**12\_Modelling line elements; beams and columns**

Let's start with line elements. Lines are two noded elements.

That means they have 2 points automatically created at its ends.

You can draw lines from this shortcut, click anywhere in the model with left mouse click for the first point

And then click again anywhere to finish the line.

Draw option is still activated for continuous drawing.

For example you can continue drawing more line elements this way.

To cancel press enter or right click with mouse.

As you click on first point, angle of the line with x-axis and length information in selected units starts appearing.

You can also draw line connecting previously drawn point objects.

This way, points of line element will be merged with already existing nodes.

If you delete this line manually drawn points will still be available.

You can right click on line element for more information.

Here you will find information for start and end points and any loads or properties assigned to line elements.

Length of line is also shown here.

Line elements are used to draw beams and columns.

When you click on draw line shortcut, a new window pops up asking to assign frame sections to this line element.

You select from drop down list and choose any predefined section. You can even draw null line having no properties. They act as reference lines which can be deleted later on if you wish to by going to select menu and then by object time and then click on none lines.

You can change or assign frame sections to already drawn objects later on from assign menu which we will explore in next lectures.

Next option in this window is for moment releases. You can draw a line element either continuous or as pinned.

Pinned elements will have their moments released at ends and act as simple supported beams. You can also change this after you have drawn the lines from assign menu.

Next is plan offset option. For example lets draw a line 2m away from grid a by inputting 2m in this box.

Next option is for the drawing control. Currently it's none. You can press space bar button while drawing line elements to reset it to none.

From here you can choose many drawing options for example parallel to x-axis.

This way you can draw a straight line parallel to x axis.

Also you can draw a line at an angle with x-axis for example let's draw a 45 degree line.

Then you can also input the length of line to be drawn for example lets draw a fixed 10m length line.

From drawing control list you can also make use of different shortcuts. For example fixed length shortcut is l.

You can switch between different drawing controls even during the process of drawing.

For example let's start drawing a line by click at this point and now press on keyboard a for angle option or l for fixed length or x to draw a line parallel to x.

This draw control option is the same even when drawing slabs or areas.

You can also draw line elements over grids by this shortcut button and by selecting the grids with window selection technique.

You have to select the entire grid line in selection box to draw lines like this.

So far we had drawn line elements as beams.

If you right click on a beam you will notice line type as beam because anything drawn at

Floor level is called a beam.

To draw column select this shortcut click anywhere in the model.

In angle box we can rotate the axis of column to any degree for example lets draw column rotate at 45 degrees from x-axis.

X-axis is the base for angles.

Similar concept of moment releases and offset dimensions in beam applies to columns as well.

You can also view columns in elevation. Click on elevation shortcut and select this grid for example to see columns in elevation.

We have drawn elements at only roof.

Columns in ETABS are drawn from story level to below. So if you draw a column at roof that is actually starting from a story below that is from second floor. This is also true for walls because they are also vertical elements. Horizontal elements such as beams and slabs stay on the floor in which they are drawn.

We worked with one story options.

If you select all stories and draw a line element at roof it will be drawn at each level even at base level.

If you select similar stories and draw anything at level 1 or 2 they will be copied to both these levels because these stories are set as similar to each other.

Elements can be drawn in any view, plan, and elevation or even in 3d view.

Right clicking on any element will open its properties.

Let's go back to plan view and right click at column to see its properties.

Notice that ETABS displays point properties not the column properties because we clicked on point not on column.

To right click on column either do it from 3d view or from elevation view.

You can also right click on column the same way you did in how to select things lecture by pressing CTRL button on keyboard and holding and then right click at this point and choose column from the list.

You can also draw multiple columns at grid intersections by just making a selection window and selecting all grid intersection in it.

Each element has its own local axis. More detailed lecture on this is available in next course on advanced modeling.

We can also see line sections or labels from view options by click here and turning on section options.

Similarly you can turn on points visibility from this option.