONDARY & TERTIARY STRUCTURAL STEEL (UNMODELED PART)
*(Sum of LC 111 to 113)
***--
REPEAT LOAD
111 1.0 112 1.0 113 1.0
***--
LOAD 120 ADDITIONAL LOAD TO MATCH THE WCR STRUCTURAL WEIGHT
***--
***--
LOAD 131 PAINTING LOAD
**2% OF MODELLED STRUCTURAL STEEL WEIGHT CAN BE CONSIDERED AS AN EARLY ESTIMATE
***--
LOAD 132 FIRE PROOFING LOADS
***--
***--
LOAD 130 MISCELLANEOUS LOADS (SUM OF LC 131 AND LC 132)
***--
REPEAT LOAD
131 1.0 132 1.0
***--
LOAD 140 HOOK UP LOADS
***--
LOAD 10 TOTAL STRUCTURAL DEAD LOAD (SUM OF LC 100, 110, 120, 130,140)

***---
REPEAT LOAD
100 1.0 110 1.0 120 1.0 130 1.0 140 1.0
***---
LOAD 201 OPEN AREA LIVE LOADS/ OPERATING PLATFORMS (5 KN/M2)
***---
MEMBER LOAD
*Live load 3.0 kN/m2 at +5.0 level
17 145 151 152 156 157 161 162 166 167 179 184 188 190 191 615 623 -
624 627 839 840 UNI GY -3
14 15 18 146 170 173 180 181 193 616 618 625 UNI GY -1.5
*Live load 3.0 kN/m2 at +8.20 level
32 33 35 36 200 203 206 209 TO 212 217 221 224 229 232 235 600 603 -
634 635 637 638 644 TO 647 650 651 654 655 661 664 667 670 672 674 -
676 678 679 UNI GY -3
*Live load 3kN/m2 at +12.80 level
53 238 241 244 247 256 TO 259 263 539 542 TO 545 547 TO 549 -
551 TO 564 709 710 UNI GY -3
50 51 54 260 537 538 540 541 546 550 560 UNI GY -1.5
*Live load 3kN/m2 at +17.40 level
71 283 TO 291 468 471 TO 474 476 TO 478 480 TO 488 490 TO 493 -
804 TO 806 812 TO 819 826 TO 828 UNI GY -3
68 69 72 282 469 470 475 479 489 529 532 UNI GY -1.5
*UDL At +20.40 level 3kN/m2
89 313 TO 321 403 410 413 416 419 425 427 429 433 TO 436 448 TO 457 -
771 TO 773 781 TO 785 787 788 797 UNI GY -3
86 87 90 312 404 407 422 432 444 447 453 UNI GY -1.5
*UDL At +23.80 level 3kN/m2
107 335 338 339 342 345 355 TO 363 365 371 376 381 382 389 390 712 -
713 715 716 720 725 TO 728 734 TO 739 751 753 758 759 762 UNI GY -3
104 105 108 373 374 380 388 718 722 757 UNI GY -1.5
****LIVE LOAD ON MAIN OPERATING FLOOR
*Live load on stair = 3kN/m2
*width of stair = 1.0m length of stringer = 4m total area =4m2
*width of landing= 1.6m length of landing =3m Area =3*1.6= 4.8m2
*total area= 4+4.8 =8.8 m2
*Load due to stair = 8.8*3 = 26.40 kN
14 32 50 68 86 104 693 696 699 702 705 708 CON GY -26.4
***---
LOAD 202 LIVE LOAD ON SERVICE PLATFORMS, PEDESTALS, WALKWAYS (3 KN/M2)
***---
LOAD 203 LIVE LOAD ON STAIRWAYS (5KN/M2)
***---
LOAD 204 LIVE LOADS ON STORAGE AREAS (LAYDOWN) (7.5 KN/M2)
***---
LOAD 20 TOTAL LIVE LOAD (SUM OF LC 201 TO 204) (LL)
***---
REPEAT LOAD
201 1.0 202 1.0 203 1.0 204 1.0
***---
LOAD 301 EMPTY WEIGHT OF PIPE (UDL)/PIPE AREA LOAD
MEMBER LOAD

```
*UDL load 1.0 kN/m2 at +5.0 level
17 145 151 152 156 157 161 162 166 167 179 184 188 190 191 623 624 -
627 839 840 UNI GY -1
15 18 146 170 173 180 181 193 616 625 UNI GY -0.5
*UDL load 1.0 kN/m2 at +8.20 level
33 35 36 200 203 206 209 TO 212 217 221 224 229 232 235 634 635 637 -
638 644 TO 647 650 651 654 655 661 664 667 670 672 674 676 678 -
679 UNI GY -1
*UDL At +12.80 level 1kN/m2
53 238 241 244 247 256 TO 259 263 539 542 TO 545 547 TO 549 -
551 TO 564 709 710 UNI GY -1
51 54 260 540 541 546 550 560 UNI GY -0.5
*UDL At +17.40 level 1kN/m2
71 283 TO 291 468 471 TO 474 476 TO 478 480 TO 488 490 TO 493 -
804 TO 806 812 TO 819 826 TO 828 UNI GY -1
69 72 282 469 470 475 479 489 UNI GY -0.5
*UDL At +20.40 level 1kN/m2
89 313 TO 321 403 410 413 416 419 425 427 429 433 TO 436 448 TO 457 -
771 TO 773 781 TO 785 787 788 792 794 797 UNI GY -1
87 90 312 404 407 422 432 UNI GY -0.5
*UDL At +23.80 level 1kN/m2
107 335 338 339 342 345 355 TO 363 365 376 381 382 389 390 712 713 -
715 716 720 725 TO 728 734 TO 739 751 753 758 759 762 UNI GY -1
105 108 374 380 388 718 722 757 UNI GY -0.5
***-----------------------------------------------------------------------
***-----------------------------------------------------------------------
LOAD 302 EMPTY WEIGHT OF PIPE VALVES, SUPPORTS (POINT LOAD)
MEMBER LOAD
683 CON GY -80 0.1
54 CON GY -70 1.1
51 CON GY -80 1
317 CON GY -15 1
JOINT LOAD
182 FY -5
MEMBER LOAD
714 717 CON GY -7.5
***-----------------------------------------------------------------------
LOAD 303 EMPTY WEIGHT OF PIPE VALVES, SUPPORTS ON HOOK UP STEEL
***-----------------------------------------------------------------------
LOAD 300 PIPING DRY WEIGHTS (SUM OF LC 301 TO 303)
***-----------------------------------------------------------------------
REPEAT LOAD
301 1.0 302 1.0 303 1.0
***-----------------------------------------------------------------------
LOAD 311 EQUIPMENT DRY WEIGHT (> 10MT)
***-----------------------------------------------------------------------
***-----------------------------------------------------------------------
LOAD 312 EQUIPMENT DRY WEIGHT (<10 MT) /AREA LOAD
*Empty weight of equipmnet V06 =35/4 =8.75
MEMBER LOAD
174 688 CON GY -9
176 CON GY -9 0.8
```

183 CON GY -9 0.2
**Weight of E616
627 CON GY -3
**Weight of V602
657 TO 660 CON GY -15
*Empty weight of Eq E606 = 22kN
238 CON GY -22 1.75
*Empty weight of Eq E617 = 40kN
711 CON GY -40
*Empty weight of Eq E608 = 60/2 = 30 kN
367 369 CON GY -30 0.412
*Empty weight of Eq E610 = 35/2 = 17.5 kN
376 CON GY -17.5 1
360 CON GY -17.5 1.63
*Empty weight of S601 = 73/4 = 19KN
397 TO 400 CON GY -19
***---
LOAD 310 MECHANICAL DRY WEIGHTS (SUM OF LC 311 TO 312)
***---
REPEAT LOAD
311 1.0 312 1.0
***---
LOAD 321 ELECTRICAL EQUIPMENT DRY WEIGHT
***---
LOAD 322 ELECTRICAL CABLES, CABLE DUCTS/ TRAYS
***---
LOAD 320 ELECTRICAL DRY WEIGHTS (SUM OF LC 321 TO 322)
***---
REPEAT LOAD
321 1.0 322 1.0
***---
LOAD 331 INSTRUMENTATION EQUIPMENT DRY WEIGHT
***---
LOAD 332 INSTRUMENTATION CABLES, CABLE DUCTS/ TRAYS
***---
LOAD 330 INSTRUMENTATION DRY WEIGHTS (SUM OF LC 331 TO 332)
***---
REPEAT LOAD
331 1.0 332 1.0
***---
LOAD 30 TOTAL EMPTY WEIGHT OF PIPING/ EQUIPMENT/ E&I
*(Sum of LC 300,310,320,330)(EQE)
***---
REPEAT LOAD
300 1.0 310 1.0 320 1.0 330 1.0
***---
LOAD 401 OPERATING WEIGHT OF PIPE (UDL)/ AREA LOAD
MEMBER LOAD
*UDL load 2.0 kN/m2 at +5.0 level
17 145 151 152 156 157 161 162 166 167 179 184 188 190 191 623 624 -
627 839 840 UNI GY -2
15 18 146 170 173 180 181 183 193 616 625 686 687 UNI GY -1

```
*UDL load 2.0 kN/m2 at +8.20 level
33 35 36 200 203 206 209 TO 212 217 221 224 229 232 235 634 635 637 -
638 644 TO 647 650 651 654 655 661 664 667 670 672 674 676 678 -
679 UNI GY -2
*UDL At +12.80 level 2kN/m2
53 238 241 244 247 256 TO 259 263 539 542 TO 545 547 TO 549 -
551 TO 564 709 710 UNI GY -2
51 54 260 540 541 546 550 560 UNI GY -1
*UDL At +17.40 level 2kN/m2
71 283 TO 291 468 471 TO 474 476 TO 478 480 TO 488 490 TO 493 -
804 TO 806 812 TO 819 826 TO 828 UNI GY -2
69 72 282 469 470 475 479 489 UNI GY -1
*UDL At +20.40 level 2kN/m2
89 313 TO 321 403 410 413 416 419 425 427 429 433 TO 436 448 TO 457 -
771 TO 773 781 TO 785 787 788 792 794 797 UNI GY -2
87 90 312 404 407 422 432 UNI GY -1
*UDL At +23.80 level 2kN/m2
107 335 338 339 342 345 355 TO 363 365 376 381 382 389 390 712 713 -
715 716 720 725 TO 728 734 TO 739 751 753 758 759 762 UNI GY -2
105 108 374 380 388 718 722 757 UNI GY -1
***-------------------------------------------------------------------------
***-------------------------------------------------------------------------
LOAD 402 OPERATING WEIGHT OF PIPE SUPPORT (POINT LOAD)
MEMBER LOAD
683 CON GY -90 0.1
54 CON GY -80 1.1
51 CON GY -90 1
317 CON GY -20 1
JOINT LOAD
182 FY -6
MEMBER LOAD
714 717 CON GY -25
***-------------------------------------------------------------------------
LOAD 400 OPERATING PIPE WEIGHTS (SUM OF LC 401 TO 402)
***-------------------------------------------------------------------------
REPEAT LOAD
401 1.0 402 1.0
***-------------------------------------------------------------------------
LOAD 411 EQUIPMENT OPERATING WEIGHT (> 10MT)
***-------------------------------------------------------------------------
REPEAT LOAD
311 1.15
***-------------------------------------------------------------------------
LOAD 412 EQUIPMENT OPERATING WEIGHT (<10 MT)
*Operating weight of equipmnet V06 =50/4 =12.5 kN
MEMBER LOAD
174 688 CON GY -12.5
176 CON GY -12.5 0.8
183 CON GY -12.5 0.2
*weight of E616 = 3kN
627 CON GY -3
*Operating Weight of V602 = 90/4 = 22.5 kN
```

```
657 TO 660 CON GY -22.5
*Empty weight of Eq E606 = 22kN
238 CON GY -25 1.75
*Empty weight of Eq E617 = 40kN
711 CON GY -45
*Operating weight of Eq E608 = 70/2 = 35 kN
367 369 CON GY -35 0.412
*Operating weight of Eq E610 = 40/2 = 40 kN
376 CON GY -20 1
360 CON GY -20 1.63
*Operating weight of S601 = 80/4 = 20KN
397 TO 400 CON GY -20
***----------------------------------------------------------------------
LOAD 410 MECHANICAL EQUIPMENT  WEIGHTS (SUM OF LC 411 TO 412)
***----------------------------------------------------------------------
REPEAT LOAD
411 1.0 412 1.0
***----------------------------------------------------------------------
LOAD 421 ELECTRICAL EQUIPMENT  WEIGHT/ BULK ITEMS/CABLES, CABLE DUCTS/
TRAYS
***----------------------------------------------------------------------
LOAD 420 ELECTRICAL ITEM WEIGHTS IN  OPERATING CONDITION(LC 421)
***----------------------------------------------------------------------
REPEAT LOAD
421 1.0
***----------------------------------------------------------------------
LOAD 431 INSTRUMENTATION EQUIPMENT WEIGHT/BULK ITEMS/CABLES,CABLE
DUCTS/ TRAYS
***----------------------------------------------------------------------
LOAD 430 INSTRUMENTATION ITEM WEIGHTS IN OPERATING CONDITION (LC 431)
***----------------------------------------------------------------------
REPEAT LOAD
431 1.0
***----------------------------------------------------------------------
LOAD 40 TOTAL OPERATING WEIGH OF PIPING/EQUIPMENT/E&I
*(Sum of LC 400,410,420,430)(EQLO)
***----------------------------------------------------------------------
REPEAT LOAD
400 1.0 410 1.0 420 1.0 430 1.0
***----------------------------------------------------------------------
LOAD 501 HYDROTEST WEIGHT OF PIPING (UDL)
***----------------------------------------------------------------------
LOAD 502 HYDROTEST WEIGHT OF PIPE SUPPORTS (POINT LOAD)
MEMBER LOAD
54 CON GY -200
JOINT LOAD
182 FY -15
***----------------------------------------------------------------------
LOAD 500 PIPING HYDROTEST WEIGHTS (SUM OF LC 501 & LC 502)
***----------------------------------------------------------------------
REPEAT LOAD
501 1.0 502 1.0
```

```
***---------------------------------------------------------------------------
LOAD 511 EQUIPMENT HYDROTEST WEIGHT (> 10MT)
***---------------------------------------------------------------------------
LOAD 512 EQUIPMENT HYDROTEST WEIGHT (<10 MT)
*Test weight of equipmnet V06= 80/4 20kN
MEMBER LOAD
174 688 CON GY -20
176 CON GY -20 0.8
183 CON GY -20 0.2
*test weight of V602 = 140/4 =35KN
657 TO 660 CON GY -35
***---------------------------------------------------------------------------
LOAD 510 MECHANICAL HYDROTEST WEIGHTS (SUM OF LC 511 & LC 512)
***---------------------------------------------------------------------------
REPEAT LOAD
511 1.0 512 1.0
***---------------------------------------------------------------------------
LOAD 50 TOTAL HYDROTEST WEIGH OF PIPING/EQUIPMENT/E&I
*(Sum of LC 500,510,420,430)(EQLT)
***---------------------------------------------------------------------------
REPEAT LOAD
500 1.0 510 1.0 420 1.0 430 1.0
***---------------------------------------------------------------------------
LOAD 6110 WIND LOADS DUE TO STRUCTURE SELF OBSTRUCTION [W-E] -VE X
DIRECTION
WIND LOAD X -1.8 TYPE 1 XR 11.9 12.1 YR 0 26 ZR 3 8 OPEN
WIND LOAD X -1.8 TYPE 1 XR 5.9 6.1 YR 0 26 ZR 0 3 OPEN
WIND LOAD X -0.75 TYPE 1 XR 5.9 6.1 YR 0 26 ZR 3 8 OPEN
WIND LOAD X -0.75 TYPE 1 XR 0 0.1 YR 0 26 ZR 0 8 OPEN
***---------------------------------------------------------------------------
***---------------------------------------------------------------------------
LOAD 6310 WIND LOADS DUE TO STRUCTURE SELF OBSTRUCTION [S-N] -VE Z
DIRECTION
WIND LOAD Z -1.8 TYPE 1 XR 0 12 YR 0 26 ZR 7.9 8.1 OPEN
WIND LOAD Z -0.85 TYPE 1 XR 0 12 YR 0 26 ZR 2.9 3.1 OPEN
WIND LOAD Z -0.85 TYPE 1 XR 0 6 YR 0 26 ZR 0 0.1 OPEN
***---------------------------------------------------------------------------
***---------------------------------------------------------------------------
LOAD 611 WIND LOAD ON STR. DUE TO SELF OBSTRUCTION IN  +VE X-(E-W) DIRECTION
WIND LOAD X 1.8 TYPE 1 XR 0 0.1 YR 0.3 28 ZR 0 8 OPEN
WIND LOAD X 0.75 TYPE 1 XR 5.9 6.1 YR 0 26 ZR 0 8 OPEN
WIND LOAD X 0.75 TYPE 1 XR 11.9 12.1 YR 0 26 ZR 3 8 OPEN
***---------------------------------------------------------------------------
***---------------------------------------------------------------------------
LOAD 612 WIND LOAD ON PIPING IN +VE X-(E-W) DIRECTION
***---------------------------------------------------------------------------
****EL +5.0M
JOINT LOAD
13 14 FX 2
****EL +8.0M
21 22 FX 2
****EL +12.80M
```

29 30 FX 5.1
****EL +17.4M
37 38 FX 4.4
****EL +20.4 M
45 46 FX 4.5
****EL +23.80M
53 54 FX 3.2
*Wind load on vertical 40" dia pipe
*F=1.25*0.8*1 = 1 kN/m to be applied along the column
MEMBER LOAD
2 3 20 21 38 39 56 57 74 75 92 93 682 684 UNI GX 1
***---
LOAD 613 WIND LOAD ON EQUIPMENT +VE X-(E-W) DIRECTION
*Wind load on V605 equipmnet =3.3/2 =1.65kN
MEMBER LOAD
174 CON GX 1.65
183 CON GX 1.65 0.3
174 CON GY 1
183 CON GY -1 0.3
*Wind load on V602 equipmnet =5.0/4 =1.25kN
657 TO 660 CON GX 1.25
657 658 CON GY 0.92
659 660 CON GY -0.92
*Wind load on E606 equipmnet =3.3/2 =0.85kN
238 CON GX 3.3 1.8
238 CON GY 1.05 1.8
709 CON GY -1.05 1
*Wind load on E617 equipmnet =3.3/2 =0.85kN
711 CON GX 3.3
JOINT LOAD
378 FY 1.05
379 FY -1.05
*Wind load on S601 equipmnet =2.7/4 =0.7kN
MEMBER LOAD
397 TO 400 CON GX 0.7
*Wind load on E608 equipmnet =14.4/2 =7.2kN
JOINT LOAD
205 208 FX 7.2
*Wind load on E610 equipmnet =3.4/2 =1.7kN
MEMBER LOAD
376 CON GX 1.7 0.5
360 CON GX 1.7 1.2
376 CON GY 0.7 0.5
360 CON GY -0.7 1.2
***---
***---
LOAD 614 WIND LOAD ON CABLE TRAY +VE X-(E-W) DIRECTION
***---
LOAD 61 TOTAL WIND LOAD IN +VE X-(E-W) DIRECTION (LC 611)
***---
REPEAT LOAD
611 1.0 612 1.0 613 1.0 614 1.0

```
***-------------------------------------------------------------------------
LOAD 621 WIND LOAD ON STRUCTURE DUE TO SELF OBSTRUCTION IN +VE Z-(N-S) DIR
WIND LOAD Z 1.8 TYPE 1 XR 0 6 YR 0 26 ZR 0 0.1 OPEN
WIND LOAD Z 1.8 TYPE 1 XR 6 12 YR 0 26 ZR 2.9 3.1 OPEN
WIND LOAD Z 0.85 TYPE 1 XR 0 6 YR 0 26 ZR 2.9 3.1 OPEN
WIND LOAD Z 0.85 TYPE 1 XR 0 12 YR 0 26 ZR 7.9 8.1 OPEN
***-------------------------------------------------------------------------
***-------------------------------------------------------------------------
LOAD 622 WIND LOAD ON PIPING IN +VE Z-(N-S) DIRECTION
***-------------------------------------------------------------------------
****EL +5.0M
JOINT LOAD
14 FZ 3.4
11 17 FZ 1.7
****EL +8.20M
22 FZ 3.7776
19 25 FZ 1.8888
****EL +12.80M
30 FZ 4.4
27 33 FZ 2.2
****EL +17.40 M
38 FZ 4.9584
35 41 FZ 2.4792
****EL +20.4 M
46 FZ 5.3
43 49 FZ 2.6
****EL +23.8 M
54 FZ 5.52
51 57 FZ 2.76
MEMBER LOAD
2 8 20 26 38 44 56 62 74 80 92 98 UNI GZ 1
***-------------------------------------------------------------------------
LOAD 623 WIND LOAD ON EQUIPMENT  +VE Z-(N-S) DIRECTION
***-------------------------------------------------------------------------
*Wind load on V605 equipmnet =3.3/2 =1.65kN
MEMBER LOAD
688 CON GZ 1.65
176 CON GZ 1.65 0.9
688 CON GY -1
176 CON GY 1 0.9
*Wind load on V602 equipmnet =5.0/4 =1.25kN
657 TO 660 CON GZ 1.25
657 659 CON GY 0.92
658 660 CON GY -0.92
*Wind load on E606 equipmnet =4.8
238 CON GZ 4.8 1.8
238 CON GY -1.5 1.8
238 CON GY 1.5 1
*Wind load on E617 equipmnet =3.3/2 =0.85kN
711 CON GZ 3.3
711 CON GY 1.05
JOINT LOAD
```

```
184 FY 1.05
*Wind load on S601 equipmnet =2.7/4 =0.7kN
MEMBER LOAD
397 TO 400 CON GZ 0.7
*Wind load on E608 equipmnet =14.4/2 =7.2kN
JOINT LOAD
205 208 FZ 7.2
*Wind load on E610 equipmnet =3.4/2 =1.7kN
MEMBER LOAD
376 CON GZ 1.7 0.5
360 CON GZ 1.7 1.2
***-----------------------------------------------------------------------
LOAD 624 WIND LOAD ON CABLE TRAY  +VE Z-(N-S) DIRECTION
***-----------------------------------------------------------------------
LOAD 62 TOTAL WIND LOAD IN +VE Z-(N-S) DIRECTION (LC 621)
***-----------------------------------------------------------------------
REPEAT LOAD
621 1.0 622 1.0 623 1.0 624 1.0
***-----------------------------------------------------------------------
LOAD 631 WIND LOAD ON STRUCTURE DUE TO SELF OBSTRUCTION IN -VE X-(W-E) DIR
WIND LOAD X -1.8 TYPE 1 XR 11.9 12.1 YR 0 26 ZR 3 8 OPEN
WIND LOAD X -1.8 TYPE 1 XR 5.9 6.1 YR 0 26 ZR 0 3 OPEN
WIND LOAD X -0.75 TYPE 1 XR 5.9 6.1 YR 0 26 ZR 3 8 OPEN
WIND LOAD X -0.75 TYPE 1 XR 0 0.1 YR 0 26 ZR 0 8 OPEN
***-----------------------------------------------------------------------
***-----------------------------------------------------------------------
LOAD 632 WIND LOAD ON PIPING IN -VE  X-(W-E) DIRECTION
***-----------------------------------------------------------------------
****EL +5.0M
JOINT LOAD
13 14 FX -2
****EL +8.0M
21 22 FX -2
****EL +12.80M
29 30 FX -5.1
****EL +17.4M
37 38 FX -4.4
****EL +20.4 M
45 46 FX -4.5
****EL +23.80M
53 54 FX -3.2
*Wind load on vertical 40" dia pipe
*F=1.25*0.8*1 = 1.0 kN/m to be applied along the column
MEMBER LOAD
2 3 20 21 38 39 56 57 74 75 92 93 682 684 UNI GX -1
***-----------------------------------------------------------------------
LOAD 633 WIND LOAD ON EQUIPMENT -VE  X-(W-E) DIRECTION
***-----------------------------------------------------------------------
*Wind load on V605 equipmnet =2.9/2 =1.45kN
MEMBER LOAD
174 CON GX -1.45
183 CON GX -1.45 0.3
```

```
174 CON GY -1
183 CON GY 1 0.3
*Wind load on V602 equipmnet =4.3/4 =1.1kN
657 TO 660 CON GX -1.1
657 658 CON GY -0.8
659 660 CON GY 0.8
*Wind load on E606 equipmnet =3.3/2 =0.85kN
238 CON GX -3.3 1.8
238 CON GY -1.05 1.8
709 CON GY 1.05 1
*Wind load on E617 equipmnet =3.3/2 =0.85kN
711 CON GX -3.3
JOINT LOAD
378 FY -1.05
379 FY 1.05
*Wind load on S601 equipmnet =2.4/4 =0.6kN
MEMBER LOAD
397 TO 400 CON GX -0.6
*Wind load on E608 equipmnet =14.4/2 =7.2kN
JOINT LOAD
205 208 FX -7.2
*Wind load on E610 equipmnet =3.4/2 =1.7kN
MEMBER LOAD
376 CON GX -1.7 0.5
360 CON GX -1.7 1.2
376 CON GY -0.7 0.5
360 CON GY 0.7 1.2
***-----------------------------------------------------------------------
LOAD 634 WIND LOAD ON CABLE TRAY -VE  X-(W-E) DIRECTION
***-----------------------------------------------------------------------
LOAD 63 TOTAL WIND LOAD IN -VE  X-(W-E) DIRECTION (LC 631)
***-----------------------------------------------------------------------
REPEAT LOAD
631 1.0 632 1.0 633 1.0 634 1.0
***-----------------------------------------------------------------------
LOAD 641 WIND LOAD ON STRUCTURE DUE TO SELF OBSTRUCTION IN -VE Z-(S-N) DIR
WIND LOAD Z -1.8 TYPE 1 XR 0 12 YR 0 26 ZR 7.9 8.1 OPEN
WIND LOAD Z -0.85 TYPE 1 XR 0 12 YR 0 26 ZR 2.9 3.1 OPEN
WIND LOAD Z -0.85 TYPE 1 XR 0 6 YR 0 26 ZR 0 0.1 OPEN
***-----------------------------------------------------------------------
***-----------------------------------------------------------------------
LOAD 642 WIND LOAD ON PIPING IN -VE Z-(S-N) DIRECTION
***-----------------------------------------------------------------------
****EL +5.0M
JOINT LOAD
14 FZ -3.4
11 17 FZ -1.7
****EL +8.20M
22 FZ -3.7776
19 25 FZ -1.8888
****EL +12.80M
30 FZ -4.4
```

```
27 33 FZ -2.2
****EL +17.40 M
38 FZ -4.9584
35 41 FZ -2.4792
****EL +20.4 M
46 FZ -5.3
43 49 FZ -2.6
****EL +23.8 M
54 FZ -5.52
51 57 FZ -2.76
MEMBER LOAD
3 7 21 25 39 43 57 61 75 79 93 97 396 682 684 UNI GZ -1
***-----------------------------------------------------------------------
LOAD 643 WIND LOAD ON EQUIPMENT -VE Z-(S-N) DIRECTION
***-----------------------------------------------------------------------
*Wind load on V605 equipmnet =3.3/2 =1.65kN
MEMBER LOAD
688 CON GZ -1.65
176 CON GZ -1.65 0.9
688 CON GY 1
176 CON GY -1 0.9
*Wind load on V602 equipmnet =5.0/4 =1.25kN
657 TO 660 CON GZ -1.25
657 659 CON GY -0.92
658 660 CON GY 0.92
*Wind load on E606 equipmnet =4.8
238 CON GZ -4.8 1.8
238 CON GY 1.5 1.8
238 CON GY -1.5 1
*Wind load on E617 equipmnet =3.3/2 =0.85kN
711 CON GZ -3.3
711 CON GY -1.05
JOINT LOAD
184 FY 1.05
*Wind load on S601 equipmnet =2.7/4 =0.7kN
MEMBER LOAD
397 TO 400 CON GZ -0.7
*Wind load on E608 equipmnet =14.4/2 =7.2kN
JOINT LOAD
205 208 FZ -7.2
*Wind load on E610 equipmnet =3.4/2 =1.7kN
MEMBER LOAD
376 CON GZ -1.7 0.5
360 CON GZ -1.7 1.2
***-----------------------------------------------------------------------
LOAD 644 WIND LOAD ON CABLE TRAY -VE Z-(S-N) DIRECTION
***-----------------------------------------------------------------------
LOAD 64 TOTAL WIND LOAD IN -VE Z-(S-N) DIRECTION (LC 641)
***-----------------------------------------------------------------------
REPEAT LOAD
641 1.0 642 1.0 643 1.0 644 1.0
***-----------------------------------------------------------------------
```

LOAD 81 PIPING THERMAL LOAD IN E-W DIRECTION (FDN/GLOBAL DESIGN) (TLE)
MEMBER LOAD
*UDL load 2.0 kN/m2 at +5.0 level
17 145 151 152 156 157 161 162 166 167 179 183 184 188 190 191 623 -
624 627 686 687 839 840 UNI GX 0.24
15 18 146 170 173 180 181 193 616 625 UNI GX 0.12
*UDL load 2.0 kN/m2 at +8.20 level
33 35 36 200 203 206 209 TO 212 217 221 224 229 232 235 634 635 637 -
638 644 TO 647 650 651 654 655 661 664 667 670 672 674 676 678 -
679 UNI GX 0.2
*UDL At +12.80 level 2kN/m2
53 238 241 244 247 256 TO 259 263 539 542 TO 545 547 TO 549 -
551 TO 564 709 710 UNI GX 0.24
51 54 260 540 541 546 550 560 UNI GX 0.12
*UDL At +17.40 level 2kN/m2
71 283 TO 291 468 471 TO 474 476 TO 478 480 TO 488 490 TO 493 -
804 TO 806 812 TO 819 826 TO 828 UNI GX 0.24
69 72 282 469 470 475 479 489 UNI GX 0.12
*UDL At +20.40 level 2kN/m2
89 313 TO 321 403 410 413 416 419 425 427 429 433 TO 436 448 TO 457 -
771 TO 773 781 TO 785 787 788 797 UNI GX 0.24
87 90 312 404 407 422 432 UNI GX 0.12
*UDL At +23.80 level 0.2 kN/m2
107 335 338 339 342 345 355 TO 363 365 376 381 382 389 390 712 713 -
715 716 720 725 TO 728 734 TO 739 751 753 758 759 762 UNI GX 0.2
105 108 374 380 388 718 722 757 UNI GX 0.1
***---
***---
LOAD 82 PIPING THERMAL LOAD IN N-S DIRECTION (FDN/GLOBAL DESIGN) (TLN)
MEMBER LOAD
*UDL load 2.0 kN/m2 at +5.0 level
17 145 151 152 156 157 161 162 166 167 179 184 188 190 191 615 623 -
624 627 839 840 UNI GZ 0.24
14 15 18 146 170 173 175 180 181 183 193 616 618 625 686 687 UNI GZ 0.12
*UDL load 2.0 kN/m2 at +8.20 level
33 35 36 200 203 206 209 TO 212 217 221 224 229 232 235 634 635 637 -
638 644 TO 647 650 651 654 655 661 664 667 670 672 674 676 678 -
679 UNI GZ 0.2
*UDL At +12.80 level 2kN/m2
53 238 241 244 247 256 TO 259 263 539 542 TO 545 547 TO 549 -
551 TO 564 709 710 UNI GZ 0.24
51 54 260 540 541 546 550 560 UNI GZ 0.12
*UDL At +17.40 level 2kN/m2
71 283 TO 291 468 471 TO 474 476 TO 478 480 TO 488 490 TO 493 -
804 TO 806 812 TO 819 826 TO 828 UNI GZ 0.24
69 72 282 469 470 475 479 489 UNI GZ 0.12
*UDL At +20.40 level 2kN/m2
89 313 TO 321 403 410 413 416 419 425 427 429 433 TO 436 448 TO 457 -
771 TO 773 781 TO 785 787 788 797 UNI GZ 0.24
87 90 312 404 407 422 432 UNI GZ 0.12
*UDL At +23.80 level 0.2 kN/m2
107 335 338 339 342 345 355 TO 363 365 376 381 382 389 390 712 713 -

715 716 720 725 TO 728 734 TO 739 751 753 758 759 762 UNI GZ 0.2
105 108 374 380 388 718 722 757 UNI GZ 0.1
***---
***---
LOAD 83 PIPE/EQUIPMENT FRICTION LOAD IN E-W DIRECTION (FLE)
***---
LOAD 84 PIPE/EQUIPMENT FRICTION LOAD IN N-S DIRECTION (FLN)
***---
LOAD 85 STEEL THERMAL LOAD ON STRUCTURE IN WARM CONDITION (ENT+)
TEMPERATURE LOAD
1 TO 83 85 TO 142 144 TO 196 198 TO 219 221 224 227 TO 260 263 266 -
267 TO 291 296 TO 321 327 329 TO 363 365 TO 374 376 380 TO 411 413 -
414 TO 638 640 TO 717 TEMP 30
***---
***---
LOAD 86 STEEL THERMAL LOAD ON STRUCTURE IN COLD CONDITION (ENT-)
TEMPERATURE LOAD
1 TO 83 85 TO 142 144 TO 196 198 TO 219 221 224 227 TO 260 263 266 -
267 TO 291 296 TO 321 327 329 TO 363 365 TO 374 376 380 TO 411 413 -
414 TO 638 640 TO 717 TEMP -30
***---
***---
LOAD 87 LOCAL WIND LOAD ON PIPE/EQUIPMENT IN X -(E-W) DIRECTION (LOCAL
DESIGN
***---
LOAD 88 LOCAL WIND LOAD ON PIPE/EQUIPMENT IN Z -(N-S) DIRECTION (LOCAL
DESIGN)
***---
LOAD 89 LOCAL PIPE HORIZONTAL LOAD IN E-W DIRECTION (LOCAL DESIGN)
(TLELOCAL)
***---
LOAD 90 LOCAL PIPE HORIZONTAL LOAD IN N-S DIRECTION (LOCAL DESIGN)
(TLNLOCAL)
***---
LOAD 911 VERTICAL LOAD DUE TO CRANE, MONORAIL AND BUNDLE PULL LOADS
***---
LOAD 912 HORIZONTAL LOAD DUE TO CRANE, MONORAIL AND BUNDLE PULL LOADS
***---
LOAD 91 MAINTENANCE LOAD (SUM OF LC 911 & LC 912) (ML)
***---
REPEAT LOAD
911 1.0 912 1.0
***---
LOAD 92 HORIZONTAL LOADS OF PSV (LOCAL DESIGN) (PSV)
***---
LOAD 93 MINIMUM VERTICAL LOAD FOR BEAM DESIGN (VMIN)
*MEMBER LOAD
*14 16 32 34 50 52 68 70 86 88 104 106 151 156 161 371 373 444 447 529 -
*532 537 538 600 603 615 618 625 839 CON GY -10
*693 696 699 702 705 708 CON GY -3
*JOINT LOAD
*70 88 89 100 111 113 142 143 160 161 178 179 204 206 212 TO 216 226 -

*234 TO 241 256 264 TO 271 290 298 TO 305 329 334 335 354 TO 360 385 -
*387 TO 390 404 410 422 427 438 FY -10
***--
LOAD 94 SNOW LOAD (SL)
*The characteristic snow load, Sk = 0.7kN/m2. (As per section 2.4.9 of 16471-C50-00001)
*Shape coefficient ?i = 0.8 (for flat roof)
*Exposure coefficient Ce = 1.0
*Heat Coefficient Ct = 1.0
*Snow load on roof S =sk * ?i* Ce* Ct = 0.7*0.8*1.0*1.0 = 0.56 kN/m2
*100 % snow load applied on top most floor = 0.56*1 =0.56kN/m
*50% snow load applied on subsequent floors =0.256*0.5*1= 0.28 kN/m2
MEMBER LOAD
104 105 107 108 335 338 339 342 345 355 TO 363 365 371 373 374 376 -
380 TO 382 388 TO 390 712 713 715 716 718 720 722 725 TO 728 -
734 TO 739 751 753 757 TO 759 762 UNI GY -0.56
14 15 17 18 32 33 35 36 50 51 53 54 68 69 71 72 86 87 89 90 145 146 -
151 152 156 157 161 162 166 167 170 173 TO 175 179 TO 181 183 184 -
188 190 191 193 200 203 206 209 TO 212 217 221 224 229 232 235 238 -
241 244 247 256 TO 260 263 282 TO 291 312 TO 321 403 404 407 410 413 -
416 419 422 425 427 429 432 TO 436 444 447 TO 457 468 TO 493 529 532 -
537 TO 564 600 603 615 618 623 TO 625 627 634 635 637 638 644 TO 647 -
650 651 654 655 661 664 667 670 672 674 676 678 679 686 687 709 710 -
771 TO 773 781 TO 785 787 788 797 804 TO 806 812 TO 819 826 TO 828 -
839 840 UNI GY -0.28
***--
***--
LOAD 1001 NOTIONAL LOAD FOR DEAD LOAD IN X -(E-W) DIRECTION (NLDE)
NOTIONAL LOAD
10 X 0.005
*---
LOAD 1002 NOTIONAL LOAD FOR DEAD LOAD IN Z -(N-S) DIRECTION (NLDN)
NOTIONAL LOAD
10 Z 0.005
*---
LOAD 1003 NOTIONAL LOAD FOR EMPTY LOAD OF PIPING & EQUIPMENT IN X-(E-W)
(NLEE)
NOTIONAL LOAD
30 X 0.005
*---
LOAD 1004 NOTIONAL LOAD FOR EMPTY LOAD OF PIPING & EQUIPMENT IN Z-(N-
S)(NLEN)
NOTIONAL LOAD
30 Z 0.005
*---
LOAD 1005 NOTIONAL LOAD FOR OPERATING LOAD OF PIPING & EQUIPMNT IN X(E-
W)(NLOE)
NOTIONAL LOAD
40 X 0.005
*---
LOAD 1006 NOTIONAL LOAD FOR OPERATING LOAD OF PIPING & EQUIPMNT IN Z(N-
S)(NLON)
NOTIONAL LOAD

40 Z 0.005
*---
LOAD 1007 NOTIONAL LOAD FOR LIVE LOAD IN X -(E-W) DIRECTION (NLLE)
NOTIONAL LOAD
20 X 0.005
*---
LOAD 1008 NOTIONAL LOAD FOR LIVE LOAD IN Z -(N-S) DIRECTION (NLLN)
NOTIONAL LOAD
20 Z 0.005
***
*****LOAD COMBINATIONS FOR STAAD
*****LOAD COMBINATION FOR SUPERSTRUCTURE_SLS
LOAD 30001
REPEAT LOAD
10 1.0 30 1.0 85 1.0
*****
LOAD 30002
REPEAT LOAD
10 1.0 30 1.0 86 1.0
*****
LOAD 30003
REPEAT LOAD
10 1.0 30 1.0 631 0.5 61 1.0
*****
LOAD 30004
REPEAT LOAD
10 1.0 30 1.0 611 0.5 62 1.0
*****
LOAD 30005
REPEAT LOAD
10 1.0 30 1.0 6310 0.5 63 1.0
*****
LOAD 30006
REPEAT LOAD
10 1.0 30 1.0 6110 0.5 64 1.0
*****
LOAD 30007
REPEAT LOAD
10 1.0 30 1.0 6310 0.5 61 1.0
*****
LOAD 30008
REPEAT LOAD
10 1.0 30 1.0 6110 0.5 62 1.0
*****
LOAD 30009
REPEAT LOAD
10 1.0 30 1.0 631 0.5 63 1.0
*****
LOAD 30010
REPEAT LOAD
10 1.0 30 1.0 611 0.5 64 1.0
*****

LOAD 30011
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0
*****
LOAD 30012
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0
*****
LOAD 30013
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0
*****
LOAD 30014
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0
*****
LOAD 30015
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0
*****
LOAD 30016
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0
*****
LOAD 30017
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0
*****
LOAD 30018
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0
*****
LOAD 30019
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 85 1.0
*****
LOAD 30020
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 85 1.0
*****
LOAD 30021
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 85 1.0
*****
LOAD 30022
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 85 1.0
*****
LOAD 30023
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 85 1.0
*****

LOAD 30024
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 85 1.0
*****
LOAD 30025
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 85 1.0
*****
LOAD 30026
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 85 1.0
*****
LOAD 30027
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 86 1.0
*****
LOAD 30028
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 86 1.0
*****
LOAD 30029
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 86 1.0
*****
LOAD 30030
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 86 1.0
*****
LOAD 30031
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 86 1.0
*****
LOAD 30032
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 86 1.0
*****
LOAD 30033
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 86 1.0
*****
LOAD 30034
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 86 1.0
*****
LOAD 30035
REPEAT LOAD
10 1.0 40 1.0 20 1.0 631 0.5 61 1.0 81 1.0 82 1.0
*****
LOAD 30036
REPEAT LOAD
10 1.0 40 1.0 20 1.0 611 0.5 62 1.0 81 1.0 82 1.0
*****

LOAD 30037
REPEAT LOAD
10 1.0 40 1.0 20 1.0 6310 0.5 63 1.0 81 -1.0 82 -1.0
*****
LOAD 30038
REPEAT LOAD
10 1.0 40 1.0 20 1.0 6110 0.5 64 1.0 81 -1.0 82 -1.0
*****
LOAD 30039
REPEAT LOAD
10 1.0 40 1.0 20 1.0 6310 0.5 61 1.0 81 1.0 82 -1.0
*****
LOAD 30040
REPEAT LOAD
10 1.0 40 1.0 20 1.0 6110 0.5 62 1.0 81 -1.0 82 1.0
*****
LOAD 30041
REPEAT LOAD
10 1.0 40 1.0 20 1.0 631 0.5 63 1.0 81 -1.0 82 1.0
*****
LOAD 30042
REPEAT LOAD
10 1.0 40 1.0 20 1.0 611 0.5 64 1.0 81 1.0 82 -1.0
*****
LOAD 30043
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 94 1.0
*****
LOAD 30044
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 94 1.0
*****
LOAD 30045
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 94 1.0
*****
LOAD 30046
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 94 1.0
*****
LOAD 30047
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 94 1.0
*****
LOAD 30048
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 94 1.0
*****
LOAD 30049
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 94 1.0
*****

LOAD 30050
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 94 1.0
*****
LOAD 30051
REPEAT LOAD
10 1.0 40 1.0 631 0.5 61 1.0 81 1.0 82 1.0
*****
LOAD 30052
REPEAT LOAD
10 1.0 40 1.0 611 0.5 62 1.0 81 1.0 82 1.0
*****
LOAD 30053
REPEAT LOAD
10 1.0 40 1.0 6310 0.5 63 1.0 81 -1.0 82 -1.0
*****
LOAD 30054
REPEAT LOAD
10 1.0 40 1.0 6110 0.5 64 1.0 81 -1.0 82 -1.0
*****
LOAD 30055
REPEAT LOAD
10 1.0 40 1.0 6310 0.5 61 1.0 81 1.0 82 -1.0
*****
LOAD 30056
REPEAT LOAD
10 1.0 40 1.0 6110 0.5 62 1.0 81 -1.0 82 1.0
*****
LOAD 30057
REPEAT LOAD
10 1.0 40 1.0 631 0.5 63 1.0 81 -1.0 82 1.0
*****
LOAD 30058
REPEAT LOAD
10 1.0 40 1.0 611 0.5 64 1.0 81 1.0 82 -1.0
*****
LOAD 30059
REPEAT LOAD
10 1.0 50 1.0 20 0.5 631 0.25 61 0.5
*****
LOAD 30060
REPEAT LOAD
10 1.0 50 1.0 20 0.5 611 0.25 62 0.5
*****
LOAD 30061
REPEAT LOAD
10 1.0 50 1.0 20 0.5 6310 0.25 63 0.5
*****
LOAD 30062
REPEAT LOAD
10 1.0 50 1.0 20 0.5 6110 0.25 64 0.5
*****

LOAD 30063
REPEAT LOAD
10 1.0 50 1.0 20 0.5 6310 0.25 61 0.5
*****
LOAD 30064
REPEAT LOAD
10 1.0 50 1.0 20 0.5 6110 0.25 62 0.5
*****
LOAD 30065
REPEAT LOAD
10 1.0 50 1.0 20 0.5 631 0.25 63 0.5
*****
LOAD 30066
REPEAT LOAD
10 1.0 50 1.0 20 0.5 611 0.25 64 0.5
*****
LOAD 30067
REPEAT LOAD
10 1.0 50 1.0 20 0.5 85 1.0
*****
LOAD 30068
REPEAT LOAD
10 1.0 50 1.0 20 0.5 86 1.0
*****
LOAD 30069
REPEAT LOAD
10 1.0 30 1.0 20 1.0 631 0.5 61 1.0 91 1.0
*****
LOAD 30070
REPEAT LOAD
10 1.0 30 1.0 20 1.0 611 0.5 62 1.0 91 1.0
*****
LOAD 30071
REPEAT LOAD
10 1.0 30 1.0 20 1.0 6310 0.5 63 1.0 91 1.0
*****
LOAD 30072
REPEAT LOAD
10 1.0 30 1.0 20 1.0 6110 0.5 64 1.0 91 1.0
*****
LOAD 30073
REPEAT LOAD
10 1.0 30 1.0 20 1.0 6310 0.5 61 1.0 91 1.0
*****
LOAD 30074
REPEAT LOAD
10 1.0 30 1.0 20 1.0 6110 0.5 62 1.0 91 1.0
*****
LOAD 30075
REPEAT LOAD
10 1.0 30 1.0 20 1.0 631 0.5 63 1.0 91 1.0
*****

LOAD 30076
REPEAT LOAD
10 1.0 30 1.0 20 1.0 611 0.5 64 1.0 91 1.0
*****
LOAD 30077
REPEAT LOAD
10 1.0 30 1.0 20 1.0 85 1.0 91 1.0
*****
LOAD 30078
REPEAT LOAD
10 1.0 30 1.0 20 1.0 86 1.0 91 1.0
*****
LOAD 30079
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 83 1.0 84 1.0 89 1.0 90 1.0 93 1.0
*****
LOAD 30080
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 83 1.0 84 1.0 89 1.0 90 1.0 93 1.0
*****
LOAD 30081
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 83 -1.0 84 -1.0 89 -1.0 90 -1.0 -
93 1.0
*****
LOAD 30082
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 83 -1.0 84 -1.0 89 -1.0 90 -1.0 -
93 1.0
*****
LOAD 30083
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 83 1.0 84 -1.0 89 1.0 90 -1.0 -
93 1.0
*****
LOAD 30084
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 83 -1.0 84 1.0 89 -1.0 90 1.0 -
93 1.0
*****
LOAD 30085
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 83 -1.0 84 1.0 89 -1.0 90 1.0 -
93 1.0
*****
LOAD 30086
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 83 1.0 84 -1.0 89 1.0 90 -1.0 -
93 1.0
*****
LOAD 30087
REPEAT LOAD

10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 83 1.0 84 1.0 85 1.0 89 1.0 90 1.0 -
93 1.0
*****
LOAD 30088
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 83 1.0 84 1.0 85 1.0 89 1.0 90 1.0 -
93 1.0
*****
LOAD 30089
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 83 -1.0 84 -1.0 85 1.0 89 -1.0 -
90 -1.0 93 1.0
*****
LOAD 30090
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 83 -1.0 84 -1.0 85 1.0 89 -1.0 -
90 -1.0 93 1.0
*****
LOAD 30091
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 83 1.0 84 -1.0 85 1.0 89 1.0 -
90 -1.0 93 1.0
*****
LOAD 30092
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 83 -1.0 84 1.0 85 1.0 89 -1.0 -
90 1.0 93 1.0
*****
LOAD 30093
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 83 -1.0 84 1.0 85 1.0 89 -1.0 -
90 1.0 93 1.0
*****
LOAD 30094
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 83 1.0 84 -1.0 85 1.0 89 1.0 -
90 -1.0 93 1.0
*****
LOAD 30095
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 83 1.0 84 1.0 86 1.0 89 1.0 90 1.0 -
93 1.0
*****
LOAD 30096
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 83 1.0 84 1.0 86 1.0 89 1.0 90 1.0 -
93 1.0
*****
LOAD 30097
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 83 -1.0 84 -1.0 86 1.0 89 -1.0 -
90 -1.0 93 1.0

*****
LOAD 30098
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 83 -1.0 84 -1.0 86 1.0 89 -1.0 -
90 -1.0 93 1.0
*****
LOAD 30099
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 83 1.0 84 -1.0 86 1.0 89 1.0 -
90 -1.0 93 1.0
*****
LOAD 30100
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 83 -1.0 84 1.0 86 1.0 89 -1.0 -
90 1.0 93 1.0
*****
LOAD 30101
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 83 -1.0 84 1.0 86 1.0 89 -1.0 -
90 1.0 93 1.0
*****
LOAD 30102
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 83 1.0 84 -1.0 86 1.0 89 1.0 -
90 -1.0 93 1.0
*****
LOAD 30103
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 83 1.0 84 1.0 89 1.0 90 1.0 93 1.0 -
94 1.0
*****
LOAD 30104
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 83 1.0 84 1.0 89 1.0 90 1.0 93 1.0 -
94 1.0
*****
LOAD 30105
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 83 -1.0 84 -1.0 89 -1.0 90 -1.0 -
93 1.0 94 1.0
*****
LOAD 30106
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 83 -1.0 84 -1.0 89 -1.0 90 -1.0 -
93 1.0 94 1.0
*****
LOAD 30107
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 83 1.0 84 -1.0 89 1.0 90 -1.0 -
93 1.0 94 1.0
*****
LOAD 30108

```
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 83 -1.0 84 1.0 89 -1.0 90 1.0 -
93 1.0 94 1.0
*****
LOAD 30109
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 83 -1.0 84 1.0 89 -1.0 90 1.0 -
93 1.0 94 1.0
*****
LOAD 30110
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 83 1.0 84 -1.0 89 1.0 90 -1.0 -
93 1.0 94 1.0
*****
LOAD 30111
REPEAT LOAD
10 1.0 40 1.0 20 1.0 631 0.5 61 1.0 81 1.0 82 1.0 87 1.0 89 1.0 -
90 1.0 93 1.0
*****
LOAD 30112
REPEAT LOAD
10 1.0 40 1.0 20 1.0 611 0.5 62 1.0 81 1.0 82 1.0 88 1.0 89 1.0 -
90 1.0 93 1.0
*****
LOAD 30113
REPEAT LOAD
10 1.0 40 1.0 20 1.0 6310 0.5 63 1.0 81 -1.0 82 -1.0 87 -1.0 89 -1.0 -
90 -1.0 93 1.0
*****
LOAD 30114
REPEAT LOAD
10 1.0 40 1.0 20 1.0 6110 0.5 64 1.0 81 -1.0 82 -1.0 88 -1.0 89 -1.0 -
90 -1.0 93 1.0
*****
LOAD 30115
REPEAT LOAD
10 1.0 40 1.0 20 1.0 6310 0.5 61 1.0 81 1.0 82 -1.0 87 1.0 89 1.0 -
90 -1.0 93 1.0
*****
LOAD 30116
REPEAT LOAD
10 1.0 40 1.0 20 1.0 6110 0.5 62 1.0 81 -1.0 82 1.0 88 1.0 89 -1.0 -
90 1.0 93 1.0
*****
LOAD 30117
REPEAT LOAD
10 1.0 40 1.0 20 1.0 631 0.5 63 1.0 81 -1.0 82 1.0 87 -1.0 89 -1.0 -
90 1.0 93 1.0
*****
LOAD 30118
REPEAT LOAD
10 1.0 40 1.0 20 1.0 611 0.5 64 1.0 81 1.0 82 -1.0 88 -1.0 89 1.0 -
```

90 -1.0 93 1.0
*****
LOAD 30119
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 89 1.0 90 1.0 93 1.0 94 1.0
*****
LOAD 30120
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 89 1.0 90 1.0 93 1.0 94 1.0
*****
LOAD 30121
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 89 -1.0 90 -1.0 93 1.0 94 1.0
*****
LOAD 30122
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 89 -1.0 90 -1.0 93 1.0 94 1.0
*****
LOAD 30123
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 89 1.0 90 -1.0 93 1.0 94 1.0
*****
LOAD 30124
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 89 -1.0 90 1.0 93 1.0 94 1.0
*****
LOAD 30125
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 89 -1.0 90 1.0 93 1.0 94 1.0
*****
LOAD 30126
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 89 1.0 90 -1.0 93 1.0 94 1.0
*****
LOAD 30127
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 85 1.0 89 1.0 90 1.0 93 1.0
*****
LOAD 30128
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 85 1.0 89 1.0 90 1.0 93 1.0
*****
LOAD 30129
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 85 1.0 89 -1.0 90 -1.0 93 1.0
*****
LOAD 30130
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 85 1.0 89 -1.0 90 -1.0 93 1.0
*****
LOAD 30131
REPEAT LOAD

10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 85 1.0 89 1.0 90 -1.0 93 1.0
*****
LOAD 30132
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 85 1.0 89 -1.0 90 1.0 93 1.0
*****
LOAD 30133
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 85 1.0 89 -1.0 90 1.0 93 1.0
*****
LOAD 30134
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 85 1.0 89 1.0 90 -1.0 93 1.0
*****
LOAD 30135
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 86 1.0 89 1.0 90 1.0 93 1.0
*****
LOAD 30136
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 86 1.0 89 1.0 90 1.0 93 1.0
*****
LOAD 30137
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 86 1.0 89 -1.0 90 -1.0 93 1.0
*****
LOAD 30138
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 86 1.0 89 -1.0 90 -1.0 93 1.0
*****
LOAD 30139
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 86 1.0 89 1.0 90 -1.0 93 1.0
*****
LOAD 30140
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 86 1.0 89 -1.0 90 1.0 93 1.0
*****
LOAD 30141
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 86 1.0 89 -1.0 90 1.0 93 1.0
*****
LOAD 30142
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 86 1.0 89 1.0 90 -1.0 93 1.0
*****
LOAD 30143
REPEAT LOAD
10 1.0 50 1.0 20 0.5 631 0.25 61 0.5 87 0.5 93 1.0
*****
LOAD 30144
REPEAT LOAD

10 1.0 50 1.0 20 0.5 611 0.25 62 0.5 88 0.5 93 1.0
*****
LOAD 30145
REPEAT LOAD
10 1.0 50 1.0 20 0.5 6310 0.25 63 0.5 87 -0.5 93 1.0
*****
LOAD 30146
REPEAT LOAD
10 1.0 50 1.0 20 0.5 6110 0.25 64 0.5 88 -0.5 93 1.0
*****
LOAD 30147
REPEAT LOAD
10 1.0 50 1.0 20 0.5 6310 0.25 61 0.5 87 0.5 93 1.0
*****
LOAD 30148
REPEAT LOAD
10 1.0 50 1.0 20 0.5 6110 0.25 62 0.5 88 0.5 93 1.0
*****
LOAD 30149
REPEAT LOAD
10 1.0 50 1.0 20 0.5 631 0.25 63 0.5 87 -0.5 93 1.0
*****
LOAD 30150
REPEAT LOAD
10 1.0 50 1.0 20 0.5 611 0.25 64 0.5 88 -0.5 93 1.0
*****
LOAD 30151
REPEAT LOAD
10 1.0 50 1.0 20 0.5 85 1.0 93 1.0
*****
LOAD 30152
REPEAT LOAD
10 1.0 50 1.0 20 0.5 86 1.0 93 1.0
*****
LOAD 30153
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 85 1.5 89 1.0 90 1.0 92 1.0 93 1.0
*****
LOAD 30154
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 85 1.5 89 1.0 90 1.0 92 1.0 93 1.0
*****
LOAD 30155
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 85 1.5 89 -1.0 90 -1.0 92 1.0 -
93 1.0
*****
LOAD 30156
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 85 1.5 89 -1.0 90 -1.0 92 1.0 -
93 1.0
*****

LOAD 30157
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 86 1.5 89 1.0 90 -1.0 92 1.0 -
93 1.0
*****
LOAD 30158
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 86 1.5 89 -1.0 90 1.0 92 1.0 -
93 1.0
*****
LOAD 30159
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 86 1.5 89 -1.0 90 1.0 92 1.0 -
93 1.0
*****
LOAD 30160
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 86 1.5 89 1.0 90 -1.0 92 1.0 -
93 1.0
*****
*****LOAD COMBINATIONS FOR STAAD
*****LOAD COMBINATION FOR SUPERSTRUCTURE_ULS
LOAD 40001
REPEAT LOAD
10 1.0 1001 1.0 30 1.0 1003 1.0 85 1.5
*****
LOAD 40002
REPEAT LOAD
10 1.0 1002 1.0 30 1.0 1004 1.0 85 1.5
*****
LOAD 40003
REPEAT LOAD
10 1.0 1001 -1.0 30 1.0 1003 -1.0 85 1.5
*****
LOAD 40004
REPEAT LOAD
10 1.0 1002 -1.0 30 1.0 1004 -1.0 85 1.5
*****
LOAD 40005
REPEAT LOAD
10 1.0 1001 1.0 30 1.0 1003 1.0 86 1.5
*****
LOAD 40006
REPEAT LOAD
10 0.8 1002 0.8 30 0.8 1004 0.8 86 1.5
*****
LOAD 40007
REPEAT LOAD
10 1.0 1001 -1.0 30 1.0 1003 -1.0 86 1.5
*****
LOAD 40008
REPEAT LOAD

10 1.0 1002 -1.0 30 1.0 1004 -1.0 86 1.5
*****
LOAD 40009
REPEAT LOAD
10 1.0 1001 1.0 30 1.0 1003 1.0 631 0.75 61 1.5
*****
LOAD 40010
REPEAT LOAD
10 1.0 1002 1.0 30 1.0 1004 1.0 611 0.75 62 1.5
*****
LOAD 40011
REPEAT LOAD
10 1.0 1001 -1.0 30 1.0 1003 -1.0 6310 0.75 63 1.5
*****
LOAD 40012
REPEAT LOAD
10 1.0 1002 -1.0 30 1.0 1004 -1.0 6110 0.75 64 1.5
*****
LOAD 40013
REPEAT LOAD
10 1.0 1001 1.0 30 1.0 1003 1.0 6310 0.75 61 1.5
*****
LOAD 40014
REPEAT LOAD
10 1.0 1002 1.0 30 1.0 1004 1.0 6110 0.75 62 1.5
*****
LOAD 40015
REPEAT LOAD
10 1.0 1001 -1.0 30 1.0 1003 -1.0 631 0.75 63 1.5
*****
LOAD 40016
REPEAT LOAD
10 1.0 1002 -1.0 30 1.0 1004 -1.0 611 0.75 64 1.5
*****
LOAD 40017
REPEAT LOAD
10 1.35 1001 1.35 40 1.35 1005 1.35 20 1.5 1007 1.5 81 1.35 82 1.35
*****
LOAD 40018
REPEAT LOAD
10 1.35 1002 1.35 40 1.35 1006 1.35 20 1.5 1008 1.5 81 1.35 82 1.35
*****
LOAD 40019
REPEAT LOAD
10 1.35 1001 -1.35 40 1.35 1005 -1.35 20 1.5 1007 -1.5 81 -1.35 -
82 -1.35
*****
LOAD 40020
REPEAT LOAD
10 1.35 1002 -1.35 40 1.35 1006 -1.35 20 1.5 1008 -1.5 81 -1.35 -
82 -1.35
*****

LOAD 40021
REPEAT LOAD
10 1.35 1001 1.35 40 1.35 1005 1.35 20 1.5 1007 1.5 81 1.35 82 -1.35
*****
LOAD 40022
REPEAT LOAD
10 1.35 1002 1.35 40 1.35 1006 1.35 20 1.5 1008 1.5 81 -1.35 82 1.35
*****
LOAD 40023
REPEAT LOAD
10 1.35 1001 -1.35 40 1.35 1005 -1.35 20 1.5 1007 -1.5 81 -1.35 -
82 1.35
*****
LOAD 40024
REPEAT LOAD
10 1.35 1002 -1.35 40 1.35 1006 -1.35 20 1.5 1008 -1.5 81 1.35 -
82 -1.35
*****
LOAD 40025
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 1.2 85 1.5
*****
LOAD 40026
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 1.2 82 1.2 85 1.5
*****
LOAD 40027
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 -1.2 -
85 1.5
*****
LOAD 40028
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 -1.2 82 -1.2 -
85 1.5
*****
LOAD 40029
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 -1.2 85 1.5
*****
LOAD 40030
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 -1.2 82 1.2 85 1.5
*****
LOAD 40031
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 1.2 -
85 1.5
*****
LOAD 40032
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 1.2 82 -1.2 -

85 1.5
*****
LOAD 40033
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 1.2 86 1.5
*****
LOAD 40034
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 1.2 82 1.2 86 1.5
*****
LOAD 40035
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 -1.2 -
86 1.5
*****
LOAD 40036
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 -1.2 82 -1.2 -
86 1.5
*****
LOAD 40037
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 -1.2 86 1.5
*****
LOAD 40038
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 -1.2 82 1.2 86 1.5
*****
LOAD 40039
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 1.2 -
86 1.5
*****
LOAD 40040
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 1.2 82 -1.2 -
86 1.5
*****
LOAD 40041
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 631 0.75 61 1.5 -
81 1.2 82 1.2
*****
LOAD 40042
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 611 0.75 62 1.5 -
81 1.2 82 1.2
*****
LOAD 40043
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 6310 0.75 63 1.5 -
81 -1.2 82 -1.2

*****
LOAD 40044
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 6110 0.75 64 1.5 -
81 -1.2 82 -1.2
*****
LOAD 40045
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 6310 0.75 61 1.5 -
81 1.2 82 -1.2
*****
LOAD 40046
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 6110 0.75 62 1.5 -
81 -1.2 82 1.2
*****
LOAD 40047
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 631 0.75 63 1.5 -
81 -1.2 82 1.2
*****
LOAD 40048
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 611 0.75 64 1.5 -
81 1.2 82 -1.2
*****
LOAD 40049
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 1.2 94 1.5
*****
LOAD 40050
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 1.2 82 1.2 94 1.5
*****
LOAD 40051
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 -1.2 -
94 1.5
*****
LOAD 40052
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 -1.2 82 -1.2 -
94 1.5
*****
LOAD 40053
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 -1.2 94 1.5
*****
LOAD 40054
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 -1.2 82 1.2 94 1.5
*****

LOAD 40055
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 1.2 -
94 1.5
*****
LOAD 40056
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 1.2 82 -1.2 -
94 1.5
*****
LOAD 40057
REPEAT LOAD
10 0.8 1001 0.8 40 0.8 1005 0.8 631 0.75 61 1.5 81 1.0 82 1.0
*****
LOAD 40058
REPEAT LOAD
10 0.8 1002 0.8 40 0.8 1006 0.8 611 0.75 62 1.5 81 1.0 82 1.0
*****
LOAD 40059
REPEAT LOAD
10 0.8 1001 -0.8 40 0.8 1005 -0.8 6310 0.75 63 1.5 81 -1.0 82 -1.0
*****
LOAD 40060
REPEAT LOAD
10 0.8 1002 -0.8 40 0.8 1006 -0.8 6110 0.75 64 1.5 81 -1.0 82 -1.0
*****
LOAD 40061
REPEAT LOAD
10 0.8 1001 0.8 40 0.8 1005 0.8 6310 0.75 61 1.5 81 1.0 82 -1.0
*****
LOAD 40062
REPEAT LOAD
10 0.8 1002 0.8 40 0.8 1006 0.8 6110 0.75 62 1.5 81 -1.0 82 1.0
*****
LOAD 40063
REPEAT LOAD
10 0.8 1001 -0.8 40 0.8 1005 -0.8 631 0.75 63 1.5 81 -1.0 82 1.0
*****
LOAD 40064
REPEAT LOAD
10 0.8 1002 -0.8 40 0.8 1006 -0.8 611 0.75 64 1.5 81 1.0 82 -1.0
*****
LOAD 40065
REPEAT LOAD
10 1.35 1001 1.35 50 1.35 20 0.75 1007 0.75
*****
LOAD 40066
REPEAT LOAD
10 1.35 1002 1.35 50 1.35 20 0.75 1008 0.75
*****
LOAD 40067
REPEAT LOAD

10 1.35 1001 -1.35 50 1.35 20 0.75 1007 -0.75
*****
LOAD 40068
REPEAT LOAD
10 1.35 1002 -1.35 50 1.35 20 0.75 1008 -0.75
*****
LOAD 40069
REPEAT LOAD
10 1.2 1001 1.2 50 1.2 20 0.75 1007 0.75 631 0.375 61 0.75
*****
LOAD 40070
REPEAT LOAD
10 1.2 1002 1.2 50 1.2 20 0.75 1008 0.75 611 0.375 62 0.75
*****
LOAD 40071
REPEAT LOAD
10 1.2 1001 -1.2 50 1.2 20 0.75 1007 -0.75 6310 0.375 63 0.75
*****
LOAD 40072
REPEAT LOAD
10 1.2 1002 -1.2 50 1.2 20 0.75 1008 -0.75 6110 0.375 64 0.75
*****
LOAD 40073
REPEAT LOAD
10 1.2 1001 1.2 50 1.2 20 0.75 1007 0.75 6310 0.375 61 0.75
*****
LOAD 40074
REPEAT LOAD
10 1.2 1002 1.2 50 1.2 20 0.75 1008 0.75 6110 0.375 62 0.75
*****
LOAD 40075
REPEAT LOAD
10 1.2 1001 -1.2 50 1.2 20 0.75 1007 -0.75 631 0.375 63 0.75
*****
LOAD 40076
REPEAT LOAD
10 1.2 1002 -1.2 50 1.2 20 0.75 1008 -0.75 611 0.375 64 0.75
*****
LOAD 40077
REPEAT LOAD
10 1.2 1001 1.2 50 1.2 20 0.75 1007 0.75 85 1.5
*****
LOAD 40078
REPEAT LOAD
10 1.2 1002 1.2 50 1.2 20 0.75 1008 0.75 85 1.5
*****
LOAD 40079
REPEAT LOAD
10 1.2 1001 -1.2 50 1.2 20 0.75 1007 -0.75 85 1.5
*****
LOAD 40080
REPEAT LOAD

10 1.2 1002 -1.2 50 1.2 20 0.75 1008 -0.75 85 1.5
*****
LOAD 40081
REPEAT LOAD
10 1.2 1001 1.2 50 1.2 20 0.75 1007 0.75 86 1.5
*****
LOAD 40082
REPEAT LOAD
10 1.2 1002 1.2 50 1.2 20 0.75 1008 0.75 86 1.5
*****
LOAD 40083
REPEAT LOAD
10 1.2 1001 -1.2 50 1.2 20 0.75 1007 -0.75 86 1.5
*****
LOAD 40084
REPEAT LOAD
10 1.2 1002 -1.2 50 1.2 20 0.75 1008 -0.75 86 1.5
*****
LOAD 40085
REPEAT LOAD
10 1.35 1001 1.35 30 1.35 1003 1.35 20 1.5 1007 1.5 91 1.5
*****
LOAD 40086
REPEAT LOAD
10 1.35 1002 1.35 30 1.35 1004 1.35 20 1.5 1008 1.5 91 1.5
*****
LOAD 40087
REPEAT LOAD
10 1.35 1001 -1.35 30 1.35 1003 -1.35 20 1.5 1007 -1.5 91 1.5
*****
LOAD 40088
REPEAT LOAD
10 1.35 1002 -1.35 30 1.35 1004 -1.35 20 1.5 1008 -1.5 91 1.5
*****
LOAD 40089
REPEAT LOAD
10 1.2 1001 1.2 30 1.2 1003 1.2 20 1.5 1007 1.5 631 0.75 61 1.5 -
91 1.5
*****
LOAD 40090
REPEAT LOAD
10 1.2 1002 1.2 30 1.2 1004 1.2 20 1.5 1008 1.5 611 0.75 62 1.5 -
91 1.5
*****
LOAD 40091
REPEAT LOAD
10 1.2 1001 -1.2 30 1.2 1003 -1.2 20 1.5 1007 -1.5 6310 0.75 63 1.5 -
91 1.5
*****
LOAD 40092
REPEAT LOAD
10 1.2 1002 -1.2 30 1.2 1004 -1.2 20 1.5 1008 -1.5 6110 0.75 64 1.5 -

91 1.5
*****
LOAD 40093
REPEAT LOAD
10 1.2 1001 1.2 30 1.2 1003 1.2 20 1.5 1007 1.5 6310 0.75 61 1.5 -
91 1.5
*****
LOAD 40094
REPEAT LOAD
10 1.2 1002 1.2 30 1.2 1004 1.2 20 1.5 1008 1.5 6110 0.75 62 1.5 -
91 1.5
*****
LOAD 40095
REPEAT LOAD
10 1.2 1001 -1.2 30 1.2 1003 -1.2 20 1.5 1007 -1.5 631 0.75 63 1.5 -
91 1.5
*****
LOAD 40096
REPEAT LOAD
10 1.2 1002 -1.2 30 1.2 1004 -1.2 20 1.5 1008 -1.5 611 0.75 64 1.5 -
91 1.5
*****
LOAD 40097
REPEAT LOAD
10 1.2 1001 1.2 30 1.2 1003 1.2 20 1.5 1007 1.5 85 1.5 91 1.5
*****
LOAD 40098
REPEAT LOAD
10 1.2 1002 1.2 30 1.2 1004 1.2 20 1.5 1008 1.5 85 1.5 91 1.5
*****
LOAD 40099
REPEAT LOAD
10 1.2 1001 -1.2 30 1.2 1003 -1.2 20 1.5 1007 -1.5 85 1.5 91 1.5
*****
LOAD 40100
REPEAT LOAD
10 1.2 1002 -1.2 30 1.2 1004 -1.2 20 1.5 1008 -1.5 85 1.5 91 1.5
*****
LOAD 40101
REPEAT LOAD
10 1.2 1001 1.2 30 1.2 1003 1.2 20 1.5 1007 1.5 86 1.5 91 1.5
*****
LOAD 40102
REPEAT LOAD
10 1.2 1002 1.2 30 1.2 1004 1.2 20 1.5 1008 1.5 86 1.5 91 1.5
*****
LOAD 40103
REPEAT LOAD
10 1.2 1001 -1.2 30 1.2 1003 -1.2 20 1.5 1007 -1.5 86 1.5 91 1.5
*****
LOAD 40104
REPEAT LOAD

10 1.2 1002 -1.2 30 1.2 1004 -1.2 20 1.5 1008 -1.5 86 1.5 91 1.5
*****
LOAD 40105
REPEAT LOAD
10 1.35 1001 1.35 40 1.35 1005 1.35 20 1.5 1007 1.5 81 1.35 82 1.35 -
83 1.35 84 1.35 89 1.35 90 1.35 93 1.35
*****
LOAD 40106
REPEAT LOAD
10 1.35 1002 1.35 40 1.35 1006 1.35 20 1.5 1008 1.5 81 1.35 82 1.35 -
83 1.35 84 1.35 89 1.35 90 1.35 93 1.35
*****
LOAD 40107
REPEAT LOAD
10 1.35 1001 -1.35 40 1.35 1005 -1.35 20 1.5 1007 -1.5 81 -1.35 -
82 -1.35 83 -1.35 84 -1.35 89 -1.35 90 -1.35 93 1.35
*****
LOAD 40108
REPEAT LOAD
10 1.35 1002 -1.35 40 1.35 1006 -1.35 20 1.5 1008 -1.5 81 -1.35 -
82 -1.35 83 -1.35 84 -1.35 89 -1.35 90 -1.35 93 1.35
*****
LOAD 40109
REPEAT LOAD
10 1.35 1001 1.35 40 1.35 1005 1.35 20 1.5 1007 1.5 81 1.35 82 -1.35 -
83 1.35 84 -1.35 89 1.35 90 -1.35 93 1.35
*****
LOAD 40110
REPEAT LOAD
10 1.35 1002 1.35 40 1.35 1006 1.35 20 1.5 1008 1.5 81 -1.35 82 1.35 -
83 -1.35 84 1.35 89 -1.35 90 1.35 93 1.35
*****
LOAD 40111
REPEAT LOAD
10 1.35 1001 -1.35 40 1.35 1005 -1.35 20 1.5 1007 -1.5 81 -1.35 -
82 1.35 83 -1.35 84 1.35 89 -1.35 90 1.35 93 1.35
*****
LOAD 40112
REPEAT LOAD
10 1.35 1002 -1.35 40 1.35 1006 -1.35 20 1.5 1008 -1.5 81 1.35 -
82 -1.35 83 1.35 84 -1.35 89 1.35 90 -1.35 93 1.35
*****
LOAD 40113
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 1.2 83 1.2 -
84 1.2 85 1.5 89 1.2 90 1.2 93 1.2
*****
LOAD 40114
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 1.2 82 1.2 83 1.2 -
84 1.2 85 1.5 89 1.2 90 1.2 93 1.2
*****

LOAD 40115
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 -1.2 -
83 -1.2 84 -1.2 85 1.5 89 -1.2 90 -1.2 93 1.2
*****
LOAD 40116
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 -1.2 82 -1.2 -
83 -1.2 84 -1.2 85 1.5 89 -1.2 90 -1.2 93 1.2
*****
LOAD 40117
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 -1.2 83 1.2 -
84 -1.2 85 1.5 89 1.2 90 -1.2 93 1.2
*****
LOAD 40118
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 -1.2 82 1.2 -
83 -1.2 84 1.2 85 1.5 89 -1.2 90 1.2 93 1.2
*****
LOAD 40119
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 1.2 -
83 -1.2 84 1.2 85 1.5 89 -1.2 90 1.2 93 1.2
*****
LOAD 40120
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 1.2 82 -1.2 -
83 1.2 84 -1.2 85 1.5 89 1.2 90 -1.2 93 1.2
*****
LOAD 40121
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 1.2 83 1.2 -
84 1.2 86 1.5 89 1.2 90 1.2 93 1.2
*****
LOAD 40122
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 1.2 82 1.2 83 1.2 -
84 1.2 86 1.5 89 1.2 90 1.2 93 1.2
*****
LOAD 40123
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 -1.2 -
83 -1.2 84 -1.2 86 1.5 89 -1.2 90 -1.2 93 1.2
*****
LOAD 40124
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 -1.2 82 -1.2 -
83 -1.2 84 -1.2 86 1.5 89 -1.2 90 -1.2 93 1.2
*****
LOAD 40125
REPEAT LOAD

10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 -1.2 83 1.2 -
84 -1.2 86 1.5 89 1.2 90 -1.2 93 1.2
*****
LOAD 40126
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 -1.2 82 1.2 -
83 -1.2 84 1.2 86 1.5 89 -1.2 90 1.2 93 1.2
*****
LOAD 40127
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 1.2 -
83 -1.2 84 1.2 86 1.5 89 -1.2 90 1.2 93 1.2
*****
LOAD 40128
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 1.2 82 -1.2 -
83 1.2 84 -1.2 86 1.5 89 1.2 90 -1.2 93 1.2
*****
LOAD 40129
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 1.2 83 1.2 -
84 1.2 89 1.2 90 1.2 93 1.2 94 1.5
*****
LOAD 40130
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 1.2 82 1.2 83 1.2 -
84 1.2 89 1.2 90 1.2 93 1.2 94 1.5
*****
LOAD 40131
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 -1.2 -
83 -1.2 84 -1.2 89 -1.2 90 -1.2 93 1.2 94 1.5
*****
LOAD 40132
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 -1.2 82 -1.2 -
83 -1.2 84 -1.2 89 -1.2 90 -1.2 93 1.2 94 1.5
*****
LOAD 40133
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 -1.2 83 1.2 -
84 -1.2 89 1.2 90 -1.2 93 1.2 94 1.5
*****
LOAD 40134
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 -1.2 82 1.2 -
83 -1.2 84 1.2 89 -1.2 90 1.2 93 1.2 94 1.5
*****
LOAD 40135
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 1.2 -
83 -1.2 84 1.2 89 -1.2 90 1.2 93 1.2 94 1.5

*****
LOAD 40136
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 1.2 82 -1.2 -
83 1.2 84 -1.2 89 1.2 90 -1.2 93 1.2 94 1.5
*****
LOAD 40137
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 631 0.75 61 1.5 -
81 1.2 82 1.2 87 1.5 89 1.2 90 1.2 93 1.2
*****
LOAD 40138
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 611 0.75 62 1.5 -
81 1.2 82 1.2 88 1.5 89 1.2 90 1.2 93 1.2
*****
LOAD 40139
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 6310 0.75 63 1.5 -
81 -1.2 82 -1.2 87 -1.5 89 -1.2 90 -1.2 93 1.2
*****
LOAD 40140
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 6110 0.75 64 1.5 -
81 -1.2 82 -1.2 88 -1.5 89 -1.2 90 -1.2 93 1.2
*****
LOAD 40141
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 6310 0.75 61 1.5 -
81 1.2 82 -1.2 87 1.5 89 1.2 90 -1.2 93 1.2
*****
LOAD 40142
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 6110 0.75 62 1.5 -
81 -1.2 82 1.2 88 1.5 89 -1.2 90 1.2 93 1.2
*****
LOAD 40143
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 631 0.75 63 1.5 -
81 -1.2 82 1.2 87 -1.5 89 -1.2 90 1.2 93 1.2
*****
LOAD 40144
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 611 0.75 64 1.5 -
81 1.2 82 -1.2 88 -1.5 89 1.2 90 -1.2 93 1.2
*****
LOAD 40145
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 1.2 89 1.2 -
90 1.2 93 1.2 94 1.5
*****
LOAD 40146

REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 1.2 82 1.2 89 1.2 -
90 1.2 93 1.2 94 1.5
*****
LOAD 40147
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 -1.2 -
89 -1.2 90 -1.2 93 1.2 94 1.5
*****
LOAD 40148
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 -1.2 82 -1.2 -
89 -1.2 90 -1.2 93 1.2 94 1.5
*****
LOAD 40149
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 -1.2 89 1.2 -
90 -1.2 93 1.2 94 1.5
*****
LOAD 40150
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 -1.2 82 1.2 -
89 -1.2 90 1.2 93 1.2 94 1.5
*****
LOAD 40151
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 1.2 -
89 -1.2 90 1.2 93 1.2 94 1.5
*****
LOAD 40152
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 1.2 82 -1.2 -
89 1.2 90 -1.2 93 1.2 94 1.5
*****
LOAD 40153
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 1.2 85 1.5 -
89 1.2 90 1.2 93 1.2
*****
LOAD 40154
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 1.2 82 1.2 85 1.5 -
89 1.2 90 1.2 93 1.2
*****
LOAD 40155
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 -1.2 -
85 1.5 89 -1.2 90 -1.2 93 1.2
*****
LOAD 40156
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 -1.2 82 -1.2 -

85 1.5 89 -1.2 90 -1.2 93 1.2
*****
LOAD 40157
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 -1.2 85 1.5 -
89 1.2 90 -1.2 93 1.2
*****
LOAD 40158
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 -1.2 82 1.2 85 1.5 -
89 -1.2 90 1.2 93 1.2
*****
LOAD 40159
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 1.2 -
85 1.5 89 -1.2 90 1.2 93 1.2
*****
LOAD 40160
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 1.2 82 -1.2 -
85 1.5 89 1.2 90 -1.2 93 1.2
*****
LOAD 40161
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 1.2 86 1.5 -
89 1.2 90 1.2 93 1.2
*****
LOAD 40162
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 1.2 82 1.2 86 1.5 -
89 1.2 90 1.2 93 1.2
*****
LOAD 40163
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 -1.2 -
86 1.5 89 -1.2 90 -1.2 93 1.2
*****
LOAD 40164
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 -1.2 82 -1.2 -
86 1.5 89 -1.2 90 -1.2 93 1.2
*****
LOAD 40165
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 -1.2 86 1.5 -
89 1.2 90 -1.2 93 1.2
*****
LOAD 40166
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 -1.2 82 1.2 86 1.5 -
89 -1.2 90 1.2 93 1.2
*****

LOAD 40167
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 1.2 -
86 1.5 89 -1.2 90 1.2 93 1.2
*****
LOAD 40168
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 1.2 82 -1.2 -
86 1.5 89 1.2 90 -1.2 93 1.2
*****
LOAD 40169
REPEAT LOAD
10 1.35 1001 1.35 50 1.35 20 0.75 1007 0.75 93 1.2
*****
LOAD 40170
REPEAT LOAD
10 1.35 1002 1.35 50 1.35 20 0.75 1008 0.75 93 1.2
*****
LOAD 40171
REPEAT LOAD
10 1.35 1001 -1.35 50 1.35 20 0.75 1007 -0.75 93 1.2
*****
LOAD 40172
REPEAT LOAD
10 1.35 1002 -1.35 50 1.35 20 0.75 1008 -0.75 93 1.2
*****
LOAD 40173
REPEAT LOAD
10 1.2 1001 1.2 50 1.2 20 0.75 1007 0.75 631 0.375 61 0.75 87 0.75 -
93 1.2
*****
LOAD 40174
REPEAT LOAD
10 1.2 1002 1.2 50 1.2 20 0.75 1008 0.75 611 0.375 62 0.75 88 0.75 -
93 1.2
*****
LOAD 40175
REPEAT LOAD
10 1.2 1001 -1.2 50 1.2 20 0.75 1007 -0.75 6310 0.375 63 0.75 -
87 -0.75 93 1.2
*****
LOAD 40176
REPEAT LOAD
10 1.2 1002 -1.2 50 1.2 20 0.75 1008 -0.75 6110 0.375 64 0.75 -
88 -0.75 93 1.2
*****
LOAD 40177
REPEAT LOAD
10 1.2 1001 1.2 50 1.2 20 0.75 1007 0.75 6310 0.375 61 0.75 87 0.75 -
93 1.2
*****
LOAD 40178

REPEAT LOAD
10 1.2 1002 1.2 50 1.2 20 0.75 1008 0.75 6110 0.375 62 0.75 88 0.75 -
93 1.2
*****
LOAD 40179
REPEAT LOAD
10 1.2 1001 -1.2 50 1.2 20 0.75 1007 -0.75 631 0.375 63 0.75 87 -0.75 -
93 1.2
*****
LOAD 40180
REPEAT LOAD
10 1.2 1002 -1.2 50 1.2 20 0.75 1008 -0.75 611 0.375 64 0.75 88 -0.75 -
93 1.2
*****
LOAD 40181
REPEAT LOAD
10 1.2 1001 1.2 50 1.2 20 0.75 1007 0.75 85 1.5 93 1.2
*****
LOAD 40182
REPEAT LOAD
10 1.2 1002 1.2 50 1.2 20 0.75 1008 0.75 85 1.5 93 1.2
*****
LOAD 40183
REPEAT LOAD
10 1.2 1001 -1.2 50 1.2 20 0.75 1007 -0.75 85 1.5 93 1.2
*****
LOAD 40184
REPEAT LOAD
10 1.2 1002 -1.2 50 1.2 20 0.75 1008 -0.75 85 1.5 93 1.2
*****
LOAD 40185
REPEAT LOAD
10 1.2 1001 1.2 50 1.2 20 0.75 1007 0.75 86 1.5 93 1.2
*****
LOAD 40186
REPEAT LOAD
10 1.2 1002 1.2 50 1.2 20 0.75 1008 0.75 86 1.5 93 1.2
*****
LOAD 40187
REPEAT LOAD
10 1.2 1001 -1.2 50 1.2 20 0.75 1007 -0.75 86 1.5 93 1.2
*****
LOAD 40188
REPEAT LOAD
10 1.2 1002 -1.2 50 1.2 20 0.75 1008 -0.75 86 1.5 93 1.2
*****
LOAD 40189
REPEAT LOAD
10 1.35 1001 1.35 40 1.35 1005 1.35 20 1.5 1007 1.5 81 1.35 82 1.35 -
89 1.35 90 1.35 92 1.35 93 1.35
*****
LOAD 40190

REPEAT LOAD
10 1.35 1002 1.35 40 1.35 1006 1.35 20 1.5 1008 1.5 81 1.35 82 1.35 -
89 1.35 90 1.35 92 1.35 93 1.35
*****
LOAD 40191
REPEAT LOAD
10 1.35 1001 -1.35 40 1.35 1005 -1.35 20 1.5 1007 -1.5 81 -1.35 -
82 -1.35 89 -1.35 90 -1.35 92 1.35 93 1.35
*****
LOAD 40192
REPEAT LOAD
10 1.35 1002 -1.35 40 1.35 1006 -1.35 20 1.5 1008 -1.5 81 -1.35 -
82 -1.35 89 -1.35 90 -1.35 92 1.35 93 1.35
*****
LOAD 40193
REPEAT LOAD
10 1.35 1001 1.35 40 1.35 1005 1.35 20 1.5 1007 1.5 81 1.35 82 -1.35 -
89 1.35 90 -1.35 92 1.35 93 1.35
*****
LOAD 40194
REPEAT LOAD
10 1.35 1002 1.35 40 1.35 1006 1.35 20 1.5 1008 1.5 81 -1.35 82 1.35 -
89 -1.35 90 1.35 92 1.35 93 1.35
*****
LOAD 40195
REPEAT LOAD
10 1.35 1001 -1.35 40 1.35 1005 -1.35 20 1.5 1007 -1.5 81 -1.35 -
82 1.35 89 -1.35 90 1.35 92 1.35 93 1.35
*****
LOAD 40196
REPEAT LOAD
10 1.35 1002 -1.35 40 1.35 1006 -1.35 20 1.5 1008 -1.5 81 1.35 -
82 -1.35 89 1.35 90 -1.35 92 1.35 93 1.35
*****
LOAD 40197
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 1.2 85 1.5 -
89 1.2 90 1.2 92 1.2 93 1.2
*****
LOAD 40198
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 1.2 82 1.2 85 1.5 -
89 1.2 90 1.2 92 1.2 93 1.2
*****
LOAD 40199
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 -1.2 -
85 1.5 89 -1.2 90 -1.2 92 1.2 93 1.2
*****
LOAD 40200
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 -1.2 82 -1.2 -

85 1.5 89 -1.2 90 -1.2 92 1.2 93 1.2
*****
LOAD 40201
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 -1.2 86 1.5 -
89 1.2 90 -1.2 92 1.2 93 1.2
*****
LOAD 40202
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 -1.2 82 1.2 86 1.5 -
89 -1.2 90 1.2 92 1.2 93 1.2
*****
LOAD 40203
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 1.2 -
86 1.5 89 -1.2 90 1.2 92 1.2 93 1.2
*****
LOAD 40204
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 1.2 82 -1.2 -
86 1.5 89 1.2 90 -1.2 92 1.2 93 1.2
LOAD 10001 LOADTYPE None TITLE BX +X
WIND LOAD Z 1 TYPE 2 XR 0 6 YR 0 26 ZR 0 0.1 OPEN
WIND LOAD Z 1 TYPE 2 XR 6 12 YR 0 26 ZR 2.9 3.1 OPEN
WIND LOAD Z -1 TYPE 2 XR 0 12 YR 0 26 ZR 7.9 8.1 OPEN
*WIND LOAD X 1 TYPE 3 XR 0 0.1 YR 0 26 ZR 0 8 OPEN
WIND LOAD X 1 TYPE 3 XR 5.9 6.1 YR 0 26 ZR 0 8 OPEN
*WIND LOAD X 1 TYPE 3 XR 11.9 12.1 YR 0 26 ZR 0 8 OPEN
**Blast load on pipes
*dia of pie = 40"
*so exposed width considered = 1.0m on each column
*Blast load =6.07 *0.8*1.0 =4.856 kN/m
MEMBER LOAD
2 3 20 21 38 39 56 57 74 75 92 93 682 684 UNI GX 4.856
*Blast load on equipment V605
*Height of equipment =3.25 m
*Dia of equipment = 1.5m
* Load due to blast = 3.25*1.5*6.07*0.8 = 23.7 kN
*Above load distributed on two beams at +5.0 level
*Blast load on V605 equipmnet =23.7/2 =11.85kN
MEMBER LOAD
174 CON GX 11.85
183 CON GX 11.85 0.3
174 CON GY 6.88
183 CON GY -6.88 0.3
*Blast load on equipment V602
*Height of equipment =3.6 m
*Dia of equipment = 1.8m
* Load due to blast = 3.6*1.8*6.07*0.8 = 31.9 kN
*Above load distributed on two columns at +8.00 level
*Blast load on V602 equipmnet =31.9 /4 =8kN
MEMBER LOAD

657 TO 660 CON GX 8
657 658 CON GY 5.91
659 660 CON GY -5.91
*Blast load on equipment E606
*Height of equipment =1.5 m
*Dia of equipment = 1.0m
* Load due to blast = 1.5*1.0*6.07*1 = 9.10 kN
*Above load distributed on two columns at +12.80 level
*Wind load on E606 equipmnet =9.10 kN
238 CON GX 9.1 1.8
238 CON GY 3.41
709 CON GY -3.41 1
*Blast load on equipment E617 is ignore due to shielding
*Wind load on E617 equipmnet =10.9kN
711 CON GX 10.9
JOINT LOAD
378 FY 2.85
379 FY -2.85
*Blast load on equipment E608
*Height of equipment =3.50 m
*Dia of equipment = 1.5 m
* Load due to blast = 3.5*1.5*6.07 = 32 kN
*Above load distributed on two columns at +23.80 level
*Wind load on E608 equipmnet =32/2 =16kN
JOINT LOAD
205 208 FX 16
*Blast load on E610 equipmnet =9/2 =4.5kN
*Height of equipment =1.65m
*Dia of equipment = 0.75 m
* Load due to blast = 1.65*0.75*6.07 = 7.5 kN
*Above load distributed on two columns at +23.80 level
MEMBER LOAD
376 CON GX 3.75 0.5
360 CON GX 3.75 1.2
376 CON GY 1.5 0.5
360 CON GY -1.5 1.2
*Blast load on equipment ES601
*Height of equipment =2.5 m
*Dia of equipment = 1.0 m
* Load due to blast = 2.5*1.0*6.07*0.8 = 12.1 kN
*Above load distributed on two columns at +26.00 level
*Wind load on S601 equipmnet =12.1/2 =6.1kN
MEMBER LOAD
397 TO 400 CON GX 6.1
LOAD 10002 LOADTYPE None TITLE BL -X
*WIND LOAD X -1 TYPE 3 XR 11.9 12.1 YR 0 26 ZR 3 8 OPEN
WIND LOAD X -1 TYPE 3 XR 5.9 6.1 YR 0 26 ZR 0 8 OPEN
WIND LOAD Z 1 TYPE 2 XR 0 6 YR 0 26 ZR 0 0.1 OPEN
WIND LOAD Z 1 TYPE 2 XR 6 12 YR 0 26 ZR 2.9 3.1 OPEN
WIND LOAD Z -1 TYPE 2 XR 0 12 YR 0 26 ZR 7.9 8.1 OPEN
**Blast load on pipes
*dia of pie = 40"

*so exposed width considered = 1.5m on each column
*Blast load =6.07 *1.0*0.8 =4.856 kN/m
MEMBER LOAD
2 3 20 21 38 39 56 57 74 75 92 93 682 684 UNI GX -4.856
*Blast load on equipment V605
*Height of equipment =3.25 m
*Dia of equipment = 1.5m
* Load due to blast = 3.25*1.5*6.07*0.8 = 23.7 kN
*Above load distributed on two beams at +5.0 level
*Blast load on V605 equipmnet =23.7/2 =11.85kN
MEMBER LOAD
174 CON GX -11.85
183 CON GX -11.85 0.3
174 CON GY -6.88
183 CON GY 6.88 0.3
*Blast load on equipment V602
*Height of equipment =3.6 m
*Dia of equipment = 1.8m
* Load due to blast = 3.6*1.8*6.07*0.8 = 31.9 kN
*Above load distributed on two columns at +8.00 level
*Blast load on V602 equipmnet =31.9 /4 =8kN
MEMBER LOAD
657 TO 660 CON GX -8
657 658 CON GY -5.91
659 660 CON GY 5.91
*Blast load on equipment E606
*Height of equipment =1.5 m
*Dia of equipment = 1.0m
* Load due to blast = 1.5*1.0*6.07*1 = 9.10 kN
*Above load distributed on two columns at +12.80 level
*Wind load on E606 equipmnet =9.10 kN
238 CON GX -9.1 1.8
238 CON GY -3.41
709 CON GY 3.41 1
*Blast load on equipment E617 is ignore due to shielding
*Wind load on E617 equipmnet =10.9kN
711 CON GX -10.9
JOINT LOAD
378 FY -2.85
379 FY 2.85
*Blast load on equipment E608
*Height of equipment =3.50 m
*Dia of equipment = 1.5 m
* Load due to blast = 3.5*1.5*6.07 = 32 kN
*Above load distributed on two columns at +23.80 level
*Wind load on E608 equipmnet =32/2 =16kN
JOINT LOAD
205 208 FX -16
*Blast load on E610 equipmnet =9/2 =4.5kN
*Height of equipment =1.65m
*Dia of equipment = 0.75 m
* Load due to blast = 1.65*0.75*6.07 = 7.5 kN

*Above load distributed on two columns at +23.80 level
MEMBER LOAD
376 CON GX -3.75 0.5
360 CON GX -3.75 1.2
376 CON GY -1.5 0.5
360 CON GY 1.5 1.2
*Blast load on equipment ES601
*Height of equipment =2.5 m
*Dia of equipment = 1.0 m
* Load due to blast = 2.5*1.0*6.07*0.8 = 12.1 kN
*Above load distributed on two columns at +26.00 level
*Wind load on S601 equipmnet =12.1/2 =6.1kN
MEMBER LOAD
397 TO 400 CON GX -6.1
LOAD 10003 LOADTYPE None TITLE BL +Z
WIND LOAD Z 1 TYPE 3 XR 0 6 YR 0 26 ZR 0 0.1 OPEN
WIND LOAD Z 1 TYPE 3 XR 6 12 YR 0 26 ZR 2.9 3.1 OPEN
*WIND LOAD Z 1 TYPE 3 XR 0 12 YR 0 26 ZR 7.9 8.1 OPEN
WIND LOAD X 1 TYPE 2 XR 0 0.1 YR 0 26 ZR 0 8 OPEN
WIND LOAD X -1 TYPE 2 XR 11.9 12.1 YR 0 26 ZR 0 8 OPEN
MEMBER LOAD
2 8 20 26 38 44 56 62 74 80 92 98 UNI GZ 4.856
*Blast load on V605 equipmnet =23.7/2 =11.85 kN
MEMBER LOAD
688 CON GZ 11.85
176 CON GZ 11.85 0.9
688 CON GY -6.88
176 CON GY 6.88 0.9
*Blast load on V602 equipmnet =31.9/4 =8kN
657 TO 660 CON GZ 8
657 659 CON GY 5.91
658 660 CON GY -5.91
*Blast load on E606 equipmnet =9.10
238 CON GZ 9.1 1.8
238 CON GY -3.41 1.8
238 CON GY 3.41 1
*Blast load on E617 equipmnet =10.9kN
711 CON GZ 10.9
711 CON GY -2.85
JOINT LOAD
184 FY 3.41
*Blast load on S601 equipmnet =12.1/4 = 3.1kN
MEMBER LOAD
397 TO 400 CON GZ 3.1
*Blast load on E608 equipmnet =32/2 =16kN
JOINT LOAD
205 208 FZ 16
*Blast load on E610 equipmnet =7.5/2 =3.75kN
MEMBER LOAD
376 CON GZ 3.75 0.5
360 CON GZ 3.75 1.2
LOAD 10004 LOADTYPE None TITLE BL -Z

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WIND LOAD Z -1 TYPE 3 XR 0 12 YR 0 26 ZR 7.9 8.1 OPEN
WIND LOAD X 1 TYPE 2 XR 0 0.1 YR 0 26 ZR 0 8 OPEN
WIND LOAD X -1 TYPE 2 XR 11.9 12.1 YR 0 26 ZR 0 8 OPEN
WIND LOAD X -1 TYPE 2 XR 5.9 6.1 YR 0 26 ZR 0 3 OPEN
MEMBER LOAD
3 7 21 25 39 43 57 61 75 79 93 97 682 684 UNI GZ -4.856
*Blast load on V605 equipmnet =23.7/2 =11.85 kN
MEMBER LOAD
688 CON GZ -11.85
176 CON GZ -11.85 0.9
688 CON GY 6.88
176 CON GY -6.88 0.9
*Blast load on V602 equipmnet =31.9/4 =8kN
657 TO 660 CON GZ -8
657 659 CON GY -5.91
658 660 CON GY 5.91
*Blast load on E606 equipmnet =9.10
238 CON GZ -9.1 1.8
238 CON GY 3.41 1.8
238 CON GY -3.41 1
*Blast load on E617 equipmnet =10.9kN
711 CON GZ -10.9
711 CON GY 2.85
JOINT LOAD
184 FY -3.41
*Blast load on S601 equipmnet =12.1/4 = 3.1kN
MEMBER LOAD
397 TO 400 CON GZ -3.1
*Blast load on E608 equipmnet =32/2 =16kN
JOINT LOAD
205 208 FZ -16
*Blast load on E610 equipmnet =7.5/2 =3.75kN
MEMBER LOAD
376 CON GZ -3.75 0.5
360 CON GZ -3.75 1.2
LOAD COMB 10005 COMBINATION LOAD CASE 1
10001 1.0 10 1.0 20 1.0
LOAD COMB 10006 COMBINATION LOAD CASE 1
10 1.0 20 1.0 10002 1.0
LOAD COMB 10007 COMBINATION LOAD CASE 1
10 1.0 20 1.0 10003 1.0
LOAD COMB 10008 COMBINATION LOAD CASE 1
10 1.0 20 1.0 10004 1.0
***-----------------------------------
**-----------------------------------
PDELTA ANALYSIS SMALLDELTA PRINT STATICS CHECK
***-----------------------------------
DEFINE ENVELOPE
10005 TO 10008 30001 TO 30160 ENVELOPE 1 TYPE SERVICEABILITY
10005 TO 10008 40001 TO 40204 ENVELOPE 2 TYPE STRENGTH
*40001 TO 40204 10005 to 10008 ENVELOPE 2 TYPE STRENGTH
END DEFINE ENVELOPE
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** MINIMUM DESIGN PARAMETERS BASED ON EC8 TO BE ASSIGNED ARE LISTED AS
FOLLOWS
**STRENGTH CHECK
PARAMETER 1
CODE EN 1993-1-1:2005
FU 360000 MEMB 1 TO 83 85 TO 142 144 TO 196 198 TO 219 221 224 227 -
228 TO 260 263 266 TO 291 296 TO 321 327 329 TO 363 365 TO 374 376 -
380 TO 411 413 TO 638 640 TO 718 720 722 725 TO 728 734 TO 739 751 -
753 757 TO 763 768 TO 773 775 TO 779 781 TO 785 787 TO 791 793 795 -
796 TO 797 801 TO 806 808 TO 828 831 832 836 TO 840
PY 235000 MEMB 1 TO 83 85 TO 142 144 TO 196 198 TO 219 221 224 227 -
228 TO 260 263 266 TO 291 296 TO 321 327 329 TO 363 365 TO 374 376 -
380 TO 411 413 TO 638 640 TO 718 720 722 725 TO 728 734 TO 739 751 -
753 757 TO 763 768 TO 773 775 TO 779 781 TO 785 787 TO 791 793 795 -
796 TO 797 801 TO 806 808 TO 828 831 832 836 TO 840
SBLT 0 MEMB 1 TO 83 85 TO 142 144 TO 196 198 TO 219 221 224 -
227 TO 260 263 266 TO 291 296 TO 321 327 329 TO 363 365 TO 374 376 -
380 TO 411 413 TO 638 640 TO 718 720 722 725 TO 728 734 TO 739 751 -
753 757 TO 763 768 TO 773 775 TO 779 781 TO 785 787 TO 791 793 795 -
796 TO 797 801 TO 806 808 TO 828 831 832 836 TO 840
BEAM 3 MEMB 1 TO 83 85 TO 142 144 TO 196 198 TO 219 221 224 -
227 TO 260 263 266 TO 291 296 TO 321 327 329 TO 363 365 TO 374 376 -
380 TO 411 413 TO 638 640 TO 718 720 722 725 TO 728 734 TO 739 751 -
753 757 TO 763 768 TO 773 775 TO 779 781 TO 785 787 TO 791 793 795 -
796 TO 797 801 TO 806 808 TO 828 831 832 836 TO 840
*DFF 300 ALL
*MAIN 200 ALL
*****************
****NATIONAL ANNEX OF NETHERLAND TO BE USED
*NA 2
*PY
****PY TO BE REDUCED BASED ON THICKNESS OF ELEMENT
*FU
*BEAM 3 ALL
*****FOR BUILTUP MEMBERS ONLY
*SBLT 1
*KC 0 ALL
****KY KZ CONSIDERED AS 1 THEREFORE NOT REQUIRED TO BE GIVEN
*KZ 1
*KY 1
****
*LZ
*LY
*UNL
****
**-------------------------------------
*TORSION 2 ALL
***
*-----------------------------------------------------------------------------
***FOR ANY MEMBER FAILING IN TORSION, IF THE TORSION VALUE IS LESS THAN 3KN-
M AND
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***APPROPRIATE ARRANGEMENT IS PRESENT TO COUNTER THE TORSION MOMENT
THEN ASSIGN
***?TORSION 3 MEMB ? TO THAT MEMBER
*RATIO 0.9 ALL
*TRACK 2 ALL
*LOAD LIST ENV
KZ 1.5 MEMB 1 TO 8 682 684 691 692
KZ 1.2 MEMB 19 TO 26 37 TO 44 55 TO 62 73 TO 80 91 TO 98 393 TO 396 -
694 695 697 698 700 701 703 704 706 707
LZ 4.7 MEMB 1
LZ 3.2 MEMB 19
LZ 4.6 MEMB 37
LZ 4.6 MEMB 55
LZ 6.4 MEMB 73 91
LY 4.7 MEMB 1
LY 3.2 MEMB 19
LY 4.6 MEMB 37
LY 4.6 MEMB 55
LY 3 MEMB 73
LY 3.4 MEMB 91
UNL 4.7 MEMB 1
UNL 3.2 MEMB 19
UNL 4.6 MEMB 37
UNL 4.6 MEMB 55
UNL 3 MEMB 73
UNL 3.4 MEMB 91
*****************
LZ 4.7 MEMB 4 692
LZ 3.2 MEMB 22 695
LZ 4.6 MEMB 40 698
LZ 4.6 MEMB 58 701
LZ 6.4 MEMB 76 94 704 707
LY 4.7 MEMB 4 692
LY 3.2 MEMB 22 695
LY 4.6 MEMB 40 698
LY 4.6 MEMB 58 701
LY 3 MEMB 76 704
LY 3.4 MEMB 94 707
UNL 4.7 MEMB 4 692
UNL 3.2 MEMB 22 695
UNL 4.6 MEMB 40 698
UNL 4.6 MEMB 58 701
UNL 3 MEMB 76 704
UNL 3.4 MEMB 94 707
*****************
LZ 4.7 MEMB 2
LZ 3.2 MEMB 20
LZ 4.6 MEMB 38
LZ 4.6 MEMB 56
LZ 3 MEMB 74
LZ 3.4 MEMB 92
LY 4.7 MEMB 2
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LY 3.2 MEMB 20
LY 4.6 MEMB 38
LY 4.6 MEMB 56
LY 3 MEMB 74
LY 3.4 MEMB 92
UNL 4.7 MEMB 2
UNL 3.2 MEMB 20
UNL 4.6 MEMB 38
UNL 4.6 MEMB 56
UNL 3 MEMB 74
UNL 3.4 MEMB 92
****
LZ 4.7 MEMB 5 691
LZ 3.2 MEMB 23 694
LZ 4.6 MEMB 41 697
LZ 4.6 MEMB 59 700
LZ 3 MEMB 77 703
LZ 3.4 MEMB 95 706
LY 4.7 MEMB 5 691
LY 3.2 MEMB 23 694
LY 4.6 MEMB 41 697
LY 4.6 MEMB 59 700
LY 3 MEMB 77 703
LY 3.4 MEMB 95 706
UNL 4.7 MEMB 5 691
UNL 3.2 MEMB 23 694
UNL 4.6 MEMB 41 697
UNL 4.6 MEMB 59 700
UNL 3 MEMB 77 703
UNL 3.4 MEMB 95 706
****
LZ 4.7 MEMB 8
LZ 3.2 MEMB 26
LZ 4.6 MEMB 44
LZ 4.6 MEMB 62
LZ 3 MEMB 80
LZ 3.4 MEMB 98
LY 4.7 MEMB 8
LY 3.2 MEMB 26
LY 4.6 MEMB 44
LY 4.6 MEMB 62
LY 3 MEMB 80
LY 3.4 MEMB 98
UNL 4.7 MEMB 8
UNL 3.2 MEMB 26
UNL 4.6 MEMB 44
UNL 4.6 MEMB 62
UNL 3 MEMB 80
UNL 3.4 MEMB 98
****
LZ 2.2 MEMB 393
LY 2.2 MEMB 393

UNL 2.2 MEMB 393
****
LZ 2.2 MEMB 395
LY 2.2 MEMB 395
UNL 2.2 MEMB 395
****
LZ 4.7 MEMB 3 682 684
LZ 3.2 MEMB 21
LZ 4.6 MEMB 39
LZ 4.6 MEMB 57
LZ 3 MEMB 75
LZ 3.4 MEMB 93
LY 4.7 MEMB 3 684
LY 4.7 MEMB 682
LY 3.2 MEMB 21
LY 4.6 MEMB 39
LY 4.6 MEMB 57
LY 3 MEMB 75
LY 3.4 MEMB 93
UNL 4.7 MEMB 3 684
UNL 4.7 MEMB 682
UNL 3.2 MEMB 21
UNL 4.6 MEMB 39
UNL 4.6 MEMB 57
UNL 3 MEMB 75
UNL 3.4 MEMB 93
****
LZ 4.7 MEMB 6
LZ 3.2 MEMB 24
LZ 4.6 MEMB 42
LZ 4.6 MEMB 60
LZ 3 MEMB 78
LZ 3.4 MEMB 96
LY 4.7 MEMB 6
LY 3.2 MEMB 24
LY 4.6 MEMB 42
LY 4.6 MEMB 60
LY 3 MEMB 78
LY 3.4 MEMB 96
UNL 4.7 MEMB 6
UNL 3.2 MEMB 24
UNL 4.6 MEMB 42
UNL 4.6 MEMB 60
UNL 3 MEMB 78
UNL 3.4 MEMB 96
****
LZ 2.2 MEMB 394
LY 2.2 MEMB 394
UNL 2.2 MEMB 394
****
LZ 4.7 MEMB 7
LZ 3.2 MEMB 25

LZ 4.6 MEMB 43
LZ 4.6 MEMB 61
LZ 3 MEMB 79
LZ 3.4 MEMB 97
LZ 2.2 MEMB 396
LY 4.7 MEMB 7
LY 3.2 MEMB 25
LY 4.6 MEMB 43
LY 4.6 MEMB 61
LY 3 MEMB 79
LY 3.4 MEMB 97
LY 2.2 MEMB 396
UNL 4.7 MEMB 7
UNL 3.2 MEMB 25
UNL 4.6 MEMB 43
UNL 4.6 MEMB 61
UNL 3 MEMB 79
UNL 3.4 MEMB 97
UNL 2.2 MEMB 396
*******----------*********EL + Y 3***Along-Z
LZ 3 MEMB 693
LY 3 MEMB 693
UNL 3 MEMB 693
*******----------*********EL + Y 3.72***Along-X
LZ 1 MEMB 683
LY 1 MEMB 683
UNL 1 MEMB 683
*******----------*********EL + Y 5***Along-X
LZ 6 MEMB 13 614 617
LY 6 MEMB 13 614 617
UNL 6 MEMB 13 614 617
LZ 6 MEMB 11 127 169 172 177 613 616 621 622
LY 4.3 MEMB 11 177 613 616
LY 4.3 MEMB 127 169 621 622
LY 4.3 MEMB 172
UNL 4.3 MEMB 11 127 169 172 177 613 616 621 622
LZ 3 MEMB 12 149 154 159 164 329 837
LY 1.2 MEMB 12 149 154 159 164 329 837
UNL 1.2 MEMB 12 149 154 159 164 329 837
LZ 3.3 MEMB 182 619 620
LY 3.3 MEMB 182 619 620
UNL 3.3 MEMB 182 619 620
LZ 1 MEMB 194
LY 1 MEMB 194
UNL 1 MEMB 194
LZ 1.7 MEMB 176 178
LY 1.7 MEMB 176 178
UNL 1.7 MEMB 176 178
LZ 3.3 MEMB 185 TO 187
LY 1.3 MEMB 185 TO 187
UNL 1.3 MEMB 185 TO 187
LZ 1 MEMB 192

LY 1 MEMB 192
UNL 1 MEMB 192
LZ 1.2 MEMB 147
LY 1.2 MEMB 147
UNL 1.2 MEMB 147
LZ 1.2 MEMB 150
LY 1.2 MEMB 150
UNL 1.2 MEMB 150
LZ 1.2 MEMB 155 838
LY 1.2 MEMB 155 838
UNL 1.2 MEMB 155 838
LZ 1.2 MEMB 160
LY 1.2 MEMB 160
UNL 1.2 MEMB 160
LZ 1.2 MEMB 165
LY 1.2 MEMB 165
UNL 1.2 MEMB 165
LZ 1.7 MEMB 688
LY 1.7 MEMB 688
UNL 1.7 MEMB 688
LZ 3 MEMB 9 109 168 171 189
LY 1.7 MEMB 9
LY 1.3 MEMB 168
LY 1 MEMB 109 171 189
UNL 1.7 MEMB 9
UNL 1.3 MEMB 168
UNL 1 MEMB 109 171 189
LZ 6 MEMB 10 148 153 158 163 836
LY 1.2 MEMB 10 148 153 158 163 836
UNL 1.2 MEMB 10 148 153 158 163 836
LZ 3 MEMB 14
LY 3 MEMB 14
UNL 3 MEMB 14
LZ 5 MEMB 15 174 686
LY 5 MEMB 15 174 686
UNL 5 MEMB 15 174 686
LZ 3 MEMB 615
LY 3 MEMB 615
UNL 3 MEMB 615
LZ 2.7 MEMB 179
LY 2.7 MEMB 179
UNL 2.7 MEMB 179
LZ 3 MEMB 618
LY 3 MEMB 618
UNL 3 MEMB 618
LZ 5 MEMB 170 175 180 183 687
LY 3.3 MEMB 170 175 180 183 687
UNL 3.3 MEMB 170 175 180 183 616 687
LZ 0.7 MEMB 623
LY 0.7 MEMB 623
UNL 0.7 MEMB 623
LZ 1.7 MEMB 188

LY 1.7 MEMB 188
UNL 1.7 MEMB 188
LZ 0.7 MEMB 624
LY 0.7 MEMB 624
UNL 0.7 MEMB 624
LZ 1.7 MEMB 190
LY 1.7 MEMB 190
UNL 1.7 MEMB 190
LZ 5 MEMB 173 181 184 193
LY 3.3 MEMB 173 181 184 193
UNL 3.3 MEMB 173 181 184 193
LZ 3 MEMB 16
LY 3 MEMB 16
UNL 3 MEMB 16
LZ 5 MEMB 17 145 191
LY 3.3 MEMB 17 145 191
UNL 3.3 MEMB 17 145 191
LZ 5 MEMB 151 152
LY 3.3 MEMB 151 152
UNL 3.3 MEMB 151
LZ 5 MEMB 156 157 839 840
LY 3.3 MEMB 156 157 839 840
UNL 3.3 MEMB 156 157 839 840
LZ 5 MEMB 161 162
LY 3.3 MEMB 161 162
UNL 3.3 MEMB 161 162
LZ 5 MEMB 166 167 627
LY 2.2 MEMB 166 167 627
UNL 2.2 MEMB 166 167 627
LZ 5 MEMB 18 146 625
LY 2.2 MEMB 18 146 625
UNL 2.2 MEMB 18 146 625
*******----------*********EL + Y 7***Along-Z
LZ 3 MEMB 696
LY 3 MEMB 696
UNL 3 MEMB 696
*******----------*********EL + Y 8.2***Along-X
LZ 6 MEMB 31 599 602
LY 6 MEMB 31 599 602
UNL 6 MEMB 31 599 602
LZ 6 MEMB 29 128 216 219 228 231 234 598 601 630 632 641
LY 3.6 MEMB 29 128 216 219 228 231 234 598 601 630 632 641
UNL 3.6 MEMB 29 128 216 219 228 231 234 598 601 630 632 641
LZ 3 MEMB 30 196 199 202 205 208
LY 6 MEMB 30 196 199 202 205 208
UNL 6 MEMB 30 196 199 202 205 208
LZ 2.15 MEMB 648 649 653
LY 2.15 MEMB 648 649 653
UNL 2.15 MEMB 648 649 653
LZ 1.8 MEMB 643 832
LY 1.8 MEMB 643 832
UNL 1.8 MEMB 643 832

LZ 1.2 MEMB 680
LY 1.2 MEMB 680
UNL 1.2 MEMB 680
LZ 1.2 MEMB 681
LY 1.2 MEMB 681
UNL 1.2 MEMB 681
LZ 1.8 MEMB 636 642 831
LY 1.8 MEMB 636 642 831
UNL 1.8 MEMB 636 642 831
LZ 0.9 MEMB 668
LY 0.9 MEMB 668
UNL 0.9 MEMB 668
LZ 0.9 MEMB 669
LY 0.9 MEMB 669
UNL 0.9 MEMB 669
LZ 2.15 MEMB 213 214 652 656
LY 2.15 MEMB 213 214 652 656
UNL 2.15 MEMB 213 214 652 656
LZ 0.85 MEMB 671
LY 0.85 MEMB 671
UNL 0.85 MEMB 671
LZ 1 MEMB 673
LY 1 MEMB 673
UNL 1 MEMB 673
LZ 1 MEMB 675
LY 1 MEMB 675
UNL 1 MEMB 675
LZ 1 MEMB 677
LY 1 MEMB 677
UNL 1 MEMB 677
LZ 3 MEMB 27 112 215 218 227 230 233 631 633 640
LY 3.6 MEMB 27 112 215 218 227 230 233 631 633 640
UNL 3.6 MEMB 27 112 215 218 227 230 233 631 633 640
LZ 6 MEMB 28 195 198 201 204 207
LY 6 MEMB 28 195 198 201 204 207
UNL 6 MEMB 28 195
LZ 3 MEMB 32
LY 3 MEMB 32
UNL 3 MEMB 32
LZ 5 MEMB 33 221 679
LY 2.7 MEMB 33 221 679
UNL 2.7 MEMB 33 221 679
LZ 3 MEMB 600
LY 3 MEMB 600
UNL 3 MEMB 600
LZ 5 MEMB 217 661 664 678
LY 1.35 MEMB 217 661 664 678
UNL 1.35 MEMB 217 661 664 678
LZ 3 MEMB 603
LY 3 MEMB 603
UNL 3 MEMB 603
LZ 5 MEMB 229 634 637

LY 2.7 MEMB 229 634 637
UNL 2.7 MEMB 229 634 637
LZ 1.3 MEMB 644
LY 1.3 MEMB 644
UNL 1.3 MEMB 644
LZ 2.3 MEMB 645
LY 2.3 MEMB 645
UNL 2.3 MEMB 645
LZ 5 MEMB 232 635 638
LY 2.7 MEMB 232 635 638
UNL 2.7 MEMB 232 635 638
LZ 5 MEMB 235 667
LY 2.7 MEMB 235 667
UNL 2.7 MEMB 235 667
LZ 3 MEMB 34
LY 3 MEMB 34
UNL 3 MEMB 34
LZ 5 MEMB 35 210 224 646 650 654
LY 2.7 MEMB 35 36 200 203 206 209 210 212 224 646 647 650 651 654 655 -
670 672 674 676
UNL 2.7 MEMB 35 36 200 203 206 209 210 212 224 646 647 650 651 654 -
655 670 672 674 676
LZ 5 MEMB 200 212 647 651 655
LZ 5 MEMB 203 670
LZ 5 MEMB 206 672
LZ 5 MEMB 209 674
LZ 5 MEMB 36 676
*******----------*********EL + Y 10.6***Along-Z
LZ 3 MEMB 699
LY 3 MEMB 699
UNL 3 MEMB 699
*******----------*********EL + Y 12.8***Along-X
LZ 6 MEMB 49 534 536
LY 6 MEMB 49 534 536
UNL 6 MEMB 49 534 536
LZ 6 MEMB 47 129 249 251 253 255 533 535
LY 1.2 MEMB 47 129 249 251 253 255 533 535
UNL 1.2 MEMB 47 129 249 251 253 255 533 535
LZ 3 MEMB 48 237 240 243 246 330
LY 1.2 MEMB 48 237 240 243 246 330
UNL 1.2 MEMB 48 237 240 243 246 330
LZ 1.2 MEMB 711
LY 1.2 MEMB 711
UNL 1.2 MEMB 711
LZ 1.2 MEMB 578
LY 1.2 MEMB 578
UNL 1.2 MEMB 578
LZ 1.2 MEMB 579
LY 1.2 MEMB 579
UNL 1.2 MEMB 579
LZ 1.2 MEMB 580
LY 1.2 MEMB 580

UNL 1.2 MEMB 580
LZ 1.2 MEMB 581
LY 1.2 MEMB 581
UNL 1.2 MEMB 581
LZ 1.2 MEMB 582
LY 1.2 MEMB 582
UNL 1.2 MEMB 582
LZ 1.2 MEMB 583
LY 1.2 MEMB 583
UNL 1.2 MEMB 583
LZ 1.2 MEMB 584
LY 1.2 MEMB 584
UNL 1.2 MEMB 584
LZ 1.2 MEMB 585
LY 1.2 MEMB 585
UNL 1.2 MEMB 585
LZ 1.2 MEMB 586
LY 1.2 MEMB 586
UNL 1.2 MEMB 586
LZ 1.2 MEMB 587
LY 1.2 MEMB 587
UNL 1.2 MEMB 587
LZ 1.2 MEMB 588
LY 1.2 MEMB 588
UNL 1.2 MEMB 588
LZ 1.2 MEMB 589
LY 1.2 MEMB 589
UNL 1.2 MEMB 589
LZ 1.2 MEMB 590
LY 1.2 MEMB 590
UNL 1.2 MEMB 590
LZ 1.2 MEMB 591
LY 1.2 MEMB 591
UNL 1.2 MEMB 591
LZ 1.2 MEMB 592
LY 1.2 MEMB 592
UNL 1.2 MEMB 592
LZ 1.2 MEMB 593
LY 1.2 MEMB 593
UNL 1.2 MEMB 593
LZ 1.2 MEMB 594
LY 1.2 MEMB 594
UNL 1.2 MEMB 594
LZ 1.2 MEMB 595
LY 1.2 MEMB 595
UNL 1.2 MEMB 595
LZ 1.2 MEMB 596
LY 1.2 MEMB 596
UNL 1.2 MEMB 596
LZ 1.2 MEMB 597
LY 1.2 MEMB 597
UNL 1.2 MEMB 597

LZ 3 MEMB 45 115 248 250 252 254
LY 1.2 MEMB 45 115 248 250 252 254
UNL 1.2 MEMB 45 115 248 250 252 254
LZ 6 MEMB 46 236 239 242 245
LY 1.2 MEMB 46 236 239 242 245
UNL 1.2 MEMB 46 236 239 242 245
LZ 3 MEMB 50
LY 3 MEMB 50
UNL 3 MEMB 50
LZ 5 MEMB 51 260 540 541
LY 1.25 MEMB 51 260 540 541
UNL 1.25 MEMB 51 260 540 541
LZ 3 MEMB 537
LY 3 MEMB 537
UNL 3 MEMB 537
LZ 5 MEMB 256 539 556
LY 2.5 MEMB 54 238 241 244 247 256 TO 259 539 542 TO 554 556 TO 564 -
709 710
UNL 2.5 MEMB 54 238 241 244 247 256 TO 259 539 542 TO 554 556 TO 564 -
709 710
LZ 3 MEMB 538
LY 3 MEMB 538
UNL 3 MEMB 538
LZ 5 MEMB 257 542 547 557
LZ 5 MEMB 258 548 558
LZ 5 MEMB 259 543 549 559
LZ 3 MEMB 52
LY 3 MEMB 52
UNL 3 MEMB 52
LZ 5 MEMB 53 263 555
LZ 5 MEMB 238 544 551 561
LZ 5 MEMB 241 552 562 709
LZ 5 MEMB 244 545 553 563 710
LZ 5 MEMB 247 554 564
LZ 5 MEMB 54 546 550 560
*******----------*********EL + Y 15.2***Along-Z
LZ 3 MEMB 702
LY 3 MEMB 702
UNL 3 MEMB 702
*******----------*********EL + Y 17.4***Along-X
LZ 6 MEMB 67 528 531
LY 6 MEMB 67 528 531
UNL 6 MEMB 67 528 531
LZ 6 MEMB 65 130 275 277 279 281 527 530 809 822
LY 1.2 MEMB 65 130 275 277 279 281 527 530 809 822
UNL 1.2 MEMB 65 130 275 277 279 281 527 530 809 822
LZ 3 MEMB 66 267 269 271 273 331
LY 1.2 MEMB 66 267 269 271 273 331
UNL 1.2 MEMB 66 267 269 271 273 331
LZ 1.2 MEMB 507
LY 1.2 MEMB 507
UNL 1.2 MEMB 507

LZ 1.2 MEMB 508
LY 1.2 MEMB 508
UNL 1.2 MEMB 508
LZ 1.2 MEMB 509 810 820 824 825
LY 1.2 MEMB 509 810 820 824 825
UNL 1.2 MEMB 509 810 820 824 825
LZ 1.2 MEMB 510
LY 1.2 MEMB 510
UNL 1.2 MEMB 510
LZ 1.2 MEMB 511
LY 1.2 MEMB 511
UNL 1.2 MEMB 511
LZ 1.2 MEMB 512
LY 1.2 MEMB 512
UNL 1.2 MEMB 512
LZ 1.2 MEMB 513
LY 1.2 MEMB 513
UNL 1.2 MEMB 513
LZ 1.2 MEMB 514 802
LY 1.2 MEMB 514 802
UNL 1.2 MEMB 514 802
LZ 1.2 MEMB 515
LY 1.2 MEMB 515
UNL 1.2 MEMB 515
LZ 1.2 MEMB 516
LY 1.2 MEMB 516
UNL 1.2 MEMB 516
LZ 1.2 MEMB 517
LY 1.2 MEMB 517
UNL 1.2 MEMB 517
LZ 1.2 MEMB 518
LY 1.2 MEMB 518
UNL 1.2 MEMB 518
LZ 1.2 MEMB 519 811 823
LY 1.2 MEMB 519 811 823
UNL 1.2 MEMB 519 811 823
LZ 1.2 MEMB 520
LY 1.2 MEMB 520
UNL 1.2 MEMB 520
LZ 1.2 MEMB 521
LY 1.2 MEMB 521
UNL 1.2 MEMB 521
LZ 1.2 MEMB 522
LY 1.2 MEMB 522
UNL 1.2 MEMB 522
LZ 1.2 MEMB 523
LY 1.2 MEMB 523
UNL 1.2 MEMB 523
LZ 1.2 MEMB 524 803
LY 1.2 MEMB 524 803
UNL 1.2 MEMB 524 803
LZ 1.2 MEMB 525

LY 1.2 MEMB 525
UNL 1.2 MEMB 525
LZ 1.2 MEMB 526
LY 1.2 MEMB 526
UNL 1.2 MEMB 526
LZ 6 MEMB 63 118 274 276 278 280 808 821
LY 1.2 MEMB 63 118 274 276 278 280 808 821
UNL 1.2 MEMB 63 118 274 276 278 280 808 821
LZ 6 MEMB 64 266 268 270 272 801
LY 1.2 MEMB 64 266 268 270 272 801
UNL 1.2 MEMB 64 266 268 270 272 801
LZ 3 MEMB 68
LY 3 MEMB 68
UNL 3 MEMB 68
LZ 5 MEMB 69 71 72 282 TO 291 468 TO 493 804 TO 806 812 TO 819 826 -
827 TO 828
LY 2.5 MEMB 69 71 72 282 TO 291 468 TO 493 804 TO 806 812 TO 819 826 -
827 TO 828
UNL 2.5 MEMB 69 71 72 282 TO 291 468 TO 493 804 TO 806 812 TO 819 826 -
827 TO 828
*******----------*********EL + Y 19***Along-Z
LZ 3 MEMB 705
LY 3 MEMB 705
UNL 3 MEMB 705
*******----------*********EL + Y 20.4***Along-X
LZ 6 MEMB 85 443 446
LY 6 MEMB 85 443 446
UNL 6 MEMB 85 443 446
LZ 6 MEMB 83 131 305 307 309 311 442 445 775 777 795
LY 1.2 MEMB 83 131 305 307 309 311 442 445 775 777 795
UNL 1.2 MEMB 83 131 305 307 309 311 442 445 775 777 795
LZ 3 MEMB 297 299 301 303 332 689
LY 1.2 MEMB 297 299 301 303 332 689
UNL 1.2 MEMB 297 299 301 303 332 689
LZ 1.2 MEMB 424
LY 1.2 MEMB 424
UNL 1.2 MEMB 424
LZ 1.2 MEMB 426
LY 1.2 MEMB 426
UNL 1.2 MEMB 426
LZ 1.2 MEMB 428 778 789 790 796
LY 1.2 MEMB 428 778 789 790 796
UNL 1.2 MEMB 428 778 789 790 796
LZ 1.2 MEMB 430
LY 1.2 MEMB 430
UNL 1.2 MEMB 430
LZ 1.2 MEMB 431
LY 1.2 MEMB 431
UNL 1.2 MEMB 431
LZ 1.2 MEMB 437
LY 1.2 MEMB 437
UNL 1.2 MEMB 437

LZ 1.2 MEMB 438
LY 1.2 MEMB 438
UNL 1.2 MEMB 438
LZ 1.2 MEMB 439 769
LY 1.2 MEMB 439 769
UNL 1.2 MEMB 439 769
LZ 1.2 MEMB 440
LY 1.2 MEMB 440
UNL 1.2 MEMB 440
LZ 1.2 MEMB 441
LY 1.2 MEMB 441
UNL 1.2 MEMB 441
LZ 1.2 MEMB 458
LY 1.2 MEMB 458
UNL 1.2 MEMB 458
LZ 1.2 MEMB 459
LY 1.2 MEMB 459
UNL 1.2 MEMB 459
LZ 1.2 MEMB 460 779 791
LY 1.2 MEMB 460 779 791
UNL 1.2 MEMB 460 779 791
LZ 1.2 MEMB 461
LY 1.2 MEMB 461
UNL 1.2 MEMB 461
LZ 1.2 MEMB 462
LY 1.2 MEMB 462
UNL 1.2 MEMB 462
LZ 1.2 MEMB 463
LY 1.2 MEMB 463
UNL 1.2 MEMB 463
LZ 1.2 MEMB 464
LY 1.2 MEMB 464
UNL 1.2 MEMB 464
LZ 1.2 MEMB 465 770
LY 1.2 MEMB 465 770
UNL 1.2 MEMB 465 770
LZ 1.2 MEMB 466
LY 1.2 MEMB 466
UNL 1.2 MEMB 466
LZ 1.2 MEMB 467
LY 1.2 MEMB 467
UNL 1.2 MEMB 467
LZ 3 MEMB 81 121 304 306 308 310 776 793
LY 1.2 MEMB 81 121 304 306 308 310 776 793
UNL 1.2 MEMB 81 121 304 306 308 310 776 793
LZ 6 MEMB 82 296 298 300 302 768
LY 1.2 MEMB 82 296 298 300 302 768
UNL 1.2 MEMB 82 296 298 300 302 768
LZ 3 MEMB 86
LY 3 MEMB 86
UNL 3 MEMB 86
LZ 5 MEMB 87 89 90 312 TO 321 403 404 407 410 413 416 419 422 425 427 -

429 432 TO 436 448 TO 457 771 TO 773 781 TO 785 787 788 797
LY 2.5 MEMB 87 89 90 312 TO 321 403 404 407 410 413 416 419 422 425 -
427 429 432 TO 436 448 TO 457 771 TO 773 781 TO 785 787 788 797
UNL 2.5 MEMB 87 89 90 312 TO 321 403 404 407 410 413 416 419 422 425 -
427 429 432 TO 436 448 TO 457 771 TO 773 781 TO 785 787 788 797
*******----------*********EL + Y 22.4***Along-Z
LZ 3 MEMB 708
LY 3 MEMB 708
UNL 3 MEMB 708
*******----------*********EL + Y 23.8***Along-X
LZ 6 MEMB 103 370 372
LY 6 MEMB 103 370 372
UNL 6 MEMB 103 370 372
LZ 6 MEMB 101 132 334 337 341 344
LY 3 MEMB 101 132 334 337 341 344
UNL 3 MEMB 101 132 334 337 341 344
LZ 3 MEMB 102 327 348 350 352 354
LY 6 MEMB 102 327 346 TO 354 387
UNL 6 MEMB 100 102 327 346 TO 354 387
UNL 2 MEMB 366 367
LZ 2 MEMB 366 TO 369
LY 2 MEMB 366 TO 369
UNL 2 MEMB 368 369
LZ 1 MEMB 714
LY 1 MEMB 714
UNL 1 MEMB 714
LZ 1 MEMB 385 760 763
LY 1 MEMB 385 760 763
UNL 1 MEMB 385 760 763
LZ 1 MEMB 386 761
LY 1 MEMB 386 761
UNL 1 MEMB 386 761
LZ 1 MEMB 391 392
LY 1 MEMB 391 392
UNL 1 MEMB 391 392
LZ 1 MEMB 717
LY 1 MEMB 717
UNL 1 MEMB 717
LZ 3 MEMB 99 124 333 336 340 343
LY 3 MEMB 99 124 333 336 340 343
UNL 3 MEMB 99 124 333 336 340 343
LZ 6 MEMB 100 346 347 349 351 353 387
LZ 3 MEMB 104
LY 3 MEMB 104
UNL 3 MEMB 104
LZ 5 MEMB 105 374 718 722
LY 2.5 MEMB 105 374 718 722
UNL 2.5 MEMB 105 374 718 722
LZ 3 MEMB 371
LY 3 MEMB 371
UNL 3 MEMB 371
LZ 5 MEMB 335 720 735

LY 5 MEMB 335 720 735
UNL 5 MEMB 335 720 735
LZ 3 MEMB 373
LY 3 MEMB 373
UNL 3 MEMB 373
LZ 5 MEMB 338 725 736
LY 5 MEMB 338 725 736
UNL 5 MEMB 338 725 736
LZ 5 MEMB 339 726 737
LY 5 MEMB 339 726 737
UNL 5 MEMB 339 726 737
LZ 5 MEMB 342 727 738
LY 5 MEMB 342 727 738
UNL 5 MEMB 342 727 738
LZ 5 MEMB 345 728 739
LY 5 MEMB 345 728 739
UNL 5 MEMB 345 728 739
LZ 3 MEMB 106
LY 3 MEMB 106
UNL 3 MEMB 106
LZ 5 MEMB 107 376 734
LY 2.5 MEMB 107 376 734
UNL 2.5 MEMB 107 376 734
LZ 5 MEMB 355 360 363 751
LY 3.13 MEMB 355 357 360 362 363 365 713 716 751 762
UNL 3.13 MEMB 355 357 360 362 363 365 713 716 751 762
LZ 0.33 MEMB 356
LY 0.33 MEMB 356
UNL 0.33 MEMB 356
LZ 3.13 MEMB 361 712 715 753
LY 3.13 MEMB 361 712 715 753
UNL 3.13 MEMB 361 712 715 753
LZ 5 MEMB 357 362 365 713 716 762
LZ 5 MEMB 358 381 389 758
LY 2.5 MEMB 358 381 389 758
UNL 2.5 MEMB 358 381 389 758
LZ 5 MEMB 359 382 390 759
LY 2.5 MEMB 359 382 390 759
UNL 2.5 MEMB 359 382 390 759
LZ 5 MEMB 108 380 388 757
LY 2.5 MEMB 108 380 388 757
UNL 2.5 MEMB 108 380 388 757
*******----------*********EL + Y 26***Along-X
LZ 1.5 MEMB 397
LY 1.5 MEMB 397
UNL 1.5 MEMB 397
LZ 1.5 MEMB 398
LY 1.5 MEMB 398
UNL 1.5 MEMB 398
LZ 2.2 MEMB 400
LY 2.2 MEMB 400
UNL 2.2 MEMB 400

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LZ 2.2 MEMB 399
LY 2.2 MEMB 399
UNL 2.2 MEMB 399
KC 0 MEMB 1 TO 83 85 TO 142 144 TO 196 198 TO 219 221 224 227 TO 260 -
263 266 TO 291 296 TO 321 327 329 TO 363 365 TO 374 376 380 TO 411 -
413 TO 638 640 TO 718 720 722 725 TO 728 734 TO 739 751 753 -
757 TO 763 768 TO 773 775 TO 779 781 TO 785 787 TO 791 793 -
795 TO 797 801 TO 806 808 TO 828 831 832 836 TO 840
TORSION 2 MEMB 1 TO 83 85 TO 142 144 TO 196 198 TO 219 221 224 227 -
228 TO 260 263 266 TO 291 296 TO 321 327 329 TO 363 365 TO 374 376 -
380 TO 411 413 TO 638 640 TO 718 720 722 725 TO 728 734 TO 739 751 -
753 757 TO 763 768 TO 773 775 TO 779 781 TO 785 787 TO 791 793 795 -
796 TO 797 801 TO 806 808 TO 828 831 832 836 TO 840
RATIO 0.9 MEMB 1 TO 83 85 TO 142 144 TO 196 198 TO 219 221 224 227 -
228 TO 260 263 266 TO 291 296 TO 321 327 329 TO 363 365 TO 374 376 -
380 TO 411 413 TO 638 640 TO 718 720 722 725 TO 728 734 TO 739 751 -
753 757 TO 763 768 TO 773 775 TO 779 781 TO 785 787 TO 791 793 795 -
796 TO 797 801 TO 806 808 TO 828 831 832 836 TO 840
TRACK 2 MEMB 1 TO 83 85 TO 142 144 TO 196 198 TO 219 221 224 -
227 TO 260 263 266 TO 291 296 TO 321 327 329 TO 363 365 TO 374 376 -
380 TO 411 413 TO 638 640 TO 718 720 722 725 TO 728 734 TO 739 751 -
753 757 TO 763 768 TO 773 775 TO 779 781 TO 785 787 TO 791 793 795 -
796 TO 797 801 TO 806 808 TO 828 831 832 836 TO 840
STEEL TAKE OFF ALL
LOAD LIST ENV 2
CHECK CODE ALL

****---------------------------------------------------------
**DEFLECTION CHECK
PARAMETER 2
CODE EN 1993-1-1:2005
FU 360000 ALL
PY 235000 ALL
SBLT 0 ALL
BEAM 3 ALL
DFF 300 MEMB 9 TO 14 16 TO 18 27 TO 34 36 45 TO 54 63 TO 72 81 TO 83 -
85 TO 90 99 TO 106 108 109 112 115 118 121 124 127 TO 132 145 TO 169 -
171 TO 173 177 179 181 182 184 TO 196 198 199 201 TO 209 211 -
215 TO 219 221 227 TO 237 239 TO 260 263 266 TO 291 296 TO 321 327 -
329 TO 354 356 358 359 361 370 TO 374 380 TO 382 385 TO 392 403 404 -
407 410 413 416 419 422 424 TO 493 507 TO 543 545 TO 550 552 TO 560 -
562 TO 564 578 TO 603 613 TO 625 627 630 TO 638 640 TO 645 661 664 -
667 TO 681 683 689 693 696 699 702 705 708 TO 712 714 715 717 718 -
720 722 725 TO 728 735 TO 739 753 757 TO 759 831 TO 835
DFF 400 MEMB 15 35 107 170 174 TO 176 178 180 183 200 210 212 TO 214 -
224 238 355 357 360 362 363 365 TO 369 376 397 TO 400 544 551 561 -
646 TO 660 686 TO 688 713 716 734 751 762
DJ1 367 MEMB 693
DJ2 366 MEMB 693
*******----------*********EL + 3.72
DJ1 362 MEMB 683
DJ2 361 MEMB 683
```

*******----------*********EL + 5
DJ1 12 MEMB 13 614 617
DJ2 15 MEMB 13 614 617
DJ1 11 MEMB 11 127 169 172 177 613 616 621 622
DJ2 14 MEMB 11 127 169 172 177 613 616 621 622
DJ1 14 MEMB 12 149 154 159 164 329
DJ2 17 MEMB 12 149 154 159 164 329
DJ1 92 MEMB 182 619 620
DJ2 93 MEMB 182 619 620
DJ1 100 MEMB 194
DJ2 70 MEMB 194
DJ1 88 MEMB 176 178
DJ2 89 MEMB 176 178
DJ1 94 MEMB 185 TO 187
DJ2 95 MEMB 185 TO 187
DJ1 95 MEMB 192
DJ2 99 MEMB 192
DJ1 99 MEMB 147
DJ2 74 MEMB 147
DJ1 74 MEMB 150
DJ2 77 MEMB 150
DJ1 77 MEMB 155
DJ2 80 MEMB 155
DJ1 80 MEMB 160
DJ2 83 MEMB 160
DJ1 83 MEMB 165
DJ2 71 MEMB 165
DJ1 364 MEMB 688
DJ2 365 MEMB 688
DJ1 10 MEMB 9 109 168 171 189
DJ2 13 MEMB 9 109 168 171 189
DJ1 13 MEMB 10 148 153 158 163
DJ2 16 MEMB 10 148 153 158 163
DJ1 12 MEMB 14
DJ2 11 MEMB 14
DJ1 11 MEMB 15 174 686
DJ2 10 MEMB 15 174 686
DJ1 321 MEMB 615
DJ2 320 MEMB 615
DJ1 90 MEMB 179
DJ2 91 MEMB 179
DJ1 323 MEMB 618
DJ2 322 MEMB 618
DJ1 85 MEMB 170 175 180 183 687
DJ2 84 MEMB 170 175 180 183 687
DJ1 326 MEMB 623
DJ2 324 MEMB 623
DJ1 96 MEMB 188
DJ2 58 MEMB 188
DJ1 327 MEMB 624
DJ2 325 MEMB 624
DJ1 97 MEMB 190

DJ2 98 MEMB 190
DJ1 87 MEMB 173 181 184 193
DJ2 86 MEMB 173 181 184 193
DJ1 15 MEMB 16
DJ2 14 MEMB 16
DJ1 14 MEMB 17 145 191
DJ2 13 MEMB 17 145 191
DJ1 73 MEMB 151 152
DJ2 72 MEMB 151 152
DJ1 76 MEMB 156 157
DJ2 75 MEMB 156 157
DJ1 79 MEMB 161 162
DJ2 78 MEMB 161 162
DJ1 82 MEMB 166 167 627
DJ2 81 MEMB 166 167 627
DJ1 17 MEMB 18 146 625
DJ2 16 MEMB 18 146 625
*******----------*********EL + 7
DJ1 369 MEMB 696
DJ2 368 MEMB 696
*******----------*********EL + 8.2
DJ1 20 MEMB 31 599 602
DJ2 23 MEMB 31 599 602
DJ1 19 MEMB 29 128 216 219 228 231 234 598 601 630 632 641
DJ2 22 MEMB 29 128 216 219 228 231 234 598 601 630 632 641
DJ1 22 MEMB 30 196 199 202 205 208
DJ2 25 MEMB 30 196 199 202 205 208
DJ1 342 MEMB 648 649 653
DJ2 343 MEMB 648 649 653
DJ1 336 MEMB 643
DJ2 337 MEMB 643
DJ1 360 MEMB 680
DJ2 359 MEMB 680
DJ1 359 MEMB 681
DJ2 334 MEMB 681
DJ1 334 MEMB 636 642
DJ2 335 MEMB 636 642
DJ1 335 MEMB 668
DJ2 354 MEMB 668
DJ1 354 MEMB 669
DJ2 111 MEMB 669
DJ1 111 MEMB 213 214 652 656
DJ2 113 MEMB 213 214 652 656
DJ1 113 MEMB 671
DJ2 355 MEMB 671
DJ1 355 MEMB 673
DJ2 356 MEMB 673
DJ1 356 MEMB 675
DJ2 357 MEMB 675
DJ1 357 MEMB 677
DJ2 358 MEMB 677
DJ1 18 MEMB 27 112 215 218 227 230 233 631 633 640

DJ2 21 MEMB 27 112 215 218 227 230 233 631 633 640
DJ1 21 MEMB 28 195 198 201 204 207
DJ2 24 MEMB 28 195 198 201 204 207
DJ1 20 MEMB 32
DJ2 19 MEMB 32
DJ1 19 MEMB 33 221 679
DJ2 18 MEMB 33 221 679
DJ1 317 MEMB 600
DJ2 316 MEMB 600
DJ1 115 MEMB 217 661 664 678
DJ2 114 MEMB 217 661 664 678
DJ1 319 MEMB 603
DJ2 318 MEMB 603
DJ1 117 MEMB 229 634 637
DJ2 116 MEMB 229 634 637
DJ1 339 MEMB 644
DJ2 341 MEMB 644
DJ1 340 MEMB 645
DJ2 338 MEMB 645
DJ1 123 MEMB 232 635 638
DJ2 122 MEMB 232 635 638
DJ1 125 MEMB 235 667
DJ2 124 MEMB 235 667
DJ1 23 MEMB 34
DJ2 22 MEMB 34
DJ1 22 MEMB 35 210 224 646 650 654
DJ2 21 MEMB 35 210 224 646 650 654
DJ1 112 MEMB 211
DJ2 101 MEMB 211
DJ1 104 MEMB 200 212 647 651 655
DJ2 103 MEMB 200 212 647 651 655
DJ1 106 MEMB 203 670
DJ2 105 MEMB 203 670
DJ1 108 MEMB 206 672
DJ2 107 MEMB 206 672
DJ1 110 MEMB 209 674
DJ2 109 MEMB 209 674
DJ1 25 MEMB 36 676
DJ2 24 MEMB 36 676
*******----------*********EL + 10.6
DJ1 371 MEMB 699
DJ2 370 MEMB 699
*******----------*********EL + 12.8
DJ1 28 MEMB 49 534 536
DJ2 31 MEMB 49 534 536
DJ1 27 MEMB 47 129 249 251 253 255 533 535
DJ2 30 MEMB 47 129 249 251 253 255 533 535
DJ1 30 MEMB 48 237 240 243 246 330
DJ2 33 MEMB 48 237 240 243 246 330
DJ1 378 MEMB 711
DJ2 379 MEMB 711
DJ1 142 MEMB 578

DJ2 290 MEMB 578
DJ1 290 MEMB 579
DJ2 298 MEMB 579
DJ1 298 MEMB 580
DJ2 299 MEMB 580
DJ1 299 MEMB 581
DJ2 300 MEMB 581
DJ1 300 MEMB 582
DJ2 143 MEMB 582
DJ1 143 MEMB 583
DJ2 302 MEMB 583
DJ1 302 MEMB 584
DJ2 303 MEMB 584
DJ1 303 MEMB 585
DJ2 304 MEMB 585
DJ1 304 MEMB 586
DJ2 305 MEMB 586
DJ1 305 MEMB 587
DJ2 301 MEMB 587
DJ1 292 MEMB 588
DJ2 307 MEMB 588
DJ1 307 MEMB 589
DJ2 308 MEMB 589
DJ1 308 MEMB 590
DJ2 309 MEMB 590
DJ1 309 MEMB 591
DJ2 310 MEMB 591
DJ1 310 MEMB 592
DJ2 306 MEMB 592
DJ1 306 MEMB 593
DJ2 312 MEMB 593
DJ1 312 MEMB 594
DJ2 313 MEMB 594
DJ1 313 MEMB 595
DJ2 314 MEMB 595
DJ1 314 MEMB 596
DJ2 315 MEMB 596
DJ1 315 MEMB 597
DJ2 311 MEMB 597
DJ1 26 MEMB 45 115 248 250 252 254
DJ2 29 MEMB 45 115 248 250 252 254
DJ1 29 MEMB 46 236 239 242 245
DJ2 32 MEMB 46 236 239 242 245
DJ1 28 MEMB 50
DJ2 27 MEMB 50
DJ1 27 MEMB 51 260 540 541
DJ2 26 MEMB 51 260 540 541
DJ1 287 MEMB 537
DJ2 286 MEMB 537
DJ1 135 MEMB 256 539 556
DJ2 134 MEMB 256 539 556
DJ1 289 MEMB 538

DJ2 288 MEMB 538
DJ1 137 MEMB 257 542 547 557
DJ2 136 MEMB 257 542 547 557
DJ1 139 MEMB 258 548 558
DJ2 138 MEMB 258 548 558
DJ1 141 MEMB 259 543 549 559
DJ2 140 MEMB 259 543 549 559
DJ1 31 MEMB 52
DJ2 30 MEMB 52
DJ1 30 MEMB 53 263 555
DJ2 29 MEMB 53 263 555
DJ1 127 MEMB 238 544 551 561
DJ2 126 MEMB 238 544 551 561
DJ1 129 MEMB 241 552 562 709
DJ2 128 MEMB 241 552 562 709
DJ1 131 MEMB 244 545 553 563 710
DJ2 130 MEMB 244 545 553 563 710
DJ1 133 MEMB 247 554 564
DJ2 132 MEMB 247 554 564
DJ1 33 MEMB 54 546 550 560
DJ2 32 MEMB 54 546 550 560
*******----------*********EL + 15.2
DJ1 373 MEMB 702
DJ2 372 MEMB 702
*******----------*********EL + 17.4
DJ1 36 MEMB 67 528 531
DJ2 39 MEMB 67 528 531
DJ1 35 MEMB 65 130 275 277 279 281 527 530
DJ2 38 MEMB 65 130 275 277 279 281 527 530
DJ1 38 MEMB 66 267 269 271 273 331
DJ2 41 MEMB 66 267 269 271 273 331
DJ1 160 MEMB 507
DJ2 256 MEMB 507
DJ1 256 MEMB 508
DJ2 264 MEMB 508
DJ1 264 MEMB 509
DJ2 265 MEMB 509
DJ1 265 MEMB 510
DJ2 266 MEMB 510
DJ1 266 MEMB 511
DJ2 161 MEMB 511
DJ1 161 MEMB 512
DJ2 268 MEMB 512
DJ1 268 MEMB 513
DJ2 269 MEMB 513
DJ1 269 MEMB 514
DJ2 270 MEMB 514
DJ1 270 MEMB 515
DJ2 271 MEMB 515
DJ1 271 MEMB 516
DJ2 267 MEMB 516
DJ1 258 MEMB 517

DJ2 273 MEMB 517
DJ1 273 MEMB 518
DJ2 274 MEMB 518
DJ1 274 MEMB 519
DJ2 275 MEMB 519
DJ1 275 MEMB 520
DJ2 276 MEMB 520
DJ1 276 MEMB 521
DJ2 272 MEMB 521
DJ1 272 MEMB 522
DJ2 278 MEMB 522
DJ1 278 MEMB 523
DJ2 279 MEMB 523
DJ1 279 MEMB 524
DJ2 280 MEMB 524
DJ1 280 MEMB 525
DJ2 281 MEMB 525
DJ1 281 MEMB 526
DJ2 277 MEMB 526
DJ1 34 MEMB 63 118 274 276 278 280
DJ2 37 MEMB 63 118 274 276 278 280
DJ1 37 MEMB 64 266 268 270 272
DJ2 40 MEMB 64 266 268 270 272
DJ1 36 MEMB 68
DJ2 35 MEMB 68
DJ1 35 MEMB 69 282 469 470
DJ2 34 MEMB 69 282 469 470
DJ1 283 MEMB 529
DJ2 282 MEMB 529
DJ1 153 MEMB 288 468 485
DJ2 152 MEMB 288 468 485
DJ1 285 MEMB 532
DJ2 284 MEMB 532
DJ1 155 MEMB 289 471 476 486
DJ2 154 MEMB 289 471 476 486
DJ1 157 MEMB 290 477 487
DJ2 156 MEMB 290 477 487
DJ1 159 MEMB 291 472 478 488
DJ2 158 MEMB 291 472 478 488
DJ1 39 MEMB 70
DJ2 38 MEMB 70
DJ1 38 MEMB 71 283 484
DJ2 37 MEMB 71 283 484
DJ1 145 MEMB 284 473 480 490
DJ2 144 MEMB 284 473 480 490
DJ1 147 MEMB 285 481 491
DJ2 146 MEMB 285 481 491
DJ1 149 MEMB 286 474 482 492
DJ2 148 MEMB 286 474 482 492
DJ1 151 MEMB 287 483 493
DJ2 150 MEMB 287 483 493
DJ1 41 MEMB 72 475 479 489

DJ2 40 MEMB 72 475 479 489
*******----------*********EL + 19
DJ1 375 MEMB 705
DJ2 374 MEMB 705
*******----------*********EL + 20.4
DJ1 44 MEMB 85 443 446
DJ2 47 MEMB 85 443 446
DJ1 43 MEMB 83 131 305 307 309 311 442 445
DJ2 46 MEMB 83 131 305 307 309 311 442 445
DJ1 46 MEMB 297 299 301 303 332 689
DJ2 49 MEMB 297 299 301 303 332 689
DJ1 178 MEMB 424
DJ2 226 MEMB 424
DJ1 226 MEMB 426
DJ2 234 MEMB 426
DJ1 234 MEMB 428
DJ2 235 MEMB 428
DJ1 235 MEMB 430
DJ2 236 MEMB 430
DJ1 236 MEMB 431
DJ2 179 MEMB 431
DJ1 179 MEMB 437
DJ2 238 MEMB 437
DJ1 238 MEMB 438
DJ2 239 MEMB 438
DJ1 239 MEMB 439
DJ2 240 MEMB 439
DJ1 240 MEMB 440
DJ2 241 MEMB 440
DJ1 241 MEMB 441
DJ2 237 MEMB 441
DJ1 228 MEMB 458
DJ2 247 MEMB 458
DJ1 247 MEMB 459
DJ2 248 MEMB 459
DJ1 248 MEMB 460
DJ2 249 MEMB 460
DJ1 249 MEMB 461
DJ2 250 MEMB 461
DJ1 250 MEMB 462
DJ2 246 MEMB 462
DJ1 246 MEMB 463
DJ2 252 MEMB 463
DJ1 252 MEMB 464
DJ2 253 MEMB 464
DJ1 253 MEMB 465
DJ2 254 MEMB 465
DJ1 254 MEMB 466
DJ2 255 MEMB 466
DJ1 255 MEMB 467
DJ2 251 MEMB 467
DJ1 42 MEMB 81 121 304 306 308 310

DJ2 45 MEMB 81 121 304 306 308 310
DJ1 45 MEMB 82 296 298 300 302
DJ2 48 MEMB 82 296 298 300 302
DJ1 44 MEMB 86
DJ2 43 MEMB 86
DJ1 43 MEMB 87 312 404 407
DJ2 42 MEMB 87 312 404 407
DJ1 243 MEMB 444
DJ2 242 MEMB 444
DJ1 171 MEMB 318 403 449
DJ2 170 MEMB 318 403 449
DJ1 245 MEMB 447
DJ2 244 MEMB 447
DJ1 173 MEMB 319 410 425 450
DJ2 172 MEMB 319 410 425 450
DJ1 175 MEMB 320 427 451
DJ2 174 MEMB 320 427 451
DJ1 177 MEMB 321 413 429 452
DJ2 176 MEMB 321 413 429 452
DJ1 47 MEMB 88
DJ2 46 MEMB 88
DJ1 46 MEMB 89 313 448
DJ2 45 MEMB 89 313 448
DJ1 163 MEMB 314 416 433 454
DJ2 162 MEMB 314 416 433 454
DJ1 165 MEMB 315 434 455
DJ2 164 MEMB 315 434 455
DJ1 167 MEMB 316 419 435 456
DJ2 166 MEMB 316 419 435 456
DJ1 169 MEMB 317 436 457
DJ2 168 MEMB 317 436 457
DJ1 49 MEMB 90 422 432 453
DJ2 48 MEMB 90 422 432 453
*******----------*********EL + 22.4
DJ1 377 MEMB 708
DJ2 376 MEMB 708
*******----------*********EL + 23.8
DJ1 52 MEMB 103 370 372
DJ2 55 MEMB 103 370 372
DJ1 51 MEMB 101 132 334 337 341 344
DJ2 54 MEMB 101 132 334 337 341 344
DJ1 54 MEMB 102 327 348 350 352 354
DJ2 57 MEMB 102 327 348 350 352 354
DJ1 207 MEMB 366 367
DJ2 209 MEMB 366 367
DJ1 204 MEMB 368 369
DJ2 206 MEMB 368 369
DJ1 380 MEMB 714
DJ2 381 MEMB 714
DJ1 215 MEMB 385
DJ2 216 MEMB 385
DJ1 216 MEMB 386

DJ2 214 MEMB 386
DJ1 219 MEMB 391 392
DJ2 220 MEMB 391 392
DJ1 382 MEMB 717
DJ2 383 MEMB 717
DJ1 50 MEMB 99 124 333 336 340 343
DJ2 53 MEMB 99 124 333 336 340 343
DJ1 53 MEMB 100 346 347 349 351 353 387
DJ2 56 MEMB 100 346 347 349 351 353 387
DJ1 52 MEMB 104
DJ2 51 MEMB 104
DJ1 51 MEMB 105 374
DJ2 50 MEMB 105 374
DJ1 210 MEMB 371
DJ2 188 MEMB 371
DJ1 188 MEMB 335
DJ2 187 MEMB 335
DJ1 211 MEMB 373
DJ2 190 MEMB 373
DJ1 190 MEMB 338
DJ2 189 MEMB 338
DJ1 69 MEMB 339
DJ2 63 MEMB 339
DJ1 192 MEMB 342
DJ2 191 MEMB 342
DJ1 194 MEMB 345
DJ2 193 MEMB 345
DJ1 55 MEMB 106
DJ2 54 MEMB 106
DJ1 54 MEMB 107 376
DJ2 53 MEMB 107 376
DJ1 197 MEMB 355 360 363
DJ2 196 MEMB 355 360 363
DJ1 199 MEMB 356
DJ2 208 MEMB 356
DJ1 205 MEMB 361 712 715
DJ2 198 MEMB 361 712 715
DJ1 182 MEMB 357 362 365 713 716
DJ2 195 MEMB 357 362 365 713 716
DJ1 201 MEMB 358 381 389
DJ2 200 MEMB 358 381 389
DJ1 203 MEMB 359 382 390
DJ2 202 MEMB 359 382 390
DJ1 57 MEMB 108 380 388
DJ2 56 MEMB 108 380 388
*******----------*********EL + 26
DJ1 225 MEMB 397
DJ2 224 MEMB 397
DJ1 223 MEMB 398
DJ2 222 MEMB 398
DJ1 225 MEMB 400
DJ2 223 MEMB 400

```
DJ1 224 MEMB 399
DJ2 222 MEMB 399
LOAD LIST ENV 1
CHECK CODE MEMB 9 TO 18 27 TO 36 45 TO 54 63 TO 72 81 TO 83 85 TO 90 -
99 TO 109 112 115 118 121 124 127 TO 132 145 TO 196 198 TO 219 221 -
224 227 TO 260 263 266 TO 291 296 TO 321 327 329 TO 363 365 TO 374 -
376 380 TO 382 385 TO 392 397 TO 400 403 404 407 410 413 416 419 422 -
424 TO 493 507 TO 564 578 TO 603 613 TO 625 627 630 TO 638 -
640 TO 656 661 664 667 TO 681 683 686 TO 689 693 696 699 702 705 708 -
709 TO 717
FINISH
```

ANNEXURE I
STAAD INPUT FILE FOR FOUNDATION DESIGN

STAAD SPACE
START JOB INFORMATION
ENGINEER DATE 07-Sep-22
JOB NAME SK5101
JOB CLIENT YARA
JOB NO SLUISKIL
JOB REV 00 for FOUNDATION Design
JOB PART Status FEED
ENGINEER NAME Murthy
CHECKER NAME KHushal
APPROVED NAME JS
END JOB INFORMATION
SET NL 1050
UNIT INCHES KIP
SET DISPLACEMENT 0.001
***---
*------------------------- JOINT COORDINATES -----------------------------
***---
UNIT METER KN
JOINT COORDINATES
1 0 0.300001 8.00002; 2 0 0.300001 3.00001; 3 0 0.300001 0;
4 6.00001 0.300001 8.00002; 5 6.00001 0.300001 3.00001;
6 6.00001 0.300001 0; 7 12 0.300001 8.00002; 8 12 0.300001 3.00001;
10 0 5.00001 8.00002; 11 0 5.00001 3.00001; 12 0 5.00001 0;
13 6.00001 5.00001 8.00002; 14 6.00001 5.00001 3.00001;
15 6.00001 5.00001 0; 16 12 5.00001 8.00002; 17 12 5.00001 3.00001;
18 0 8.20002 8.00002; 19 0 8.20002 3.00001; 20 0 8.20002 0;
21 6.00001 8.20002 8.00002; 22 6.00001 8.20002 3.00001;
23 6.00001 8.20002 0; 24 12 8.20002 8.00002; 25 12 8.20002 3.00001;
26 0 12.8 8.00002; 27 0 12.8 3.00001; 28 0 12.8 0;
29 6.00001 12.8 8.00002; 30 6.00001 12.8 3.00001; 31 6.00001 12.8 0;
32 12 12.8 8.00002; 33 12 12.8 3.00001; 34 0 17.4 8.00002;
35 0 17.4 3.00001; 36 0 17.4 0; 37 6.00001 17.4 8.00002;
38 6.00001 17.4 3.00001; 39 6.00001 17.4 0; 40 12 17.4 8.00002;
41 12 17.4 3.00001; 42 0 20.4 8.00002; 43 0 20.4 3.00001; 44 0 20.4 0;
45 6.00001 20.4 8.00002; 46 6.00001 20.4 3.00001; 47 6.00001 20.4 0;
48 12 20.4 8.00002; 49 12 20.4 3.00001; 50 0 23.8 8.00002;
51 0 23.8 3.00001; 52 0 23.8 0; 53 6.00001 23.8 8.00002;
54 6.00001 23.8 3.00001; 55 6.00001 23.8 0; 56 12 23.8 8.00002;
57 12 23.8 3.00001; 58 3.00001 5.00001 8.00002;
59 3.00001 8.20002 8.00002; 60 3.00001 12.8 8.00002;
61 3.00001 17.4 8.00002; 62 3.00001 20.4 8.00002;
63 3.00001 23.8 8.00002; 64 3.00001 5.00001 3.00001;
65 3.00001 8.20002 3.00001; 66 3.00001 12.8 3.00001;
67 3.00001 17.4 3.00001; 68 3.00001 20.4 3.00001;
69 3.00001 23.8 3.00001; 70 6.00001 5.00001 5.50001;
71 12 5.00001 6.30001; 72 7.00001 5.00001 8.00002;
73 7.00001 5.00001 3.00001; 74 7.00001 5.00001 6.30001;
75 8.00002 5.00001 8.00002; 76 8.00002 5.00001 3.00001;
77 8.00002 5.00001 6.30001; 78 10 5.00001 8.00002;
79 10 5.00001 3.00001; 80 10 5.00001 6.30001; 81 11 5.00001 8.00002;
82 11 5.00001 3.00001; 83 11 5.00001 6.30001; 84 2 5.00001 8.00002;

85 2 5.00001 3.00001; 86 5.00001 5.00001 8.00002;
87 5.00001 5.00001 3.00001; 88 0 5.00001 5.70002; 89 2 5.00001 5.70002;
90 1 5.00001 3.00001; 91 1 5.00001 5.70002; 92 2 5.00001 3.70001;
93 5.00001 5.00001 3.70001; 94 2 5.00001 6.30002;
95 5.00001 5.00001 6.30002; 96 3.00001 5.00001 6.30002;
97 4.00001 5.00001 6.30002; 98 4.00001 5.00001 8.00002;
99 6.00001 5.00001 6.30001; 100 5.00001 5.00001 5.50001;
101 7.00001 8.20002 8.00002; 102 7.00001 8.20002 3.00001;
103 8.15001 8.20002 8.00002; 104 8.15001 8.20002 3.00001;
105 9.00002 8.20002 8.00002; 106 9.00002 8.20002 3.00001;
107 10 8.20002 8.00002; 108 10 8.20002 3.00001; 109 11 8.20002 8.00002;
110 11 8.20002 3.00001; 111 6.00001 8.20002 5.70001;
112 7.00001 8.20002 5.70001; 113 8.15001 8.20002 5.70001;
114 1 8.20002 8.00002; 115 1 8.20002 3.00001; 116 2 8.20002 8.00002;
117 2 8.20002 3.00001; 118 0 8.20002 5.50001;
119 6.00001 8.20002 5.50001; 120 2.80001 8.20002 8.00002;
121 2.80001 8.20002 3.00001; 122 4.20001 8.20002 8.00002;
123 4.20001 8.20002 3.00001; 124 5.10001 8.20002 8.00002;
125 5.10001 8.20002 3.00001; 126 7.20001 12.8 8.00002;
127 7.20001 12.8 3.00001; 128 8.40001 12.8 8.00002;
129 8.40001 12.8 3.00001; 130 9.60002 12.8 8.00002;
131 9.60002 12.8 3.00001; 132 10.8 12.8 8.00002; 133 10.8 12.8 3.00001;
134 1.2 12.8 8.00002; 135 1.2 12.8 3.00001; 136 2.4 12.8 8.00002;
137 2.4 12.8 3.00001; 138 3.60001 12.8 8.00002;
139 3.60001 12.8 3.00001; 140 4.80001 12.8 8.00002;
141 4.80001 12.8 3.00001; 142 0 12.8 5.50001; 143 6.00001 12.8 5.50001;
144 7.00001 17.4 8.00002; 145 7.00001 17.4 3.00001;
146 8.00001 17.4 8.00002; 147 8.00001 17.4 3.00001; 148 10 17.4 8.00002;
149 10 17.4 3.00001; 150 11 17.4 8.00002; 151 11 17.4 3.00001;
152 1 17.4 8.00002; 153 1 17.4 3.00001; 154 2 17.4 8.00002;
155 2 17.4 3.00001; 156 4.20001 17.4 8.00002; 157 4.20001 17.4 3.00001;
158 5.00001 17.4 8.00002; 159 5.00001 17.4 3.00001; 160 0 17.4 5.50001;
161 6.00001 17.4 5.50001; 162 7.00001 20.4 8.00002;
163 7.00001 20.4 3.00001; 164 8.00001 20.4 8.00002;
165 8.00001 20.4 3.00001; 166 10 20.4 8.00002; 167 10 20.4 3.00001;
168 11 20.4 8.00002; 169 11 20.4 3.00001; 170 1 20.4 8.00002;
171 1 20.4 3.00001; 172 2 20.4 8.00002; 173 2 20.4 3.00001;
174 4.20001 20.4 8.00002; 175 4.20001 20.4 3.00001;
176 5.00001 20.4 8.00002; 177 5.00001 20.4 3.00001; 178 0 20.4 5.50001;
179 6.00001 20.4 5.50001; 182 9.00002 23.8 3.00001;
183 9.00002 5.00001 3.00001; 184 9.00002 12.8 3.00001;
185 9.00002 17.4 3.00001; 186 9.00002 20.4 3.00001; 187 1 23.8 8.00002;
188 1 23.8 3.00001; 189 2 23.8 8.00002; 190 2 23.8 3.00001;
191 4.00001 23.8 8.00002; 192 4.00001 23.8 3.00001;
193 5.00001 23.8 8.00002; 194 5.00001 23.8 3.00001;
195 9.00002 23.8 8.00002; 196 7.00001 23.8 8.00002;
197 7.00001 23.8 3.00001; 198 8.00002 23.8 8.00002;
199 8.00002 23.8 3.00001; 200 10 23.8 8.00002; 201 10 23.8 3.00001;
202 11 23.8 8.00002; 203 11 23.8 3.00001; 204 7.00001 23.8 4.87001;
205 8.00002 23.8 4.87001; 206 9.00002 23.8 4.87001;
207 7.00001 23.8 3.33001; 208 8.00002 23.8 3.33001;
209 9.00002 23.8 3.33001; 210 1 23.8 0; 211 2 23.8 0;

212 0 23.8 5.50001; 213 6.00001 23.8 5.50001; 214 12 23.8 5.50001;
215 10 23.8 5.50001; 216 11 23.8 5.50001; 217 10.5 23.8 8.00002;
218 12 23.8 5.80002; 219 10 23.8 5.80002; 220 11 23.8 5.80002;
221 10.5 23.8 5.80002; 222 12 26 8.00002; 223 10.5 26 8.00002;
224 12 26 5.80002; 225 10.5 26 5.80002; 226 1 20.4 5.50001;
227 0 20.4 4.25001; 228 0 20.4 6.75002; 229 2 20.4 6.80002;
230 5.00001 20.4 6.80002; 231 7.00001 20.4 6.80002; 232 10 20.4 6.80002;
233 12 20.4 6.80002; 234 2 20.4 5.50002; 235 4.20001 20.4 5.50001;
236 5.00001 20.4 5.50002; 237 12 20.4 5.50001; 238 7.00001 20.4 5.50001;
239 8.00001 20.4 5.50002; 240 10 20.4 5.50001; 241 11 20.4 5.50002;
242 0.750002 20.4 3.00001; 243 0.750002 20.4 0; 244 1.5 20.4 3.00001;
245 1.5 20.4 0; 246 6.00001 20.4 6.75001; 247 1 20.4 6.75002;
248 2 20.4 6.75002; 249 4.20001 20.4 6.75002; 250 5.00001 20.4 6.75002;
251 12 20.4 6.75001; 252 7.00001 20.4 6.75002; 253 8.00001 20.4 6.75002;
254 10 20.4 6.75002; 255 11 20.4 6.75002; 256 1 17.4 5.50001;
257 0 17.4 4.25001; 258 0 17.4 6.75002; 259 2 17.4 6.80002;
260 5.00001 17.4 6.80002; 261 7.00001 17.4 6.80002; 262 10 17.4 6.80002;
263 12 17.4 6.80002; 264 2 17.4 5.50002; 265 4.20001 17.4 5.50001;
266 5.00001 17.4 5.50002; 267 12 17.4 5.50001; 268 7.00001 17.4 5.50001;
269 8.00001 17.4 5.50002; 270 10 17.4 5.50001; 271 11 17.4 5.50002;
272 6.00001 17.4 6.75001; 273 1 17.4 6.75002; 274 2 17.4 6.75002;
275 4.20001 17.4 6.75002; 276 5.00001 17.4 6.75002; 277 12 17.4 6.75001;
278 7.00001 17.4 6.75002; 279 8.00001 17.4 6.75002; 280 10 17.4 6.75002;
281 11 17.4 6.75002; 282 0.750002 17.4 3.00001; 283 0.750002 17.4 0;
284 1.5 17.4 3.00001; 285 1.5 17.4 0; 286 0.750002 12.8 3.00001;
287 0.750002 12.8 0; 288 1.5 12.8 3.00001; 289 1.5 12.8 0;
290 1.2 12.8 5.50001; 291 0 12.8 4.25001; 292 0 12.8 6.75002;
293 2.4 12.8 6.80002; 294 4.80001 12.8 6.80002;
295 7.20001 12.8 6.80002; 296 9.60002 12.8 6.80002; 297 12 12.8 6.80002;
298 2.4 12.8 5.50002; 299 3.60001 12.8 5.50001;
300 4.80001 12.8 5.50002; 301 12 12.8 5.50001; 302 7.20001 12.8 5.50001;
303 8.40001 12.8 5.50002; 304 9.60002 12.8 5.50001;
305 10.8 12.8 5.50002; 306 6.00001 12.8 6.75001; 307 1.2 12.8 6.75002;
308 2.4 12.8 6.75002; 309 3.60001 12.8 6.75002;
310 4.80001 12.8 6.75002; 311 12 12.8 6.75001; 312 7.20001 12.8 6.75002;
313 8.40001 12.8 6.75002; 314 9.60002 12.8 6.75002;
315 10.8 12.8 6.75002; 316 0.750002 8.20002 3.00001;
317 0.750002 8.20002 0; 318 1.5 8.20002 3.00001; 319 1.5 8.20002 0;
320 0.750002 5.00001 3.00001; 321 0.750002 5.00001 0;
322 1.5 5.00001 3.00001; 323 1.5 5.00001 0; 324 2.8 5.00001 3.70001;
325 3.90001 5.00001 3.70001; 326 2.8 5.00001 3.00001;
327 3.90001 5.00001 3.00001; 328 12 5.00001 4.10001;
329 11 5.00001 5.20001; 330 2.40001 8.20002 3.00001;
331 2.40001 8.20002 8.00002; 332 1.2 8.20002 3.00001;
333 1.2 8.20002 8.00002; 334 2.00001 8.20002 5.70001;
335 4.20001 8.20002 5.70001; 336 2.00001 8.20002 4.30001;
337 4.20001 8.20002 4.30001; 338 3.50001 8.20002 8.00002;
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343 8.15001 8.20002 3.45001; 344 6.65001 8.20002 3.45001;
345 6.00001 8.20002 4.10001; 346 8.15001 8.20002 4.10001;
347 6.65001 8.20002 5.70001; 348 7.50001 8.20002 3.45001;

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355 9.00002 8.20002 5.70002; 356 10 8.20002 5.70002;
357 11 8.20002 5.70002; 358 12 8.20002 5.70002; 359 1 8.20002 5.70002;
360 0 8.20002 5.70001; 361 0 3.72001 8.00002; 362 -1 3.72001 8.00002;
363 0 2.72001 8.00002; 364 0 5.00001 7.50002; 365 2 5.00001 7.50002;
366 6.00001 3.00001 3.00001; 367 6.00001 3.00001 0;
368 6.00001 7.00001 3.00001; 369 6.00001 7.00001 0;
370 6.00001 10.6 3.00001; 371 6.00001 10.6 0; 372 6.00001 15.2 3.00001;
373 6.00001 15.2 0; 374 6.00001 19 3.00001; 375 6.00001 19 0;
376 6.00001 22.4 3.00001; 377 6.00001 22.4 0; 378 8.40001 12.8 3.80001;
379 9.60002 12.8 3.80001; 380 8.00002 23.8 5.32001;
381 9.00002 23.8 5.32001; 382 8.00002 23.8 6.67001;
383 9.00002 23.8 6.67001; 384 0 23.8 4.25001; 385 1 23.8 5.50002;
386 0 23.8 6.75001; 387 2 23.8 5.50002; 388 3.00001 23.8 5.50002;
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394 3.00001 23.8 6.75002; 395 4.00001 23.8 6.75002;
396 5.00001 23.8 6.75002; 397 7.00001 23.8 6.75001;
398 8.00002 23.8 6.75001; 399 12 23.8 6.75001; 400 10 23.8 6.75001;
401 11 23.8 6.75001; 402 9.00002 23.8 6.75001; 403 9.00001 20.4 8.00002;
404 9.00001 20.4 5.50002; 405 9.00001 20.4 6.75002;
406 3.80001 20.4 3.00001; 407 2.8 20.4 8.00002; 408 2.8 20.4 3.00001;
409 2.8 20.4 6.80002; 410 2.8 20.4 5.50002; 411 2.8 20.4 6.75002;
412 4.20001 20.4 5.70001; 413 2.8 20.4 5.70002;
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417 3.5 20.4 6.75002; 418 3.50001 20.4 8.00002; 419 3.5 20.4 3.00001;
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422 9.00001 17.4 5.50002; 423 9.00001 17.4 6.75002;
424 2.8 17.4 8.00002; 425 2.8 17.4 3.00001; 426 2.8 17.4 6.80002;
427 2.8 17.4 5.50002; 428 2.8 17.4 6.75002; 429 2.8 17.4 5.70002;
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434 3.50001 17.4 3.00001; 435 3.50001 17.4 6.75002;
436 3.50001 17.4 5.70001; 437 3.50001 17.4 4.30001;
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463 -13.6 -0.8 -0.4; 464 -13.6 -0.8 0; 465 -13.2 -0.8 -0.4;
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475 -11.2 -0.8 -0.4; 476 -11.2 -0.8 0; 477 -10.8 -0.8 -0.4;
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485 -9.2 -0.8 -0.4; 486 -9.2 -0.8 0; 487 -8.8 -0.8 -0.4;
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492 -8 -0.8 0; 493 -7.6 -0.8 -0.4; 494 -7.6 -0.8 0; 495 -7.2 -0.8 -0.4;
496 -7.2 -0.8 0; 497 -6.8 -0.8 -0.4; 498 -6.8 -0.8 0;
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506 -5.2 -0.8 0; 507 -4.8 -0.8 -0.4; 508 -4.8 -0.8 0;
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526 -1.2 -0.8 0; 527 -0.799999 -0.8 -0.4; 528 -0.799999 -0.8 0;
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544 -9.2 -0.8 0.300001; 545 -8.8 -0.8 0.300001; 546 -8.4 -0.8 0.300001;
547 -8 -0.8 0.300001; 548 -7.6 -0.8 0.300001; 549 -7.2 -0.8 0.300001;
550 -6.8 -0.8 0.300001; 551 -6.4 -0.8 0.300001; 552 -6 -0.8 0.300001;
553 -5.6 -0.8 0.300001; 554 -5.2 -0.8 0.300001; 555 -4.8 -0.8 0.300001;
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565 -0.799999 -0.8 0.300001; 566 -0.400001 -0.8 0.300001;
567 0 -0.8 0.300001; 568 -14 -0.8 0.600002; 569 -14.4 -0.8 0.600002;
570 -13.6 -0.8 0.600002; 571 -13.2 -0.8 0.600002;
572 -12.8 -0.8 0.600002; 573 -12.4 -0.8 0.600002; 574 -12 -0.8 0.600002;
575 -11.6 -0.8 0.600002; 576 -11.2 -0.8 0.600002;
577 -10.8 -0.8 0.600002; 578 -10.4 -0.8 0.600002; 579 -10 -0.8 0.600002;
580 -9.6 -0.8 0.600002; 581 -9.2 -0.8 0.600002; 582 -8.8 -0.8 0.600002;
583 -8.4 -0.8 0.600002; 584 -8 -0.8 0.600002; 585 -7.6 -0.8 0.600002;
586 -7.2 -0.8 0.600002; 587 -6.8 -0.8 0.600002; 588 -6.4 -0.8 0.600002;
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595 -3.6 -0.8 0.600002; 596 -3.2 -0.8 0.600002; 597 -2.8 -0.8 0.600002;
598 -2.4 -0.8 0.600002; 599 -2 -0.8 0.600002; 600 -1.6 -0.8 0.600002;
601 -1.2 -0.8 0.600002; 602 -0.799999 -0.8 0.600002;
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606 -14.4 -0.8 0.900003; 607 -13.6 -0.8 0.900003;
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100 TO 109 112 115 118 121 124 127 TO 132 145 TO 196 198 TO 219 221 -
224 227 TO 260 263 266 TO 291 296 TO 321 327 329 TO 363 365 TO 374 -
376 380 TO 382 385 TO 392 397 TO 400 403 404 407 410 413 416 419 422 -
424 TO 493 507 TO 564 578 TO 603 613 TO 625 627 630 TO 638 -
640 TO 656 661 664 667 TO 681 683 686 TO 689 693 696 699 702 705 708 -
709 TO 718 720 722 725 TO 728 734 TO 739 751 753 757 TO 763 -

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768 TO 773 775 TO 779 781 TO 785 787 TO 791 793 795 TO 797 -
801 TO 806 808 TO 828 831 832 836 TO 840 3180
_COLUMNS_STEEL 1 TO 8 19 TO 26 37 TO 44 55 TO 62 73 TO 80 91 TO 98 -
393 TO 396 682 684 691 692 694 695 697 698 700 701 703 704 706 707
_VERTICAL-BRACINGS_STEEL 110 111 113 114 116 117 119 120 122 123 125 -
126 133 TO 142 144 401 402 685 690
_HORIZONTAL-BRACINGS_STEEL 383 384 405 406 408 409 411 414 415 417 -
418 420 421 423 494 TO 506 565 TO 577 604 TO 612 626 628 629 -
657 TO 660 662 663 665 666
_V604 3151 TO 3154
_V601 3155 TO 3158
_V603A 3159 TO 3162
_SK4101 3167 TO 3170
_E607 3171
_F601 3172
_T601 3173
_V606 3174 TO 3177
_V603B 3163 TO 3166
_HYDRTEST_CD6001 3178
_PIPESUP_CD6010 3179
END GROUP DEFINITION
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*------------------------ MATERIAL SPECIFICATION ----------------------------
***-----------------------------------------------------------------------
***-----------------------------------------------------------------------
ELEMENT PROPERTY
842 TO 3142 THICKNESS 0.6
DEFINE MATERIAL START
ISOTROPIC STEEL
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E 2.1e+08
POISSON 0.3
DENSITY 78.5
ALPHA 1.2e-05
DAMP 0.03
TYPE STEEL
STRENGTH FY 355000 FU 470000 RY 1.5 RT 1.2
G 8.1e+07
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ISOTROPIC CONCRETE
***-----------------------------------------------------------------------
E 3.3e+07
POISSON 0.2
DENSITY 25
ALPHA 1e-05
DAMP 0.05
TYPE CONCRETE
STRENGTH FCU 30000
***-----------------------------------------------------------------------
****RIGID MATERIAL
***-----------------------------------------------------------------------
ISOTROPIC RIGID
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E 9.99e+08
POISSON 0.3
DENSITY 1e-09
ALPHA 1.2e-05
DAMP 0.03
TYPE STEEL
STRENGTH FY 355000 FU 470000 RY 1.5 RT 1.2
G 8.1e+07
END DEFINE MATERIAL
CONSTANTS
BETA 90 MEMB 2 3 5 TO 8 20 21 23 TO 26 38 39 41 TO 44 56 57 59 TO 62 -
74 75 77 TO 80 92 93 95 TO 98 393 TO 396 682 684 691 694 697 700 703 -
706 3145 TO 3150
MATERIAL STEEL MEMB 1 TO 83 85 TO 142 144 TO 196 198 TO 219 221 224 -
227 TO 260 263 266 TO 291 296 TO 321 327 329 TO 363 365 TO 374 376 -
380 TO 411 413 TO 638 640 TO 779 781 TO 785 787 TO 841 3180
MATERIAL CONCRETE MEMB 842 TO 3179
*MATERIAL STEEL MEMB INCIDENCES
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START USER TABLE
TABLE 1
UNIT METER KN
GENERAL
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-1.4 -1.4 -0.58 -1.4 0.58 -0.58 1.4
*UNIT METER KN
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***-----------------------------------------------------------------------
***-----------------------------------------------------------------------
*TABLE 2
***-----------------------------------------------------------------------
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END
***-----------------------------------------------------------------------
*------------------------ MEMBER PROPERTIES ------------------------------
***-----------------------------------------------------------------------
*MATERIAL STEEL MEMB 2 3 5
MEMBER PROPERTY EUROPEAN
1 4 9 TO 13 19 22 27 TO 30 33 35 36 38 39 41 TO 48 53 56 57 59 TO 66 -
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115 118 121 124 127 TO 132 148 149 153 154 158 159 163 164 168 169 -
171 172 177 189 195 196 198 TO 202 204 205 207 208 210 212 215 216 -
218 219 221 227 228 230 231 233 234 236 237 239 240 242 243 245 246 -
248 TO 255 263 266 TO 283 296 TO 313 327 329 TO 334 336 337 340 341 -
343 344 346 TO 354 357 362 365 374 376 380 387 388 402 404 407 422 -
432 442 445 448 453 469 470 475 479 484 489 527 530 533 535 555 598 -
601 613 614 616 617 621 622 630 TO 633 640 641 646 647 650 651 654 -
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655 676 679 689 692 695 697 700 703 706 713 716 718 722 734 757 762 -
768 775 TO 777 793 795 801 808 809 821 822 836 837 TABLE ST HE300A
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167 170 173 175 176 178 180 181 183 184 193 203 206 209 217 229 232 -
235 238 241 244 247 256 TO 259 335 338 339 342 345 355 356 -
358 TO 361 363 366 TO 370 372 381 382 389 390 443 446 528 531 534 -
536 539 542 TO 545 547 TO 549 551 TO 554 556 TO 559 561 TO 564 599 -
602 627 634 TO 638 642 TO 645 661 664 667 670 672 674 678 687 688 -
698 701 704 707 709 710 712 714 715 717 720 725 TO 728 735 TO 739 -
751 753 758 759 831 TO 835 839 840 TABLE ST HE220A
14 16 32 34 50 52 68 70 86 88 104 106 110 111 133 134 179 182 -
185 TO 187 192 211 213 214 224 284 TO 291 314 TO 321 371 373 391 392 -
403 410 413 416 419 425 427 429 433 TO 436 444 447 449 TO 452 454 -
455 TO 457 468 471 TO 474 476 TO 478 480 TO 483 485 TO 488 490 TO 493 -
529 532 537 538 600 603 615 618 TO 620 648 649 652 653 656 TO 660 -
683 693 696 699 702 705 708 771 TO 773 778 781 TO 785 787 TO 790 792 -
794 796 797 804 TO 806 810 812 TO 820 824 TO 828 -
3180 TABLE ST HE200A
147 150 155 160 165 383 TO 386 405 406 408 409 411 414 415 417 418 -
420 421 423 424 426 428 430 431 437 TO 441 458 TO 467 494 TO 526 565 -
566 TO 597 604 TO 612 626 628 629 662 663 665 666 668 669 671 673 675 -
677 680 681 719 721 723 724 729 TO 733 740 TO 750 752 754 TO 756 760 -
761 763 TO 767 769 770 774 779 791 798 TO 800 802 803 807 811 823 -
829 830 838 841 TABLE ST L75X75X6
401 685 TABLE ST L90X90X8
122 123 125 126 141 142 144 188 190 194 623 624 690 711 TABLE ST HE140A
113 114 116 117 119 120 135 TO 140 393 TO 400 TABLE ST HE160A
51 54 260 540 541 546 550 560 TABLE ST HE500A
15 17 18 145 146 174 191 625 686 TABLE ST HE700A
2 3 5 TO 8 20 21 23 TO 26 682 684 691 694 TABLE ST HE600A
MEMBER PROPERTY
3167 TO 3171 3178 3179 PRIS YD 0.6 ZD 0.6
3172 PRIS YD 0.9 ZD 0.9
3145 TO 3150 PRIS YD 0.8 ZD 0.7
3143 3144 PRIS YD 0.55 ZD 0.55
3151 TO 3166 3174 TO 3177 PRIS YD 0.4 ZD 0.4
3173 UPTABLE 1 OCTAGON2.8
***-----------------------------------------------------------------------
*----------------- SUPPORT CONDITION ---------------------------------------
***-----------------------------------------------------------------------
****BASE CONDITION TO BE SIMULATED AS PINNED CONNECTION
***-----------------------------------------------------------------------
*----------------- MEMEBER SPECIFICATION -----------------------------------
***-----------------------------------------------------------------------
MEMBER RELEASE
1 TO 12 14 16 27 TO 30 32 34 45 TO 48 50 52 63 TO 66 68 70 81 TO 83 -
85 86 88 99 TO 102 104 106 110 111 113 114 116 117 119 120 122 123 -
125 126 133 TO 142 144 147 150 151 155 156 160 161 165 166 170 173 -
176 179 182 185 188 190 192 194 200 203 206 209 211 213 217 229 232 -
235 238 241 244 247 256 TO 259 284 TO 291 314 TO 321 335 338 339 342 -
345 355 TO 359 361 366 368 371 373 383 TO 386 391 393 TO 398 401 402 -
405 406 408 409 411 414 415 417 418 420 421 423 424 426 428 430 431 -
```

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437 TO 441 444 447 458 TO 467 494 TO 526 529 532 537 538 565 TO 597 -
600 603 TO 612 615 618 623 624 626 628 629 636 644 645 648 -
657 TO 660 662 663 665 666 668 669 671 673 675 677 680 681 685 688 -
689 TO 690 693 696 699 702 705 708 711 714 717 719 721 723 724 729 -
730 TO 733 740 TO 750 752 754 TO 756 760 761 763 TO 767 771 774 778 -
779 781 789 791 792 797 TO 800 802 TO 804 807 810 TO 812 820 823 826 -
828 TO 833 838 839 841 START MY MZ
14 16 32 34 50 52 68 70 86 88 104 106 110 111 113 114 116 117 119 120 -
122 123 125 126 133 TO 142 144 147 150 152 155 157 160 162 TO 165 -
167 171 172 178 179 184 187 188 190 192 194 207 208 211 212 233 234 -
245 246 254 255 272 273 280 281 302 303 310 311 343 344 353 354 356 -
367 369 371 373 383 TO 386 392 397 398 401 402 405 406 408 TO 411 -
413 TO 421 423 424 426 428 430 431 437 438 440 441 444 446 447 449 -
451 455 457 TO 464 466 467 471 TO 474 485 487 491 493 TO 526 529 532 -
537 538 542 TO 545 556 558 562 564 TO 597 600 603 TO 612 615 618 620 -
623 624 626 628 629 634 TO 636 642 TO 645 653 656 TO 663 665 TO 675 -
677 680 681 685 687 688 690 693 696 699 702 705 708 711 714 717 719 -
721 723 724 729 TO 733 735 TO 756 758 TO 767 769 770 773 774 779 790 -
791 794 796 TO 800 802 803 806 807 811 813 823 TO 827 829 830 835 -
838 840 841 3180 END MY MZ
SUPPORTS
533 538 544 550 556 562 781 787 975 980 986 992 998 1004 1186 1192 -
1307 1312 1318 1324 1330 1336 1441 1447 1453 1534 1540 1620 1626 1632 -
1698 1704 1755 1761 1767 1804 1816 1888 1894 1960 1966 1972 2053 2059 -
2140 2146 2152 2228 2234 2240 2246 2357 2480 2486 2492 2498 2588 2669 -
2675 2681 2687 2771 2779 -
2785 FIXED BUT MX MY MZ KFX 3500 KFY 102000 KFZ 3500
DEFINE WIND LOAD
TYPE 1 WIND 1
<! STAAD PRO GENERATED DATA DO NOT MODIFY !!!
CUSTOM:PARAMS
!> END GENERATED DATA BLOCK
INT 0.71 0.79 0.85 0.91 0.95 1 1.03 1.07 1.14 1.2 1.25 1.3 1.38 HEIG 6 8 10 -
12 14 16 18 20 25 30 35 40 50
TYPE 2 BLAST LOAD
<! STAAD PRO GENERATED DATA DO NOT MODIFY !!!
CUSTOM:PARAMS
!> END GENERATED DATA BLOCK
INT 2.99 2.99 2.99 2.99 HEIG  0  5  25  30
TYPE 3 BLAST LOAD
<! STAAD PRO GENERATED DATA DO NOT MODIFY !!!
CUSTOM:PARAMS
!> END GENERATED DATA BLOCK
INT 6.07 6.07 6.07 6.07 6.07 6.07 HEIG  0  5  10  15  25  30
***-----------------------------------------------------------------------
*------------------------------ WIND LOAD DEFINITION ----------------------
***-----------------------------------------------------------------------
LOAD 101 MODELLED STRUCTURAL/ FOUNDATION SELF WEIGHT
***-----------------------------------------------------------------------
SELFWEIGHT Y -1.15
***-----------------------------------------------------------------------
LOAD 102 NODE/ CONNECTION WEIGHT/LIFTING LUG/ PAD-EYE WEIGHT
```

***---
LOAD 100 PRIMARY STRUCTURAL STEEL (SUM OF LC 101 TO 102)
***---
REPEAT LOAD
101 1.0 102 1.0
***---
LOAD 111 GRATING/ CHEQUERED PLATE /EQUIPMENT SUPPORTS / SECONDARY PLATFORMS/
MEMBER LOAD
*grating load 0.25kN/m2 at +5.0 level
17 145 151 152 156 157 161 162 166 167 179 184 188 190 191 615 623 -
624 627 839 840 UNI GY -0.25
14 15 18 146 170 173 180 181 193 618 625 UNI GY -0.125
*grating load 0.5kN/m2 at +8.20 level for 1m spacing
32 33 35 36 200 203 206 209 TO 212 217 221 224 229 232 235 600 603 -
634 635 637 638 644 TO 647 650 651 654 655 661 664 667 670 672 674 -
676 678 679 833 TO 835 UNI GY -0.25
*grating load 0.5kN/m2 at +12.80 level
53 238 241 244 247 256 TO 259 263 539 542 TO 545 547 TO 549 -
551 TO 559 561 TO 564 709 710 UNI GY -0.25
50 51 54 260 537 538 540 541 546 550 560 UNI GY -0.125
*grating load 0.5kN/m2 at +17.40 level
71 283 TO 291 468 471 TO 474 476 TO 478 480 TO 488 490 TO 493 -
804 TO 806 812 TO 819 826 TO 828 UNI GY -0.25
68 69 72 282 469 470 475 479 489 529 532 UNI GY -0.125
*grating load 0.5kN/m2 at +20.40 level
89 313 TO 321 403 410 413 416 419 425 427 429 433 TO 436 448 TO 457 -
771 TO 773 781 TO 785 787 788 797 3180 UNI GY -0.25
86 87 90 312 404 407 422 432 444 447 453 UNI GY -0.125
*grating load 0.5kN/m2 at +23.80 level
107 335 338 339 342 345 355 TO 363 365 371 376 381 382 389 390 712 -
713 715 716 720 725 TO 728 734 TO 739 751 753 758 759 -
762 UNI GY -0.25
****HANDRAIL WEIGHT***0.06KN/M
9 10 12 TO 15 18 27 28 30 TO 33 36 45 46 48 TO 51 54 63 64 66 TO 69 -
72 81 82 85 TO 87 90 99 100 102 TO 105 108 109 112 115 118 121 124 -
127 TO 132 146 148 149 153 154 158 159 163 164 168 169 171 172 174 -
189 195 196 198 199 201 202 204 205 207 208 215 218 219 227 228 230 -
231 233 234 236 237 239 240 242 243 245 246 248 250 TO 255 260 266 -
267 TO 274 276 TO 282 296 TO 304 306 TO 312 327 329 TO 333 336 337 -
340 341 343 344 346 TO 354 370 374 380 387 388 404 407 422 432 443 -
445 453 469 470 475 479 489 528 530 534 535 540 541 546 550 560 599 -
601 614 616 621 622 625 630 631 633 640 641 676 679 686 689 693 696 -
699 702 705 708 718 722 757 768 775 TO 777 793 795 801 808 809 821 -
822 836 837 UNI GY -0.06
*Staircase stringer /ladder /Handrail
*weight of stair = 2kN/m2 assumed
*width of stair = 1.0m length of stringer = 4m total area =4m2
*width of landing= 1.6m length of landing =3m Area =3*1.6= 4.8m2
*total area= 4+4.8 =8.8 m2
*Load due to stair = 8.8*2 = 17.6 kN
14 32 50 68 86 104 693 696 699 702 705 708 CON GY -17.6

104 105 108 374 380 388 718 722 757 UNI GY -0.125
****GRATING LOAD
****SECONDARY BEAMS WEIGHT
*Load due to empty weight of platforms on vessel V603 A/B
JOINT LOAD
*Load due to V603 A/B =15 kN
*Load on each support = 15/4 = 4 kn
2872 TO 2879 FY -4
*Load due to weight of 200mm thick paving =25*0.2 =5kN/m2
ELEMENT LOAD
842 TO 3142 PR GY -5
***--
LOAD 112 PIPE SUPPORTS/ MONORAILS, RUNWAY BEAMS, MATERIAL HANDLING ITEMS
***--
LOAD 113 RIGGING WEIGHT/SEA FASTENING/ LASHING/ SECURING WEIGHTS
***--
LOAD 110 SECONDARY & TERTIARY STRUCTURAL STEEL (UNMODELED PART)
*(Sum of LC 111 to 113)
***--
REPEAT LOAD
111 1.0 112 1.0 113 1.0
***--
LOAD 120 ADDITIONAL LOAD TO MATCH THE WCR STRUCTURAL WEIGHT
***--
***--
LOAD 131 PAINTING LOAD
**2% OF MODELLED STRUCTURAL STEEL WEIGHT CAN BE CONSIDERED AS AN EARLY ESTIMATE
***--
LOAD 132 FIRE PROOFING LOADS
***--
***--
LOAD 130 MISCELLANEOUS LOADS (SUM OF LC 131 AND LC 132)
***--
REPEAT LOAD
131 1.0 132 1.0
***--
LOAD 140 HOOK UP LOADS
***--
LOAD 10 TOTAL STRUCTURAL DEAD LOAD (SUM OF LC 100, 110, 120, 130,140)
***--
REPEAT LOAD
100 1.0 110 1.0 120 1.0 130 1.0 140 1.0
***--
LOAD 201 OPEN AREA LIVE LOADS/ OPERATING PLATFORMS (5 KN/M2)
***--
MEMBER LOAD
*Live load 3.0 kN/m2 at +5.0 level
17 145 151 152 156 157 161 162 166 167 179 184 188 190 191 615 623 -
624 627 839 840 UNI GY -3
14 15 18 146 170 173 180 181 193 616 618 625 UNI GY -1.5
*Live load 3.0 kN/m2 at +8.20 level

32 33 35 36 200 203 206 209 TO 212 217 221 224 229 232 235 600 603 -
634 635 637 638 644 TO 647 650 651 654 655 661 664 667 670 672 674 -
676 678 679 UNI GY -3
*Live load 3kN/m2 at +12.80 level
53 238 241 244 247 256 TO 259 263 539 542 TO 545 547 TO 549 -
551 TO 564 709 710 UNI GY -3
50 51 54 260 537 538 540 541 546 550 560 UNI GY -1.5
*Live load 3kN/m2 at +17.40 level
71 283 TO 291 468 471 TO 474 476 TO 478 480 TO 488 490 TO 493 -
804 TO 806 812 TO 819 826 TO 828 UNI GY -3
68 69 72 282 469 470 475 479 489 529 532 UNI GY -1.5
*UDL At +20.40 level 3kN/m2
89 313 TO 321 403 410 413 416 419 425 427 429 433 TO 436 448 TO 457 -
771 TO 773 781 TO 785 787 788 797 3180 UNI GY -3
86 87 90 312 404 407 422 432 444 447 453 UNI GY -1.5
*UDL At +23.80 level 3kN/m2
107 335 338 339 342 345 355 TO 363 365 371 376 381 382 389 390 712 -
713 715 716 720 725 TO 728 734 TO 739 751 753 758 759 762 UNI GY -3
104 105 108 373 374 380 388 718 722 757 UNI GY -1.5
****LIVE LOAD ON MAIN OPERATING FLOOR
*Live load on stair = 3kN/m2
*width of stair = 1.0m length of stringer = 4m total area =4m2
*width of landing= 1.6m length of landing =3m Area =3*1.6= 4.8m2
*total area= 4+4.8 =8.8 m2
*Load due to stair = 8.8*3 = 26.40 kN
14 32 50 68 86 104 693 696 699 702 705 708 CON GY -26.4
**Traffic load 20kN/m2
ELEMENT LOAD
842 TO 3142 PR GY -20
***--
LOAD 202 LIVE LOAD ON SERVICE PLATFORMS, PEDESTALS, WALKWAYS (3 KN/M2)
*Load due to Operating weight of platforms on vessel V603 A/B
JOINT LOAD
*Load due to V603 A/B =80 kN
*Load on each support = 80/4 = 20 kn
2872 TO 2879 FY -20
***--
LOAD 203 LIVE LOAD ON STAIRWAYS (5KN/M2)
***--
LOAD 204 LIVE LOADS ON STORAGE AREAS (LAYDOWN) (7.5 KN/M2)
***--
LOAD 20 TOTAL LIVE LOAD (SUM OF LC 201 TO 204) (LL)
***--
REPEAT LOAD
201 1.0 202 1.0 203 1.0 204 1.0
***--
LOAD 301 EMPTY WEIGHT OF PIPE (UDL)/PIPE AREA LOAD
MEMBER LOAD
*UDL load 1.0 kN/m2 at +5.0 level
17 145 151 152 156 157 161 162 166 167 179 184 188 190 191 623 624 -
627 839 840 UNI GY -1
15 18 146 170 173 180 181 193 616 625 UNI GY -0.5

```
*UDL load 1.0 kN/m2 at +8.20 level
33 35 36 200 203 206 209 TO 212 217 221 224 229 232 235 634 635 637 -
638 644 TO 647 650 651 654 655 661 664 667 670 672 674 676 678 -
679 UNI GY -1
*UDL At +12.80 level 1kN/m2
53 238 241 244 247 256 TO 259 263 539 542 TO 545 547 TO 549 -
551 TO 564 709 710 UNI GY -1
51 54 260 540 541 546 550 560 UNI GY -0.5
*UDL At +17.40 level 1kN/m2
71 283 TO 291 468 471 TO 474 476 TO 478 480 TO 488 490 TO 493 -
804 TO 806 812 TO 819 826 TO 828 UNI GY -1
69 72 282 469 470 475 479 489 UNI GY -0.5
*UDL At +20.40 level 1kN/m2
89 313 TO 321 403 410 413 416 419 425 427 429 433 TO 436 448 TO 457 -
771 TO 773 781 TO 785 787 788 792 794 797 3180 UNI GY -1
87 90 312 404 407 422 432 UNI GY -0.5
*UDL At +23.80 level 1kN/m2
107 335 338 339 342 345 355 TO 363 365 376 381 382 389 390 712 713 -
715 716 720 725 TO 728 734 TO 739 751 753 758 759 762 UNI GY -1
105 108 374 380 388 718 722 757 UNI GY -0.5
***------------------------------------------------------------------------
***------------------------------------------------------------------------
LOAD 302 EMPTY WEIGHT OF PIPE VALVES, SUPPORTS (POINT LOAD)
MEMBER LOAD
683 CON GY -80 0.1
54 CON GY -70 1.1
51 CON GY -80 1
317 CON GY -15 1
JOINT LOAD
182 FY -5
MEMBER LOAD
714 717 CON GY -7.5
***------------------------------------------------------------------------
LOAD 303 EMPTY WEIGHT OF PIPE VALVES, SUPPORTS ON HOOK UP STEEL
***------------------------------------------------------------------------
LOAD 300 PIPING DRY WEIGHTS (SUM OF LC 301 TO 303)
***------------------------------------------------------------------------
REPEAT LOAD
301 1.0 302 1.0 303 1.0
***------------------------------------------------------------------------
LOAD 311 EQUIPMENT DRY WEIGHT (> 10MT)
JOINT LOAD
*Load due to V603 A/B =185 kN
*Load on each support = 185/4 = 47 kn
2872 TO 2879 FY -47
*Empty load due to T601
2886 FY -220
*EMpty load due to V606
2887 TO 2890 FY -42
* empty weight of V604 equipmnet =615 kN
*Load on each support = 615/4 = 154 kn
2864 TO 2867 FY -155
```

*Empty weight of equipmnet V601 = 133 kN
*Load oneach support =133/4 =34kN
2868 TO 2871 FY -35
***---
***---
LOAD 312 EQUIPMENT DRY WEIGHT (<10 MT) /AREA LOAD
*Empty weight of equipmnet V06 =35/4 =8.75
MEMBER LOAD
174 688 CON GY -9
176 CON GY -9 0.8
183 CON GY -9 0.2
**Weight of E616
627 CON GY -3
**Weight of V602
657 TO 660 CON GY -15
*Empty weight of Eq E606 = 22kN
238 CON GY -22 1.75
*Empty weight of Eq E617 = 40kN
711 CON GY -40
*Empty weight of Eq E608 = 60/2 = 30 kN
367 369 CON GY -30 0.412
*Empty weight of Eq E610 = 35/2 = 17.5 kN
376 CON GY -17.5 1
360 CON GY -17.5 1.63
*Empty weight of S601 = 73/4 = 19KN
397 TO 400 CON GY -19
JOINT LOAD
2885 FY -20
*Load due SK4101
*Load at each point given 20kN
*Multiplied with 2 as no of supports reduced.
2880 TO 2883 FY -40
*Empty weight of E607
JOINT LOAD
2884 FY -5
***---
LOAD 310 MECHANICAL DRY WEIGHTS (SUM OF LC 311 TO 312)
***---
REPEAT LOAD
311 1.0 312 1.0
***---
LOAD 321 ELECTRICAL EQUIPMENT DRY WEIGHT
***---
LOAD 322 ELECTRICAL CABLES, CABLE DUCTS/ TRAYS
***---
LOAD 320 ELECTRICAL DRY WEIGHTS (SUM OF LC 321 TO 322)
***---
REPEAT LOAD
321 1.0 322 1.0
***---
LOAD 331 INSTRUMENTATION EQUIPMENT DRY WEIGHT
***---

LOAD 332 INSTRUMENTATION CABLES, CABLE DUCTS/ TRAYS
***---
LOAD 330 INSTRUMENTATION DRY WEIGHTS (SUM OF LC 331 TO 332)
***---
REPEAT LOAD
331 1.0 332 1.0
***---
LOAD 30 TOTAL EMPTY WEIGHT OF PIPING/ EQUIPMENT/ E&I
*(Sum of LC 300,310,320,330)(EQE)
***---
REPEAT LOAD
300 1.0 310 1.0 320 1.0 330 1.0
***---
LOAD 401 OPERATING WEIGHT OF PIPE (UDL)/ AREA LOAD
MEMBER LOAD
*UDL load 2.0 kN/m2 at +5.0 level
17 145 151 152 156 157 161 162 166 167 179 184 188 190 191 623 624 -
627 839 840 UNI GY -2
15 18 146 170 173 180 181 183 193 616 625 686 687 UNI GY -1
*UDL load 2.0 kN/m2 at +8.20 level
33 35 36 200 203 206 209 TO 212 217 221 224 229 232 235 634 635 637 -
638 644 TO 647 650 651 654 655 661 664 667 670 672 674 676 678 -
679 UNI GY -2
*UDL At +12.80 level 2kN/m2
53 238 241 244 247 256 TO 259 263 539 542 TO 545 547 TO 549 -
551 TO 564 709 710 UNI GY -2
51 54 260 540 541 546 550 560 UNI GY -1
*UDL At +17.40 level 2kN/m2
71 283 TO 291 468 471 TO 474 476 TO 478 480 TO 488 490 TO 493 -
804 TO 806 812 TO 819 826 TO 828 UNI GY -2
69 72 282 469 470 475 479 489 UNI GY -1
*UDL At +20.40 level 2kN/m2
89 313 TO 321 403 410 413 416 419 425 427 429 433 TO 436 448 TO 457 -
771 TO 773 781 TO 785 787 788 792 794 797 3180 UNI GY -2
87 90 312 404 407 422 432 UNI GY -1
*UDL At +23.80 level 2kN/m2
107 335 338 339 342 345 355 TO 363 365 376 381 382 389 390 712 713 -
715 716 720 725 TO 728 734 TO 739 751 753 758 759 762 UNI GY -2
105 108 374 380 388 718 722 757 UNI GY -1
***---
***---
LOAD 402 OPERATING WEIGHT OF PIPE SUPPORT (POINT LOAD)
MEMBER LOAD
683 CON GY -90 0.1
54 CON GY -80 1.1
51 CON GY -90 1
317 CON GY -20 1
JOINT LOAD
182 FY -6
MEMBER LOAD
714 717 CON GY -25
***---

LOAD 400 OPERATING PIPE WEIGHTS (SUM OF LC 401 TO 402)
***---
REPEAT LOAD
401 1.0 402 1.0
***---
LOAD 411 EQUIPMENT OPERATING WEIGHT (> 10MT)
JOINT LOAD
*Opearting load due to V603 A/B =323 kN
*Load on each support = 323/4 = 81 kn
2872 TO 2879 FY -81
*opearating load due to T601
2886 FY -617
*opearating load due to V606
2887 TO 2890 FY -42
* opearating weight of V604 equipmnet =734 kN
*Load on each support = 734/4 = 184 kn
2864 TO 2867 FY -184
*opearating weight of equipmnet V601 = 296 kN
*Load oneach support =296/4 = 74 kN
2868 TO 2871 FY -74
***---
*REPEAT LOAD
*311 1.15
***---
LOAD 412 EQUIPMENT OPERATING WEIGHT (<10 MT)
*Operating weight of equipmnet V06 =50/4 =12.5 kN
MEMBER LOAD
174 688 CON GY -12.5
176 CON GY -12.5 0.8
183 CON GY -12.5 0.2
*weight of E616 = 3kN
627 CON GY -3
*Operating Weight of V602 = 90/4 = 22.5 kN
657 TO 660 CON GY -22.5
*Empty weight of Eq E606 = 22kN
238 CON GY -25 1.75
*Empty weight of Eq E617 = 40kN
711 CON GY -45
*Operating weight of Eq E608 = 70/2 = 35 kN
367 369 CON GY -35 0.412
*Operating weight of Eq E610 = 40/2 = 40 kN
376 CON GY -20 1
360 CON GY -20 1.63
*Operating weight of S601 = 80/4 = 20KN
397 TO 400 CON GY -20
JOINT LOAD
2885 FY -20
*Load due SK4101
*Load at each point given 35kN
*Multiplied with 2 as no of supports reduced.
2880 TO 2883 FY -70
*Empty weight of E607

JOINT LOAD
2884 FY -10
***---
LOAD 410 MECHANICAL EQUIPMENT WEIGHTS (SUM OF LC 411 TO 412)
***---
REPEAT LOAD
411 1.0 412 1.0
***---
LOAD 421 ELECTRICAL EQUIPMENT WEIGHT/ BULK ITEMS/CABLES, CABLE DUCTS/ TRAYS
***---
LOAD 420 ELECTRICAL ITEM WEIGHTS IN OPERATING CONDITION(LC 421)
***---
REPEAT LOAD
421 1.0
***---
LOAD 431 INSTRUMENTATION EQUIPMENT WEIGHT/BULK ITEMS/CABLES,CABLE DUCTS/ TRAYS
***---
LOAD 430 INSTRUMENTATION ITEM WEIGHTS IN OPERATING CONDITION (LC 431)
***---
REPEAT LOAD
431 1.0
***---
LOAD 40 TOTAL OPERATING WEIGH OF PIPING/EQUIPMENT/E&I
*(Sum of LC 400,410,420,430)(EQLO)
***---
REPEAT LOAD
400 1.0 410 1.0 420 1.0 430 1.0
***---
LOAD 501 HYDROTEST WEIGHT OF PIPING (UDL)
***---
LOAD 502 HYDROTEST WEIGHT OF PIPE SUPPORTS (POINT LOAD)
MEMBER LOAD
54 CON GY -200
JOINT LOAD
182 FY -15
JOINT LOAD
2891 FY -280
2892 FY -200
***---
LOAD 500 PIPING HYDROTEST WEIGHTS (SUM OF LC 501 & LC 502)
***---
REPEAT LOAD
501 1.0 502 1.0
***---
LOAD 511 EQUIPMENT HYDROTEST WEIGHT (> 10MT)
JOINT LOAD
*Opearting load due to V603 A/B =350 kN
*Load on each support = 350/4 = 87.5 kn
2872 TO 2879 FY -87.5
*opearating load due to T601

2886 FY -617
*opearating load due to V606
2887 TO 2890 FY -42
* opearating weight of V604 equipmnet =1978 kN
*Load on each support =1978/4 = 495 kn
2864 TO 2867 FY -495
*opearating weight of equipmnet V601 = 1365 kN
*Load oneach support =1365/4 = 345 kN
2868 TO 2871 FY -345
***--
LOAD 512 EQUIPMENT HYDROTEST WEIGHT (<10 MT)
*Test weight of equipmnet V06= 80/4 20kN
MEMBER LOAD
174 688 CON GY -20
176 CON GY -20 0.8
183 CON GY -20 0.2
*test weight of V602 = 140/4 =35KN
657 TO 660 CON GY -35
JOINT LOAD
2885 FY -20
*Load due SK4101
*Load at each point given 35kN
*Multiplied with 2 as no of supports reduced.
2880 TO 2883 FY -70
*Empty weight of E607
JOINT LOAD
2884 FY -10
***--
LOAD 510 MECHANICAL HYDROTEST WEIGHTS (SUM OF LC 511 & LC 512)
***--
REPEAT LOAD
511 1.0 512 1.0
***--
LOAD 50 TOTAL HYDROTEST WEIGH OF PIPING/EQUIPMENT/E&I
*(Sum of LC 500,510,420,430)(EQLT)
***--
REPEAT LOAD
500 1.0 510 1.0 420 1.0 430 1.0
***--
LOAD 6110 WIND LOADS DUE TO STRUCTURE SELF OBSTRUCTION [W-E] -VE X DIRECTION
WIND LOAD X -1.8 TYPE 1 XR 11.9 12.1 YR 0 26 ZR 3 8 OPEN
WIND LOAD X -1.8 TYPE 1 XR 5.9 6.1 YR 0 26 ZR 0 3 OPEN
WIND LOAD X -0.75 TYPE 1 XR 5.9 6.1 YR 0 26 ZR 3 8 OPEN
WIND LOAD X -0.75 TYPE 1 XR 0 0.1 YR 0 26 ZR 0 8 OPEN
***--
***--
LOAD 6310 WIND LOADS DUE TO STRUCTURE SELF OBSTRUCTION [S-N] -VE Z DIRECTION
WIND LOAD Z -1.8 TYPE 1 XR 0 12 YR 0 26 ZR 7.9 8.1 OPEN
WIND LOAD Z -0.85 TYPE 1 XR 0 12 YR 0 26 ZR 2.9 3.1 OPEN
WIND LOAD Z -0.85 TYPE 1 XR 0 6 YR 0 26 ZR 0 0.1 OPEN

```
***-----------------------------------------------------------------------
***-----------------------------------------------------------------------
LOAD 611 WIND LOAD ON STR. DUE TO SELF OBSTRUCTION IN  +VE X-(E-W) DIRECTION
WIND LOAD X 1.8 TYPE 1 XR 0 0.1 YR 0.3 28 ZR 0 8 OPEN
WIND LOAD X 0.75 TYPE 1 XR 5.9 6.1 YR 0 26 ZR 0 8 OPEN
WIND LOAD X 0.75 TYPE 1 XR 11.9 12.1 YR 0 26 ZR 3 8 OPEN
***-----------------------------------------------------------------------
***-----------------------------------------------------------------------
LOAD 612 WIND LOAD ON PIPING IN +VE X-(E-W) DIRECTION
***-----------------------------------------------------------------------
****EL +5.0M
JOINT LOAD
13 14 FX 2
****EL +8.0M
21 22 FX 2
****EL +12.80M
29 30 FX 5.1
****EL +17.4M
37 38 FX 4.4
****EL +20.4 M
45 46 FX 4.5
****EL +23.80M
53 54 FX 3.2
*Wind load on vertical 40" dia pipe
*F=1.25*0.8*1 = 1 kN/m to be applied along the column
MEMBER LOAD
2 3 20 21 38 39 56 57 74 75 92 93 682 684 UNI GX 1
***-----------------------------------------------------------------------
LOAD 613 WIND LOAD ON EQUIPMENT +VE X-(E-W) DIRECTION
*Wind load on V605 equipmnet =3.3/2 =1.65kN
MEMBER LOAD
174 CON GX 1.65
183 CON GX 1.65 0.3
174 CON GY 1
183 CON GY -1 0.3
*Wind load on V602 equipmnet =5.0/4 =1.25kN
657 TO 660 CON GX 1.25
657 658 CON GY 0.92
659 660 CON GY -0.92
*Wind load on E606 equipmnet =3.3/2 =0.85kN
238 CON GX 3.3 1.8
238 CON GY 1.05 1.8
709 CON GY -1.05 1
*Wind load on E617 equipmnet =3.3/2 =0.85kN
711 CON GX 3.3
JOINT LOAD
378 FY 1.05
379 FY -1.05
*Wind load on S601 equipmnet =2.7/4 =0.7kN
MEMBER LOAD
397 TO 400 CON GX 0.7
*Wind load on E608 equipmnet =14.4/2 =7.2kN
```

```
JOINT LOAD
205 208 FX 7.2
*Wind load on E610 equipmnet =3.4/2 =1.7kN
MEMBER LOAD
376 CON GX 1.7 0.5
360 CON GX 1.7 1.2
376 CON GY 0.7 0.5
360 CON GY -0.7 1.2
*Wind load on equipmnet V603 A/B
JOINT LOAD
2872 TO 2879 FX 2.15
2872 2874 2876 2878 FY 6.58
2873 2875 2877 2879 FY -6.5
*Wind load on equipmnet T601
JOINT LOAD
2886 FX 26.8
2886 MZ -299
*Wind load on equipmnet V606
JOINT LOAD
2887 TO 2890 FX 3.2
2887 2889 FY 15.8
2888 2890 FY -15.8
*Wind load on equipmnet V601
JOINT LOAD
2868 TO 2871 FX 7.7
2868 2870 FY 28.24
2869 2871 FY -28.24
*Wind load on equipmnet V604
JOINT LOAD
2864 TO 2867 FX 8.45
2864 2866 FY 32.2
2865 2867 FY -32.2
*Wind load on structure SK2101
JOINT LOAD
2880 TO 2883 FX 5
***---------------------------------------------------------------------------
***---------------------------------------------------------------------------
LOAD 614 WIND LOAD ON CABLE TRAY +VE X-(E-W) DIRECTION
***---------------------------------------------------------------------------
LOAD 61 TOTAL WIND LOAD IN +VE  X-(E-W) DIRECTION (LC 611)
***---------------------------------------------------------------------------
REPEAT LOAD
611 1.0 612 1.0 613 1.0 614 1.0
***---------------------------------------------------------------------------
LOAD 621 WIND LOAD ON STRUCTURE DUE TO SELF OBSTRUCTION IN +VE Z-(N-S) DIR
WIND LOAD Z 1.8 TYPE 1 XR 0 6 YR 0 26 ZR 0 0.1 OPEN
WIND LOAD Z 1.8 TYPE 1 XR 6 12 YR 0 26 ZR 2.9 3.1 OPEN
WIND LOAD Z 0.85 TYPE 1 XR 0 6 YR 0 26 ZR 2.9 3.1 OPEN
WIND LOAD Z 0.85 TYPE 1 XR 0 12 YR 0 26 ZR 7.9 8.1 OPEN
***---------------------------------------------------------------------------
***---------------------------------------------------------------------------
LOAD 622 WIND LOAD ON PIPING IN +VE Z-(N-S) DIRECTION
```

```
***-------------------------------------------------------------------------
****EL +5.0M
JOINT LOAD
14 FZ 3.4
11 17 FZ 1.7
****EL +8.20M
22 FZ 3.7776
19 25 FZ 1.8888
****EL +12.80M
30 FZ 4.4
27 33 FZ 2.2
****EL +17.40 M
38 FZ 4.9584
35 41 FZ 2.4792
****EL +20.4 M
46 FZ 5.3
43 49 FZ 2.6
****EL +23.8 M
54 FZ 5.52
51 57 FZ 2.76
MEMBER LOAD
2 8 20 26 38 44 56 62 74 80 92 98 UNI GZ 1
***-------------------------------------------------------------------------
LOAD 623 WIND LOAD ON EQUIPMENT  +VE Z-(N-S) DIRECTION
***-------------------------------------------------------------------------
*Wind load on V605 equipmnet =3.3/2 =1.65kN
MEMBER LOAD
688 CON GZ 1.65
176 CON GZ 1.65 0.9
688 CON GY -1
176 CON GY 1 0.9
*Wind load on V602 equipmnet =5.0/4 =1.25kN
657 TO 660 CON GZ 1.25
657 659 CON GY 0.92
658 660 CON GY -0.92
*Wind load on E606 equipmnet =4.8
238 CON GZ 4.8 1.8
238 CON GY -1.5 1.8
238 CON GY 1.5 1
*Wind load on E617 equipmnet =3.3/2 =0.85kN
711 CON GZ 3.3
711 CON GY 1.05
JOINT LOAD
184 FY 1.05
*Wind load on S601 equipmnet =2.7/4 =0.7kN
MEMBER LOAD
397 TO 400 CON GZ 0.7
*Wind load on E608 equipmnet =14.4/2 =7.2kN
JOINT LOAD
205 208 FZ 7.2
*Wind load on E610 equipmnet =3.4/2 =1.7kN
MEMBER LOAD
```

```
376 CON GZ 1.7 0.5
360 CON GZ 1.7 1.2
*Wind load on equipmnet V603 A/B
JOINT LOAD
2872 TO 2879 FZ 2.15
2872 2873 2876 2877 FY 6.58
2874 2875 2878 2879 FY -6.5
*Wind load on equipmnet T601
JOINT LOAD
2886 FZ 26.8
2886 MX 299
*Wind load on equipmnet V606
JOINT LOAD
2887 TO 2890 FZ 3.2
2887 2888 FY 15.8
2889 2890 FY -15.8
*Wind load on equipmnet V601
JOINT LOAD
2868 TO 2871 FZ 7.7
2868 2869 FY 28.24
2870 2871 FY -28.24
*Wind load on equipmnet V604
JOINT LOAD
2864 TO 2867 FZ 8.45
2864 2865 FY 32.2
2866 2867 FY -32.2
*Wind load on structure SK2101
JOINT LOAD
2880 TO 2883 FZ 5
***-----------------------------------------------------------------------
LOAD 624 WIND LOAD ON CABLE TRAY  +VE Z-(N-S) DIRECTION
***-----------------------------------------------------------------------
LOAD 62 TOTAL WIND LOAD IN +VE Z-(N-S) DIRECTION (LC 621)
***-----------------------------------------------------------------------
REPEAT LOAD
621 1.0 622 1.0 623 1.0 624 1.0
***-----------------------------------------------------------------------
LOAD 631 WIND LOAD ON STRUCTURE DUE TO SELF OBSTRUCTION IN -VE X-(W-E) DIR
WIND LOAD X -1.8 TYPE 1 XR 11.9 12.1 YR 0 26 ZR 3 8 OPEN
WIND LOAD X -1.8 TYPE 1 XR 5.9 6.1 YR 0 26 ZR 0 3 OPEN
WIND LOAD X -0.75 TYPE 1 XR 5.9 6.1 YR 0 26 ZR 3 8 OPEN
WIND LOAD X -0.75 TYPE 1 XR 0 0.1 YR 0 26 ZR 0 8 OPEN
***-----------------------------------------------------------------------
***-----------------------------------------------------------------------
LOAD 632 WIND LOAD ON PIPING IN -VE  X-(W-E) DIRECTION
***-----------------------------------------------------------------------
****EL +5.0M
JOINT LOAD
13 14 FX -2
****EL +8.0M
21 22 FX -2
****EL +12.80M
```

29 30 FX -5.1
****EL +17.4M
37 38 FX -4.4
****EL +20.4 M
45 46 FX -4.5
****EL +23.80M
53 54 FX -3.2
*Wind load on vertical 40" dia pipe
*F=1.25*0.8*1 = 1.0 kN/m to be applied along the column
MEMBER LOAD
2 3 20 21 38 39 56 57 74 75 92 93 682 684 UNI GX -1
***---
LOAD 633 WIND LOAD ON EQUIPMENT -VE X-(W-E) DIRECTION
***---
*Wind load on V605 equipmnet =2.9/2 =1.45kN
MEMBER LOAD
174 CON GX -1.45
183 CON GX -1.45 0.3
174 CON GY -1
183 CON GY 1 0.3
*Wind load on V602 equipmnet =4.3/4 =1.1kN
657 TO 660 CON GX -1.1
657 658 CON GY -0.8
659 660 CON GY 0.8
*Wind load on E606 equipmnet =3.3/2 =0.85kN
238 CON GX -3.3 1.8
238 CON GY -1.05 1.8
709 CON GY 1.05 1
*Wind load on E617 equipmnet =3.3/2 =0.85kN
711 CON GX -3.3
JOINT LOAD
378 FY -1.05
379 FY 1.05
*Wind load on S601 equipmnet =2.4/4 =0.6kN
MEMBER LOAD
397 TO 400 CON GX -0.6
*Wind load on E608 equipmnet =14.4/2 =7.2kN
JOINT LOAD
205 208 FX -7.2
*Wind load on E610 equipmnet =3.4/2 =1.7kN
MEMBER LOAD
376 CON GX -1.7 0.5
360 CON GX -1.7 1.2
376 CON GY -0.7 0.5
360 CON GY 0.7 1.2
*Wind load on equipmnet V603 A/B
JOINT LOAD
2872 TO 2879 FX -2.15
2872 2874 2876 2878 FY -6.58
2873 2875 2877 2879 FY 6.5
*Wind load on equipmnet T601
JOINT LOAD

```
2886 FX -26.8
2886 MZ 299
*Wind load on equipmnet V606
JOINT LOAD
2887 TO 2890 FX -3.2
2887 2889 FY -15.8
2888 2890 FY 15.8
*Wind load on equipmnet V601
JOINT LOAD
2868 TO 2871 FX -7.7
2868 2870 FY -28.24
2869 2871 FY 28.24
*Wind load on equipmnet V604
JOINT LOAD
2864 TO 2867 FX -8.45
2864 2866 FY -32.2
2865 2867 FY 32.2
*Wind load on structure SK2101
JOINT LOAD
2880 TO 2883 FX -5
***---------------------------------------------------------------------
LOAD 634 WIND LOAD ON CABLE TRAY -VE  X-(W-E) DIRECTION
***---------------------------------------------------------------------
LOAD 63 TOTAL WIND LOAD IN -VE  X-(W-E) DIRECTION (LC 631)
***---------------------------------------------------------------------
REPEAT LOAD
631 1.0 632 1.0 633 1.0 634 1.0
***---------------------------------------------------------------------
LOAD 641 WIND LOAD ON STRUCTURE DUE TO SELF OBSTRUCTION IN -VE Z-(S-N) DIR
WIND LOAD Z -1.8 TYPE 1 XR 0 12 YR 0 26 ZR 7.9 8.1 OPEN
WIND LOAD Z -0.85 TYPE 1 XR 0 12 YR 0 26 ZR 2.9 3.1 OPEN
WIND LOAD Z -0.85 TYPE 1 XR 0 6 YR 0 26 ZR 0 0.1 OPEN
***---------------------------------------------------------------------
***---------------------------------------------------------------------
LOAD 642 WIND LOAD ON PIPING IN -VE Z-(S-N) DIRECTION
***---------------------------------------------------------------------
****EL +5.0M
JOINT LOAD
14 FZ -3.4
11 17 FZ -1.7
****EL +8.20M
22 FZ -3.7776
19 25 FZ -1.8888
****EL +12.80M
30 FZ -4.4
27 33 FZ -2.2
****EL +17.40 M
38 FZ -4.9584
35 41 FZ -2.4792
****EL +20.4 M
46 FZ -5.3
43 49 FZ -2.6
```

```
****EL +23.8 M
54 FZ -5.52
51 57 FZ -2.76
MEMBER LOAD
3 7 21 25 39 43 57 61 75 79 93 97 396 682 684 UNI GZ -1
***-----------------------------------------------------------------------
LOAD 643 WIND LOAD ON EQUIPMENT -VE Z-(S-N) DIRECTION
***-----------------------------------------------------------------------
*Wind load on V605 equipmnet =3.3/2 =1.65kN
MEMBER LOAD
688 CON GZ -1.65
176 CON GZ -1.65 0.9
688 CON GY 1
176 CON GY -1 0.9
*Wind load on V602 equipmnet =5.0/4 =1.25kN
657 TO 660 CON GZ -1.25
657 659 CON GY -0.92
658 660 CON GY 0.92
*Wind load on E606 equipmnet =4.8
238 CON GZ -4.8 1.8
238 CON GY 1.5 1.8
238 CON GY -1.5 1
*Wind load on E617 equipmnet =3.3/2 =0.85kN
711 CON GZ -3.3
711 CON GY -1.05
JOINT LOAD
184 FY 1.05
*Wind load on S601 equipmnet =2.7/4 =0.7kN
MEMBER LOAD
397 TO 400 CON GZ -0.7
*Wind load on E608 equipmnet =14.4/2 =7.2kN
JOINT LOAD
205 208 FZ -7.2
*Wind load on E610 equipmnet =3.4/2 =1.7kN
MEMBER LOAD
376 CON GZ -1.7 0.5
360 CON GZ -1.7 1.2
*Wind load on equipmnet V603 A/B
JOINT LOAD
2872 TO 2879 FZ -2.15
2872 2873 2876 2877 FY -6.58
2874 2875 2878 2879 FY 6.5
*Wind load on equipmnet T601
JOINT LOAD
2886 FZ -26.8
2886 MX -299
*Wind load on equipmnet V606
JOINT LOAD
2887 TO 2890 FZ -3.2
2887 2888 FY -15.8
2889 2890 FY 15.8
*Wind load on equipmnet V601
```

JOINT LOAD
2868 TO 2871 FZ -7.7
2868 2869 FY -28.24
2870 2871 FY 28.24
*Wind load on equipmnet V604
JOINT LOAD
2864 TO 2867 FZ -8.45
2864 2865 FY -32.2
2866 2867 FY 32.2
*Wind load on structure SK2101
JOINT LOAD
2880 TO 2883 FZ -5
***---
LOAD 644 WIND LOAD ON CABLE TRAY -VE Z-(S-N) DIRECTION
***---
LOAD 64 TOTAL WIND LOAD IN -VE Z-(S-N) DIRECTION (LC 641)
***---
REPEAT LOAD
641 1.0 642 1.0 643 1.0 644 1.0
***---
LOAD 81 PIPING THERMAL LOAD IN E-W DIRECTION (FDN/GLOBAL DESIGN) (TLE)
MEMBER LOAD
*UDL load 2.0 kN/m2 at +5.0 level
17 145 151 152 156 157 161 162 166 167 179 183 184 188 190 191 623 -
624 627 686 687 839 840 UNI GX 0.24
15 18 146 170 173 180 181 193 616 625 UNI GX 0.12
*UDL load 2.0 kN/m2 at +8.20 level
33 35 36 200 203 206 209 TO 212 217 221 224 229 232 235 634 635 637 -
638 644 TO 647 650 651 654 655 661 664 667 670 672 674 676 678 -
679 UNI GX 0.2
*UDL At +12.80 level 2kN/m2
53 238 241 244 247 256 TO 259 263 539 542 TO 545 547 TO 549 -
551 TO 564 709 710 UNI GX 0.24
51 54 260 540 541 546 550 560 UNI GX 0.12
*UDL At +17.40 level 2kN/m2
71 283 TO 291 468 471 TO 474 476 TO 478 480 TO 488 490 TO 493 -
804 TO 806 812 TO 819 826 TO 828 UNI GX 0.24
69 72 282 469 470 475 479 489 UNI GX 0.12
*UDL At +20.40 level 2kN/m2
89 313 TO 321 403 410 413 416 419 425 427 429 433 TO 436 448 TO 457 -
771 TO 773 781 TO 785 787 788 797 3180 UNI GX 0.24
87 90 312 404 407 422 432 UNI GX 0.12
*UDL At +23.80 level 0.2 kN/m2
107 335 338 339 342 345 355 TO 363 365 376 381 382 389 390 712 713 -
715 716 720 725 TO 728 734 TO 739 751 753 758 759 762 UNI GX 0.2
105 108 374 380 388 718 722 757 UNI GX 0.1
*thermal load on equipmnet V603 A/B
JOINT LOAD
2872 TO 2879 FX 3
***---
***---
LOAD 82 PIPING THERMAL LOAD IN N-S DIRECTION (FDN/GLOBAL DESIGN) (TLN)

```
MEMBER LOAD
*UDL load 2.0 kN/m2 at +5.0 level
17 145 151 152 156 157 161 162 166 167 179 184 188 190 191 615 623 -
624 627 839 840 UNI GZ 0.24
14 15 18 146 170 173 175 180 181 183 193 616 618 625 686 687 UNI GZ 0.12
*UDL load 2.0 kN/m2 at +8.20 level
33 35 36 200 203 206 209 TO 212 217 221 224 229 232 235 634 635 637 -
638 644 TO 647 650 651 654 655 661 664 667 670 672 674 676 678 -
679 UNI GZ 0.2
*UDL At +12.80 level 2kN/m2
53 238 241 244 247 256 TO 259 263 539 542 TO 545 547 TO 549 -
551 TO 564 709 710 UNI GZ 0.24
51 54 260 540 541 546 550 560 UNI GZ 0.12
*UDL At +17.40 level 2kN/m2
71 283 TO 291 468 471 TO 474 476 TO 478 480 TO 488 490 TO 493 -
804 TO 806 812 TO 819 826 TO 828 UNI GZ 0.24
69 72 282 469 470 475 479 489 UNI GZ 0.12
*UDL At +20.40 level 2kN/m2
89 313 TO 321 403 410 413 416 419 425 427 429 433 TO 436 448 TO 457 -
771 TO 773 781 TO 785 787 788 797 3180 UNI GZ 0.24
87 90 312 404 407 422 432 UNI GZ 0.12
*UDL At +23.80 level 0.2 kN/m2
107 335 338 339 342 345 355 TO 363 365 376 381 382 389 390 712 713 -
715 716 720 725 TO 728 734 TO 739 751 753 758 759 762 UNI GZ 0.2
105 108 374 380 388 718 722 757 UNI GZ 0.1
*thermal load on equipmnet V603 A/B
JOINT LOAD
2872 TO 2879 FZ 3
***-------------------------------------------------------------------------
***-------------------------------------------------------------------------
LOAD 83 PIPE/EQUIPMENT FRICTION LOAD IN E-W DIRECTION  (FLE)
***-------------------------------------------------------------------------
LOAD 84 PIPE/EQUIPMENT FRICTION LOAD IN N-S DIRECTION  (FLN)
***-------------------------------------------------------------------------
LOAD 85 STEEL THERMAL LOAD ON STRUCTURE IN WARM CONDITION (ENT+)
TEMPERATURE LOAD
1 TO 83 85 TO 142 144 TO 196 198 TO 219 221 224 227 TO 260 263 266 -
267 TO 291 296 TO 321 327 329 TO 363 365 TO 374 376 380 TO 411 413 -
414 TO 638 640 TO 717 TEMP 30
***-------------------------------------------------------------------------
***-------------------------------------------------------------------------
LOAD 86 STEEL THERMAL LOAD ON STRUCTURE IN COLD CONDITION (ENT-)
TEMPERATURE LOAD
1 TO 83 85 TO 142 144 TO 196 198 TO 219 221 224 227 TO 260 263 266 -
267 TO 291 296 TO 321 327 329 TO 363 365 TO 374 376 380 TO 411 413 -
414 TO 638 640 TO 717 TEMP -30
***-------------------------------------------------------------------------
***-------------------------------------------------------------------------
LOAD 87 LOCAL WIND LOAD ON PIPE/EQUIPMENT IN X -(E-W) DIRECTION (LOCAL
DESIGN
***-------------------------------------------------------------------------
```

LOAD 88 LOCAL WIND LOAD ON PIPE/EQUIPMENT IN Z -(N-S) DIRECTION (LOCAL DESIGN)
***---
LOAD 89 LOCAL PIPE HORIZONTAL LOAD IN E-W DIRECTION (LOCAL DESIGN) (TLELOCAL)
***---
LOAD 90 LOCAL PIPE HORIZONTAL LOAD IN N-S DIRECTION (LOCAL DESIGN) (TLNLOCAL)
***---
LOAD 911 VERTICAL LOAD DUE TO CRANE, MONORAIL AND BUNDLE PULL LOADS
***---
LOAD 912 HORIZONTAL LOAD DUE TO CRANE, MONORAIL AND BUNDLE PULL LOADS
***---
LOAD 91 MAINTENANCE LOAD (SUM OF LC 911 & LC 912) (ML)
***---
REPEAT LOAD
911 1.0 912 1.0
***---
LOAD 92 HORIZONTAL LOADS OF PSV (LOCAL DESIGN) (PSV)
***---
LOAD 93 MINIMUM VERTICAL LOAD FOR BEAM DESIGN (VMIN)
***---
LOAD 94 SNOW LOAD (SL)
MEMBER LOAD
104 105 107 108 335 338 339 342 345 355 TO 363 365 371 373 374 376 -
380 TO 382 388 TO 390 712 713 715 716 718 720 722 725 TO 728 -
734 TO 739 751 753 757 TO 759 762 UNI GY -1
14 15 17 18 32 33 35 36 50 51 53 54 68 69 71 72 86 87 89 90 145 146 -
151 152 156 157 161 162 166 167 170 173 TO 175 179 TO 181 183 184 -
188 190 191 193 200 203 206 209 TO 212 217 221 224 229 232 235 238 -
241 244 247 256 TO 260 263 282 TO 291 312 TO 321 403 404 407 410 413 -
416 419 422 425 427 429 432 TO 436 444 447 TO 457 468 TO 493 529 532 -
537 TO 564 600 603 615 618 623 TO 625 627 634 635 637 638 644 TO 647 -
650 651 654 655 661 664 667 670 672 674 676 678 679 686 687 709 710 -
771 TO 773 781 TO 785 787 788 797 804 TO 806 812 TO 819 826 TO 828 -
839 840 3180 UNI GY -0.6
***---
***---
LOAD 1001 NOTIONAL LOAD FOR DEAD LOAD IN X -(E-W) DIRECTION (NLDE)
NOTIONAL LOAD
10 X 0.005
*---
LOAD 1002 NOTIONAL LOAD FOR DEAD LOAD IN Z -(N-S) DIRECTION (NLDN)
NOTIONAL LOAD
10 Z 0.005
*---
LOAD 1003 NOTIONAL LOAD FOR EMPTY LOAD OF PIPING & EQUIPMENT IN X-(E-W) (NLEE)
NOTIONAL LOAD
30 X 0.005
*---

LOAD 1004 NOTIONAL LOAD FOR EMPTY LOAD OF PIPING & EQUIPMENT IN Z-(N-S)(NLEN)
NOTIONAL LOAD
30 Z 0.005
*---
LOAD 1005 NOTIONAL LOAD FOR OPERATING LOAD OF PIPING & EQUIPMNT IN X(E-W)(NLOE)
NOTIONAL LOAD
40 X 0.005
*---
LOAD 1006 NOTIONAL LOAD FOR OPERATING LOAD OF PIPING & EQUIPMNT IN Z(N-S)(NLON)
NOTIONAL LOAD
40 Z 0.005
*---
LOAD 1007 NOTIONAL LOAD FOR LIVE LOAD IN X -(E-W) DIRECTION (NLLE)
NOTIONAL LOAD
20 X 0.005
*---
LOAD 1008 NOTIONAL LOAD FOR LIVE LOAD IN Z -(N-S) DIRECTION (NLLN)
NOTIONAL LOAD
20 Z 0.005
***
*****LOAD COMBINATIONS FOR STAAD
*****LOAD COMBINATION FOR SUPERSTRUCTURE_SLS
LOAD 30001
REPEAT LOAD
10 1.0 30 1.0 85 1.0
*****
LOAD 30002
REPEAT LOAD
10 1.0 30 1.0 86 1.0
*****
LOAD 30003
REPEAT LOAD
10 1.0 30 1.0 631 0.5 61 1.0
*****
LOAD 30004
REPEAT LOAD
10 1.0 30 1.0 611 0.5 62 1.0
*****
LOAD 30005
REPEAT LOAD
10 1.0 30 1.0 6310 0.5 63 1.0
*****
LOAD 30006
REPEAT LOAD
10 1.0 30 1.0 6110 0.5 64 1.0
*****
LOAD 30007
REPEAT LOAD
10 1.0 30 1.0 6310 0.5 61 1.0

*****
LOAD 30008
REPEAT LOAD
10 1.0 30 1.0 6110 0.5 62 1.0
*****
LOAD 30009
REPEAT LOAD
10 1.0 30 1.0 631 0.5 63 1.0
*****
LOAD 30010
REPEAT LOAD
10 1.0 30 1.0 611 0.5 64 1.0
*****
LOAD 30011
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0
*****
LOAD 30012
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0
*****
LOAD 30013
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0
*****
LOAD 30014
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0
*****
LOAD 30015
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0
*****
LOAD 30016
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0
*****
LOAD 30017
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0
*****
LOAD 30018
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0
*****
LOAD 30019
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 85 1.0
*****
LOAD 30020
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 85 1.0

*****
LOAD 30021
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 85 1.0
*****
LOAD 30022
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 85 1.0
*****
LOAD 30023
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 85 1.0
*****
LOAD 30024
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 85 1.0
*****
LOAD 30025
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 85 1.0
*****
LOAD 30026
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 85 1.0
*****
LOAD 30027
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 86 1.0
*****
LOAD 30028
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 86 1.0
*****
LOAD 30029
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 86 1.0
*****
LOAD 30030
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 86 1.0
*****
LOAD 30031
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 86 1.0
*****
LOAD 30032
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 86 1.0
*****
LOAD 30033
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 86 1.0

*****
LOAD 30034
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 86 1.0
*****
LOAD 30035
REPEAT LOAD
10 1.0 40 1.0 20 1.0 631 0.5 61 1.0 81 1.0 82 1.0
*****
LOAD 30036
REPEAT LOAD
10 1.0 40 1.0 20 1.0 611 0.5 62 1.0 81 1.0 82 1.0
*****
LOAD 30037
REPEAT LOAD
10 1.0 40 1.0 20 1.0 6310 0.5 63 1.0 81 -1.0 82 -1.0
*****
LOAD 30038
REPEAT LOAD
10 1.0 40 1.0 20 1.0 6110 0.5 64 1.0 81 -1.0 82 -1.0
*****
LOAD 30039
REPEAT LOAD
10 1.0 40 1.0 20 1.0 6310 0.5 61 1.0 81 1.0 82 -1.0
*****
LOAD 30040
REPEAT LOAD
10 1.0 40 1.0 20 1.0 6110 0.5 62 1.0 81 -1.0 82 1.0
*****
LOAD 30041
REPEAT LOAD
10 1.0 40 1.0 20 1.0 631 0.5 63 1.0 81 -1.0 82 1.0
*****
LOAD 30042
REPEAT LOAD
10 1.0 40 1.0 20 1.0 611 0.5 64 1.0 81 1.0 82 -1.0
*****
LOAD 30043
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 94 1.0
*****
LOAD 30044
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 94 1.0
*****
LOAD 30045
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 94 1.0
*****
LOAD 30046
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 94 1.0

*****
LOAD 30047
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 94 1.0
*****
LOAD 30048
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 94 1.0
*****
LOAD 30049
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 94 1.0
*****
LOAD 30050
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 94 1.0
*****
LOAD 30051
REPEAT LOAD
10 1.0 40 1.0 631 0.5 61 1.0 81 1.0 82 1.0
*****
LOAD 30052
REPEAT LOAD
10 1.0 40 1.0 611 0.5 62 1.0 81 1.0 82 1.0
*****
LOAD 30053
REPEAT LOAD
10 1.0 40 1.0 6310 0.5 63 1.0 81 -1.0 82 -1.0
*****
LOAD 30054
REPEAT LOAD
10 1.0 40 1.0 6110 0.5 64 1.0 81 -1.0 82 -1.0
*****
LOAD 30055
REPEAT LOAD
10 1.0 40 1.0 6310 0.5 61 1.0 81 1.0 82 -1.0
*****
LOAD 30056
REPEAT LOAD
10 1.0 40 1.0 6110 0.5 62 1.0 81 -1.0 82 1.0
*****
LOAD 30057
REPEAT LOAD
10 1.0 40 1.0 631 0.5 63 1.0 81 -1.0 82 1.0
*****
LOAD 30058
REPEAT LOAD
10 1.0 40 1.0 611 0.5 64 1.0 81 1.0 82 -1.0
*****
LOAD 30059
REPEAT LOAD
10 1.0 50 1.0 20 0.5 631 0.25 61 0.5

*****
LOAD 30060
REPEAT LOAD
10 1.0 50 1.0 20 0.5 611 0.25 62 0.5
*****
LOAD 30061
REPEAT LOAD
10 1.0 50 1.0 20 0.5 6310 0.25 63 0.5
*****
LOAD 30062
REPEAT LOAD
10 1.0 50 1.0 20 0.5 6110 0.25 64 0.5
*****
LOAD 30063
REPEAT LOAD
10 1.0 50 1.0 20 0.5 6310 0.25 61 0.5
*****
LOAD 30064
REPEAT LOAD
10 1.0 50 1.0 20 0.5 6110 0.25 62 0.5
*****
LOAD 30065
REPEAT LOAD
10 1.0 50 1.0 20 0.5 631 0.25 63 0.5
*****
LOAD 30066
REPEAT LOAD
10 1.0 50 1.0 20 0.5 611 0.25 64 0.5
*****
LOAD 30067
REPEAT LOAD
10 1.0 50 1.0 20 0.5 85 1.0
*****
LOAD 30068
REPEAT LOAD
10 1.0 50 1.0 20 0.5 86 1.0
*****
LOAD 30069
REPEAT LOAD
10 1.0 30 1.0 20 1.0 631 0.5 61 1.0 91 1.0
*****
LOAD 30070
REPEAT LOAD
10 1.0 30 1.0 20 1.0 611 0.5 62 1.0 91 1.0
*****
LOAD 30071
REPEAT LOAD
10 1.0 30 1.0 20 1.0 6310 0.5 63 1.0 91 1.0
*****
LOAD 30072
REPEAT LOAD
10 1.0 30 1.0 20 1.0 6110 0.5 64 1.0 91 1.0

*****
LOAD 30073
REPEAT LOAD
10 1.0 30 1.0 20 1.0 6310 0.5 61 1.0 91 1.0
*****
LOAD 30074
REPEAT LOAD
10 1.0 30 1.0 20 1.0 6110 0.5 62 1.0 91 1.0
*****
LOAD 30075
REPEAT LOAD
10 1.0 30 1.0 20 1.0 631 0.5 63 1.0 91 1.0
*****
LOAD 30076
REPEAT LOAD
10 1.0 30 1.0 20 1.0 611 0.5 64 1.0 91 1.0
*****
LOAD 30077
REPEAT LOAD
10 1.0 30 1.0 20 1.0 85 1.0 91 1.0
*****
LOAD 30078
REPEAT LOAD
10 1.0 30 1.0 20 1.0 86 1.0 91 1.0
*****
LOAD 30079
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 83 1.0 84 1.0 89 1.0 90 1.0 93 1.0
*****
LOAD 30080
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 83 1.0 84 1.0 89 1.0 90 1.0 93 1.0
*****
LOAD 30081
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 83 -1.0 84 -1.0 89 -1.0 90 -1.0 -
93 1.0
*****
LOAD 30082
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 83 -1.0 84 -1.0 89 -1.0 90 -1.0 -
93 1.0
*****
LOAD 30083
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 83 1.0 84 -1.0 89 1.0 90 -1.0 -
93 1.0
*****
LOAD 30084
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 83 -1.0 84 1.0 89 -1.0 90 1.0 -
93 1.0

*****
LOAD 30085
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 83 -1.0 84 1.0 89 -1.0 90 1.0 -
93 1.0
*****
LOAD 30086
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 83 1.0 84 -1.0 89 1.0 90 -1.0 -
93 1.0
*****
LOAD 30087
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 83 1.0 84 1.0 85 1.0 89 1.0 90 1.0 -
93 1.0
*****
LOAD 30088
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 83 1.0 84 1.0 85 1.0 89 1.0 90 1.0 -
93 1.0
*****
LOAD 30089
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 83 -1.0 84 -1.0 85 1.0 89 -1.0 -
90 -1.0 93 1.0
*****
LOAD 30090
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 83 -1.0 84 -1.0 85 1.0 89 -1.0 -
90 -1.0 93 1.0
*****
LOAD 30091
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 83 1.0 84 -1.0 85 1.0 89 1.0 -
90 -1.0 93 1.0
*****
LOAD 30092
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 83 -1.0 84 1.0 85 1.0 89 -1.0 -
90 1.0 93 1.0
*****
LOAD 30093
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 83 -1.0 84 1.0 85 1.0 89 -1.0 -
90 1.0 93 1.0
*****
LOAD 30094
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 83 1.0 84 -1.0 85 1.0 89 1.0 -
90 -1.0 93 1.0
*****
LOAD 30095

REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 83 1.0 84 1.0 86 1.0 89 1.0 90 1.0 -
93 1.0
*****
LOAD 30096
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 83 1.0 84 1.0 86 1.0 89 1.0 90 1.0 -
93 1.0
*****
LOAD 30097
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 83 -1.0 84 -1.0 86 1.0 89 -1.0 -
90 -1.0 93 1.0
*****
LOAD 30098
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 83 -1.0 84 -1.0 86 1.0 89 -1.0 -
90 -1.0 93 1.0
*****
LOAD 30099
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 83 1.0 84 -1.0 86 1.0 89 1.0 -
90 -1.0 93 1.0
*****
LOAD 30100
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 83 -1.0 84 1.0 86 1.0 89 -1.0 -
90 1.0 93 1.0
*****
LOAD 30101
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 83 -1.0 84 1.0 86 1.0 89 -1.0 -
90 1.0 93 1.0
*****
LOAD 30102
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 83 1.0 84 -1.0 86 1.0 89 1.0 -
90 -1.0 93 1.0
*****
LOAD 30103
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 83 1.0 84 1.0 89 1.0 90 1.0 93 1.0 -
94 1.0
*****
LOAD 30104
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 83 1.0 84 1.0 89 1.0 90 1.0 93 1.0 -
94 1.0
*****
LOAD 30105
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 83 -1.0 84 -1.0 89 -1.0 90 -1.0 -

93 1.0 94 1.0
*****
LOAD 30106
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 83 -1.0 84 -1.0 89 -1.0 90 -1.0 -
93 1.0 94 1.0
*****
LOAD 30107
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 83 1.0 84 -1.0 89 1.0 90 -1.0 -
93 1.0 94 1.0
*****
LOAD 30108
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 83 -1.0 84 1.0 89 -1.0 90 1.0 -
93 1.0 94 1.0
*****
LOAD 30109
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 83 -1.0 84 1.0 89 -1.0 90 1.0 -
93 1.0 94 1.0
*****
LOAD 30110
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 83 1.0 84 -1.0 89 1.0 90 -1.0 -
93 1.0 94 1.0
*****
LOAD 30111
REPEAT LOAD
10 1.0 40 1.0 20 1.0 631 0.5 61 1.0 81 1.0 82 1.0 87 1.0 89 1.0 -
90 1.0 93 1.0
*****
LOAD 30112
REPEAT LOAD
10 1.0 40 1.0 20 1.0 611 0.5 62 1.0 81 1.0 82 1.0 88 1.0 89 1.0 -
90 1.0 93 1.0
*****
LOAD 30113
REPEAT LOAD
10 1.0 40 1.0 20 1.0 6310 0.5 63 1.0 81 -1.0 82 -1.0 87 -1.0 89 -1.0 -
90 -1.0 93 1.0
*****
LOAD 30114
REPEAT LOAD
10 1.0 40 1.0 20 1.0 6110 0.5 64 1.0 81 -1.0 82 -1.0 88 -1.0 89 -1.0 -
90 -1.0 93 1.0
*****
LOAD 30115
REPEAT LOAD
10 1.0 40 1.0 20 1.0 6310 0.5 61 1.0 81 1.0 82 -1.0 87 1.0 89 1.0 -
90 -1.0 93 1.0
*****

LOAD 30116
REPEAT LOAD
10 1.0 40 1.0 20 1.0 6110 0.5 62 1.0 81 -1.0 82 1.0 88 1.0 89 -1.0 -
90 1.0 93 1.0
*****
LOAD 30117
REPEAT LOAD
10 1.0 40 1.0 20 1.0 631 0.5 63 1.0 81 -1.0 82 1.0 87 -1.0 89 -1.0 -
90 1.0 93 1.0
*****
LOAD 30118
REPEAT LOAD
10 1.0 40 1.0 20 1.0 611 0.5 64 1.0 81 1.0 82 -1.0 88 -1.0 89 1.0 -
90 -1.0 93 1.0
*****
LOAD 30119
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 89 1.0 90 1.0 93 1.0 94 1.0
*****
LOAD 30120
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 89 1.0 90 1.0 93 1.0 94 1.0
*****
LOAD 30121
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 89 -1.0 90 -1.0 93 1.0 94 1.0
*****
LOAD 30122
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 89 -1.0 90 -1.0 93 1.0 94 1.0
*****
LOAD 30123
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 89 1.0 90 -1.0 93 1.0 94 1.0
*****
LOAD 30124
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 89 -1.0 90 1.0 93 1.0 94 1.0
*****
LOAD 30125
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 89 -1.0 90 1.0 93 1.0 94 1.0
*****
LOAD 30126
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 89 1.0 90 -1.0 93 1.0 94 1.0
*****
LOAD 30127
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 85 1.0 89 1.0 90 1.0 93 1.0
*****
LOAD 30128

REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 85 1.0 89 1.0 90 1.0 93 1.0
*****
LOAD 30129
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 85 1.0 89 -1.0 90 -1.0 93 1.0
*****
LOAD 30130
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 85 1.0 89 -1.0 90 -1.0 93 1.0
*****
LOAD 30131
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 85 1.0 89 1.0 90 -1.0 93 1.0
*****
LOAD 30132
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 85 1.0 89 -1.0 90 1.0 93 1.0
*****
LOAD 30133
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 85 1.0 89 -1.0 90 1.0 93 1.0
*****
LOAD 30134
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 85 1.0 89 1.0 90 -1.0 93 1.0
*****
LOAD 30135
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 86 1.0 89 1.0 90 1.0 93 1.0
*****
LOAD 30136
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 86 1.0 89 1.0 90 1.0 93 1.0
*****
LOAD 30137
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 86 1.0 89 -1.0 90 -1.0 93 1.0
*****
LOAD 30138
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 86 1.0 89 -1.0 90 -1.0 93 1.0
*****
LOAD 30139
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 86 1.0 89 1.0 90 -1.0 93 1.0
*****
LOAD 30140
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 86 1.0 89 -1.0 90 1.0 93 1.0
*****
LOAD 30141

REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 86 1.0 89 -1.0 90 1.0 93 1.0
*****
LOAD 30142
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 86 1.0 89 1.0 90 -1.0 93 1.0
*****
LOAD 30143
REPEAT LOAD
10 1.0 50 1.0 20 0.5 631 0.25 61 0.5 87 0.5 93 1.0
*****
LOAD 30144
REPEAT LOAD
10 1.0 50 1.0 20 0.5 611 0.25 62 0.5 88 0.5 93 1.0
*****
LOAD 30145
REPEAT LOAD
10 1.0 50 1.0 20 0.5 6310 0.25 63 0.5 87 -0.5 93 1.0
*****
LOAD 30146
REPEAT LOAD
10 1.0 50 1.0 20 0.5 6110 0.25 64 0.5 88 -0.5 93 1.0
*****
LOAD 30147
REPEAT LOAD
10 1.0 50 1.0 20 0.5 6310 0.25 61 0.5 87 0.5 93 1.0
*****
LOAD 30148
REPEAT LOAD
10 1.0 50 1.0 20 0.5 6110 0.25 62 0.5 88 0.5 93 1.0
*****
LOAD 30149
REPEAT LOAD
10 1.0 50 1.0 20 0.5 631 0.25 63 0.5 87 -0.5 93 1.0
*****
LOAD 30150
REPEAT LOAD
10 1.0 50 1.0 20 0.5 611 0.25 64 0.5 88 -0.5 93 1.0
*****
LOAD 30151
REPEAT LOAD
10 1.0 50 1.0 20 0.5 85 1.0 93 1.0
*****
LOAD 30152
REPEAT LOAD
10 1.0 50 1.0 20 0.5 86 1.0 93 1.0
*****
LOAD 30153
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 85 1.5 89 1.0 90 1.0 92 1.0 93 1.0
*****
LOAD 30154

REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 1.0 85 1.5 89 1.0 90 1.0 92 1.0 93 1.0
*****
LOAD 30155
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 85 1.5 89 -1.0 90 -1.0 92 1.0 -
93 1.0
*****
LOAD 30156
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 -1.0 85 1.5 89 -1.0 90 -1.0 92 1.0 -
93 1.0
*****
LOAD 30157
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 86 1.5 89 1.0 90 -1.0 92 1.0 -
93 1.0
*****
LOAD 30158
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 86 1.5 89 -1.0 90 1.0 92 1.0 -
93 1.0
*****
LOAD 30159
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 -1.0 82 1.0 86 1.5 89 -1.0 90 1.0 92 1.0 -
93 1.0
*****
LOAD 30160
REPEAT LOAD
10 1.0 40 1.0 20 1.0 81 1.0 82 -1.0 86 1.5 89 1.0 90 -1.0 92 1.0 -
93 1.0
*****
*****LOAD COMBINATIONS FOR STAAD
*****LOAD COMBINATION FOR SUPERSTRUCTURE_ULS
LOAD 40001
REPEAT LOAD
10 1.0 1001 1.0 30 1.0 1003 1.0 85 1.5
*****
LOAD 40002
REPEAT LOAD
10 1.0 1002 1.0 30 1.0 1004 1.0 85 1.5
*****
LOAD 40003
REPEAT LOAD
10 1.0 1001 -1.0 30 1.0 1003 -1.0 85 1.5
*****
LOAD 40004
REPEAT LOAD
10 1.0 1002 -1.0 30 1.0 1004 -1.0 85 1.5
*****
LOAD 40005

REPEAT LOAD
10 1.0 1001 1.0 30 1.0 1003 1.0 86 1.5
*****
LOAD 40006
REPEAT LOAD
10 0.8 1002 0.8 30 0.8 1004 0.8 86 1.5
*****
LOAD 40007
REPEAT LOAD
10 1.0 1001 -1.0 30 1.0 1003 -1.0 86 1.5
*****
LOAD 40008
REPEAT LOAD
10 1.0 1002 -1.0 30 1.0 1004 -1.0 86 1.5
*****
LOAD 40009
REPEAT LOAD
10 1.0 1001 1.0 30 1.0 1003 1.0 631 0.75 61 1.5
*****
LOAD 40010
REPEAT LOAD
10 1.0 1002 1.0 30 1.0 1004 1.0 611 0.75 62 1.5
*****
LOAD 40011
REPEAT LOAD
10 1.0 1001 -1.0 30 1.0 1003 -1.0 6310 0.75 63 1.5
*****
LOAD 40012
REPEAT LOAD
10 1.0 1002 -1.0 30 1.0 1004 -1.0 6110 0.75 64 1.5
*****
LOAD 40013
REPEAT LOAD
10 1.0 1001 1.0 30 1.0 1003 1.0 6310 0.75 61 1.5
*****
LOAD 40014
REPEAT LOAD
10 1.0 1002 1.0 30 1.0 1004 1.0 6110 0.75 62 1.5
*****
LOAD 40015
REPEAT LOAD
10 1.0 1001 -1.0 30 1.0 1003 -1.0 631 0.75 63 1.5
*****
LOAD 40016
REPEAT LOAD
10 1.0 1002 -1.0 30 1.0 1004 -1.0 611 0.75 64 1.5
*****
LOAD 40017
REPEAT LOAD
10 1.35 1001 1.35 40 1.35 1005 1.35 20 1.5 1007 1.5 81 1.35 82 1.35
*****
LOAD 40018

REPEAT LOAD
10 1.35 1002 1.35 40 1.35 1006 1.35 20 1.5 1008 1.5 81 1.35 82 1.35
*****
LOAD 40019
REPEAT LOAD
10 1.35 1001 -1.35 40 1.35 1005 -1.35 20 1.5 1007 -1.5 81 -1.35 -
82 -1.35
*****
LOAD 40020
REPEAT LOAD
10 1.35 1002 -1.35 40 1.35 1006 -1.35 20 1.5 1008 -1.5 81 -1.35 -
82 -1.35
*****
LOAD 40021
REPEAT LOAD
10 1.35 1001 1.35 40 1.35 1005 1.35 20 1.5 1007 1.5 81 1.35 82 -1.35
*****
LOAD 40022
REPEAT LOAD
10 1.35 1002 1.35 40 1.35 1006 1.35 20 1.5 1008 1.5 81 -1.35 82 1.35
*****
LOAD 40023
REPEAT LOAD
10 1.35 1001 -1.35 40 1.35 1005 -1.35 20 1.5 1007 -1.5 81 -1.35 -
82 1.35
*****
LOAD 40024
REPEAT LOAD
10 1.35 1002 -1.35 40 1.35 1006 -1.35 20 1.5 1008 -1.5 81 1.35 -
82 -1.35
*****
LOAD 40025
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 1.2 85 1.5
*****
LOAD 40026
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 1.2 82 1.2 85 1.5
*****
LOAD 40027
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 -1.2 -
85 1.5
*****
LOAD 40028
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 -1.2 82 -1.2 -
85 1.5
*****
LOAD 40029
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 -1.2 85 1.5

*****
LOAD 40030
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 -1.2 82 1.2 85 1.5
*****
LOAD 40031
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 1.2 -
85 1.5
*****
LOAD 40032
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 1.2 82 -1.2 -
85 1.5
*****
LOAD 40033
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 1.2 86 1.5
*****
LOAD 40034
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 1.2 82 1.2 86 1.5
*****
LOAD 40035
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 -1.2 -
86 1.5
*****
LOAD 40036
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 -1.2 82 -1.2 -
86 1.5
*****
LOAD 40037
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 -1.2 86 1.5
*****
LOAD 40038
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 -1.2 82 1.2 86 1.5
*****
LOAD 40039
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 1.2 -
86 1.5
*****
LOAD 40040
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 1.2 82 -1.2 -
86 1.5
*****
LOAD 40041

REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 631 0.75 61 1.5 -
81 1.2 82 1.2
*****
LOAD 40042
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 611 0.75 62 1.5 -
81 1.2 82 1.2
*****
LOAD 40043
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 6310 0.75 63 1.5 -
81 -1.2 82 -1.2
*****
LOAD 40044
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 6110 0.75 64 1.5 -
81 -1.2 82 -1.2
*****
LOAD 40045
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 6310 0.75 61 1.5 -
81 1.2 82 -1.2
*****
LOAD 40046
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 6110 0.75 62 1.5 -
81 -1.2 82 1.2
*****
LOAD 40047
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 631 0.75 63 1.5 -
81 -1.2 82 1.2
*****
LOAD 40048
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 611 0.75 64 1.5 -
81 1.2 82 -1.2
*****
LOAD 40049
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 1.2 94 1.5
*****
LOAD 40050
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 1.2 82 1.2 94 1.5
*****
LOAD 40051
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 -1.2 -
94 1.5
*****

LOAD 40052
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 -1.2 82 -1.2 -
94 1.5
*****
LOAD 40053
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 -1.2 94 1.5
*****
LOAD 40054
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 -1.2 82 1.2 94 1.5
*****
LOAD 40055
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 1.2 -
94 1.5
*****
LOAD 40056
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 1.2 82 -1.2 -
94 1.5
*****
LOAD 40057
REPEAT LOAD
10 0.8 1001 0.8 40 0.8 1005 0.8 631 0.75 61 1.5 81 1.0 82 1.0
*****
LOAD 40058
REPEAT LOAD
10 0.8 1002 0.8 40 0.8 1006 0.8 611 0.75 62 1.5 81 1.0 82 1.0
*****
LOAD 40059
REPEAT LOAD
10 0.8 1001 -0.8 40 0.8 1005 -0.8 6310 0.75 63 1.5 81 -1.0 82 -1.0
*****
LOAD 40060
REPEAT LOAD
10 0.8 1002 -0.8 40 0.8 1006 -0.8 6110 0.75 64 1.5 81 -1.0 82 -1.0
*****
LOAD 40061
REPEAT LOAD
10 0.8 1001 0.8 40 0.8 1005 0.8 6310 0.75 61 1.5 81 1.0 82 -1.0
*****
LOAD 40062
REPEAT LOAD
10 0.8 1002 0.8 40 0.8 1006 0.8 6110 0.75 62 1.5 81 -1.0 82 1.0
*****
LOAD 40063
REPEAT LOAD
10 0.8 1001 -0.8 40 0.8 1005 -0.8 631 0.75 63 1.5 81 -1.0 82 1.0
*****
LOAD 40064

REPEAT LOAD
10 0.8 1002 -0.8 40 0.8 1006 -0.8 611 0.75 64 1.5 81 1.0 82 -1.0
*****
LOAD 40065
REPEAT LOAD
10 1.35 1001 1.35 50 1.35 20 0.75 1007 0.75
*****
LOAD 40066
REPEAT LOAD
10 1.35 1002 1.35 50 1.35 20 0.75 1008 0.75
*****
LOAD 40067
REPEAT LOAD
10 1.35 1001 -1.35 50 1.35 20 0.75 1007 -0.75
*****
LOAD 40068
REPEAT LOAD
10 1.35 1002 -1.35 50 1.35 20 0.75 1008 -0.75
*****
LOAD 40069
REPEAT LOAD
10 1.2 1001 1.2 50 1.2 20 0.75 1007 0.75 631 0.375 61 0.75
*****
LOAD 40070
REPEAT LOAD
10 1.2 1002 1.2 50 1.2 20 0.75 1008 0.75 611 0.375 62 0.75
*****
LOAD 40071
REPEAT LOAD
10 1.2 1001 -1.2 50 1.2 20 0.75 1007 -0.75 6310 0.375 63 0.75
*****
LOAD 40072
REPEAT LOAD
10 1.2 1002 -1.2 50 1.2 20 0.75 1008 -0.75 6110 0.375 64 0.75
*****
LOAD 40073
REPEAT LOAD
10 1.2 1001 1.2 50 1.2 20 0.75 1007 0.75 6310 0.375 61 0.75
*****
LOAD 40074
REPEAT LOAD
10 1.2 1002 1.2 50 1.2 20 0.75 1008 0.75 6110 0.375 62 0.75
*****
LOAD 40075
REPEAT LOAD
10 1.2 1001 -1.2 50 1.2 20 0.75 1007 -0.75 631 0.375 63 0.75
*****
LOAD 40076
REPEAT LOAD
10 1.2 1002 -1.2 50 1.2 20 0.75 1008 -0.75 611 0.375 64 0.75
*****
LOAD 40077

REPEAT LOAD
10 1.2 1001 1.2 50 1.2 20 0.75 1007 0.75 85 1.5
*****
LOAD 40078
REPEAT LOAD
10 1.2 1002 1.2 50 1.2 20 0.75 1008 0.75 85 1.5
*****
LOAD 40079
REPEAT LOAD
10 1.2 1001 -1.2 50 1.2 20 0.75 1007 -0.75 85 1.5
*****
LOAD 40080
REPEAT LOAD
10 1.2 1002 -1.2 50 1.2 20 0.75 1008 -0.75 85 1.5
*****
LOAD 40081
REPEAT LOAD
10 1.2 1001 1.2 50 1.2 20 0.75 1007 0.75 86 1.5
*****
LOAD 40082
REPEAT LOAD
10 1.2 1002 1.2 50 1.2 20 0.75 1008 0.75 86 1.5
*****
LOAD 40083
REPEAT LOAD
10 1.2 1001 -1.2 50 1.2 20 0.75 1007 -0.75 86 1.5
*****
LOAD 40084
REPEAT LOAD
10 1.2 1002 -1.2 50 1.2 20 0.75 1008 -0.75 86 1.5
*****
LOAD 40085
REPEAT LOAD
10 1.35 1001 1.35 30 1.35 1003 1.35 20 1.5 1007 1.5 91 1.5
*****
LOAD 40086
REPEAT LOAD
10 1.35 1002 1.35 30 1.35 1004 1.35 20 1.5 1008 1.5 91 1.5
*****
LOAD 40087
REPEAT LOAD
10 1.35 1001 -1.35 30 1.35 1003 -1.35 20 1.5 1007 -1.5 91 1.5
*****
LOAD 40088
REPEAT LOAD
10 1.35 1002 -1.35 30 1.35 1004 -1.35 20 1.5 1008 -1.5 91 1.5
*****
LOAD 40089
REPEAT LOAD
10 1.2 1001 1.2 30 1.2 1003 1.2 20 1.5 1007 1.5 631 0.75 61 1.5 -
91 1.5
*****

LOAD 40090
REPEAT LOAD
10 1.2 1002 1.2 30 1.2 1004 1.2 20 1.5 1008 1.5 611 0.75 62 1.5 -
91 1.5
*****
LOAD 40091
REPEAT LOAD
10 1.2 1001 -1.2 30 1.2 1003 -1.2 20 1.5 1007 -1.5 6310 0.75 63 1.5 -
91 1.5
*****
LOAD 40092
REPEAT LOAD
10 1.2 1002 -1.2 30 1.2 1004 -1.2 20 1.5 1008 -1.5 6110 0.75 64 1.5 -
91 1.5
*****
LOAD 40093
REPEAT LOAD
10 1.2 1001 1.2 30 1.2 1003 1.2 20 1.5 1007 1.5 6310 0.75 61 1.5 -
91 1.5
*****
LOAD 40094
REPEAT LOAD
10 1.2 1002 1.2 30 1.2 1004 1.2 20 1.5 1008 1.5 6110 0.75 62 1.5 -
91 1.5
*****
LOAD 40095
REPEAT LOAD
10 1.2 1001 -1.2 30 1.2 1003 -1.2 20 1.5 1007 -1.5 631 0.75 63 1.5 -
91 1.5
*****
LOAD 40096
REPEAT LOAD
10 1.2 1002 -1.2 30 1.2 1004 -1.2 20 1.5 1008 -1.5 611 0.75 64 1.5 -
91 1.5
*****
LOAD 40097
REPEAT LOAD
10 1.2 1001 1.2 30 1.2 1003 1.2 20 1.5 1007 1.5 85 1.5 91 1.5
*****
LOAD 40098
REPEAT LOAD
10 1.2 1002 1.2 30 1.2 1004 1.2 20 1.5 1008 1.5 85 1.5 91 1.5
*****
LOAD 40099
REPEAT LOAD
10 1.2 1001 -1.2 30 1.2 1003 -1.2 20 1.5 1007 -1.5 85 1.5 91 1.5
*****
LOAD 40100
REPEAT LOAD
10 1.2 1002 -1.2 30 1.2 1004 -1.2 20 1.5 1008 -1.5 85 1.5 91 1.5
*****
LOAD 40101

REPEAT LOAD
10 1.2 1001 1.2 30 1.2 1003 1.2 20 1.5 1007 1.5 86 1.5 91 1.5
*****
LOAD 40102
REPEAT LOAD
10 1.2 1002 1.2 30 1.2 1004 1.2 20 1.5 1008 1.5 86 1.5 91 1.5
*****
LOAD 40103
REPEAT LOAD
10 1.2 1001 -1.2 30 1.2 1003 -1.2 20 1.5 1007 -1.5 86 1.5 91 1.5
*****
LOAD 40104
REPEAT LOAD
10 1.2 1002 -1.2 30 1.2 1004 -1.2 20 1.5 1008 -1.5 86 1.5 91 1.5
*****
LOAD 40105
REPEAT LOAD
10 1.35 1001 1.35 40 1.35 1005 1.35 20 1.5 1007 1.5 81 1.35 82 1.35 -
83 1.35 84 1.35 89 1.35 90 1.35 93 1.35
*****
LOAD 40106
REPEAT LOAD
10 1.35 1002 1.35 40 1.35 1006 1.35 20 1.5 1008 1.5 81 1.35 82 1.35 -
83 1.35 84 1.35 89 1.35 90 1.35 93 1.35
*****
LOAD 40107
REPEAT LOAD
10 1.35 1001 -1.35 40 1.35 1005 -1.35 20 1.5 1007 -1.5 81 -1.35 -
82 -1.35 83 -1.35 84 -1.35 89 -1.35 90 -1.35 93 1.35
*****
LOAD 40108
REPEAT LOAD
10 1.35 1002 -1.35 40 1.35 1006 -1.35 20 1.5 1008 -1.5 81 -1.35 -
82 -1.35 83 -1.35 84 -1.35 89 -1.35 90 -1.35 93 1.35
*****
LOAD 40109
REPEAT LOAD
10 1.35 1001 1.35 40 1.35 1005 1.35 20 1.5 1007 1.5 81 1.35 82 -1.35 -
83 1.35 84 -1.35 89 1.35 90 -1.35 93 1.35
*****
LOAD 40110
REPEAT LOAD
10 1.35 1002 1.35 40 1.35 1006 1.35 20 1.5 1008 1.5 81 -1.35 82 1.35 -
83 -1.35 84 1.35 89 -1.35 90 1.35 93 1.35
*****
LOAD 40111
REPEAT LOAD
10 1.35 1001 -1.35 40 1.35 1005 -1.35 20 1.5 1007 -1.5 81 -1.35 -
82 1.35 83 -1.35 84 1.35 89 -1.35 90 1.35 93 1.35
*****
LOAD 40112
REPEAT LOAD

10 1.35 1002 -1.35 40 1.35 1006 -1.35 20 1.5 1008 -1.5 81 1.35 -
82 -1.35 83 1.35 84 -1.35 89 1.35 90 -1.35 93 1.35
*****
LOAD 40113
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 1.2 83 1.2 -
84 1.2 85 1.5 89 1.2 90 1.2 93 1.2
*****
LOAD 40114
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 1.2 82 1.2 83 1.2 -
84 1.2 85 1.5 89 1.2 90 1.2 93 1.2
*****
LOAD 40115
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 -1.2 -
83 -1.2 84 -1.2 85 1.5 89 -1.2 90 -1.2 93 1.2
*****
LOAD 40116
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 -1.2 82 -1.2 -
83 -1.2 84 -1.2 85 1.5 89 -1.2 90 -1.2 93 1.2
*****
LOAD 40117
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 -1.2 83 1.2 -
84 -1.2 85 1.5 89 1.2 90 -1.2 93 1.2
*****
LOAD 40118
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 -1.2 82 1.2 -
83 -1.2 84 1.2 85 1.5 89 -1.2 90 1.2 93 1.2
*****
LOAD 40119
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 1.2 -
83 -1.2 84 1.2 85 1.5 89 -1.2 90 1.2 93 1.2
*****
LOAD 40120
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 1.2 82 -1.2 -
83 1.2 84 -1.2 85 1.5 89 1.2 90 -1.2 93 1.2
*****
LOAD 40121
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 1.2 83 1.2 -
84 1.2 86 1.5 89 1.2 90 1.2 93 1.2
*****
LOAD 40122
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 1.2 82 1.2 83 1.2 -
84 1.2 86 1.5 89 1.2 90 1.2 93 1.2

*****
LOAD 40123
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 -1.2 -
83 -1.2 84 -1.2 86 1.5 89 -1.2 90 -1.2 93 1.2
*****
LOAD 40124
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 -1.2 82 -1.2 -
83 -1.2 84 -1.2 86 1.5 89 -1.2 90 -1.2 93 1.2
*****
LOAD 40125
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 -1.2 83 1.2 -
84 -1.2 86 1.5 89 1.2 90 -1.2 93 1.2
*****
LOAD 40126
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 -1.2 82 1.2 -
83 -1.2 84 1.2 86 1.5 89 -1.2 90 1.2 93 1.2
*****
LOAD 40127
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 1.2 -
83 -1.2 84 1.2 86 1.5 89 -1.2 90 1.2 93 1.2
*****
LOAD 40128
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 1.2 82 -1.2 -
83 1.2 84 -1.2 86 1.5 89 1.2 90 -1.2 93 1.2
*****
LOAD 40129
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 1.2 83 1.2 -
84 1.2 89 1.2 90 1.2 93 1.2 94 1.5
*****
LOAD 40130
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 1.2 82 1.2 83 1.2 -
84 1.2 89 1.2 90 1.2 93 1.2 94 1.5
*****
LOAD 40131
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 -1.2 -
83 -1.2 84 -1.2 89 -1.2 90 -1.2 93 1.2 94 1.5
*****
LOAD 40132
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 -1.2 82 -1.2 -
83 -1.2 84 -1.2 89 -1.2 90 -1.2 93 1.2 94 1.5
*****
LOAD 40133

REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 -1.2 83 1.2 -
84 -1.2 89 1.2 90 -1.2 93 1.2 94 1.5
*****
LOAD 40134
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 -1.2 82 1.2 -
83 -1.2 84 1.2 89 -1.2 90 1.2 93 1.2 94 1.5
*****
LOAD 40135
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 1.2 -
83 -1.2 84 1.2 89 -1.2 90 1.2 93 1.2 94 1.5
*****
LOAD 40136
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 1.2 82 -1.2 -
83 1.2 84 -1.2 89 1.2 90 -1.2 93 1.2 94 1.5
*****
LOAD 40137
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 631 0.75 61 1.5 -
81 1.2 82 1.2 87 1.5 89 1.2 90 1.2 93 1.2
*****
LOAD 40138
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 611 0.75 62 1.5 -
81 1.2 82 1.2 88 1.5 89 1.2 90 1.2 93 1.2
*****
LOAD 40139
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 6310 0.75 63 1.5 -
81 -1.2 82 -1.2 87 -1.5 89 -1.2 90 -1.2 93 1.2
*****
LOAD 40140
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 6110 0.75 64 1.5 -
81 -1.2 82 -1.2 88 -1.5 89 -1.2 90 -1.2 93 1.2
*****
LOAD 40141
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 6310 0.75 61 1.5 -
81 1.2 82 -1.2 87 1.5 89 1.2 90 -1.2 93 1.2
*****
LOAD 40142
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 6110 0.75 62 1.5 -
81 -1.2 82 1.2 88 1.5 89 -1.2 90 1.2 93 1.2
*****
LOAD 40143
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 631 0.75 63 1.5 -

81 -1.2 82 1.2 87 -1.5 89 -1.2 90 1.2 93 1.2
*****
LOAD 40144
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 611 0.75 64 1.5 -
81 1.2 82 -1.2 88 -1.5 89 1.2 90 -1.2 93 1.2
*****
LOAD 40145
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 1.2 89 1.2 -
90 1.2 93 1.2 94 1.5
*****
LOAD 40146
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 1.2 82 1.2 89 1.2 -
90 1.2 93 1.2 94 1.5
*****
LOAD 40147
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 -1.2 -
89 -1.2 90 -1.2 93 1.2 94 1.5
*****
LOAD 40148
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 -1.2 82 -1.2 -
89 -1.2 90 -1.2 93 1.2 94 1.5
*****
LOAD 40149
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 -1.2 89 1.2 -
90 -1.2 93 1.2 94 1.5
*****
LOAD 40150
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 -1.2 82 1.2 -
89 -1.2 90 1.2 93 1.2 94 1.5
*****
LOAD 40151
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 1.2 -
89 -1.2 90 1.2 93 1.2 94 1.5
*****
LOAD 40152
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 1.2 82 -1.2 -
89 1.2 90 -1.2 93 1.2 94 1.5
*****
LOAD 40153
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 1.2 85 1.5 -
89 1.2 90 1.2 93 1.2
*****

LOAD 40154
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 1.2 82 1.2 85 1.5 -
89 1.2 90 1.2 93 1.2
*****
LOAD 40155
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 -1.2 -
85 1.5 89 -1.2 90 -1.2 93 1.2
*****
LOAD 40156
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 -1.2 82 -1.2 -
85 1.5 89 -1.2 90 -1.2 93 1.2
*****
LOAD 40157
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 -1.2 85 1.5 -
89 1.2 90 -1.2 93 1.2
*****
LOAD 40158
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 -1.2 82 1.2 85 1.5 -
89 -1.2 90 1.2 93 1.2
*****
LOAD 40159
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 1.2 -
85 1.5 89 -1.2 90 1.2 93 1.2
*****
LOAD 40160
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 1.2 82 -1.2 -
85 1.5 89 1.2 90 -1.2 93 1.2
*****
LOAD 40161
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 1.2 86 1.5 -
89 1.2 90 1.2 93 1.2
*****
LOAD 40162
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 1.2 82 1.2 86 1.5 -
89 1.2 90 1.2 93 1.2
*****
LOAD 40163
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 -1.2 -
86 1.5 89 -1.2 90 -1.2 93 1.2
*****
LOAD 40164
REPEAT LOAD

10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 -1.2 82 -1.2 -
86 1.5 89 -1.2 90 -1.2 93 1.2
*****
LOAD 40165
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 -1.2 86 1.5 -
89 1.2 90 -1.2 93 1.2
*****
LOAD 40166
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 -1.2 82 1.2 86 1.5 -
89 -1.2 90 1.2 93 1.2
*****
LOAD 40167
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 1.2 -
86 1.5 89 -1.2 90 1.2 93 1.2
*****
LOAD 40168
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 1.2 82 -1.2 -
86 1.5 89 1.2 90 -1.2 93 1.2
*****
LOAD 40169
REPEAT LOAD
10 1.35 1001 1.35 50 1.35 20 0.75 1007 0.75 93 1.2
*****
LOAD 40170
REPEAT LOAD
10 1.35 1002 1.35 50 1.35 20 0.75 1008 0.75 93 1.2
*****
LOAD 40171
REPEAT LOAD
10 1.35 1001 -1.35 50 1.35 20 0.75 1007 -0.75 93 1.2
*****
LOAD 40172
REPEAT LOAD
10 1.35 1002 -1.35 50 1.35 20 0.75 1008 -0.75 93 1.2
*****
LOAD 40173
REPEAT LOAD
10 1.2 1001 1.2 50 1.2 20 0.75 1007 0.75 631 0.375 61 0.75 87 0.75 -
93 1.2
*****
LOAD 40174
REPEAT LOAD
10 1.2 1002 1.2 50 1.2 20 0.75 1008 0.75 611 0.375 62 0.75 88 0.75 -
93 1.2
*****
LOAD 40175
REPEAT LOAD
10 1.2 1001 -1.2 50 1.2 20 0.75 1007 -0.75 6310 0.375 63 0.75 -

87 -0.75 93 1.2
*****
LOAD 40176
REPEAT LOAD
10 1.2 1002 -1.2 50 1.2 20 0.75 1008 -0.75 6110 0.375 64 0.75 -
88 -0.75 93 1.2
*****
LOAD 40177
REPEAT LOAD
10 1.2 1001 1.2 50 1.2 20 0.75 1007 0.75 6310 0.375 61 0.75 87 0.75 -
93 1.2
*****
LOAD 40178
REPEAT LOAD
10 1.2 1002 1.2 50 1.2 20 0.75 1008 0.75 6110 0.375 62 0.75 88 0.75 -
93 1.2
*****
LOAD 40179
REPEAT LOAD
10 1.2 1001 -1.2 50 1.2 20 0.75 1007 -0.75 631 0.375 63 0.75 87 -0.75 -
93 1.2
*****
LOAD 40180
REPEAT LOAD
10 1.2 1002 -1.2 50 1.2 20 0.75 1008 -0.75 611 0.375 64 0.75 88 -0.75 -
93 1.2
*****
LOAD 40181
REPEAT LOAD
10 1.2 1001 1.2 50 1.2 20 0.75 1007 0.75 85 1.5 93 1.2
*****
LOAD 40182
REPEAT LOAD
10 1.2 1002 1.2 50 1.2 20 0.75 1008 0.75 85 1.5 93 1.2
*****
LOAD 40183
REPEAT LOAD
10 1.2 1001 -1.2 50 1.2 20 0.75 1007 -0.75 85 1.5 93 1.2
*****
LOAD 40184
REPEAT LOAD
10 1.2 1002 -1.2 50 1.2 20 0.75 1008 -0.75 85 1.5 93 1.2
*****
LOAD 40185
REPEAT LOAD
10 1.2 1001 1.2 50 1.2 20 0.75 1007 0.75 86 1.5 93 1.2
*****
LOAD 40186
REPEAT LOAD
10 1.2 1002 1.2 50 1.2 20 0.75 1008 0.75 86 1.5 93 1.2
*****
LOAD 40187

REPEAT LOAD
10 1.2 1001 -1.2 50 1.2 20 0.75 1007 -0.75 86 1.5 93 1.2
*****
LOAD 40188
REPEAT LOAD
10 1.2 1002 -1.2 50 1.2 20 0.75 1008 -0.75 86 1.5 93 1.2
*****
LOAD 40189
REPEAT LOAD
10 1.35 1001 1.35 40 1.35 1005 1.35 20 1.5 1007 1.5 81 1.35 82 1.35 -
89 1.35 90 1.35 92 1.35 93 1.35
*****
LOAD 40190
REPEAT LOAD
10 1.35 1002 1.35 40 1.35 1006 1.35 20 1.5 1008 1.5 81 1.35 82 1.35 -
89 1.35 90 1.35 92 1.35 93 1.35
*****
LOAD 40191
REPEAT LOAD
10 1.35 1001 -1.35 40 1.35 1005 -1.35 20 1.5 1007 -1.5 81 -1.35 -
82 -1.35 89 -1.35 90 -1.35 92 1.35 93 1.35
*****
LOAD 40192
REPEAT LOAD
10 1.35 1002 -1.35 40 1.35 1006 -1.35 20 1.5 1008 -1.5 81 -1.35 -
82 -1.35 89 -1.35 90 -1.35 92 1.35 93 1.35
*****
LOAD 40193
REPEAT LOAD
10 1.35 1001 1.35 40 1.35 1005 1.35 20 1.5 1007 1.5 81 1.35 82 -1.35 -
89 1.35 90 -1.35 92 1.35 93 1.35
*****
LOAD 40194
REPEAT LOAD
10 1.35 1002 1.35 40 1.35 1006 1.35 20 1.5 1008 1.5 81 -1.35 82 1.35 -
89 -1.35 90 1.35 92 1.35 93 1.35
*****
LOAD 40195
REPEAT LOAD
10 1.35 1001 -1.35 40 1.35 1005 -1.35 20 1.5 1007 -1.5 81 -1.35 -
82 1.35 89 -1.35 90 1.35 92 1.35 93 1.35
*****
LOAD 40196
REPEAT LOAD
10 1.35 1002 -1.35 40 1.35 1006 -1.35 20 1.5 1008 -1.5 81 1.35 -
82 -1.35 89 1.35 90 -1.35 92 1.35 93 1.35
*****
LOAD 40197
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 1.2 85 1.5 -
89 1.2 90 1.2 92 1.2 93 1.2
*****

LOAD 40198
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 1.2 82 1.2 85 1.5 -
89 1.2 90 1.2 92 1.2 93 1.2
*****
LOAD 40199
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 -1.2 -
85 1.5 89 -1.2 90 -1.2 92 1.2 93 1.2
*****
LOAD 40200
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 -1.2 82 -1.2 -
85 1.5 89 -1.2 90 -1.2 92 1.2 93 1.2
*****
LOAD 40201
REPEAT LOAD
10 1.2 1001 1.2 40 1.2 1005 1.2 20 1.5 1007 1.5 81 1.2 82 -1.2 86 1.5 -
89 1.2 90 -1.2 92 1.2 93 1.2
*****
LOAD 40202
REPEAT LOAD
10 1.2 1002 1.2 40 1.2 1006 1.2 20 1.5 1008 1.5 81 -1.2 82 1.2 86 1.5 -
89 -1.2 90 1.2 92 1.2 93 1.2
*****
LOAD 40203
REPEAT LOAD
10 1.2 1001 -1.2 40 1.2 1005 -1.2 20 1.5 1007 -1.5 81 -1.2 82 1.2 -
86 1.5 89 -1.2 90 1.2 92 1.2 93 1.2
*****
LOAD 40204
REPEAT LOAD
10 1.2 1002 -1.2 40 1.2 1006 -1.2 20 1.5 1008 -1.5 81 1.2 82 -1.2 -
86 1.5 89 1.2 90 -1.2 92 1.2 93 1.2
LOAD 10001 LOADTYPE None TITLE BX +X
WIND LOAD Z 1 TYPE 2 XR 0 6 YR 0 26 ZR 0 0.1 OPEN
WIND LOAD Z 1 TYPE 2 XR 6 12 YR 0 26 ZR 2.9 3.1 OPEN
WIND LOAD Z -1 TYPE 2 XR 0 12 YR 0 26 ZR 7.9 8.1 OPEN
WIND LOAD X 1 TYPE 3 XR 0 0.1 YR 0 26 ZR 0 8 OPEN
*WIND LOAD X 1 TYPE 3 XR 5.9 6.1 YR 0 26 ZR 0 8 OPEN
*WIND LOAD X 1 TYPE 3 XR 11.9 12.1 YR 0 26 ZR 0 8 OPEN
*WIND LOAD X 1 TYPE 3 XR 11.9 12.1 YR 0 26 ZR 0 8 OPEN
**Blast load on pipes
*dia of pie = 40"
*so exposed width considered = 1.0m on each column
*Blast load =6.07 *0.8*1.0 =4.856 kN/m
MEMBER LOAD
2 3 20 21 38 39 56 57 74 75 92 93 682 684 UNI GX 4.856
*Blast load on equipment V605
*Height of equipment =3.25 m
*Dia of equipment = 1.5m
* Load due to blast = 3.25*1.5*6.07*0.8 = 23.7 kN

*Above load distributed on two beams at +5.0 level
*Blast load on V605 equipmnet =23.7/2 =11.85kN
MEMBER LOAD
174 CON GX 11.85
183 CON GX 11.85 0.3
174 CON GY 6.88
183 CON GY -6.88 0.3
*Blast load on equipment V602
*Height of equipment =3.6 m
*Dia of equipment = 1.8m
* Load due to blast = 3.6*1.8*6.07*0.8 = 31.9 kN
*Above load distributed on two columns at +8.00 level
*Blast load on V602 equipmnet =31.9 /4 =8kN
MEMBER LOAD
657 TO 660 CON GX 8
657 658 CON GY 5.91
659 660 CON GY -5.91
*Blast load on equipment E606
*Height of equipment =1.5 m
*Dia of equipment = 1.0m
* Load due to blast = 1.5*1.0*6.07*1 = 9.10 kN
*Above load distributed on two columns at +12.80 level
*Wind load on E606 equipmnet =9.10 kN
238 CON GX 9.1 1.8
238 CON GY 3.41
709 CON GY -3.41 1
*Blast load on equipment E617 is ignore due to shielding
*Wind load on E617 equipmnet =10.9kN
711 CON GX 10.9
JOINT LOAD
378 FY 2.85
379 FY -2.85
*Blast load on equipment E608
*Height of equipment =3.50 m
*Dia of equipment = 1.5 m
* Load due to blast = 3.5*1.5*6.07 = 32 kN
*Above load distributed on two columns at +23.80 level
*Wind load on E608 equipmnet =32/2 =16kN
JOINT LOAD
205 208 FX 16
*Blast load on E610 equipmnet =9/2 =4.5kN
*Height of equipment =1.65m
*Dia of equipment = 0.75 m
* Load due to blast = 1.65*0.75*6.07 = 7.5 kN
*Above load distributed on two columns at +23.80 level
MEMBER LOAD
376 CON GX 3.75 0.5
360 CON GX 3.75 1.2
376 CON GY 1.5 0.5
360 CON GY -1.5 1.2
*Blast load on equipment ES601
*Height of equipment =2.5 m

```
*Dia of equipment = 1.0 m
* Load due to blast = 2.5*1.0*6.07*0.8 = 12.1 kN
*Above load distributed on two columns at +26.00 level
*Wind load on S601 equipmnet =12.1/2 =6.1kN
MEMBER LOAD
397 TO 400 CON GX 6.1
*Blast load on equipmnet V603 A/B
JOINT LOAD
2872 TO 2879 FX 18.35
2872 2874 2876 2878 FY 56.48
2873 2875 2877 2879 FY -56.48
*Blast load on equipmnet T601
JOINT LOAD
2886 FX 163
2886 MZ -1812
*Blast load on equipmnet V606
JOINT LOAD
2887 TO 2890 FX 24.625
2887 2889 FY 121.7
2888 2890 FY -121.7
*Blast load on equipmnet V601
JOINT LOAD
2868 TO 2871 FX 55
2868 2870 FY 201
2869 2871 FY -201
*Blast load on equipmnet V604
JOINT LOAD
2864 TO 2867 FX 60
2864 2866 FY 229
2865 2867 FY -229
LOAD 10002 LOADTYPE None  TITLE BL -X
WIND LOAD X -1 TYPE 3 XR 11.9 12.1 YR 0 26 ZR 3 8 OPEN
WIND LOAD X -1 TYPE 3 XR 5.9 6.1 YR 0 26 ZR 0 3 OPEN
WIND LOAD Z 1 TYPE 2 XR 0 6 YR 0 26 ZR 0 0.1 OPEN
WIND LOAD Z 1 TYPE 2 XR 6 12 YR 0 26 ZR 2.9 3.1 OPEN
WIND LOAD Z -1 TYPE 2 XR 0 12 YR 0 26 ZR 7.9 8.1 OPEN
**Blast load on pipes
*dia of pie = 40"
*so exposed width considered = 1.5m on each column
*Blast load =6.07 *1.0*0.8 =4.856 kN/m
MEMBER LOAD
2 3 20 21 38 39 56 57 74 75 92 93 682 684 UNI GX -4.856
*Blast load on equipment V605
*Height of equipment =3.25 m
*Dia of equipment = 1.5m
* Load due to blast = 3.25*1.5*6.07*0.8 = 23.7 kN
*Above load distributed on two beams at +5.0 level
*Blast load on V605 equipmnet =23.7/2 =11.85kN
MEMBER LOAD
174 CON GX -11.85
183 CON GX -11.85 0.3
174 CON GY -6.88
```

183 CON GY 6.88 0.3
*Blast load on equipment V602
*Height of equipment =3.6 m
*Dia of equipment = 1.8m
* Load due to blast = 3.6*1.8*6.07*0.8 = 31.9 kN
*Above load distributed on two columns at +8.00 level
*Blast load on V602 equipmnet =31.9 /4 =8kN
MEMBER LOAD
657 TO 660 CON GX -8
657 658 CON GY -5.91
659 660 CON GY 5.91
*Blast load on equipment E606
*Height of equipment =1.5 m
*Dia of equipment = 1.0m
* Load due to blast = 1.5*1.0*6.07*1 = 9.10 kN
*Above load distributed on two columns at +12.80 level
*Wind load on E606 equipmnet =9.10 kN
238 CON GX -9.1 1.8
238 CON GY -3.41
709 CON GY 3.41 1
*Blast load on equipment E617 is ignore due to shielding
*Wind load on E617 equipmnet =10.9kN
711 CON GX -10.9
JOINT LOAD
378 FY -2.85
379 FY 2.85
*Blast load on equipment E608
*Height of equipment =3.50 m
*Dia of equipment = 1.5 m
* Load due to blast = 3.5*1.5*6.07 = 32 kN
*Above load distributed on two columns at +23.80 level
*Wind load on E608 equipmnet =32/2 =16kN
JOINT LOAD
205 208 FX -16
*Blast load on E610 equipmnet =9/2 =4.5kN
*Height of equipment =1.65m
*Dia of equipment = 0.75 m
* Load due to blast = 1.65*0.75*6.07 = 7.5 kN
*Above load distributed on two columns at +23.80 level
MEMBER LOAD
376 CON GX -3.75 0.5
360 CON GX -3.75 1.2
376 CON GY -1.5 0.5
360 CON GY 1.5 1.2
*Blast load on equipment ES601
*Height of equipment =2.5 m
*Dia of equipment = 1.0 m
* Load due to blast = 2.5*1.0*6.07*0.8 = 12.1 kN
*Above load distributed on two columns at +26.00 level
*Wind load on S601 equipmnet =12.1/2 =6.1kN
MEMBER LOAD
397 TO 400 CON GX -6.1

```
*Blast load on equipmnet V603 A/B
JOINT LOAD
2872 TO 2879 FX -18.35
2872 2874 2876 2878 FY -56.48
2873 2875 2877 2879 FY 56.48
*Blast load on equipmnet T601
JOINT LOAD
2886 FX -163
2886 MZ 1812
*Blast load on equipmnet V606
JOINT LOAD
2887 TO 2890 FX -24.625
2887 2889 FY -121.7
2888 2890 FY 121.7
*Blast load on equipmnet V601
JOINT LOAD
2868 TO 2871 FX -55
2868 2870 FY -201
2869 2871 FY 201
*Blast load on equipmnet V604
JOINT LOAD
2864 TO 2867 FX -60
2864 2866 FY -229
2865 2867 FY 229
LOAD 10003 LOADTYPE None  TITLE BL +Z
WIND LOAD Z 1 TYPE 3 XR 0 6 YR 0 26 ZR 0 0.1 OPEN
WIND LOAD Z 1 TYPE 3 XR 6 12 YR 0 26 ZR 2.9 3.1 OPEN
*WIND LOAD Z 1 TYPE 3 XR 0 12 YR 0 26 ZR 7.9 8.1 OPEN
WIND LOAD X 1 TYPE 2 XR 0 0.1 YR 0 26 ZR 0 8 OPEN
WIND LOAD X -1 TYPE 2 XR 11.9 12.1 YR 0 26 ZR 0 8 OPEN
MEMBER LOAD
2 8 20 26 38 44 56 62 74 80 92 98 UNI GZ 4.856
*Blast load on V605 equipmnet =23.7/2 =11.85 kN
MEMBER LOAD
688 CON GZ 11.85
176 CON GZ 11.85 0.9
688 CON GY -6.88
176 CON GY 6.88 0.9
*Blast load on V602 equipmnet =31.9/4 =8kN
657 TO 660 CON GZ 8
657 659 CON GY 5.91
658 660 CON GY -5.91
*Blast load on E606 equipmnet =9.10
238 CON GZ 9.1 1.8
238 CON GY -3.41 1.8
238 CON GY 3.41 1
*Blast load on E617 equipmnet =10.9kN
711 CON GZ 10.9
711 CON GY -2.85
JOINT LOAD
184 FY 3.41
*Blast load on S601 equipmnet =12.1/4 = 3.1kN
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MEMBER LOAD
397 TO 400 CON GZ 3.1
*Blast load on E608 equipmnet =32/2 =16kN
JOINT LOAD
205 208 FZ 16
*Blast load on E610 equipmnet =7.5/2 =3.75kN
MEMBER LOAD
376 CON GZ 3.75 0.5
360 CON GZ 3.75 1.2
*Blast load on equipmnet V603 A/B
JOINT LOAD
2872 TO 2879 FZ 18.35
2872 2873 2876 2877 FY 56.48
2874 2875 2878 2879 FY -56.48
*Blast load on equipmnet T601
JOINT LOAD
2886 FZ 163
2886 MX 1812
*Blast load on equipmnet V606
JOINT LOAD
2887 TO 2890 FZ 24.625
2887 2888 FY 121.7
2889 2890 FY -121.7
*Blast load on equipmnet V601
JOINT LOAD
2868 TO 2871 FZ 55
2868 2869 FY 201
2870 2871 FY -201
*Blast load on equipmnet V604
JOINT LOAD
2864 TO 2867 FZ 60
2864 2865 FY 229
2866 2867 FY -229
LOAD 10004 LOADTYPE None TITLE BL -Z
WIND LOAD Z -1 TYPE 3 XR 0 12 YR 0 26 ZR 7.9 8.1 OPEN
WIND LOAD X 1 TYPE 2 XR 0 0.1 YR 0 26 ZR 0 8 OPEN
WIND LOAD X -1 TYPE 2 XR 11.9 12.1 YR 0 26 ZR 0 8 OPEN
WIND LOAD X -1 TYPE 2 XR 5.9 6.1 YR 0 26 ZR 0 3 OPEN
MEMBER LOAD
3 7 21 25 39 43 57 61 75 79 93 97 682 684 UNI GZ -4.856
*Blast load on V605 equipmnet =23.7/2 =11.85 kN
MEMBER LOAD
688 CON GZ -11.85
176 CON GZ -11.85 0.9
688 CON GY 6.88
176 CON GY -6.88 0.9
*Blast load on V602 equipmnet =31.9/4 =8kN
657 TO 660 CON GZ -8
657 659 CON GY -5.91
658 660 CON GY 5.91
*Blast load on E606 equipmnet =9.10
238 CON GZ -9.1 1.8

238 CON GY 3.41 1.8
238 CON GY -3.41 1
*Blast load on E617 equipmnet =10.9kN
711 CON GZ -10.9
711 CON GY 2.85
JOINT LOAD
184 FY -3.41
*Blast load on S601 equipmnet =12.1/4 = 3.1kN
MEMBER LOAD
397 TO 400 CON GZ -3.1
*Blast load on E608 equipmnet =32/2 =16kN
JOINT LOAD
205 208 FZ -16
*Blast load on E610 equipmnet =7.5/2 =3.75kN
MEMBER LOAD
376 CON GZ -3.75 0.5
360 CON GZ -3.75 1.2
*Blast load on equipmnet V603 A/B
JOINT LOAD
2872 TO 2879 FZ -18.35
2872 2873 2876 2877 FY -56.48
2874 2875 2878 2879 FY 56.48
*Blast load on equipmnet T601
JOINT LOAD
2886 FZ -163
2886 MX -1812
*Blast load on equipmnet V606
JOINT LOAD
2887 TO 2890 FZ -24.625
2887 2888 FY -121.7
2889 2890 FY 121.7
*Blast load on equipmnet V601
JOINT LOAD
2868 TO 2871 FZ -55
2868 2869 FY -201
2870 2871 FY 201
*Blast load on equipmnet V604
JOINT LOAD
2864 TO 2867 FZ -60
2864 2865 FY -229
2866 2867 FY 229
LOAD COMB 10005 COMBINATION LOAD CASE 1
10001 1.0 10 1.0 20 1.0
LOAD COMB 10006 COMBINATION LOAD CASE 1
10 1.0 20 1.0 10002 1.0
LOAD COMB 10007 COMBINATION LOAD CASE 1
10 1.0 20 1.0 10003 1.0
LOAD COMB 10008 COMBINATION LOAD CASE 1
10 1.0 20 1.0 10004 1.0
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PDELTA ANALYSIS SMALLDELTA PRINT STATICS CHECK

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DEFINE ENVELOPE
10005 TO 10008 30001 TO 30160 ENVELOPE 1 TYPE SERVICEABILITY
10005 TO 10008 40001 TO 40204 ENVELOPE 2 TYPE STRENGTH
*40001 TO 40204 10005 to 10008 ENVELOPE 2 TYPE STRENGTH
END DEFINE ENVELOPE
LOAD LIST ENV 2
START CONCRETE DESIGN
CODE ACI
CLB 0.05 MEMB 3143 TO 3179
CLS 0.05 MEMB 3143 TO 3179
CLT 0.05 MEMB 3143 TO 3179
FC 35000 MEMB 3143 TO 3179
FYMAIN 415000 MEMB 3143 TO 3179
FYSEC 415000 MEMB 3143 TO 3179
MAXMAIN 16 MEMB 3143 TO 3179
MINMAIN 13 MEMB 3143 TO 3179
MINSEC 10 MEMB 3143 TO 3179
TRACK 2 MEMB 3143 TO 3179
*Load list ENV 2
DESIGN COLUMN 3143 TO 3179
END CONCRETE DESIGN
FINISH
```