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Reinforced Concrete Building

Overview

This example problem is meant to demonstrate the design of a Reinforced Concrete building (G+13 Floor + Terrace + 1Basement Podium) structure which is located in Agra is subjected to floor loads, wind loads and seismic loads

Wind Design Data

Basic wind speed 47 m/sec

Terrain Category III

Building Class A

Seismic Design Data

-Dual system (special reinforced concrete structural walls with special moment resisting frame) in both the directions

-Assigned to a seismic zone III ($Z=0.16$)

-Soil Type II (Medium Soil)

-Importance factor 1.2

-Response Reduction factor 5.0

Methodology

-Response spectrum analysis

Program Version

Gen 2026 (v1.1)

Revision Date

18/07/2025

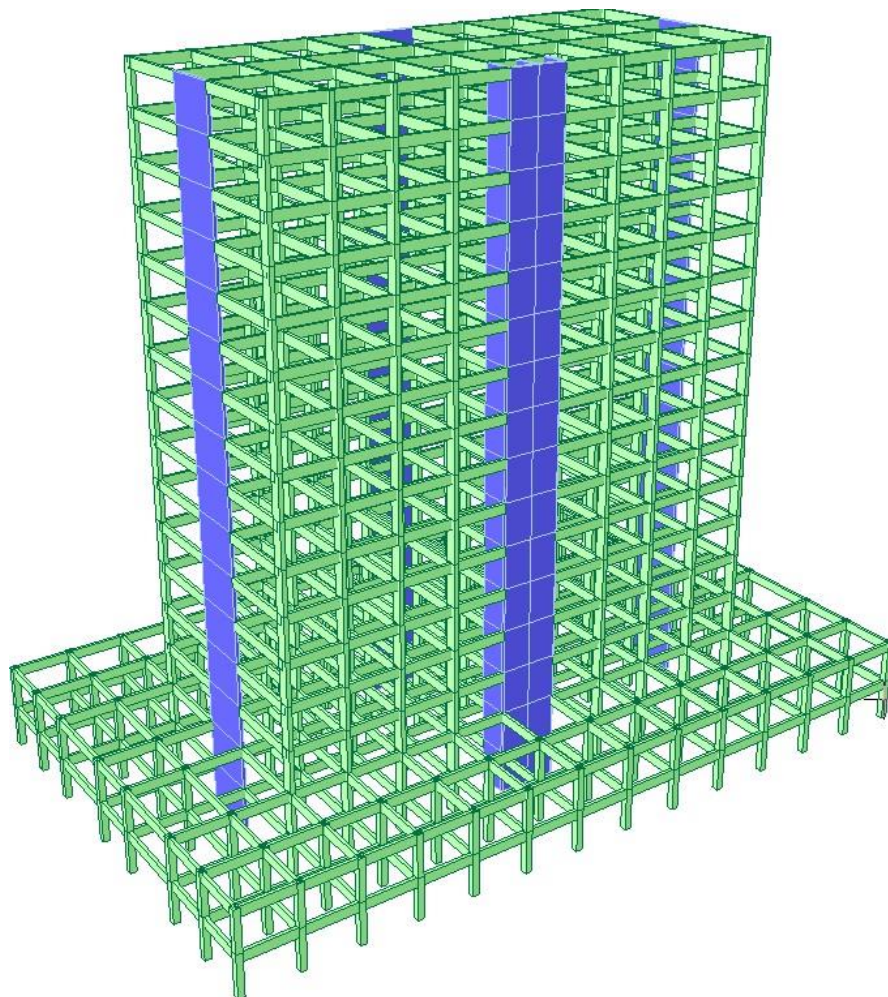


Figure 1: RC Building Model 3D

Typical Floor Plan

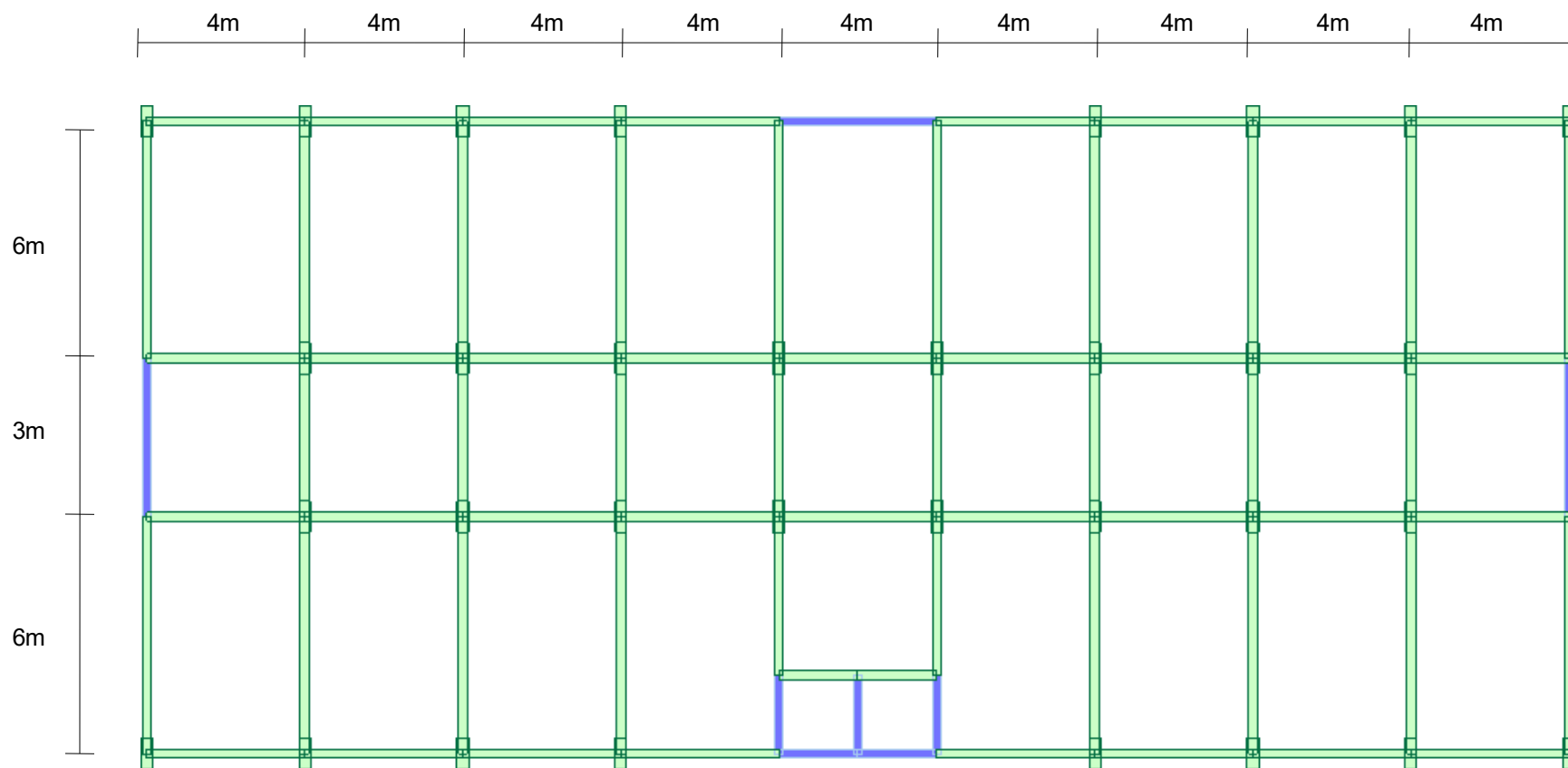


Figure 2: Typical Floor Plan

Podium Floor Plan

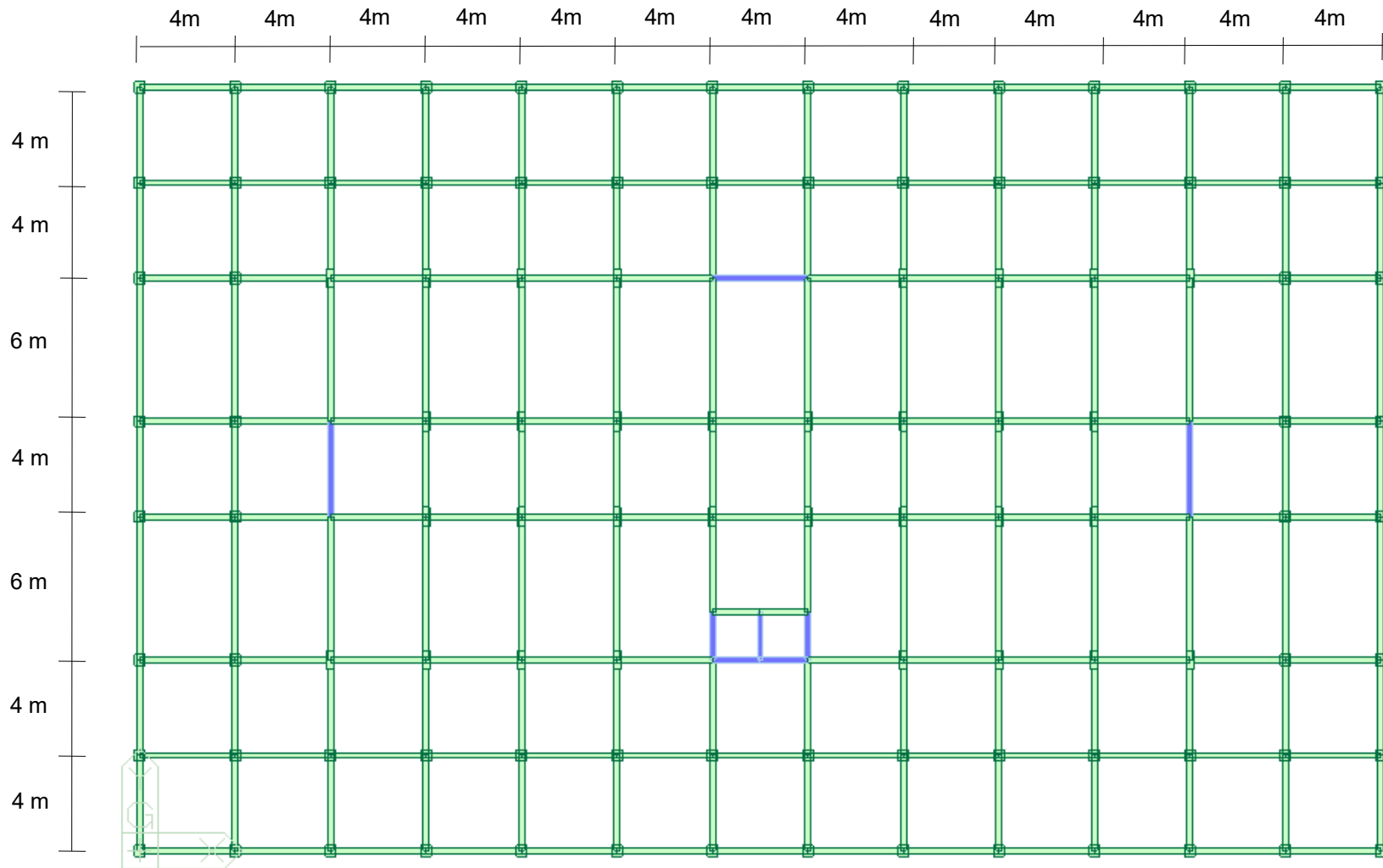
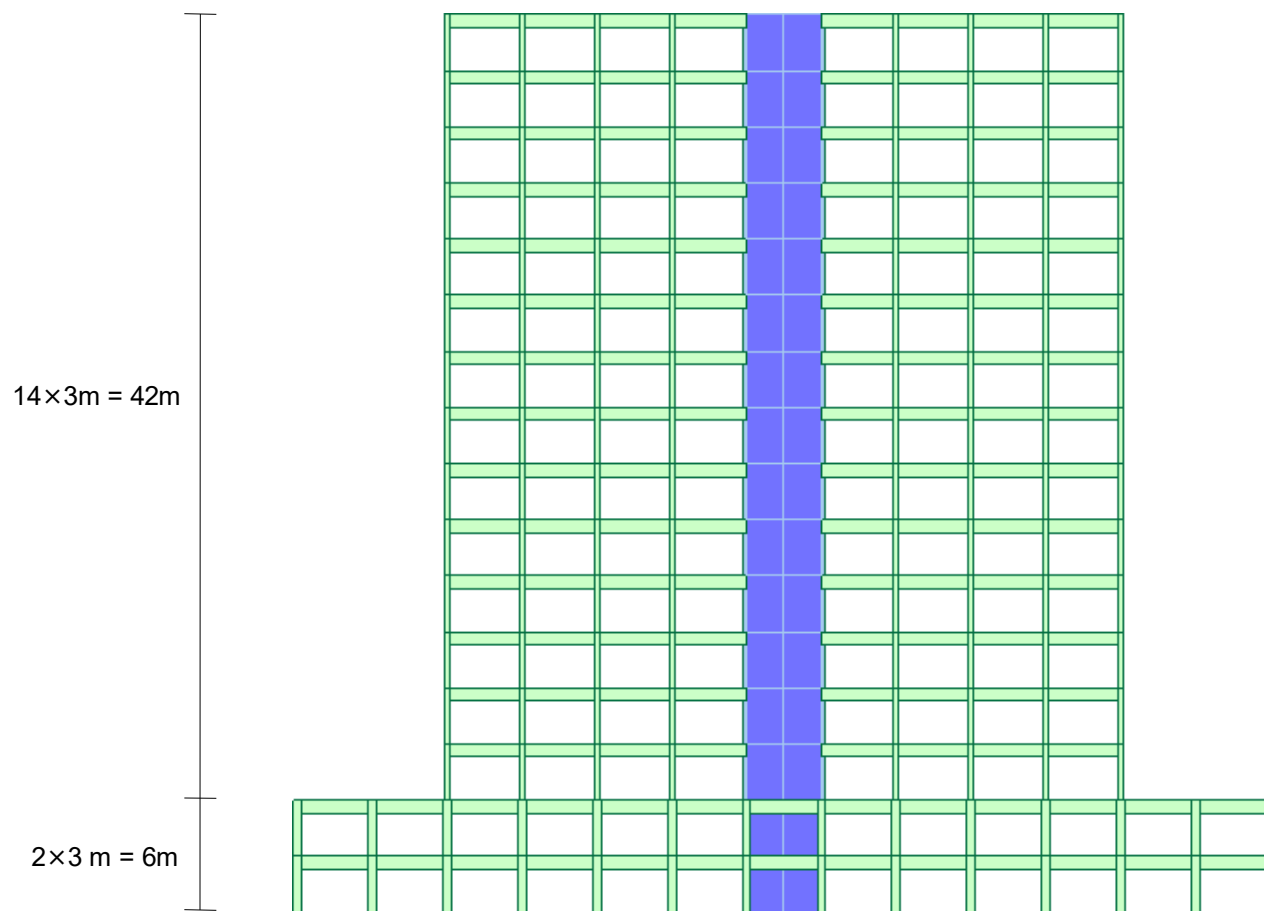


Figure 3: Podium Floor Plan

**Figure 4: Longitudinal Section**

Details of the Reinforced Concrete Building

Applied Code

RC Design Code :
IS 456-2000

Materials

Concrete M30 For Beams
Concrete M40 For Columns
Concrete M40 For Walls
Steel Fe415

Building Structure Elements

Section ID	Dimension	Description
1	450x450mm	Podium columns
2	300x800mm	Building Columns
3	230x700mm	Beam
4	230mm thick	Walls

Applied Load

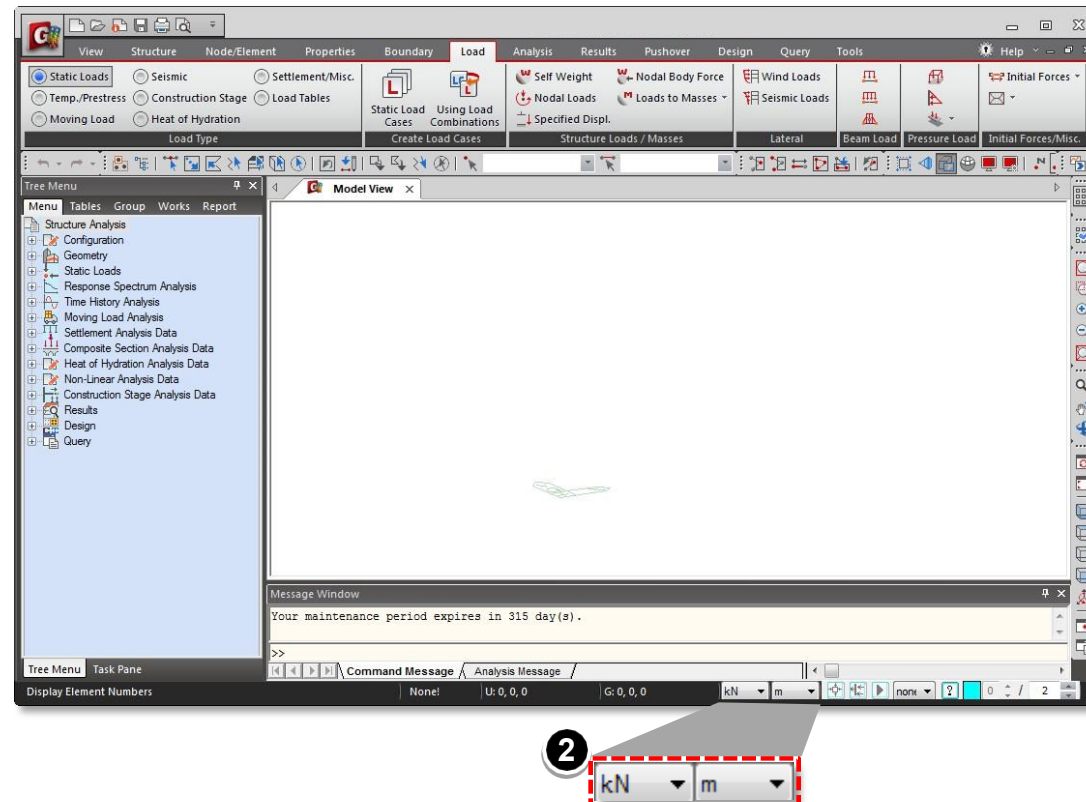
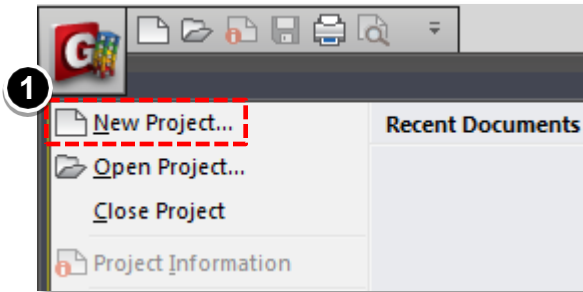
Load	Description	Intensity
Dead Load	Self Weight	
Typical Floor Load	Super imposed Dead Load Live load	4 kN/m ² 2 kN/m ²
Podium Floor	Super imposed Dead Load Live load	4 kN/m ² 4 kN/m ²
Roof Floor	Super imposed Dead Load Live load	5.5 kN/m ² 1.5 kN/m ²
Wind Load	X, Y direction	IS 875 Part3
Earthquake Loads	X, Y direction	IS 1893-2016

1-1.Initialization of workspace

Procedure

Starting Midas Gen

- 1 Click on GEN icon > New Project
- 2 Check the units on the lower right corner of the screen.

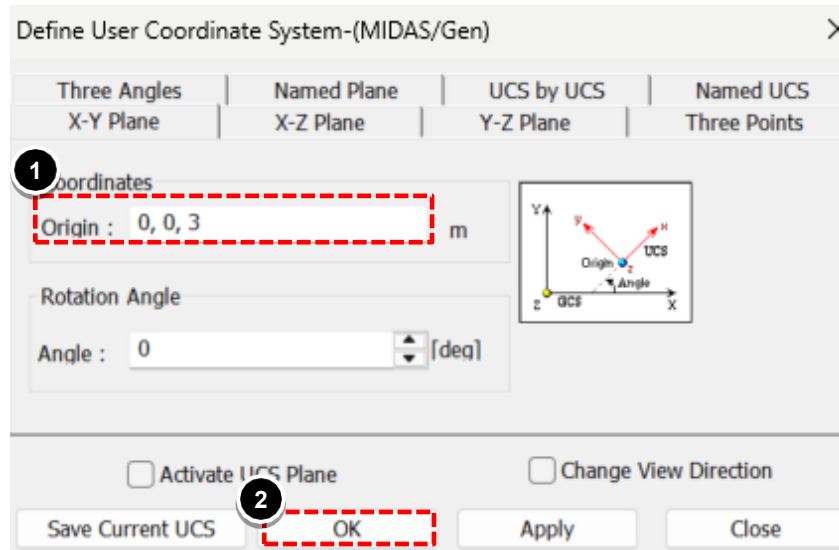
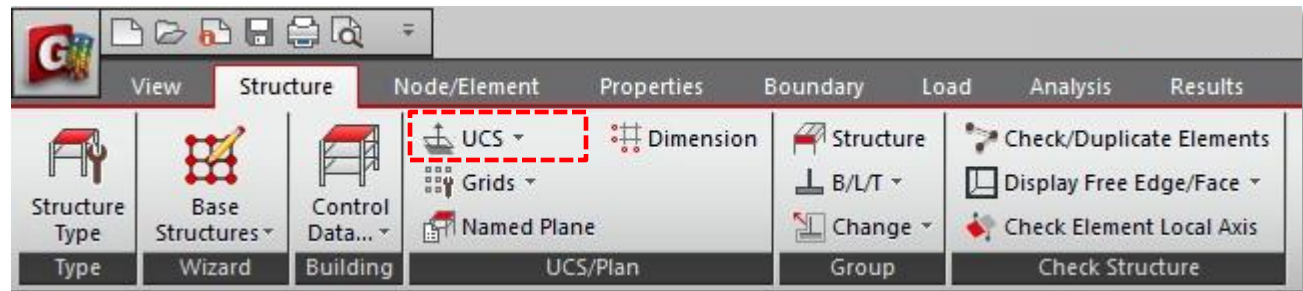


1-2.Setting UCS to XY Plane

Procedure

Structure Tab > UCS/Plan >
UCS > X-Y Plane

- ❶ Set UCS to X-Y Plane > Origin
0,0,3
- ❷ Click on Apply And OK



1-3. Generation line grid

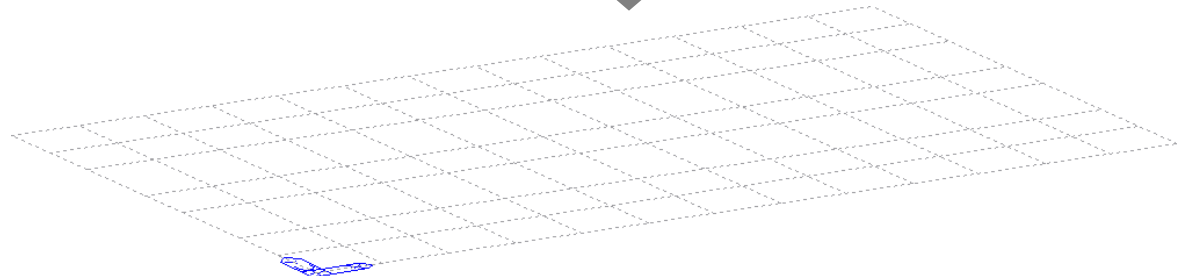
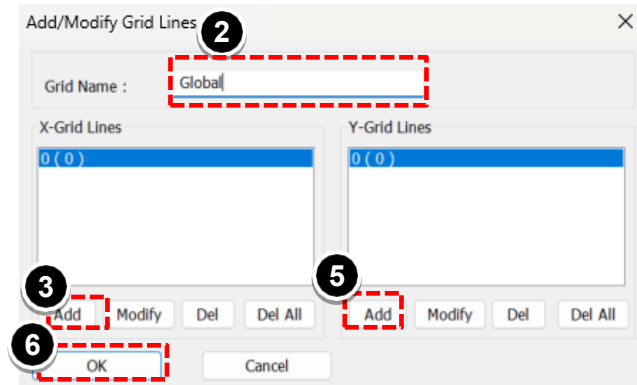
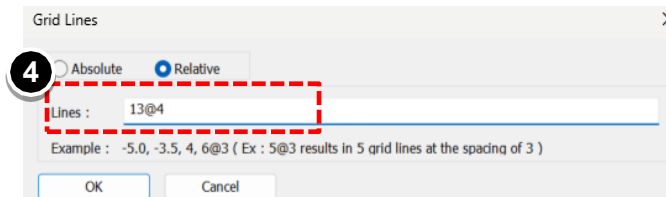
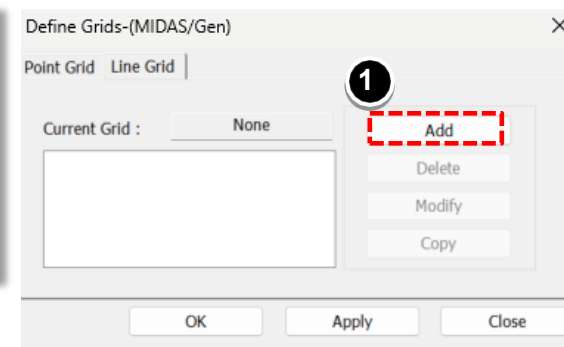
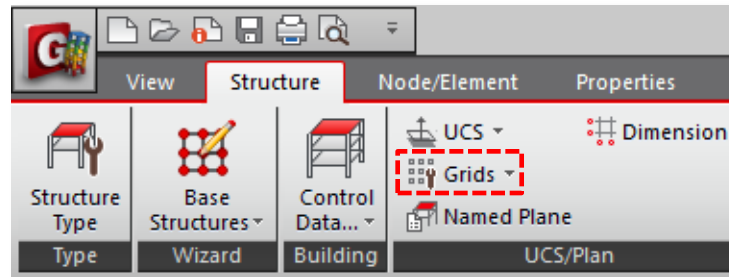
Procedure

Generate the required gridline system

Structure Tab > UCS/Plan > Grids
> Define Line Grid > Add

- ① Add
- ② Name it Global,
- ③ Add X grid lines
- ④ Relative
Lines: 13@4
(13@4, Means 13 Grid lines at the spacing of 4m)
- ⑤ Add Y grid lines and
Relative Lines: 2@4,6,4,6,2@4
- ⑥ Click OK

A dialog box depicting the Gridlines appears. Click OK



2-1. Defining the Material & Frame Section Properties

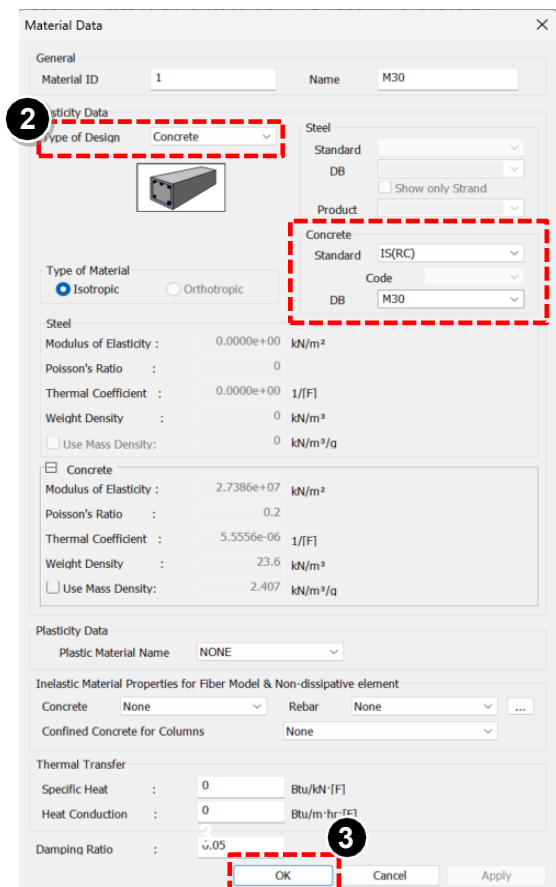
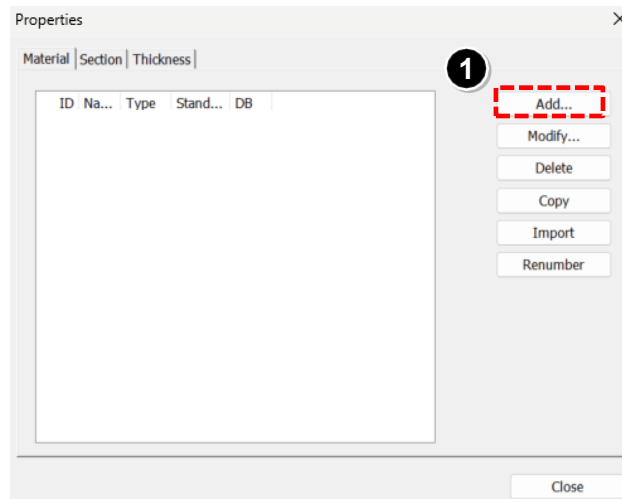
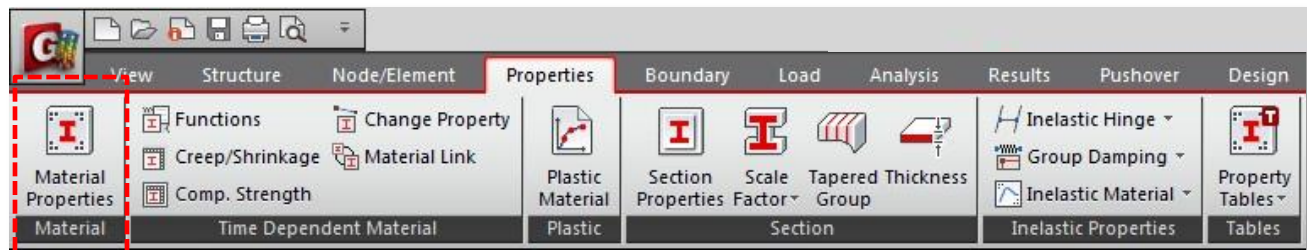
Procedure

Defining Material Properties

Properties Tab > Material > Material Properties

- ① Add
- ② Type of Design: Concrete
Standard: IS(RC)
DB: M30
- ③ Click OK

Similarly define M40 material property for columns and walls



2-1. Defining the Material & Frame Section Properties

Procedure

Defining Frame Section Properties

Properties Tab > Section > Section Properties > Add

❶ Solid rectangle

Name: Podium Column

❷ User

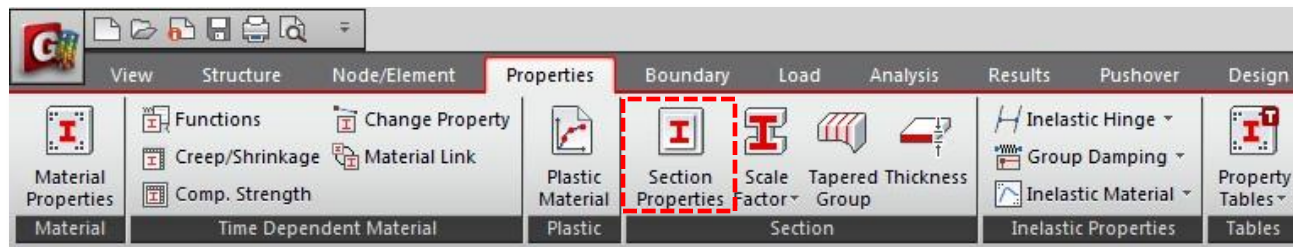
H= 0.45m

B= 0.45m

❸ Click [Apply]

Similarly define the other Frame Section Properties

Building Column 300x800,
Beam 230x700.



Section	Name	Dimension
Podium column	Podium Column	450x450mm
Building column	Building Column	300x800mm
Beam	Be a m	230x700mm

2-1. Defining Shear walls

Procedure

Defining Shear walls

Properties Tab > Section > Thickness
> Add

① For the Shear Walls

And Slab Thickness:

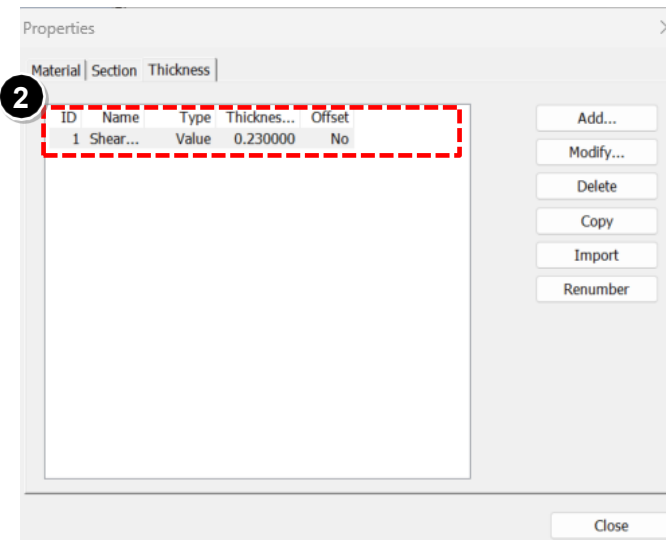
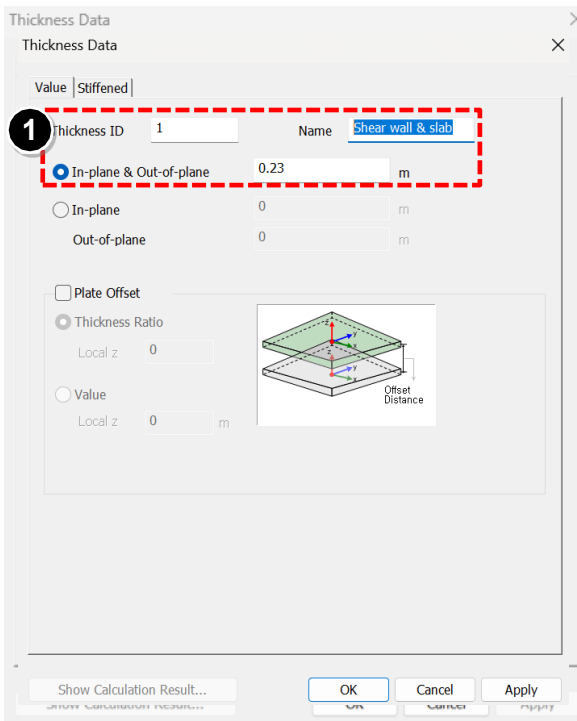
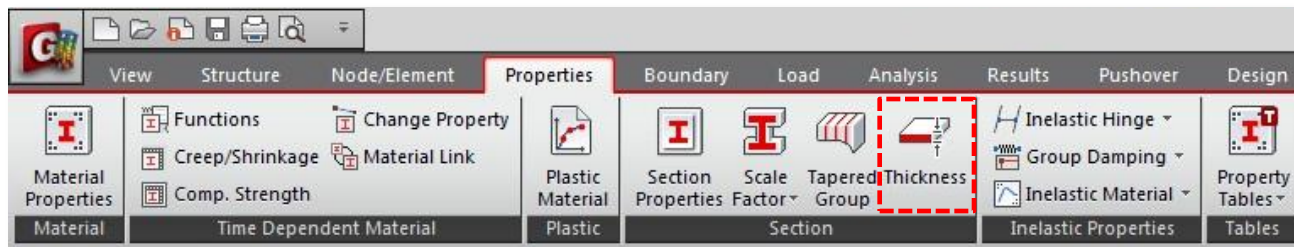
Add a 'Thickness' Section

Value

In-plane & Out-of plane= 0.23m

② On creating the wall, it is

Displayed in the dialog box



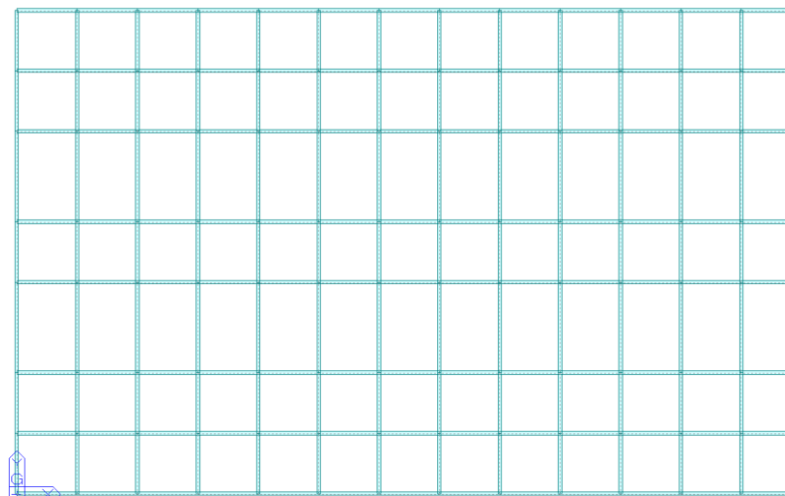
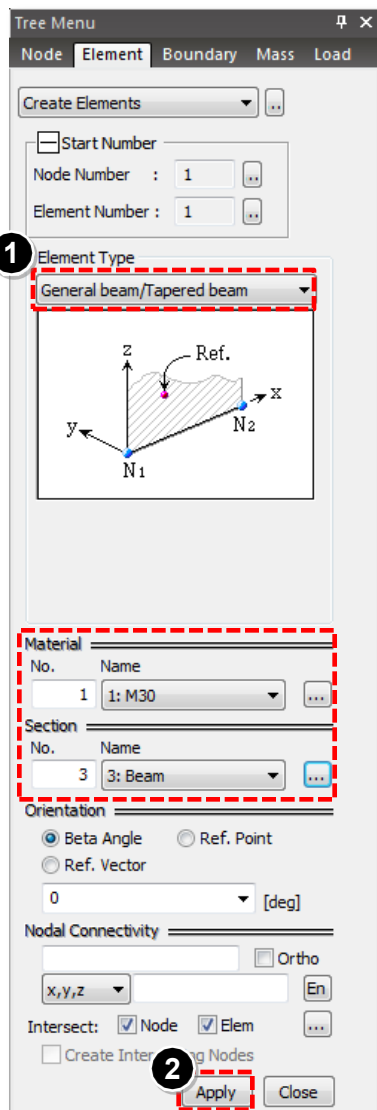
3-1. Generation of Floor layout

Procedure

Generate the Beams
Node/Element Tab > Create
Elements

- ① Select General beam/Tapered beam
- ② Make sure that Intersect at nodes and Elements is on
To create a beam, click on nodal connectivity and select the origin as the first point and draw till the last point.

*Please make sure that
Point Grid Snap is On



3-1. Generation of Floor layout

Procedure

Node/Element Tab > Divide Elements

① Click on select single

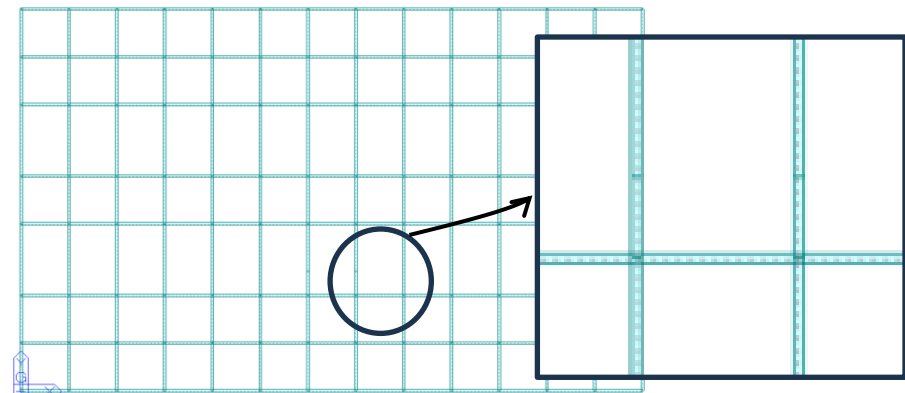
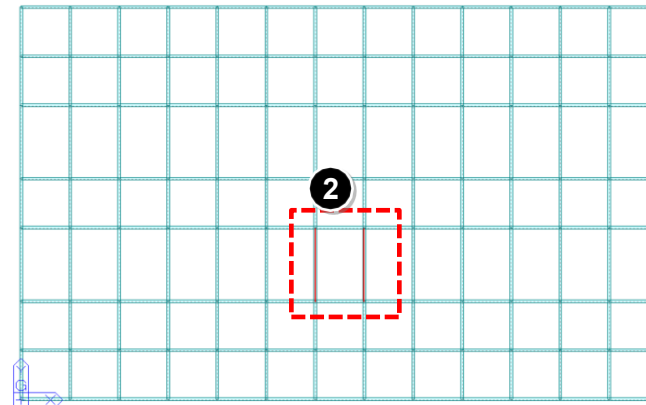
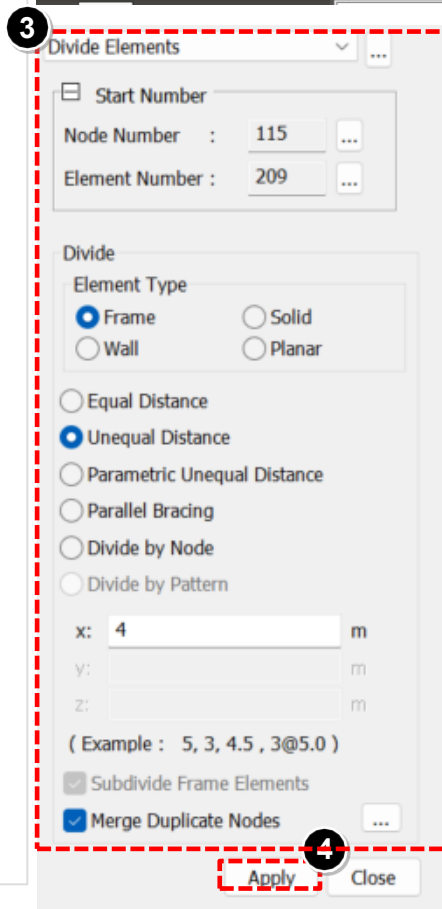
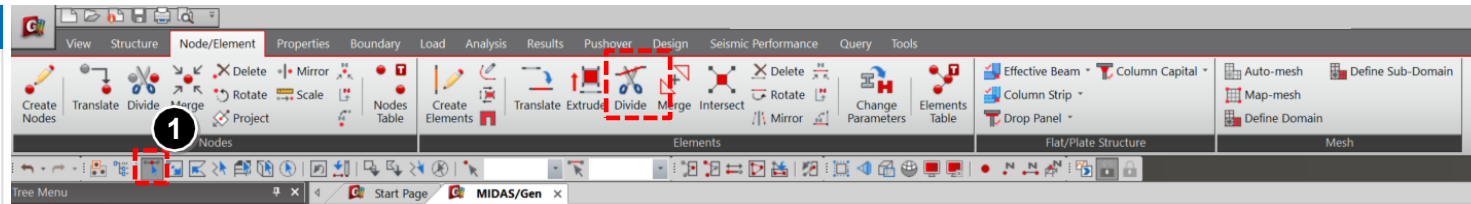
② Select the elements as shown in the figure

③ Click Unequal distance
Element type : Frame
Distance : 4 m

④ Click apply

Note:

Depending upon the local axis from i^{th} and j^{th} of the element the offset distance can vary as 2 or 4 m.

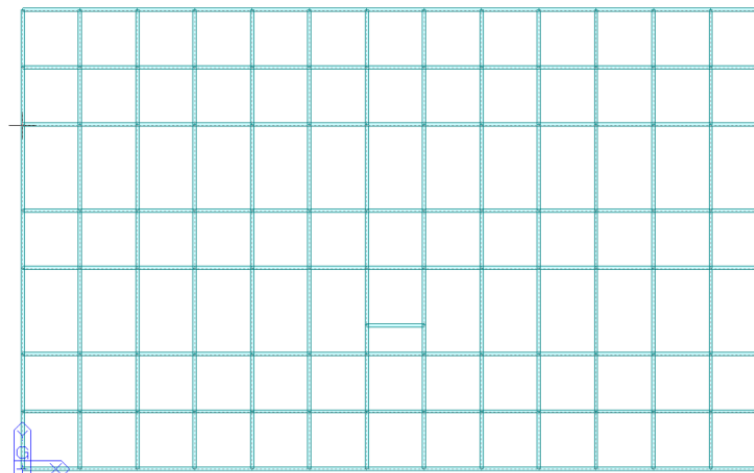
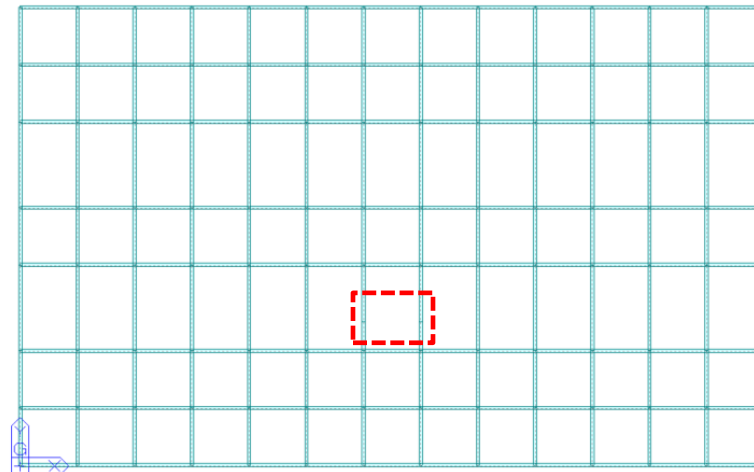
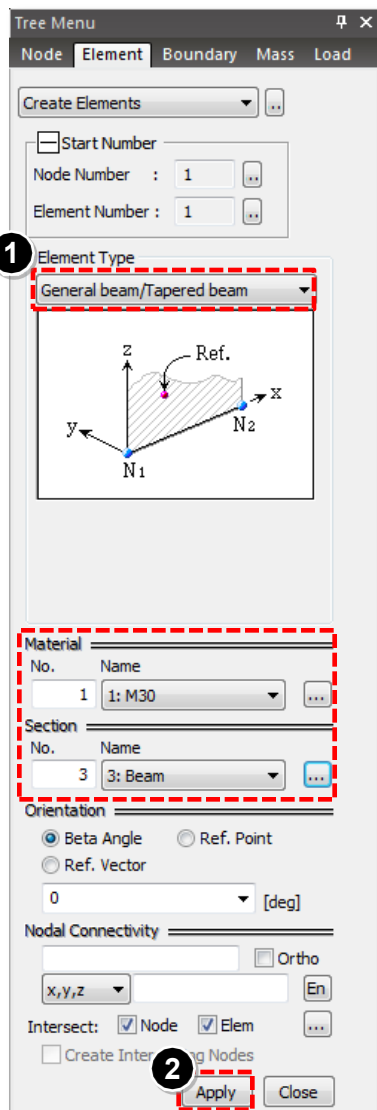


3-1. Generation of Floor layout

Procedure

Generate the Beams
Node/Element Tab > Create
Elements

- ① Select General beam/Tapered beam
- ② Make sure that Intersect at nodes and Elements is on
To create a beam, click on nodal connectivity and select the origin as the first point and draw till the last point.



3-1. Generation of Floor layout

Procedure

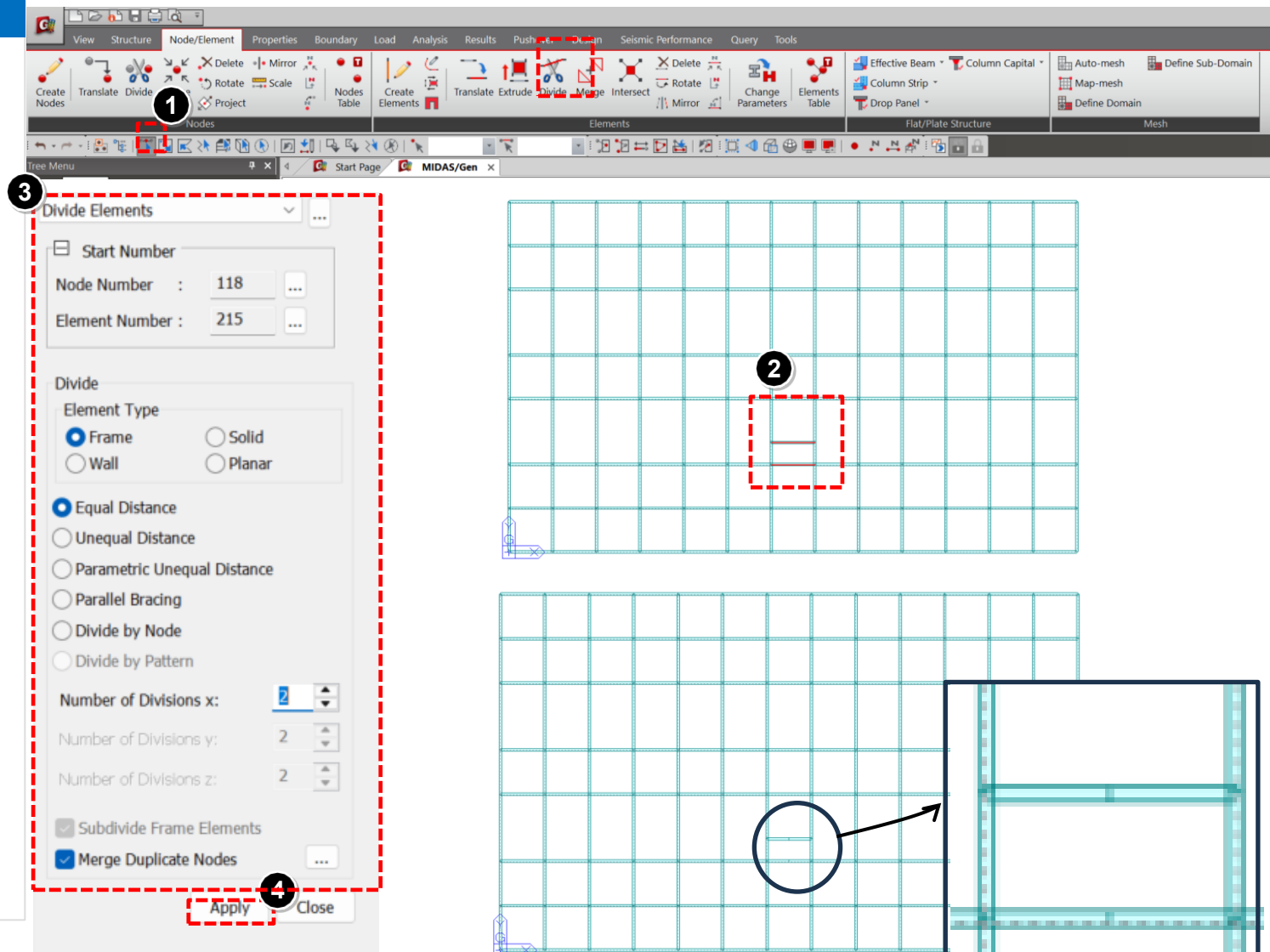
Node/Element Tab > Divide Elements

① Click on select single

② Select the elements as shown in the figure

③ Click equal distance
Element type : Frame
Equal Distance
Number of divisions : 2

④ Click apply

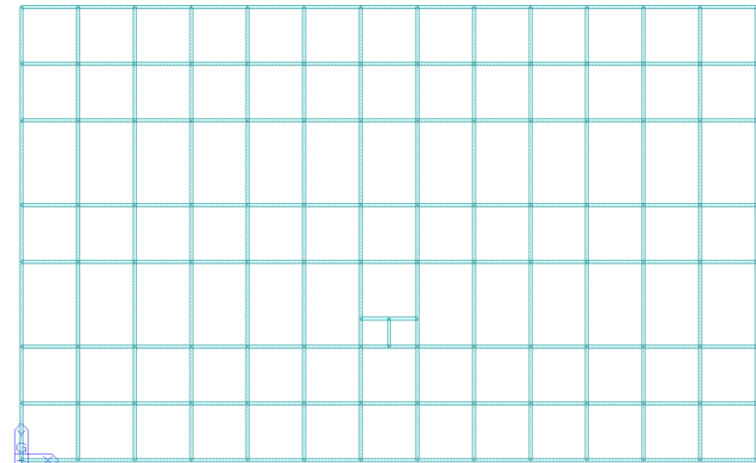
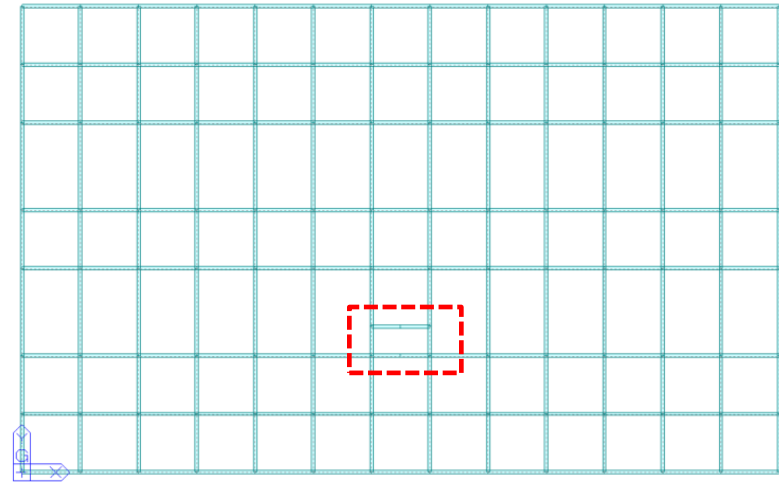
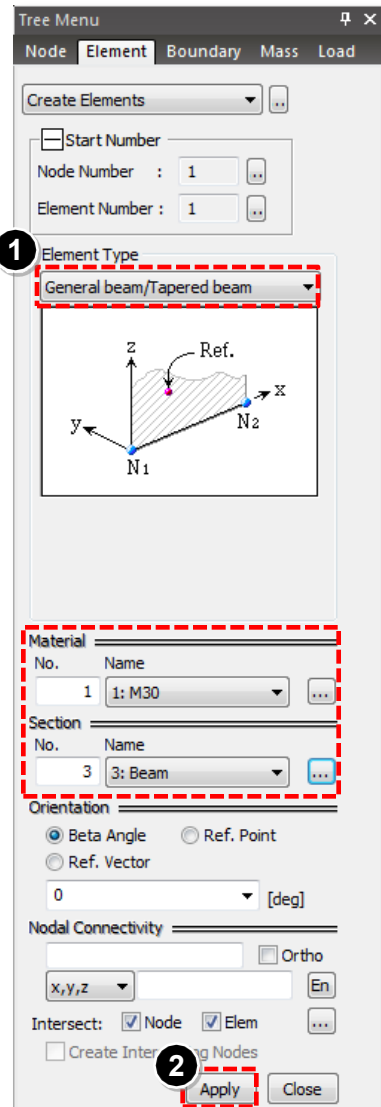


3-1. Generation of Floor layout

Procedure

Generate the Beams
Node/Element Tab > Create
Elements

- ① Select General beam/Tapered beam
- ② Make sure that Intersect at nodes and Elements is on
To create a beam, click on nodal connectivity and select the origin as the first point and draw till the last point.



3-1. Generation of Floor layout

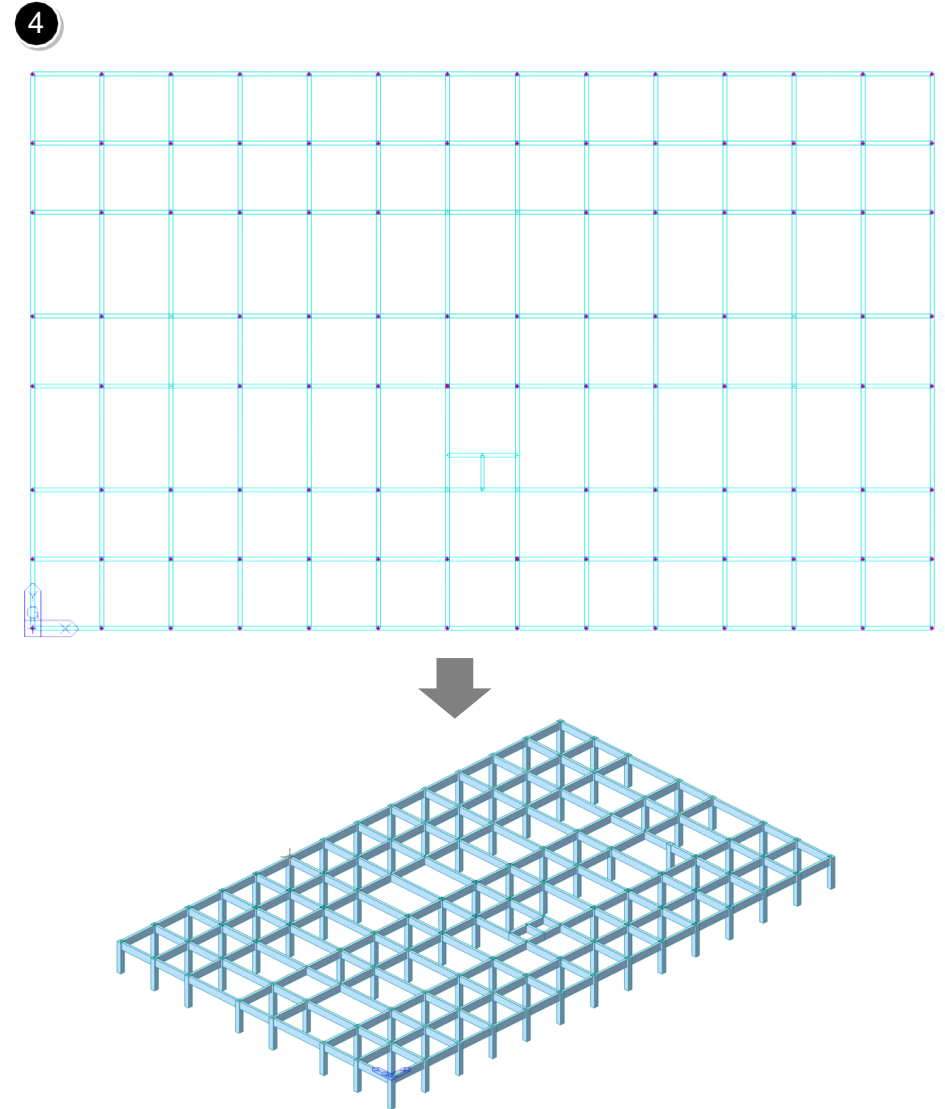
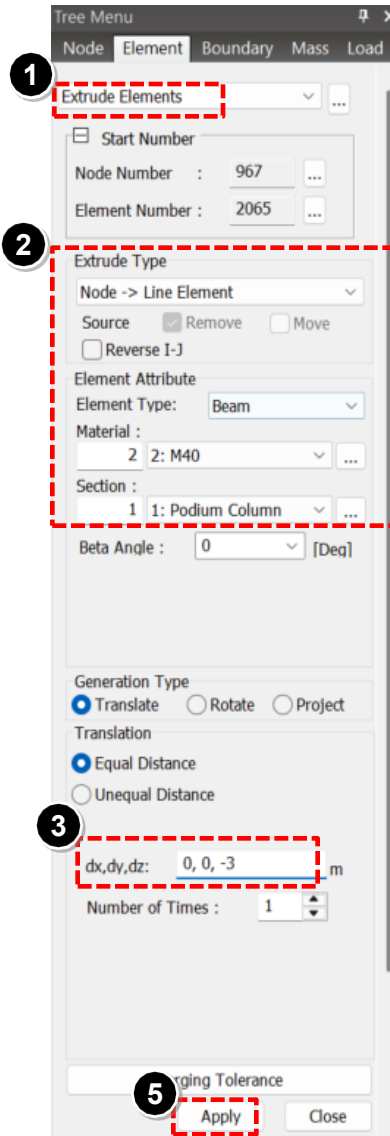
Procedure

Generate Columns

View Tab > Grid/Snap >

UCS/GCS > Click GCS

- ① Node/Element Tab>
Extrude Elements
- ② Node to Line elements,
select Element Type as
Beam
- ③ Translation Distance as 0,0,-3
Along Z axis.
- ④ Select all the nodes as shown
in the figure
- ⑤ Click on Apply



3-1. Generation of Floor layout

Procedure

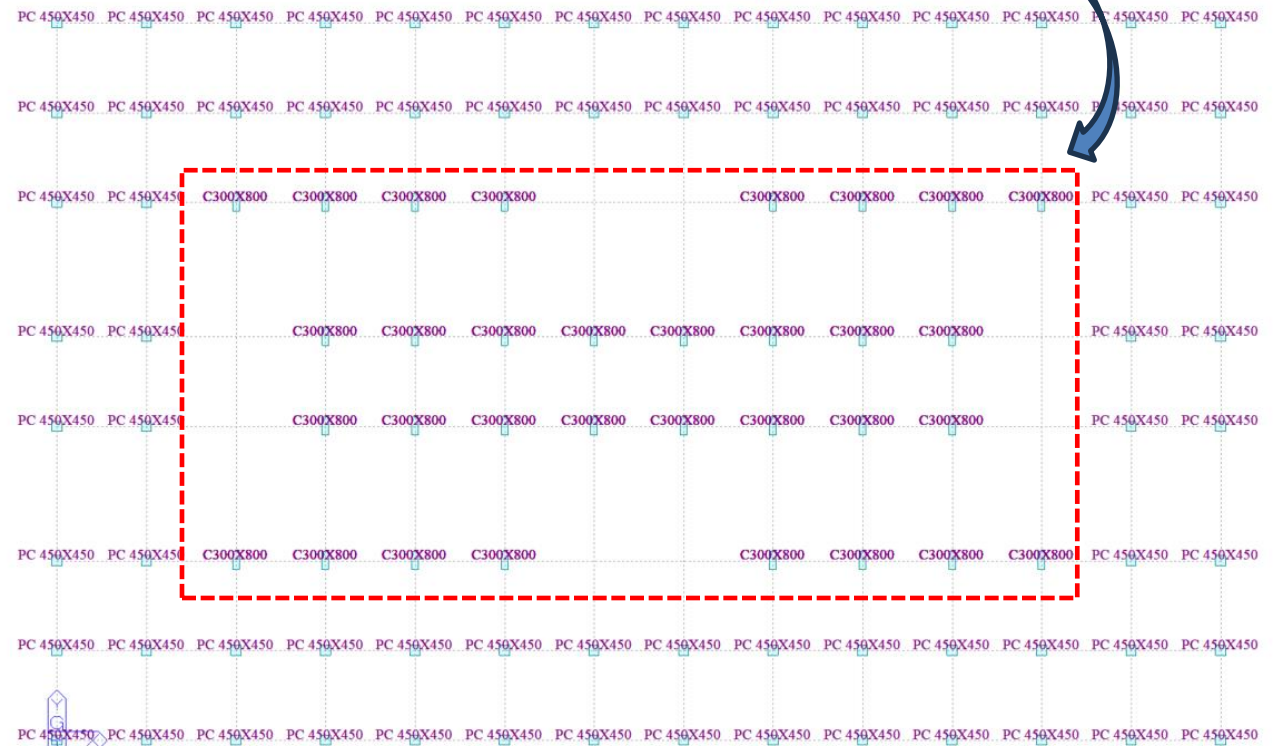
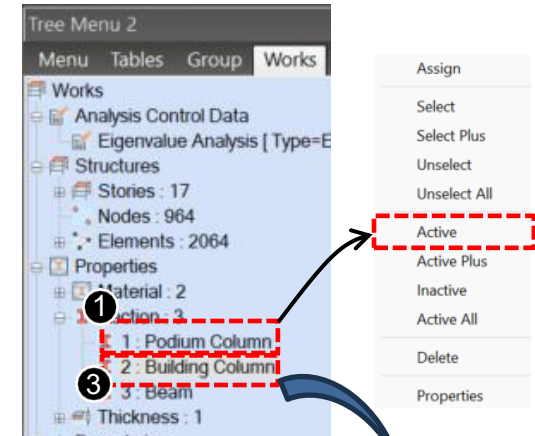
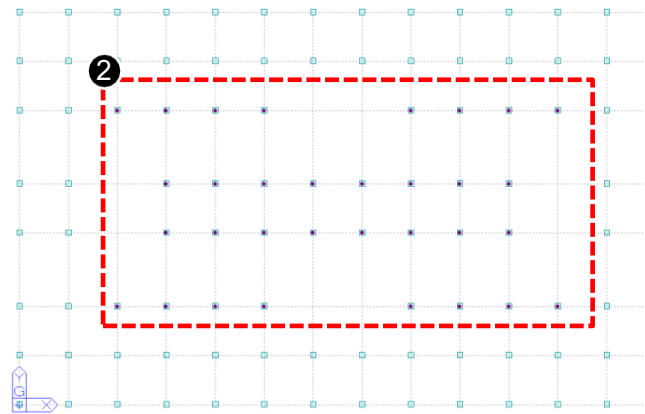
Modify the Property of Columns:
(To Change the property of certain exterior columns to Interior)

① Works> Properties > Section
>Podium Column>Right
Click > Active.

② Select the columns whose
property has to be changed
as shown in the figure.

View Tab >Display >Property
> Property Name

③ Now from the Works Menu,
Drag and Drop Interior
Building Column section



3-2. Generation of Shear Walls

Procedure

Generation Shear Walls

- ① Select the elements as shown in the figure
- ② Extrude type : Line → Planar element
Check in Remove to remove the line elements selected
Material : M40
Thickness : 0.23
- ③ Generation type : Translate
Distance : 0,0,-3

Extrude Type
Line Elem. -> Planar Elem. ▾

Source ☒ Remove ☐ Move

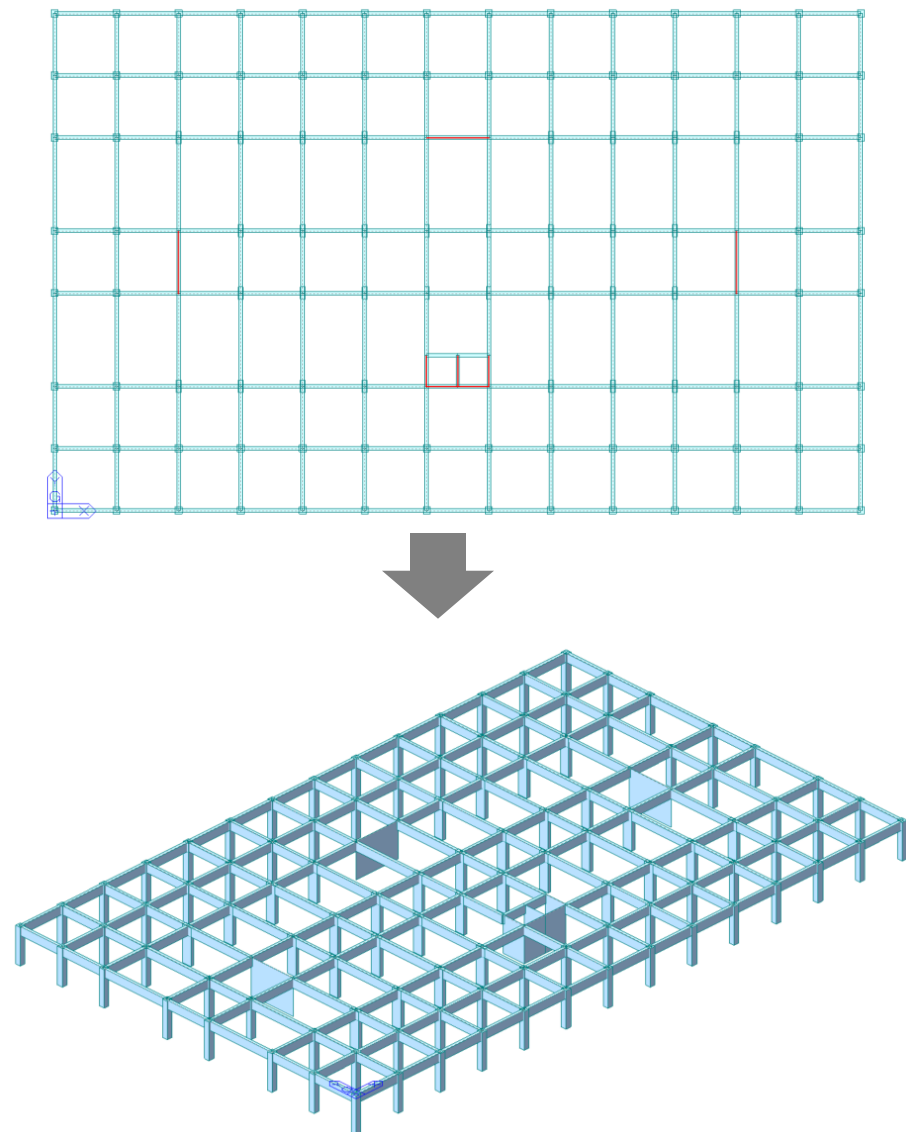
☐ Reverse I-J

② Element Attribute
Element Type: Wall ▾
Material : 2 2: M40 ▾ ...
Thickness : 1 1: 0.2300 (Shear wall & ▾ ...
☒ Membrane ☐ Plate
Wall ID : 1

③ Generation Type
☒ Translate ☐ Rotate ☐ Project
Translation
☒ Equal Distance
☐ Unequal Distance
☐ Local Direction
dx,dy,dz: 0, 0, -3 m
Number of Times : 1 ▴ ▾

Merging Tolerance

Apply Close



4-1. Generation of Building Model

Procedure

Building Generation

View Tab > Select > Select All

① Structure Tab > Control Data

Building Generation

No of Copies: 1

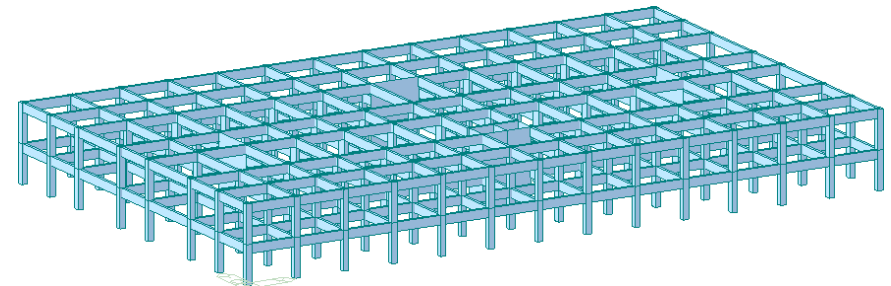
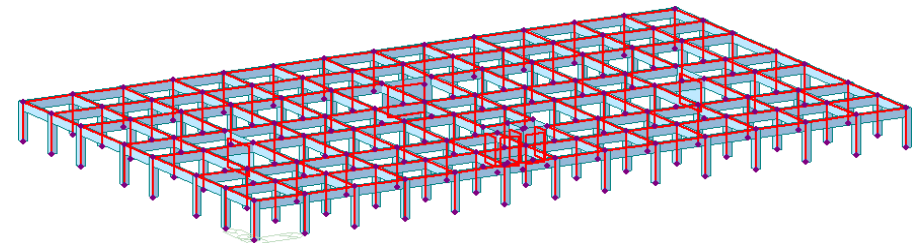
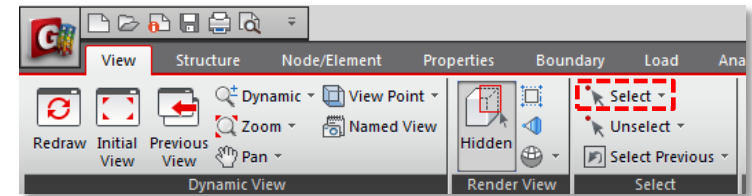
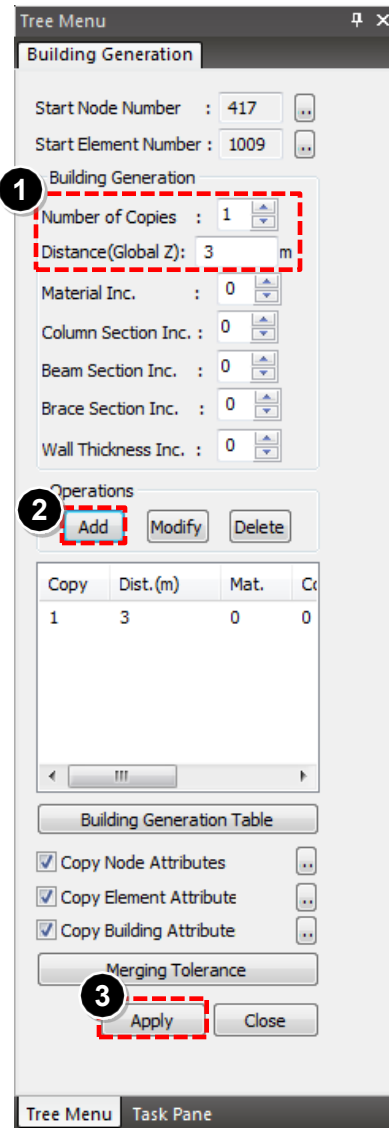
Distance (Global Z): 3.0m

② Click Add

③ Click on Apply

The building is generated as
Shown

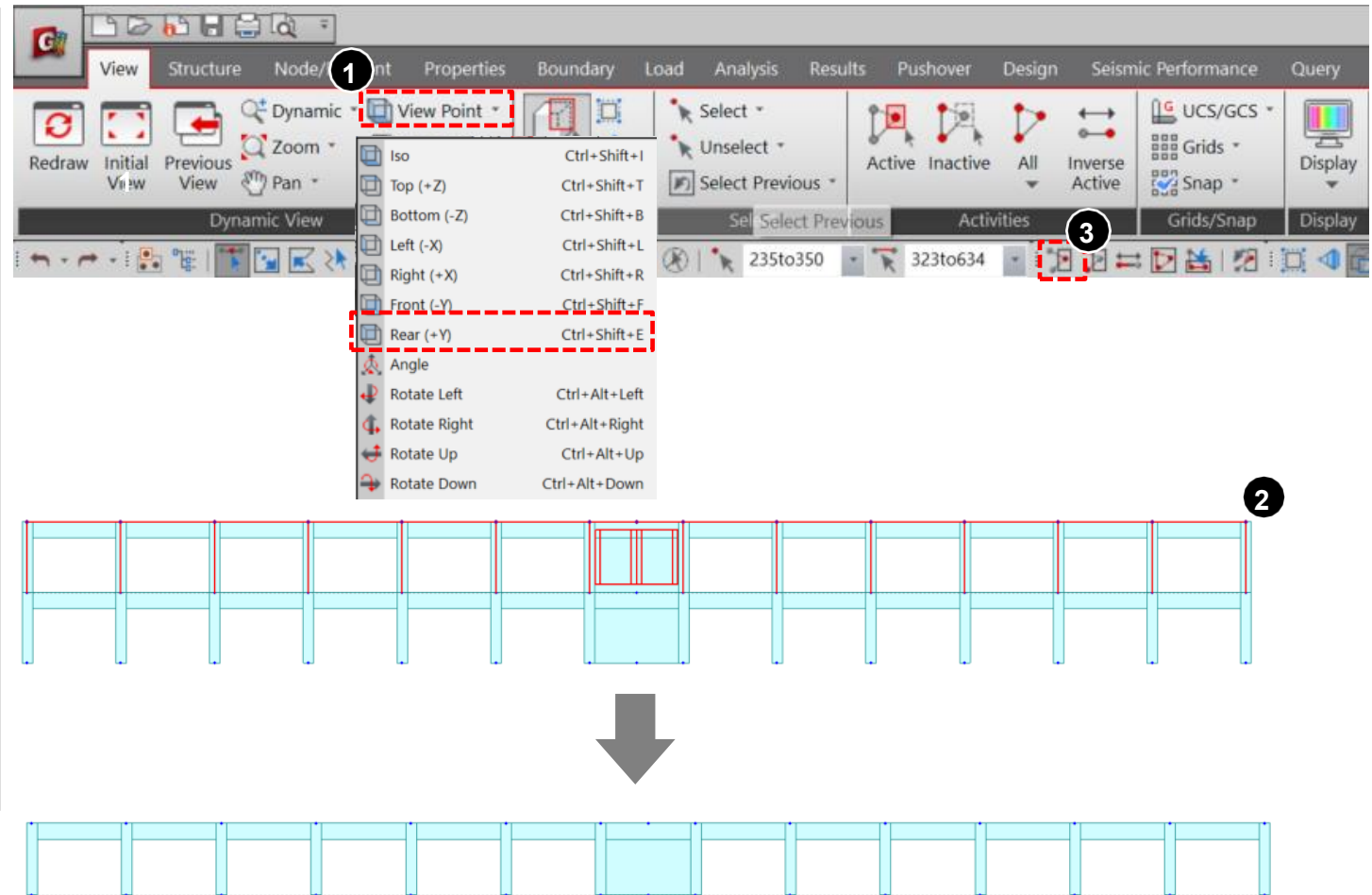
(podium is only up to two levels)



4-1. Generation of Building Model

Procedure

- ❶ View > View point > Rear (+Y)
- ❷ Select elements as shown
- ❸ Click on Active



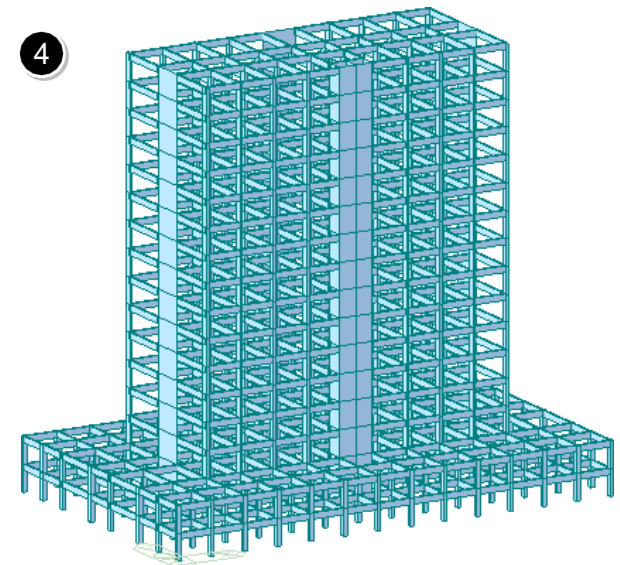
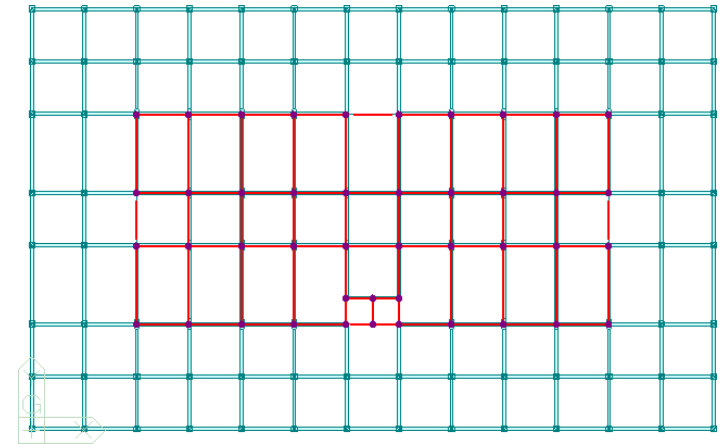
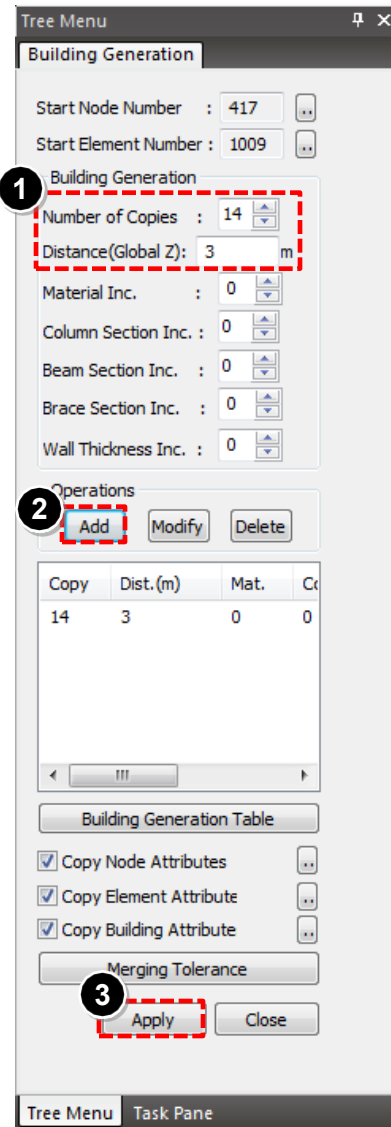
4-1. Generation of Building Model

Procedure

Building Generation

View Tab > Select > Select by single > Select ground floor as shown

- ① Structure Tab > Control Data > Building Generation
No of Copies: 14
Distance (Global Z): 3.0 m
- ② Click Add
- ③ Click on Apply
- ④ The building is generated as Shown



4-2. Automatic generation of the story data

Procedure

Structure Tab > Control Data >

Story

- ① Click [Auto Generate Story Data] button. This will create the data needed to generate diaphragms for each floor
- ② Click [OK]
Story data is generated

Story Data

Ground Level
 m ...

	Module Name	Story Name	Level(m)	Height(m)	Floor Displacement
*					

① Story / Wind / Seismic /

Auto Generate Story Data... Define Module... Calculate Accidental Ecc. Close

Automatic Generation of Story Data

Unselected List

N.	Level

Selected List

N.	Na...	Level	Height
1	1F	0	3
2	2F	3	3
3	3F	6	3
4	4F	9	3
5	5F	12	3
6	6F	15	3
7	7F	18	3
8	8F	21	3
9	9F	24	3
10	10F	27	3
11	11F	30	3
12	12F	33	3
13	13F	36	3
14	14F	39	3

☒ Include Seismic Accidental Eccentricity : % of Plan Dimension

☒ Include Wind Eccentricity : % of Plan Dimension

② OK Cancel

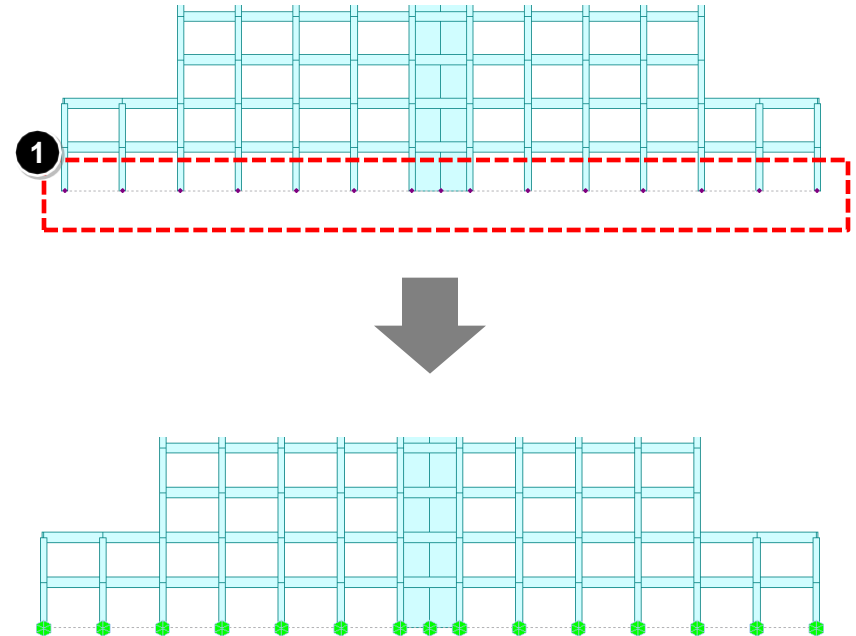
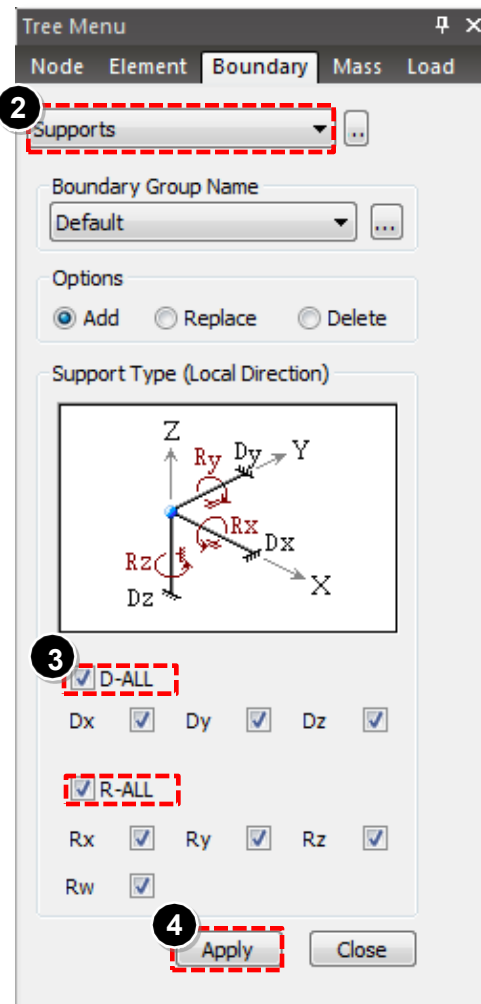
5-1. Boundary Conditions

Procedure

The lower ends of the Columns are assumed fixed

Click  "Select by window"

- ① Select the ends of all the columns from the Front view.
- ② Boundary Tab > Supports > Define Supports
- ③ Select the property of Fixed Support i.e. D- all, R- all.
- ④ Click on Apply

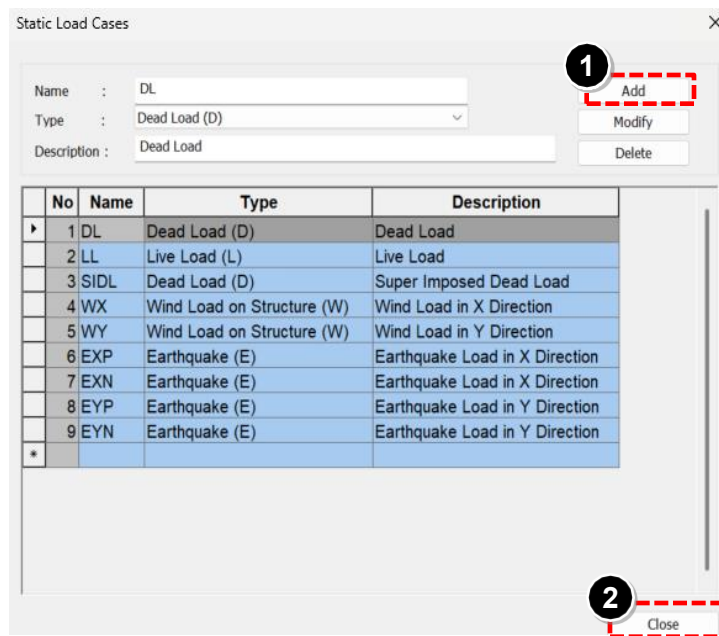
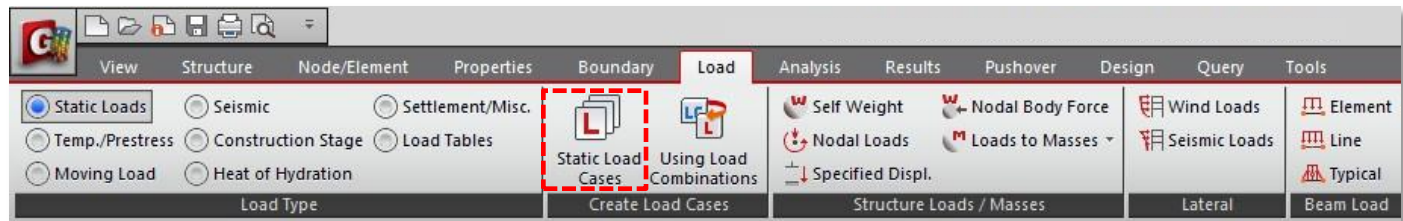


6-1. Load cases

Procedure

Load Tab > Load Type >
Static Loads > Create Load Cases
Static Load Cases

- ① Add the loads and their details as shown in the Dialog box
- ② Click : [Close]

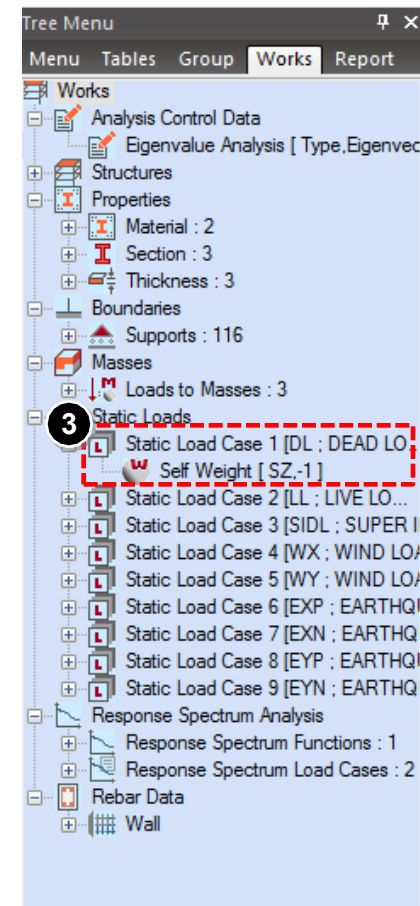
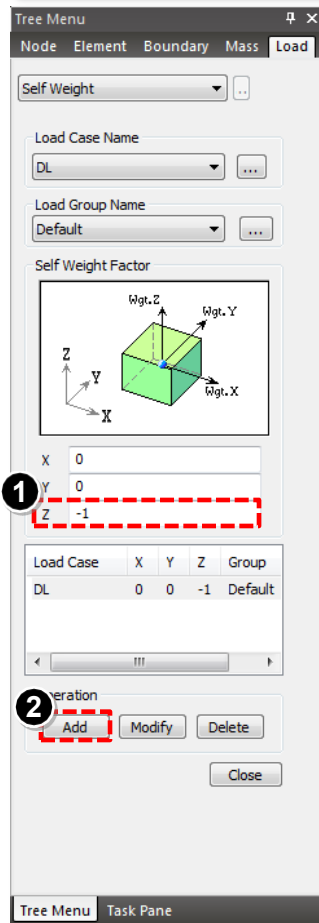
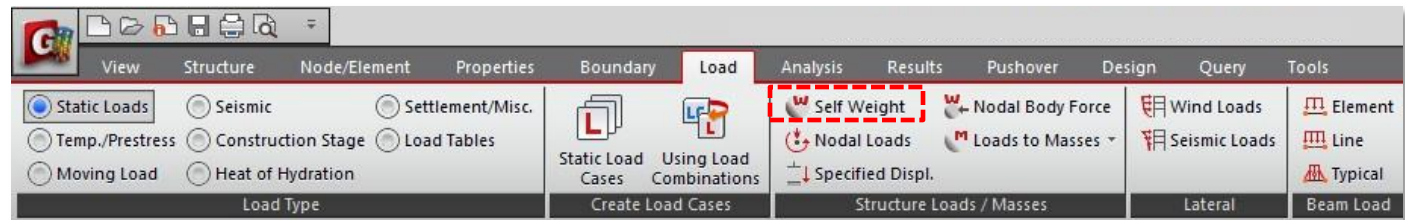


6-2. Loading Data (Self Weight)

Procedure

Load Tab> Load Type >
Static Loads > Structural Loads/
Masses > Self Weight

- ① Load Case Name: DL
Z=-1
- ② Add
- ③ In the Work Tree menu, Self Weight will be displayed



6-2. Loading Data (Floor Load)

Procedure

Load Tab > Initial Forces/Misc
> Assign Floor Load Type > Define
floor load type

① Name: Typical Floor

DL: -4kN/m² (Consider 100mm
slab thickness, self weight
added)

LL: -2kN/m²

② Click on Add

Similarly define these floor loads

Name: Podium Floor

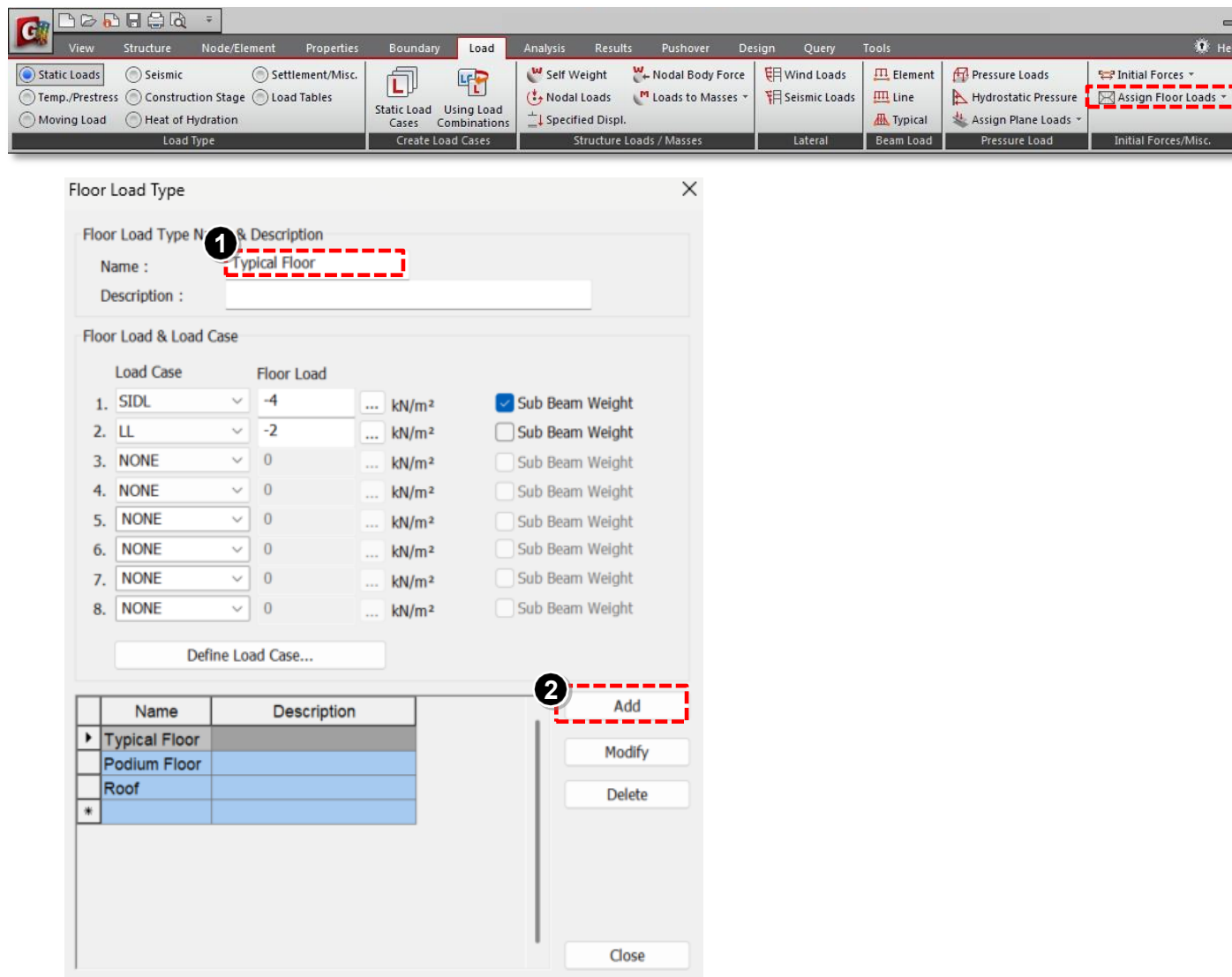
DL: -4kN/m²

LL: -4kN/m²

Name: Roof

DL: -5.5kN/m²

LL: -1.5kN/m²

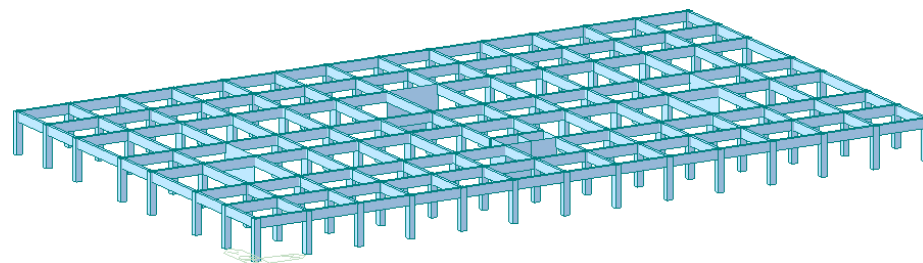
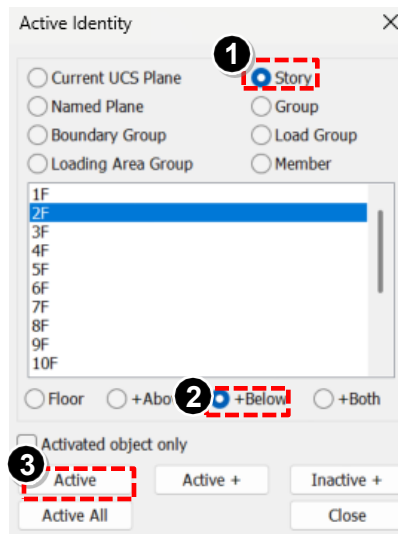
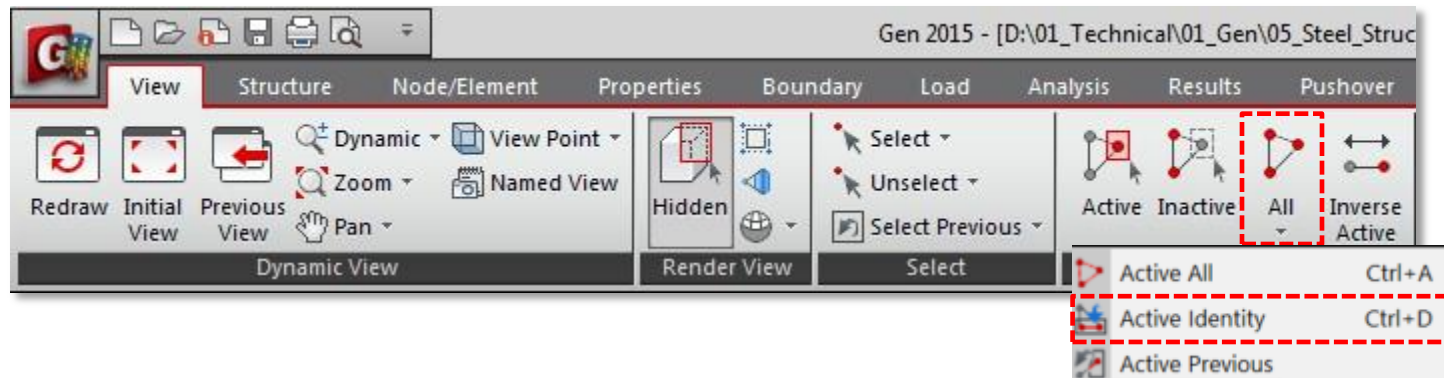


6-2. Loading Data (Floor Load)

Procedure

View Tab > Activities > All > Active Identity

- ① Check on Story
Then Select 2F
- ② Check on +Below
- ③ Click on Active



6-2. Loading Data (Podium Floor Load)

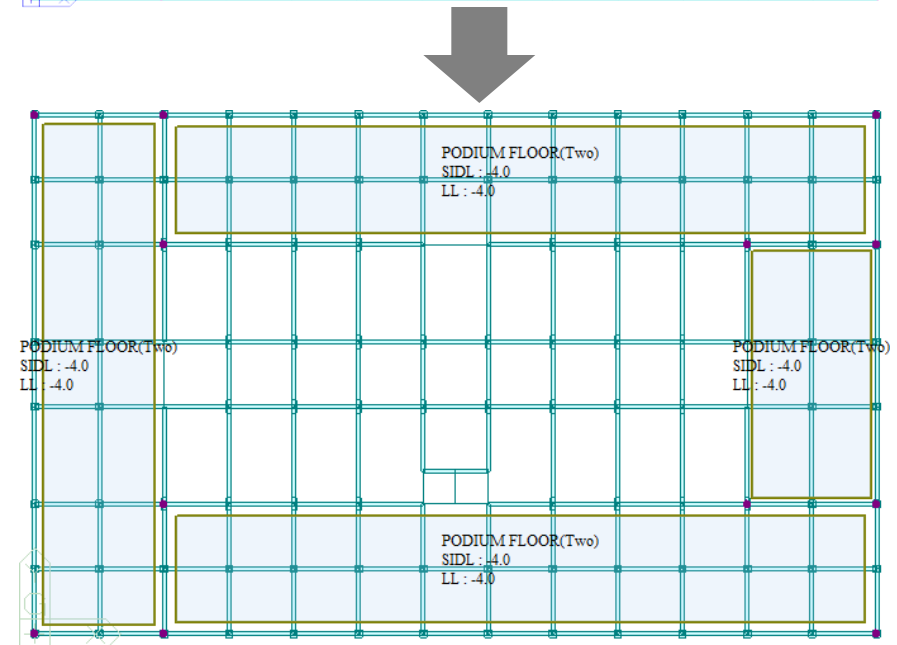
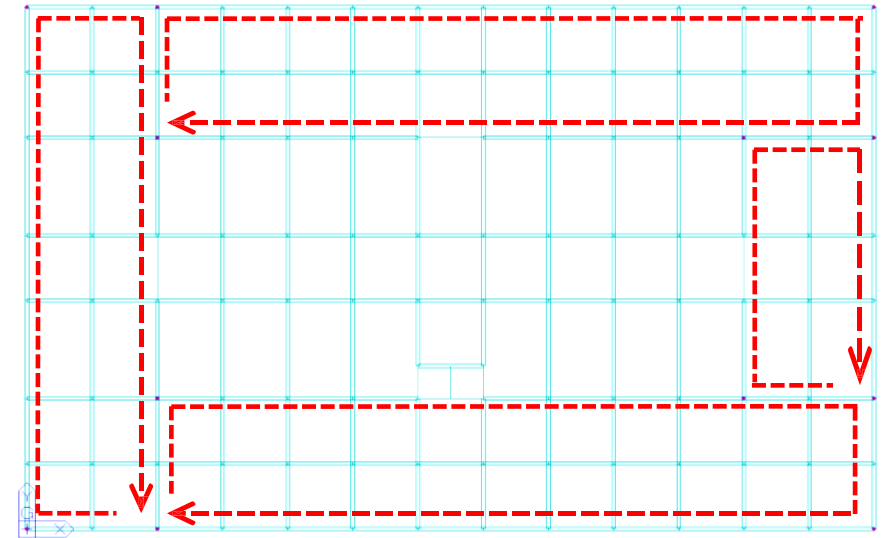
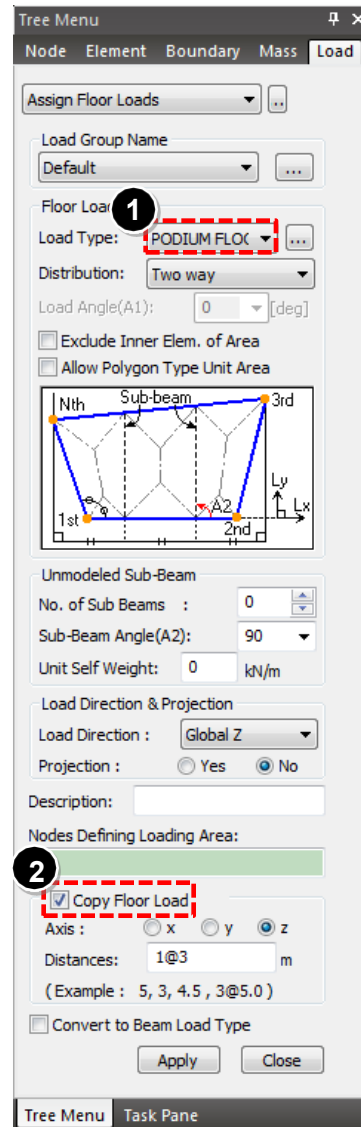
Procedure

Apply Floor Load to the Activated Floor

Load Tab > Initial Forces/Misc
> Assign Floor Loads

- 1 Name: Podium Floor
- 2 Copy Floor load: 1@3
(Total 1 floor and each floor distance is 3.0m)

To select the floor area, first
Select Nodes Defining Loading
Area where in You need to
Select the nodes . On the last
Click, the load is applied.



6-2. Loading Data (Typical Floor Load)

Procedure

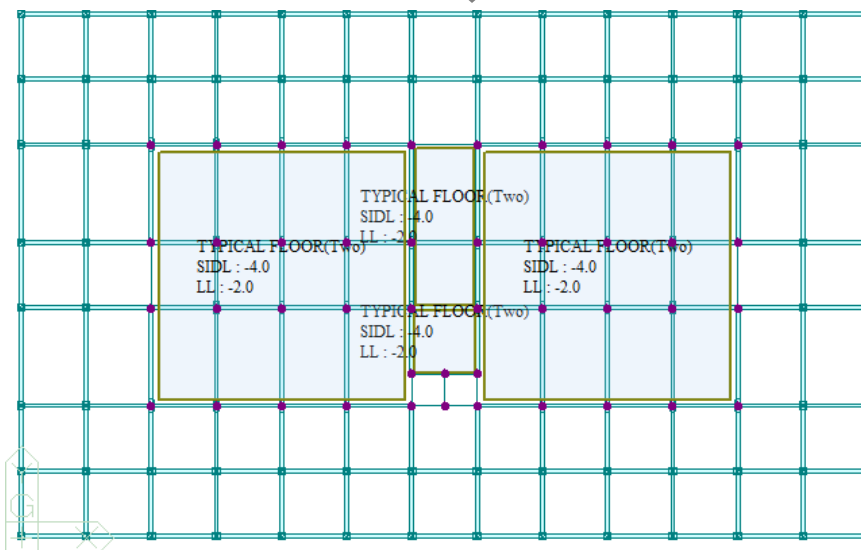
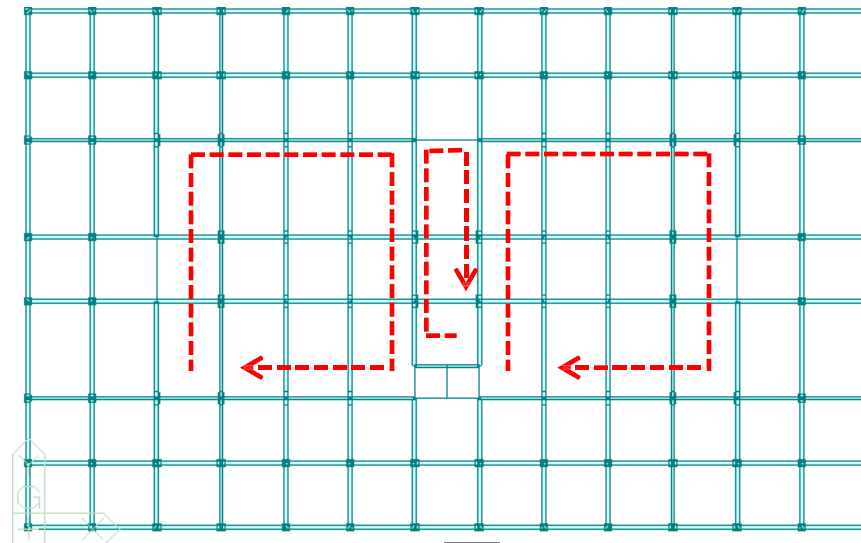
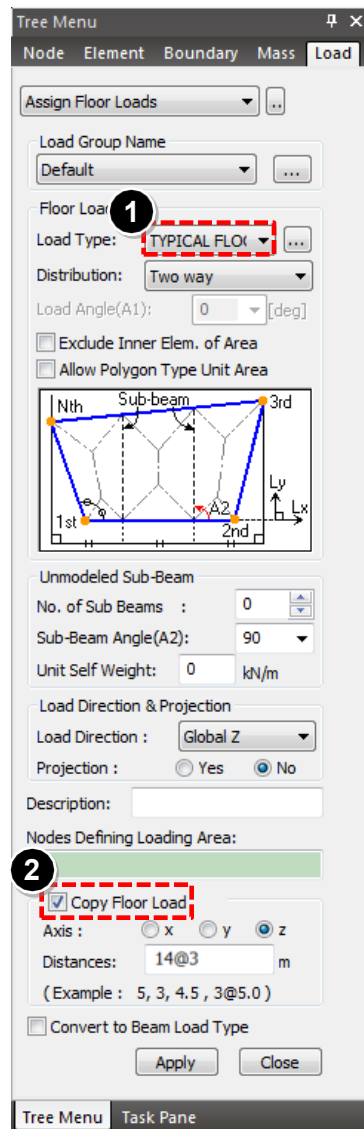
Apply Floor Load to the Activated Floor

Load Tab > Initial Forces/Misc
> Assign Floor Loads

① Name: Typical Floor

② Copy Floor load: 14@3
(Total 15 floors and each floor distance is 3.0m)

To select the floor area, first
Select Nodes Defining Loading
Area . On the last
Click, the load is applied

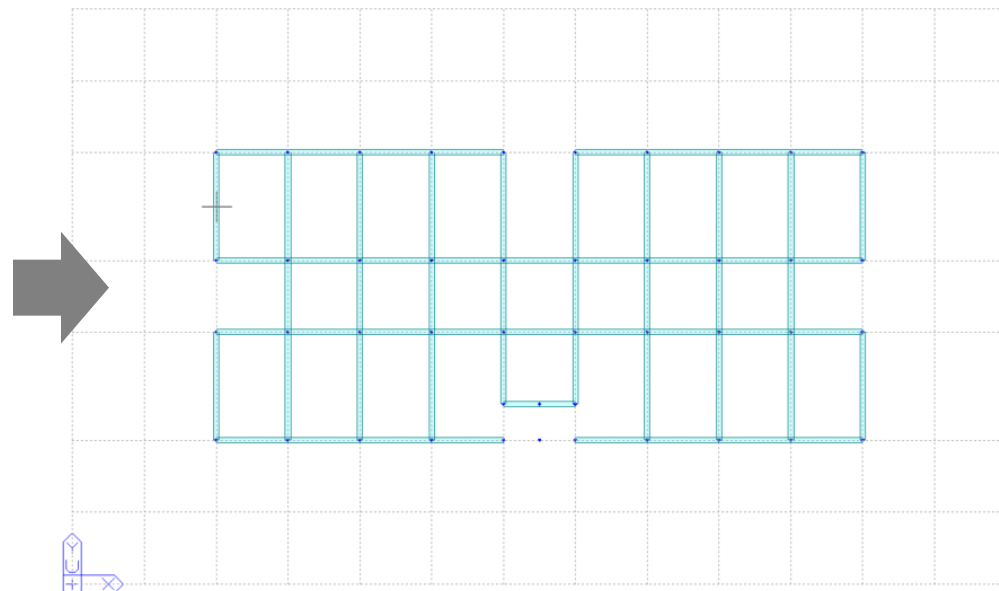
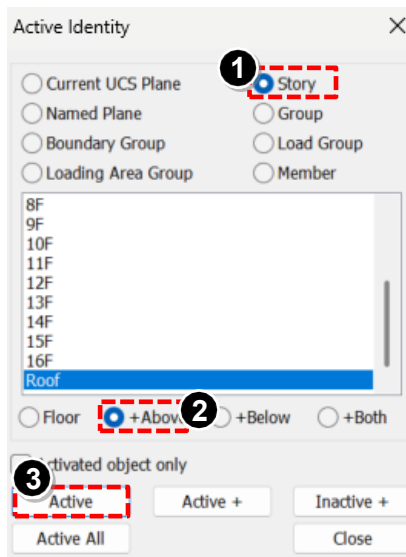
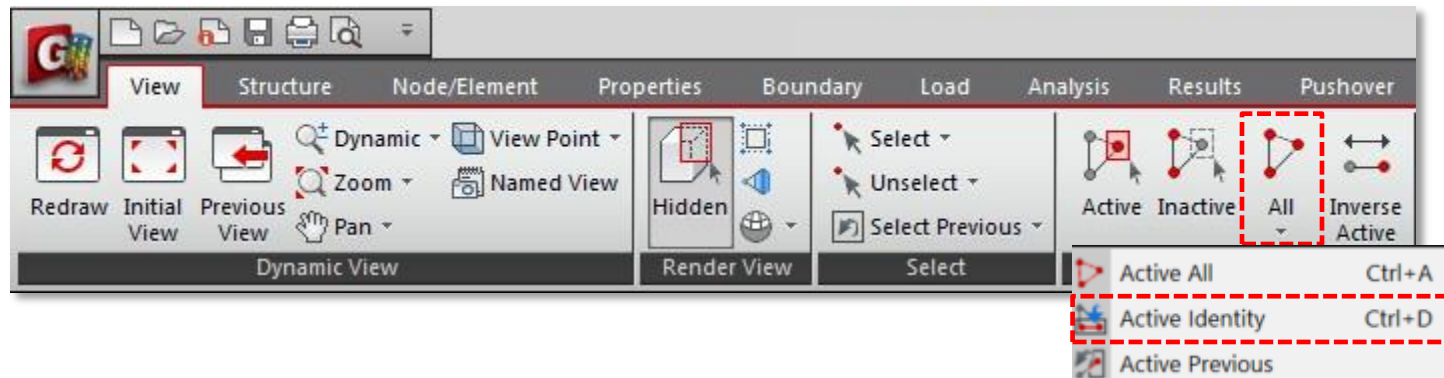


6-2. Loading Data (Roof Load)

Procedure

View Tab > Activities > All > Active Identity

- ① Check on Story
Then Select Roof
- ② Check on +Above
- ③ Click on Active



6-2. Loading Data (Roof Load)

Procedure

Apply Floor Load to the Activated Floor

Load Tab > Initial Forces/Misc
> Assign Floor Loads

- 1 Name: Typical Floor
- 2 Uncheck Copy Floor load
To select the floor area,
first Select Nodes
Defining Loading Area .
On the last
Click, the load is applied

Tree Menu

Node Element Boundary Mass Load

Assign Floor Loads

Load Group Name
Default

Floor Load 1

Load Type: Roof Floor

Distribution: Two way

Load Angle(A1): 0 [deg]

☐ Exclude Inner Elem. of Area

☐ Allow Polygon Type Unit Area

Unmodeled Sub-Beam

No. of Sub Beams : 0

Sub-Beam Angle(A2): 90

Unit Self Weight: 0 kN/m

Load Direction & Projection

Load Direction : Global Z

Projection : ☐ Yes ☒ No

Description:

Nodes Defining Loading Area:

2 ☐ Copy Floor Load

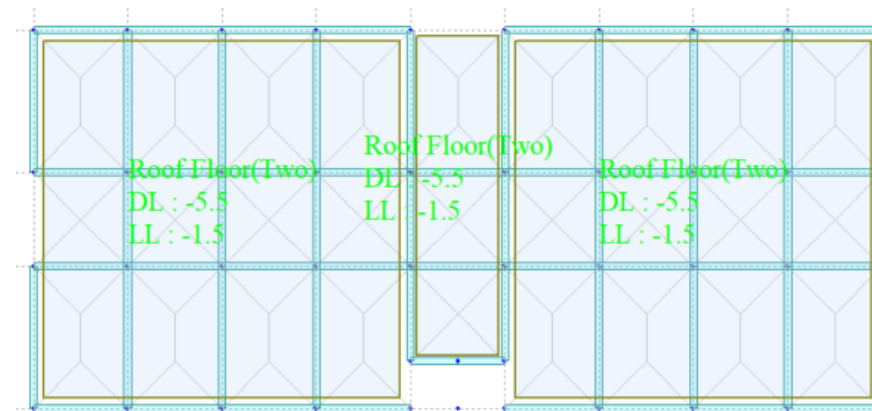
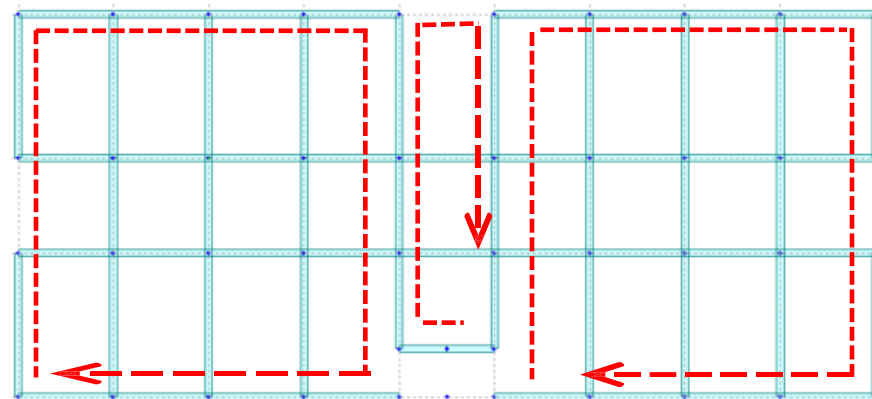
Axis : ☐ x ☐ y ☒ z

Distances: 14@3 m

(Example : 5, 3, 4.5 , 3@5.0)

☐ Convert to Beam Load Type

Apply Close

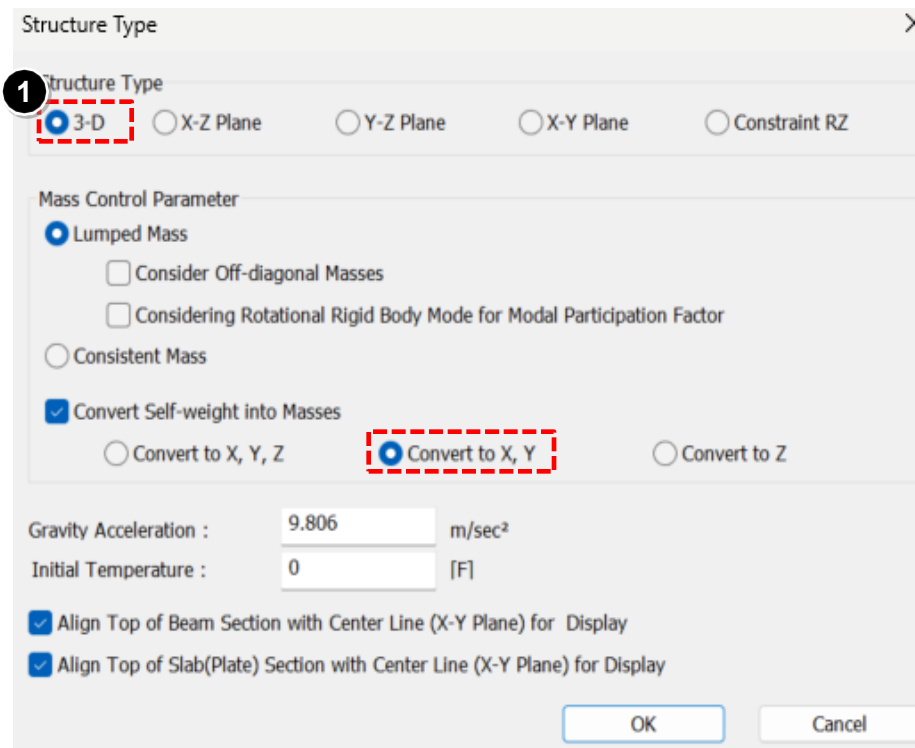
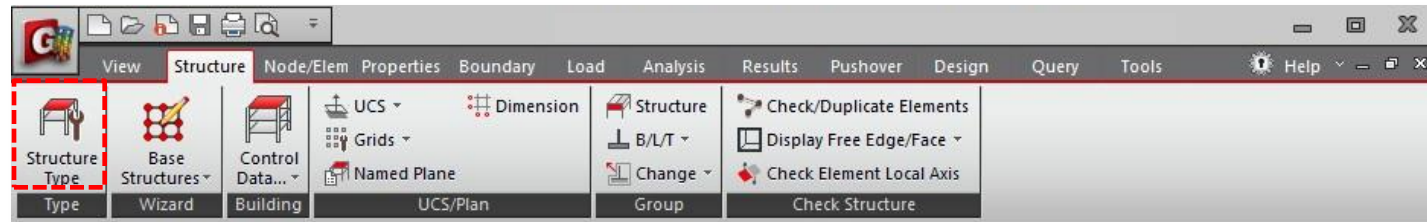


6-3. Convert Model Weight & Loads to Masses

Procedure

Structure Tab > Structure type

- Structure type: 3-D
Mass Control Parameter:
Lumped Mass
Convert Self-Weight into masses
Convert to X,Y
Gravity Acceleration:
9.806m/sec²
Check beam section and slab section Alignment (X-Y Plane)

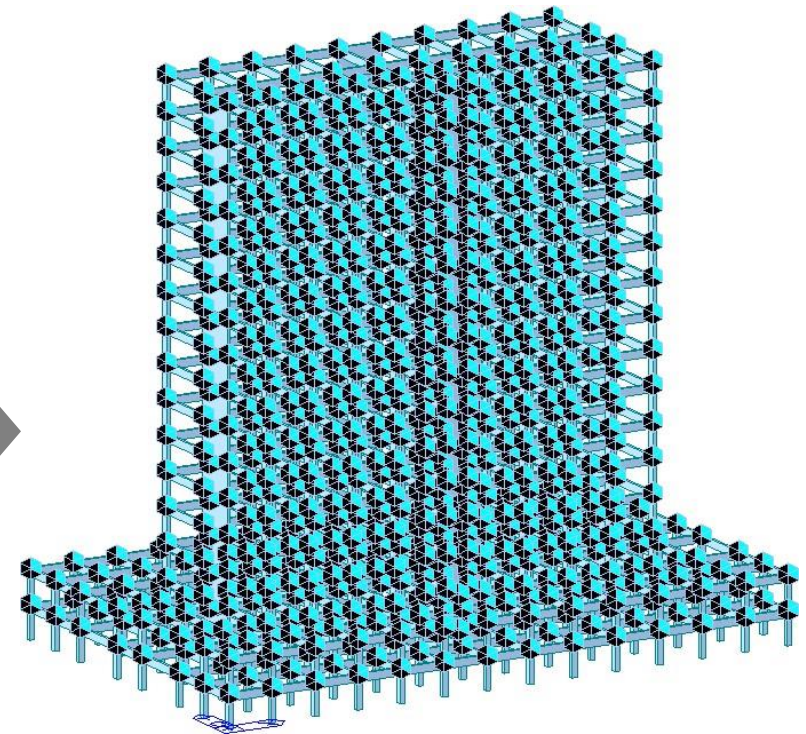
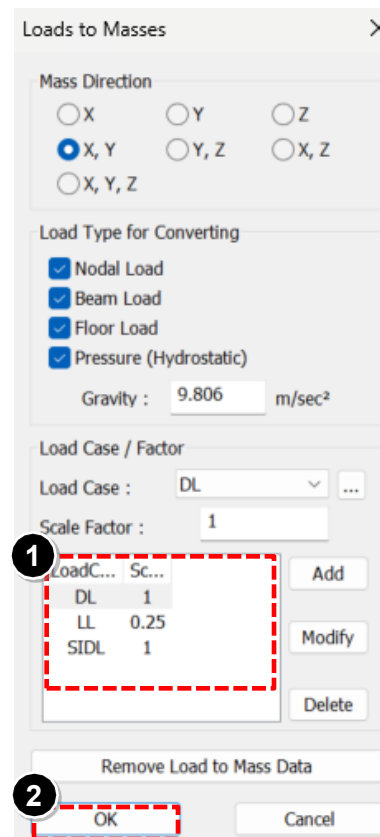
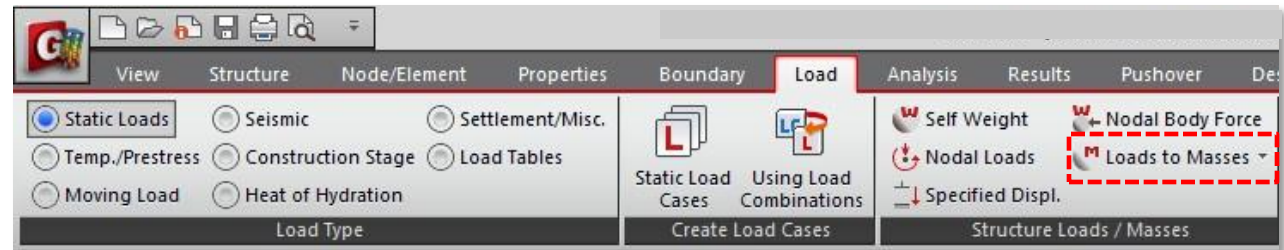


6-3. Convert Model Weight & Loads to Masses

Procedure

Load Tab > Static Loads >
Structure loads/Mass >
Loads to Masses

- ① Mass Direction: X,Y
Load Case / Factor:
DL: 1
Click Add
SIDL: 1
Click Add
LL: 0.25
Click Add
- ② On clicking Ok
Such a model is generated

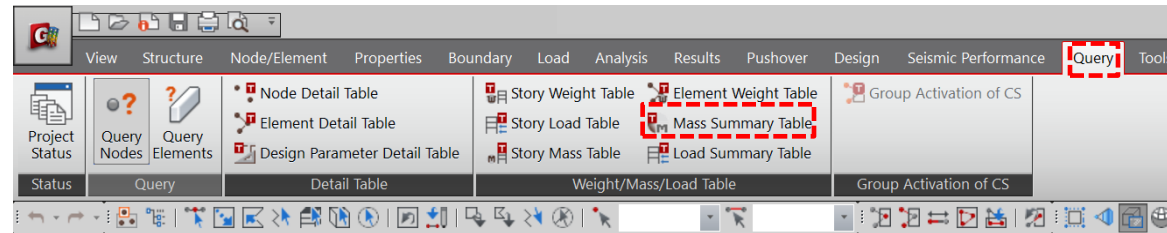


6-3. Convert Model Weight & Loads to Masses

Procedure

Query Tab > Mass Summary
Table

- 1 Mass Summary can be viewed in X,Y & Z Direction.



Start Page MIDAS/Gen Mass Summary					
	Node	Nodal Mass (kN/g)	Load To Masses	Structure Mass (kN/g)	Sum (kN/g)
▶	1	0.0000	2.0396	3.0120	5.0515
	2	0.0000	2.0396	3.0120	5.0515
	3	0.0000	2.0396	3.0120	5.0515
	4	0.0000	2.0396	3.0120	5.0515
	5	0.0000	4.0791	3.7869	7.8661
	6	0.0000	4.0791	3.7869	7.8661
	7	0.0000	4.0791	3.7869	7.8661
	8	0.0000	9.6879	6.0336	15.7215
	9	0.0000	9.6879	6.0336	15.7215
	10	0.0000	4.0791	3.7869	7.8661
	11	0.0000	4.0791	3.7869	7.8661
	12	0.0000	4.0791	3.7869	7.8661
	13	0.0000	4.0791	3.7869	7.8661
	14	0.0000	4.0791	3.7869	7.8661
	15	0.0000	4.0791	3.7869	7.8661
	16	0.0000	4.0791	3.7869	7.8661
	17	0.0000	4.0791	3.7869	7.8661
	18	0.0000	4.6230	4.8711	9.4942
	19	0.0000	4.0791	3.7869	7.8661
	20	0.0000	7.4342	4.8326	12.2669
	21	0.0000	4.0791	3.7869	7.8661
	22	0.0000	4.6230	4.8711	9.4942
	23	0.0000	4.0791	3.7869	7.8661
	24	0.0000	4.0791	3.7869	7.8661
	25	0.0000	4.0791	3.7869	7.8661
	26	0.0000	4.0791	3.7869	7.8661
1	27	0.0000	4.0791	3.7869	7.8661
		Nodal Mass(X)	Nodal Mass(Y)	Nodal Mass(Z)	

6-4. Wind Loads

Procedure

Load Tab > Static Loads
> Wind Loads > Click [Add]

- ① Load Case Name : WX
Wind Load Code : IS875(2015)
Basic Wind Speed: 47m/s
Terrain Category: III
Building Class: A
Wind Load Direction Factor
for X: 1 rest all will
Be 0. Click Apply
Similarly assign the Load
parameters for WY
- ② The loads are summarized in
the dialog box
- ③ Check wind load profile as if
Required
- ④ For detail Calculation click on
Make wind load calc. sheet

Add/Modify Wind Load Specification

1

Load Case Name : WX

Wind Load Code : IS875(2015)

Description :

☒ Standard Method ☐ Gust Factor Method

☐ Wind Load Parameters

Basic Wind Speed(Vb) : 47 m/sec

Terrain Category : III

Building Class : A

Frictional Drag Coef.(Cf) : 0.01

Wind Directional Factor(kd) : 0.9

Combination Factor(kc) : 1

Risk Coefficient

☒ Automatic Calculation ☐ User Defined

Class of Structure : General Buildings

Risk Coefficient(k1) : 1

☐ Include Topographic Effects

Topographic Factor(k3) : 1

Vertical Range for k3 : 0 m

☐ Include Cyclonic Region Effects

Importance of Structure : Other Structures

Importance Factor(k4) : 1

☐ Load Evaluation Using Force Coefficient

Force Coefficient(Cf) : 1

Wind Load Direction Factor (Scale Factor)

X-Dir. 1 Y-Dir. 0 Z-Rot. 0

Additional Wind Loads (Unit:kN,m)

Story	Add.-X	Add.-Y	Add.-Z

3

Wind Load Profile...

OK Cancel Apply

Wind Loads

2

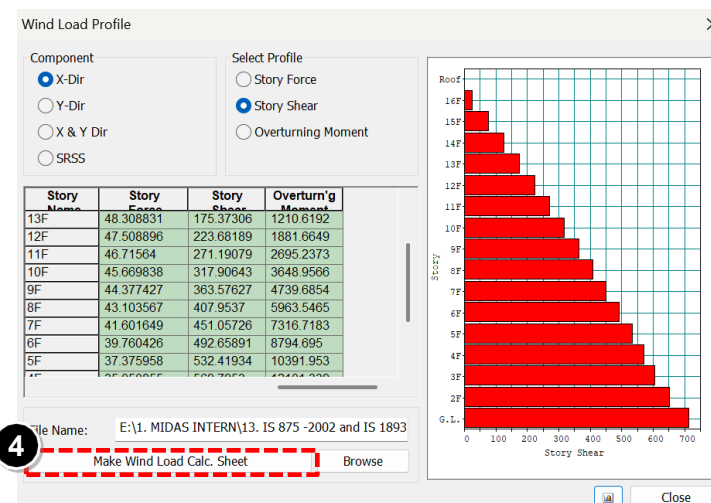
Load Case	Code Name	Description
WX	IS875(20...	
WY	IS875(20...	

Add

Modify

Delete

Close



6-5. Static Seismic Loads

Procedure

Load Tab > Static loads
> Seismic Loads

- ① Fill in the details as shown.
For EXP Click on Positive
- ② Calculating time period, use
period Calculator for
Auto-calculation of periods
from the code equations
As per IS 1893:2016 for RC
Structures without brick infill panel
 $T = 0.075h^{(0.75)}$
- ③ Similarly defining all the load
Cases such a dialog box appears.

Add/Modify Seismic Load Specification

Load Case Name : **EXP**

Seismic Load Code : **IS1893(2016)**

Description :

Seismic Load Parameters

Seismic Zone (Z) : III (0.16)

Soil Type : II (Medium Soil)

Importance Factor (I) : 1.2

Damping (%) : 5

Damping Multiplying Factor: 1

Structural Parameters

Fundamental Period : X-Dir. 0.5991 Y-Dir. 0.7637

Response Reduction Factor (R) : 5.0 5.0

Seismic Load Direction Factor (Scale Factor)

X-Direction : 1 Y-Direction : 0

Accidental Eccentricity

X-Direction (Ex) : ☒ Positive ☐ Negative ☐ None

Y-Direction (Ey) : ☐ Positive ☐ Negative ☒ None

Torsional Amplification

☐ Accidental Eccentricity ☐ Inherent Eccentricity

Additional Seismic Loads (Unit:kN,m)

Story	Add.-X	Add.-Y	Adc

Seismic Load Profile...

OK Cancel Apply

IS 1893:2016 Period Calculator

X- Direction Period

Y- Direction Period

1. $T = 0.075 h^{(0.75)}$

2. $T = 0.080 h^{(0.75)}$

3. $T = 0.085 h^{(0.75)}$

4. $T = 0.075 h^{(0.75)} / \sqrt{A_w}$

5. $T = 0.09 h / \sqrt{d}$

6. $T = 0.0644 h^{(0.9)}$

7. $T = 0.0672 h^{(0.75)}$

h : 48 (m)

Aw : 0 (m²)

d : 52 (m)

h : 48 (m)

Aw : 0 (m²)

d : 32 (m)

Note: Formula 6 and 7 in both the direction are applicable only if $h > 50$

OK Cancel

Static Seismic Loads

Load Case	Code Name	Description
EXP	IS1893-2...	
EXN	IS1893-2...	
EYP	IS1893-2...	
EYN	IS1893-2...	

Add

Modify

Delete

Close

6-5. Static Seismic Loads

b) Buildings with RC structural walls:

$$T_a = \frac{0.075h^{0.75}}{\sqrt{A_w}} \geq \frac{0.09h}{\sqrt{d}}$$

where A_w is total effective area (m^2) of walls in the first storey of the building given by:

$$A_w = \sum_{i=1}^{N_w} \left[A_{wi} \left\{ 0.2 + \left(\frac{L_{wi}}{h} \right)^2 \right\} \right]$$

where

h = height of building as defined in 7.6.2(a), in m;

A_{wi} = effective cross-sectional area of wall i in first storey of building, in m^2 ;

L_{wi} = length of structural wall i in first storey in the considered direction of lateral forces, in m;

d = base dimension of the building at the plinth level along the considered direction of earthquake shaking, in m; and

N_w = number of walls in the considered direction of earthquake shaking.

The value of L_{wi}/h to be used in this equation shall not exceed 0.9.

In X Direction: (5 WALLS)

Shear wall (1): $(4 \times 3) = 12 \text{ m}^2$

Shear wall (2): $(2 \times 3) = 6 \text{ m}^2$

$$A_{W1} = 12 \times [0.2 + (4/48)^2]$$

$$A_{W1} = (2.48) \times 2 = 4.96 \text{ m}^2$$

$$A_{W2} = 6 \times [0.2 + (2/48)^2]$$

$$A_{W2} = (1.21) \times 3 = 3.63 \text{ m}^2$$

$$A_{WT} = A_{W1} + A_{W2} = 8.59 \text{ m}^2$$

$$T_a = 0.075 \times 48^{0.75} / \sqrt{8.59} = 0.4666$$

$$T_a(\text{min}) = 0.09 \times 48 / \sqrt{52} = 0.599$$

$\rightarrow 0.4666 \not\geq 0.599$ (Condition not satisfied)

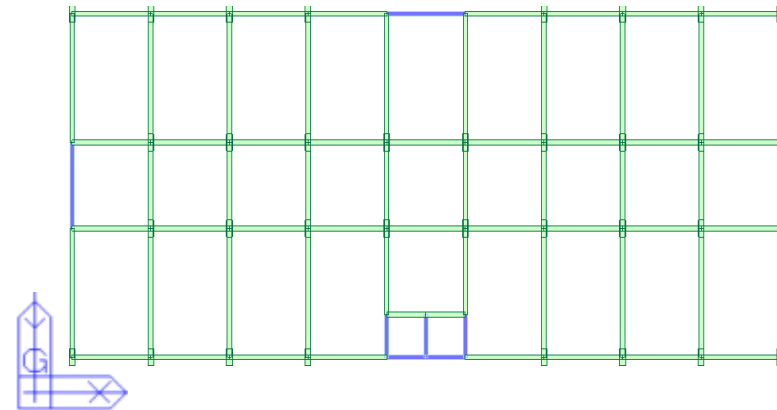
In Y Direction: (2 WALLS)

$$A_{WT} = 4.96 \text{ m}^2$$

$$T_a = 0.075 \times 48^{0.75} / \sqrt{4.96} = 0.614$$

$$T_a(\text{min}) = 0.09 \times 48 / \sqrt{32} = 0.7636$$

$\rightarrow 0.614 \not\geq 0.7636$ (Condition not satisfied)



NOTE:

Since the empirical period (T_a) is less than the minimum value ($T_a(\text{min})$) in both X and Y directions, the condition is not satisfied. Hence, the period to be used for analysis shall be taken as $T = 0.09h/\sqrt{d}$ as per code requirements.

6-5 Static Seismic Loads (Seismic Profile)

Procedure

Load Tab > Static Loads >

Seismic Loads >

Select Load Case Name EXP >

Modify

- ① Seismic Load Profile
- ② X-Dir (on)
Story shear (on)
Conform Story Shear of Base floor
- ③ Conform the Story Shear
- ④ For detail Earthquake load
Calculation click on Make seismic
Load Calc. sheet

Add/Modify Seismic Load Specification

Load Case Name : EXP

Seismic Load Code : IS1893(2016)

Description :

Seismic Load Parameters

Seismic Zone (Z) : III (0.16)

Soil Type : II (Medium Soil)

Importance Factor (I) : 1.2

Damping (%) : 5

Damping Multiplying Factor: 1

Structural Parameters

Fundamental Period : X-Dir. 0.5991 Y-Dir. 0.7637

Response Reduction Factor (R) : 5.0 5.0

Seismic Load Direction Factor (Scale Factor)

X-Direction : 1 Y-Direction : 0

Accidental Eccentricity

X-Direction (Ex) : Positive Negative None

Y-Direction (Ey) : Positive Negative None

Torsional Amplification

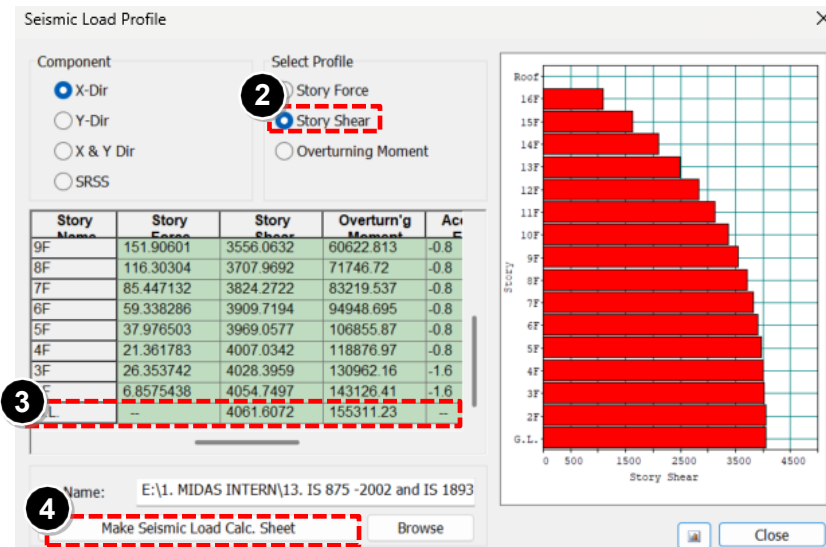
Accidental Eccentricity Inherent Eccentricity

Additional Seismic Loads (Unit:kN,m)

Story	Add.-X	Add.-Y	Add.

Seismic Load Profile...

OK Cancel Apply



6-6. Response Spectrum Functions

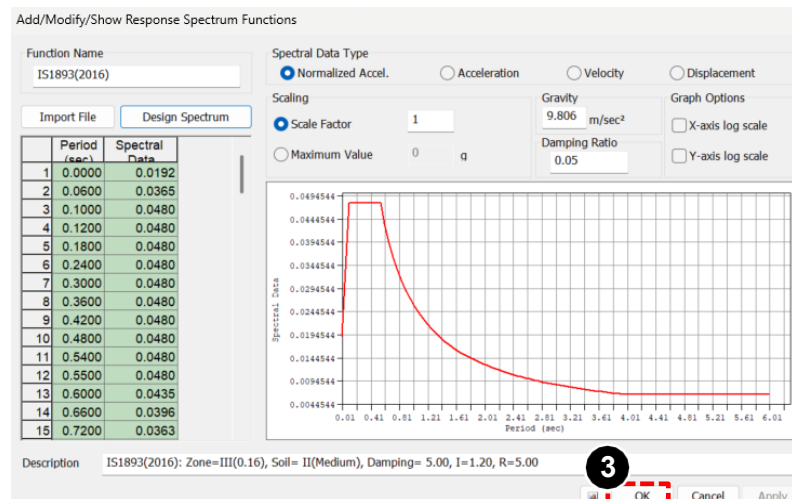
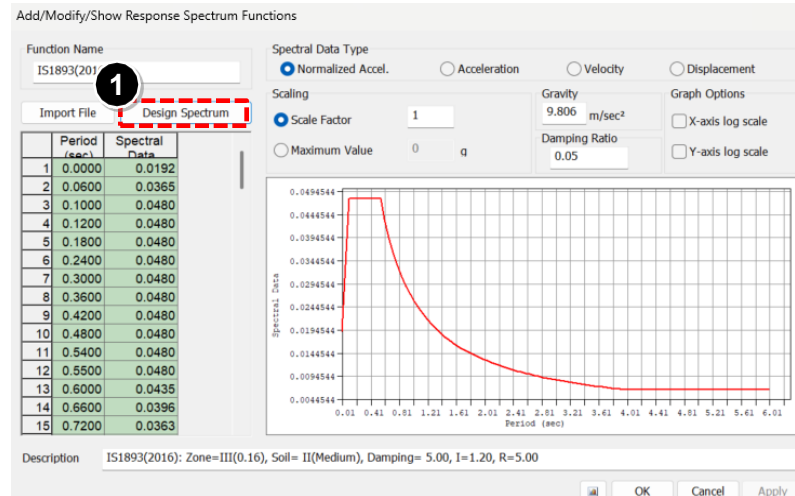
Procedure

Load Tab > Dynamic Loads >
Response Spectrum Data >
Response Spectrum Function

- ① Add > Function Name: Design Spectrum
- ② Generate Design Spectrum:
Design Spectrum: IS1893(2016)
Seismic Zone: III
Soil Type: II Importance Factor: 1
Response Reduction Factor: 5
Click OK

Such a Dialog Box appears.

- ③ Click OK
The Response Spectrum function is generated



6-7. Response Spectrum Load cases

Procedure

Load Tab > Seismic > Response
Spectrum Data > Response
Spectrum Load Cases

- ❶ Load Cases Name : SpecX
Excitation Angle : 0
- ❷ Check : IS 1893(2016)
- ❸ Click [Add]
- ❹ Load Cases Name : SpecY
Excitation Angle : 90
- ❺ Click [Add]
The two Spectrum Load Cases
Are created

Click Eigen Value Analysis
Contol

Tree Menu

Response Spectrum Load Cases

Spectrum Load Case

Load Case Name: SpecX

Direction: X-Y

☐ Auto-Search Angle

☒ Major ☐ Ortho

Excitation Angle: 0 [deg]

Scale Factor: 1

Period Modification Factor: 1

Modal Combination Control: ...

Spectrum Functions

Function Name (Damping Ratio)

☒ IS1893(2016) (0.05)

☐ Apply Damping Method

Damping Method: ...

☐ Correction by Damping Ratio

Interpolation of Spectral Data

☐ Linear ☒ Logarithm

☐ Accidental Eccentricity: ...

Description:

LoadCase	Direction	Scale
SpecX	X-Y	1

Operations

Add Modify Delete

Eigenvalue Analysis Control...

Response Spectrum Functions...

Close

Tree Menu Task Pane

Tree Menu

Response Spectrum Load Cases

Spectrum Load Case

Load Case Name: SpecY

Direction: X-Y

☐ Auto-Search Angle

☒ Major ☐ Ortho

Excitation Angle: 90 [deg]

Scale Factor: 1

Period Modification Factor: 1

Modal Combination Control: ...

Spectrum Functions

Function Name (Damping Ratio)

☒ IS1893(2016) (0.05)

☐ Apply Damping Method

Damping Method: ...

☐ Correction by Damping Ratio

Interpolation of Spectral Data

☐ Linear ☒ Logarithm

☐ Accidental Eccentricity: ...

Description:

LoadCase	Direction	Scale
SpecX	X-Y	1
SpecY	X-Y	1

Operations

Add Modify Delete

Eigenvalue Analysis Control...

Response Spectrum Functions...

Close

Tree Menu Task Pane

*** Auto-Search Angle (Principal Axis)**
Select this option to automatically take the excitation angle of response spectrum as the major-axis direction of a building.

"Major" and "Ortho" must be defined in the identical Response Spectrum function.
For example, if we define "RX" load case as "Major", "RY" load case must be defined as "Ortho". After performing the Response Spectrum Analysis, excitation angle of the structure will be automatically entered in the "Excitation Angle" field.

6.8. Eigen Analysis Control

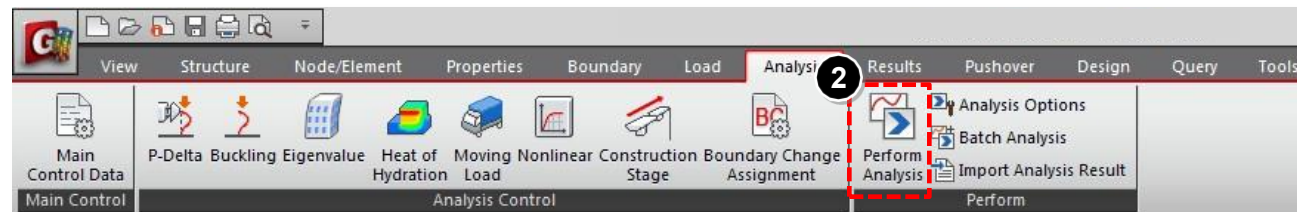
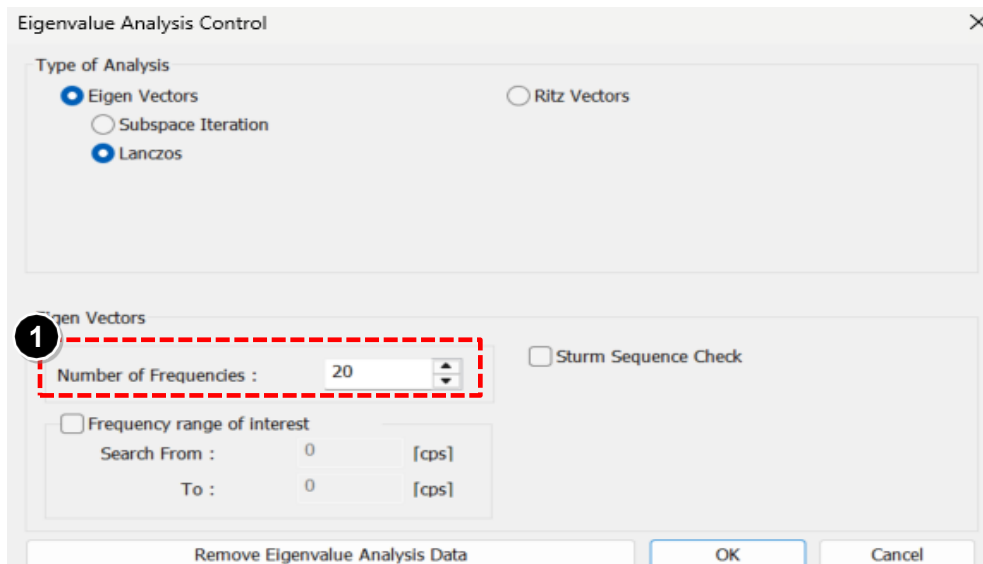
Procedure

Analysis Tab > Eigen value Analysis Control

❶ Number of Frequencies : 20

Then click OK

❷ Analysis Tab > perform analysis



7-1. Analysis of Results

Procedure

Results Tab > Tables > Result

Tables > Story > Story Shear

(Response Spectrum Analysis)

Spectrum Load Cases > Spec X(RS)

(on) & Spec Y(RS) (on)

① Compare RX(RY) with EX(EY)

Story	Level (m)	Spectrum	Inertia Force		Spring Reactions		Shear Force		With Spring	
			X (kN)	Y (kN)	X (kN)	Y (kN)	X (kN)	Y (kN)	X (kN)	Y (kN)
Roof	48.000	Spec X	3.5463e+	0.0000e+	0.0000e+	0.0000e+	0.0000e+	0.0000e+	0.0000e+	0.0000e+
16F	45.000	Spec X	1.4647e+	0.0000e+	0.0000e+	0.0000e+	3.5463e+	0.0000e+	3.5463e+	0.0000e+
15F	42.000	Spec X	1.3919e+	0.0000e+	0.0000e+	0.0000e+	4.8754e+	0.0000e+	4.8754e+	0.0000e+
14F	39.000	Spec X	1.4524e+	0.0000e+	0.0000e+	0.0000e+	5.7953e+	0.0000e+	5.7953e+	0.0000e+
13F	36.000	Spec X	1.4672e+	0.0000e+	0.0000e+	0.0000e+	6.5292e+	0.0000e+	6.5292e+	0.0000e+
12F	33.000	Spec X	1.4536e+	0.0000e+	0.0000e+	0.0000e+	7.1753e+	0.0000e+	7.1753e+	0.0000e+
11F	30.000	Spec X	1.4796e+	0.0000e+	0.0000e+	0.0000e+	7.7524e+	0.0000e+	7.7524e+	0.0000e+
10F	27.000	Spec X	1.5369e+	0.0000e+	0.0000e+	0.0000e+	8.2723e+	0.0000e+	8.2723e+	0.0000e+
9F	24.000	Spec X	1.5632e+	0.0000e+	0.0000e+	0.0000e+	8.7709e+	0.0000e+	8.7709e+	0.0000e+
8F	21.000	Spec X	1.5820e+	0.0000e+	0.0000e+	0.0000e+	9.2732e+	0.0000e+	9.2732e+	0.0000e+
7F	18.000	Spec X	1.5810e+	0.0000e+	0.0000e+	0.0000e+	9.7851e+	0.0000e+	9.7851e+	0.0000e+
6F	15.000	Spec X	1.5450e+	0.0000e+	0.0000e+	0.0000e+	1.0305e+	0.0000e+	1.0305e+	0.0000e+
5F	12.000	Spec X	1.4793e+	0.0000e+	0.0000e+	0.0000e+	1.0816e+	0.0000e+	1.0816e+	0.0000e+
4F	9.0000	Spec X	1.3596e+	0.0000e+	0.0000e+	0.0000e+	1.1286e+	0.0000e+	1.1286e+	0.0000e+
3F	6.0000	Spec X	3.3461e+	0.0000e+	0.0000e+	0.0000e+	1.1679e+	0.0000e+	1.1679e+	0.0000e+
2F	3.0000	Spec X	1.9850e+	0.0000e+	0.0000e+	0.0000e+	1.2742e+	0.0000e+	1.2742e+	0.0000e+
1F	0.0000	Spec X	1.3575e+	0.0000e+	0.0000e+	0.0000e+	1.3575e+	0.0000e+	1.3575e+	0.0000e+
Roof	48.000	Spec Y	0.0000e+	3.7458e+	0.0000e+	0.0000e+	0.0000e+	0.0000e+	0.0000e+	0.0000e+
16F	45.000	Spec Y	0.0000e+	1.5702e+	0.0000e+	0.0000e+	0.0000e+	3.7458e+	0.0000e+	3.7458e+
15F	42.000	Spec Y	0.0000e+	1.5295e+	0.0000e+	0.0000e+	0.0000e+	5.1537e+	0.0000e+	5.1537e+

X-Direction Scale Up Factor

= Static seismic result / Dynamic analysis result

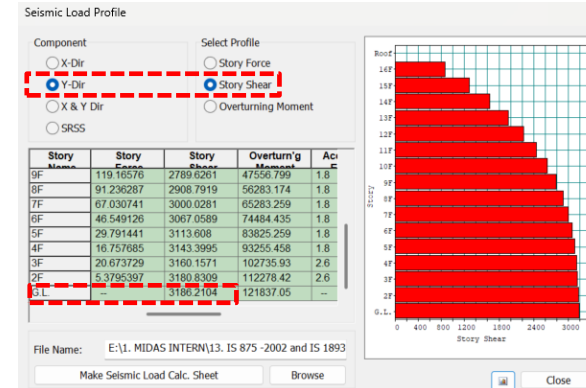
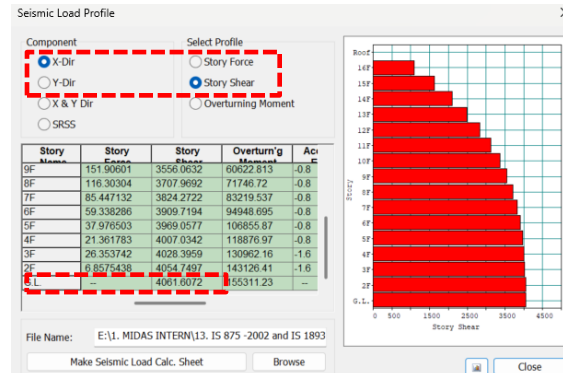
= 4061.60 / 1357.5

= 2.99

Y-Direction Scale Up Factor

= 3186.21 / 1431.1

= 2.22



7-1. Automatic generation of load combinations

Procedure

Results Tab > Combination >
Load Combination > Concrete
Design

① Select Concrete Design tab

② Click Auto-Generation

③ Select Design Code
as "IS456:2000 "

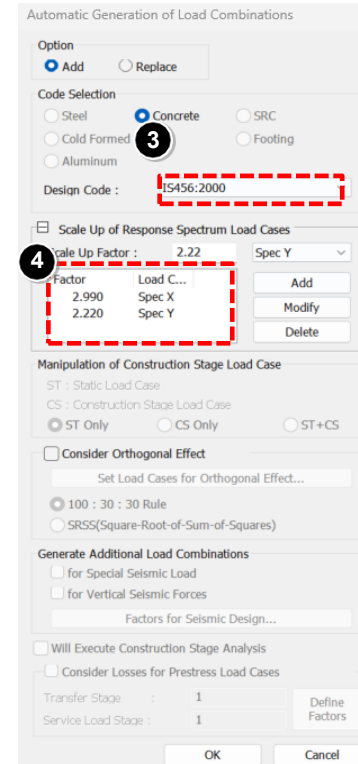
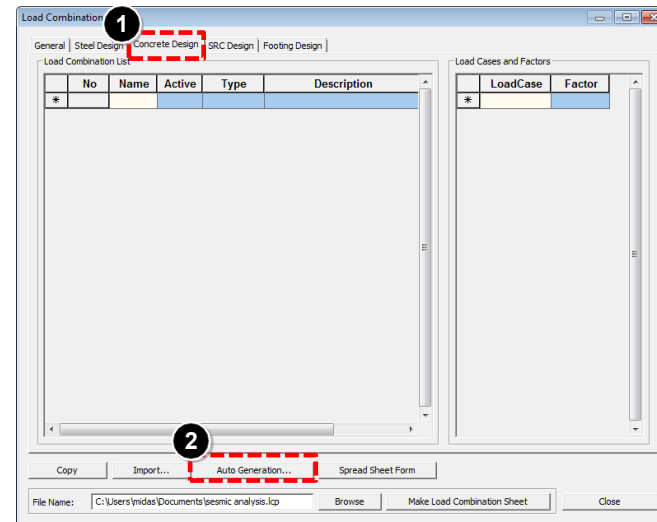
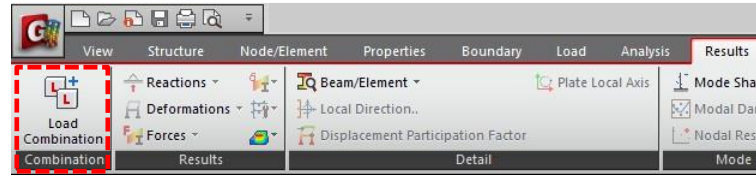
④ Scale Up of Response Spectrum
Load Cases

Scale Up Factor: Spec X 2.99

Click Add

Scale Up Factor: Spec Y 2.22

Click Add and Click [OK]

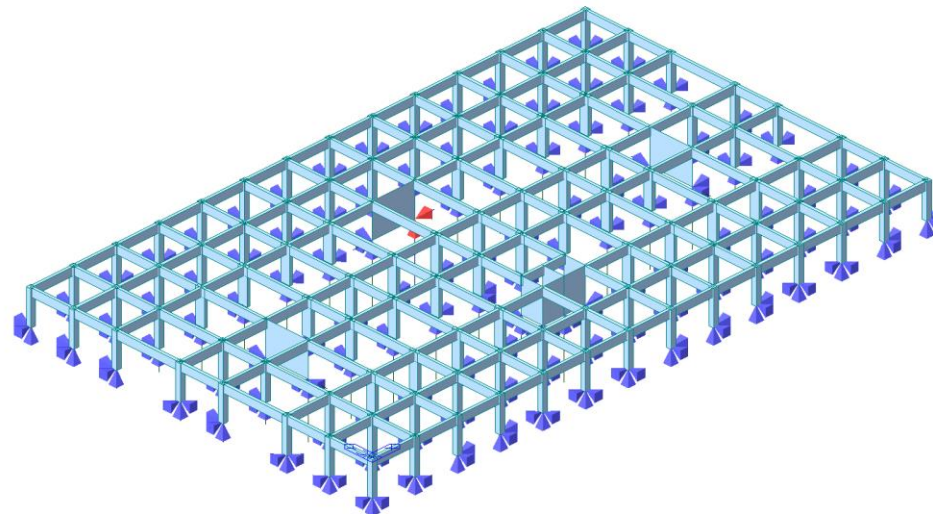
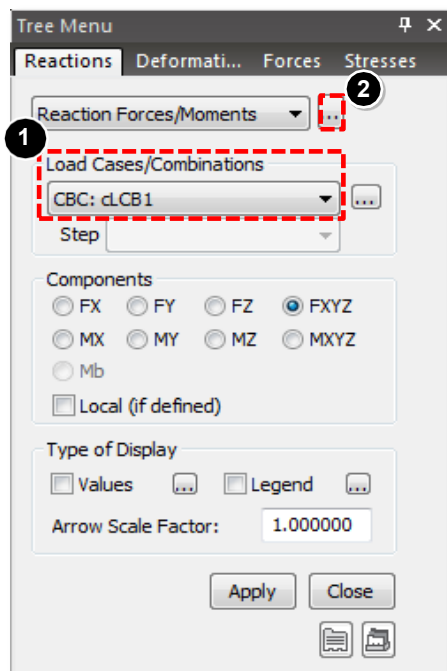


8-1.Verification of Reactions

Procedure

Results Tab > Results > Reaction
forces (or) moments

- ① Load cases/combinations
CBC:cLCB 1
- ② Click on this to see Results in
tabular format as shown below.



SUMMATION OF REACTION FORCES PRINTOUT							
	Load	FX (kN)	FY (kN)	FZ (kN)			
	DL	0.000000	0.000000	53212.5088			
	LL	0.000000	0.000000	27448.0000			
	SIDL	0.000000	0.000000	34080.0000			

Procedure

Results Tab > Results

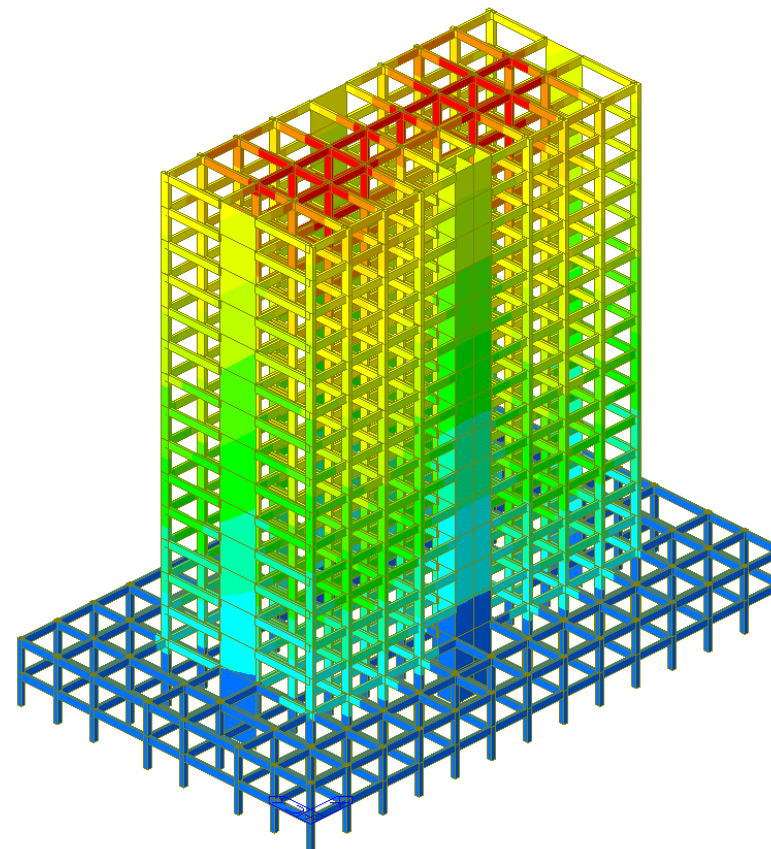
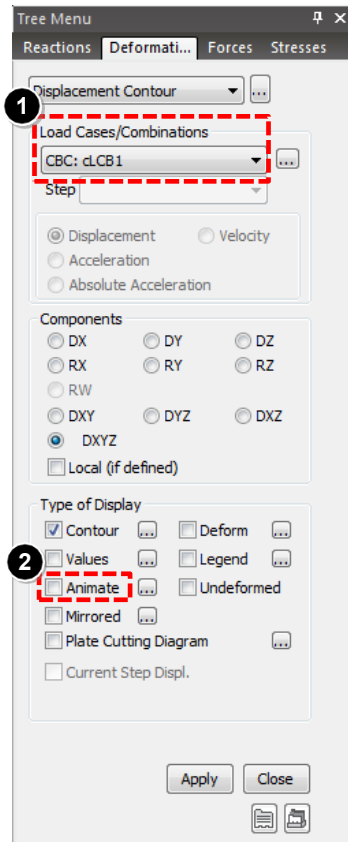
Deformations>Displacement contour

① Load cases/combinations

CBC:cLCB1

② If For Animation, click on

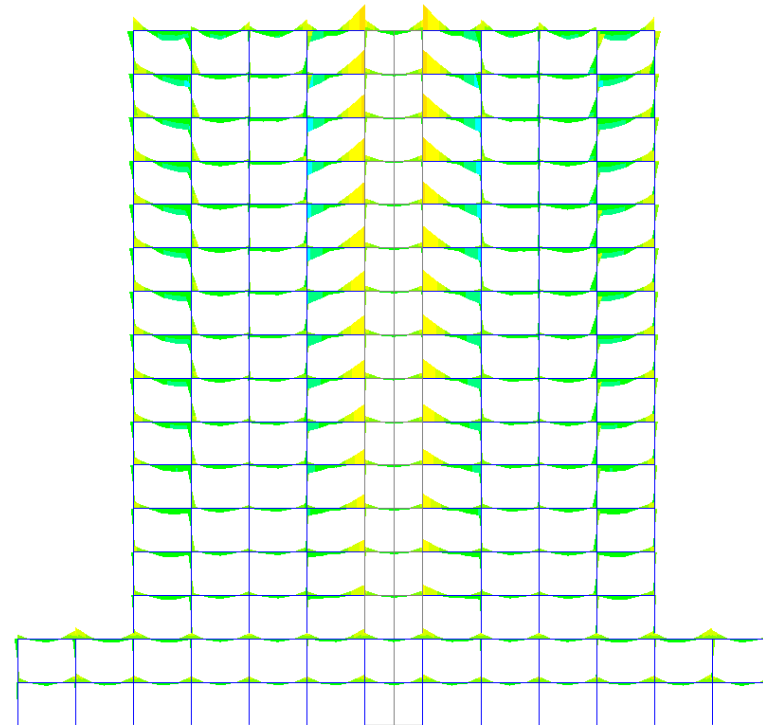
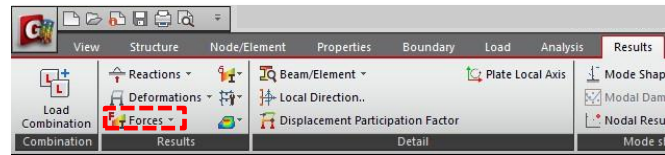
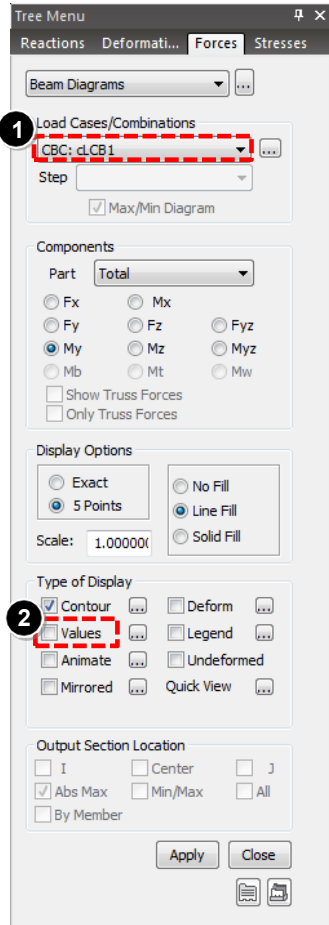
Animate and Apply



Procedure

Results Tab > Results > Forces >
Beam Diagrams

- ① Load cases/combinations
CBC:cLCB1
- ② For Values, click on Values
and Apply

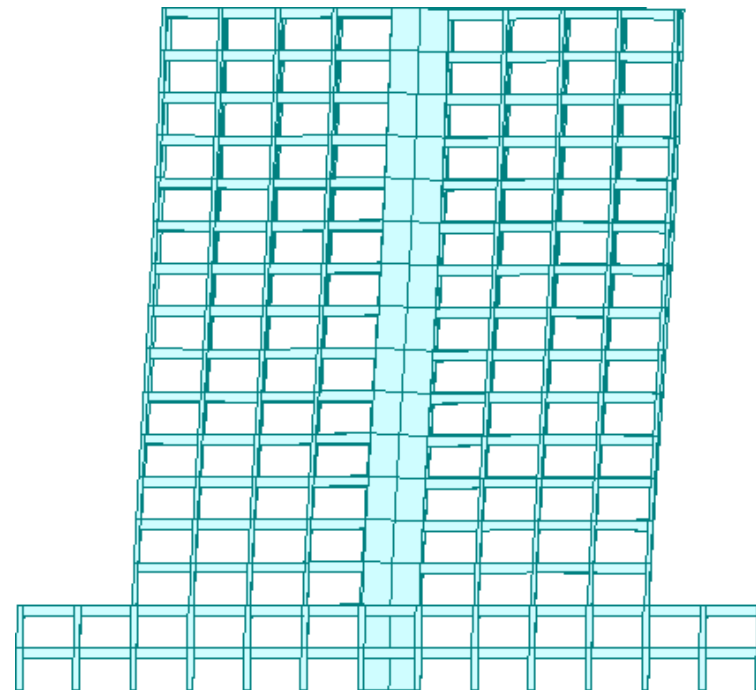
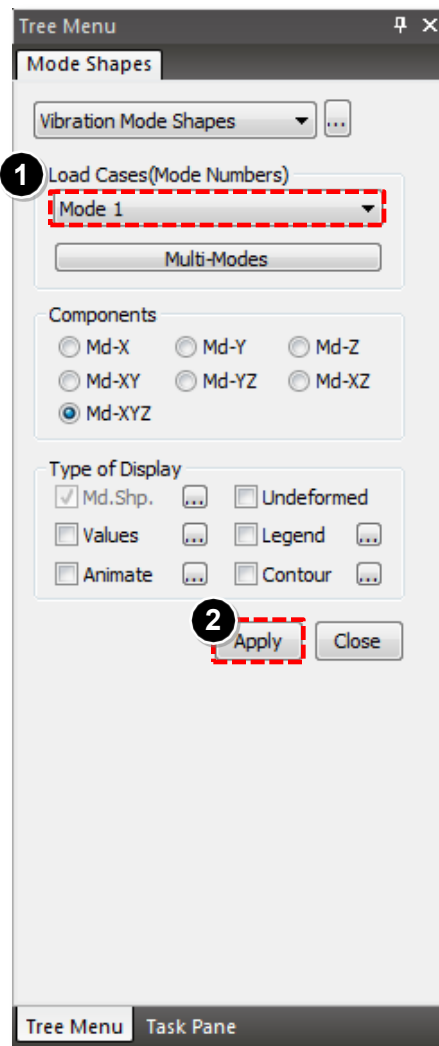


8-4. Vibration Mode Shape

Procedure

Results Tab > Tables > Results
Tables > Vibration Mode Shape

- 1 Select Mode 1
You can Select any mode shape from dropdown box
- 2 Click on Apply

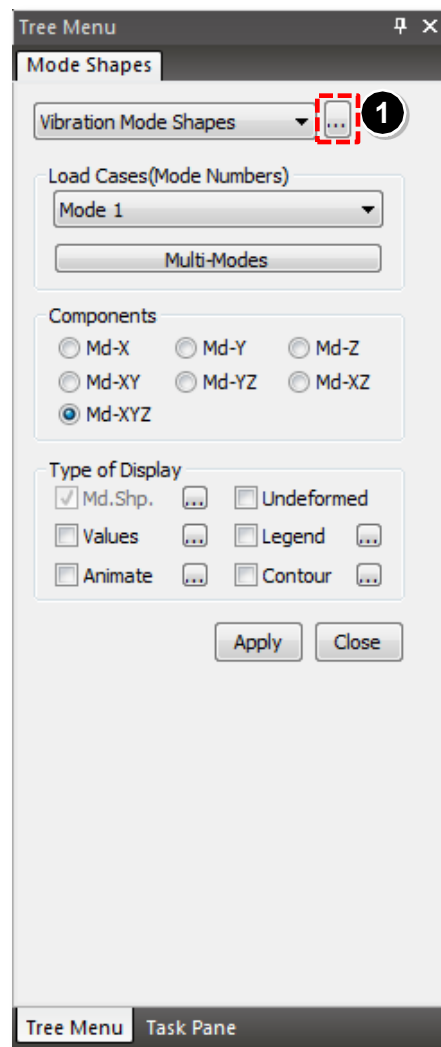


8-5.Modal Participation Masses

Procedure

Results Tab > Mode Shapes >
Vibration Mode Shapes

- ① Click on the right side of Vibration Mode Shape
- ② 90% Modal Participation Masses
In Mode 11, both x & y direction



Node	Mode	UX		UY		UZ	
MODAL PARTICIPATION MASS							
	Mode	TRAN-X		TRAN-Y		TRAN-Z	
	No	MASS(	SUM(%)	MASS(	SUM(%)	MASS(	SUM(%)
	1	60.1541	60.1541	0.0000	0.0000	0.0000	0.0000
	2	0.0000	60.1541	60.8814	60.8814	0.0000	0.0000
	3	0.8464	61.0005	0.0000	60.8814	0.0000	0.0000
	4	12.2972	73.2977	0.0000	60.8814	0.0000	0.0000
	5	0.0000	73.2977	12.8497	73.7311	0.0000	0.0000
	6	0.6615	73.9592	0.0000	73.7311	0.0000	0.0000
	7	8.7704	82.7296	0.0000	73.7311	0.0000	0.0000
	8	0.0000	82.7296	8.4740	82.2051	0.0000	0.0000
	9	0.9311	83.6607	0.0000	82.2051	0.0000	0.0000
	10	7.7846	91.4453	0.0000	82.2051	0.0000	0.0000
2	11	0.0000	91.4453	7.9015	90.1066	0.0000	0.0000
	12	0.6073	92.0526	0.0000	90.1066	0.0000	0.0000
	13	3.8070	95.8596	0.0000	90.1066	0.0000	0.0000
	14	0.0000	95.8596	4.4644	94.5710	0.0000	0.0000
	15	0.2765	96.1360	0.0000	94.5710	0.0000	0.0000
	16	1.1866	97.3227	0.0000	94.5710	0.0000	0.0000
	17	0.0000	97.3227	1.8292	96.4002	0.0000	0.0000
	18	0.8000	98.1227	0.0000	96.4002	0.0000	0.0000
	19	0.0159	98.1386	0.0000	96.4002	0.0000	0.0000
	20	0.0000	98.1386	1.0547	97.4550	0.0000	0.0000

9.1 Story Drift

Procedure

Results Tab > Results Table >
Story > Check Parameter

- ① Select Country Code :
IS1893(2016) and
click ok
- ② Results > Results Table >
Story > Story Drift
- ③ Select the Load Combination
Type and click ok

1 Select Code

Country Code : IS1893(2016)

OK Cancel

2 Check Parameter...

Story Drift...

Story Displacement...

Story Shear (Response Spectrum Analysis)...

Story Shear (Time History Analysis)...

Story Mode Shape...

Story Eccentricity...

Story Shear Force Ratio...

Stability Coefficient...

Irregularity Check Parameter...

Weight Irregularity Check...

Overturning Moment...

Story Axial Force Sum...

Torsional Irregularity Check...

Torsional Amplification Factor...

3 Records Activation Dialog

Loadcase/Combination

☐ DL(ST)

☐ LL(ST)

☐ SIDL(ST)

☐ WX(ST)

☐ WY(ST)

☒ EXP(ST)

☐ EXN(ST)

☐ EYP(ST)

☐ EYN(ST)

☐ Spec X(RS)

☐ Spec Y(RS)

OK Cancel

Load Case	Story	Story Height (m)	P-Delta Incremental Factor (ad)	Allowable Story Drift Ratio	Maximum Drift of All Vertical Elements				Drift at the Center of Mass					
					Node	Story Drift (m)	Modified Drift (m)	Story Drift Ratio	Remark	Story Drift (m)	Modified Drift (m)	Drift Factor (Maximum)	Story Drift Ratio	Remark
RMC, Not Used, Cd=1, Ie=1.5, Scale Factor=1, Allowable Ratio=0.015														
Press right mouse button and click 'Set Story Drift Parameters...' menu to change RMC or Cd/Ie/Scale Factor/Allowable Ratio/Beta!														
EXP	16F	3.00	1.00	0.0150	881	0.0026	0.0017	0.0006	OK	0.0025	0.0017	1.0385	0.0006	OK
EXP	15F	3.00	1.00	0.0150	837	0.0028	0.0019	0.0006	OK	0.0027	0.0018	1.0316	0.0006	OK
EXP	14F	3.00	1.00	0.0150	793	0.0030	0.0020	0.0007	OK	0.0030	0.0020	1.0237	0.0007	OK
EXP	13F	3.00	1.00	0.0150	749	0.0033	0.0022	0.0007	OK	0.0032	0.0022	1.0165	0.0007	OK
EXP	12F	3.00	1.00	0.0150	705	0.0035	0.0023	0.0008	OK	0.0035	0.0023	1.0105	0.0008	OK
EXP	11F	3.00	1.00	0.0150	661	0.0037	0.0025	0.0008	OK	0.0037	0.0025	1.0055	0.0008	OK
EXP	10F	3.00	1.00	0.0150	617	0.0038	0.0026	0.0009	OK	0.0038	0.0026	1.0012	0.0009	OK
EXP	9F	3.00	1.00	0.0150	579	0.0040	0.0026	0.0009	OK	0.0040	0.0026	1.0028	0.0009	OK
EXP	8F	3.00	1.00	0.0150	535	0.0040	0.0027	0.0009	OK	0.0040	0.0027	1.0067	0.0009	OK
EXP	7F	3.00	1.00	0.0150	491	0.0040	0.0027	0.0009	OK	0.0040	0.0026	1.0107	0.0009	OK
EXP	6F	3.00	1.00	0.0150	447	0.0039	0.0026	0.0009	OK	0.0038	0.0026	1.0147	0.0009	OK
EXP	5F	3.00	1.00	0.0150	403	0.0037	0.0024	0.0008	OK	0.0036	0.0024	1.0183	0.0008	OK
EXP	4F	3.00	1.00	0.0150	359	0.0033	0.0022	0.0007	OK	0.0032	0.0021	1.0204	0.0007	OK
EXP	3F	3.00	1.00	0.0150	286	0.0026	0.0018	0.0006	OK	0.0026	0.0017	1.0183	0.0006	OK
EXP	2F	3.00	1.00	0.0150	3	0.0015	0.0010	0.0003	OK	0.0015	0.0010	1.0223	0.0003	OK
EXP	1F	3.00	1.00	0.0150	117	0.0008	0.0005	0.0002	OK	0.0008	0.0005	1.0036	0.0002	OK

2 Nodal Results of RS

Story

Inelastic Hinge

Time History Analysis

Heat of Hydration Analysis

Tendon

Composite Section For C.S.

Displacement Participation Factor

Initial Element Force

Imperfection

9.2 Weight Irregularity Check

Procedure

Results Tab > Results Table >
Story > Irregularity Check
Parameter

- 1 Select Country Code :
IS1893(2016) and
click ok
- 2 Results > Results Table >
Story > Weight Irregularity Check
- 3 Select the Load Combination
Type and click ok

Results Table

	Load Case	Story	Level (m)	Story Height (m)	Story Weight (kN)	1.5*Lower Story Weight	Story Weight Ratio	Remark
▶	EXP	Roof	48.00	0.00	8219.281	6828.415	0.000	Regular
	EXP	16F	45.00	3.00	4552.277	6828.415	0.667	Regular
	EXP	15F	42.00	3.00	4552.277	6828.415	0.667	Regular
	EXP	14F	39.00	3.00	4552.277	6828.415	0.667	Regular
	EXP	13F	36.00	3.00	4552.277	6828.415	0.667	Regular
	EXP	12F	33.00	3.00	4552.277	6828.415	0.667	Regular
	EXP	11F	30.00	3.00	4552.277	6828.415	0.667	Regular
	EXP	10F	27.00	3.00	4552.277	6828.415	0.667	Regular
	EXP	9F	24.00	3.00	4552.277	6828.415	0.667	Regular
	EXP	8F	21.00	3.00	4552.277	6828.415	0.667	Regular
	EXP	7F	18.00	3.00	4552.277	6828.415	0.667	Regular
	EXP	6F	15.00	3.00	4552.277	6828.415	0.667	Regular
	EXP	5F	12.00	3.00	4552.277	6828.415	0.667	Regular
	EXP	4F	9.00	3.00	4552.277	18954.277	0.240	Regular
	EXP	3F	6.00	3.00	12636.185	19728.475	0.641	Regular
	EXP	2F	3.00	3.00	13152.317	0.000	0.000	Regular
	EXP	1F	0.00	3.00	967.128	0.000	0.000	Regular

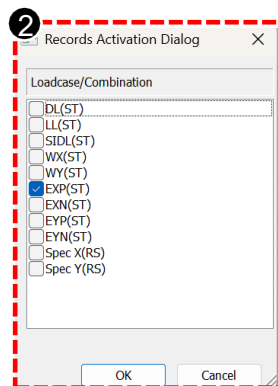
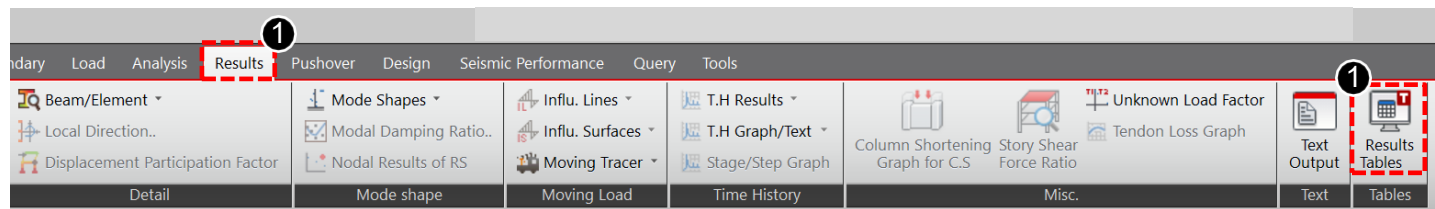
9.3 Stiffness Irregularity Check

Procedure

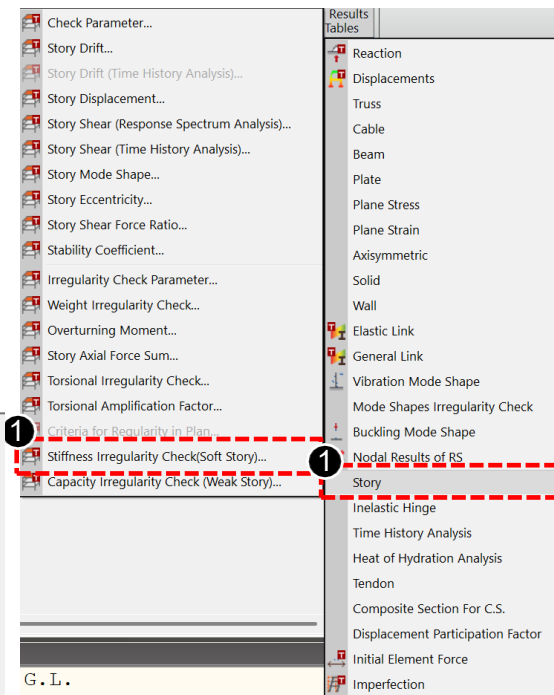
Results Tab > Results Table >
Story > Irregularity Check
Parameter

① Results > Results Table > Story
> Stiffness Irregularity Check

② Select the Load Combination
Type and click ok



	Load Case	Story	Level (m)	Story Height (m)	Story Drift (m)	Story Shear Force	Story Stiffness (kN/m)	Upper Story Stiffness	Story Stiffness Ratio	Remark
▶	EXP	16F	45.00	3.00	0.0025	1097.08	440747.	0.00	0.000	Irregular
	EXP	15F	42.00	3.00	0.0027	1631.13	601253.	440747.	1.364	Regular
	EXP	14F	39.00	3.00	0.0030	2096.34	706811.	601253.	1.176	Regular
	EXP	13F	36.00	3.00	0.0032	2497.47	774356.	706811.	1.096	Regular
	EXP	12F	33.00	3.00	0.0035	2839.26	818766.	774356.	1.057	Regular
	EXP	11F	30.00	3.00	0.0037	3126.45	850196.	818766.	1.038	Regular
	EXP	10F	27.00	3.00	0.0038	3363.81	875516.	850196.	1.030	Regular
	EXP	9F	24.00	3.00	0.0040	3556.06	899812.	875516.	1.028	Regular
	EXP	8F	21.00	3.00	0.0040	3707.97	927627.	899812.	1.031	Regular
	EXP	7F	18.00	3.00	0.0040	3824.27	964209.	927627.	1.039	Regular
	EXP	6F	15.00	3.00	0.0038	3909.72	1017290	964209.	1.055	Regular
	EXP	5F	12.00	3.00	0.0036	3969.06	1100876	1017290	1.082	Regular
	EXP	4F	9.00	3.00	0.0032	4007.03	1245620	1100876	1.131	Regular
	EXP	3F	6.00	3.00	0.0026	4028.40	1549300	1245620	1.244	Regular
	EXP	2F	3.00	3.00	0.0015	4054.75	2758028	1549300	1.780	Regular
	EXP	1F	0.00	3.00	0.0008	4061.61	5324219	2758028	1.930	Regular

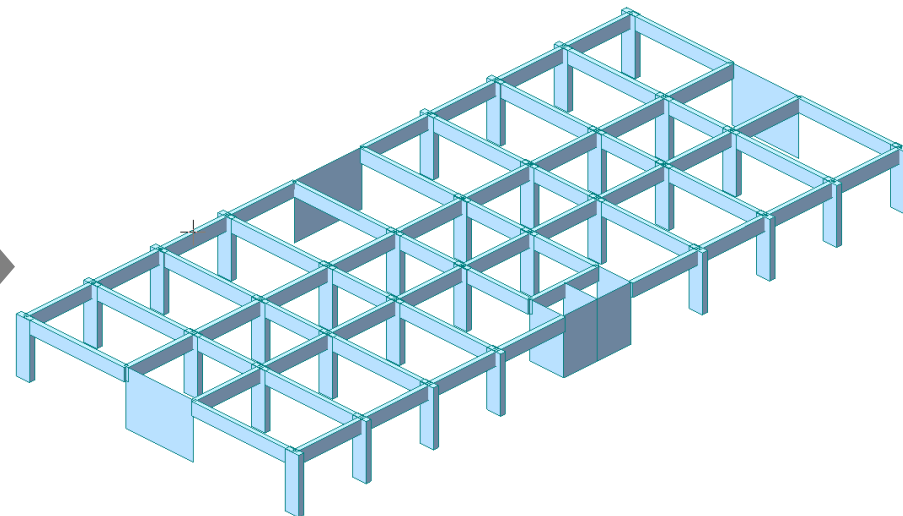
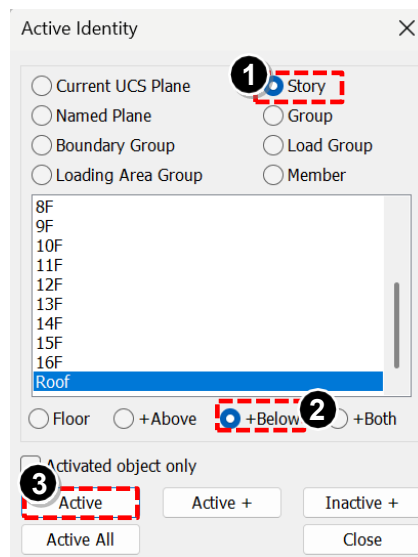
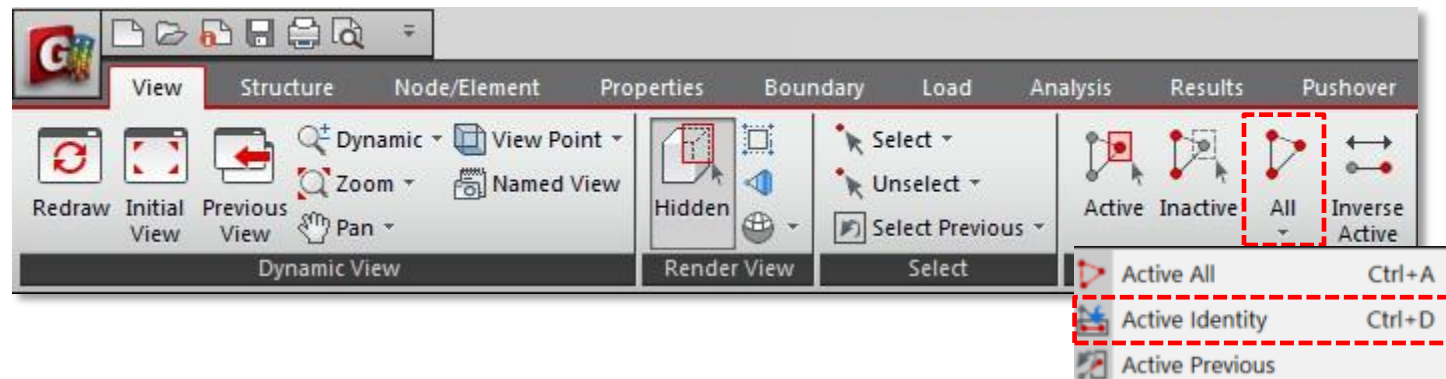


9.4 Story Shear Force Ratio

Procedure

View Tab > Activities > All > Active Identity

- ① Check on Story
Then Select Roof
- ② Check on + Below
- ③ Click on Active

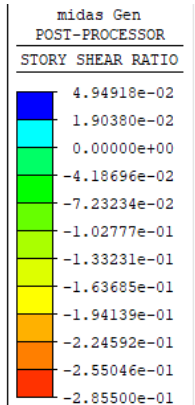
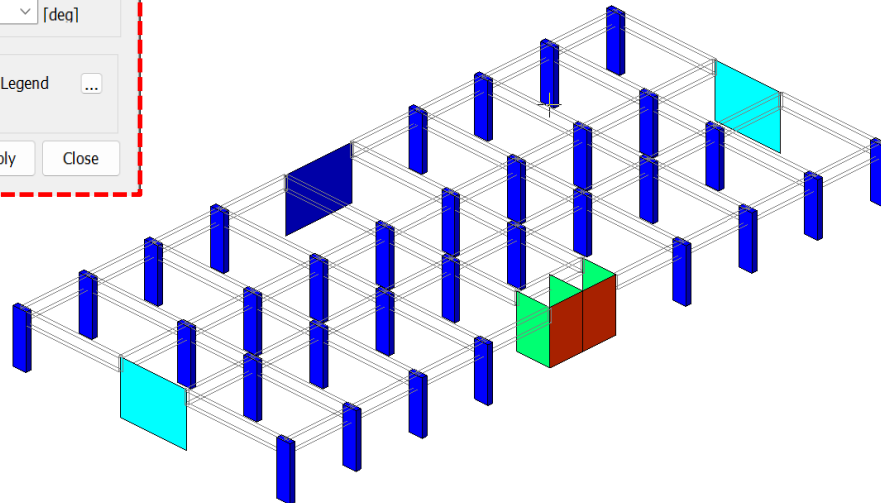
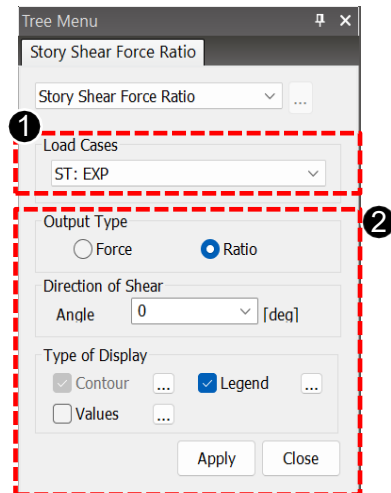
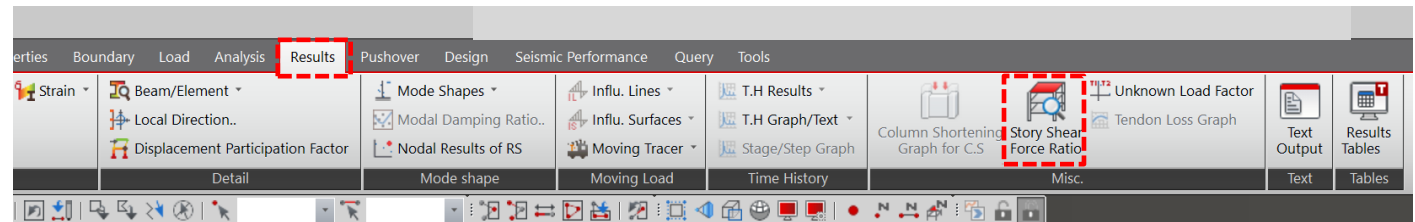


9.4 Story Shear Force Ratio

Procedure

Results Tab > Story Shear Force Ratio

- ① Select the Load Case : EXP
- ② Check on Ratio and Legends and Click Apply



ST: EXP

MAX : 2051
MIN : 2060

FILE: RC BUILDI~
UNIT:
DATE: 10/30/2025

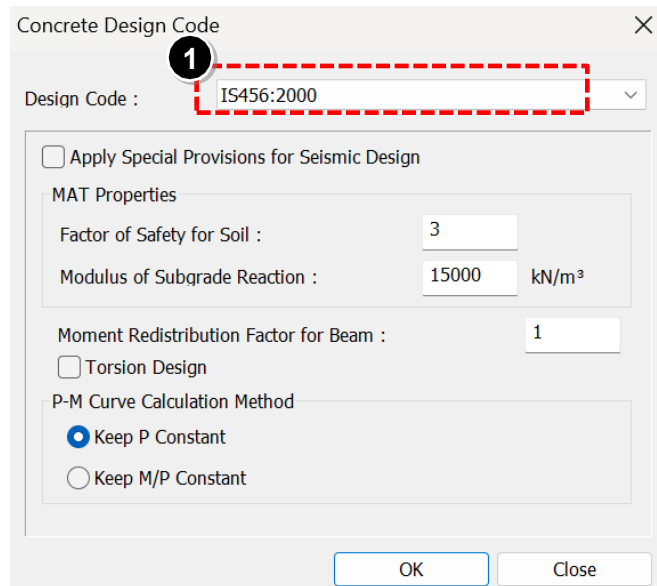
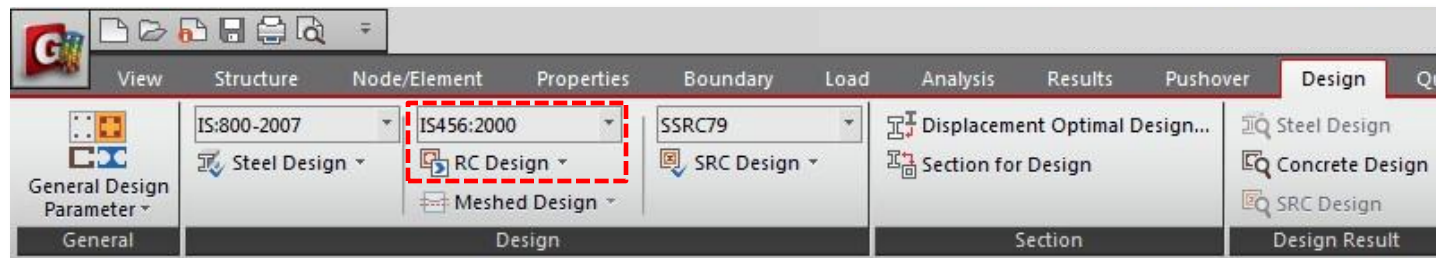
VIEW-DIRECTION
X: -0.612
Y: -0.612
Z: 0.500

10-1. Concrete Design Code

Procedure

Design Tab > Concrete design
parameter>Design code

- 1 Design code: IS 456:2000
If want to Go for ductile detailing
Then click on Apply IS13920:2016



10-2. Modifying Concrete Material

Procedure

Design Tab > RC Design >
Modify Concrete Materials

1 Select material ID #1

Rebar Selection

Code > IS(RC)

Grade of Main Rebar > Fe415

Grade of Sub-Rebar > Fe415

According to that modify other
property

Modify Concrete Materials

1 Material List

ID	Name	fc/fck R	Chk	La...	Main...	Sub-bar
1	M30	30000	X	1	Fe415	Fe415
2	M40	40000	X	1	Fe415	Fe415

Concrete Material Selection

Code : IS(RC) Grade : M40

Specified Compressive Strength (fc/fck) : 40000 kN/m²

☐ Light Weight Concrete Factor (Lambda) : 1

Rebar Selection

Code : IS(RC)

Grade of Main Rebar : Fe415 Fy : 415000 kN/m²

Grade of Sub-Rebar : Fe415 Fys : 415000 kN/m²

Modify Close

10-2. Design Criteria for Rebar

Procedure

Design Tab > RC Design >
Design Criteria for Rebar

- ❶ Fill in the details as per Requirements for every Structural element
- ❷ Click on Input Additional Wall Data
- ❸ Select any End Rebar Design Method

Design Criteria for Rebars

❶ For Beam Design

Main Rebar : P20 Rebar...
 Stirrups : P10 Arrangement : 2
 Side Bar : P12
 dT : 0.04 m dB : 0.04 m
☒ Consider Spacing Limit for Main Rebar
 Spliced Bars : ☒ None ☐ 50% ☐ 100%

For Column Design

Main Rebar : P20 Rebar...
 Ties/Spirals : P10 Arrangement : Y: 2
 do : 0.04 m Z: 2
☒ Consider Spacing Limit for Main Rebar
 Spliced Bars : ☒ None ☐ 50% ☐ 100%

For Brace Design

Main Rebar : P20 Rebar...
 Ties/Spirals : P10 Arrangement : Y: 2
 do : 0 m Z: 2
☒ Consider Spacing Limit for Main Rebar
 Spliced Bars : ☒ None ☐ 50% ☐ 100%

For Shear Wall Design

Vertical Rebar : P12 Rebar...
 Horizontal Rebar : P10 End Rebar From : P10
 Boundary Element Horz. Rebar : P10
 Boundary Element Horz. Rebar Space : 0.2 m
 Boundary Element Vert. Rebar Space : 0.1 m
 de : 0.04 m **❷** dw : 0.03 m
 Input Additional Wall Data...
 OK Close

Input Additional Wall Data

☐ Design of Out-of-plane Bending

Spacing of Wall Rebars

Spacing of Vertical Rebars : @100,@150,@200,@300,@400 Space...
 Spacing of Horizontal Rebars : From 0.05 m

❸ End Rebar Design Method

Not Used : ☒ Method-1
 Auto Calculation : ☐ Method-2 ☐ Method-3 ☐ Method-4

Spacing of End Rebar

End Rebar Q'ty = 4 End Rebar Q'ty = 6 End Rebar Q'ty >= 8

Dist1 : 0.05 m Dist2 : 0.15 m Dist3 : 0.1 m

OK Cancel

10-3. Design Output (Beam)

Procedure

Design Tab > RC Design >
Concrete code design >
Beam Design

- ① Sorted by > Member (on)>
Graphic
 - ② Graphic to see section detailing
- Similarly Design The column
And Shear wall.

IS456:2000 RC-Beam Design Resu... — □ ×

Code : IS456:2000 ① Unit : kN , m

Sorted by ☒ Member ☐ Property

MEMB	SECT	Section		fck	fy	fvy	POS	CH	K
		Bc	Hc						
Span		bf	hf						
1				30000.0			I	OK	
3		0.2300	0.7000	415000			M	OK	
4.0000		0.0000	0.0000	415000			J	OK	
2				30000.0			I	OK	
3	☒	0.2300	0.7000	415000			M	OK	
4.0000		0.0000	0.0000	415000			J	OK	
3				30000.0			I	OK	
3		0.2300	0.7000	415000			M	OK	
4.0000		0.0000	0.0000	415000			J	OK	
4				30000.0			I	OK	
3		0.2300	0.7000	415000			M	OK	
4.0000		0.0000	0.0000	415000			J	OK	
5				30000.0			I	OK	
3		0.2300	0.7000	415000			M	OK	
4.0000		0.0000	0.0000	415000			J	OK	
6				30000.0			I	OK	
3		0.2300	0.7000	415000			M	OK	
4.0000		0.0000	0.0000	415000			J	OK	
7				30000.0			I	OK	
3		0.2300	0.7000	415000			M	OK	
4.0000		0.0000	0.0000	415000			J	OK	
8				30000.0			I	OK	
3		0.2300	0.7000	415000			M	OK	
4.0000		0.0000	0.0000	415000			J	OK	
9				30000.0			I	OK	

☐ Connect Model View

② ☒ Select All ☐ Unselect All ☐ Re-calculation

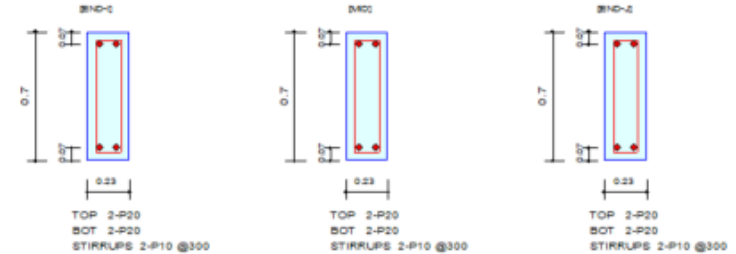
☒ Graphic... ☐ Detail... ☐ Summary... >>

Option for Detail Print Position

☒ End I. ☐ Mid. ☐ End J.

1. Design Information

Member Number 2
Design Code IS456:2000
Material Data fck = 30000, fy = 415000, fvy = 415000 KPa
Section Property Beam (No : 3)
Unit System kN, m
Beam Span 4m



2. Bending Moment Capacity

	END-I	MID	END-J
(-) Load Combination No.	28	36	24
Moment (Mu)	78.89	32.06	81.35
Factored Strength (MRd)	134.29	134.29	134.29
Check Ratio (Mu/MRd)	0.5874	0.2387	0.6058
(+) Load Combination No.	32	24	36
Moment (Mu)	60.17	40.83	47.48
Factored Strength (MRd)	134.29	134.29	134.29
Check Ratio (Mu/MRd)	0.4481	0.3040	0.3535
Required Rebar Top (As.top)	0.0004	0.0003	0.0004
Required Rebar Bot (As.bot)	0.0003	0.0003	0.0003

3. Shear Capacity

	END-I	MID	END-J
Load Combination No.	28	24	24
Factored Shear Force (Vu)	52.87	48.91	57.61
Shear Strength by Cono (Vc)	67.45	67.45	67.45
Shear Strength by Rebar (Vs)	119.04	119.04	119.04
Required Shear Reinf. (Asv)	0.0005	0.0005	0.0005
Required Stirrups Spacing	2-P10 @300	2-P10 @300	2-P10 @300
Check Ratio	0.2835	0.2623	0.3089

10-3. Design Output (Beam)

Procedure

Design Tab > RC Design >

Concrete code design >

Beam Design

1 Member(on) > Click Detail...

2 Confirm Detail Calculation report as per IS 456:2000

IS456:2000 RC-Beam Design Resu... — □ ×

Code : IS456:2000 Unit : kN , m

Sorted by ☒ Member ☐ Property

MEMB	SECT	SEL	Section		fck	POS	CH	K
			Bc	Hc				
Span			bf	hf	fyv			
1					30000.0	I	OK	
3			0.2300	0.7000	415000	M	OK	
4.0000			0.0000	0.0000	415000	J	OK	
2					30000.0	I	OK	
3		☒	0.2300	0.7000	415000	M	OK	
4.0000			0.0000	0.0000	415000	J	OK	
3					30000.0	I	OK	
3			0.2300	0.7000	415000	M	OK	
4.0000			0.0000	0.0000	415000	J	OK	
4					30000.0	I	OK	
3			0.2300	0.7000	415000	M	OK	
4.0000			0.0000	0.0000	415000	J	OK	
5					30000.0	I	OK	
3			0.2300	0.7000	415000	M	OK	
4.0000			0.0000	0.0000	415000	J	OK	
6					30000.0	I	OK	
3			0.2300	0.7000	415000	M	OK	
4.0000			0.0000	0.0000	415000	J	OK	
7					30000.0	I	OK	
3			0.2300	0.7000	415000	M	OK	
4.0000			0.0000	0.0000	415000	J	OK	
8					30000.0	I	OK	
3			0.2300	0.7000	415000	M	OK	
4.0000			0.0000	0.0000	415000	J	OK	
9					30000.0	I	OK	

☐ Connect Model View

Select All **1** Inselect All Re-calculation

Graphic... **Detail...** Summary... >>

Option for Detail Print Position

☒ End I. ☐ Mid. ☐ End J. Update Rebar

Close

2

ldas Gen - RC-Beam Design [IS456:2000] Gen 2026

5-th	0.098	255.03	226.77	87.54
6-th	0.089	229.53	226.77	98.78
7-th	0.084	216.78	226.77	95.59
8-th	0.086	223.15	226.77	98.41
9-th	0.087	226.34	226.77	99.81

```
( ). Compute ultimate moment of resistance.
-. a      = betal * X      =    0.0734 m.
-. M_Rd   = alpha1*fcd*a*Bc*(d-a/2) =    134.2903 kN-m.
```

```
( ). Check ratio of negative moment resistance.
-. Rat_N = M/M_Rd =    0.587 < 1.000 ----> O.K.
```

```
[[[*]]] Side rebar check
```

```
( ). Check side rebar requirement.
-. Hc = 0.7000 m.
-. Hc <= 0.7500 m. ----> Side Face Rebar not required.
```

```
[[[*]]] ANALYZE SHEAR CAPACITY.
```

```
-. Gamma_m = 1.50 (for concrete).
-. fcd      = fck / Gamma_m = 20000.000 KPa.
-. Gamma_m = 1.15 (for reinforcement).
-. fyd      = fy / Gamma_m = 360869.565 KPa.
```

```
( ). Calculate shear strength of concrete.
-. V      = 52.873 kN.
-. b      = 0.230 m.
-. v      = V / (b*d) = 364.8930 KPa.
-. As_bvd = 100*As/(b*d) = 0.43368 (Area of tensile reinforcement).
-. vc     = 465.513 KPa. [IS456:2000, Table-19]
```

```
( ). Calculate required shear reinforcement. ( Asv1 = 0.00008 m^2. )
-. v_lim = 3500.000 KPa.
-. Asv/s1 = 0.4*bv / (0.87*fyv) = 0.00025 m^2/m.
-. Calculate spacing s1 = 0.61614 m.
-. Smax1 = 0.30000 m.
-. Smax2 = 0.75 * d = 0.47250 m.
-. Applied spacing sv = MIN[ s1, Smax1, Smax2 ] = 0.30000 m.
-. N_leg = 2
-. Asv    = N_leg*Asv1 / sv = 0.00052 m^2/m.
```

10-3. Design Output (Column)

Procedure

Design Tab > RC Design >
Concrete code design >
Column Design

1 Sorted by > Member (on)>
Select a member>Graphic

IS456:2000 RC-Column Design Re... — □ ×

Code : IS456:2000 Unit : kN , m

Sorted by **1** Member ☒ Member ☐ Property

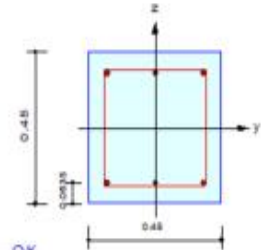
MEMB	SECT	SEL	Section	fck	f _y	CHK
			Bc Hc	Height	f _{yk}	
200	1	☐	Podium Column	40000.0	415000	OK
201	1	☐	Podium Column	40000.0	415000	OK
202	1	☐	Podium Column	40000.0	415000	OK
203	1	☐	Podium Column	40000.0	415000	OK
204	1	☐	Podium Column	40000.0	415000	OK
205	1	☐	Podium Column	40000.0	415000	OK
206	1	☒	Podium Column	40000.0	415000	OK
207	1	☐	Podium Column	40000.0	415000	OK
208	1	☐	Podium Column	40000.0	415000	OK
209	1	☐	Podium Column	40000.0	415000	OK
210	1	☐	Podium Column	40000.0	415000	OK
211	1	☐	Podium Column	40000.0	415000	OK
212	1	☐	Podium Column	40000.0	415000	OK
213	1	☐	Podium Column	40000.0	415000	OK
214	1	☐	Podium Column	40000.0	415000	OK
215	1	☐	Podium Column	40000.0	415000	OK

☐ Connect Model View

2

1. Design Condition

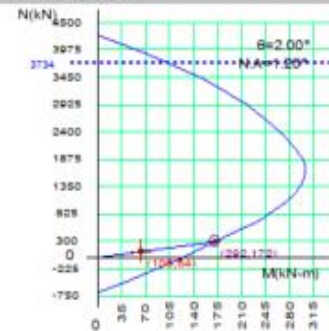
Design Code : IS456:2000 UNIT SYSTEM : kN, m
Member Number : 206
Material Data : f_{ck} = 40000, f_y = 415000, f_{yv} = 415000 KPa
Column Height : 3 m
Section Property : Podium Column (No : 1)
Rebar Pattern : 6 - 2 - P20 Ast = 0.0018852 m² (pst = 0.009)



2. Axial and Moments Capacity

Load Combination : 31 (Pos : J)
Concentric Max. Axial Load P.Rdmax = 3734.02 kN
Axial Load Ratio Pu / P.Rd = 106.220 / 291.781 = 0.364 < 1.000 O.K
Moment Ratio M_y / M.Rdy = 63.8155 / 171.914 = 0.371 < 1.000 O.K
M_z / M.Rdz = 63.7765 / 171.809 = 0.371 < 1.000 O.K

M-N Interaction Diagram



P.Rd(kN)	M.Rd(kN-m)
4267.30	0.00
3646.73	118.13
3145.10	192.12
2680.05	242.92
2261.68	276.61
1914.51	298.05
1743.33	303.58
1610.24	303.01
1369.65	296.77
1073.04	276.51
706.76	234.94
-18.19	120.92
-680.31	0.00

3. Shear Capacity

	y (LCB : 29, POS : I)	z (LCB : 31, POS : I)
Applied Shear Force (Vu)	19.9440 kN	35.2132 kN
Design Shear Strength (V _c +V _s)	137.400 + 78.2453 = 215.645 kN	128.085 + 78.2453 = 206.330 kN
Shear Ratio	0.092 < 1.000 O.K	0.171 < 1.000 O.K
Asv-H.req	0.00054 m ² /m, 2-P10 @280	0.00054 m ² /m, 2-P10 @280

	y (LCB : 29, POS : 1/2)	z (LCB : 31, POS : 1/2)
Applied Shear Force (Vu)	19.9440 kN	35.2132 kN
Design Shear Strength (V _c +V _s)	138.127 + 78.2453 = 216.372 kN	128.521 + 78.2453 = 206.767 kN
Shear Ratio	0.092 < 1.000 O.K	0.170 < 1.000 O.K
Asv-H.req	0.00054 m ² /m, 2-P10 @280	0.00054 m ² /m, 2-P10 @280

10-3. Design Output (Wall)

Procedure

Design Tab > RC Design >
Concrete code design >
Shear Wall Design

① Sorted by>Wall ID + story
and select a wall>Graphic

Such a window explaining the
design would be displayed

IS456:2000 RC-Wall Design Result Dialog

Code : IS456:2000 Unit : kN , m

Sorted by: **① Wall ID + Story** (selected) ☐ Wall ID (WID)

Sort Result...

WID	SE	Wall Mark	f _{ck}	f _y	CH
Story	L	Lw HTw	hw	fvv	K
11		wM0011	40000.0	415000	OK*
10F		2.0000 3.0000	0.2300	415000	
12		wM0012	40000.0	415000	OK*
10F		2.0000 3.0000	0.2300	415000	
1		wM0001	40000.0	415000	OK*
11F		4.0000 3.0000	0.2300	415000	
2		wM0002	40000.0	415000	OK*
11F		4.0000 3.0000	0.2300	415000	
3		wM0003	40000.0	415000	OK*
11F		4.0000 3.0000	0.2300	415000	
9		wM0009	40000.0	415000	OK*
11F		4.0000 3.0000	0.2300	415000	
10		wM0010	40000.0	415000	OK*
11F		2.0000 3.0000	0.2300	415000	
11		wM0011	40000.0	415000	OK*
11F		2.0000 3.0000	0.2300	415000	
12		wM0012	40000.0	415000	OK*
11F		2.0000 3.0000	0.2300	415000	
1		wM0001	40000.0	415000	OK*
12F		4.0000 3.0000	0.2300	415000	
2		wM0002	40000.0	415000	OK*
12F		4.0000 3.0000	0.2300	415000	
3		wM0003	40000.0	415000	OK*
12F		4.0000 3.0000	0.2300	415000	
9		wM0009	40000.0	415000	OK*
12F		4.0000 3.0000	0.2300	415000	
10		wM0010	40000.0	415000	OK*
12F		2.0000 3.0000	0.2300	415000	
11		wM0011	40000.0	415000	OK*
12F		2.0000 3.0000	0.2300	415000	
12		wM0012	40000.0	415000	OK*

☐ Connect Model View

② Select All Unselect All Re-calculation

Graphic... Detail... Summary... >>

Draw PM Curve... Update Rebar Close

1. Design Condition

Design Code : IS456:2000
Wall ID : 1 (Wall Mark : wM0001)
Story : 12F (Height = 3 m)
Material Data : f_{ck} = 40000, f_y = 415000, f_{yv} = 415000 KPa
Wall Dim. (Length*Thk) : 4*0.23 m
Vertical Rebar : P12 @400 (A_{sV} = 0.00057 m²/m)

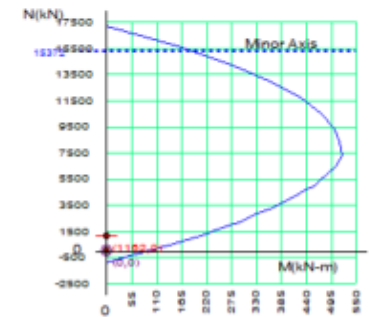
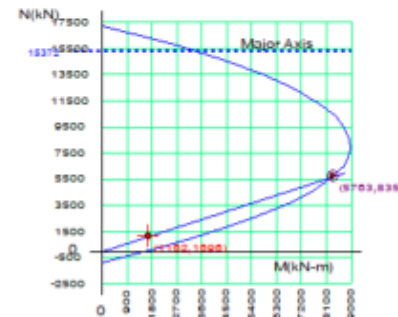
Unit System : kN, m



2. Axial and Moments Capacity

Concentric Max. Axial Load P_{Rdmax} = 15372.0 kN

	y (LCB : 33, POS : J)	z (LCB : 33, POS : J)
P _u (kN)	1162.00	1162.00
P _{Rd} (kN)	5763.26	0.00000
P _u / P _{Rd}	0.202 < 1.000 O.K	0.000 < 1.000 O.K
M (kN-m)	1696.01	0.00000
M _{Rd} (kN-m)	8359.00	0.00000
M / M _{Rd}	0.203 < 1.000 O.K	0.000 < 1.000 O.K



3. Shear Capacity

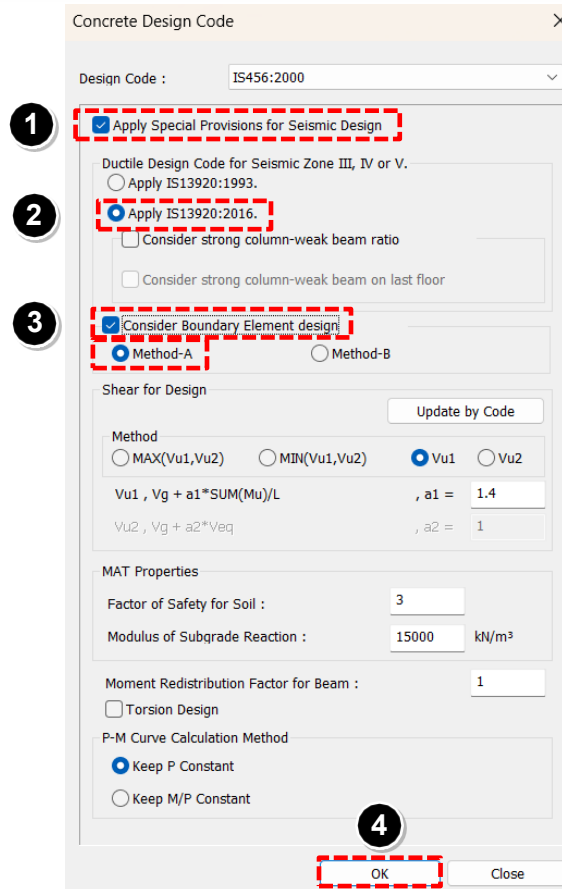
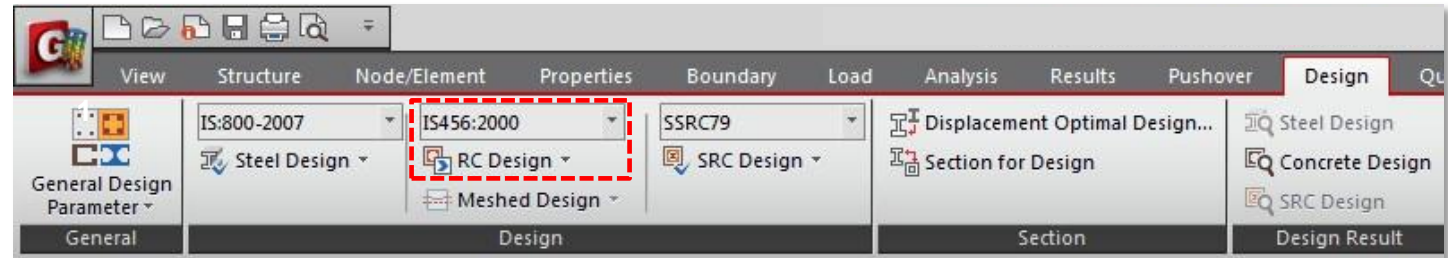
Applied Shear Force V_u = 375.674 kN (Load Combination : 29)
Design Shear Strength V_c+V_s = 2094.69 + 575.846 = 2670.54 kN
(A_{sv}-H_{req} = 0.00050 m²/m, P10 @315)
Shear Ratio V_u/V_{Rd} = 0.141 < 1.000 O.K

11-1. Ductile Design

Procedure

Design Tab > RC Design >
Design Code

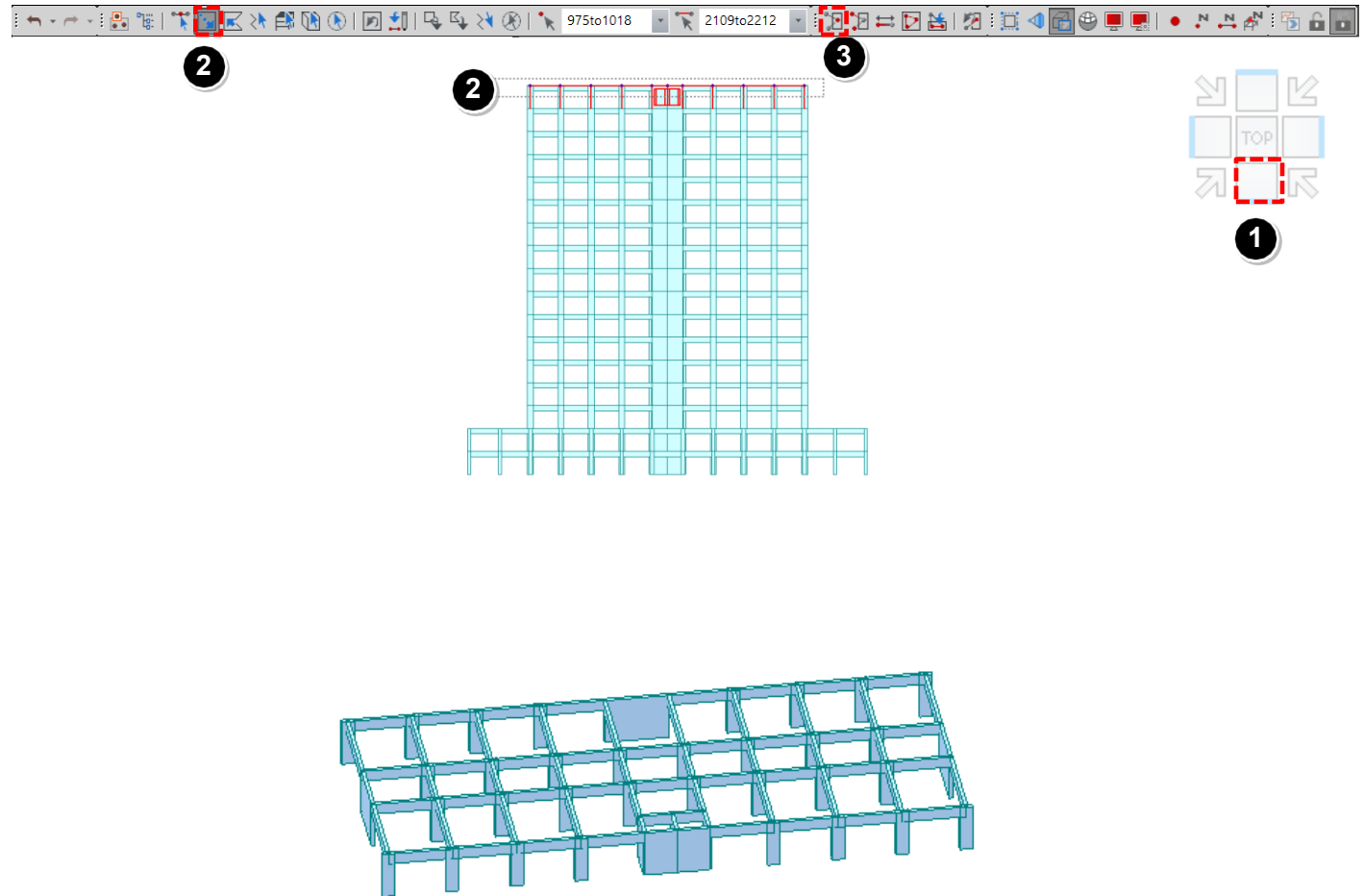
- 1 Check on Apply Special Provisions for Seismic Design
- 2 Click Apply IS13920:2016
- 3 Check Consider Boundary Element design with Method A
- 4 Click OK



11-2. Ductile Design (selection of elements)

Procedure

- 1 Click Front View
- 2 Select the Top floor elements as shown using Select window
- 3 Click Activate



11-3. Ductile Design (Wall)

Procedure

- 1 Click Select All
- 2 Design Tab > RC Design > Concrete Code Design > Wall Design
- 3 Click Wall ID + Story
- 4 Select the wall members
- 5 Click Detail... or Graphic ... to generate the design report.

IS456:2000 RC-Wall Design Result Dialog

Code : IS456:2000 Unit : kN , mm Primary Sorting Option
☒ Wall ID + Story ☐ Wall ID (WID) Sort Result...

WID	SEL	Wall Mark	fck	fy	Ratio	Pu	M	Vu	As-V	V-Rebar	End-Rebar	B.E.	B.E.H-Rebar	B.E.V-Rebar
Story		Lw HTW	hw	f _{yv}	Rat-V		LCB	LCB	Asv-H	H-Rebar	Bar Layer	LCB	B.E.-L	B.E.-Ratio
1		wM0001	0.04000	0.41500	0.247	337.073	1055629	265.579	754.00	P12 @300	Not Use	-	Not Use	-
16F		4000.0 3000.0	230.00	0.41500	0.282		33	25	615.69	P10 @255	Double	-	-	-
2	☒	wM0002	0.04000	0.41500	0.263	334.769	1071112	233.133	754.00	P12 @300	Not Use	-	Not Use	Not Use
		4000.0 3000.0	230.00	0.41500	0.242		35	44	615.69	P10 @255	Double	-	-	-
3		wM0003	0.04000	0.41500	0.247	337.073	1055629	265.579	754.00	P12 @300	Not Use	-	Not Use	Not Use
16F		4000.0 3000.0	230.00	0.41500	0.282		36	28	615.69	P10 @255	Double	-	-	-
9		wM0009	0.04000	0.41500	0.532	110.981	1270699	494.151	754.00	P12 @300	Not Use	-	Not Use	Not Use
16F		4000.0 3000.0	230.00	0.41500	0.470		34	44	615.69	P10 @255	Double	-	-	-
10		wM0010	0.04000	0.41500	0.928	-81.541	618395	354.966	1131.00	P12 @200	Not Use	-	Not Use	Not Use
16F		2000.0 3000.0	230.00	0.41500	0.991		22	44	392.50	P10 @400	Double	-	-	-
11		wM0011	0.04000	0.41500	0.928	-81.541	618395	354.966	1131.00	P12 @200	Not Use	-	Not Use	Not Use
16F		2000.0 3000.0	230.00	0.41500	0.938		26	42	392.50	P10 @400	Double	-	-	-
12		wM0012	0.04000	0.41500	0.582	-42.351	207158	182.631	565.50	P12 @400	Not Use	-	Not Use	Not Use
16F		2000.0 3000.0	230.00	0.41500	0.494		32	28	392.50	P10 @400	Double	-	-	-

☐ Connect Model View

Result View Option ☒ All ☐ OK ☐ NG
Result View Option (B.E.) ☒ All ☐ Required ☐ Not Required

WITH SCALING UP FACTORS.

Loadcase Name(Factor)	Loadcase Name(Factor)
SIDL(1.500) +	LL(1.500)
SIDL(1.200) +	LL(1.200)
SIDL(1.200) +	LL(1.200)
SIDL(1.200) +	LL(1.200)
SIDL(1.200) +	LL(1.200)
SIDL(1.500) +	WX(1.500)
SIDL(1.500) +	WY(1.500)
SIDL(1.500) +	WX(-1.500)
SIDL(1.500) +	WY(-1.500)
SIDL(0.900) +	WX(1.500)
SIDL(0.900) +	WY(1.500)
SIDL(0.900) +	WX(-1.500)
SIDL(0.900) +	WY(-1.500)
SIDL(1.200) +	LL(1.200)

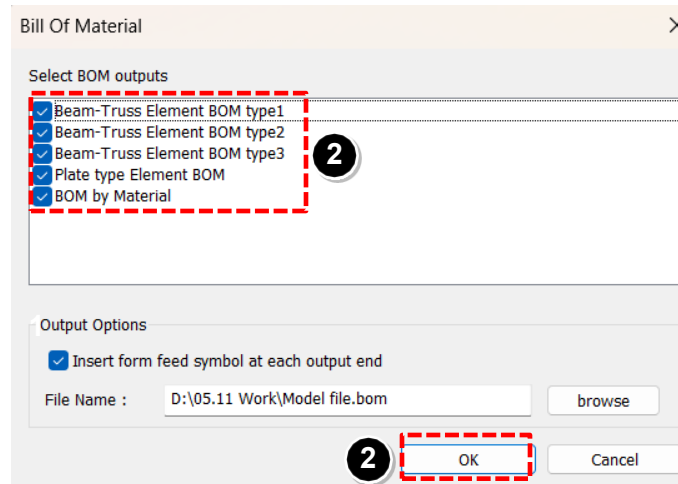
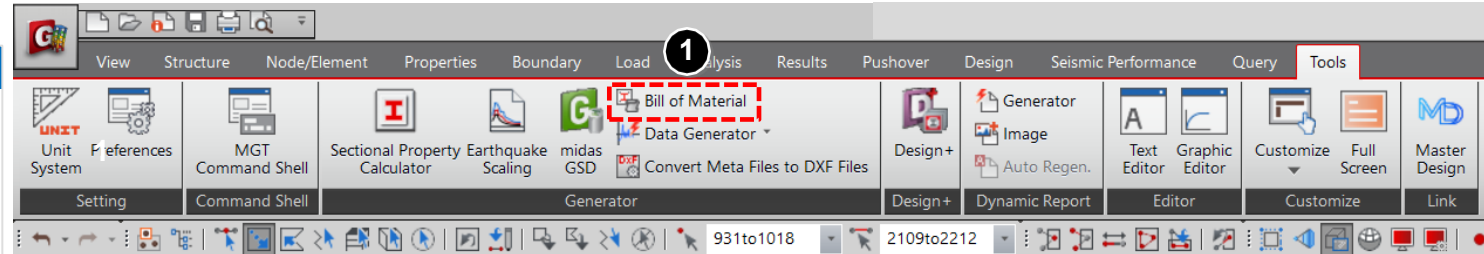
Procedure

-
- The screenshot displays the SAP2000 software interface. The top menu bar includes View, Structure, Node/Element, Properties, Boundary, Load, Analysis, Results, Pushover, and Design. The Design menu is open, showing options like Displacement Optimal Design..., Section for Design, Steel Design, Concrete Design (highlighted with a red dashed box and a red circle with the number 1), and SRC Design. Below the menu bar, the Design panel shows various design codes and methods. The Concrete Design Result dialog box is open on the left, showing the Concrete Design Result for the ALL COMBINATION. The dialog box has several sections: Ratio by Components (Axial, Shear-y, Shear-z, Bend-y, Bend-z, Combined), Type of Display (Contour, Legend, Values, Rebar, Area, Ratio(%)), Display (Beam, Column, Brace, Wall), Output Component (Ratio of Axial Stress, Main Rebar, Shear Reinforcement), Column Section Size (Scale Factor), Value Option (Decimal Pt., Exp.), and Output Section Location (Beam). The Rebar option is selected under Type of Display, and the Main Rebar option is selected under Output Component. The dialog box is also highlighted with a red dashed box and a red circle with the number 2. The main window shows a 3D model of a building structure with a grid of columns and beams, with red text labels indicating the design results for each element.

11-5. Bill of Material

Procedure

- 1 Tools tab > Bill of Material
- 2 Check all the boxes and click OK Reinforcement



BILL OF MATERIAL

BEAM & TRUSS BOM TYPE1 SECT ID, SECT NAME, MATERIAL Unit System : kN , m

SECT ID	SECTION NAME	MATERIAL ID	MATERIAL NAME	DENSITY	LENGTH	PAINT AREA INNER	PAINT AREA OUTER	WEIGHT
3	Beam	1	M30	2.360e+01	6.016e+03	0.000e+00	1.119e+04	2.286e+04
1	Podium column	2	M40	2.360e+01	4.320e+02	0.000e+00	7.776e+03	2.065e+03
2	Building column	2	M40	2.360e+01	1.632e+03	0.000e+00	3.590e+03	9.244e+03
SUMMATION :					8.080e+03	0.000e+00	1.556e+04	3.417e+04

BEAM & TRUSS BOM TYPE2 SECTION NAME, MATERIAL Unit System : kN , m

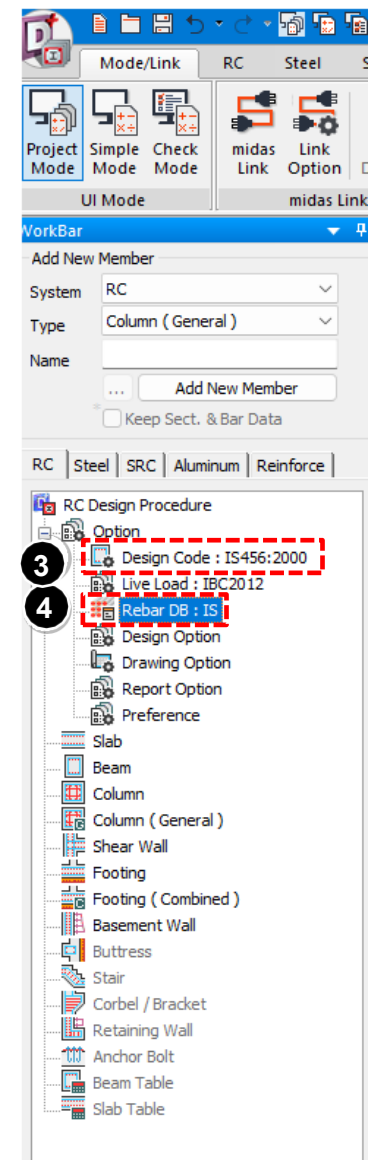
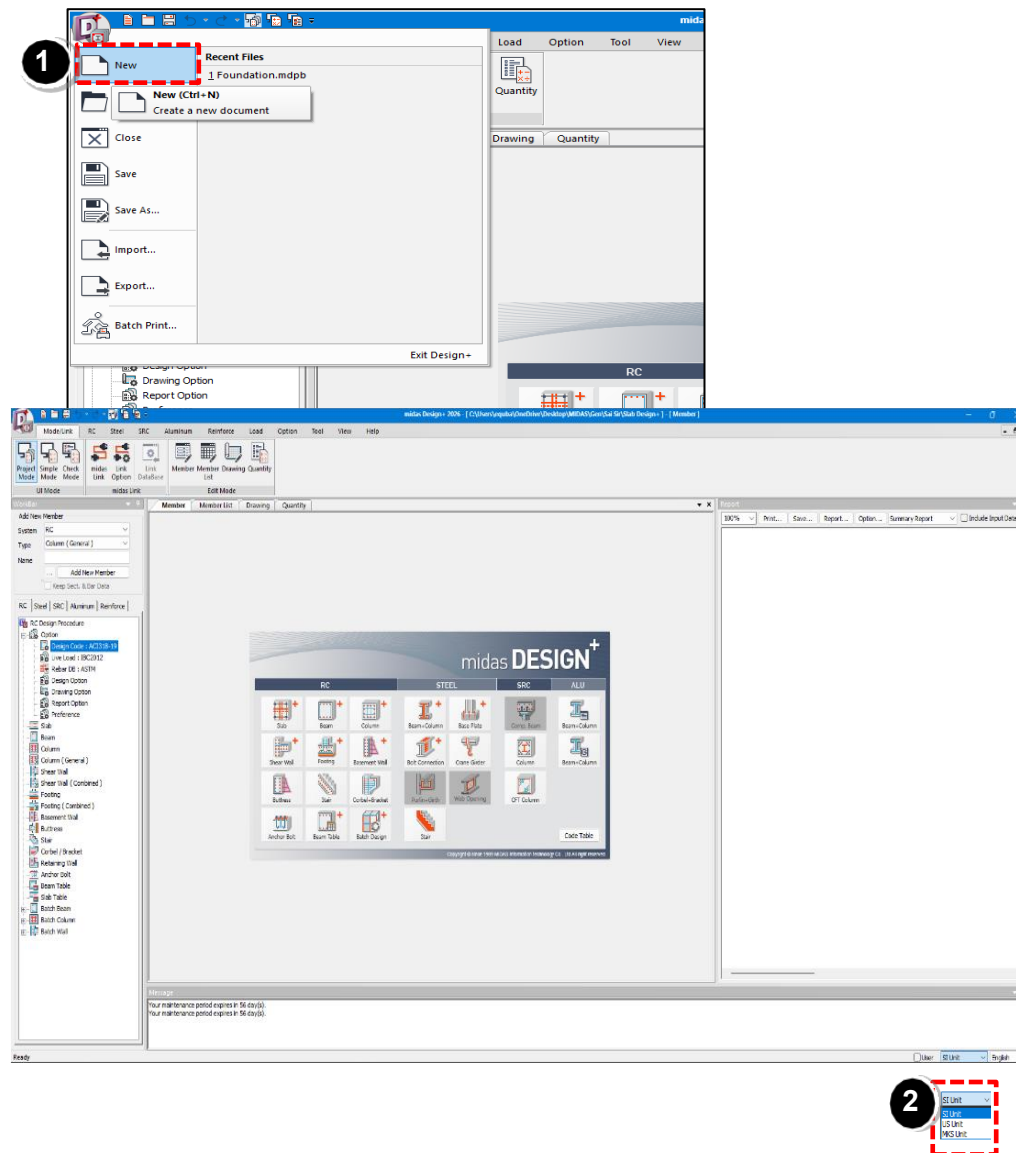
SECTION NAME	ID	MATERIAL TYPE	MATERIAL NAME	DENSITY	LENGTH	PAINT AREA INNER	PAINT AREA OUTER	WEIGHT
Beam	1	C M30		2.360e+01	6.016e+03	0.000e+00	1.119e+04	2.286e+04
Building column	2	C M40		2.360e+01	1.632e+03	0.000e+00	3.590e+03	9.244e+03
Podium column	2	C M40		2.360e+01	4.320e+02	0.000e+00	7.776e+02	2.065e+03
SUMMATION :					8.080e+03	0.000e+00	1.556e+04	3.417e+04

BEAM & TRUSS BOM TYPE3 SECTION NAME Unit System : kN , m

12-1. Initialization of workspace

Procedure

- ❶ Create a new file
- ❷ Set the unit system to SI
- ❸ Set Design code to IS 456:2000
- ❹ Update the Rebar to IS



12-2. Slab optimization in DESIGN+

Procedure

- ❶ Click on Slab Section
- ❷ Click on S01
- ❸ Click on Member >Section > Check(F5)

The screenshot shows the midas DESIGN+ software interface. The 'RC' tab is selected, and the 'Slab' icon is highlighted with a red box and a circled '1'. The 'Member' list on the left shows 'S01' selected with a red box and a circled '2'. The 'Section' dropdown is set to 'Load' with a red box and a circled '3'. The 'Check(F5)' button is highlighted with a red box and a circled '3'. The main workspace displays a diagram of a slab section with dimensions Lx, Ly, and Lx/4, and a table of bar arrangement results.

Bar Arrangement (X Direction)			
TOP			
Mu (kN.m)	0.000	OK(0.000)	
Vu (kN)	0.000	OK(0.000)	
Rebar (X1)	P10	@ 450.00	
Rebar (X2)	P10	@ 450.00	
Rebar (X3)	P10	@ 450.00	
Rebar	Link to Center		
MIDDLE			
Mu (kN.m)	0.000	OK(0.000)	
Vu (kN)	0.000	OK(0.000)	
Rebar (X1)	P10	@ 450.00	
Rebar (X2)	P10	@ 450.00	
Rebar (X3)	P10	@ 450.00	
Rebar	Link to Center		
BOTTOM			
Mu (kN.m)	0.000	OK(0.000)	
Vu (kN)	0.000	OK(0.000)	
Rebar (X1)	P10	@ 450.00	
Rebar (X2)	P10	@ 450.00	
Rebar (X3)	P10	@ 450.00	
Rebar	Link to Center		

Bar Arrangement (Y Direction)			
LEFT			
Mu (kN.m)	0.000	OK(0.000)	
Vu (kN)	0.000	OK(0.000)	
Rebar (Y1)	P10	@ 450.00	
Rebar (Y2)	P10	@ 450.00	
Rebar (Y3)	P10	@ 450.00	
Rebar	Link to Center		
CENTER			
Mu (kN.m)	0.000	OK(0.000)	
Vu (kN)	0.000	OK(0.000)	
Rebar (Y1)	P10	@ 450.00	
Rebar (Y2)	P10	@ 450.00	
Rebar (Y3)	P10	@ 450.00	
Rebar	Link to Center		
RIGHT			
Mu (kN.m)	0.000	OK(0.000)	
Vu (kN)	0.000	OK(0.000)	
Rebar (Y1)	P10	@ 450.00	
Rebar (Y2)	P10	@ 450.00	
Rebar (Y3)	P10	@ 450.00	
Rebar	Link to Center		

Calculation Result	
CHECK ITEMS	RESULT
Design type of slab	2-Way Slab
Min. Thickness (mm)	-18.62
Min. Bar Ratio (mm ²)	0.120% 180
Max. Bar Space (mm)	P10 @450
Short Deflection (mm)	-
Long Deflection (mm)	-

12-3. Slab Loading Data

Procedure

- 1 Click on "Load" tab
- 2 Enter the value of..
Dead Load= 2 kN/m²
Live Load= 3 kN/m²
- 3 Click "Check(F5)"

RC Design Procedure

- Option
 - Design Code : IS456:2000
 - Live Load : IBC2012
 - Rebar DB : IS
 - Design Option
 - Drawing Option
 - Report Option
 - Preference
- Slab (1)
 - S01
- Beam
- Column
- Column (General)
- Shear Wall
- Footing
- Footing (Combined)
- Basement Wall
- Buttress
- Stair
- Corbel / Bracket
- Retaining Wall
- Anchor Bolt
- Beam Table
- Slab Table

General

Member Name: S01

By this Member to: Dwg & Report

Design Load

Dead Load: 2 kN/m²

Live Load: 3 kN/m²

☐ Use User Input

Support Condition (2Way)

☐ ☒ ☐ ☐ ☐ ☐

Boundary Beams

B1: 400.00 x 600.00 mm

B2: 400.00 x 600.00 mm

☒ Use B1

B3: 400.00 x 600.00 mm

B4: 400.00 x 600.00 mm

☒ Use B3

Bar Arrangement (X Direction)

TOP		
Mu (kN.m)	5.303	OK(0.353)
Vu (kN)	6.750	OK(0.109)
Rebar (X1)	P10	@ 450.00
Rebar (X2)	P10	@ 450.00
Rebar (X3)	P10	@ 450.00
Rebar	☐ Link to Center	
MIDDLE		
Mu (kN.m)	4.072	OK(0.271)
Vu (kN)	3.375	OK(0.054)
Rebar (X1)	P10	@ 450.00
Rebar (X2)	P10	@ 450.00
Rebar (X3)	P10	@ 450.00
Rebar	☐ Link to Center	
BOTTOM		
Mu (kN.m)	5.303	OK(0.353)
Vu (kN)	6.750	OK(0.109)
Rebar (X1)	P10	@ 450.00
Rebar (X2)	P10	@ 450.00
Rebar (X3)	P10	@ 450.00
Rebar	☐ Link to Center	

Bar Arrangement (Y Direction)

	LEFT	CENTER	RIGHT
Mu (kN.m)	3.110 OK(0.226)	2.333 OK(0.169)	3.110 OK(0.226)
Vu (kN)	0.000 OK(0.000)	0.000 OK(0.000)	0.000 OK(0.000)
Rebar (Y1)	P10 @ 450.00	P10 @ 450.00	P10 @ 450.00
Rebar (Y2)	P10 @ 450.00	P10 @ 450.00	P10 @ 450.00
Rebar (Y3)	P10 @ 450.00	P10 @ 450.00	P10 @ 450.00
Rebar	☐ Link to Center		☐ Link to Center

Calculation Result

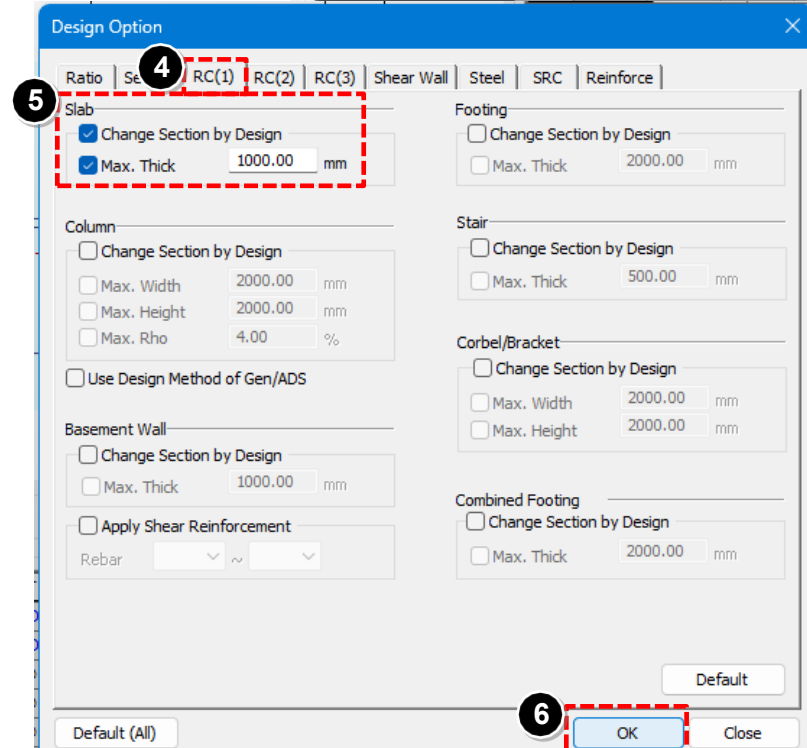
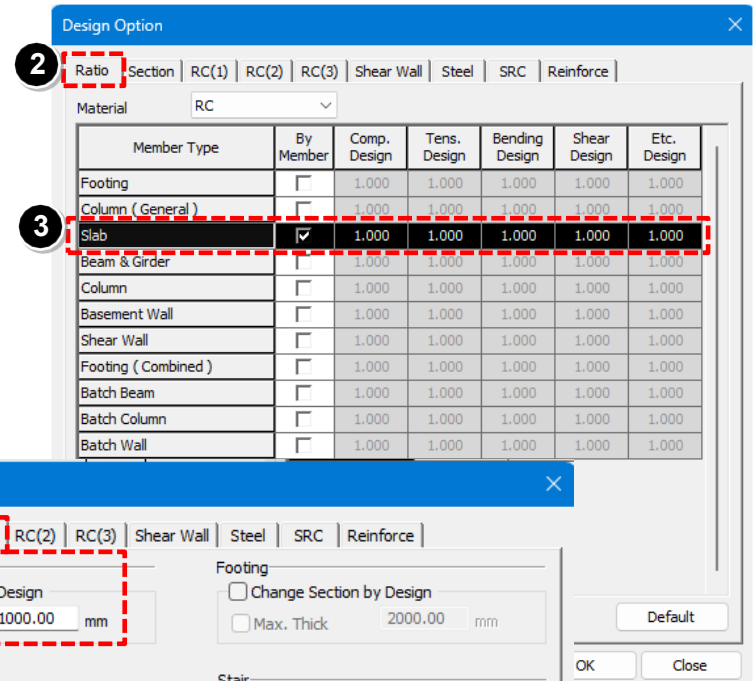
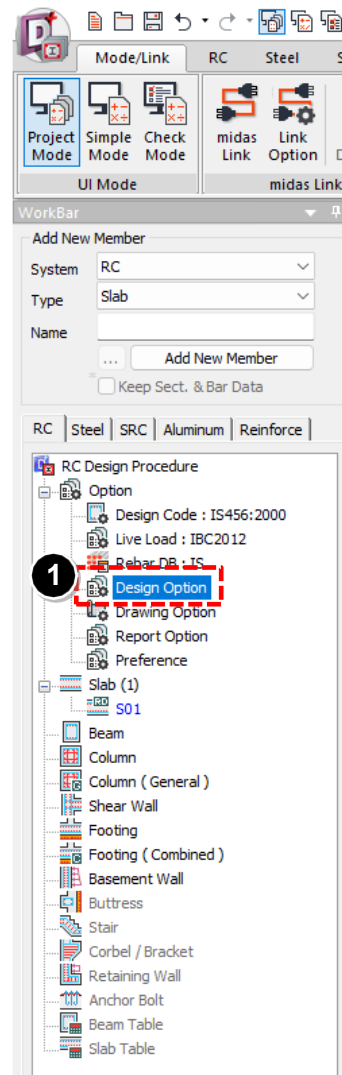
CHECK ITEMS	RESULT
Design type of slab	2-Way Slab
Min. Thickness (mm)	12.57
Min. Bar Ratio (mm ²)	0.120% 180
Max. Bar Space (mm)	P10 @450
Short Deflection (mm)	-
Long Deflection (mm)	-

Check(F5)

12-4. Design Option (Slab)

Procedure

- ❶ Go to Design Option
- ❷ Tap “Ratio” icon
- ❸ Check on Slab
- ❹ Tap “RC(1)” icon
- ❺ Check on “Change section by Design” option, put Max. Thick = 1000 mm
- ❻ Click OK



12-5. Design Result (Slab) & iteration

Procedure

- ❶ Click on “Section” tab>Design(F4)
- ❷ Check on “P10”
- ❸ Click OK
- ❹ Again go to “Section” tab
- ❺ Change the thickness to 100 mm
- ❻ Click “Check(F5)”

❶

Member Member List Drawing Qu

General

Member Name S01

Apply this Member to Dwg & Report

❷ Section Load

Material

Concrete 25 MPa

Rebar 415 MPa

☐ Light Weight Concrete

Factor 1

Stress-Strain Parabola-Rectangle (A)

Slab Type

☐ 1 Way Slab ☒ 2 Way Slab

Dimension

Span(x) 4.00 m

Span(y) 6.00 m

Thickness 150.00 mm

Cover 20.00 mm

☒ Use clear span

❸ Design(F4) Check(F5) Report ...

Design Result (Slab)

Select rebar to apply

CHK	NAME	DIR-X			DIR-Y			MIN.
		I	M	J	I	M	J	
☒	P10	@207	@281	@207	@276	@384	@276	$\rho=0.0012$
☐	P10+12	@245	@333	@245	@296	@418	@296	@350
☐	P12	@289	@393	@289	@350	@450	@350	@350
☐	P12+16	@375	@450	@375	@218	@450	@218	@350
☐	P16	@450	@450	@450	@279	@450	@279	@350

❸ OK Cancel

❹

Member Member List Drawing Qu

General

Member Name S01

Apply this Member to Dwg & Report

❺ Section Load

Material

Concrete 25 MPa

Rebar 415 MPa

☐ Light Weight Concrete

Factor 1

Stress-Strain Parabola-Rectangle (A)

Slab Type

☐ 1 Way Slab ☒ 2 Way Slab

Dimension

Span(x) 4.00 m

Span(y) 6.00 m

❺ Thickness 100 mm

Cover 20.00 mm

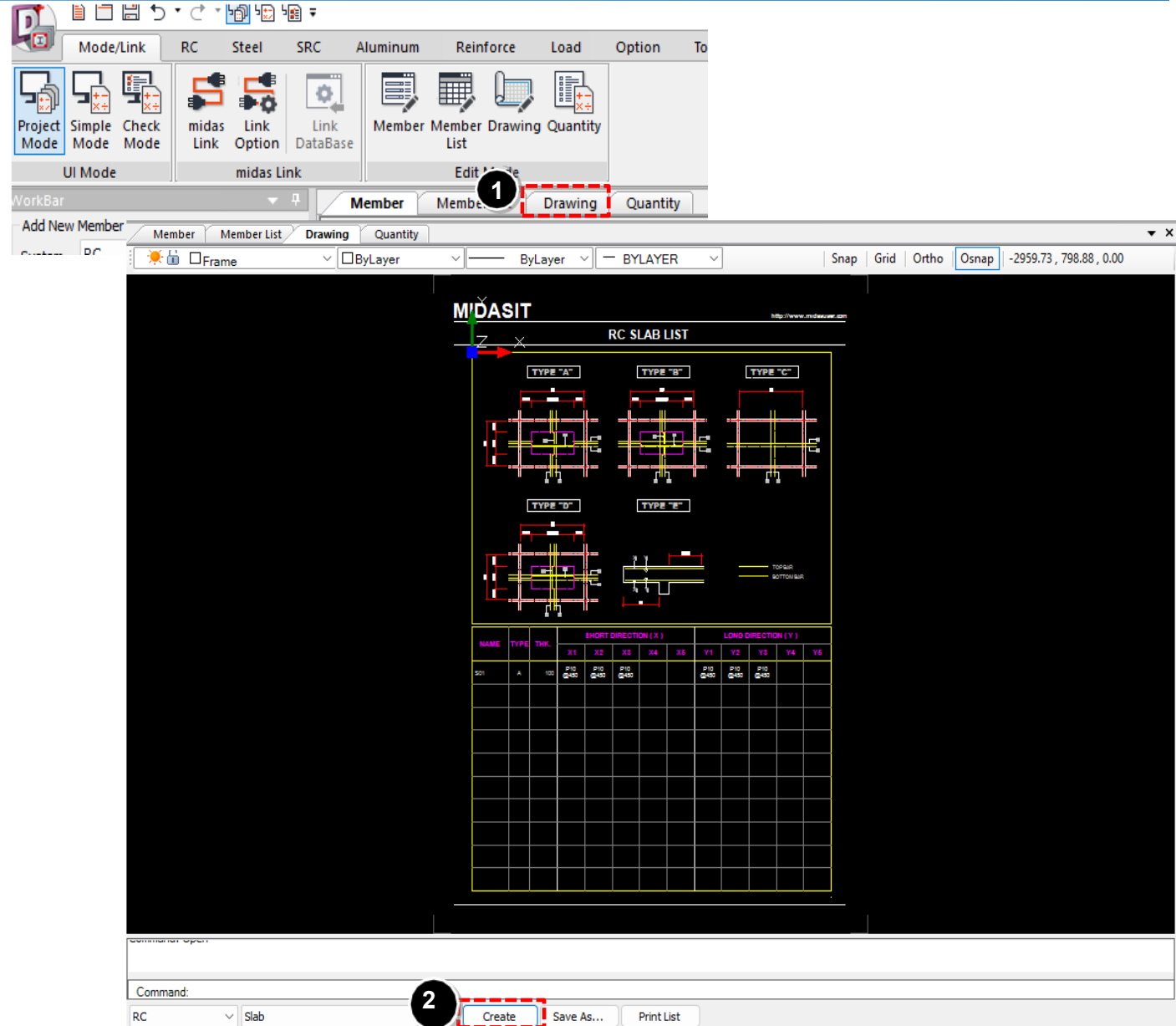
☒ Use clear span

❻ Design(F4) Check(F5) Report ...

12-6. RC Slab Drawings

Procedure

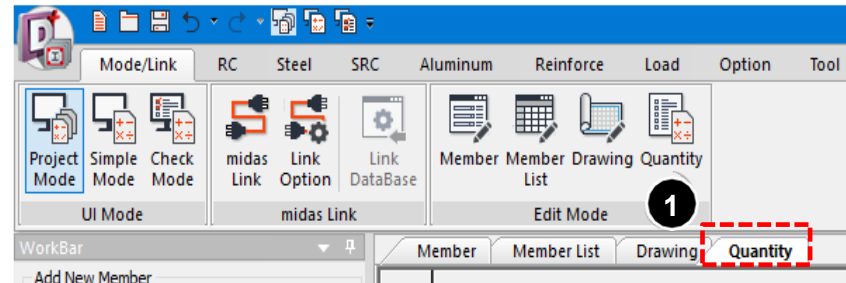
- ❶ Click on "Drawing" tab
- ❷ Check on "Create" option



12-7. RC Slab Quantity Results

Procedure

- ❶ Click on “Quantity” tab
- ❷ Check on “Create” option
- ❸ Click on “Export to Excel” > Excel Spreadsheet



Section																	
Name	Thick (mm)	Direction Y															
		Direction X								Direction Y							
		Left				Center				Right				Top			
		Rebar1 (mm)	Rebar2 (mm)	Rebar3 (mm)	Rebar1 (mm)	Rebar2 (mm)	Rebar3 (mm)	Rebar1 (mm)	Rebar2 (mm)	Rebar3 (mm)	Rebar1 (mm)	Rebar2 (mm)	Rebar3 (mm)	Rebar1 (mm)	Rebar2 (mm)	Rebar3 (mm)	Rebar1 (mm)
S01	70.00	P10@400	P10@400	P10@900	-	P10@500	P10@600	P10@400	P10@400	P10@900	P10@500	P10@600	P10@900	-	P10@700	P10@800	P10@500