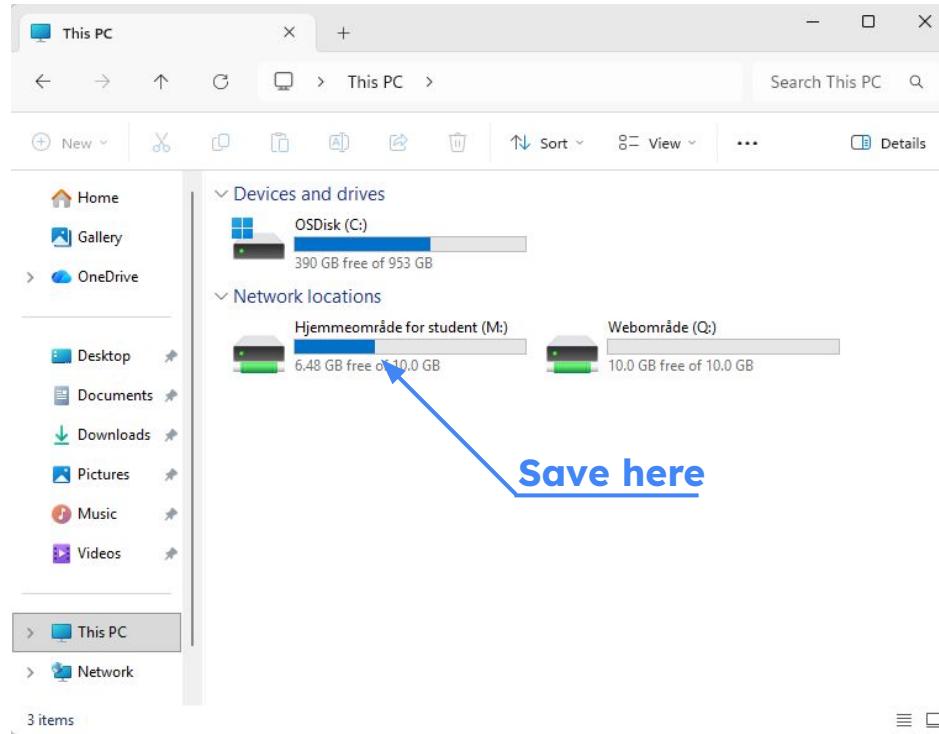




Introduction

Save file



Or:



Google Drive



OneDrive

Structure/Geometry

Workflow

0. General

1. Grid
2. Materials
3. Frame Sections
4. Frame objects
5. Connections

General

Cursor

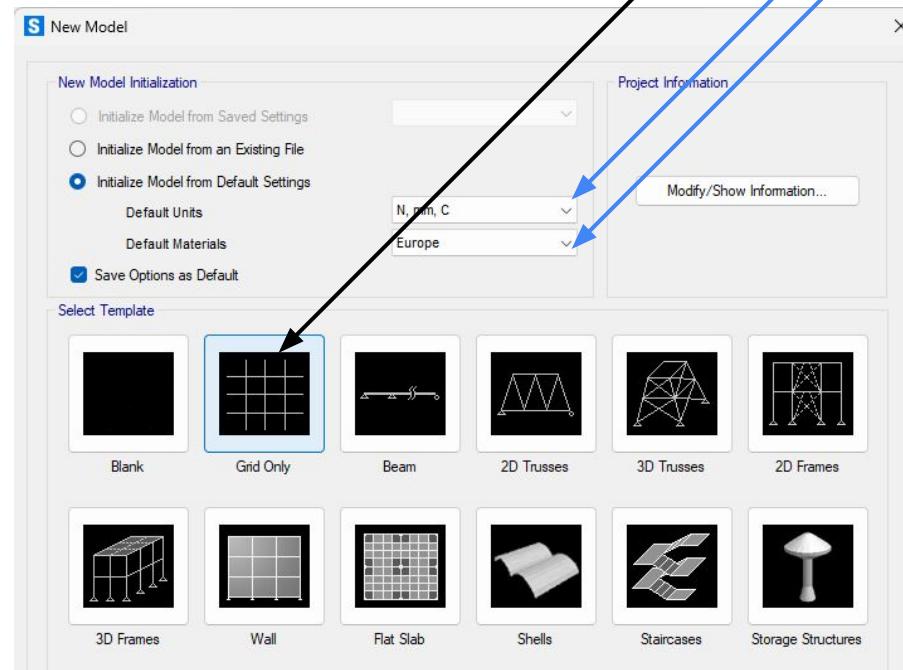
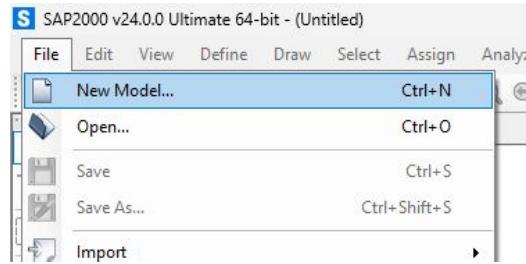
- Pan: middle mouse
- Rotate: shift - middle mouse

Display options

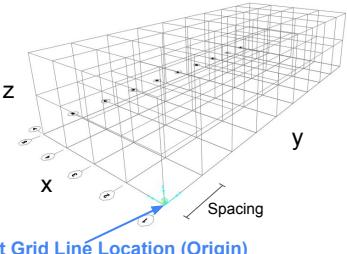
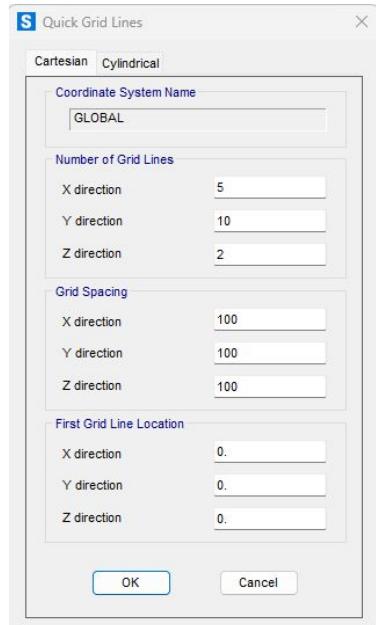
- Edit => Display options
 - 3D view:
=> View options=>Extrude

Click Grid Last

New model

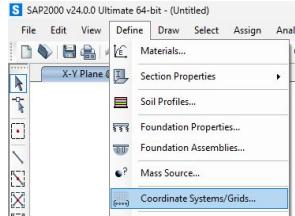


Grid Setup

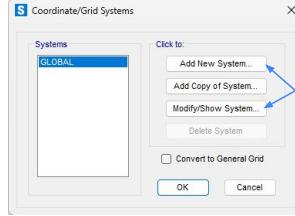


Modify grid later:

1.



2.



3.

System Name					
GLOBAL					
X Grid Data					
Grid ID	Ordinate (mm)	Line Type	Visible	Bubble Loc	Grid Color
A	0	Primary	Yes	End	Dark Gray
B	100	Primary	Yes	End	Dark Gray
C	200	Primary	Yes	End	Dark Gray
D	300	Primary	Yes	End	Dark Gray
E	400	Primary	Yes	End	Dark Gray
F	500	Primary	Yes	End	Dark Gray
G	600	Primary	Yes	End	Dark Gray

Y Grid Data					
Grid ID	Ordinate (mm)	Line Type	Visible	Bubble Loc	Grid Color
1	0	Primary	Yes	Start	Dark Gray
2	100	Primary	Yes	Start	Dark Gray
3	200	Primary	Yes	Start	Dark Gray
4	300	Primary	Yes	Start	Dark Gray
5	400	Primary	Yes	Start	Dark Gray
6	500	Primary	Yes	End	Dark Gray

Z Grid Data					
Grid ID	Ordinate (mm)	Line Type	Visible	Bubble Loc	
Z1	0	Primary	Yes	End	
Z2	100	Secondary	Yes	End	
Z3	200	Primary	Yes	End	

Last: OK

Add Line (same spacing)

Switch Coordinates/Spacing

Bubble

Primary (w/ Bubble)

Secondary (No Bubble)

6

Frame objects



Select object

Select frame or node to edit

Element drawing options



Draw frame element

Draw a frame or brace element
(Ramme-element/stav).



Draw 2D surface or square

Use to draw walls/shear walls

Node snapping options: Choose after element selected



Snap to Grid (intersections)

Snaps to defined grid



Snap to perpendicular

Snaps to a point perpendicular to the frame element of the first point



Snap to ends and midpoints

Useful for Bracing/fagverk



Snap to closest (Dont use)

Snaps to closest element/mode. Only use for ideas or tests.



Snap to element intersections

Intersections between frame elements



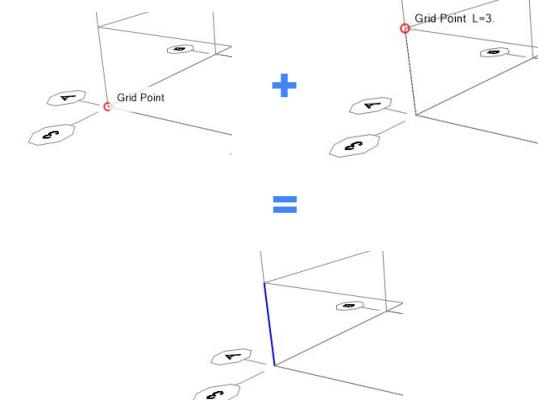
Snap to increment

Snaps to every 0.1cm etc.

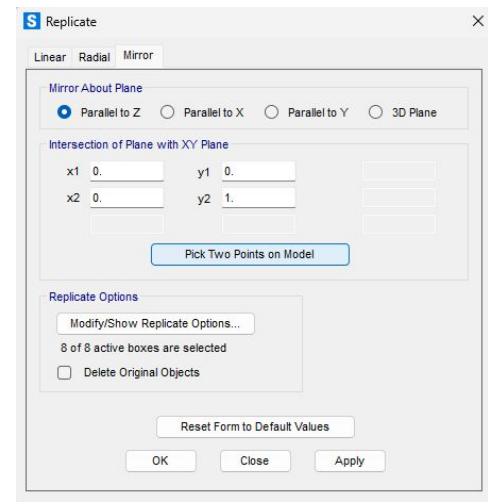
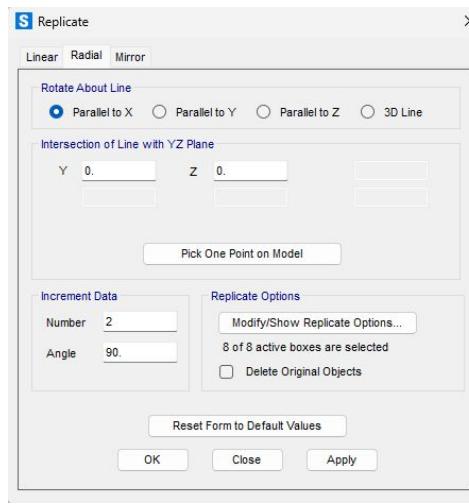
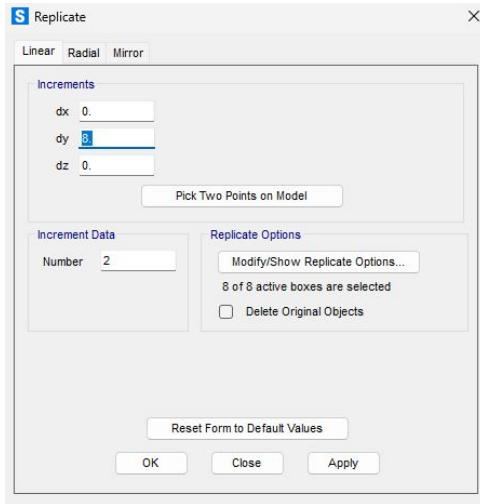
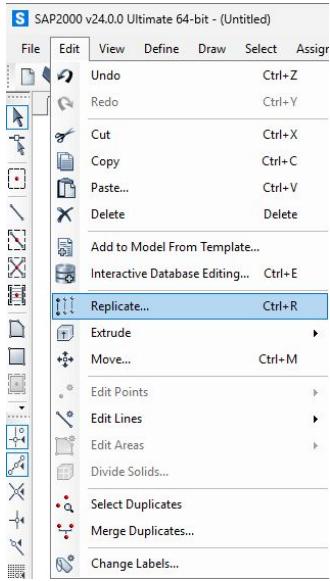
1. Choose object

2. Choose snapping

3. Click on 2 points



Mirror/rotate/duplicate



Duplicate

Increment: Choose distance between duplicates

Increment Data: Choose number of copies

Rotate

About axis: Choose axis to rotate around

Intersection: Choose where the axis is

Increment Data: Choose number of copies

Angle: Choose angle to rotate

Options: Delete original objects if you want to move the selection, instead of making a copy

Mirror

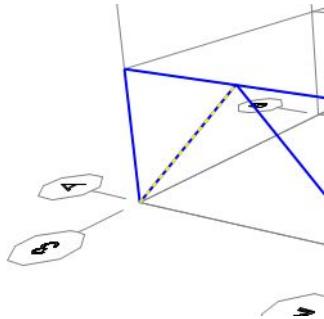
About axis: Choose axis to mirror about

Intersection: Choose where the plane is

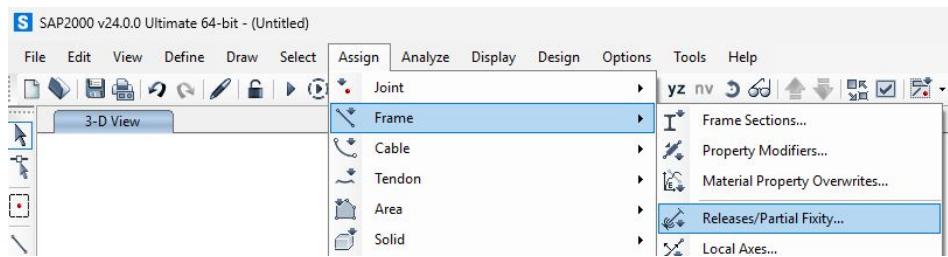
Delete original objects if you want to move the selection, instead of making a copy

Connections

1. Choose drawn element (Turns Blue/Yellow)



2. Assign => Frame => Releases/Partial Fixity

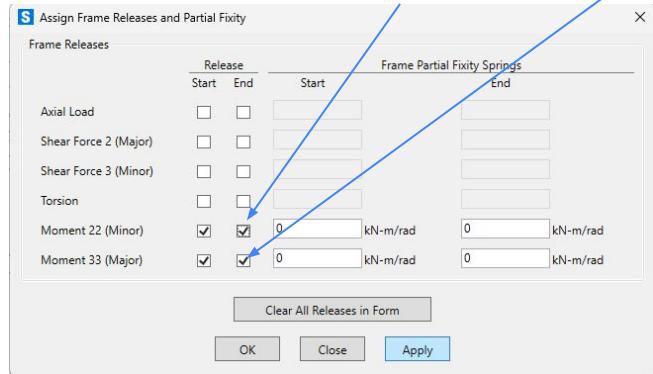


3.

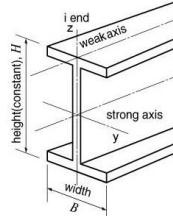
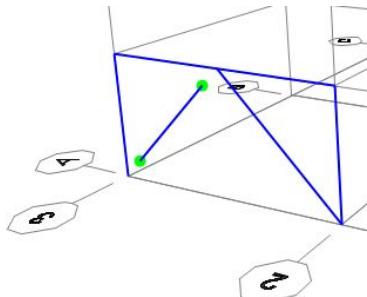
a) Pinned-Pinned

=> Release Moment,

- Major = y axis, Minor= z axis

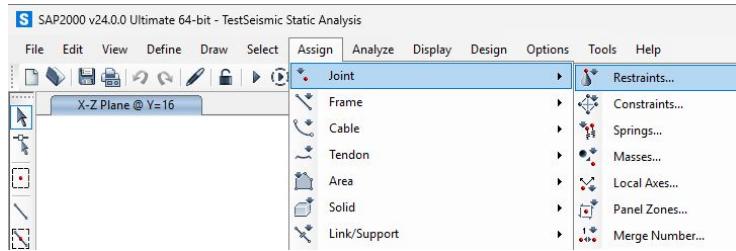


4.

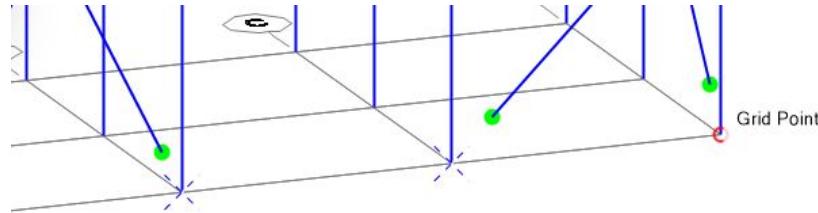


Boundary Conditions

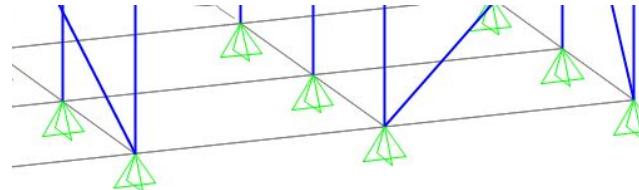
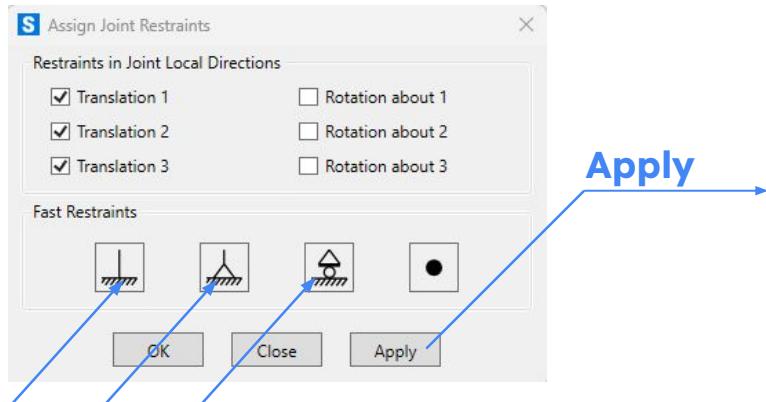
1.



2. Pick all nodes where you want a joint



3. Choose Restraint

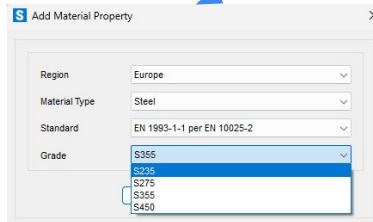
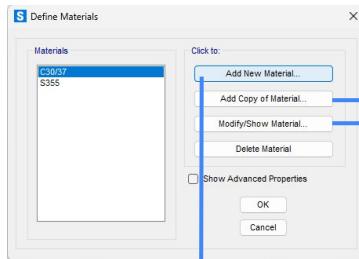


Materials

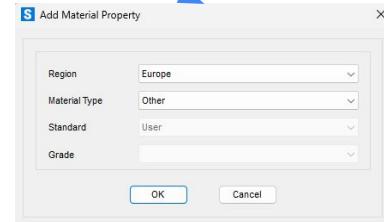
1.



2.

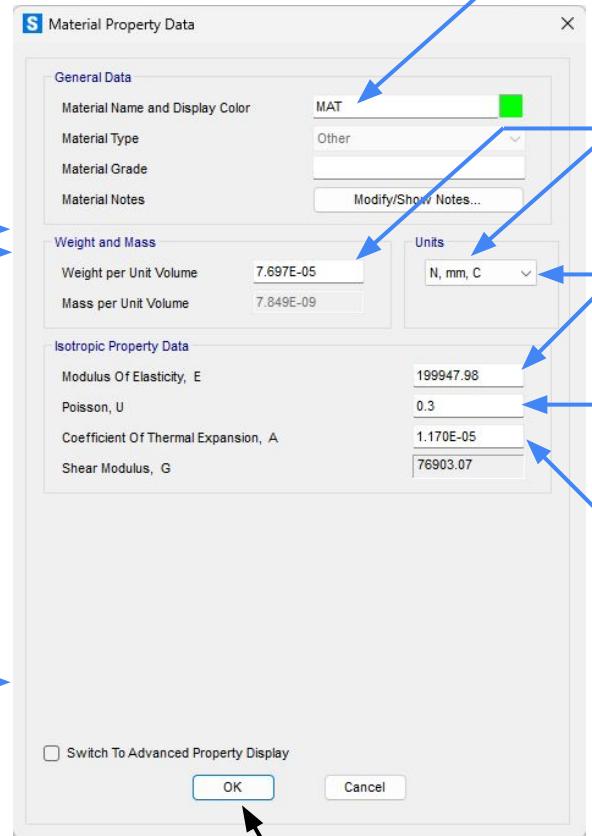


Eurocode Materials



Timber and other materials

3.



Material Name:
GL24h, C24 etc

Density
(NEWTONS)

Watch units

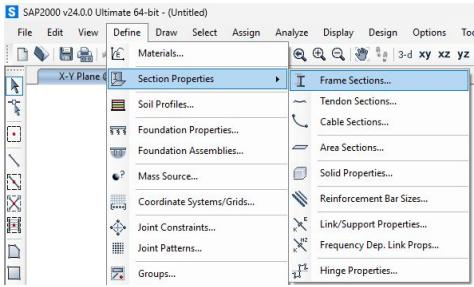
$$\nu = \frac{\varepsilon_{\perp}}{\varepsilon_{\parallel}}$$

$$\alpha \cdot \Delta T = \varepsilon$$

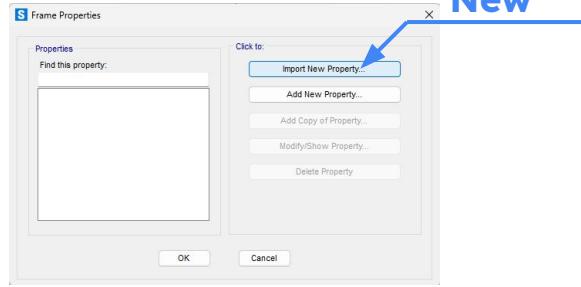
Frame sections (Cross section/tverrsnitt)

Complex sections (I, H, C)

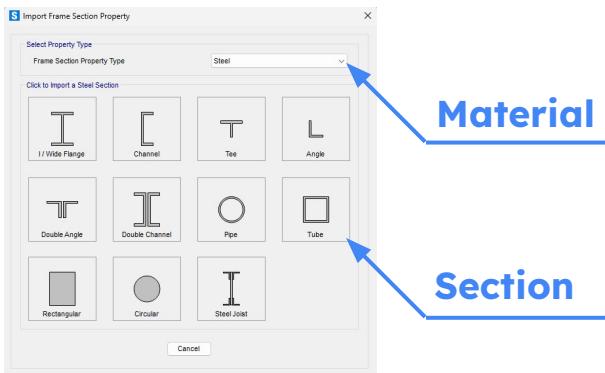
1.



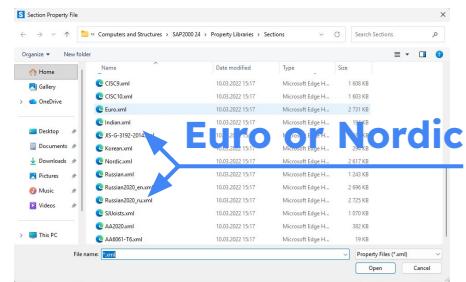
2.



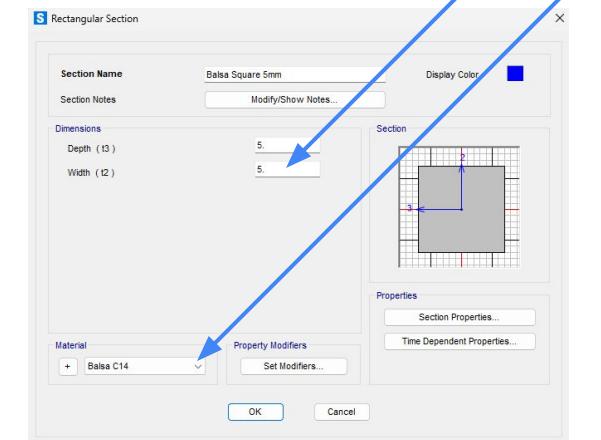
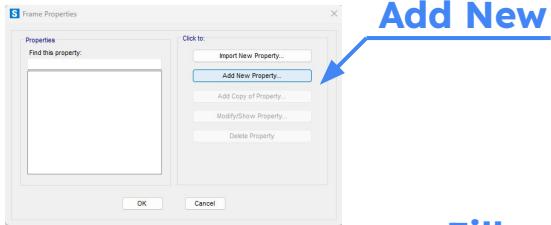
3.



4.



Simple Sections (or non standard)



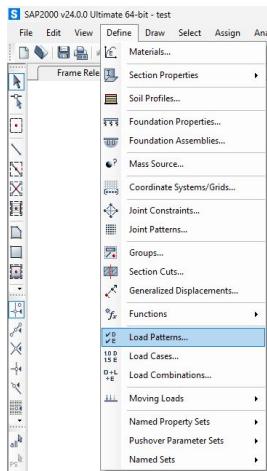
Static Analysis

Workflow

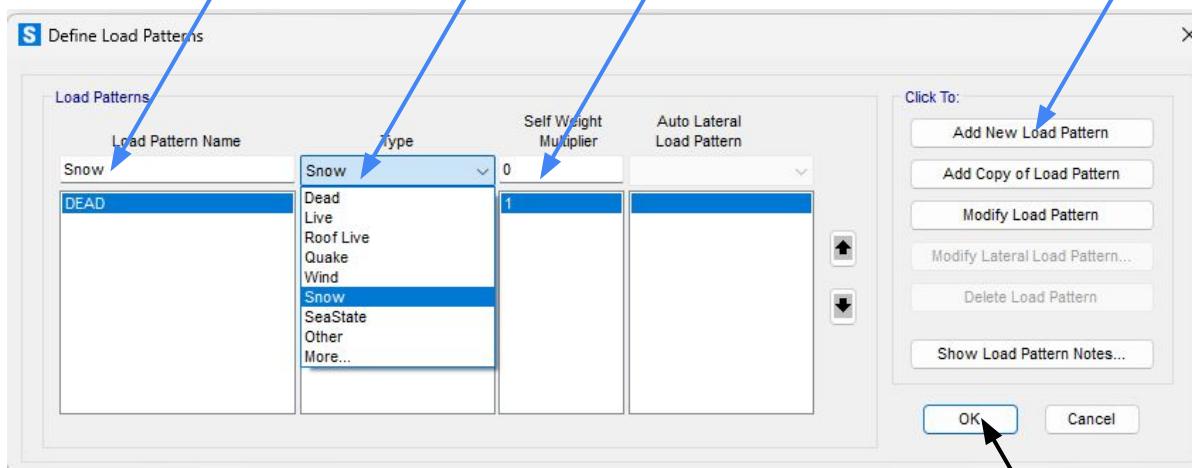
1. Load types
2. Optional: Nonlinear analysis
3. Load Combinations
4. Assign Loads
5. Analysis

Loads

1.



2.



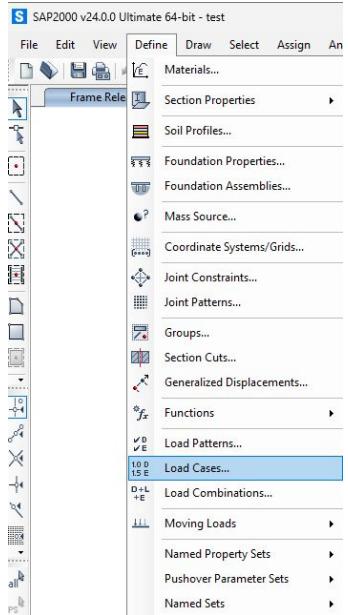
If Dead => 1: Auto adds weight

Last: Click add

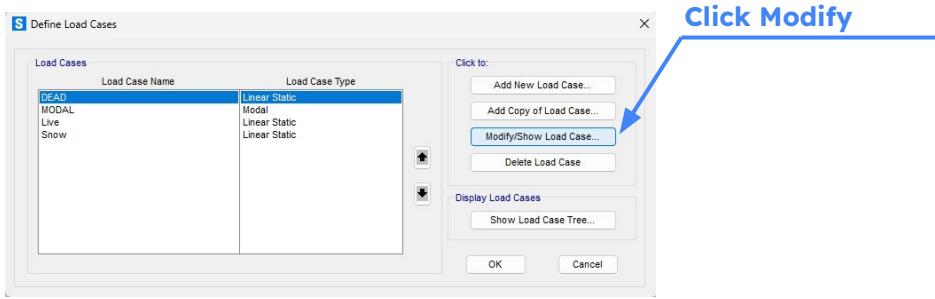
OK

Non-linear analysis

1.

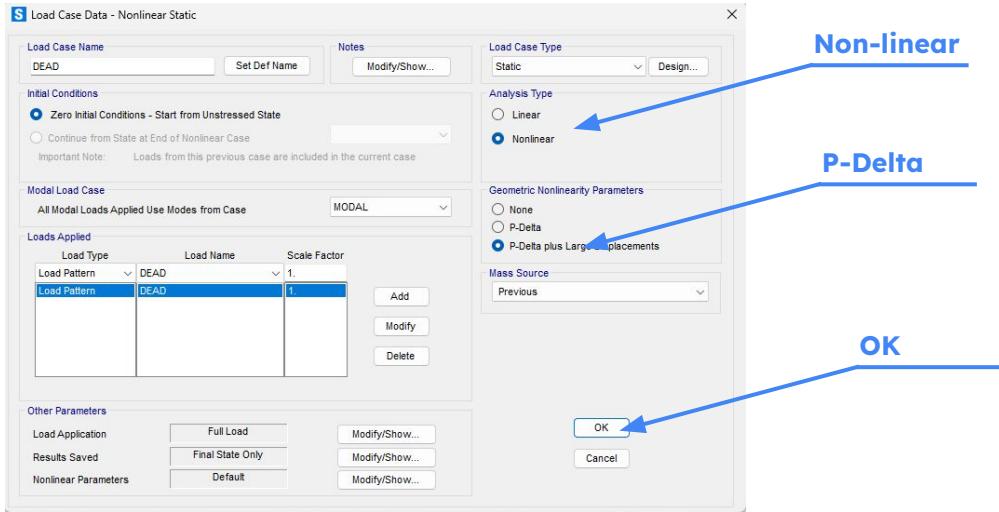


2.



Click Modify

3.



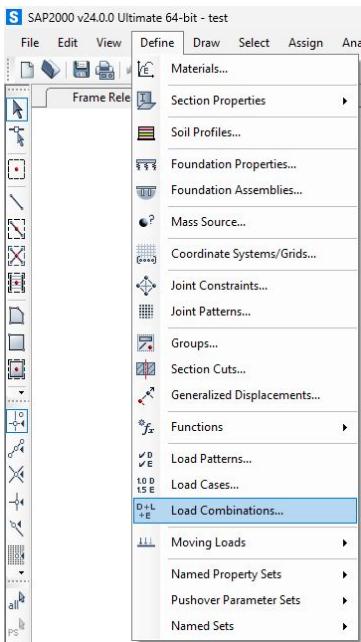
Non-linear

P-Delta

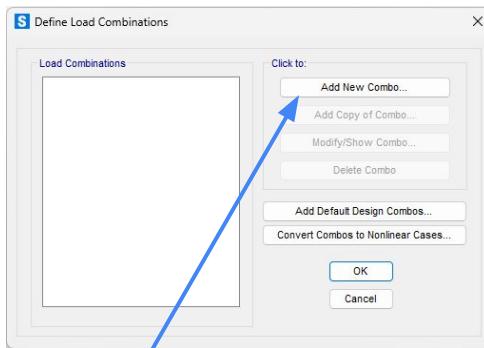
OK

Load combinations

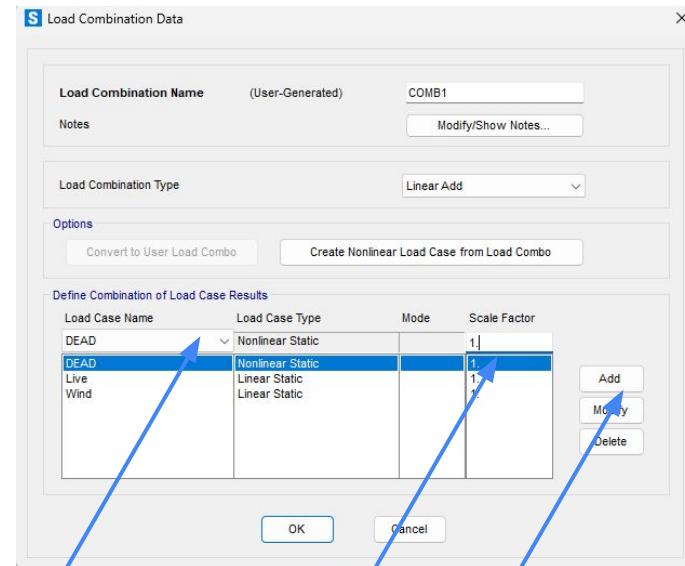
1.



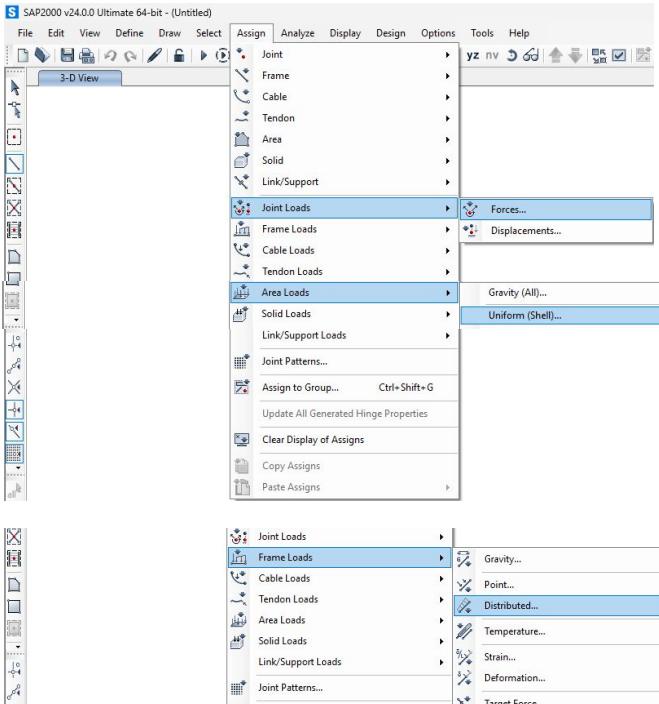
2.



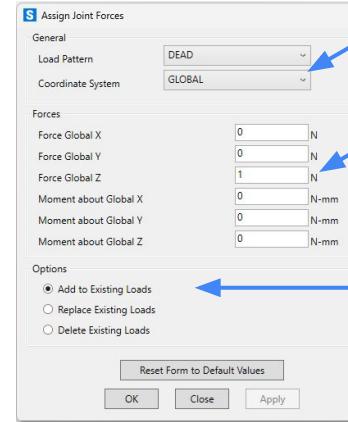
3.



Assign loads



Point Load



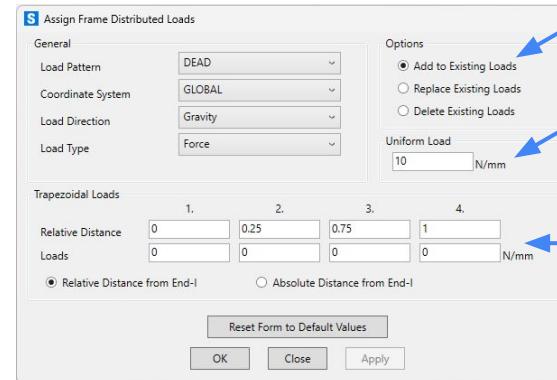
Choose load type

Add Force (Usually Z)

Make sure this is Add

=> Click on all points where you want the load
=> OK

Distributed Load



Make sure this is Add

Add distributed load

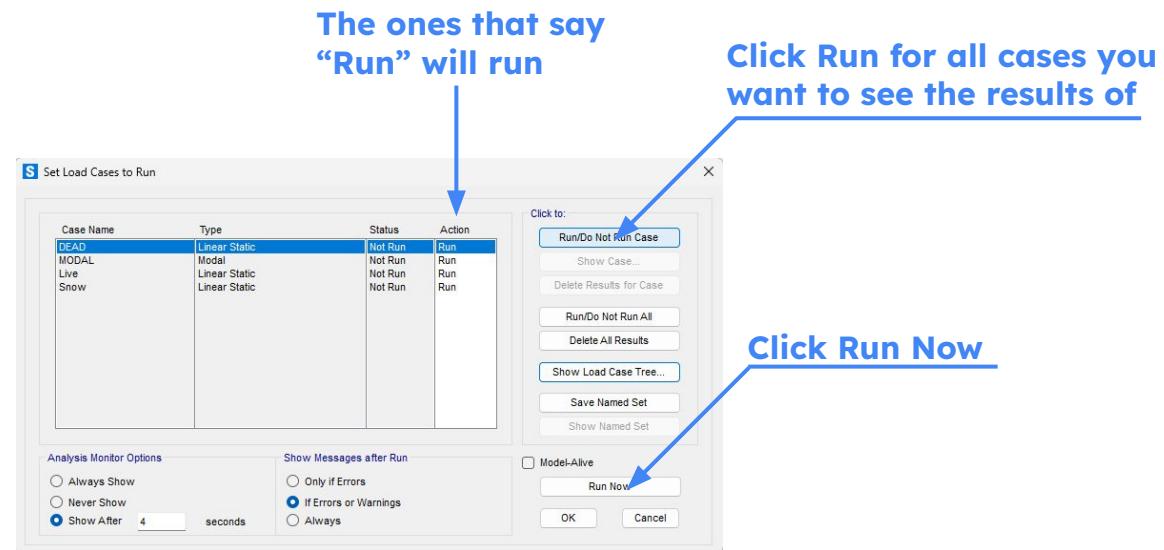
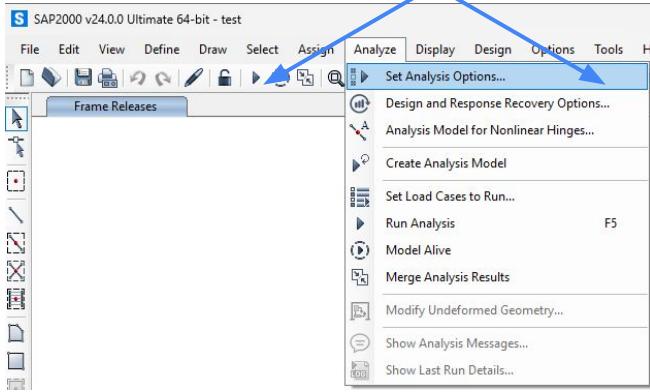
Only for non-uniform
(Don't need to touch)

=> Click on all elements where you want the load
=> OK

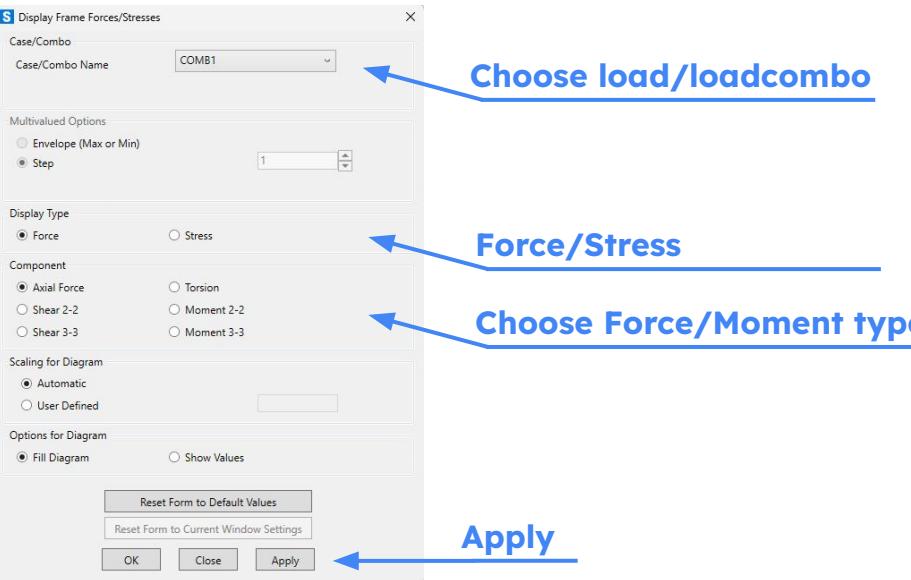
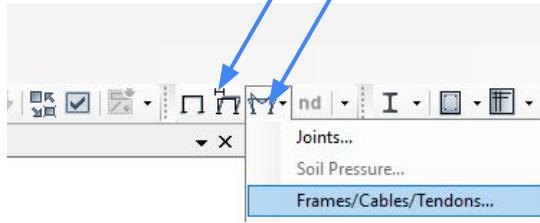
Analysis

1.

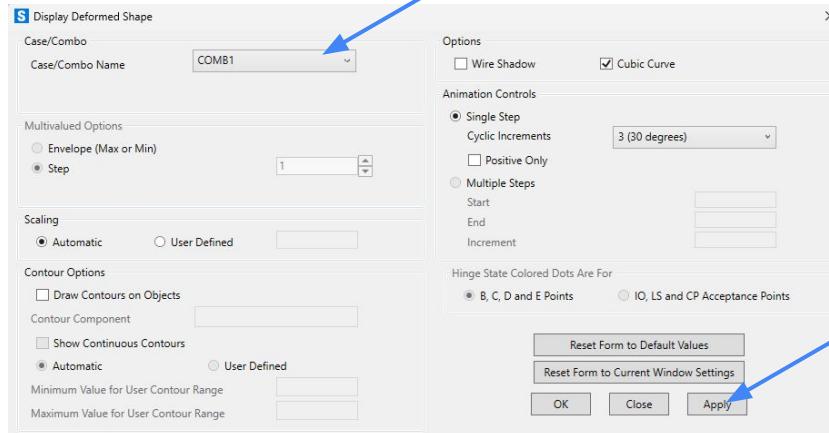
Either



View



Deformed shape



Dynamic Analysis

Workflow RHA

1. Mass
2. Time history
3. Load Case

Video on Response Time History (RHA) analysis

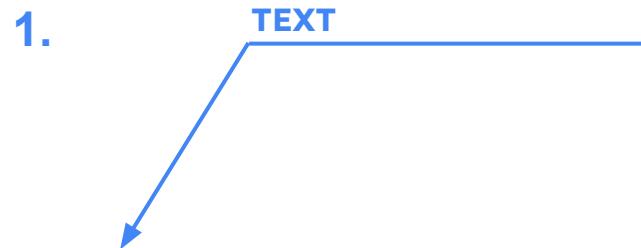
https://www.youtube.com/watch?v=VjkqA4_hIMk

Define Mass Source

1.



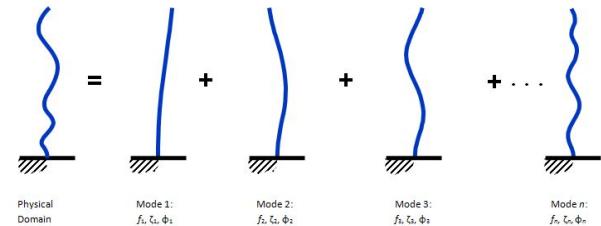
Time History



Modal Load Case

1. **TEXT**

Recall:



Modes refer to the structures oscillating behaviour.

