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Extended Three-Dimensional Analysis of Building System

ETABS

Shear Wall Analysis

SHEAR WALL ANALYSIS

Objective

This chapter describes the step by step procedure of Shear Wall Analysis of a Structure in ETABS.

Procedure:

1. In addition to the general procedure of analysis define the wall section by specifying the required properties of Shear Wall as follows

Define - Wall Sections

Use the **Define menu > Section Properties > Wall Sections** command to add a new wall property definition; modify or review an existing definition; or delete a property definition.

Note: The Wall Properties form also displays when the Modify/Show Definitions button is clicked on the Shell Assignment - Wall Section form.

Click the **Define menu > Section Properties > Wall Sections** command to access the Wall Properties form. Use the buttons on the form to perform the appropriate action.

- **Add New Property** button. Click this button to access the Wall Property Data form. Use the edit boxes and drop-down lists to define the parameters for the wall property definition.
- **Add Copy of Property** button.

a. Highlight a property name in the *Wall Property* area of the form.

b. Click the **Add Copy of Property** button to display the **Wall Property Data** form and add a new definition to the model file based on the selected property definition.

- **Modify/Show Section** button.

. Highlight a section name in the *Wall Property* area of the form.

Click the **Modify/Show Property** button to display the **Wall Property Data** form and review/modify the selected property definition without adding a new definition to the model file.

- **Delete Section** button.

. Highlight a property name in the *Wall Property* area of the form.

Click the **Delete Property** button to remove the selected definition from the model file.

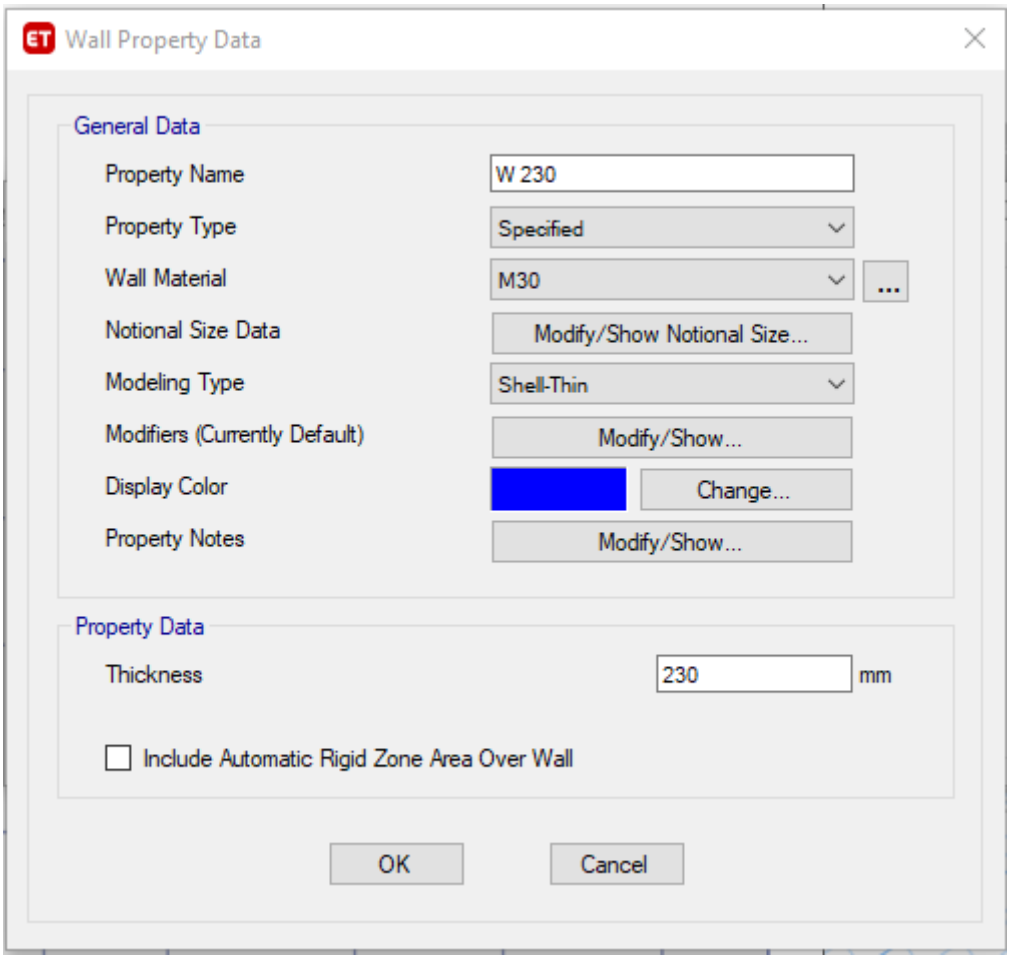
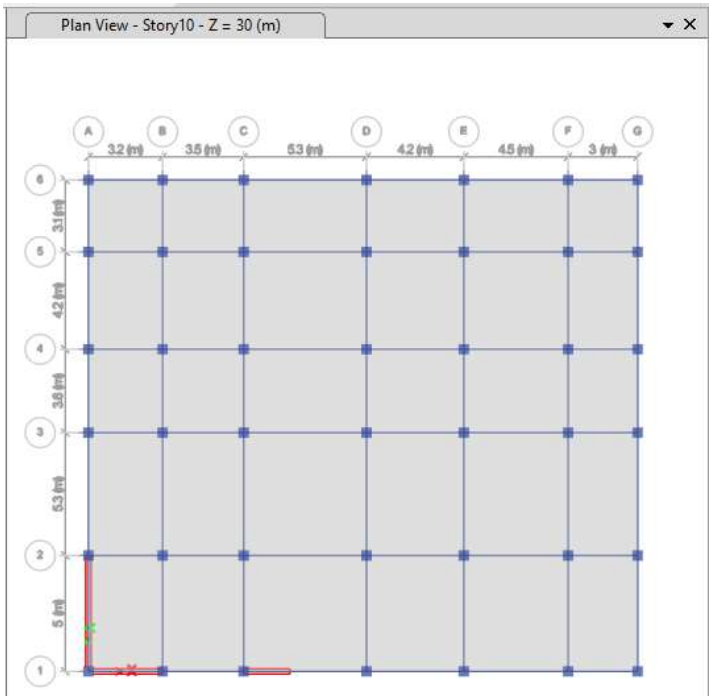


Fig: Wall Property Data form

2. Create a Shear wall of thickness 250 mm as shown in the above figure.

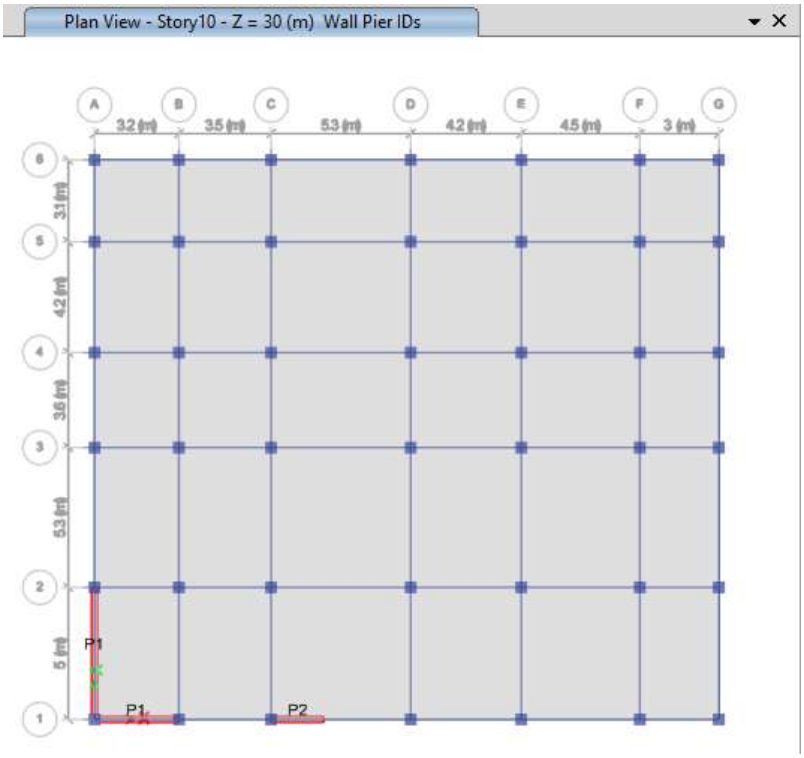
METHOD-1

3. Draw the Shear Wall at required locations by using **Draw Walls** or **Quick Draw Walls** option.



4. Define the Pier Labels as per the requirement

Ex: P1, P2, P3….



Pier Labels - Define

A wall pier can be made from a combination of both area objects (shell elements) and line objects (frame elements). To report output forces for wall piers or to design wall piers, first specify a label, then assign the name to selected objects.

1. Click the **Define menu > Pier Labels** command to access the **Pier Labels** form to add a new pier label to the model.
2. Type a name in the *Wall Piers* edit box.
3. Click the **Add New Name** button.
    - Highlight a Wall Pier label, type a new name in the edit box and click the **Change Name** button to change the pier label.
    - Highlight a name in the *Wall Piers* display list and click the **Delete Name** button to remove a Wall Pier label from the model.
4. Assign the Pier labels to shear walls by selecting the walls and go to **Assign menu > Shell > Pier Label** command to display the **Shell Assignments - Pier Label** form, select the label and click on **Apply.**
5. Perform **Model Check** and **Run Analysis**
6. To check the results like BMD or SFD click on **Display Frames/Piers/Spandrels/Links** or **F8**, select live load under load case, select Moment 3-3 or Shear 2-2 respectively and click on **OK**
7. To check the results of slabs, click **Display Shell Stresses/Forces** or **F9**
8. After analysis Go to **Design menu > Shear Wall Design> View Preferences**, check the Design parameters.
9. Go to **Design menu > Shear Wall Design > Start Design Check.**

10. To see the design details, select the member and right click, it will display the design information form, to get detailed reports click on **Details** in the same form.

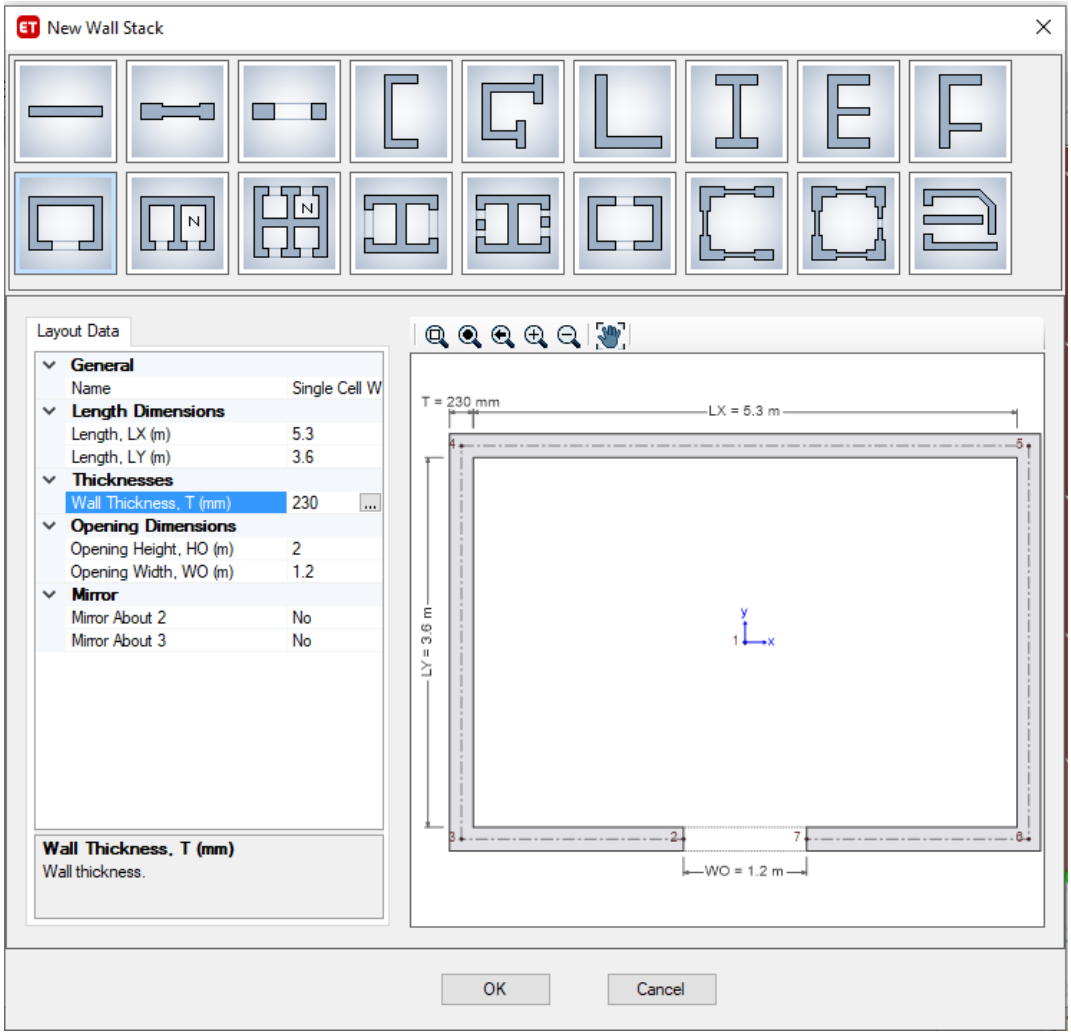
METHOD-2

3. Draw the Shear Wall at required locations by using the **Draw Wall Stacks Option.**

Draw Wall Stacks

Wall stacks are assemblages of shell objects that in plan can resemble the letters C, L, I, E, or F; single- or multi-cell boxes; or user-defined general shapes. These assemblages may include openings for doors. The thickness and length of each wall section may be set independently, and the stack may be assigned to a single story, to a range of stories, or to the entire building height.

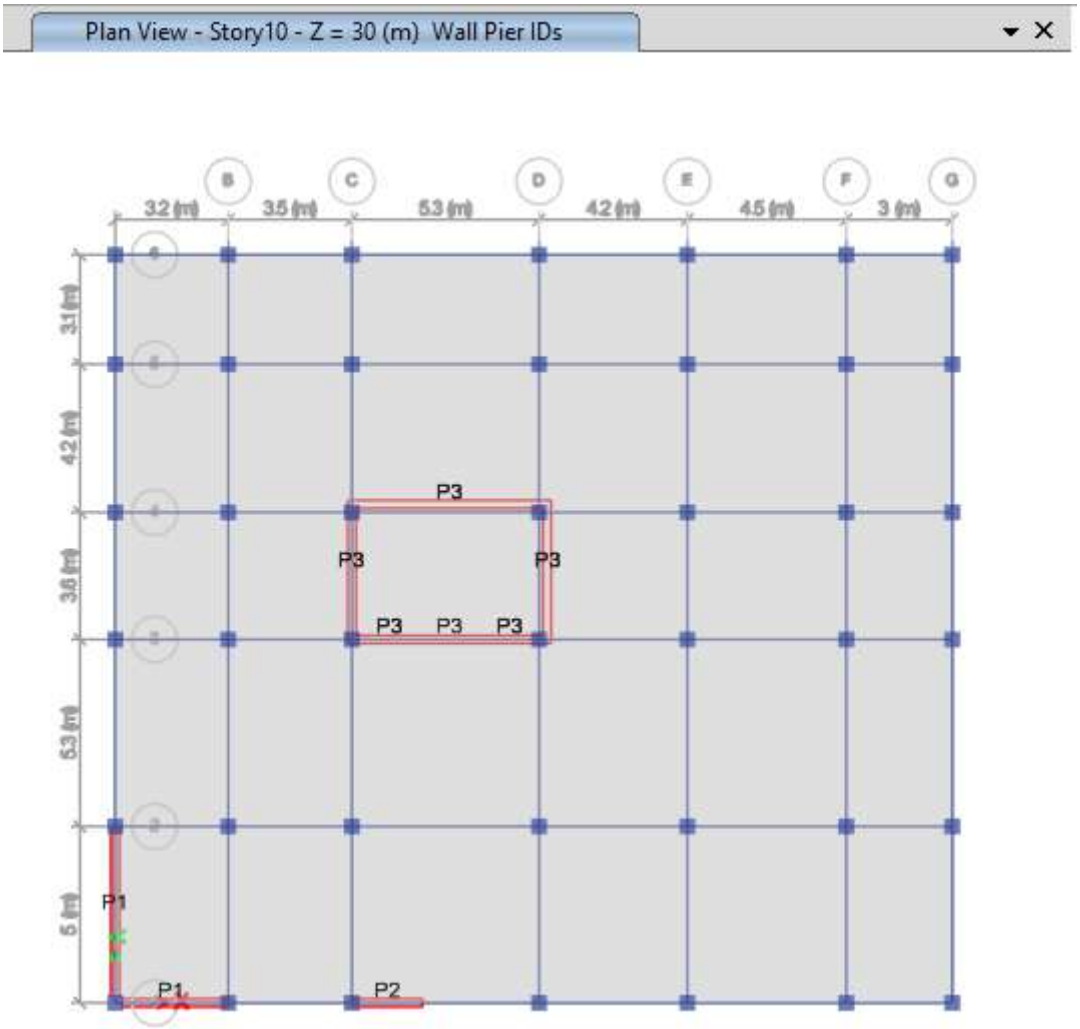
4. Use the **Draw menu > Draw Wall Stacks (Plan, Elev, 3D)** command to access the **New Wall Stack** form and select a wall stack shape and specify its layout and location.



- **Wall Stack Shape** icons. Click an icon at the top of the form to select a predefined wall stack.

- **Layout Data** Tab. Use the options on this tab to specify the wall length dimensions and its thickness. Use the Location options to specify any mirroring about the X and Y axes.
- **Display area**. A schematic of the selected shape shows in this display area. The display area has Zoom and Pan options.

When an item on one of the tabs is clicked, a brief explanation of that item will display in the lower left-hand corner of the form.



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