Andhra Pradesh State Skill Development Corporation

Skill AP
APSSDC

eSkill AP
Learn Anytime Anywhere
Andhra Pradesh State Skill Development Corporation

Extended Three-Dimensional Analysis of Building System

ETABS

Methods of Assigning Beams

METHODS OF BEAM ASSIGNMENT

Objective

This chapter describes methods of beam assignment to the grid

To assign beams to grid using Draw Beam/Column/Brace Object

Use the Draw menu > Draw Beam/Column/Brace Objects command or click one of the five buttons shown in this topic to draw frame objects. When the menu command is used, a menu of five subcommands displays.

1. Set the View. Some drawing tools do not function in some views. The views that can be used with a particular tool are indicated by the parenthetic information in the command name. That is, the Draw menu > Draw Beam/Column/Brace Objects > Draw Beam/Column/Brace (Plan, Elevation, 3D) command can be used in any view—Plan, Elevation or 3D, while the Draw menu > Draw Beam/Column/Brace Objects > Quick Draw Beams/Columns (Plan, 3D) command can be used in a Plan or 3D view only. If a particular button does not appear to function, try changing the View setting.
2. Click the Draw menu > Draw Beam/Column/Brace Objects command to display the list of subcommands. Click a subcommand or its associated toolbar button to display the Properties of Object form for the selected type of frame object. Use the options on the Properties of Object form to specify properties and control placement of frame objects for efficient integration into the model.

Properties of Object Form

When drawing objects, a Properties of Object form will display in the lower left-hand corner of the window, below the Model Explorer if the feature is enabled. Use the form to specify the following for the object being drawn:

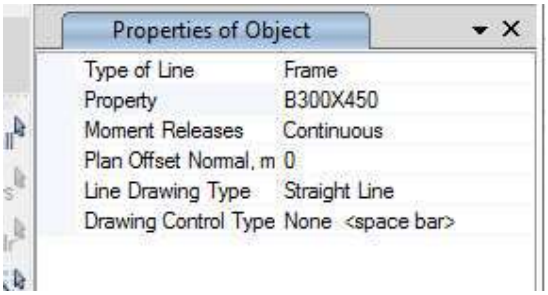

Figure: Properties of Object Form

- The property, which can be changed later using commands on the Define menu.
- Offsets of the drawn object from the clicked locations.
- Drawing Control Type to simplify proper alignment of the object.

Drawing Control Type

Drawing constraints provide the capability to constrain one of the axes when drawing or reshaping an object. For example, using a constraint, the user can quickly draw a frame

object parallel to one of the global axes. The keyboard key/drawing controls and their associated actions include the following:

Option on the Properties of Object **form**	**Keyboard Command**	**Action**
Plan View		
Parallel to X	X	Locks the Y component of the next point so that it is the same as the previous point.
Parallel to Y	Y	Locks the X component of the next point so that it is the same as the previous point.
Fixed dX and dY	D	Locks the change in the horizontal and vertical components of the next point to that of the previous one.
Elevation View		
Parallel to Baseline	B	Locks the X component of the next point so that it is parallel to the baseline.
Parallel to Z	Z	Locks the XY components of the next point so that they are the same as the previous point.
Fixed dB and dZ	D	Locks the change in the horizontal and vertical components of the next point to that of the previous one.
All Views		
Parallel to Angle A	A	Drawing is constrained (a) by default to a 45 degree angle, or (b) to be parallel to a specified line object. To specify the line object, put the mouse pointer on top of the line object when the A key is depressed.
Fixed Length	L	Locks the length component of the next segment to that of the previous segment.

Fixed Length and Angle	S	Locks the length and angle components of the next point to that of the previous point.
None	Space bar	Removes the drawing control option.

Use the constraint tools as follows:

- Locate the first point.
- Depress one of the constraint keys on the keyboard (X, Y, Z or A).
- Locate the next point. ETABS picks up only the unconstrained component of the next point. Drawing constraints are always removed as soon as the next point is drawn.

- **Line Drawing Type**
  - Arc (3 points)

    This option can be used for frames, walls (plan) and floors

    1. Select 1s point start of arch
    2. Select 2nd point end point of arch
    3. Select radius of arch
    4. In the case of floor element additionally at least two straight lines are required

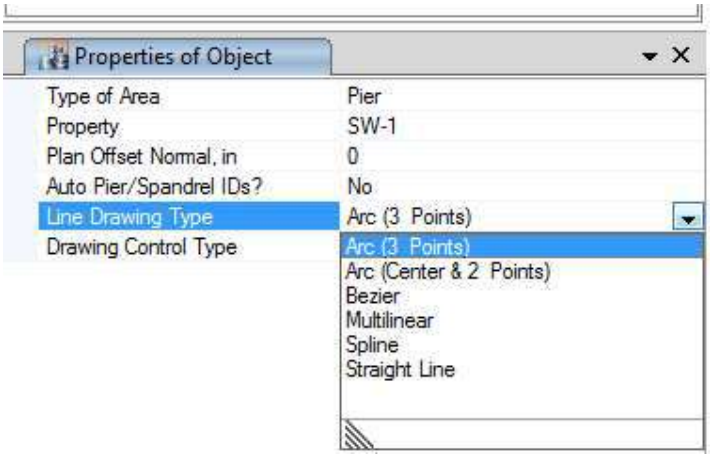

Figure: Line Drawing Type (Properties of Object)

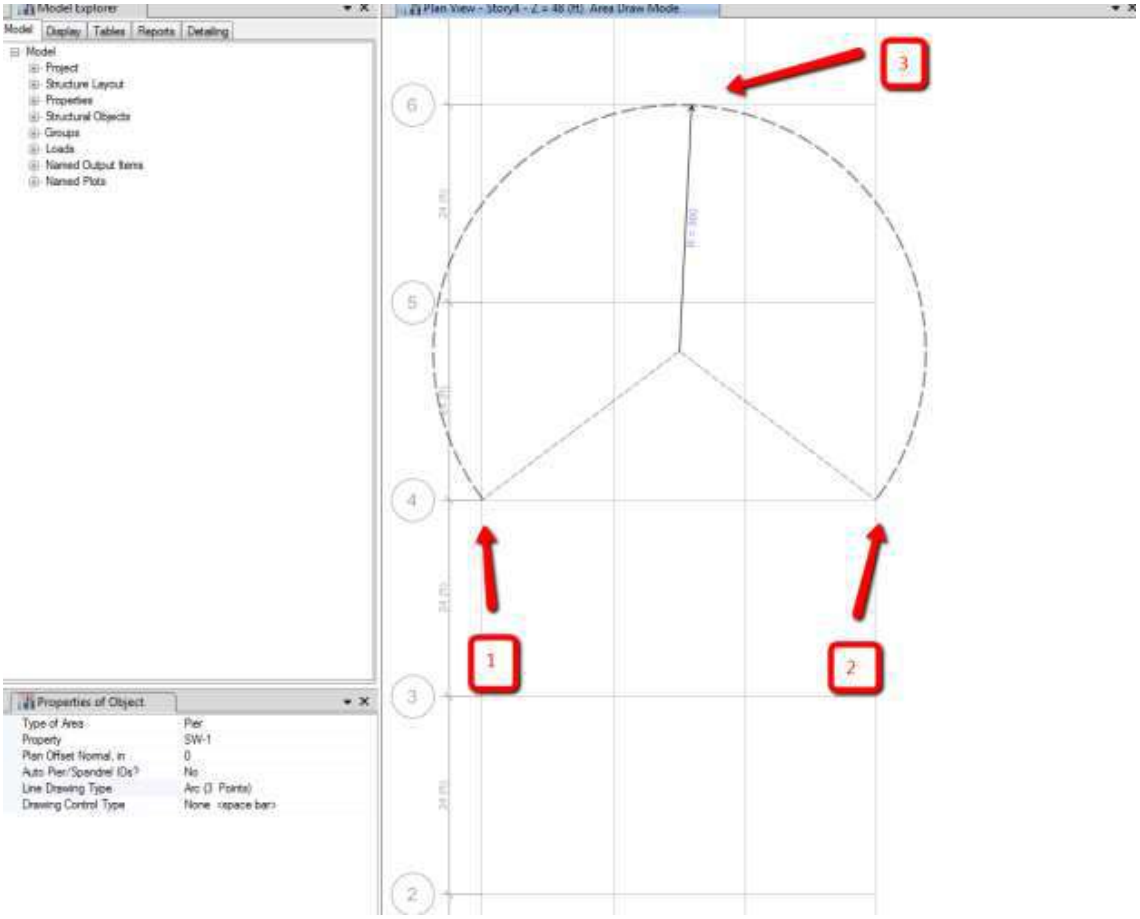

Figure: Arc (3 points)

- Arc center and 2 points

  This options can be used for frames, walls (plan) and floors

  1. Select start point of arch
  2. Select center of arch
  3. Select end point of arch
  4. In case of floors need to close arch with straight lines or enter

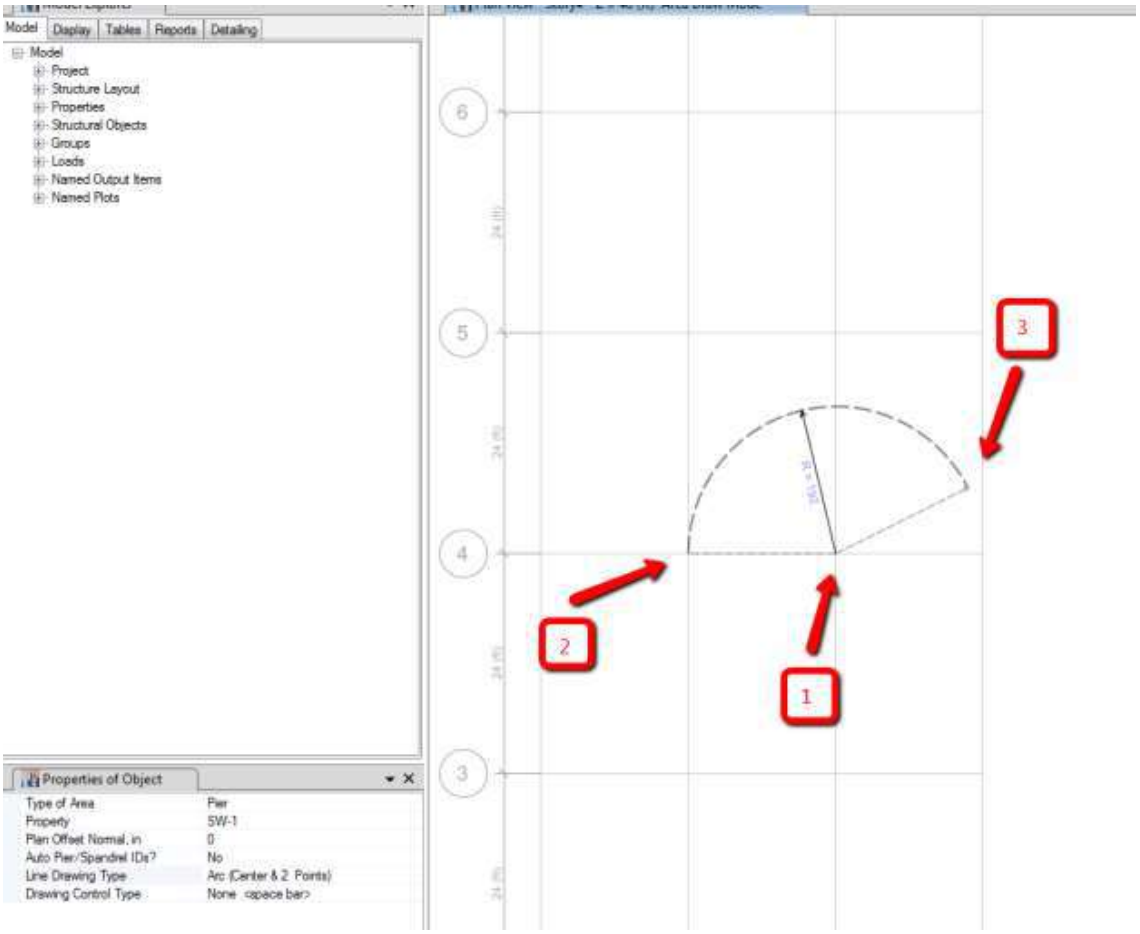

Figure: Arc center and 2 points

- Bezier curve

  Available for frames only

  1. Select first point
  2. Select last point
  3. Select points in between first and last and ENTER to finalize curve

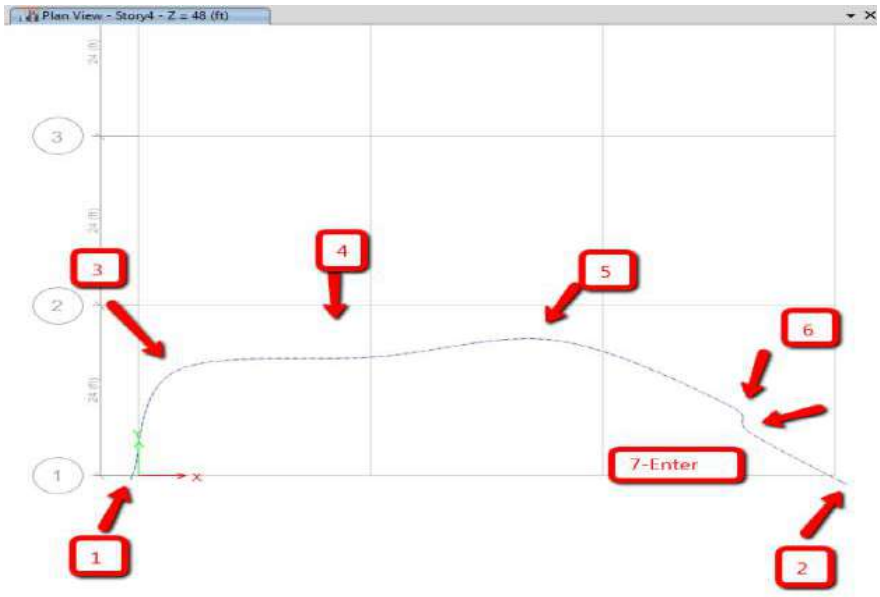

Figure: Bezier curve

- Spline

  Splines are available for frames only

  1. Draw using a control frame/polygon
  2. Select first point
  3. Select last point
  4. Select points in between first and last and ENTER to finalize curve

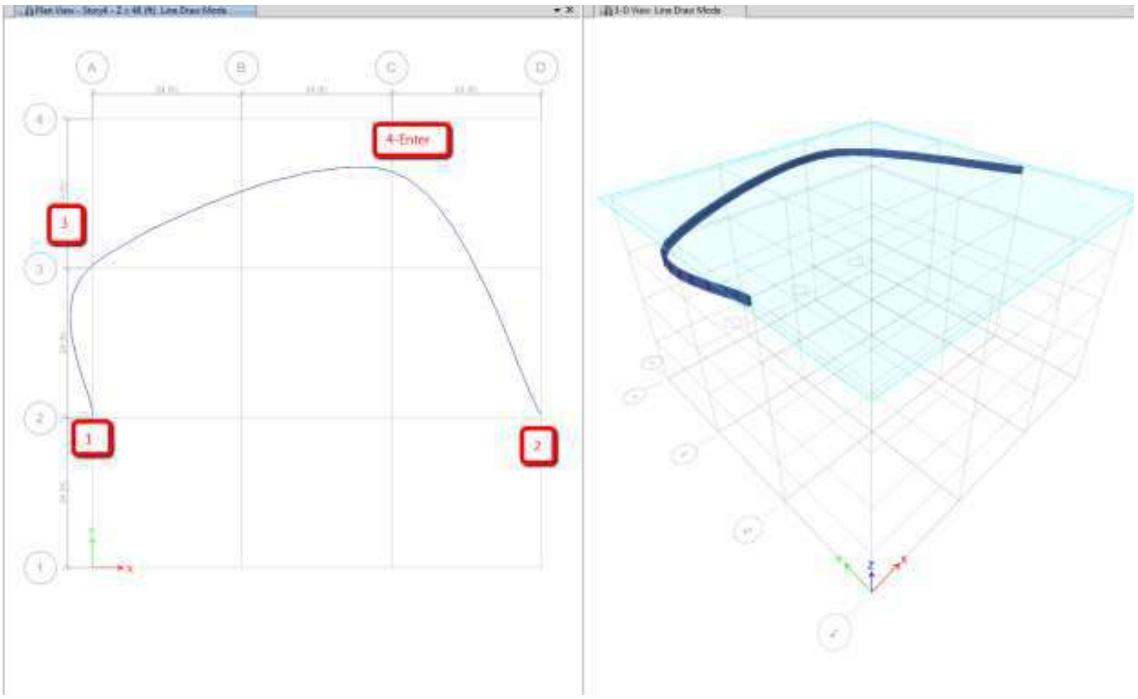

Figure: Spline

- For some objects, moment releases, number of beams, spacing, orientation, bracing configuration, and the like.
- For frame objects, options are available to use grids, points, or architectural layers.

To change options in the form, click in the appropriate cell in the right-hand column of the form, and enter the desired value or choose it from the drop-down list.

Move this form to a convenient location by clicking on its title tab and dragging it, or close it by clicking the X in the upper right-hand corner of the tab. To pin it in its original location, double click the title tab.

3. Draw the specified frame object as follows:

   I. Click the Draw menu > Draw Beam/Column/Brace Objects >Draw Beam/Column/Brace (Plan, Elevation, 3D) command or button.
   II. Left click once at the beginning of the frame.
   III. Drag the mouse to the end of the frame and left click again. Note that as the mouse is dragged, a dashed line is visible, indicating the current extent of the frame object.
   IV. Left click once on the end point of the frame object to draw another frame object starting from the end of the first object; continue as needed. Double left click or single left click and depress the Enter key on the keyboard to terminate the drawing of the next frame.

4. When using this command in an elevation view or 3D view, if a frame object is drawn that crosses story levels, ETABS immediately breaks the object at the story levels. For example, if a frame object is drawn that has its top at the 4th story level and its bottom at the 2nd story level, ETABS immediately breaks the object into two objects with the breakpoint at the 3rd story level.

To assign beams to grid using Quick Draw Beams/Columns

- Click the Draw menu > Draw Beam/Column/Brace Objects > Quick Draw Beams/Columns (Plan, Elevation, 3D) command or button .Use the options on the Properties of Object form to specify properties and control placement of frame objects for efficient integration into the model.
  - Click on any grid line (in plan view only) and a beam/column object is drawn on that grid line between the two adjacent intersecting grid lines from the same coordinate/grid system.
  - Alternatively, depress and hold down the left mouse button. While keeping the left button depressed, drag the mouse to "rubber band" a window around one or more grid line segments. Then release the left mouse button. Beam/frame objects are automatically placed at each grid line segment included in the "rubber band" window. The term grid line segment in this paragraph means that portion of a grid line between the two adjacent intersecting grid lines *from the same coordinate/grid system*.