



UNIVERSITY OF ASIA PACIFIC
DEPARTMENT OF CIVIL ENGINEERING

PROJECT REPORT

CE 418
Computer Applications in Civil and
Environmental Engineering
Semester: Spring 2023

Submitted To:
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University of Asia Pacific

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Section: B
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University of Asia Pacific

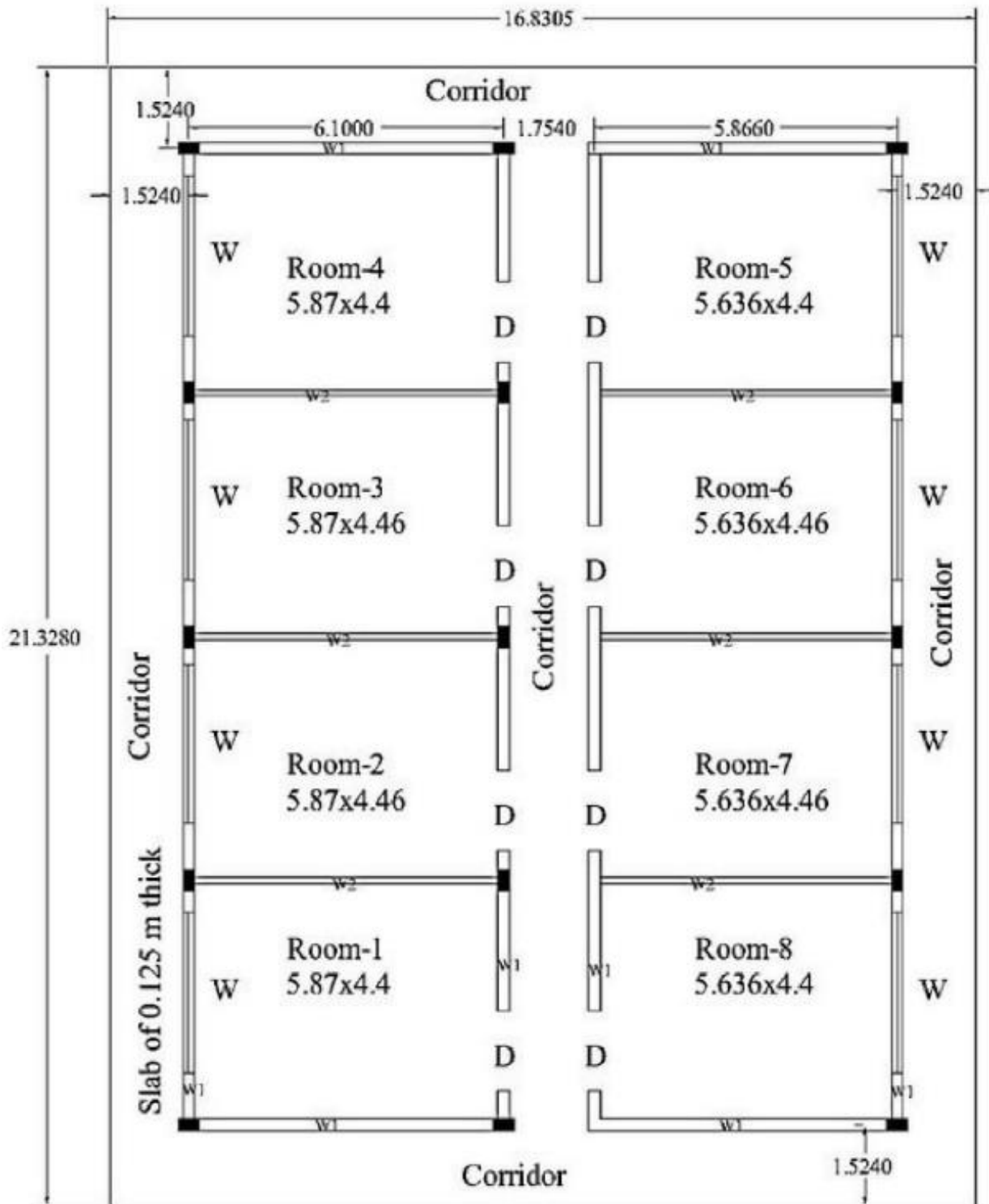


Fig: Plan View of the Building (Story 1- Story 10)

Building type: Shopping Center

District: Jhalokati

Building type: Shopping Center

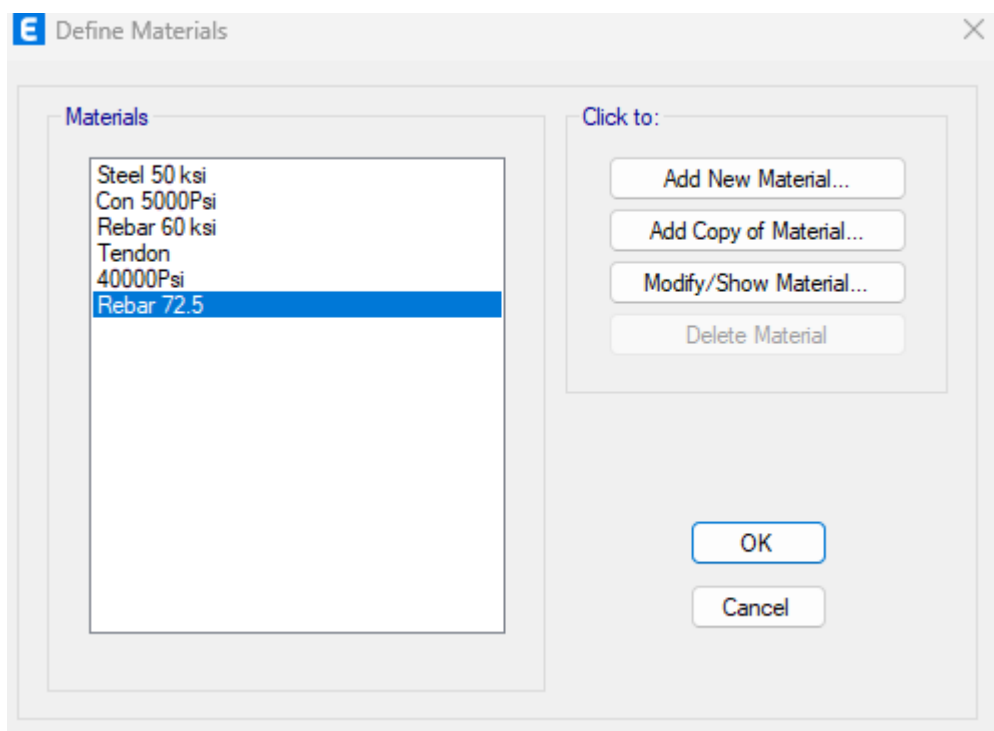
Soil Type: 4

Story Height: 10 ft

Base Height: 5 ft

Total Floor Area: 358.96 sqm =
3863.81sq ft

Material Property:



E Material Property Data ✕

General Data

Material Name	Con 5000Psi
Material Type	Concrete ▾
Directional Symmetry Type	Isotropic ▾
Material Display Color	 Change...
Material Notes	Modify/Show Notes...

Material Weight and Mass

☒ Specify Weight Density ☐ Specify Mass Density

Weight per Unit Volume	0.08681	lb/in ³
Mass per Unit Volume	0.000225	lb-s ² /in ⁴

Mechanical Property Data

Modulus of Elasticity, E	4030508.7	lb/in ²
Poisson's Ratio, U	0.2	
Coefficient of Thermal Expansion, A	0.0000055	1/F
Shear Modulus, G	1679378.63	lb/in ²

Design Property Data

Modify/Show Material Property Design Data...

Advanced Material Property Data

Nonlinear Material Data... Material Damping Properties...

Time Dependent Properties...

Modulus of Rupture for Cracked Deflections

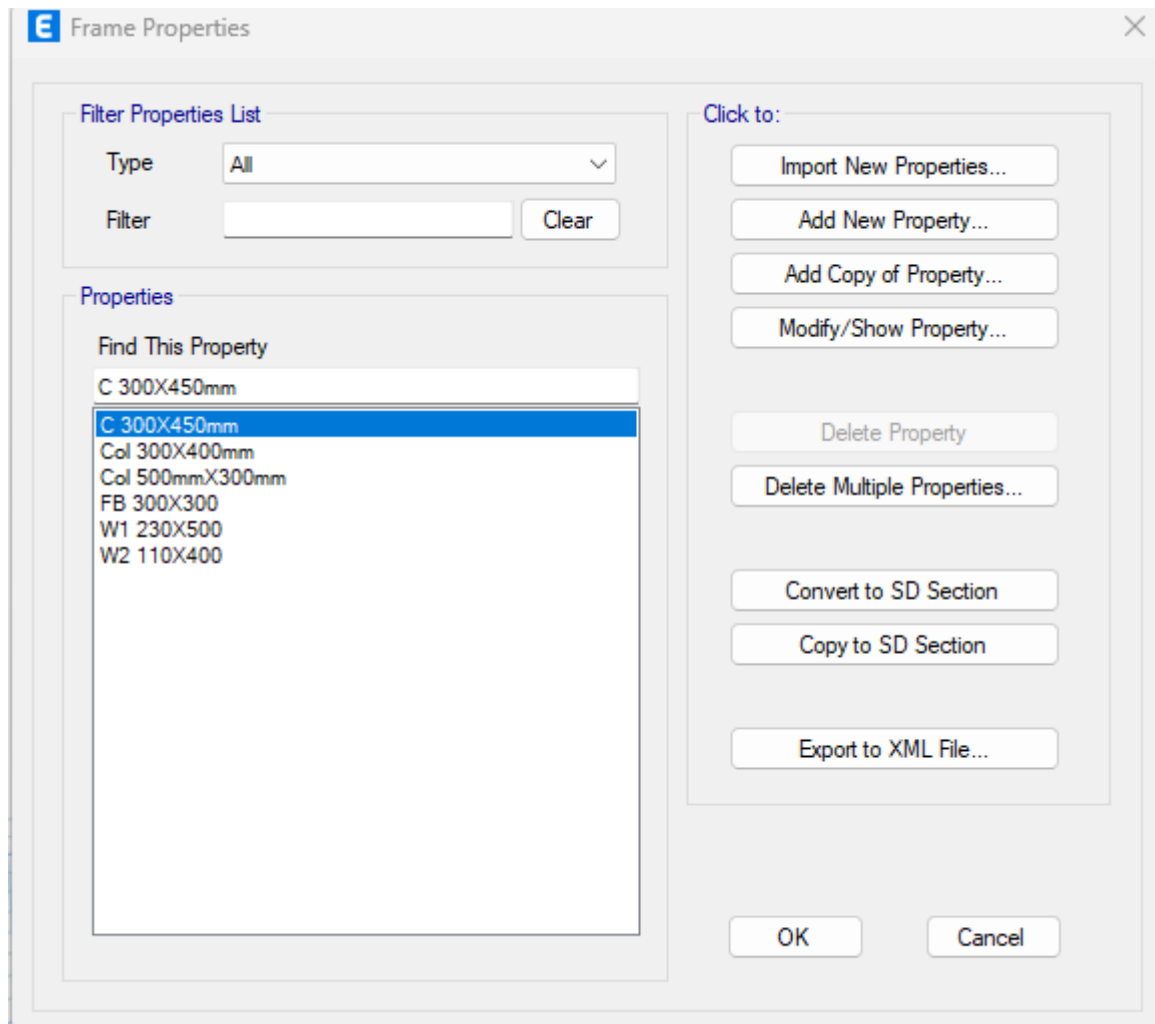
☒ Program Default (Based on Concrete Slab Design Code)

☐ User Specified

OK Cancel

Fig: Material Property of Concrete 5000 psi assigned in column and beams

Frame section:



Slab Section:

The image shows two overlapping software dialog boxes. The top dialog, titled 'Slab Properties', contains a list box with 'Slab 1' selected and a 'Click to:' section with buttons for 'Add New Property...', 'Add Copy of Property...', 'Modify/Show Property...' (highlighted), and 'Delete Property'. Below these are 'OK' and 'Cancel' buttons. The bottom dialog, titled 'Slab Property Data', is divided into two sections. The 'General Data' section includes fields for 'Property Name' (Slab 1), 'Slab Material' (40000Psi), 'Notional Size Data' (Modify/Show Notional Size...), 'Modeling Type' (Membrane), 'Modifiers (Currently User Specified)' (Modify/Show...), 'Display Color' (Change...), and 'Property Notes' (Modify/Show...), along with an unchecked checkbox for 'Use Special One-Way Load Distribution'. The 'Property Data' section includes a 'Type' dropdown (Slab) and a 'Thickness' field (125 mm).

Slab Properties

Slab Property

Slab 1

Click to:

Add New Property...

Add Copy of Property...

Modify/Show Property...

Delete Property

OK

Cancel

Slab Property Data

General Data

Property Name: Slab 1

Slab Material: 40000Psi

Notional Size Data: Modify/Show Notional Size...

Modeling Type: Membrane

Modifiers (Currently User Specified): Modify/Show...

Display Color: Change...

Property Notes: Modify/Show...

☐ Use Special One-Way Load Distribution

Property Data

Type: Slab

Thickness: 125 mm

Loads:

Shell Load Assignment - Uniform

Load Pattern Name: live load

Uniform Load

Load: 3 kN/cm²

Direction: Gravity

Options

- ☐ Add to Existing Loads
- ☒ Replace Existing Loads
- ☐ Delete Existing Loads

OK Close Apply

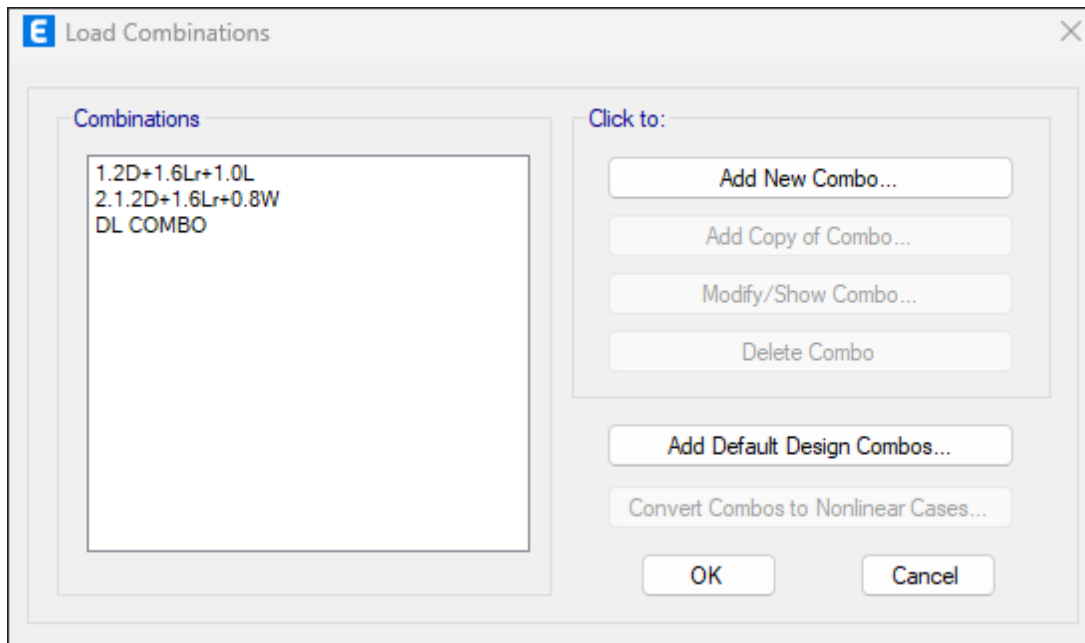
Fig: live load for Shopping Center

Live Load: 3KN/Cm2

Wind Speed, $W_x = 178.955\text{mph}$

$W_y = 178.955\text{mph}$ (90 degree)

Load Combinaiton:



Building Model:

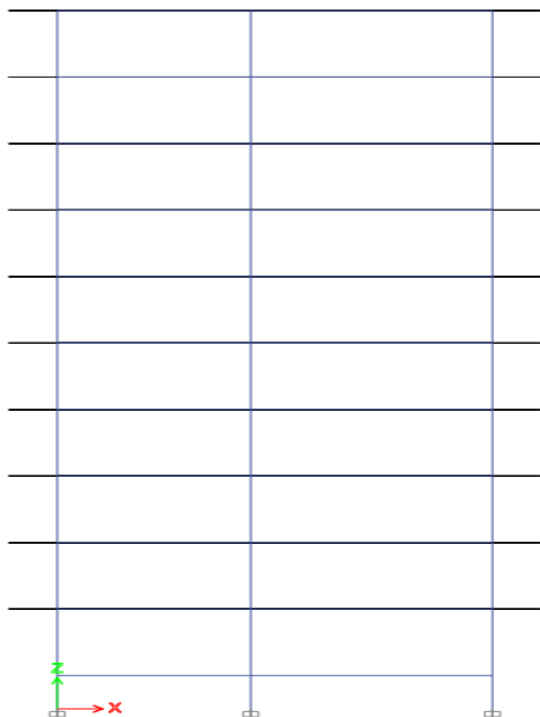


Fig: Elevation:1

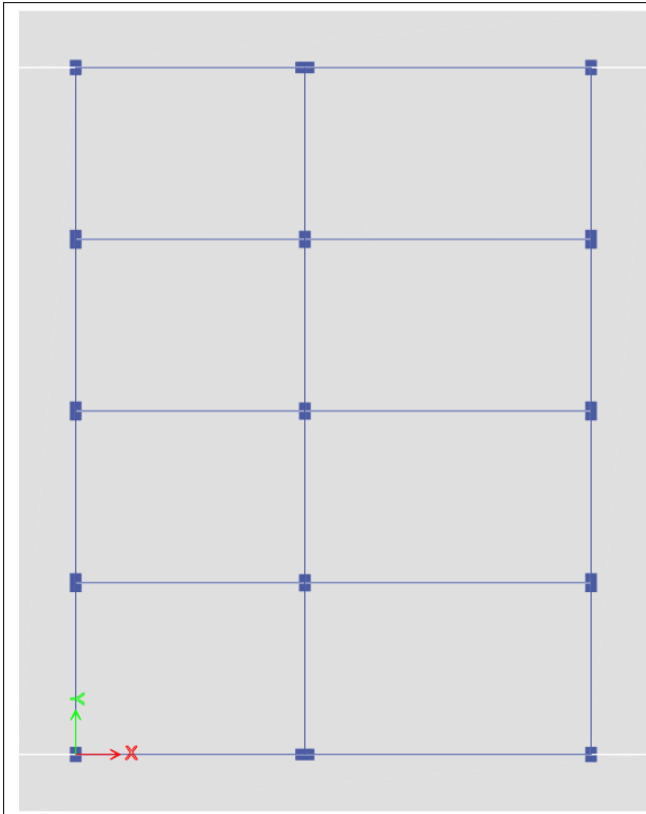


Fig: Plan View

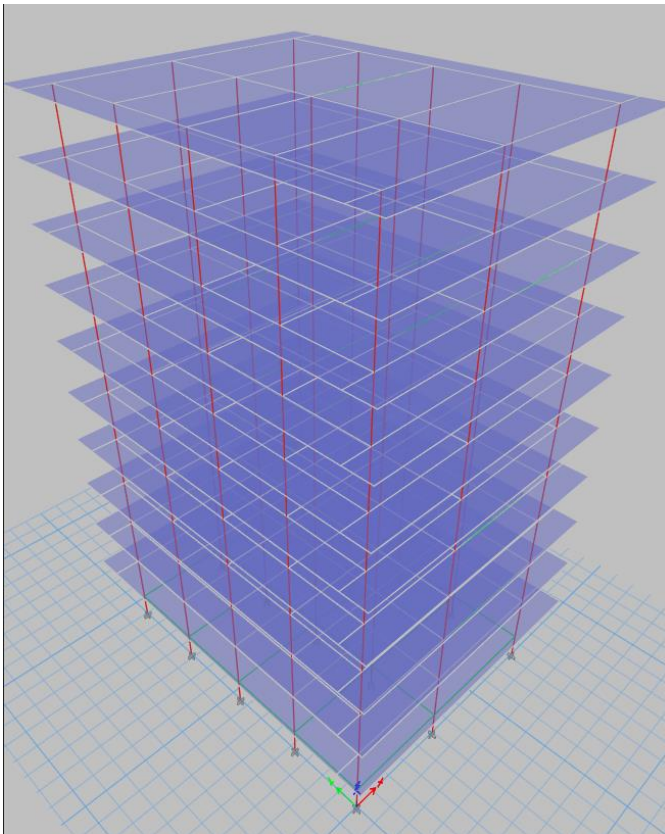
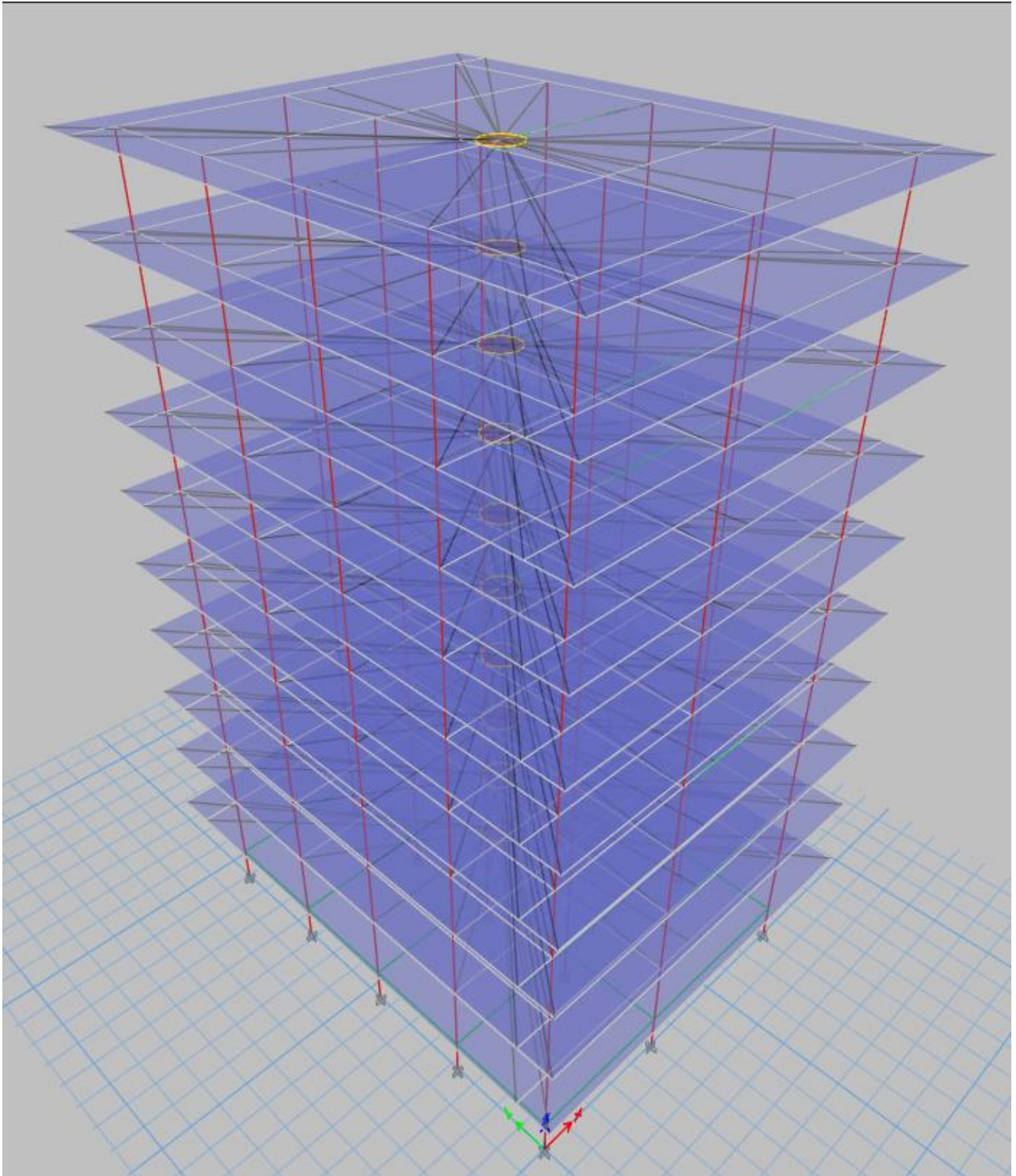


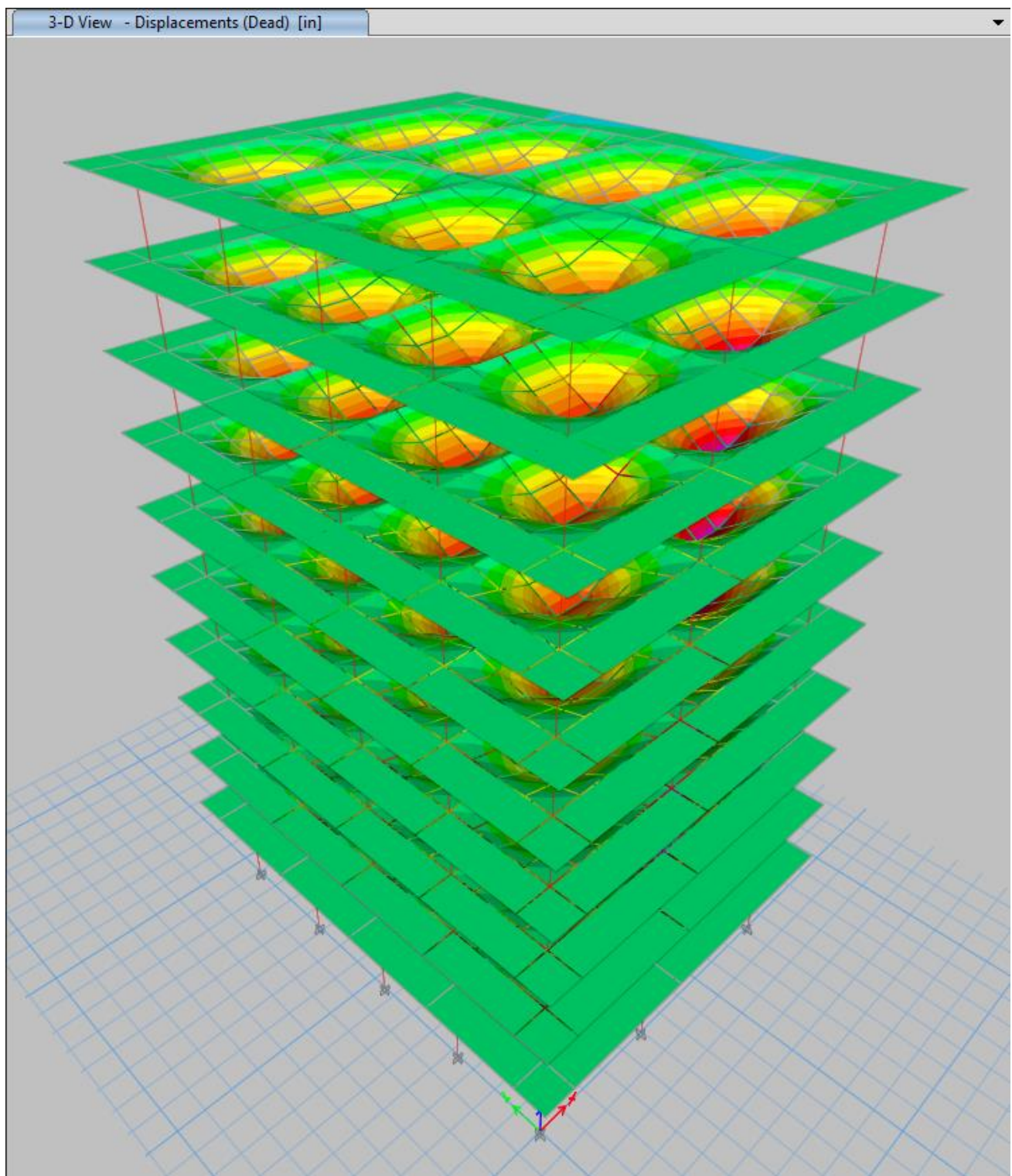
Fig: 3D view

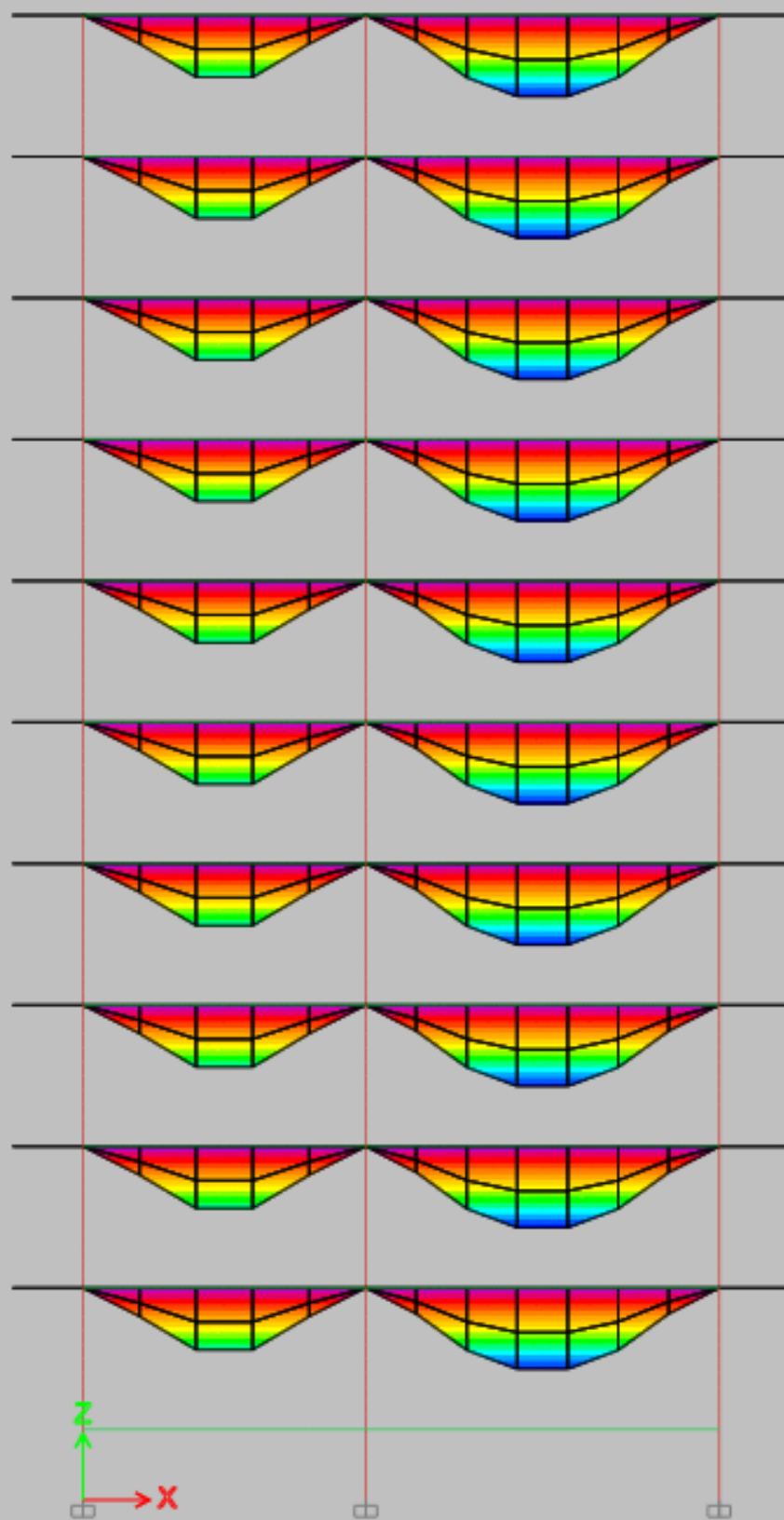
Mesh and Diaphragms:



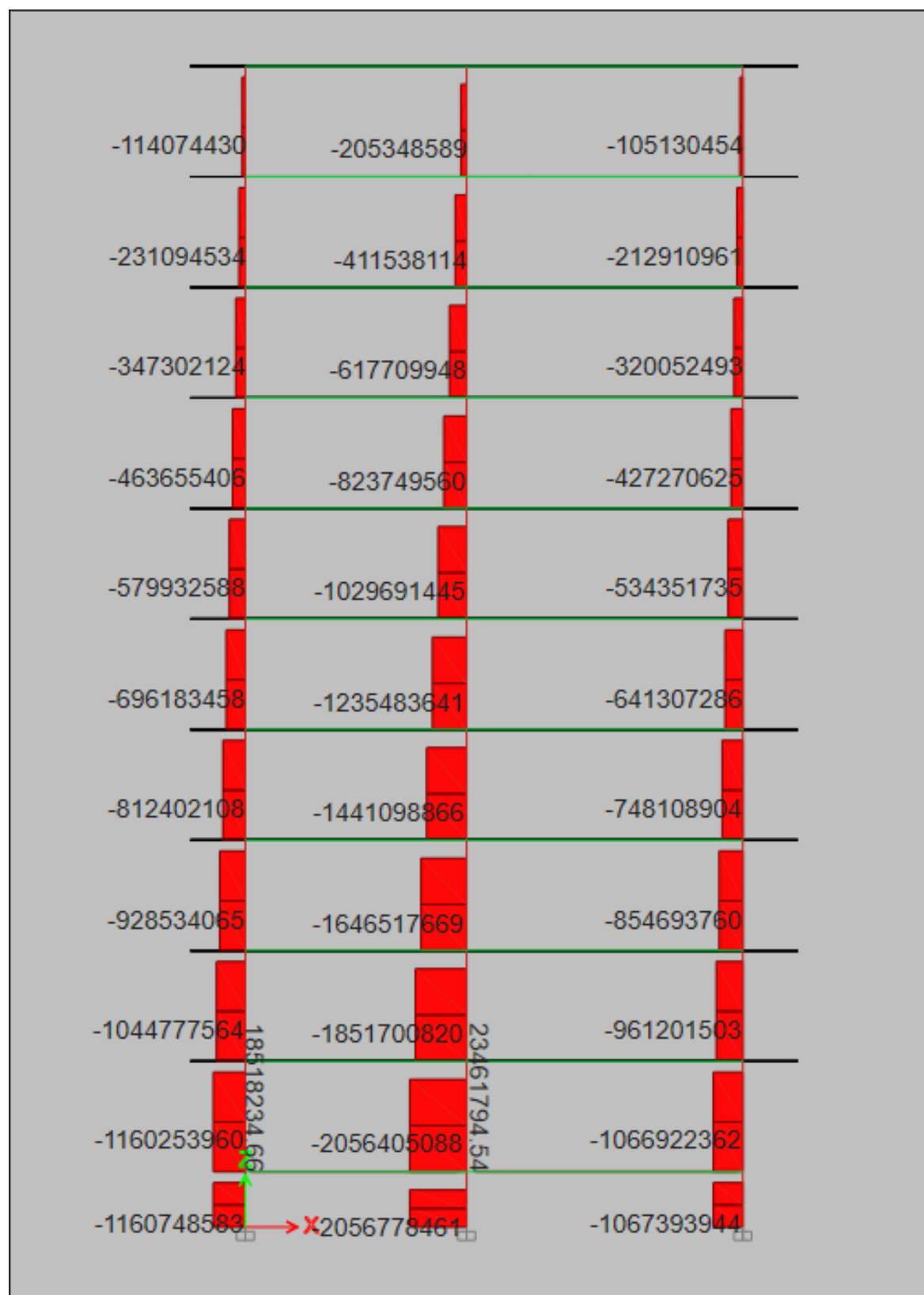
Run Analysis and Results:

Displace and Rotation

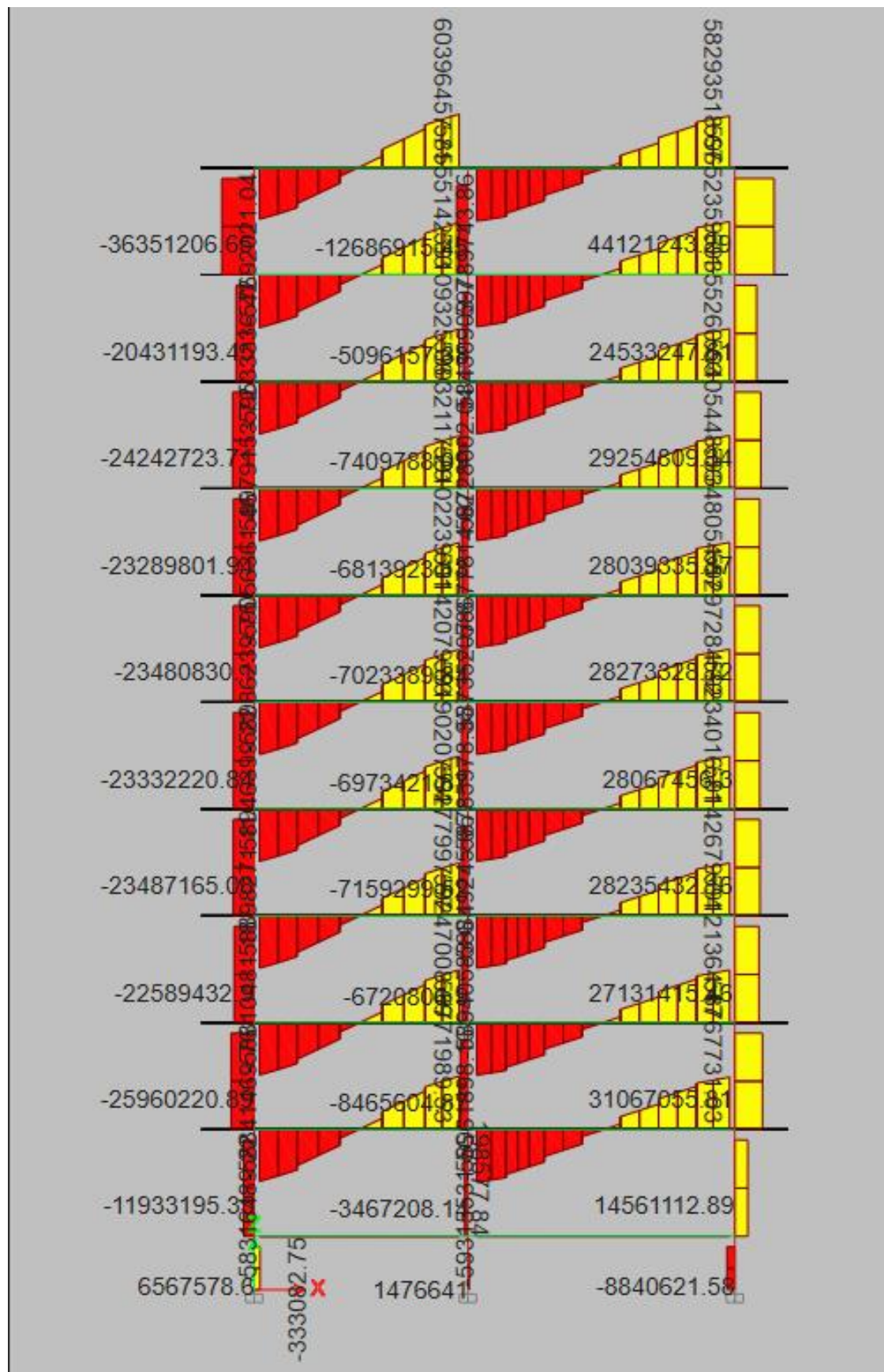




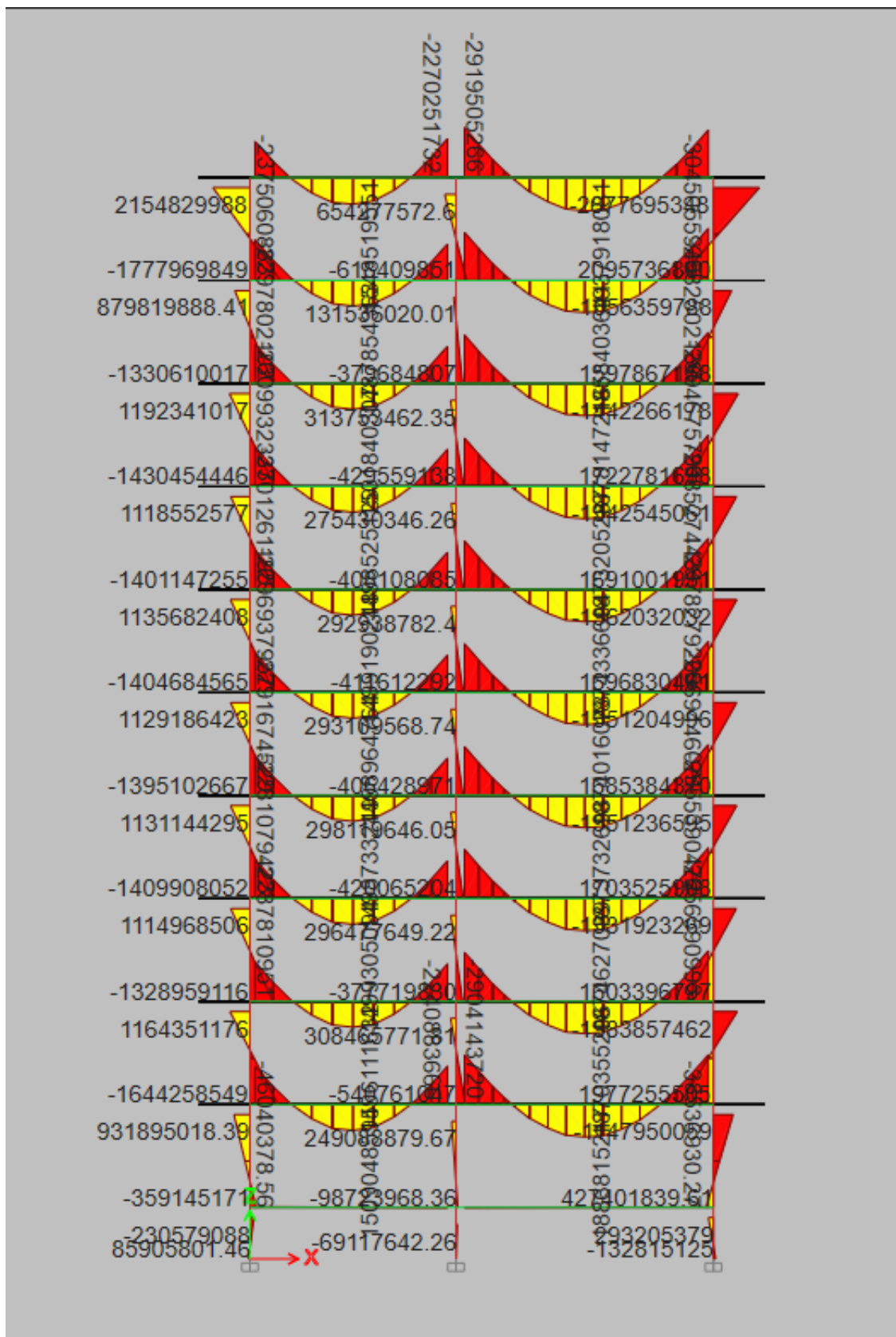
Axial Force Diagram (live):



Shear force 2-2 Diagram (Live):



Moment 3-3 Diagram (live)



Detailing:

Elevation View 1 (O/S)

Concrete Column Design Information (ACI 318-08)

Story: 2F
Column: C7
Section Name: Col 230X400mm

COMBO ID	STATION LOC	LONGITUDINAL REINFORCEMENT	MAJOR SHEAR REINFORCEMENT	MINOR SHEAR REINFORCEMENT
1.2D+1.6Lr+1	0.00	O/S #2	0.00	0.00
1.2D+1.6Lr+1	1274.00	O/S #2	0.00	0.00
1.2D+1.6Lr+1	2548.00	O/S #2	0.00	0.00
2.1.2D+1.6Lr	0.00	O/S #2	0.00	0.00
2.1.2D+1.6Lr	1274.00	O/S #2	0.00	0.00
2.1.2D+1.6Lr	2548.00	O/S #2	0.00	0.00

☐ Strength
☐ Deflection

Overwrites Interaction Details

OK Cancel

1500 177 212 184 O/S 310 401 306
347 129 411 683 153 651
168 212 196 O/S 315 406 302
1500 140 47 140 189 76 183
83 91 78 O/S 134 140 130
1500

Elevation View 1 (Correction):

Story	2F	Section Name	C 300X450mm		
Column	C7				

COMBO ID	STATION LOC	LONGITUDINAL REINFORCEMENT	MAJOR SHEAR REINFORCEMENT	MINOR SHEAR REINFORCEMENT
1.2D+1.6Lr+1	0.000	2.0925	0.0000	0.0000
1.2D+1.6Lr+1	50.157	2.0925	0.0000	0.0000
1.2D+1.6Lr+1	100.315	2.0925	0.0000	0.0000
2.1.2D+1.6Lr	0.000	2.0925	0.0000	0.0000
2.1.2D+1.6Lr	50.157	2.0925	0.0000	0.0000
2.1.2D+1.6Lr	100.315	2.0925	0.0000	0.0000

Overwrites

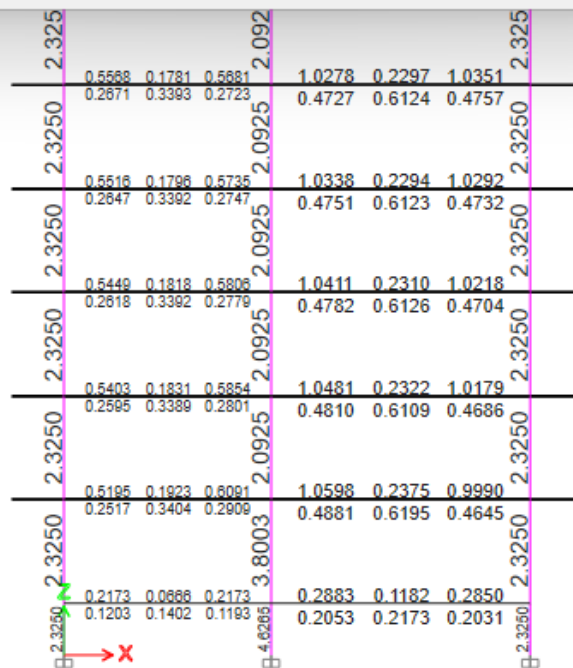
Interaction

Details

☒ Strength
☐ Deflection

OK

Cancel

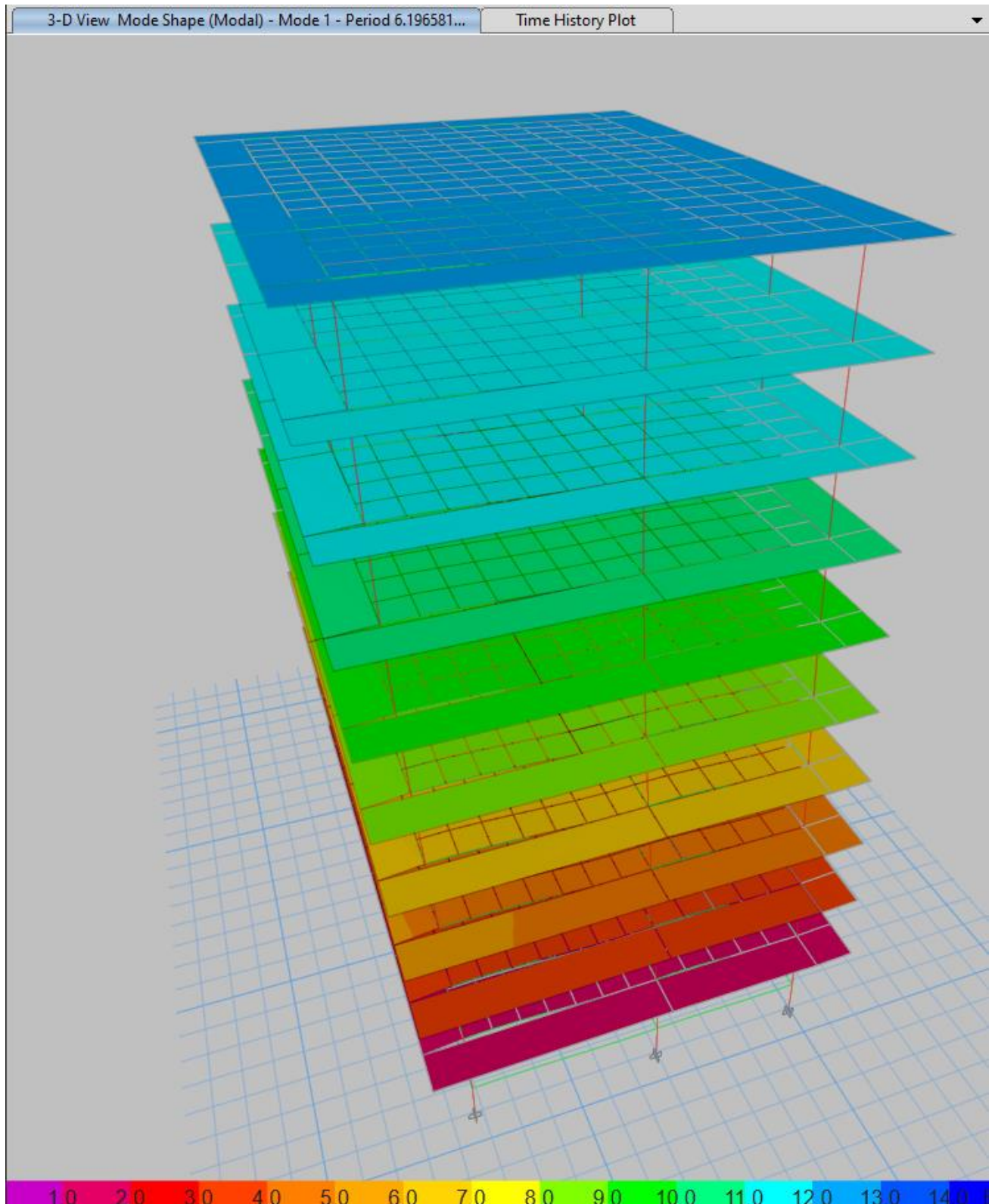


Elevation 1 Detailing

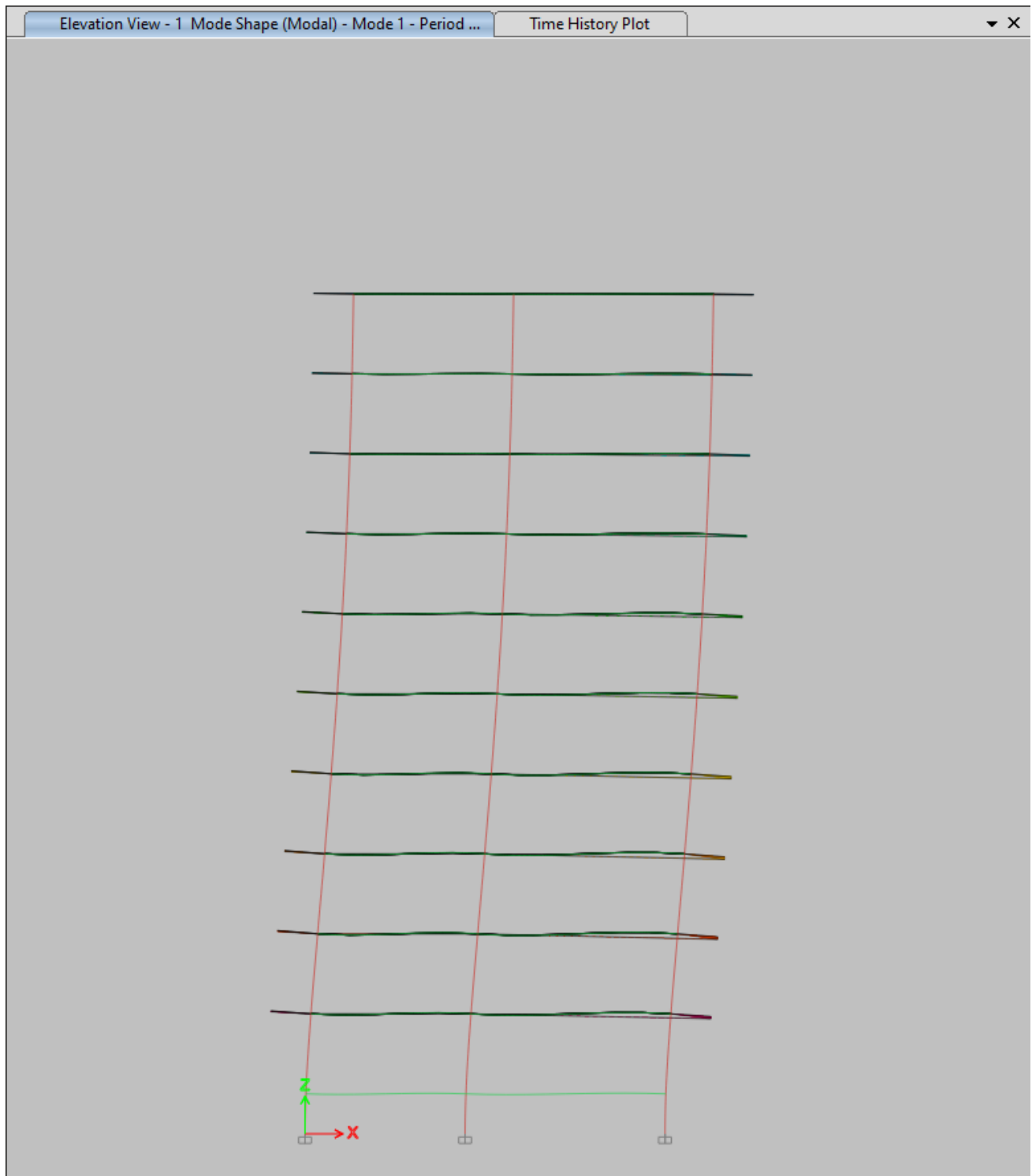
0.5053	0.2023	0.6519	1.1006	0.2421	1.0037
0.2434	0.4331	0.3102	0.5025	0.8338	0.4626
2.3250	2.3250	2.0925	2.3250	2.3250	2.3250
0.5978	0.1896	0.5343	1.0174	0.2431	1.0791
0.2889	0.3410	0.2571	0.4724	0.6117	0.5006
2.3250	2.3250	2.0925	2.3250	2.3250	2.3250
0.5833	0.1766	0.5607	1.0169	0.2306	1.0401
0.2701	0.3396	0.2688	0.4681	0.6147	0.4777
2.3250	2.3250	2.0925	2.3250	2.3250	2.3250
0.5681	0.1776	0.5589	1.0190	0.2319	1.0455
0.2715	0.3395	0.2681	0.4692	0.6123	0.4803
2.3250	2.3250	2.0925	2.3250	2.3250	2.3250
0.5608	0.1768	0.5638	1.0229	0.2305	1.0396
0.2689	0.3394	0.2703	0.4706	0.6126	0.4775
2.3250	2.3250	2.0925	2.3250	2.3250	2.3250
0.5568	0.1781	0.5681	1.0278	0.2297	1.0351
0.2671	0.3393	0.2723	0.4727	0.6124	0.4757
2.3250	2.3250	2.0925	2.3250	2.3250	2.3250
0.5516	0.1796	0.5735	1.0338	0.2294	1.0292
0.2647	0.3392	0.2747	0.4751	0.6123	0.4732
2.3250	2.3250	2.0925	2.3250	2.3250	2.3250
0.5449	0.1818	0.5806	1.0411	0.2310	1.0218
0.2618	0.3392	0.2779	0.4782	0.6126	0.4704
2.3250	2.3250	2.0925	2.3250	2.3250	2.3250
0.5403	0.1831	0.5854	1.0481	0.2322	1.0179
0.2595	0.3389	0.2801	0.4810	0.6109	0.4686
2.3250	2.3250	2.0925	2.3250	2.3250	2.3250
0.5195	0.1923	0.6091	1.0598	0.2375	0.9990
0.2517	0.3404	0.2909	0.4881	0.6195	0.4645
2.3250	2.3250	3.8003	2.3250	2.3250	2.3250
0.2173	0.0666	0.2173	0.2883	0.1182	0.2850
0.1203	0.1402	0.1193	0.2053	0.2173	0.2031
2.3250	2.3250	4.6265	2.3250	2.3250	2.3250

Time History Analysis:

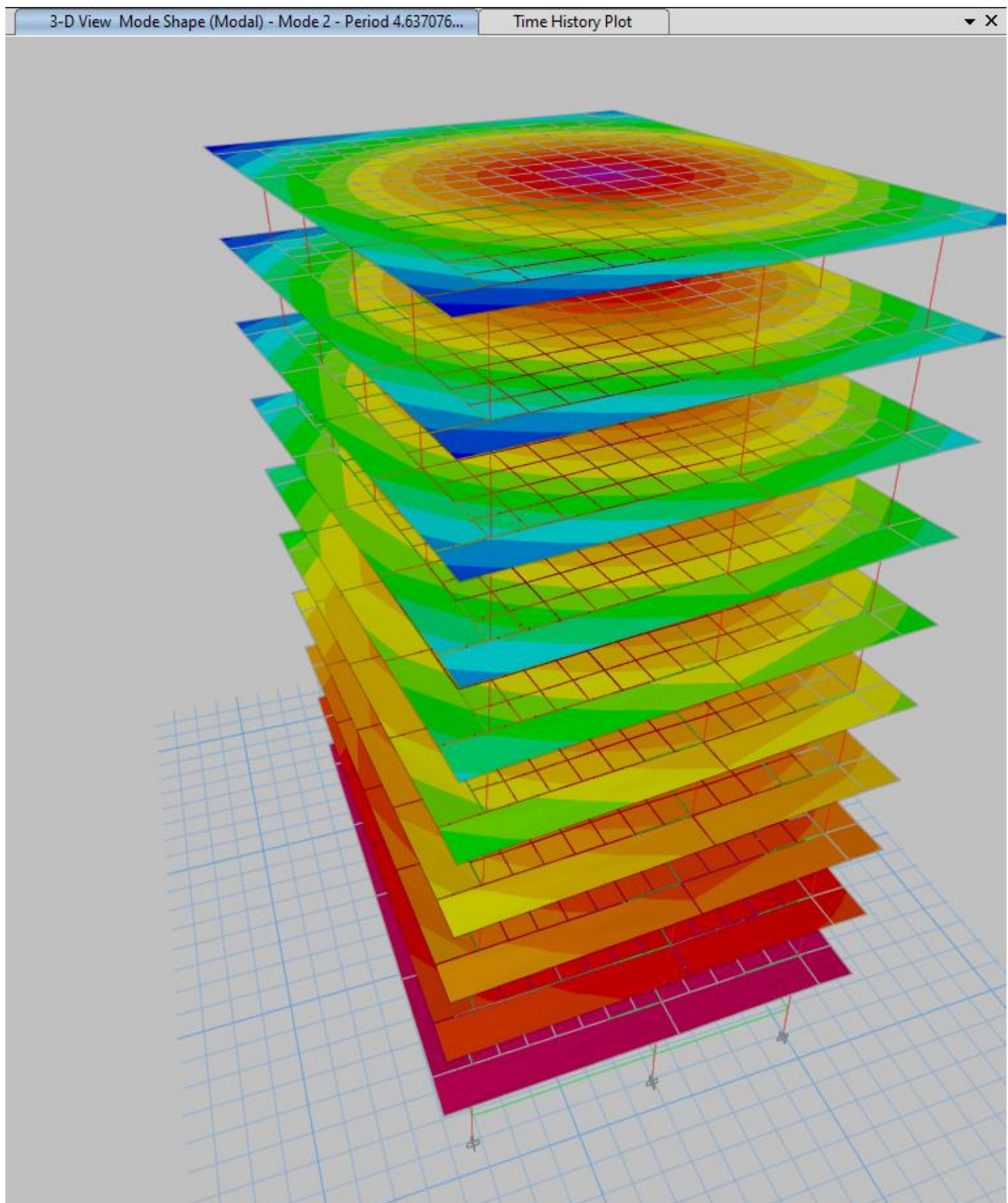
Mode 1 Period 6.196



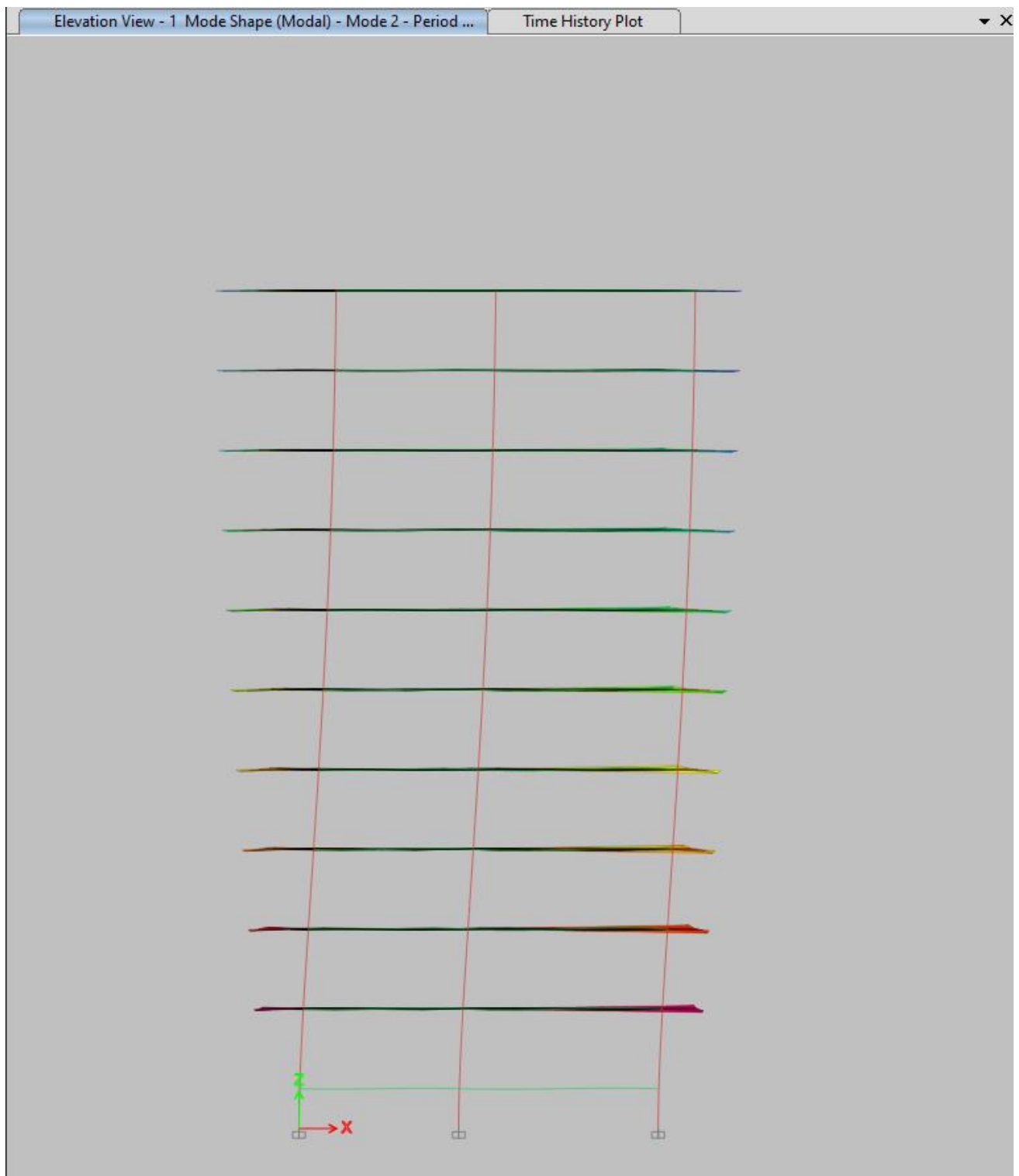
Elevation View 1 Mode 1 Period 6.196



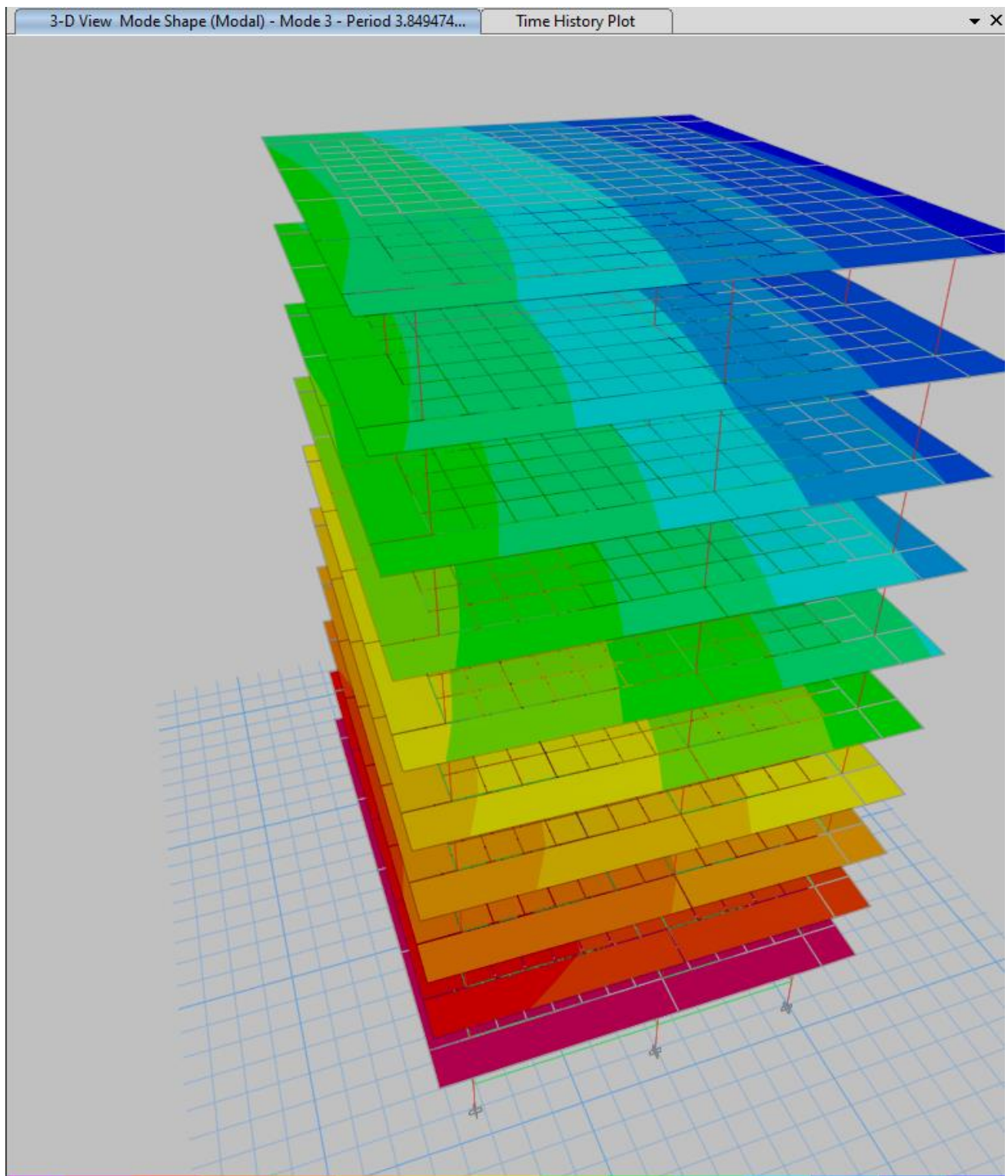
Mode Period 4.637



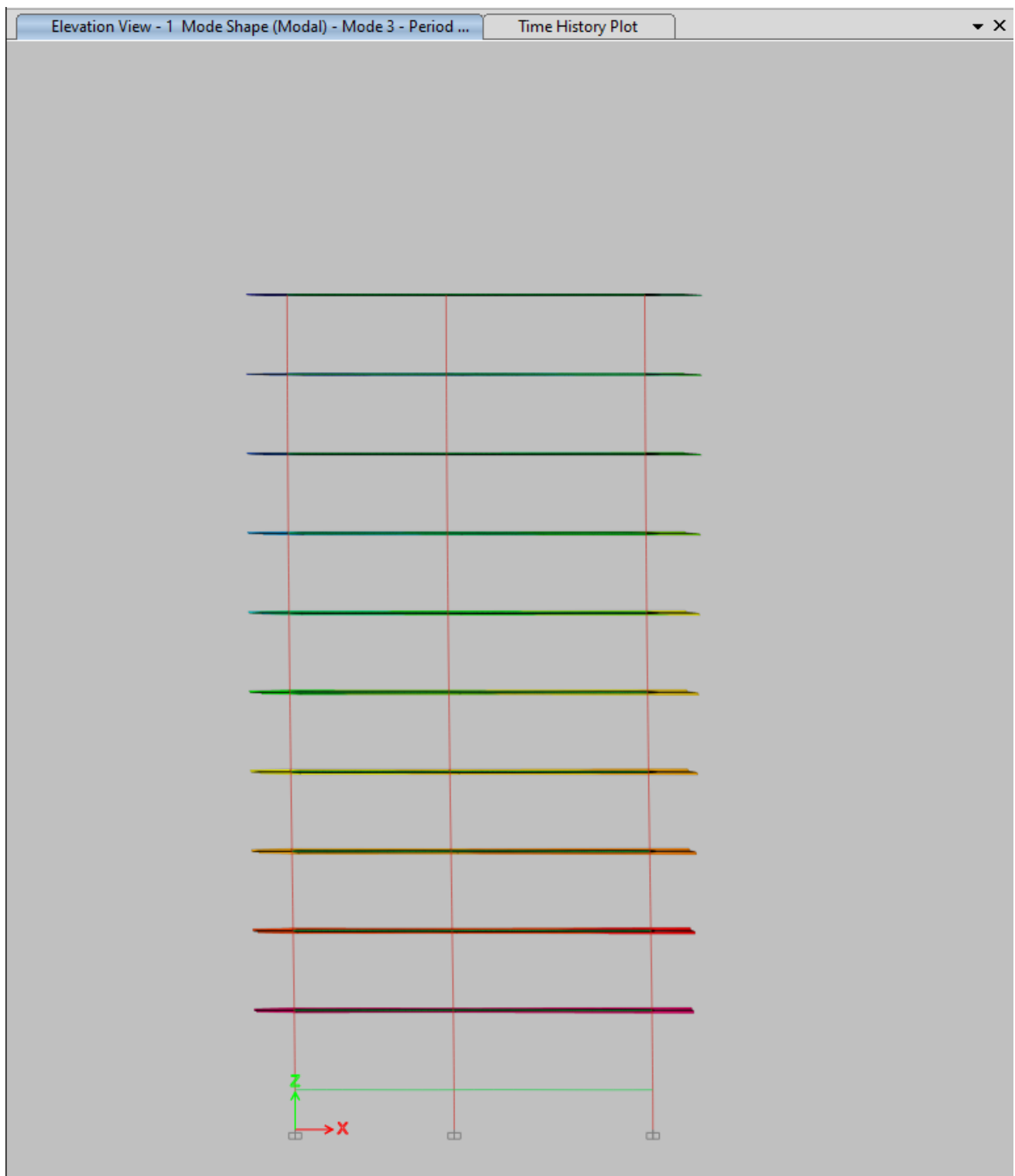
Elevation View 1 mode 2= 4.637



Mode 3 Period 3.845



Elevation view 1 mode 3 =3.845



Modal Frequency:

Mode 1

$$f = \frac{1}{6.196} = 0.161$$

Mode 2:

$$f = \frac{1}{4.637} = 0.2156$$

Mode 3:

$$f = \frac{1}{3.85} = 2.597$$

Displacement, Velocity and Acceleration (Rooftop Level 16):

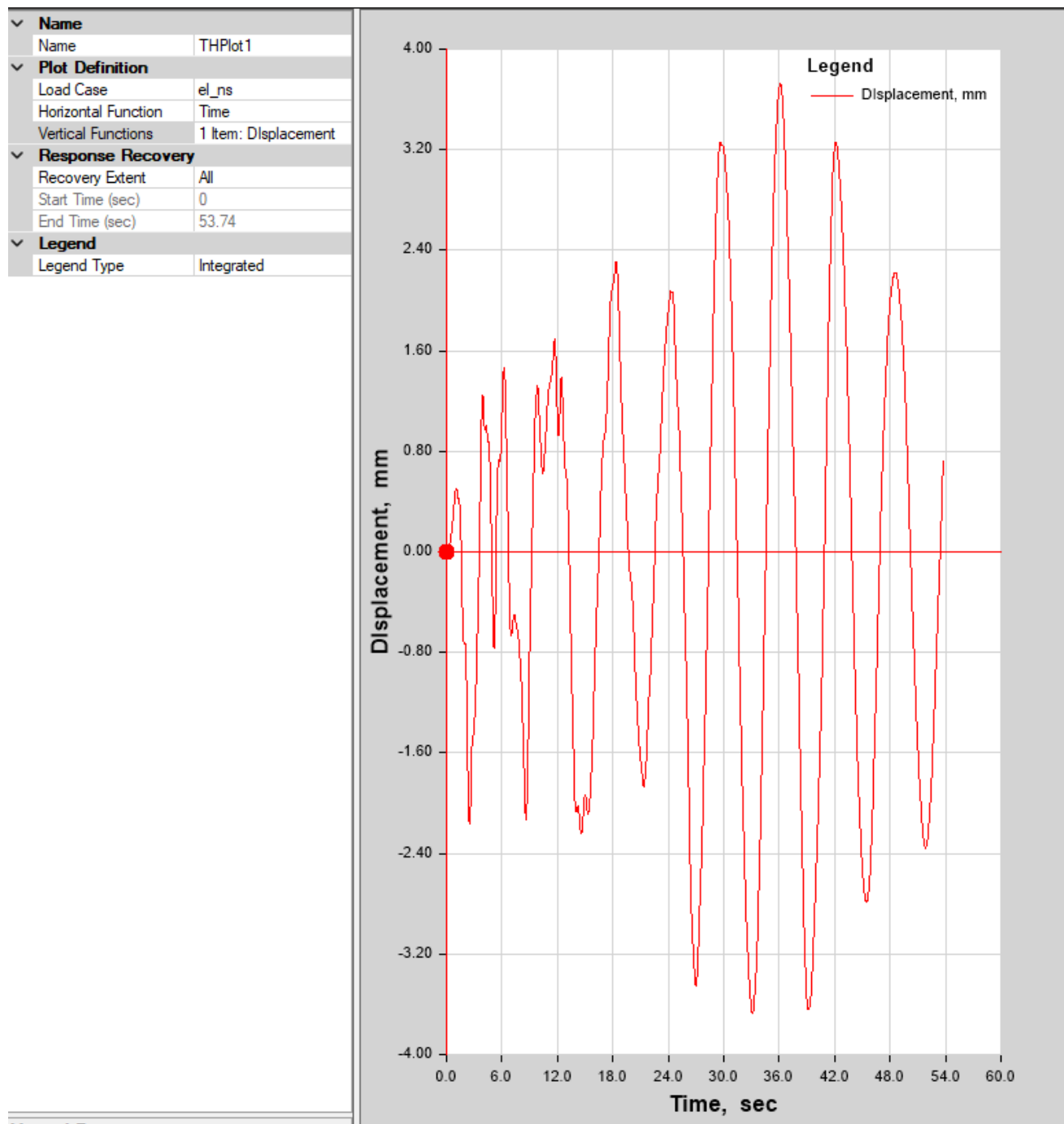


Fig: Displacement

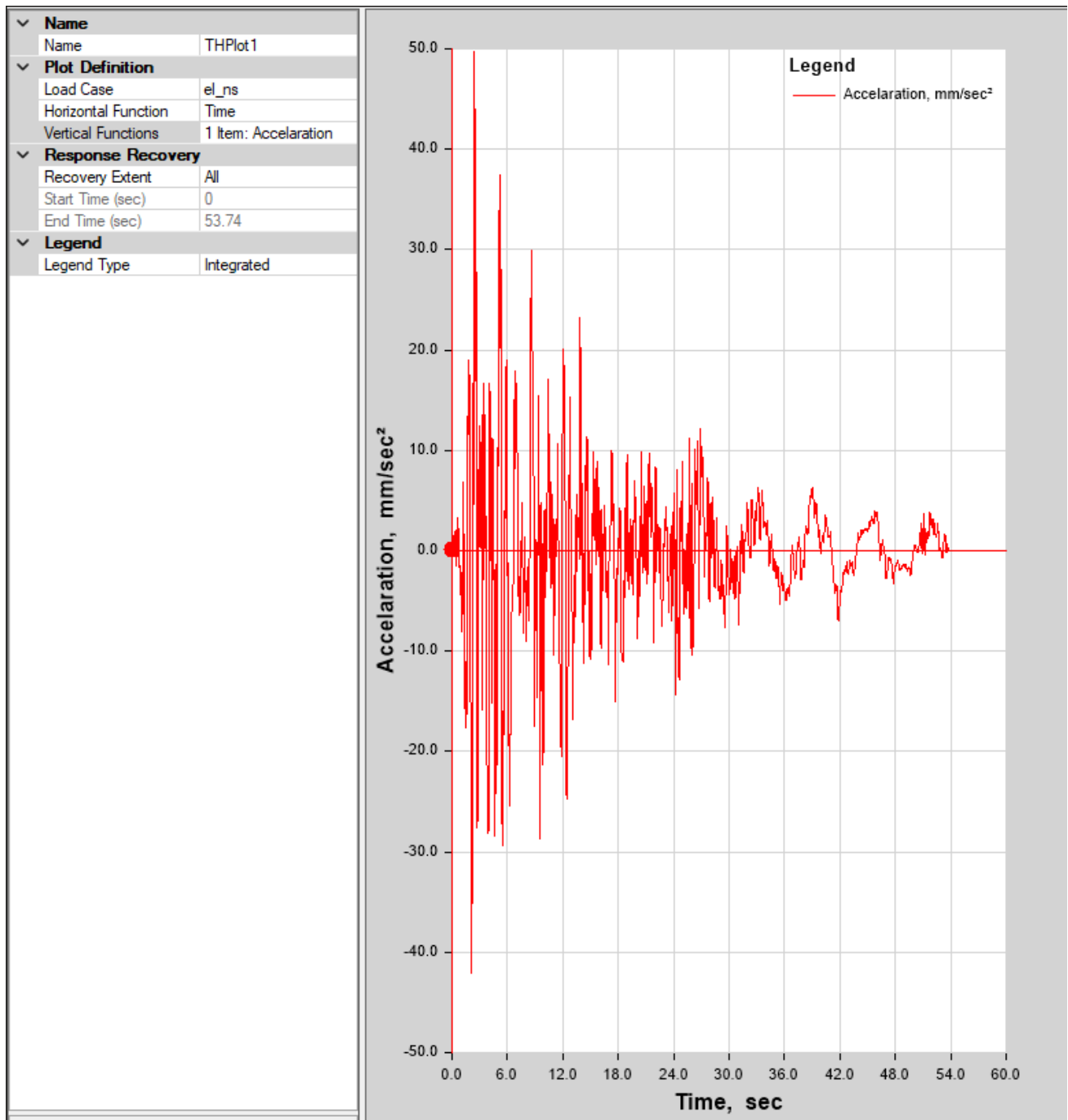


Fig: Acceleration

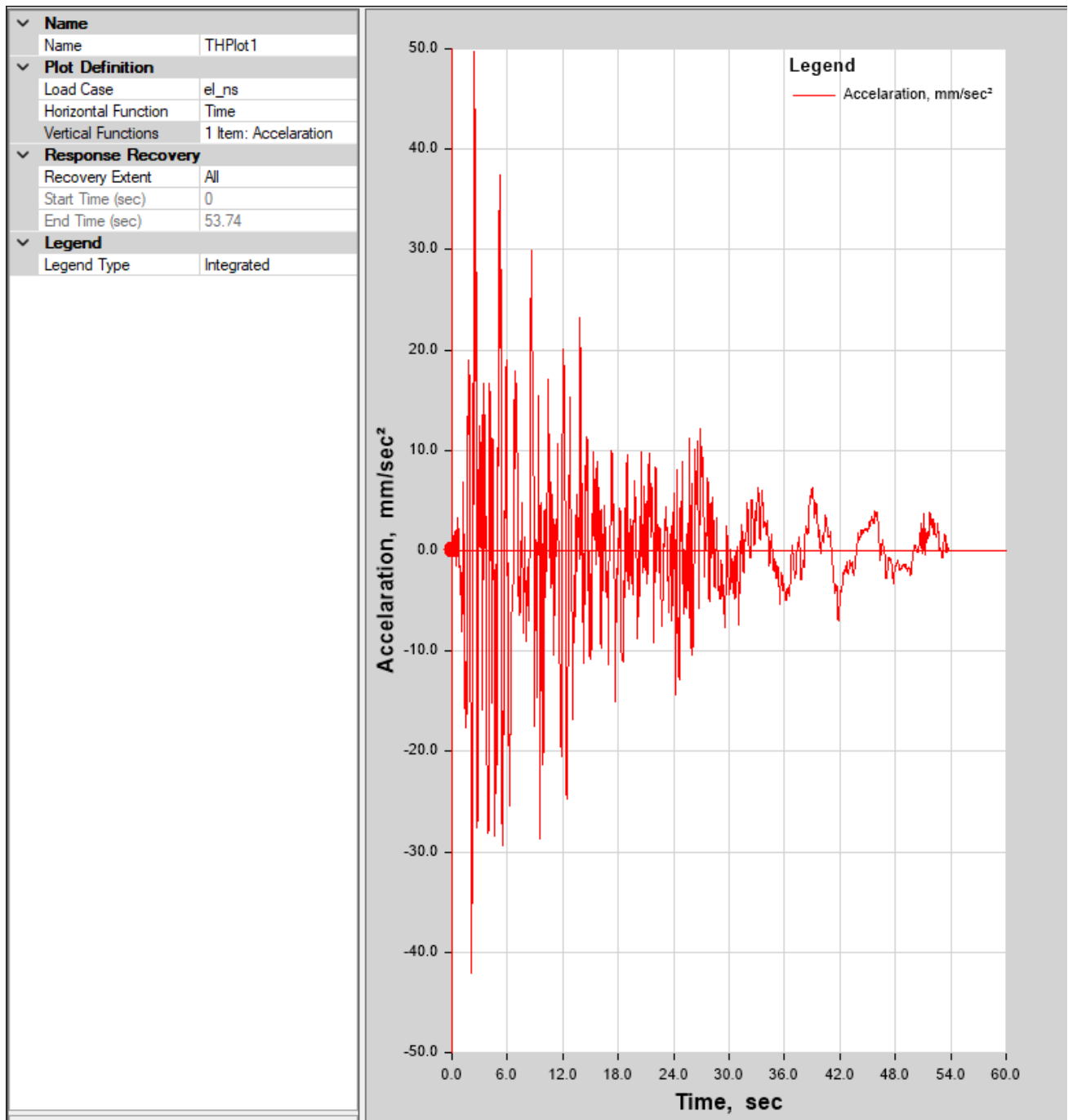


Fig: Velocity

Beam Detailing:

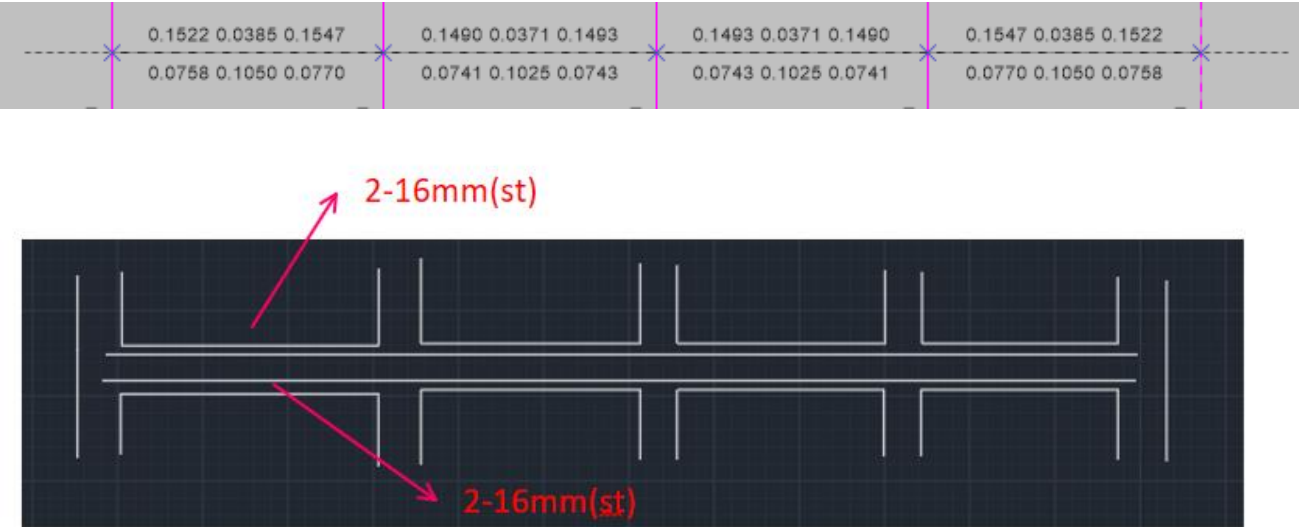


Fig:Elevation View D (7f B13,14,15,16)

Column Detailing:

