ΩMEGA
ENGINEERING CONSULTANTS LIMITED

Development
Cnr Bryce and Barton Streets
Hamilton

ΩMEGA
ENGINEERING CONSULTANTS LIMITED

P +64 6 356 6371 M +64 21 450 068
stephen@omegaengineering.co.nz
Level 1, 227 Broadway Avenue, Palmerston North
P O Box 1033, Palmerston North, 4410

The Building is Ground + three story with tilt panels to one long side, tilt panel at grid 6and steel framing to the remainder of the building.

- **Gravity Load**

  Floors are with different wall on every side. **For North elevation** Black Trespa Meteon Cladding on 200mm thick Precast Tilt panel & Insol Aurora 180mm Louvre blades.**For West elevation**Insolazimuth Perforated Steel Facasde Screens , Insol Solaris 300 Louvre blades,125mm APL Flush Glaze System & 2.0m canopy. **For South Elevation** Black Trespa Meteon Cladding on 200mm thick Precast Tilt panel,Insol Solaris 300 Louvre blades,125mm APL Flush Glaze System & 2.0m canopy. **For East elevation** 200mm thick Precast Tilt panel from Ground floor to roof Level.

  Load of walls will be carried by beams and will be transferred to columns& then foundations.

  East side wall on Grid A, Lift wall & grid 6 concrete tilt panel wall are load bearingwalls.Thesewalls will provide support of steel beams. Thesepanels will act as load bearing walls.

  Imposed floor loadswill transfer via steel deck slab. The steel deck slab is supported on steel beams. Steel beams transfer load to main frame of steel frame structure. The steel frame transfers the load to foundations.

  Cold Formed purlins spanning between the external concrete panel walls to steel beams supported on rafter steel Beam at roof level.

- **Lateral Load**

  The Roof bracing will be provided in the form of X – Bracing to create a roof diaphragm for both across and along directions.
  At deck floor slab Level rigid diaphragm will be provided by RCC Slab.

  Along direction

  Lateral load resistance will be provided by the tilt panel wall on the East elevation and moment frames on B & C grid.

  Across direction

  Concrete Tilt Panel on Grid -6and moment frames on grid 1 to 6 will take resist lateral loads.

  Analysis of Steel Structures framing will be done by using STAAD-PRO V8i Structural Analysis Software.

- **Design Code**

BS –PART	YEAR	TITLE
AS/NZS 1170.0	2002	Structural Design actions Part 0: General principles
AS/NZS 1170.1	2002	Structural Design actions Part 1: Permanent, Imposed and other actions
AS/NZS 1170.2	2011	Structural Design actions Part 2: Wind actions
AS/NZS 1170.5	2004	Structural Design actions Part 5: Earthquake actions
NZS 3101: Part 1: 2006	2006	Concrete Structures Standard Part 1: The Design of Concrete Structures
NZS 3404: Part 1& 2: 1997	1997	Steel Structures Standard Part 1 & Part 2: The Design of Steel Structures

- **FOUNDATION: -**

Cheal Consultants Ltd has submitted a geotechnical Investigation Report.

Conclusions and Recommendations from Cheal Consultants Ltd :-

In relation to the original brief, we consider that shallow footings are appropriate at this site for SLS1 and ULS earthquake loading conditions. The amount of post-construction settlements and differential settlements will be within usual acceptable limits.

We do not consider that deep foundations or ground improvements are required as long as the ground conditions encountered are consistent with those assumed in this report.

We recommend that the base of all foundation trenches are tested during construction to verify the foundation soils. Based on our investigation the ground soils should be sand and gravelly sand, and shall have a bearing capacity equivalent to 7 blows/100mm penetration when tested with a Scala Penetrometer.

All foundation trenches shall be excavated to a depth of twice the foundation width at the base. If tension piles are employed to resist likely uplift loads, we recommend that further CPTs or on-site pile load tests should to be employed to confirm pile capabilities. The number and location of the piles to be tested will be subject to detailed design.

The following Table includes various dimensions and bearing capacities for square and stripFootings for different load cases.

Upper structure	Design Vertical Load (ULS)	Depth of Footing (Df)	Design bearing capacity(kPa) (ULS)	Square (L&B) (m)	Strip (B) (m)
External and corner column	390 kN	1.6 m	270 kPa	1.2	-
Internal walls	1300 kN	1.6 m	325 kPa	2.0	-
Shear walls	390 kN/m	1.6 m	260 Kpa	-	1.5

- **MATERIAL PROPERTIES**

Structural Steel

Design yield strength fy= 300 N/mm²
(For channel and Angle)
Design yield strength fy= 300 N/mm²
(For UB and UC)
Design yield strength fy= 250/350/450 N/mm²
(For RHS and SHS)

Connection Bolts

All Bolts To be Grade 8.8 IN 300.

Concrete Grade

Compressive Strength of Concrete = 30 N/mm2

Rebar Grade

Yield stress of reinforcement = 300 N/mm2 D
(For Small Members & Stirrups)
Yield stress of reinforcement = 500 N/mm2 HD
(For Longitudinal steel in ground Beams)

- **Roof Dead Load:-**
  Self-weight of Main steel Members = 0.07 kN/m2
  Purlin = 0.05 kN/m2
  Roofing Sheets (Dimond Corrugates Profile) = 0.05 kN/m2
  Suspended Celling = 0.07 kN/m2
  Insulation = 0.02 kN/m2
  Battens = 0.02 kN/m2
  Services = 0.025 kN/m2
  Total Roof Dead Load = 0.305 kN/m2
  Same load is considered for canopy at first floor slab.

- **Deck slab Load:-**
  1.0 mm ComFlor 60 deck sheet with 150 mm thick deck slab + Suspended ceiling (0.1 kN/m2)
  1.0 mm ComFlor 60 deck sheet weight = 0.114 kN/m2
  Weight of Concrete 150 mm thick deck slab = 2.75 kN/m2
  Services = 0.025 kN/m2
  Total Weight for 150 mm thick slab = 2.99kN/m2
- **Wall Load :-**
  Timber Framed wall = 0.35 kN/m2
  Glazed wall = 0.35 kN/m2
  200 mm Concrete = 0.2 x 24 = 4.8 kN/m2

- **Roof Imposed Load :-**
  Roof Imposed load = 0.25 kN/m2 (Table 3.2 NZS1170 Part 1)
  Same load is considered for canopy at first floor slab.
- **Imposed Load for Office Area:-**
  Imposed Load Office, Kitchen, =3.0 kN/m2 (Table 3.1 NZS1170 Part 1)
  Imposed Load Stair = 4.0 kN/m2 (Table 3.1 NZS1170 Part 1)
  Imposed Load Toilet =3.0 kN/m2 (Table 3.1 NZS1170 Part 1)

Seismic Load as per NZS1170 Part 5 :-

Elastic Site Spectra for Horizontal Loading :

Elastic site hazard spectrum for Horizontal Loading C(T) :

C(T) = Ch (T) Z R N (T,D)

Where,

Ch (T) = The spectral shape factor Cl. 3.1.2 NZS 1170 Part 5 (Table 3.1)

Subsoil Classification is C

Tx	0.9	Sec	in X dir - along direction
Tz	1.1	Sec	in Z dir - across direction

Ch (Tx) =	1.29	
Ch (Tz) =	1.128	

Z = The hazard factor determind from Clause 3.1.4 NZS 1170 Part 5 (Table 3.3)

Z =	0.16	for (Hamilton)
Importance Level =	2	
Design Working Life =	50	years
Annual Probabality of Exceedance =	1/500	(Table 3.3 AS/NZS 1170.0:2002)

R = The return period factor Rs and Ru for the appropriate limit state determined from clause 3.1.5 NZS 1170 Part 5 but limited such that ZRu does not exceed 0.7

Rs =	0.25	(Serviceability Limit State)
Ru =	1	(Ultimate Limit State)

Near-Fault factor N (T,D) =	1	Clause 3.1.6 NZS1170 Part 5

Elastic site hazard spectrum for Horizontal Loading C(T) :

C(T) = Ch (T) Z R N (T,D)

C(Tx) (Serviceability Limit State) = 1.29 X 0.16 X 0.25 X 1

= 0.052

C(Tz) (Serviceability Limit State) = 1.128 X 0.16 X 0.25 X 1

= 0.045

C(Tx) (Ultimate Limit State) = 1.29 X 0.16 X 1 X 1

= 0.2064

C(Tz) (Ultimate Limit State) = 1.128 X 0.16 X 1 X 1

= 0.18048

Horizontal Design action coefficients and Design Spectra :-

Ultimate Limit State :-

μ (Ductility Factor) = 1.25 (Assumed)

For soil Classes A ,B ,C and D

$K\mu = \mu$ for $T1 \geq 0.7$ s

$((\mu - 1)T1 / 0.7) + 1$ for $T1 < 0.7$ s

Cd (T1)

= C(T1)Sp / Kμ

(Z/20 + 0.02)Ru but not less than 0.03Ru

Sp = Structural performance factor clause 12.2.2 NZS3404 Part2

= 0.9

Kμ = μ

1.25

Cd (T1x) = (0.2064X0.9)/1.25

0.150

Cd (T1z) = (0.18048X0.9)/1.25

0.1300

Serviceability Limit State :-

μ (Ductility Factor) = 1 (Assume)

For soil Classes A ,B ,C and D

$K\mu = \mu$ for $T1 \geq 0.7$ s

$((\mu - 1)T1 / 0.7) + 1$ for $T1 < 0.7$ s

Cd (T) = C(T)Sp / Kμ

Sp = Structural performance factor clause 12.2.2 NZS3404 Part2

Sp = 0.7

$K\mu = \frac{\mu}{1}$

Cd (T1x) = $\frac{(0.0516 \times 0.7)/1}{0.04}$

Cd (T1z) = $\frac{(0.04512 \times 0.7)/0.04}{0.04}$

Horizontal Design Action Coefficients :

Cds/Cdu = 0.04/0.15 (FOR X DIRECTION - ALONG)
0.267

Cds/Cdu = 0.04/0.13 (FOR Z DIRECTION - ACROSS)
0.308

Wind Load as per NZS1170 Part 2 :-

Regional Wind Speede :

V500 =	45	m/s	Table 3.1 NZS1170 Part 2
V25 =	37	m/s	Table 3.1 NZS1170 Part 2
Md =	1	Assume Clause 3.3.2 NZS1170 Part 2	

Assume Terrain Category 3 Clause 4.3.1 NZS1170 Part 2

Height of building,h = 15.67 m

Determination of terrain/height multiplier (Mz,cal) (Table 4.1 NZS1170 PART 2)

= 0.89

Table 4.1 NZS 1170 Part 2

Ms = Shielding multiplier 1 Clausew 4.3.1 NZS1170 Part 2

Mt= Topographic multiplier = 1 = Mh=Mle

Site Wind Speed

Vsit,β = Vr X Md X (Mz,cal X Ms X Mt)

V500 = 45X1X0.89X1X1

= 40.05

V25 = 37X1X0.89X1X1

= 32.93

Wh = 0.6 X 1604.0025

= 0.963 kN/m2 (ULS)

Ws = 0.6 X 1084.3849

= 0.651 kN/m2 (SLS)

Internal Pressure Coefficients : Cpi= 0.2 or -0.3

(Table 5.1(B) NZS1170 Part 2)

External Pressure Coefficients (Clasuse 5.4 NZS1170 Part 2)

d =	32.95	m
b =	14.07	m
d/b=	2.342	
b/d =	0.428	

Windward Cpe =	0.7		Table 5.2 (A) NZS1170 Part 2
Leeward Cpe (along)	-0.282	(90 degree)	Table 5.2 (B) NZS1170 Part 2
Leeward Cpe(across)	-0.5	(0 degree)	Table 5.2 (B) NZS1170 Part 2
Side wall Cpe =	-0.65	0 to 15.67 Cpi	Table 5.2 (C) NZS1170 Part 2
Side wall Cpe =	-0.5	15.67 to 31.34 Cpi	Table 5.2 (C) NZS1170 Part 2
Side wall Cpe =	-0.3	> 31.4 m Cpi =	Table 5.2 (C) NZS1170 Part 2

Roof (Table 5.3(A) NZS1170 Part 2

α <	10^0			
d =	32.95	m		
b =	14.07	m		
h =	15.67	m		
Along				
h/d =	0.476	Upward		
0 to 7.835 Cpi		-0.9	-0.4	
7.835 to 15.67 Cpi		-0.9	-0.4	
15.67 to 31.34 Cpi		-0.5	0	
> 31.4 m Cpi =		-0.3	0.1	
Across				
h/b =	1.11372			
0 to 7.835 Cpi		-1.3	-0.6	
7.835 to 15.67 Cpi		-0.7	-0.3	
> 15.67 m Cpi =		-0.7	-0.3	

WIND + X (CPE + CPI) (ALONG)

Wall	-0.45		-0.3		-0.1	
Pressure	-0.43335		-0.2889		-0.0963	
	Roof					
0.9	-0.7		-0.3		-0.1	-0.082
0.8667	-0.67		-0.29		-0.10	-0.07897

Wind X

0 to 15.67 | 15.67 to 31.34 Cpi | > 31.4 m Cpi =

WIND + X (CPE - CPI) (ALONG)

Wall	-0.95	-0.8	-0.6	
Pressure	-0.91485	-0.7704	-0.5778	
	Roof			
0.4	-1.2	-0.8	-0.6	-0.582
0.3852	-1.16	-0.77	-0.58	-0.56047

Wind X

0 to 15.67 | 15.67 to 31.34 Cpi | > 31.4 m Cpi =

WIND - X (CPE + CPI) (ALONG)

Wall	-0.1	-0.3	-0.45	
Pressure	-0.0963	-0.2889	-0.43335	
	Roof			
-0.082	-0.1	-0.3	-0.7	0.9
-0.07897	-0.10	-0.29	-0.67	0.8667

Wind -X

> 31.4 m Cpi = | 15.67 to 31.34 Cpi | 0 to 15.67 Cpi

WIND-X (CPE - CPI) (ALONG)

Wall	-0.6	-0.8	-0.95	
Pressure	-0.5778	-0.7704	-0.91485	
	Roof			
-0.582	-0.2	-0.8	-1.2	0.4
-0.56047	-0.19	-0.77	-1.16	0.3852

Wind -X

> 31.4 m Cpi = | 15.67 to 31.34 Cpi | 0 to 15.67 Cpi

WIND Z (CPE + CPI)(ACROSS)

Wall	-0.45		-0.45	
Pressure	-0.43335		-0.43335	
	Roof			
0.9	-1.1		-0.4	-0.3
0.8667	-1.06		-0.39	-0.2889

Wind Z

0 to 7.835 Cpi (upward wind) | 0 to 7.835 Cpi (downward wind)

WIND Z (CPE - CPI)(ACROSS)

Wall	-0.95		-0.95	
Pressure	-0.91485		-0.91485	
	Roof			
0.4	-1.6		-0.9	-0.8
0.3852	-1.54		-0.87	-0.7704

Wind Z

0 to 7.835 Cpi (upward wind) | 0 to 7.835 Cpi (downward wind)

WIND -Z (CPE + CPI)(ACROSS)

Wall	-0.45		-0.45	
Pressure	-0.43335		-0.43335	
	Roof			
-0.3	-0.4		-1.1	0.9
-0.2889	-0.39		-1.06	0.8667

Wind -Z

0 to 7.835 Cpi (downward wind) 0 to 7.835 Cpi (upward wind)

WIND -Z (CPE - CPI)(ACROSS)

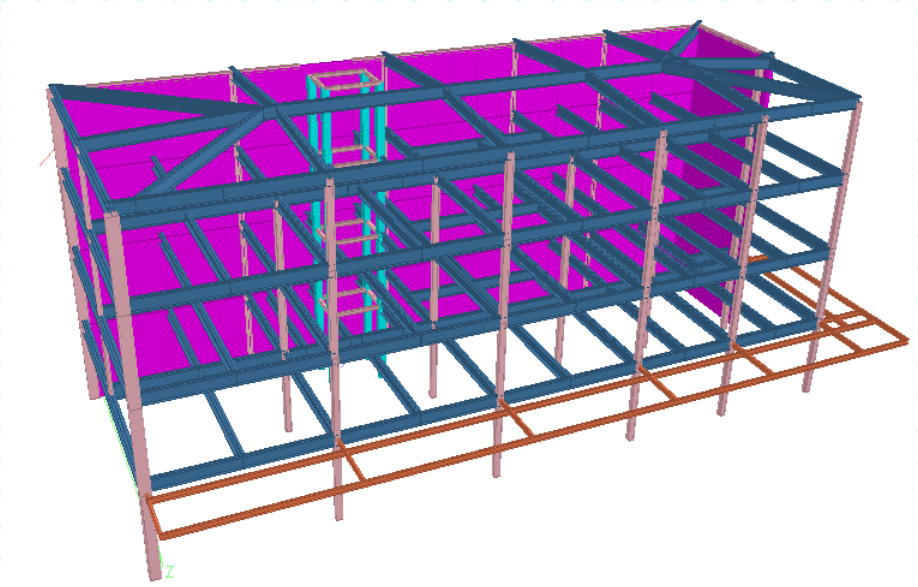
Wall	-0.95		-0.95	
Pressure	-0.91485		-0.91485	
	Roof			
-0.8	-0.9		-1.6	0.4
-0.7704	-0.87		-1.54	0.3852

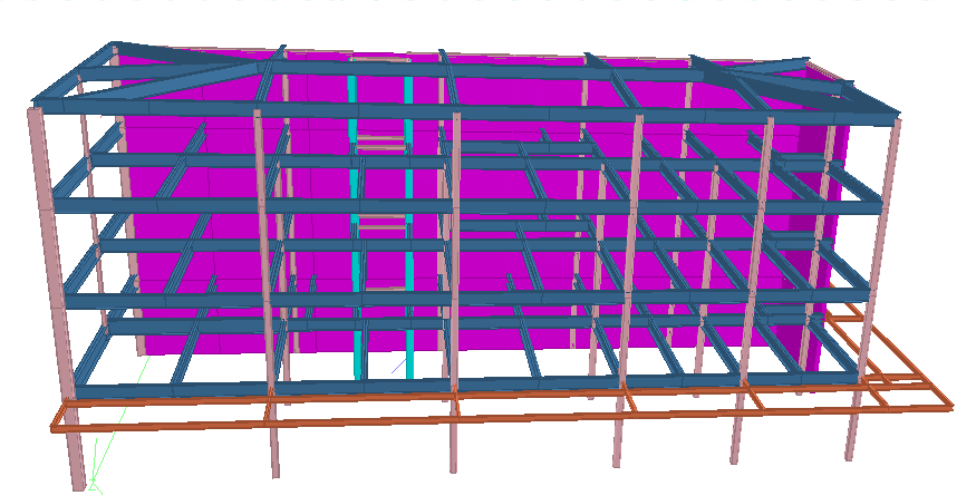
Wind -Z

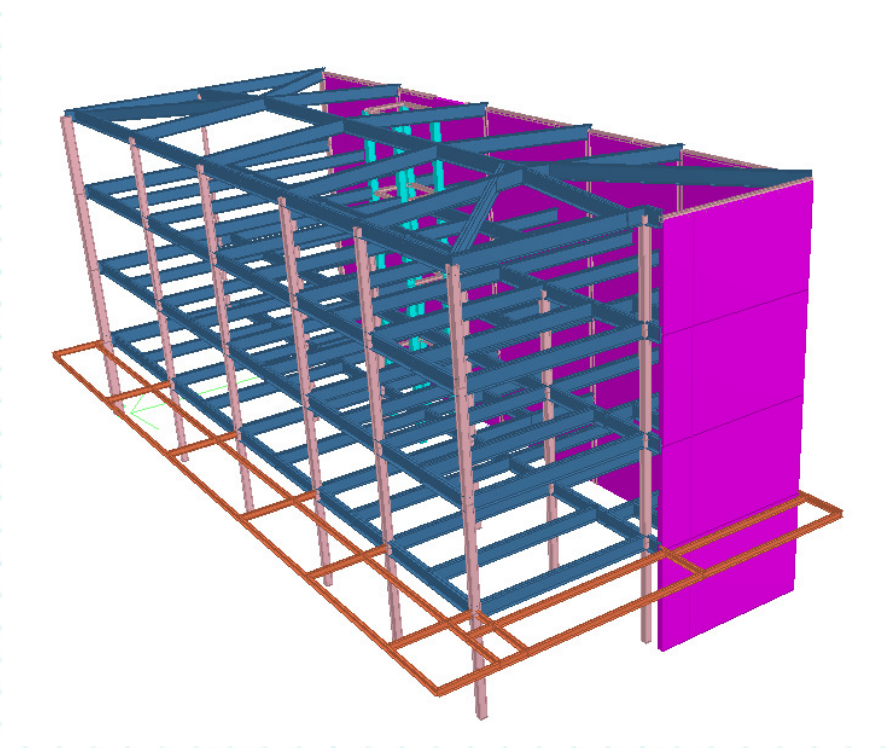
0 to 7.835 Cpi (downward wind) 0 to 7.835 Cpi (upward wind)

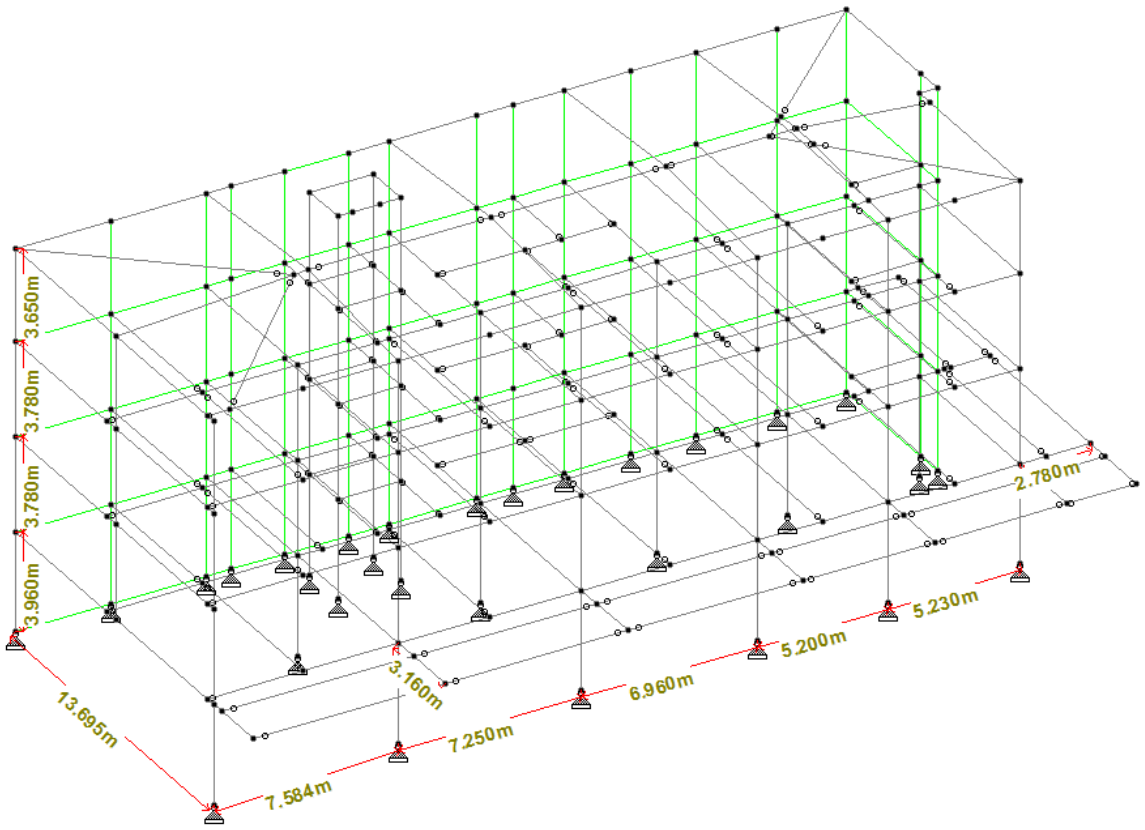
DESIGN OF THE MAIN STRUCTURE

GEOMETRICAL DATA (3D VIEW)



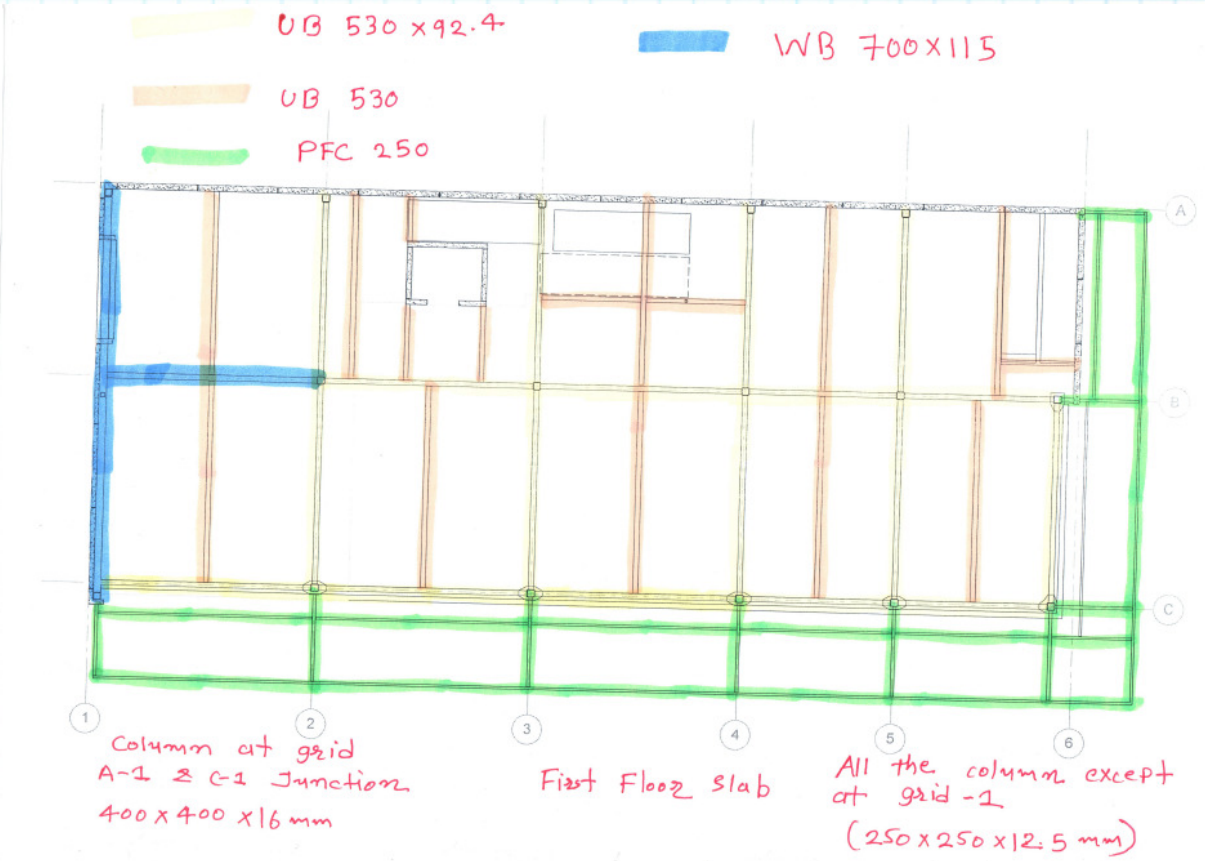




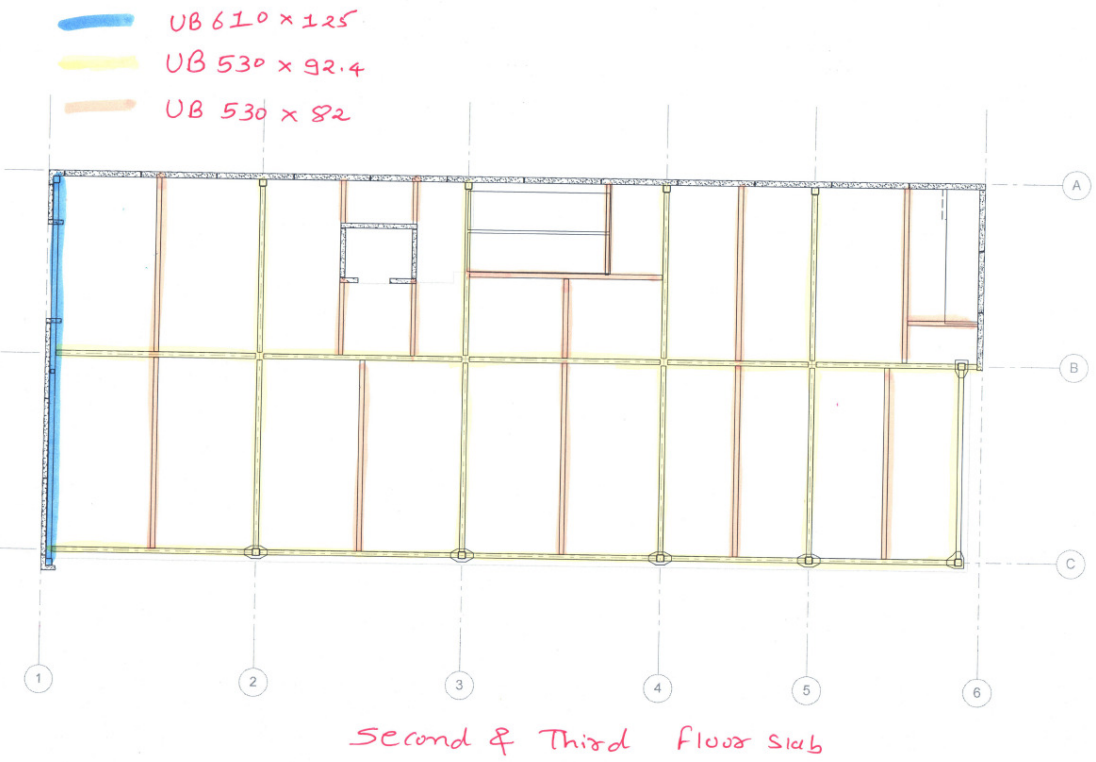


Support Condition
All column supports are considered as Pinned.

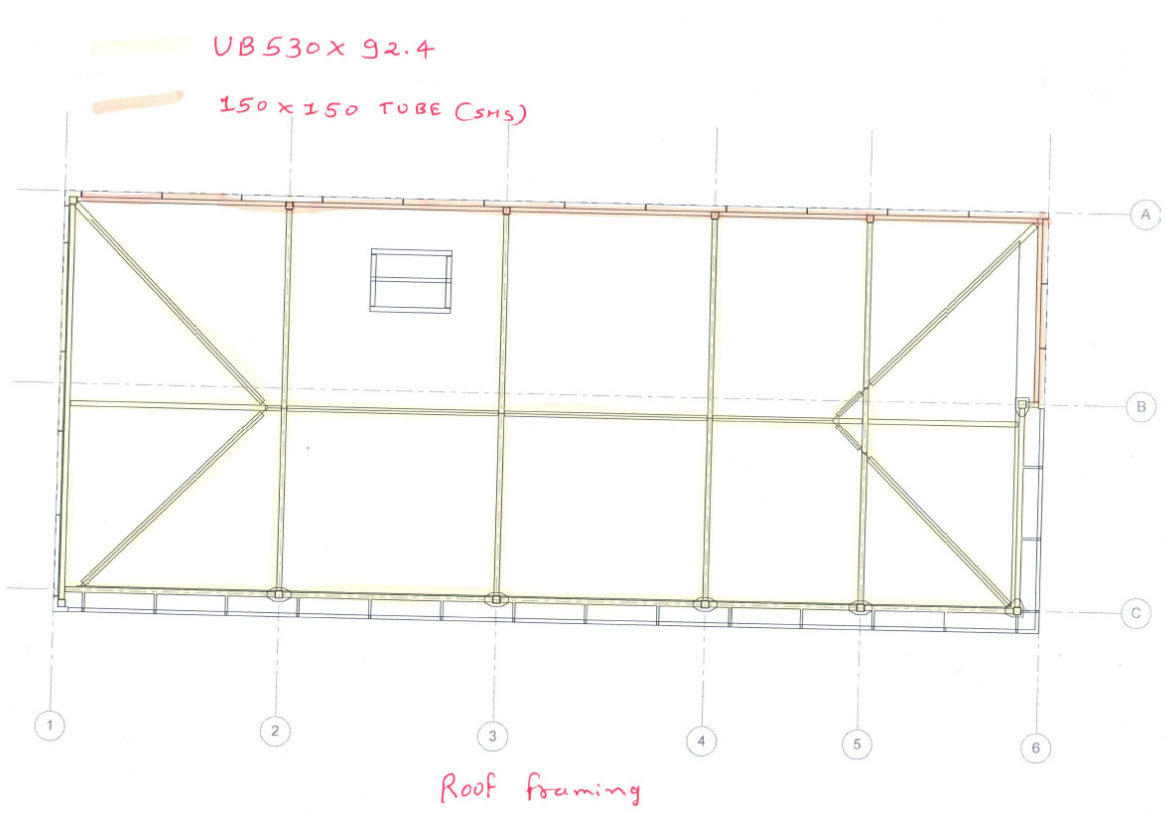
Member Property of First Floor Slab



Member Property of Second and Third Floor Slab



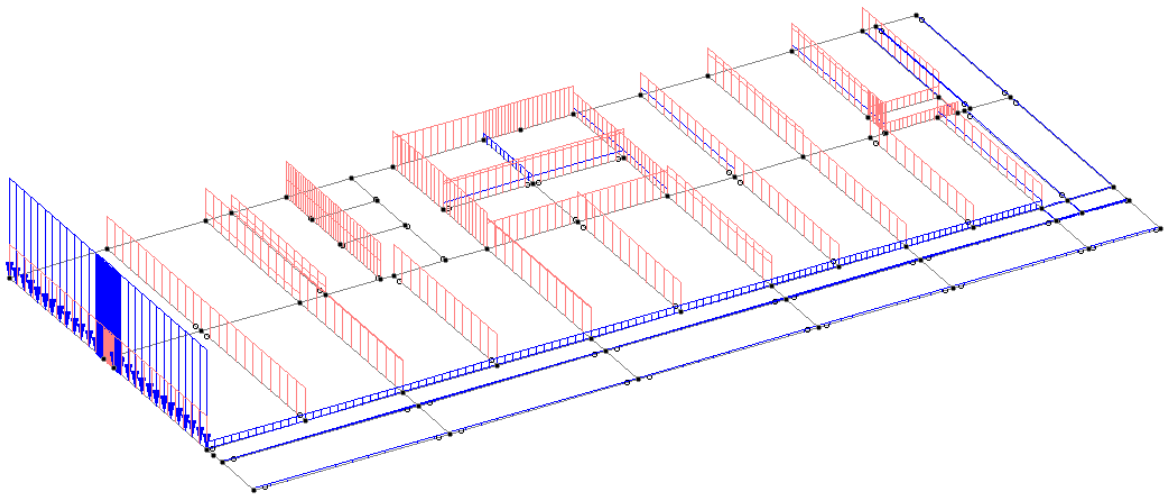
Member Property of Roof Floor Slab



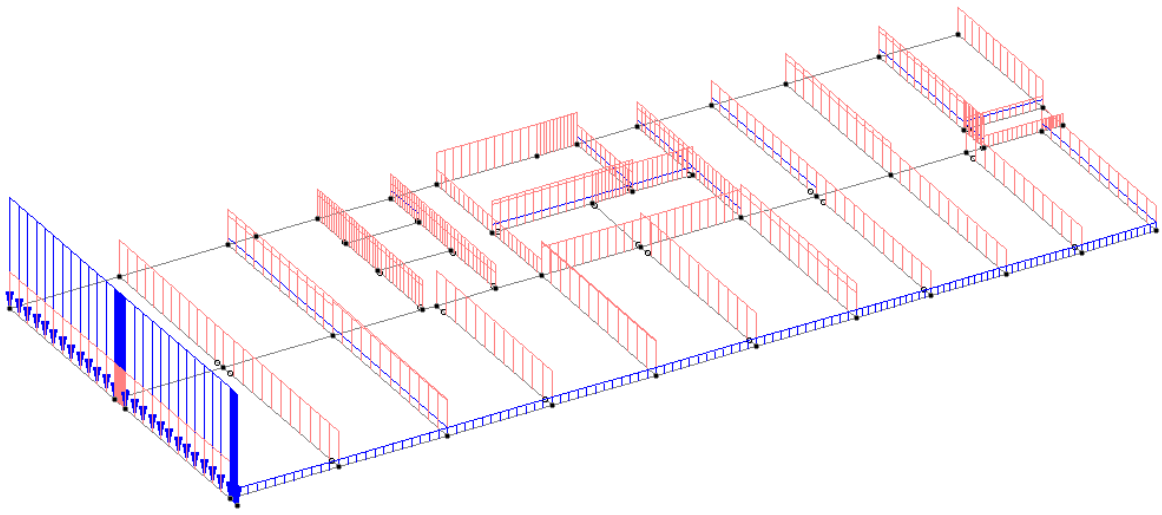
Loading Data

Dead load

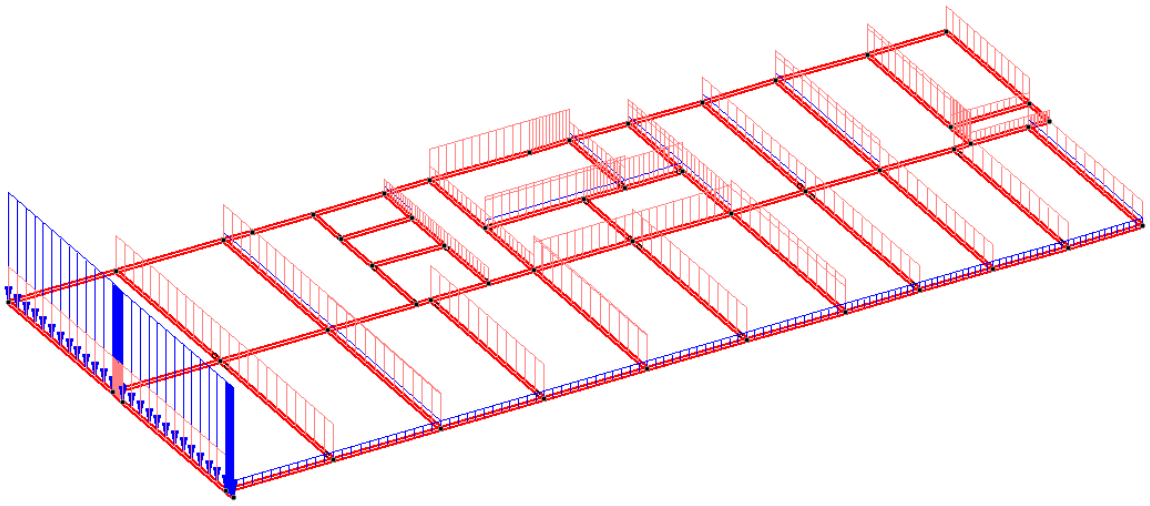
First floor slab dead load



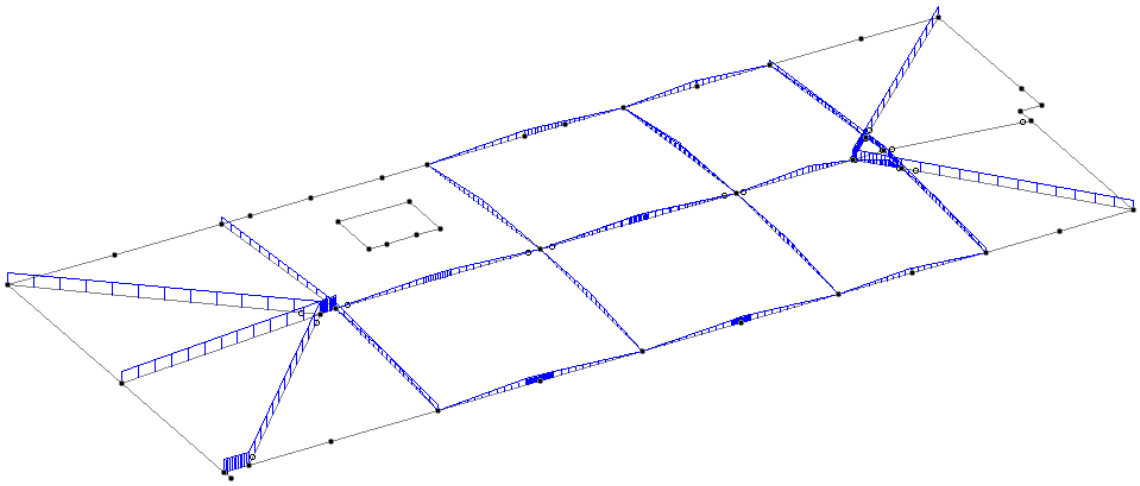
Second floor slab dead load



Third floor slab dead load

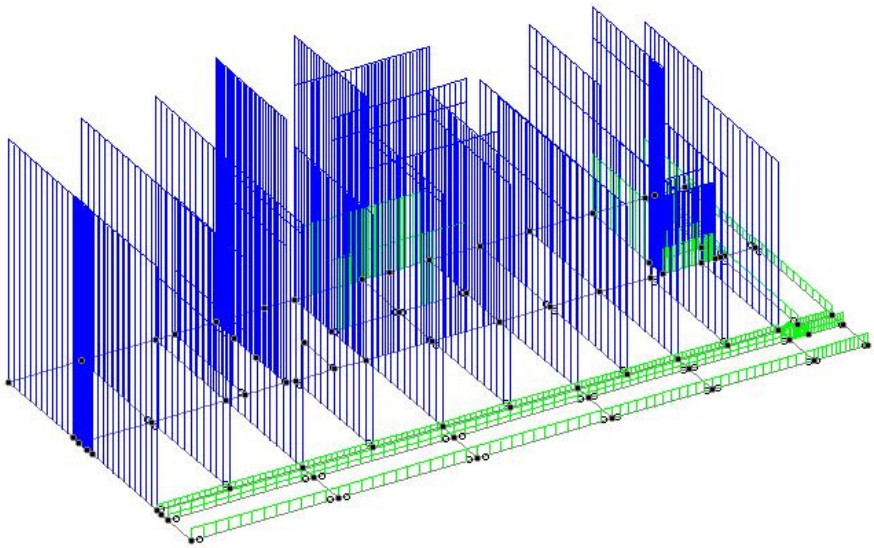


Roof dead load

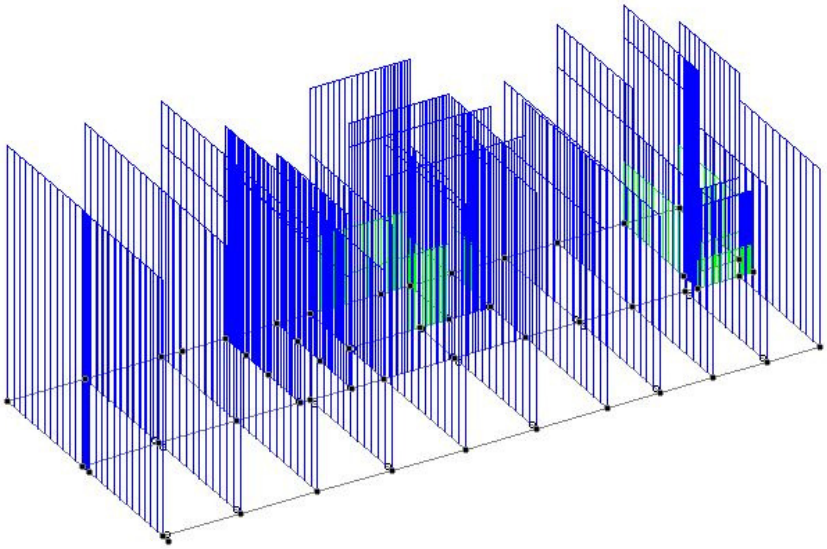


Live load

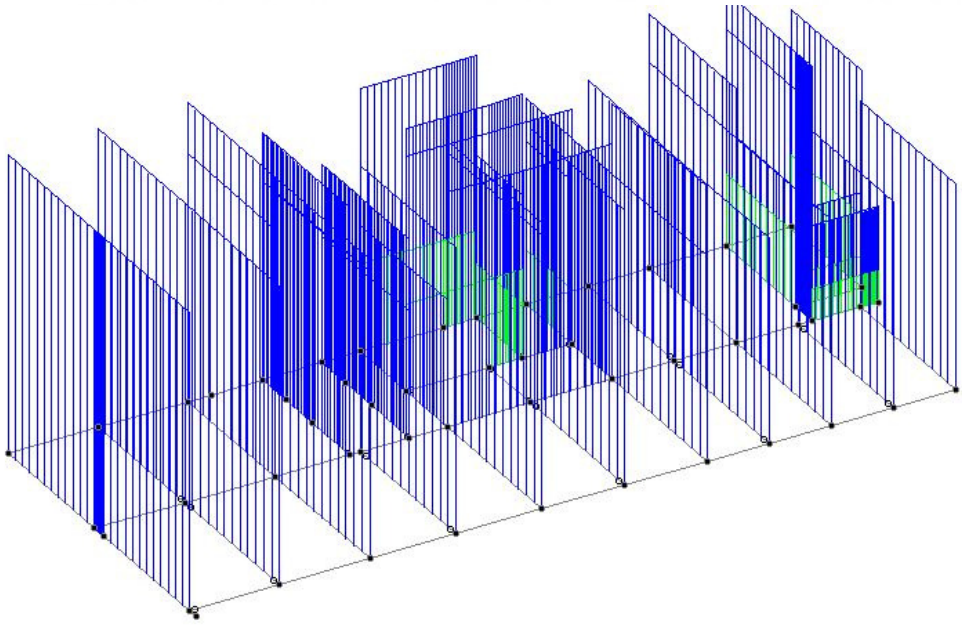
First floor slab live load



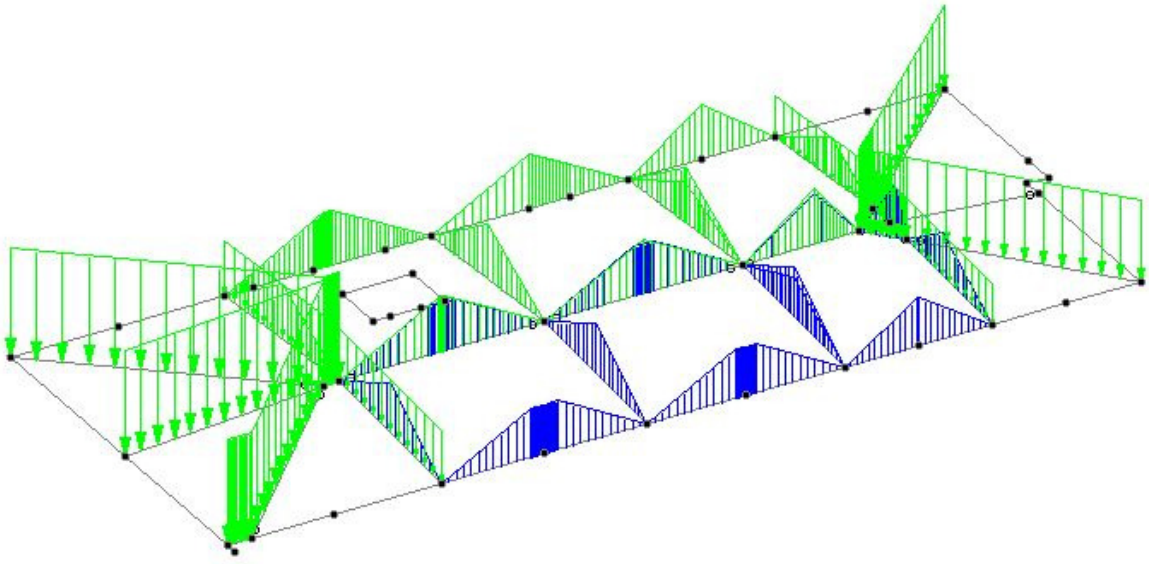
Second floor slab live load



Third floor slab live load

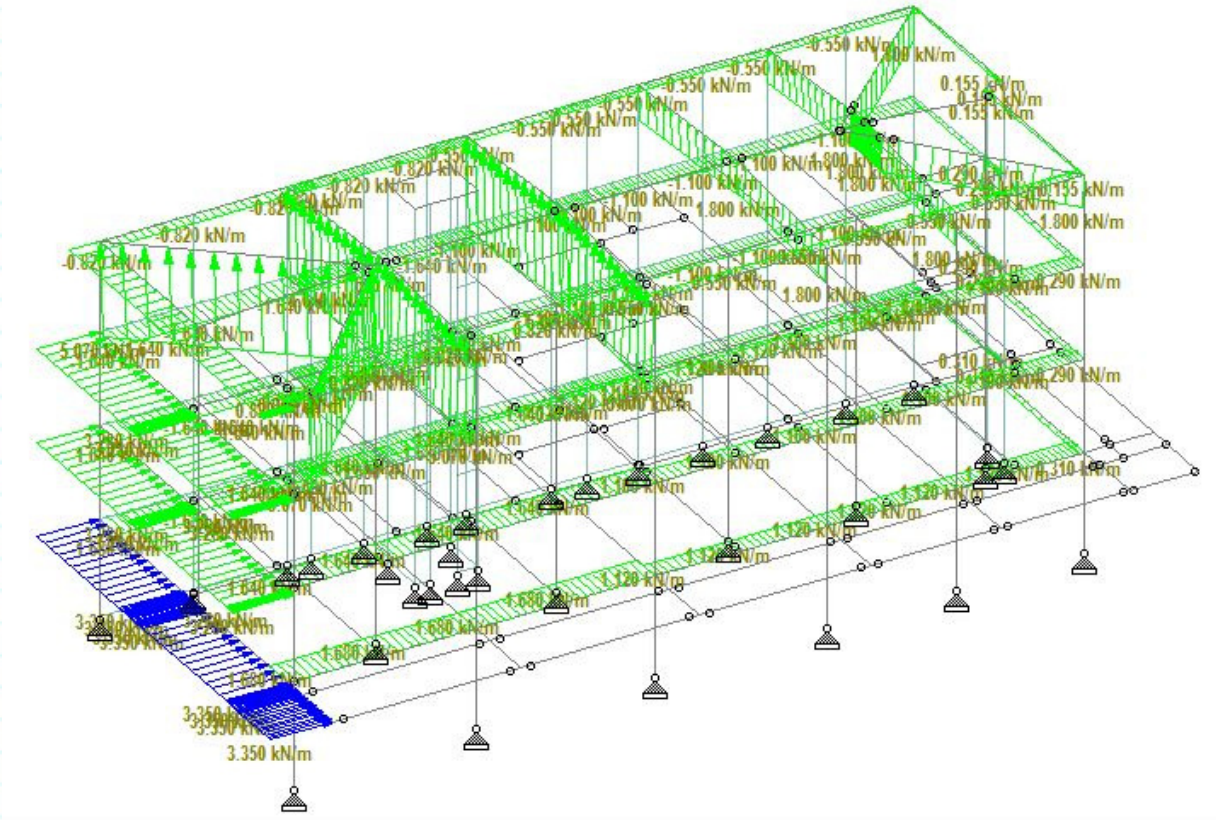


Roof live load



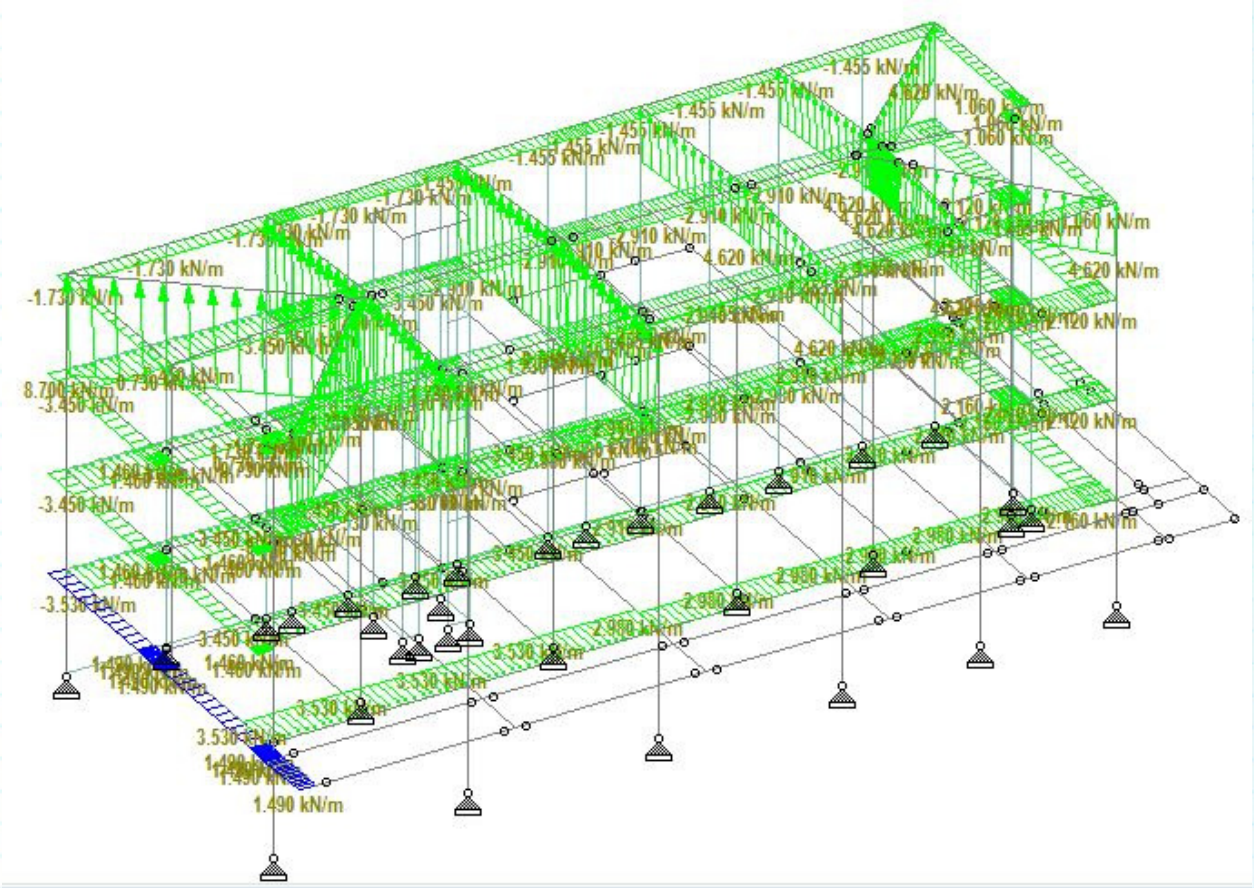
Wind Load

Wind + X (CPE + CPI)



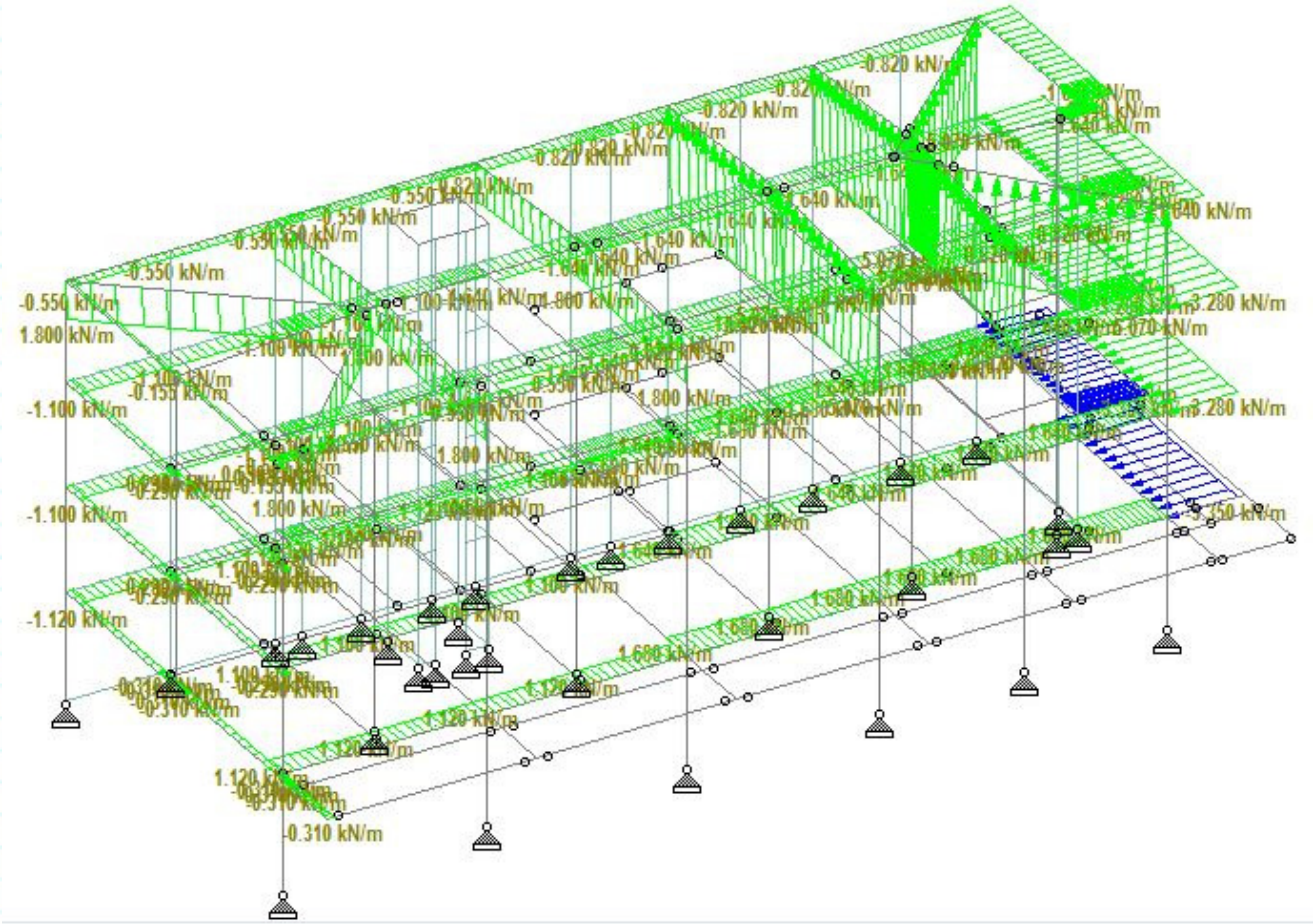
Wind load on members for the case of Wind + X (CPE + CPI) Direction

Wind + X (CPE - CPI)



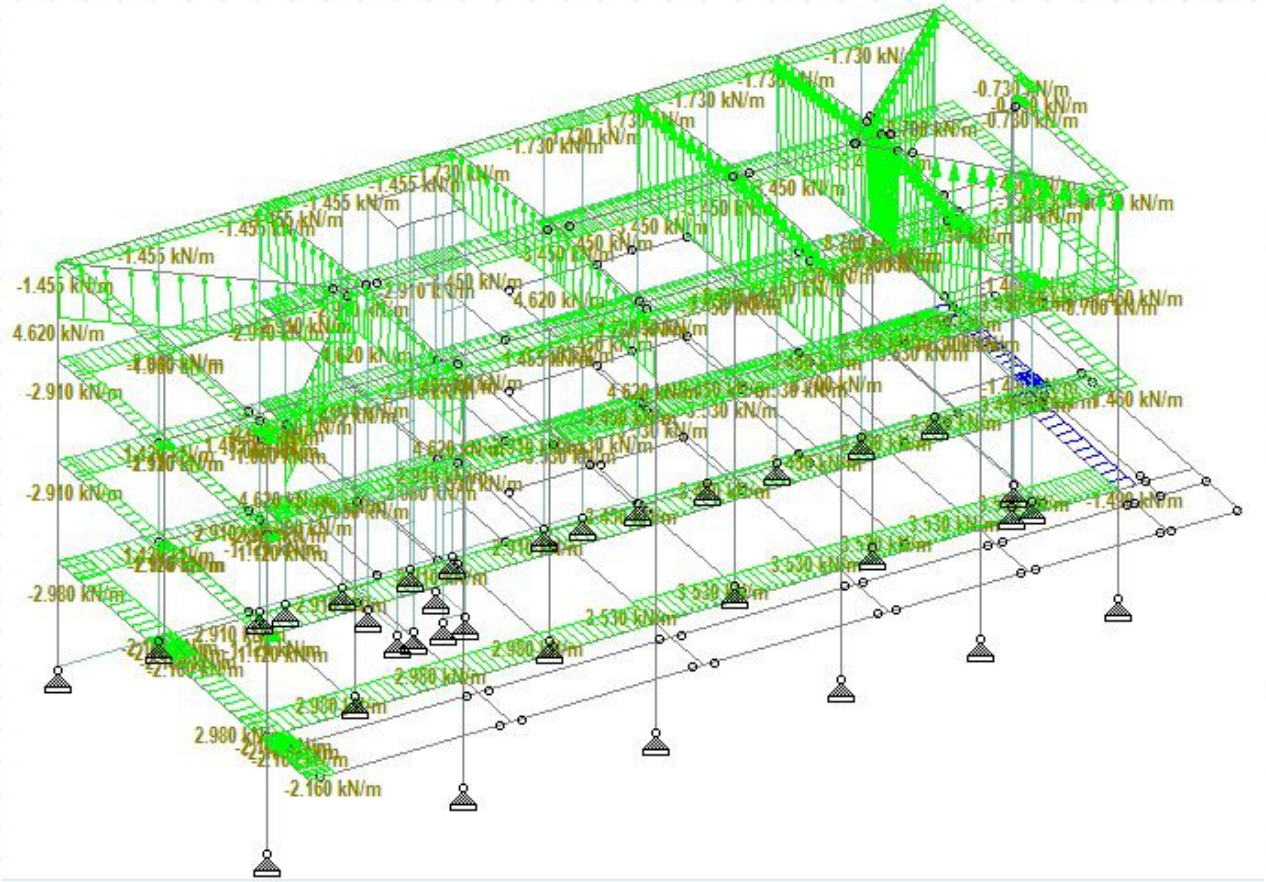
Wind load on members for the case of Wind + X (CPE - CPI) Direction

Wind - X (CPE + CPI)



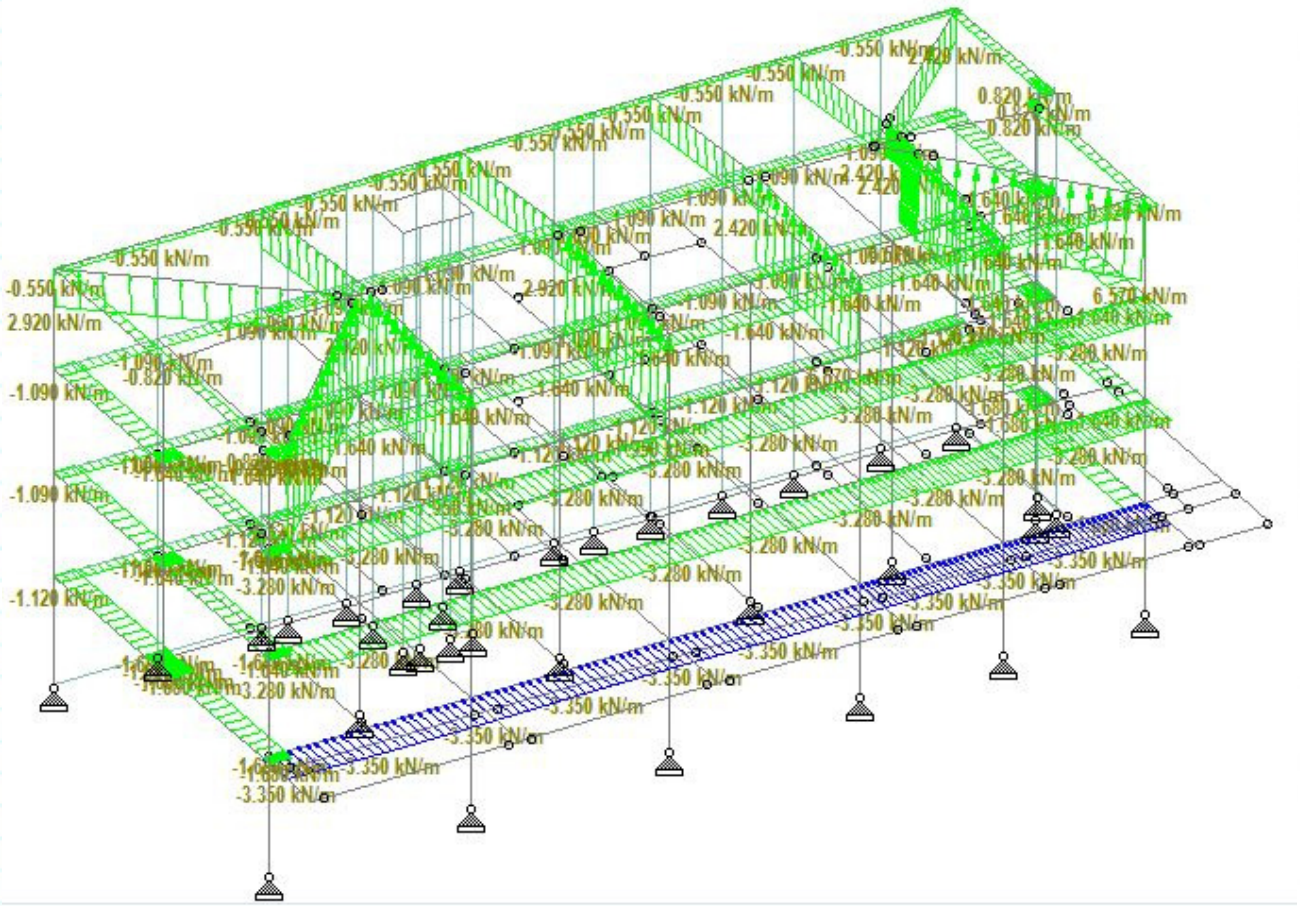
Wind load on members for the case of Wind - X (CPE + CPI) Direction

Wind - X (CPE - CPI)



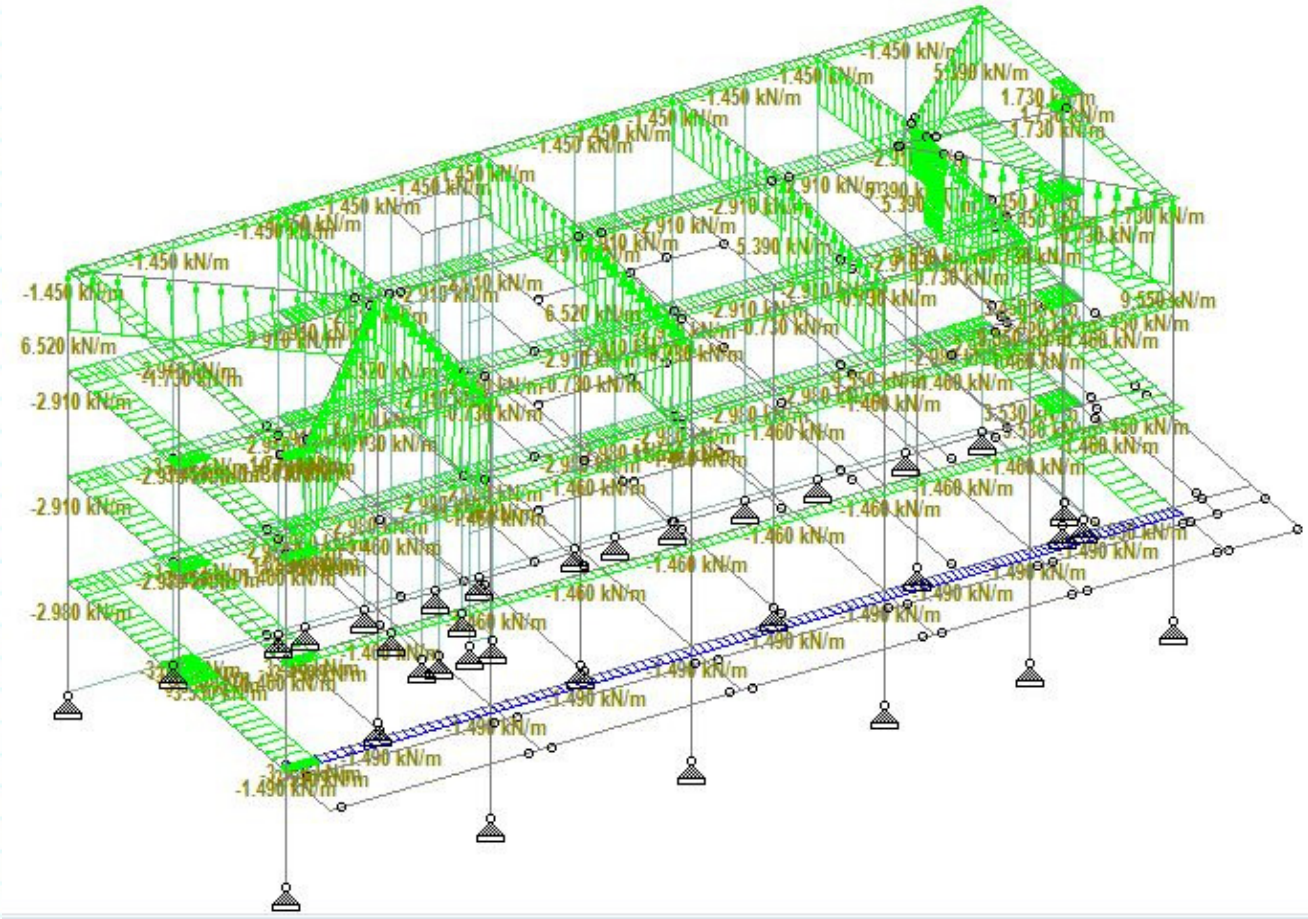
Wind load on members for the case of Wind - X (CPE - CPI) Direction

Wind + Z (CPE + CPI)



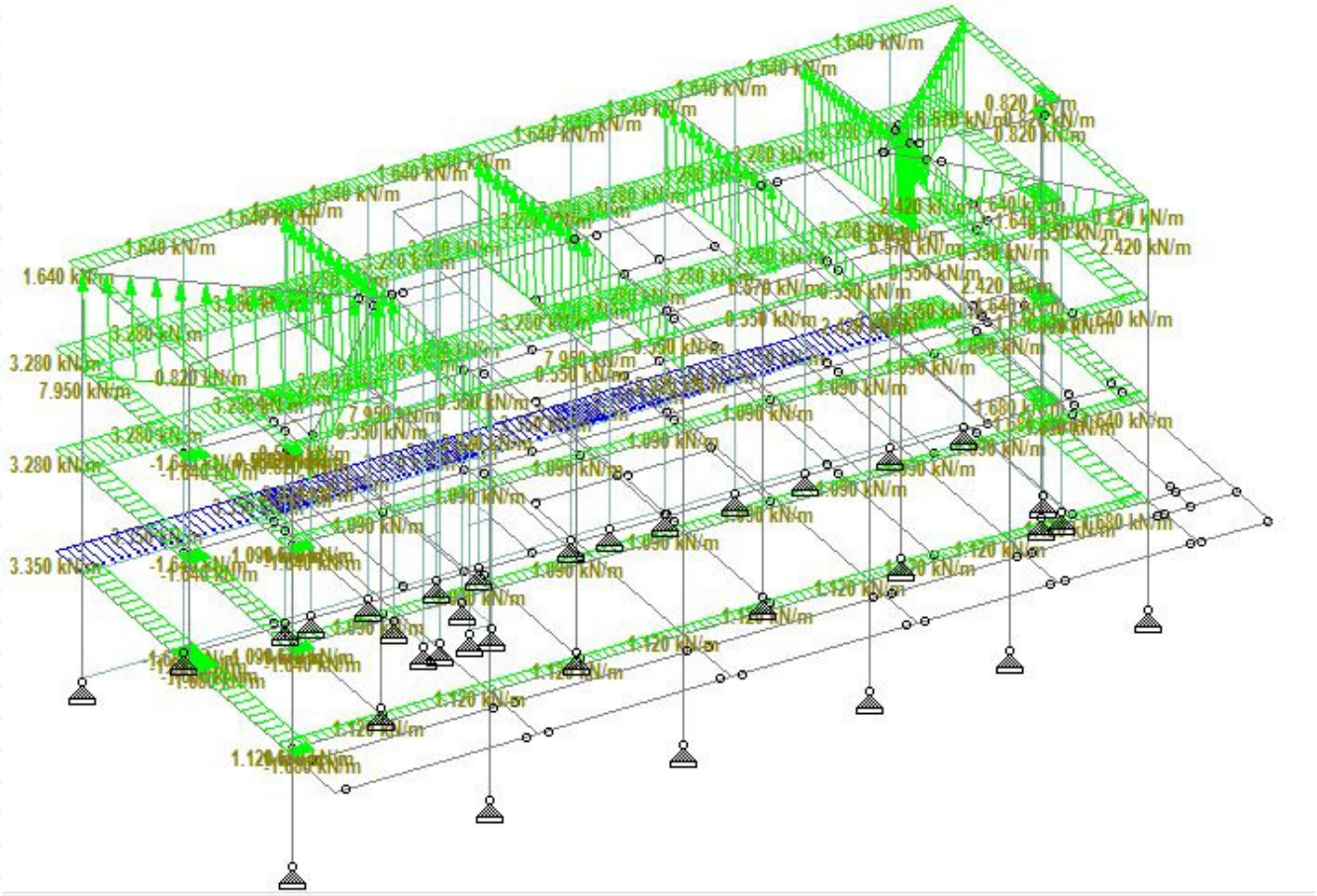
Wind load on members for the case of Wind + Z (CPE + CPI) Direction

Wind + Z (CPE - CPI)



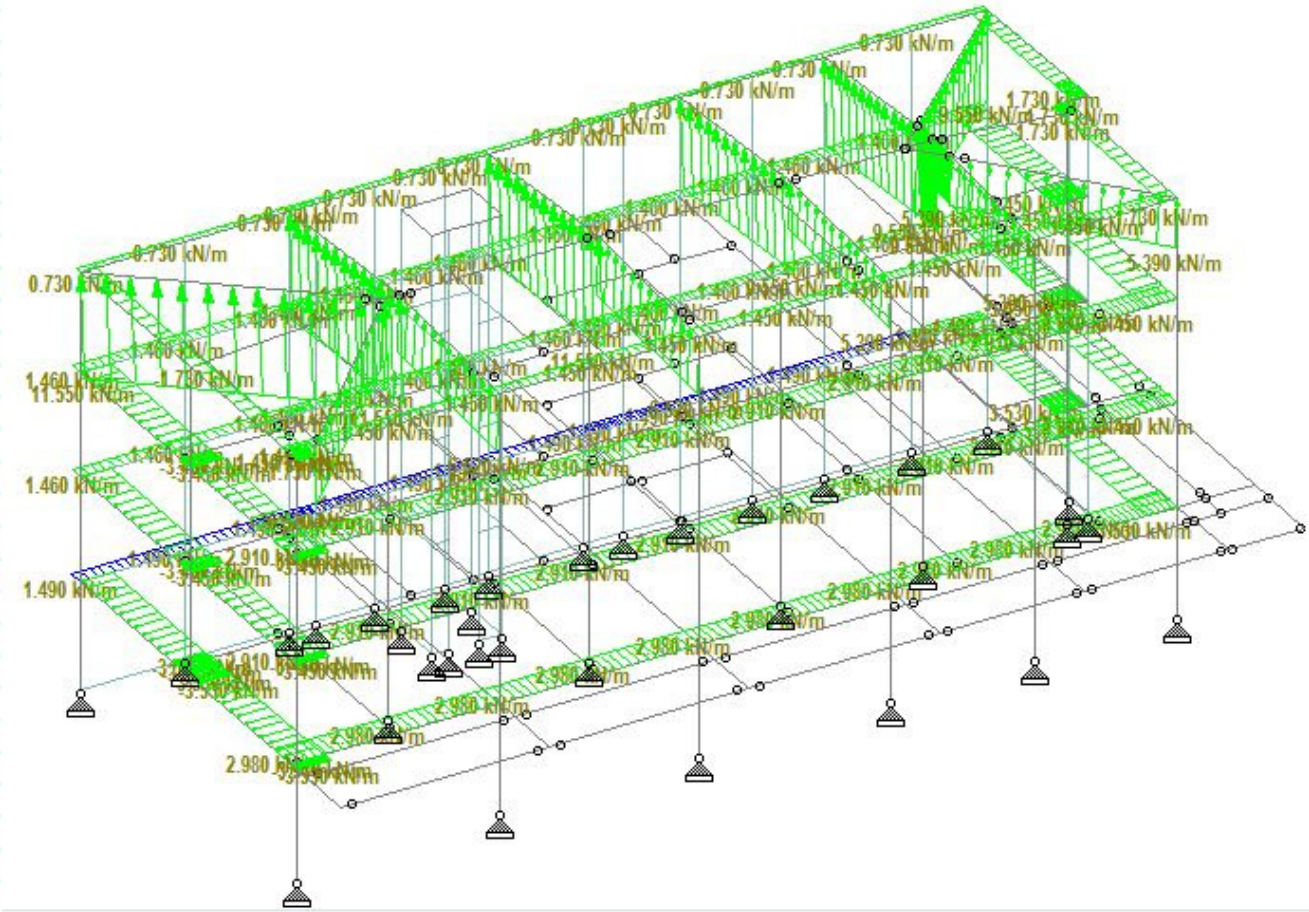
Wind load on members for the case of Wind + Z (CPE - CPI) Direction

Wind - Z (CPE + CPI)



Wind load on members for the case of Wind - Z (CPE + CPI) Direction

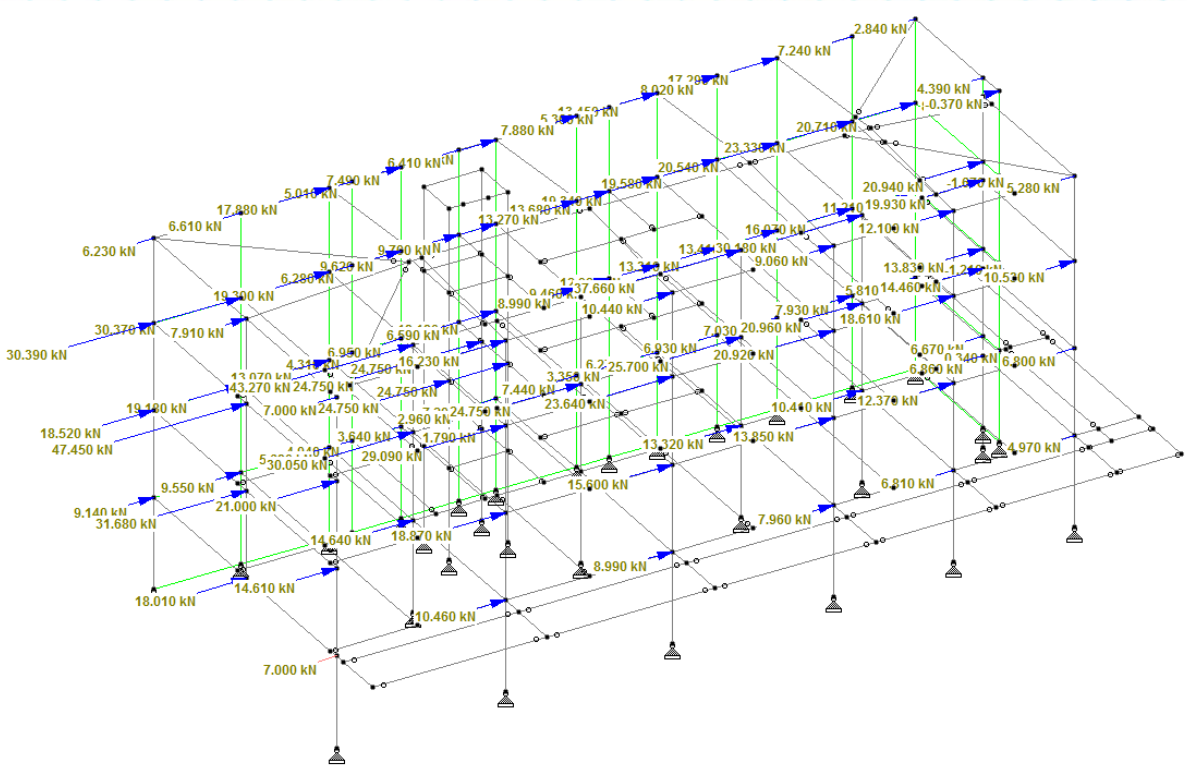
Wind - Z (CPE - CPI)



Wind load on members for the case of Wind - Z (CPE - CPI) Direction

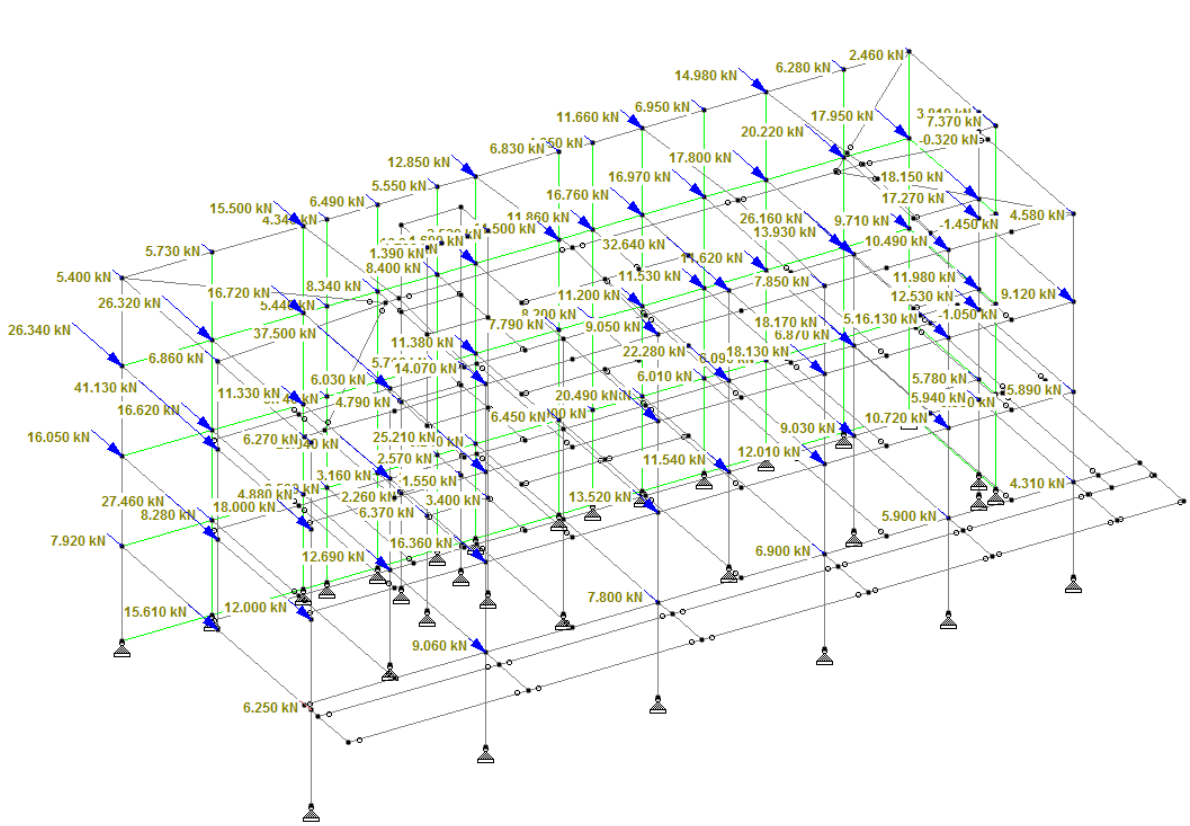
EARTHQUAKE LOAD

EARTHQUAKE + X



Earthquake load on joints for the case of Earthquake +X Direction

EARTHQUAKE + Z



Earthquake load on joints for the case of Earthquake +Z Direction

- **Design Load Cases**

For Steel Roof structure

LOAD 1 DEAD LOAD
LOAD 2 LIVE LOAD
LOAD 3 WIND + X (CPE + CPI)
LOAD 4 WIND + X (CPE - CPI)
LOAD 5 WIND -X (CPE + CPI)
LOAD 6 WIND - X (CPE - CPI)
LOAD 7 WIND + Z (CPE + CPI)
LOAD 8 WIND +Z (CPE - CPI)
LOAD 9 WIND - Z (CPE +CPI)
LOAD 10 WIND - Z (CPE - CPI)
LOAD 11 EARTHQUAKE + Z
LOAD 12 EARTHQUAKE - Z

Design Load Combinations(Clause 4.2.2 NZS1170.0:2002)
For Steel Roof structure design

1) LOAD COMB 101 1.35DL
2) LOAD COMB 102 1.2DL + 1.5LL
3) LOAD COMB 104 1.2DL + 0.4LL + 1.0 (WL+ X (CPE + CPI))
4) LOAD COMB 105 1.2DL + 0.4LL + 1.0 (WL- X (CPE + CPI))
5) LOAD COMB 106 1.2DL + 0.4LL + 1.0 (WL+ Z (CPE + CPI))
6) LOAD COMB 107 1.2DL + 0.4LL + 1.0 (WL-Z (CPE + CPI))
7) LOAD COMB 108 1.2DL + 0.4LL + 1.0 (WL+ X (CPE - CPI))
8) LOAD COMB 109 1.2DL + 0.4LL + 1.0 (WL- X (CPE - CPI))
9) LOAD COMB 110 1.2DL + 0.4LL + 1.0 (WL+ Z (CPE - CPI))
10) LOAD COMB 111 1.2DL + 0.4LL + 1.0 (WL-Z (CPE - CPI))
11) LOAD COMB 112 0.9DL + 1.0 (WL+ X (CPE + CPI))
12) LOAD COMB 113 0.9DL + 1.0 (WL+ Z(CPE + CPI))
13) LOAD COMB 114 0.9DL + 1.0 (WL- Z (CPE + CPI))
14) LOAD COMB 115 0.9DL + 1.0 (WL-X (CPE + CPI))
15) LOAD COMB 116 0.9DL + 1.0 (WL- X (CPE - CPI))
16) LOAD COMB 117 0.9DL + 1.0 (WL+ X (CPE - CPI))
17) LOAD COMB 118 0.9DL + 1.0 (WL+ Z (CPE - CPI))

18) LOAD COMB 119 0.9DL + 1.0 (WL-Z (CPE - CPI))
19) LOAD COMB 120 1.0DL + 0.3LL + 1.0 EQ+Z + 0.3 EQ +X
20) LOAD COMB 121 1.0DL + 0.3LL + 1.0 EQ-Z + 0.3 EQ-X
21) LOAD COMB 122 1.0DL + 0.3LL + 1.0 EQ+X + 0.3 EQ+Z
22) LOAD COMB 123 1.0DL + 0.3LL + 1.0 EQ –X + 0.3 EQ-Z

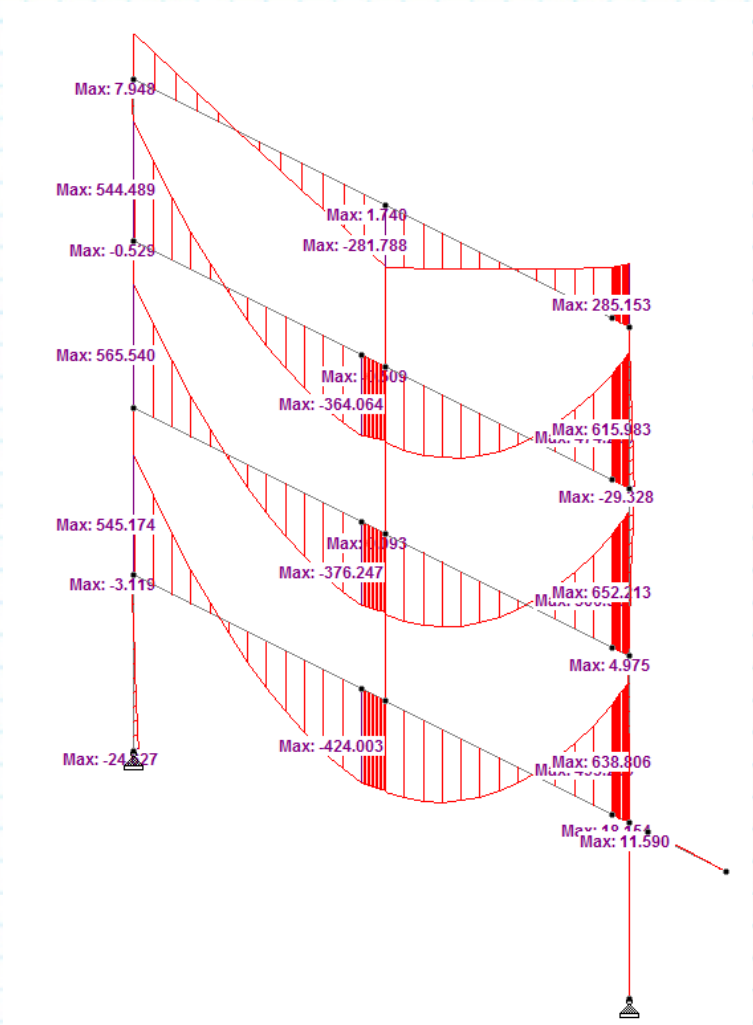
For Foundation design

23) LOAD COMB 201 1.0DL + 1.0LL
24) LOAD COMB 202 1.0DL + 1.0 (WL+ X (CPE + CPI))
25) LOAD COMB 203 1.0DL + 1.0 (WL- X (CPE + CPI))
26) LOAD COMB 204 1.0DL + 1.0 (WL+ Z (CPE + CPI))
27) LOAD COMB 205 1.0DL + 1.0 (WL-Z (CPE + CPI))
28) LOAD COMB 206 1.0DL + 1.0 (WL+ X (CPE - CPI))
29) LOAD COMB 207 1.0DL + 1.0 (WL- X (CPE - CPI))
30) LOAD COMB 208 1.0DL + 1.0 (WL+ Z (CPE - CPI))
31) LOAD COMB 209 1.0DL + 1.0 (WL-Z (CPE - CPI))
32) LOAD COMB 210 1.0DL + 1.0 EQ+Z + 0.3EQ+X
33) LOAD COMB 211 1.0DL + 1.0 EQ –Z + 0.3EQ-X
34) LOAD COMB 212 1.0DL + 1.0 EQ +X + 0.3EQ+Z
35) LOAD COMB 213 1.0DL + 1.0 EQ–X +0.3EQ-Z

(For Frame on Grid 1)

Value of B.M for 1.2DL + 1.5LL

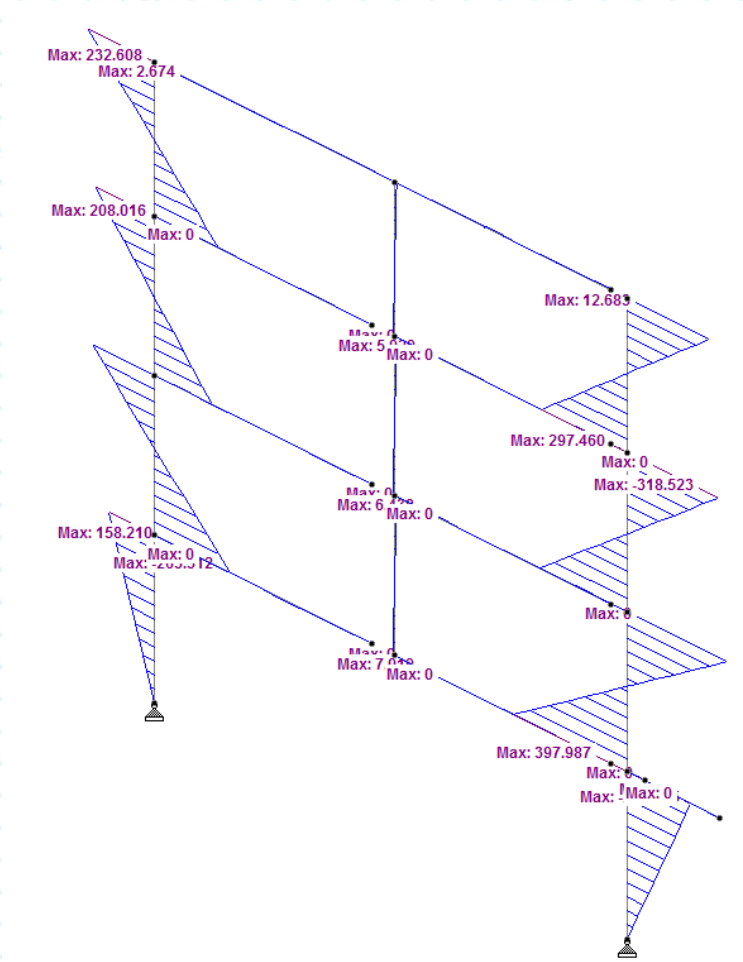
Bending Moment Diagram (Mz)



(For Frame on Grid 1)

Value of B.M for 1.2DL + 1.5LL

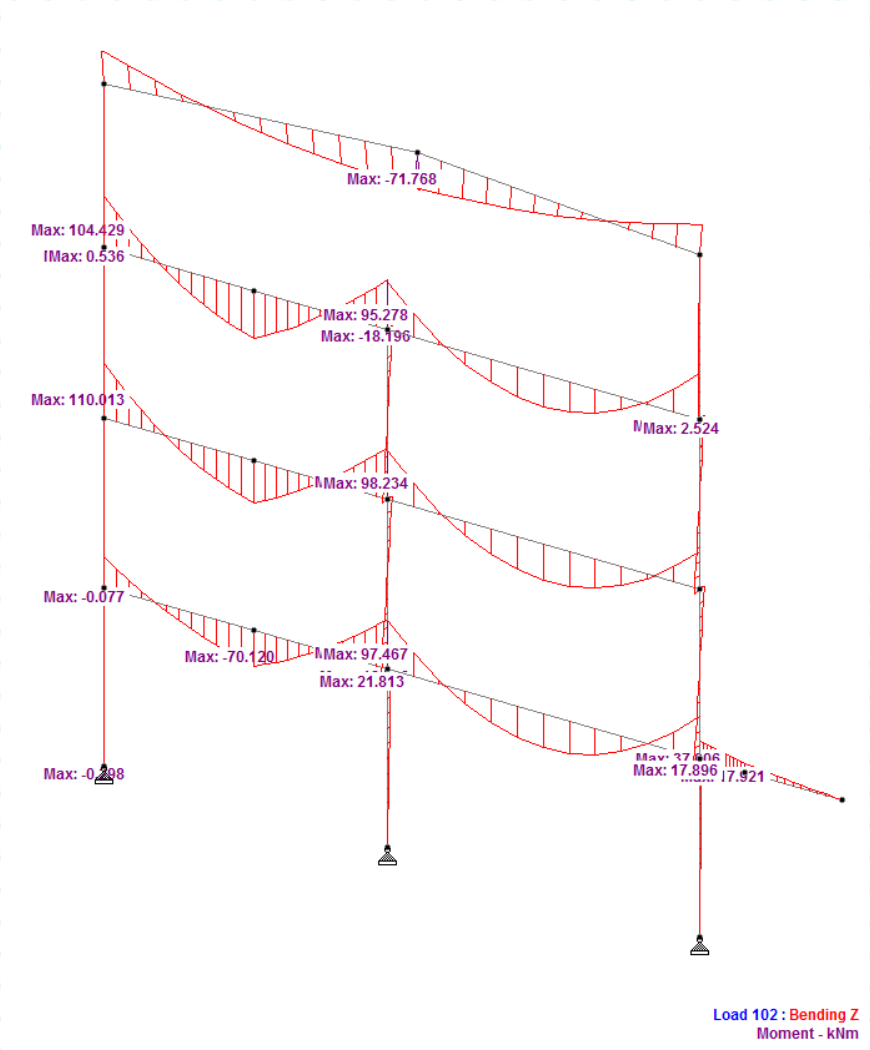
Bending Moment Diagram (My)



(For Frame on Grid 4)

Value of B.M for 1.2DL + 1.5LL

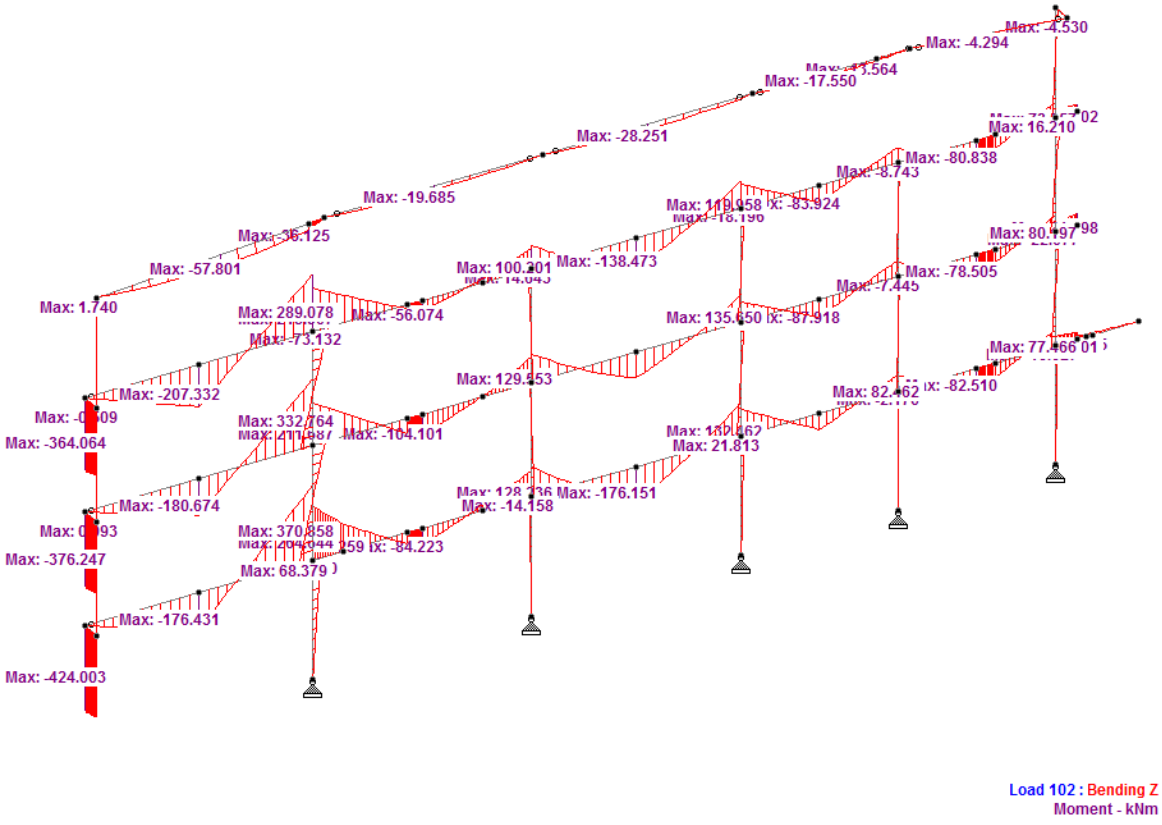
Bending Moment Diagram (Mz)



(For Frame on Grid B)

Value of B.M for 1.2DL + 1.5LL

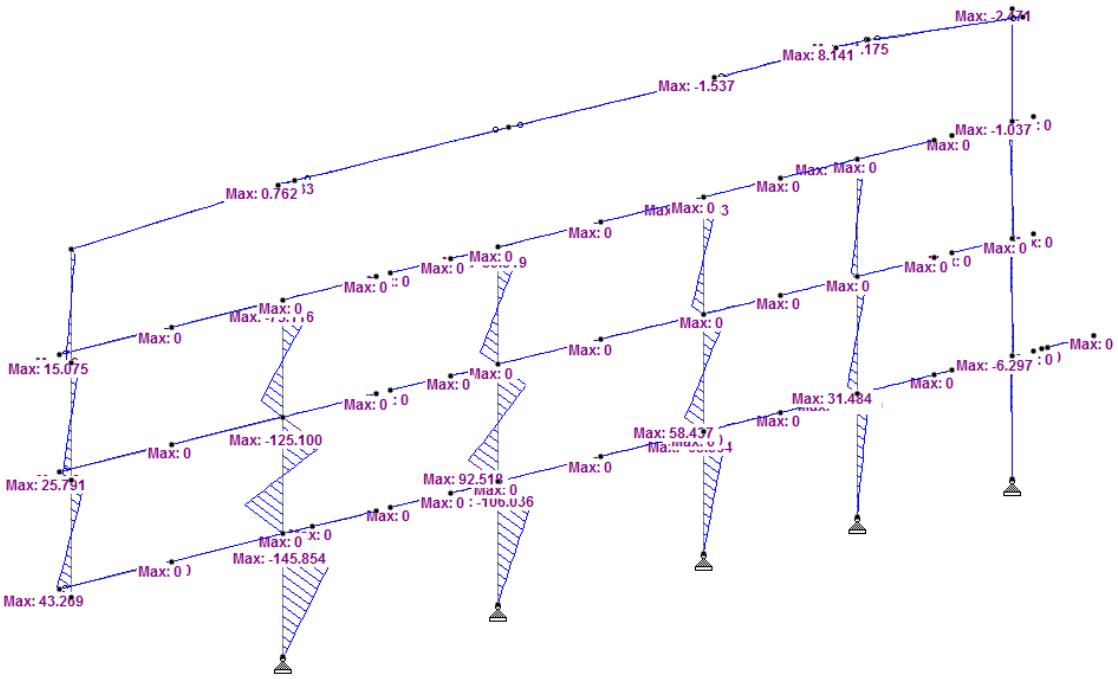
Bending Moment Diagram (Mz)



(For Frame on Grid B)

Value of B.M for 1.0DL + 0.3LL + 1.0EQ+Z + 0.3EQ+X

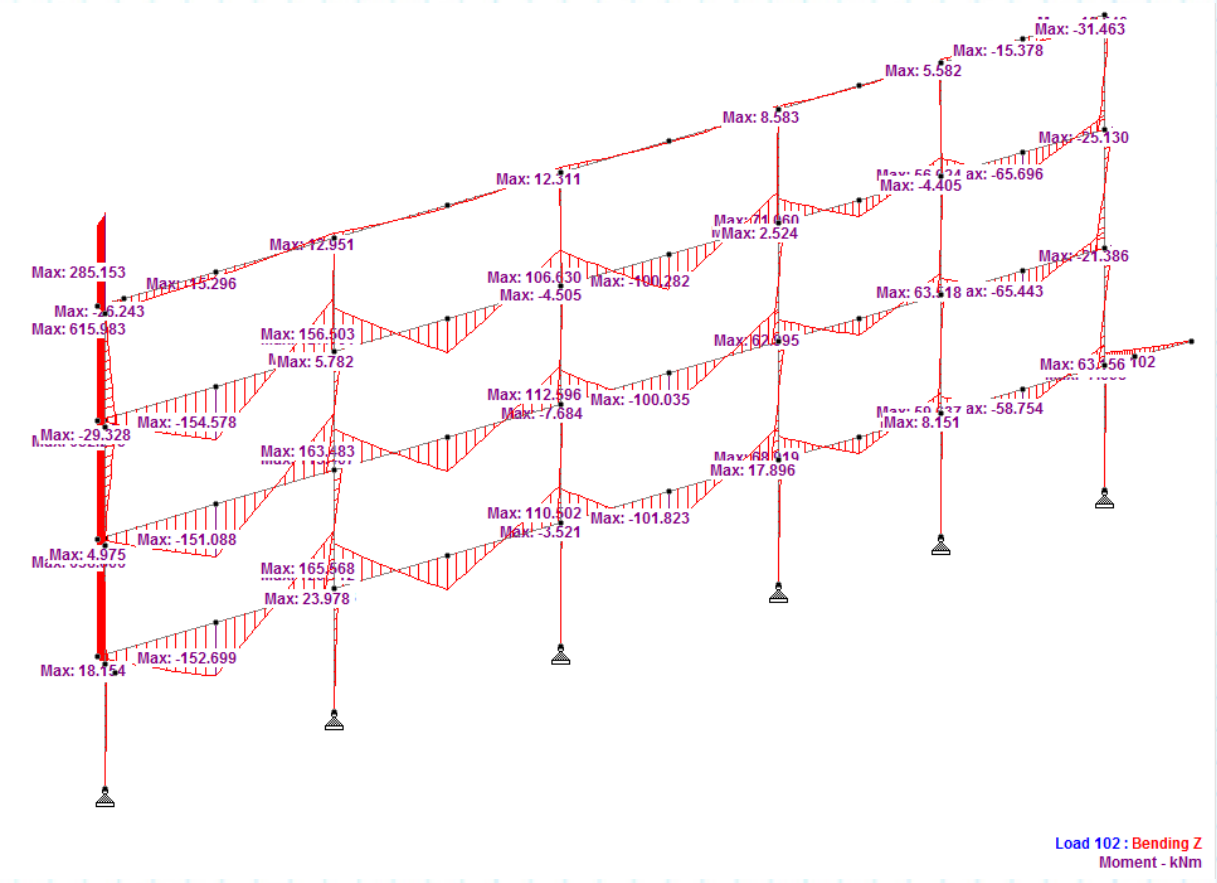
Bending Moment Diagram (My)



(For Frame on Grid C)

Value of B.M for 1.2DL + 1.5LL

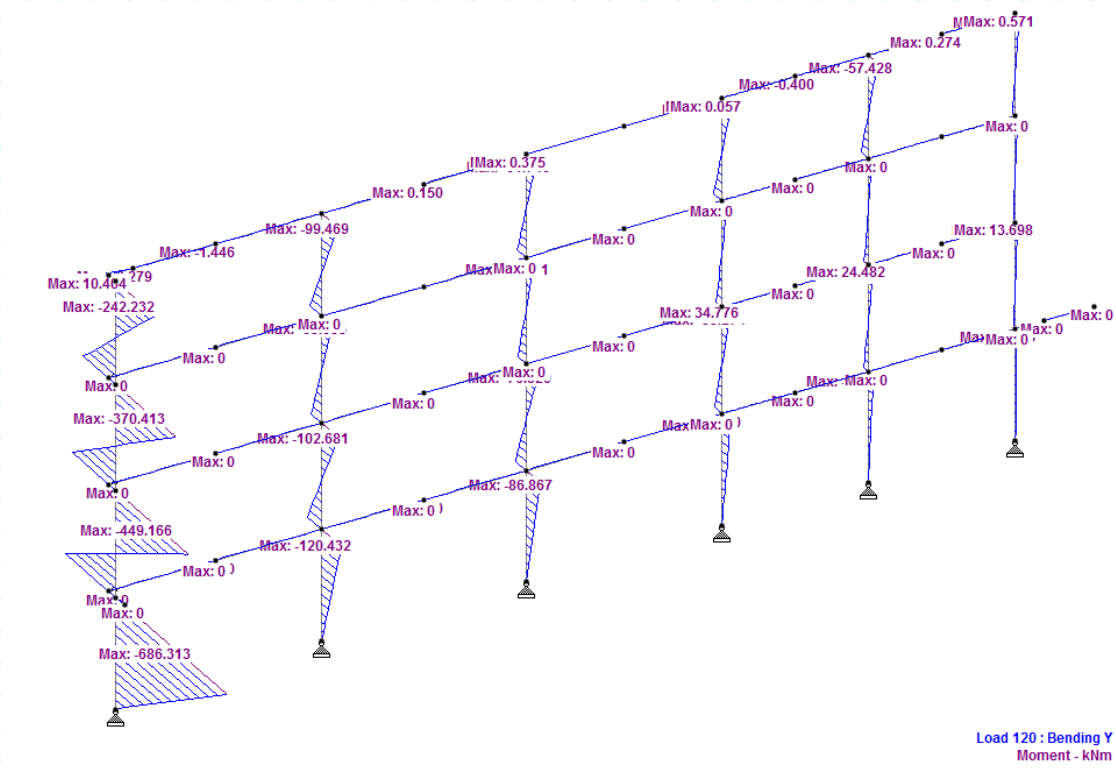
Bending Moment Diagram (Mz)



(For Frame on Grid C)

Value of B.M for 1.0DL + 0.3LL + 1.0EQ+Z + 0.3EQ+X

Bending Moment Diagram (My)



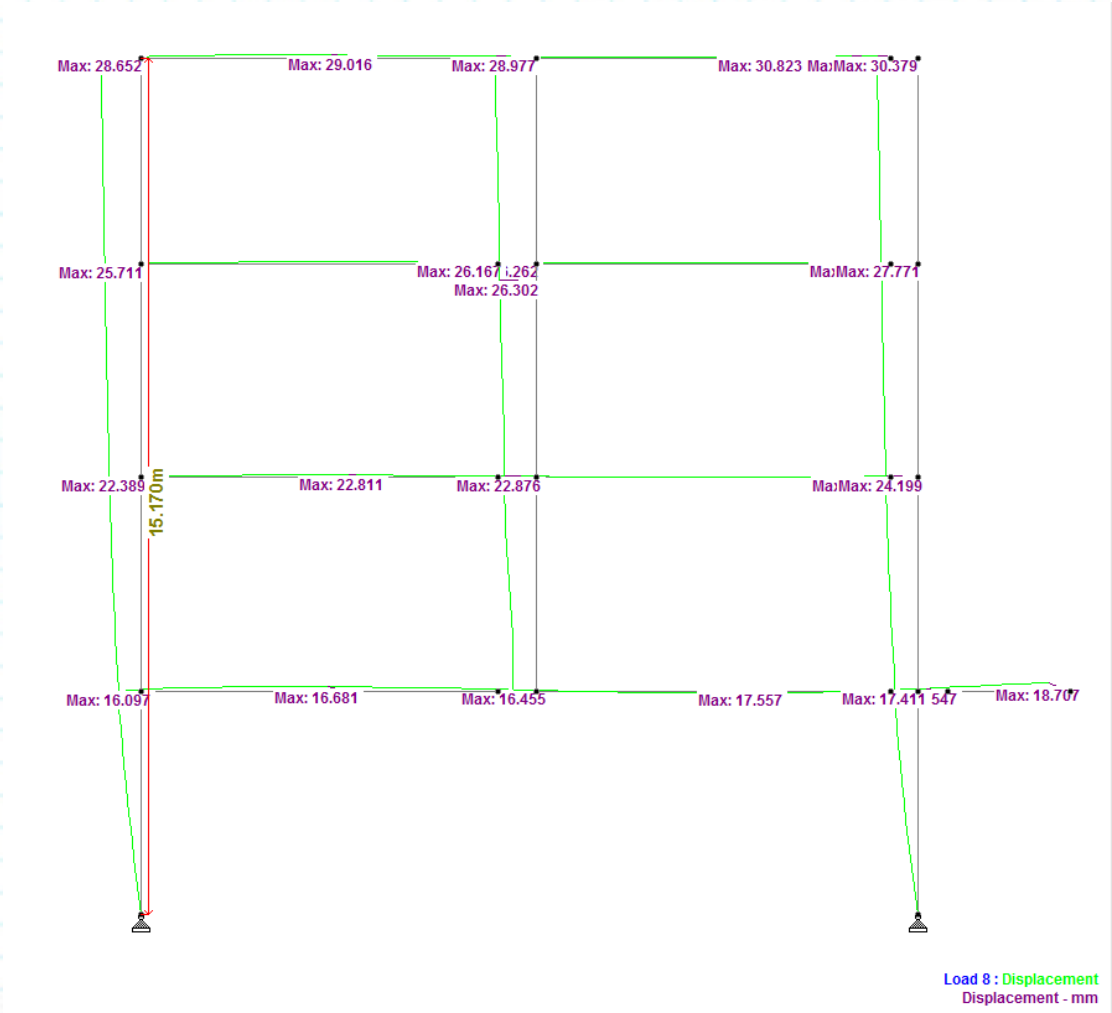
Deflection Limits:- (Table C1 NZS1170.0:2002)

Metal Roof Cladding = Span/600 < 0.5mm(Applied Load 1 kN)
Roof Members (Trusses, Rafter, etc) = Span/600 (Dead Load +Factored Imposed Load)
Column = 2.5 % of Storey Height (Earthquake Load)
Columns = Height/500 (Wind Load)
Portal Frames = Spacing/200 (Wind Load)
Lintel Beams = Span/240 (Wind Load)
Beams = Span/300 (Dead Load +Factored Imposed Load)
Flooring = Span/300 (Dead Load +Factored Imposed Load)
Floor Joist =Span/300 (Dead Load +Factored Imposed Load)

Grid 1 WIND +Z (CPE - CPI)

Maximum Allowable Deflection = Height/500 = 15170/500 = 30.34 mm

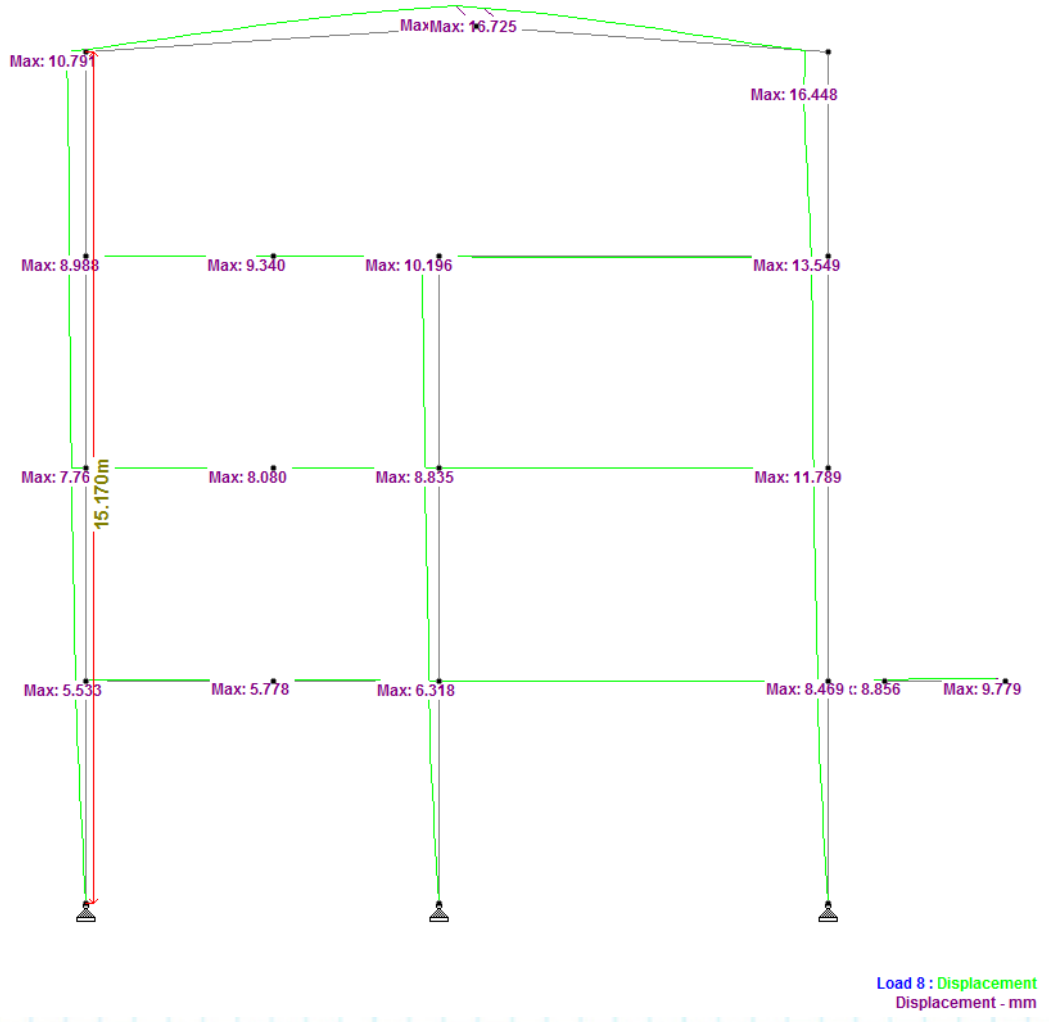
Actual maximum deflection = 30.8mm (Hence OK)



Grid 4 WIND +Z (CPE - CPI)

Maximum Allowable Deflection = Height/500 = 15170/500 = 30.34 mm

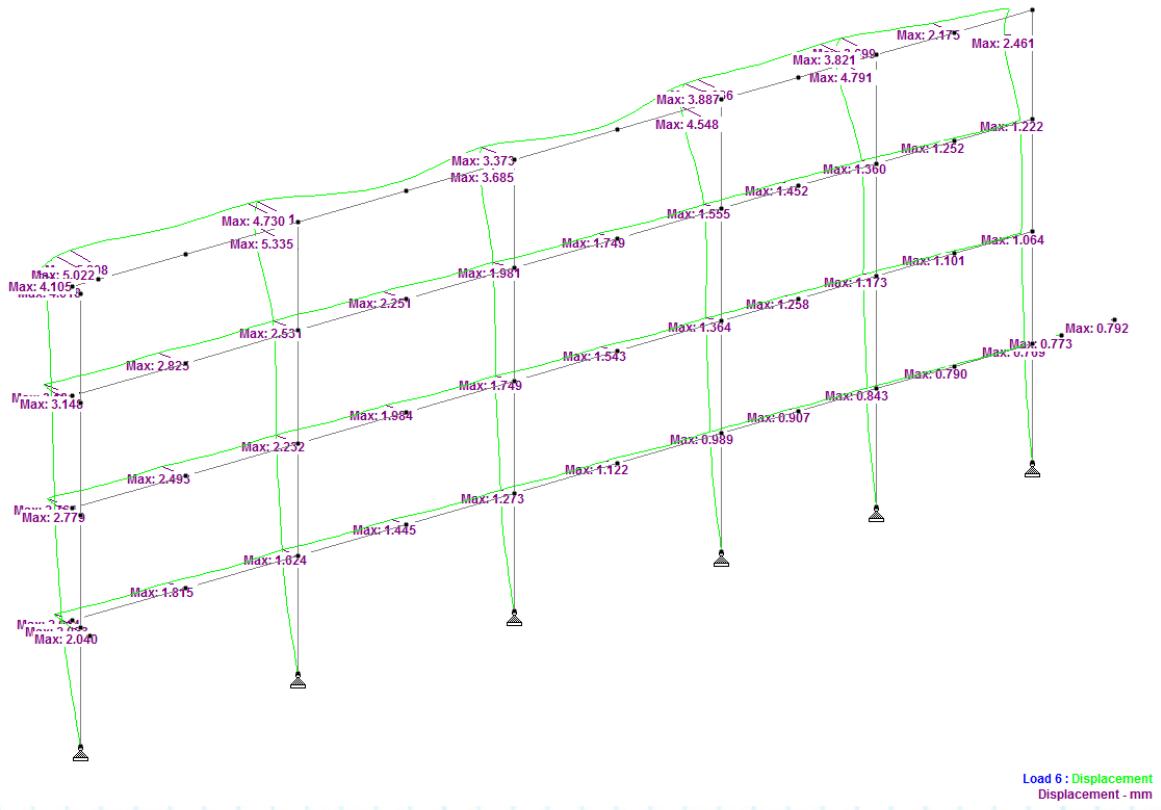
Actual maximum deflection = 16.45mm (Hence OK)



Grid C WIND -X (CPE - CPI)

Maximum Allowable Deflection = Height/500 = 15170/500 = 30.34 mm

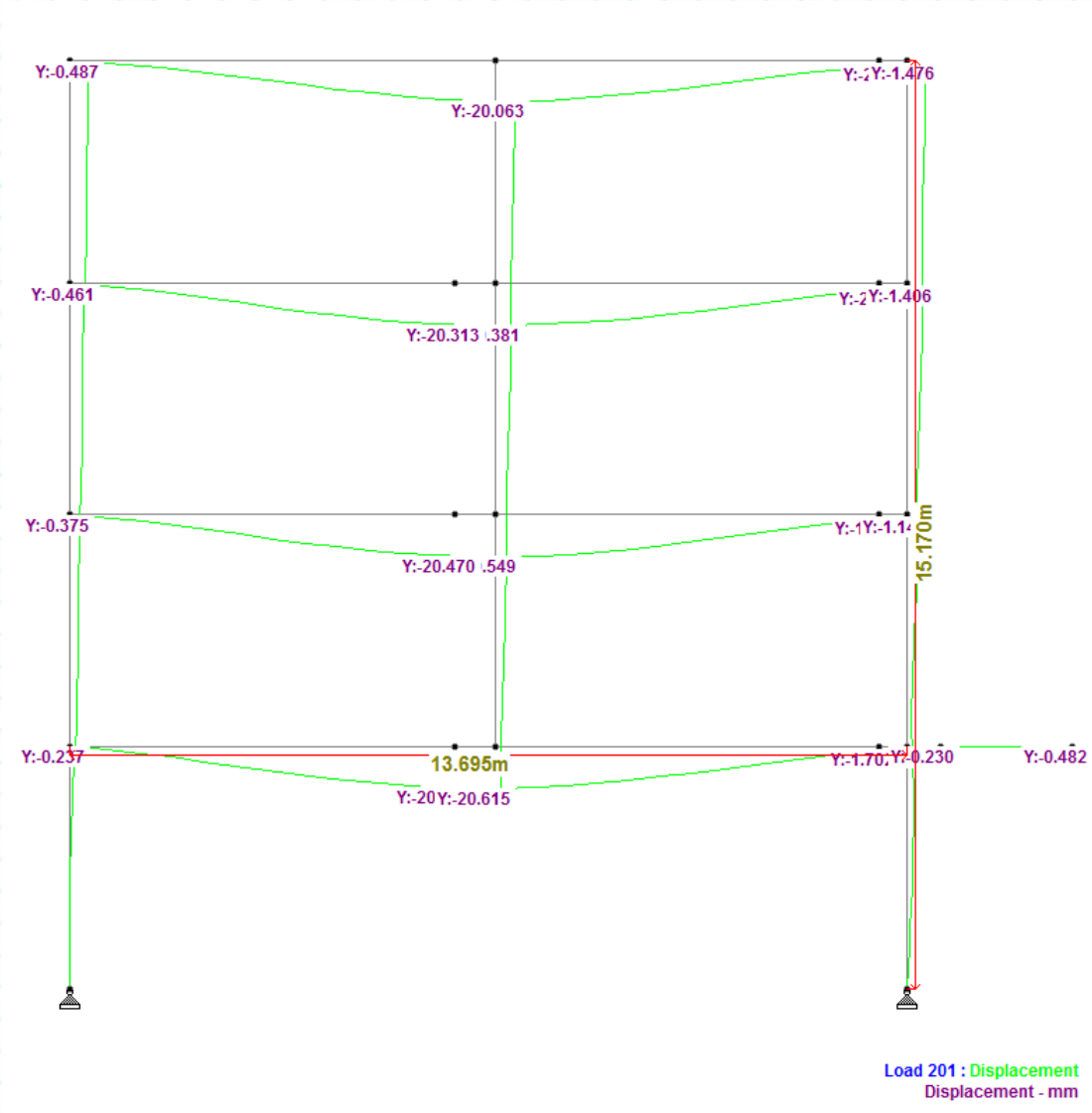
Actual maximum deflection = 5 mm (Hence OK)



Grid 1 1.0DL + 1.0LL

Maximum Allowable Deflection = Span/300 = 13695/300 = 45.65 mm

Actual maximum deflection = 20.61 mm (Hence OK)



Grid 4 1.0DL + 1.0LL

Maximum Allowable Deflection = Span/300 = 13230/300 = 44.1mm

Actual maximum deflection = 7.47 mm (Hence OK)