S A D S

Online Link
Demonstration

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Table of Contents

Foreword 0

Part I Introduction 1

1 Overview 1

Part II Extra Data 1

1 Overview 1
2 Batch Beam Data 2
3 Column Data 3
4 Wall Data 4
5 Lintel Data 5

Part III Lateral Load 5

1 Overview 5
2 Shape Factor 6
3 Wind Loads 6
4 Other Lateral Loads 7

Part IV Pre-proccessing 7

1 Overview 7
2 Collect Data 8
3 Validation By Framing Plan 11
4 Validation by Validate Button 17
5 Validation by Showing Collected Data 18
6 End Position 19
7 Load Pattern 19

Part V Linking ETABS 20

1 Overview 20
2 Link to ETABS 20
3 Run Analysis 21
4 Import Forces 21
5 Export Properties 22
6 Close Linking 22

Index 0

1 Introduction

1.1 Overview

The Online Linking Data Sub-command is using ETABS OAPI package. This linking function needs only SADS project data files. Users don't need to prepare ETABS data and provide mapping information between SADS and ETABS. This is a two ways linking. We can transfer data from SADS to ETABS. Also, we can transfer data from ETABS to SADS. All data is transferred directly. No any intermediate file or media is needed. It is the most efficiency linking function.

Using this online linking function, we can transfer story data, material properties, section properties, connectively data and lateral load data from SADS to ETABS. We can call ETABS OAPI function from SADS to create ETABS model, run analysis and export the forces to SADS for designing beams, columns, walls and lintels. When we run pre-design sub-commands in SADS**,** we may get many amended section properties and material properties. We can easily to transfer these new properties to ETABS to amend the ETABS model. Then, we can run analysis function again and export the new forces to SADS. These processing can be done by a few click on the keyboard.

The online linking function relies on the quality of SADS data. If the SADS data complete, accurate and error free, the results in this function will be very good and trouble free. So, you should run Beam Validation Sub-command, Column Validation Sub-command, Wall Validation Sub-command and Lintel Validation Sub-command and fix all errors before you start using OAPI Online Linking function.

When you need to change your framing plan, there is any limitation for the changes. You can change your project data as you needed. Then, you can reset the the collected and re-collect data for new linking. This function is not presented in our previous link functions. There is a requirement when you fix problems in collected data. You should not fix problem by changing the point label manually, you must fix the errors in your project data instead.

Furthermore, this online linking function provides comprehensive validation for SADS project data. This function can display framing plans for searching any errors in database. Also, this function provides text based validation for further checking.

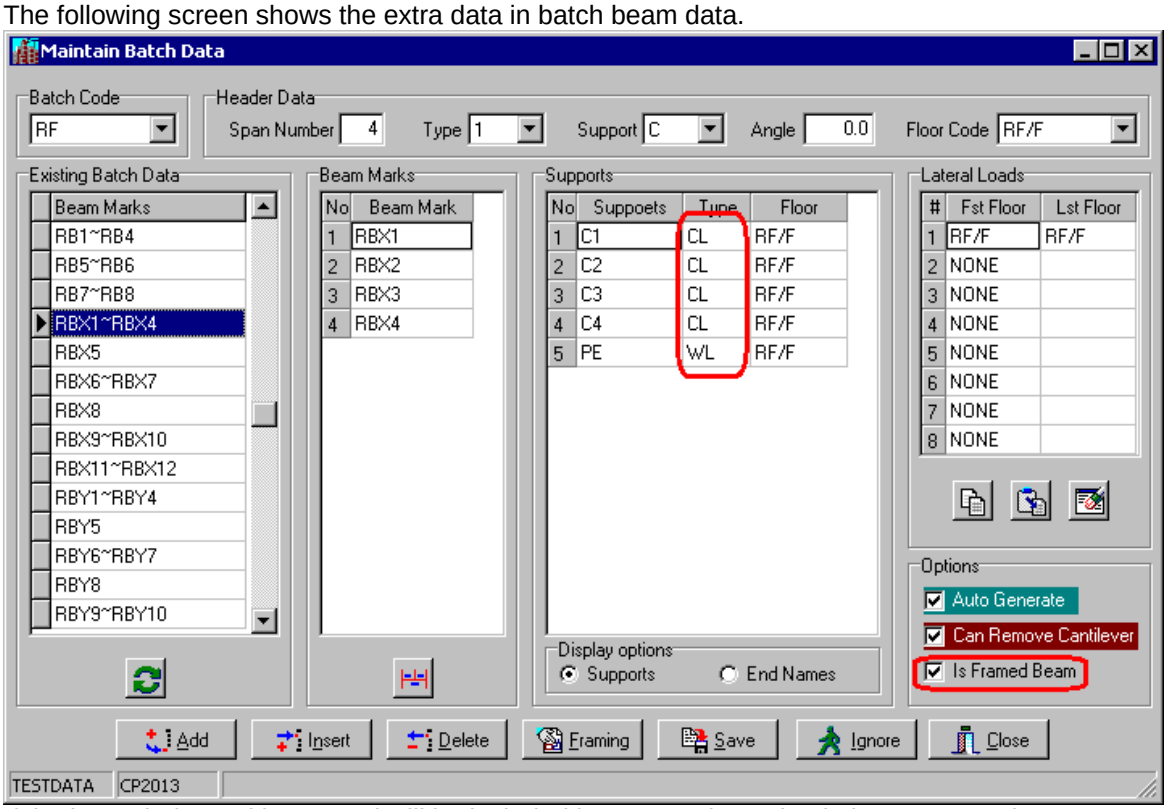
2 Extra Data

2.1 Overview

The module is using SADS project data files for linking with ETABS. But, it needs following limited extra data than previous linking version..

2.2 Batch Beam Data

The following screen shows the extra data in batch beam data.

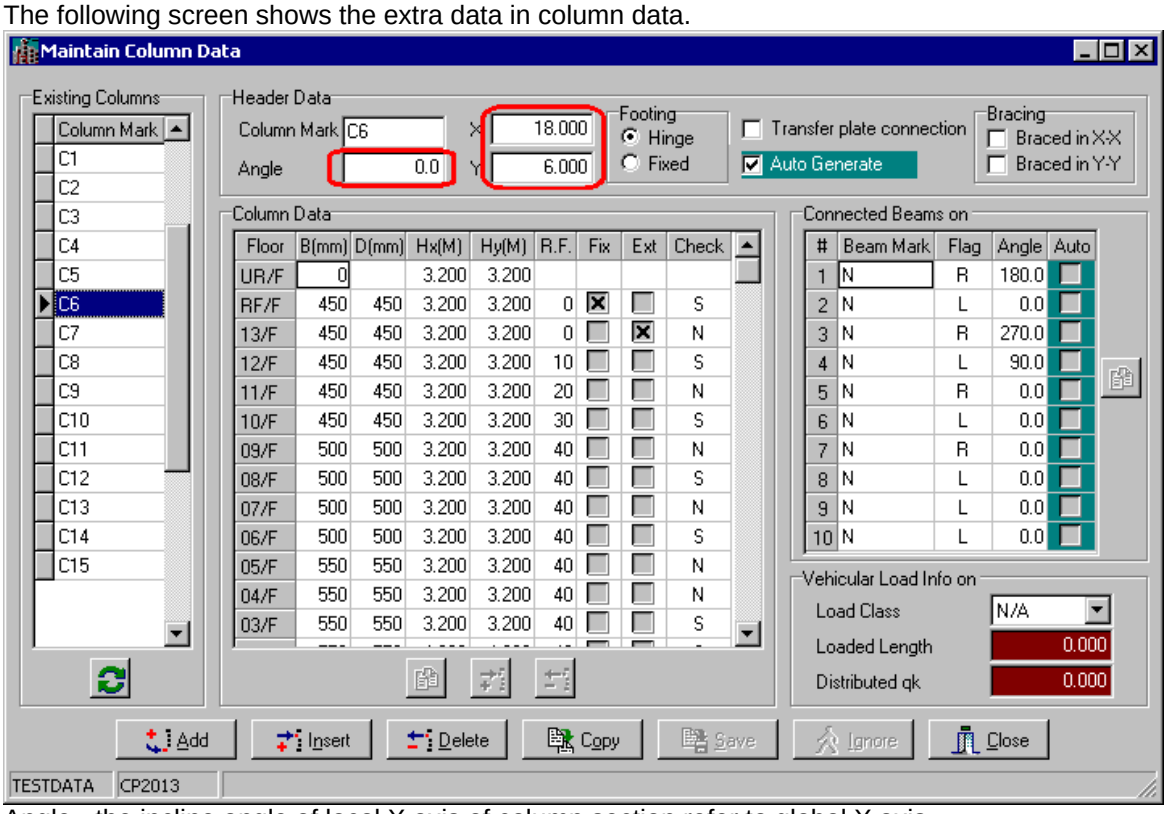


If the beam is framed beam and will be included in ETABS data, check the "Is Framed Beam" check box.

Note: If you check the "Is Framed Beam" check box, you should not define the type of support to HN, you can only define as CL, BM, WL or FX. The support with HN type can't provide necessary information for defining the ends location.

2.3 Column Data

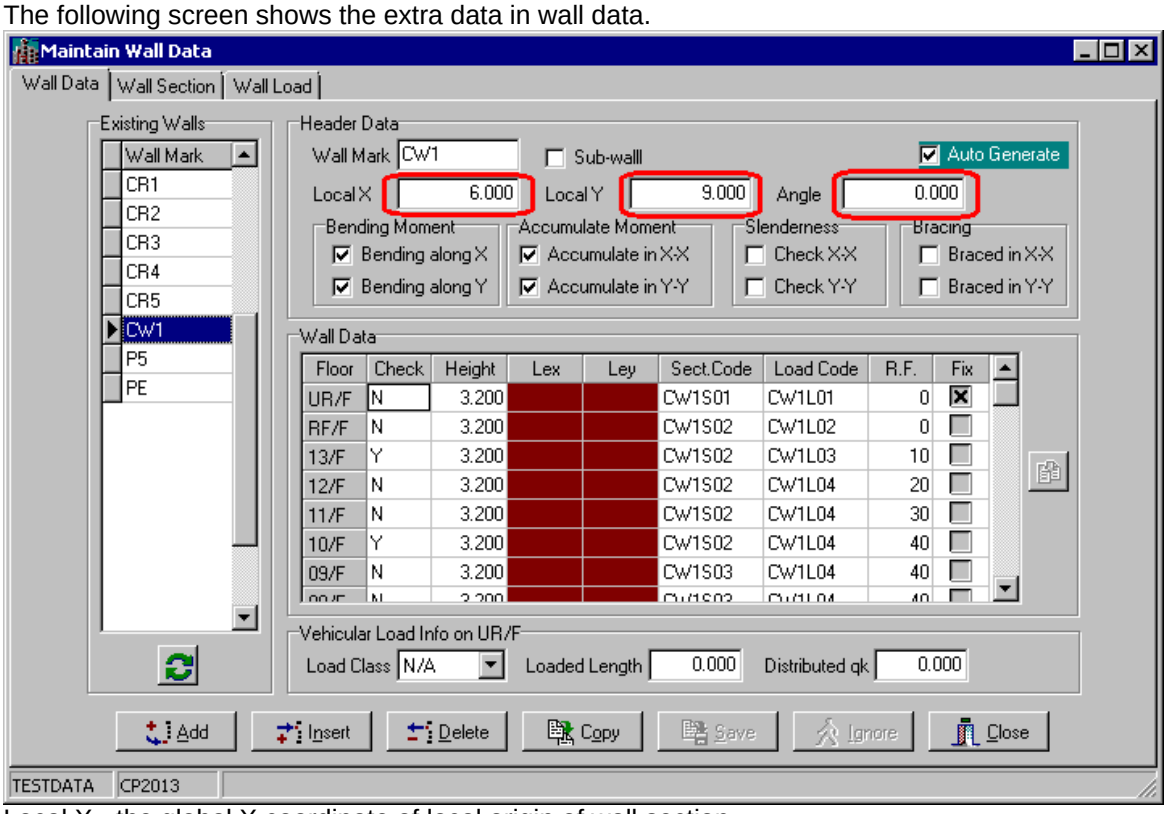
The following screen shows the extra data in column data.



Angle - the incline angle of local X axis of column section refer to global X axis.
X - the global X coordinate of column section center.
Y - the global Y coordinate of column section center.
These data are used for defining the locations of columns. You must input these data accurately.

2.4 Wall Data

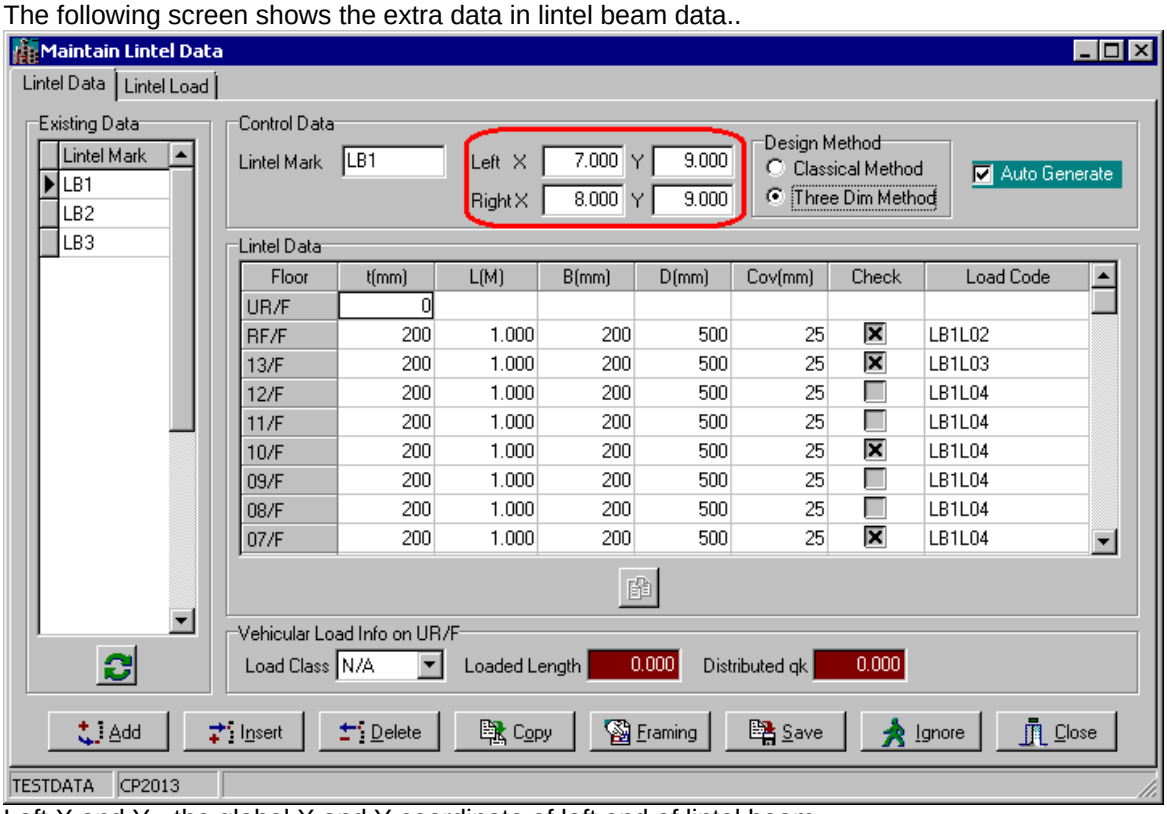
The following screen shows the extra data in wall data.



Local X - the global X coordinate of local origin of wall section.
Local Y - the global Y coordinate of local origin of wall section.
Angle - the incline angle of local X axis refer to global X axis.
These data are used for defining the locations of walls. You must input these data accurately.
Note: In sub-wall, this extra data is not required. In this example project, we need to provide extra data for CW1, P5 and PE only.

2.5 Lintel Data

The following screen shows the extra data in lintel beam data..



Left X and Y - the global X and Y coordinate of left end of lintel beam.
Right X and Y - the global X and Y coordinate of right end of lintel beam.
These data are used for defining the locations of lintels. You must input these data accurately.

3 Lateral Load

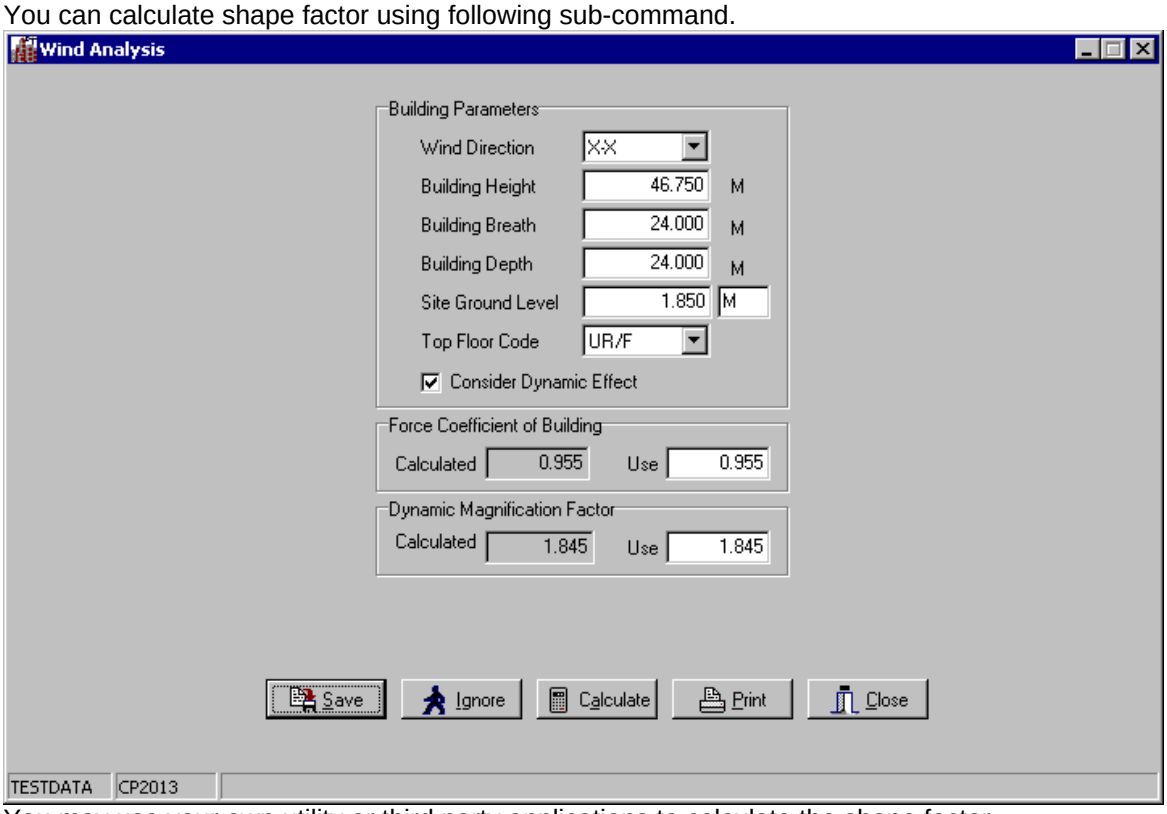
3.1 Overview

This is not an extra data. In previous SADS version, users should prepare lateral loads for creating ETABS models. In SADS 18, users must prepare the same lateral loads in SADS for exporting to ETABS models.

The following topics show how to prepare lateral loads for refreshing your experience.

3.2 Shape Factor

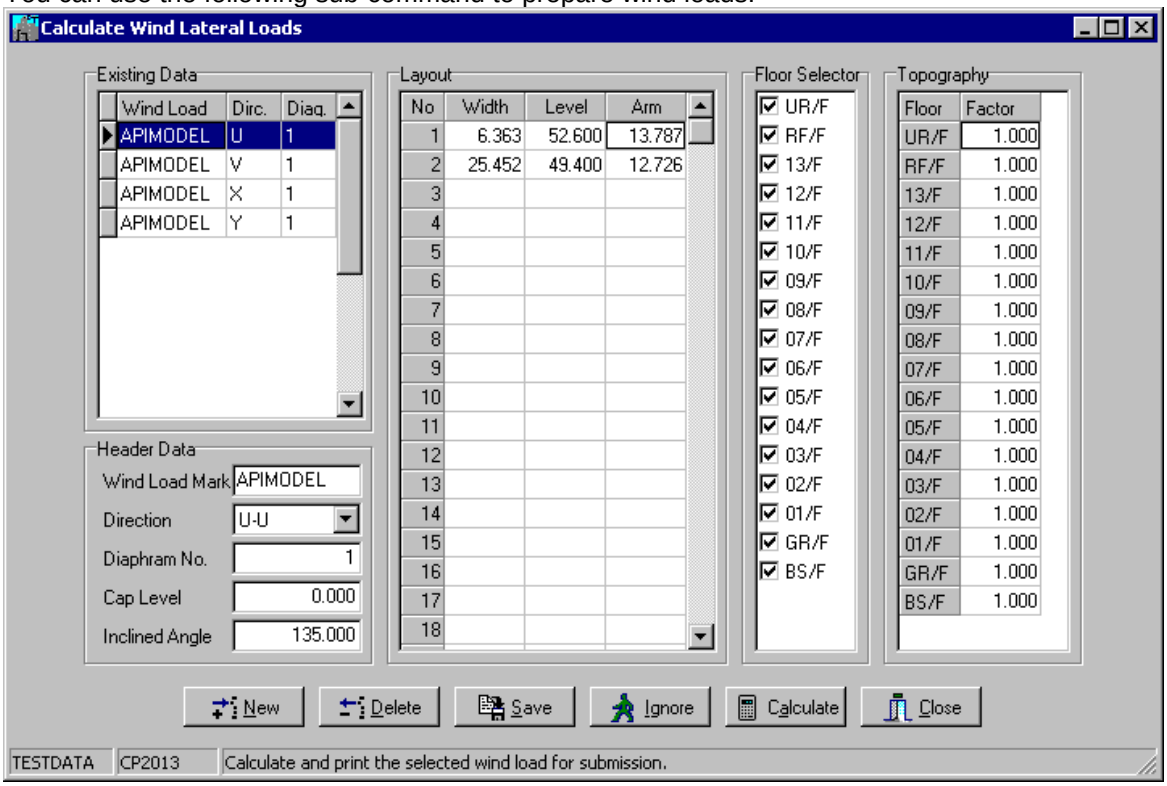
You can calculate shape factor using following sub-command.



You may use your own utility or third party applications to calculate the shape factor.

3.3 Wind Loads

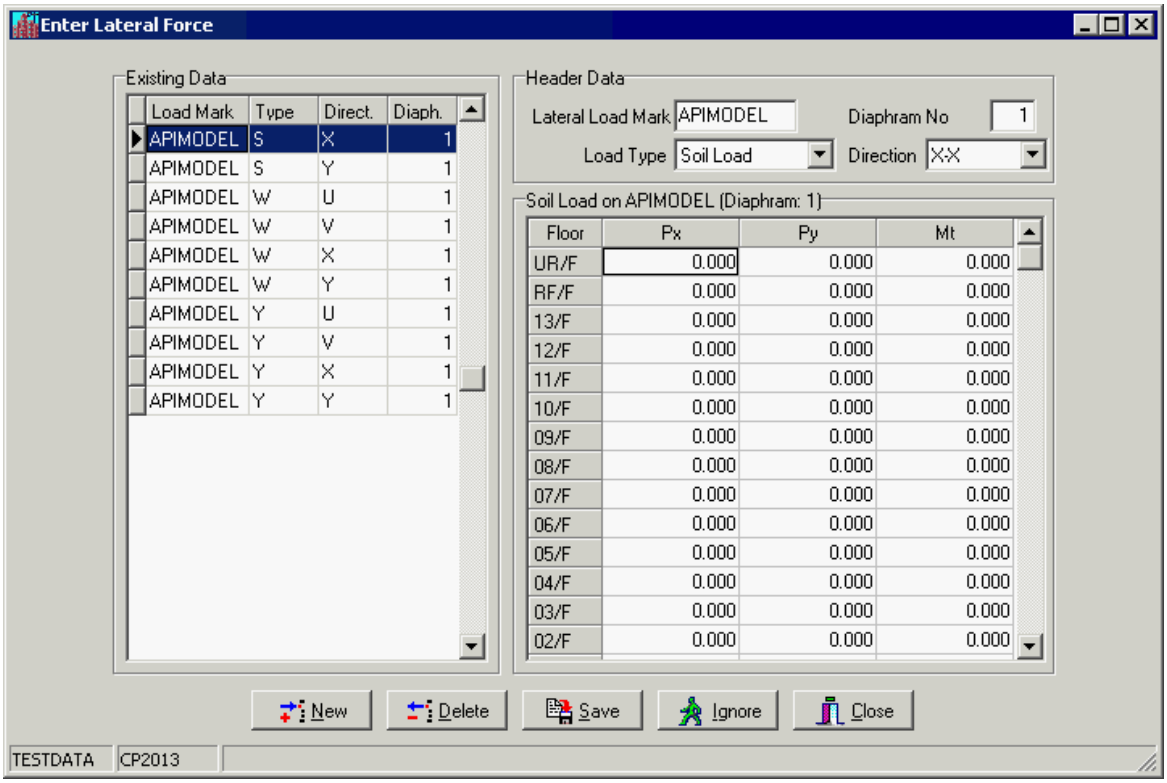
You can use the following sub-command to prepare wind loads.



The wind load mark must be the same as OAPI model name that described in next chapter.

You may use your own utility or third party applications to calculate the wind load and input these loads to the next topic.

3.4 Other Lateral Loads



For soil loads and dynamic loads, you can calculate by hand and input to the following screen. If you use the third party application to calculate the wind loads, you should input these loads to above grid manually.

You can click the New button and enter the same lateral load mark as OAPI Model name. You should select Soil Load or Dynamic Load in Load Type combo box and select proper direction in Direction combo box.

4 Pre-proccessing

4.1 Overview

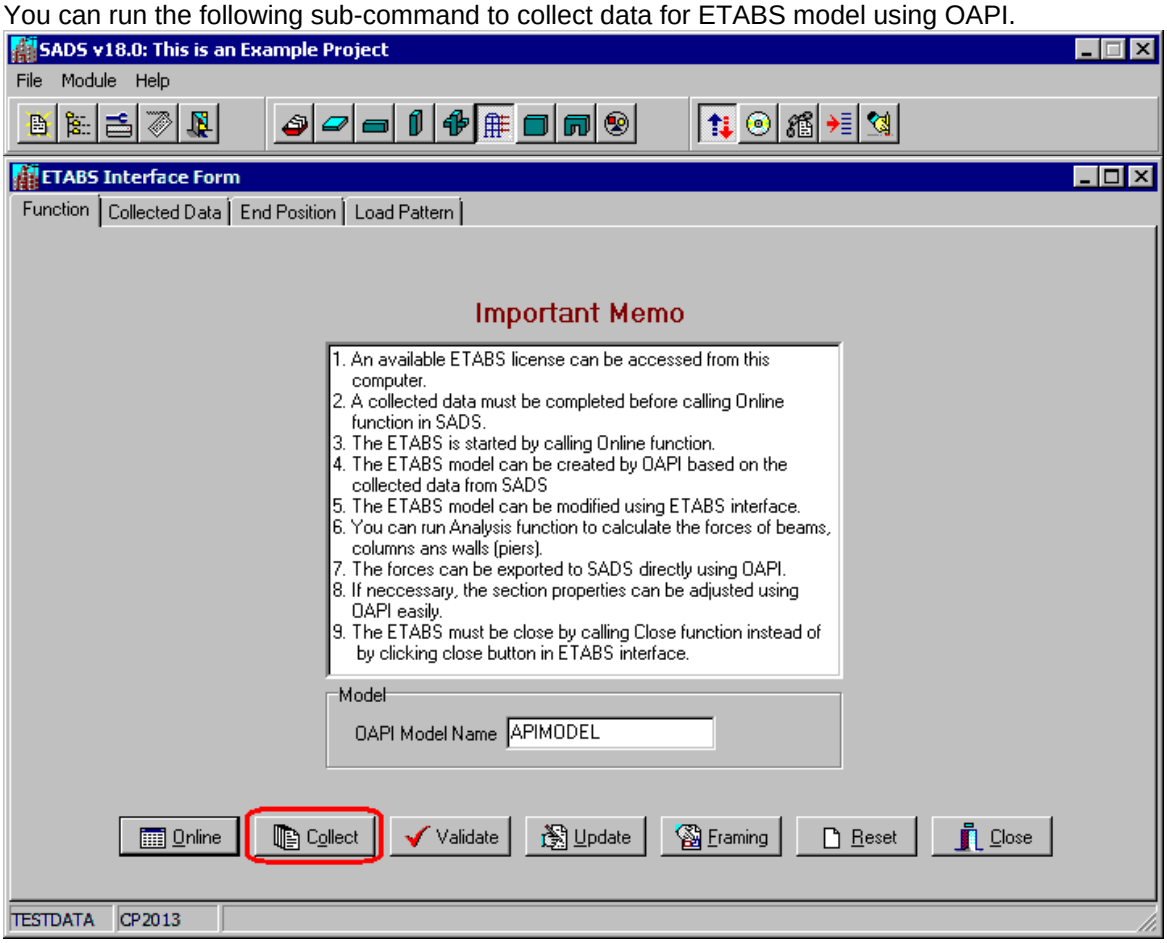
The online linking function will transfer following data from SADS to ETABS.

- Story data;
- Material Data;
- Section data;
- Lateral load data;
- Connectivity data of beams, lintels, columns and walls.

The first 4 data sets are transferred directly. The last one - connectivity data needs to be pre-processed. We collect necessary information and perform validation strictly to make sure the ETABS model can be created correctly.

4.2 Collect Data

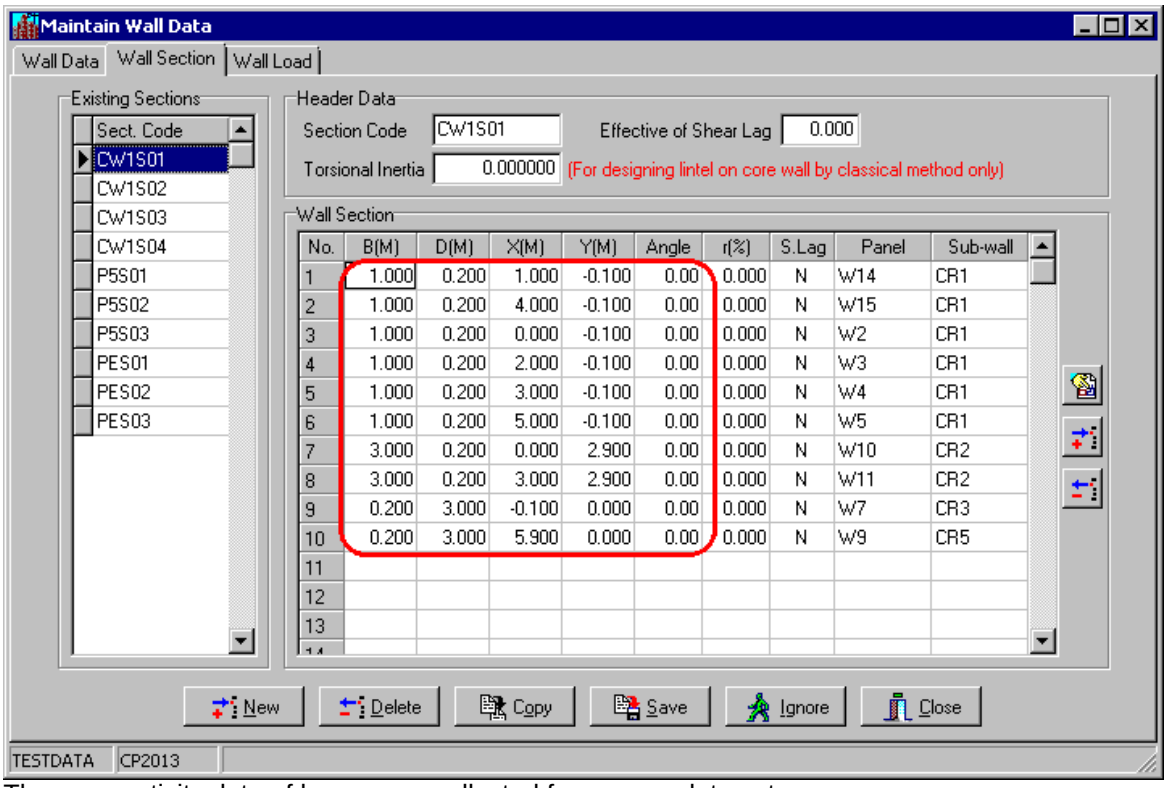
You can run the following sub-command to collect data for ETABS model using OAPI.



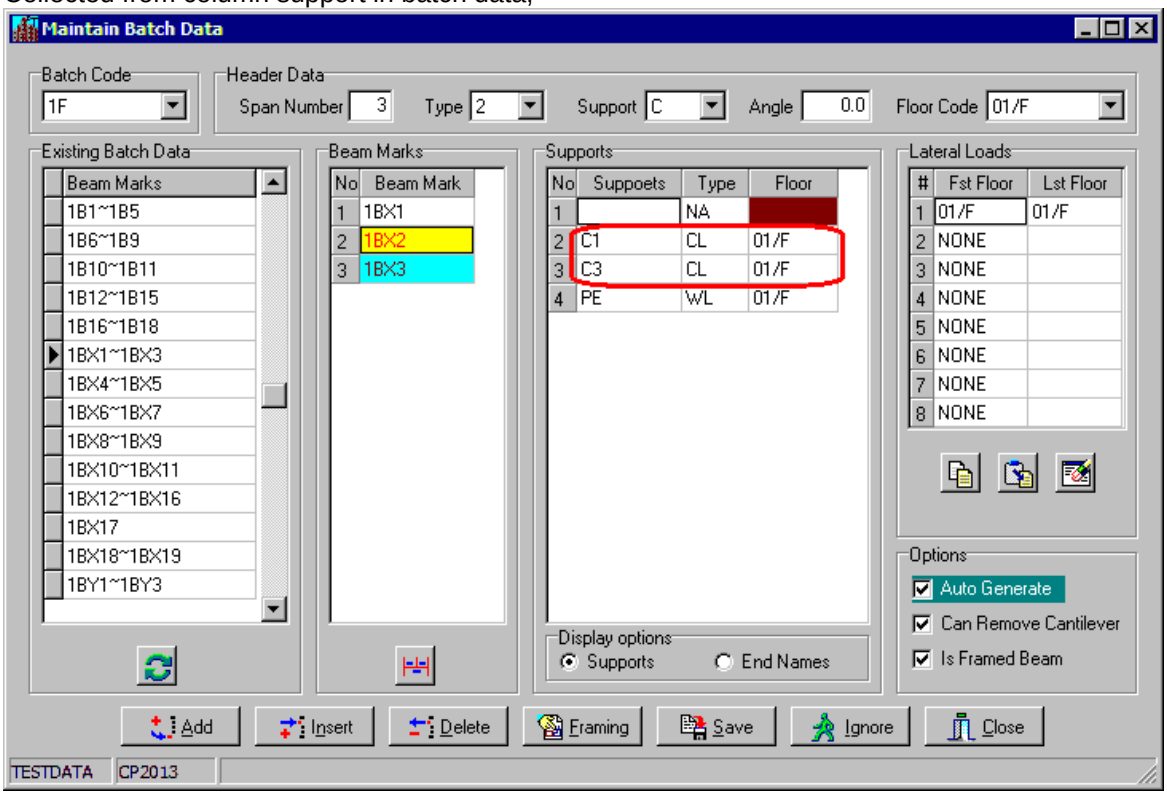
The first step is defining the OAPI model name. The default name is APIMODEL. The second is clicking the Collect button. SADS will collect the connectivity data.

- The connectivity data of beams, columns, lintel beams and walls.
- The section properties and material properties of beams, columns, lintel beams and walls.

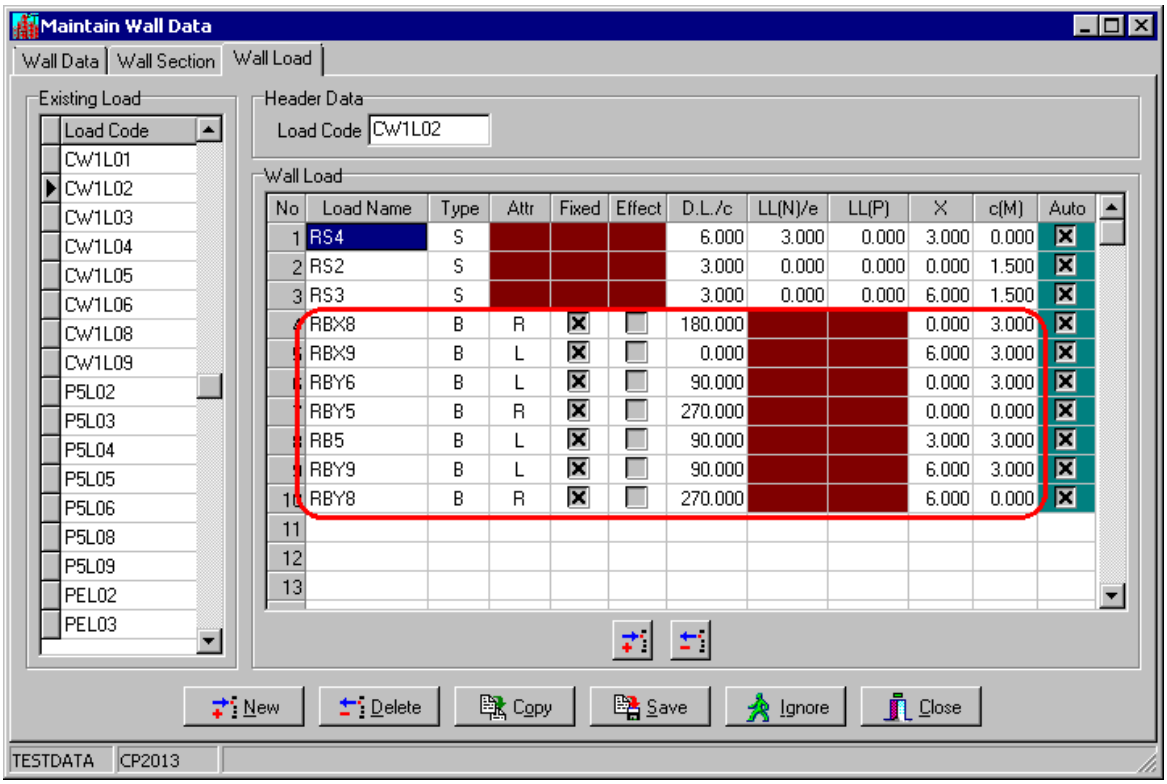
The connectivity data of columns can be collected from column extra data. The connectivity data of lintel beams can be collected from lintel beam extra data. The connectivity data of wall can be collected from wall extra data and wall section data.



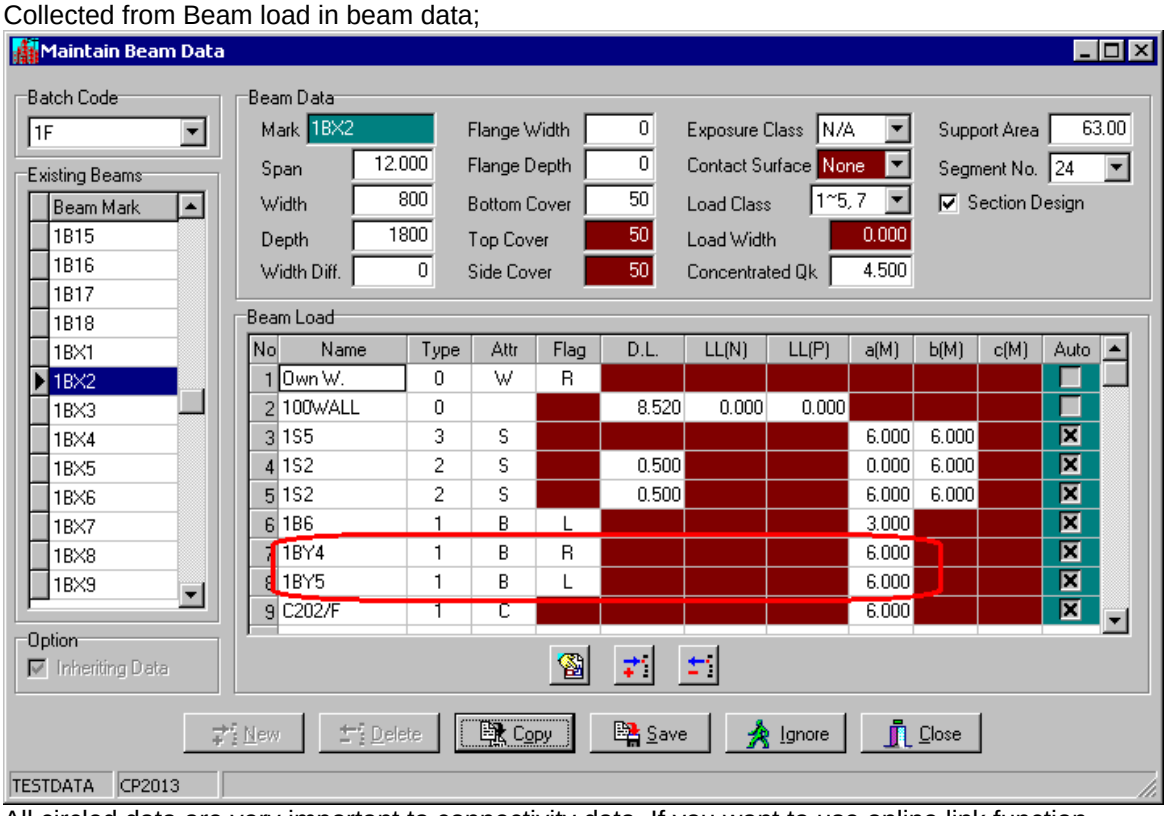
The connectivity data of beams are collected from many data sets.
Collected from column support in batch data;



Collected from beam load in wall load data;



Collected from Beam load in beam data;



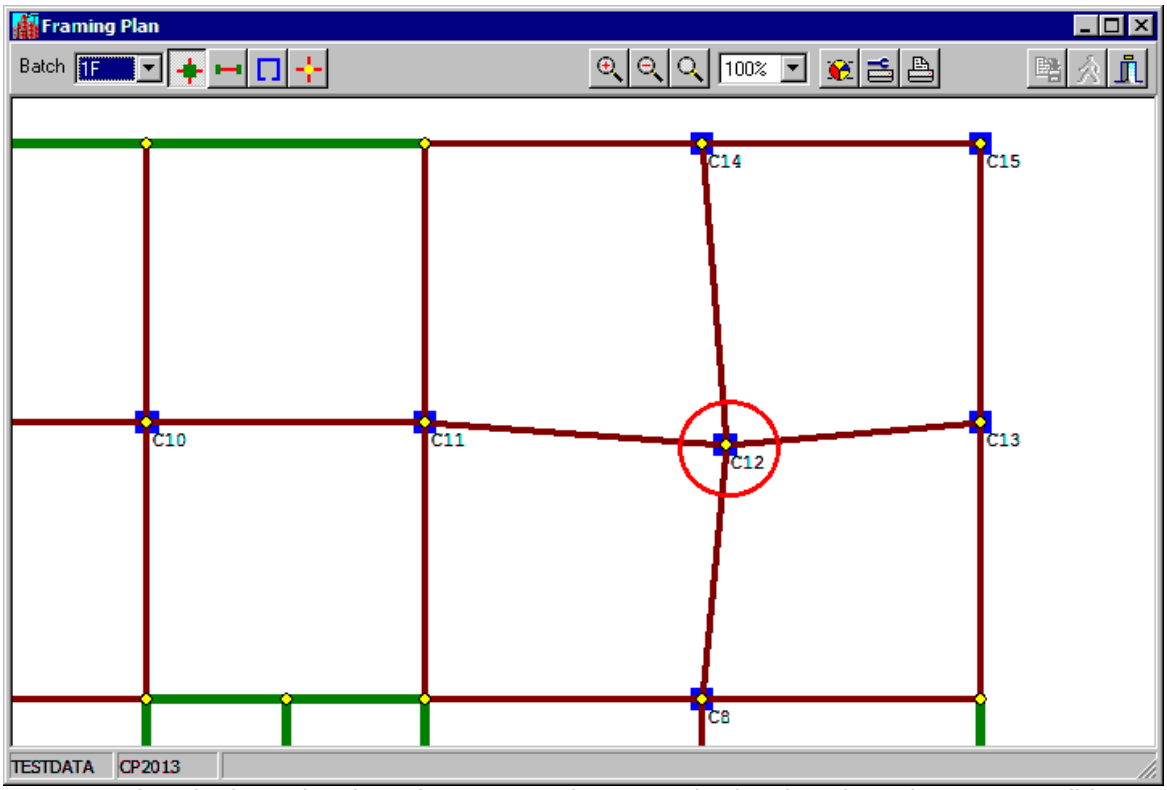
All circled data are very important to connectivity data. If you want to use online link function, please pay more attention to these data to make sure all data are input accurately.

All errors in collected data are caused by problems in your project data. You may find these problems using the method described in next topic.

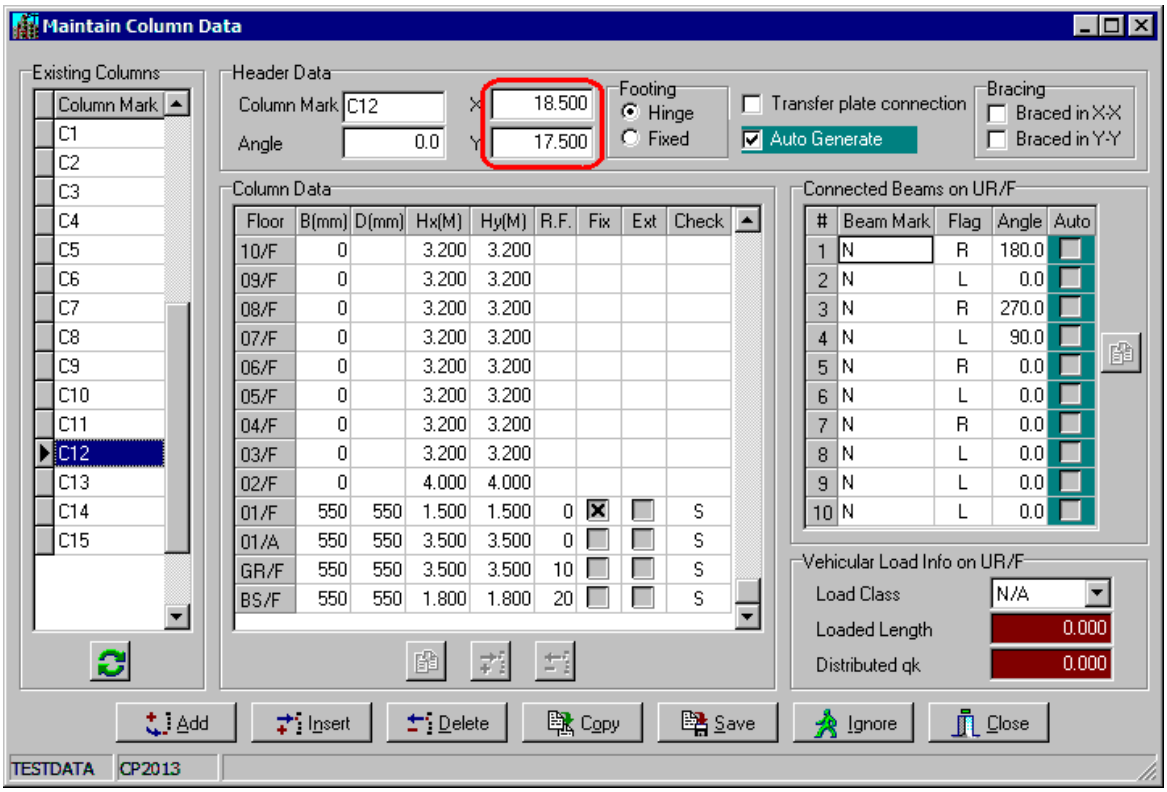
After the necessary data are collected correctly, you may perform validation to check all possible errors.

4.3 Validation By Framing Plan

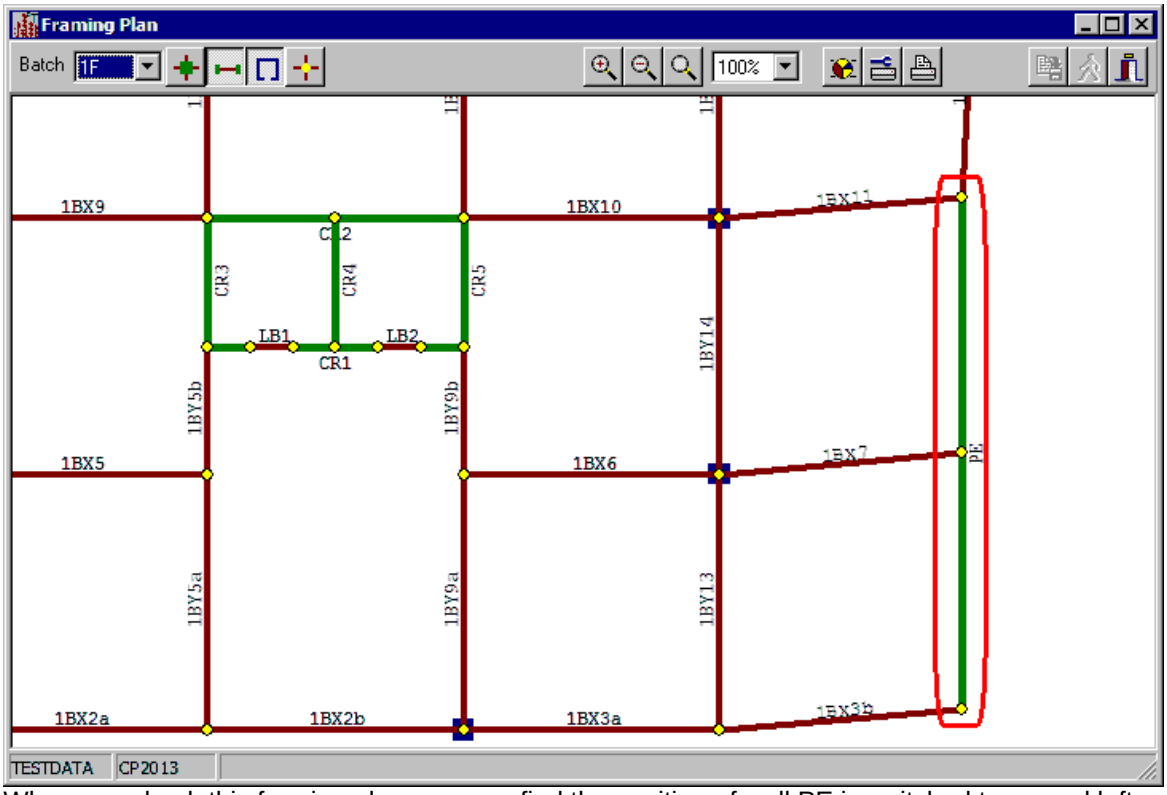
Validate columns.



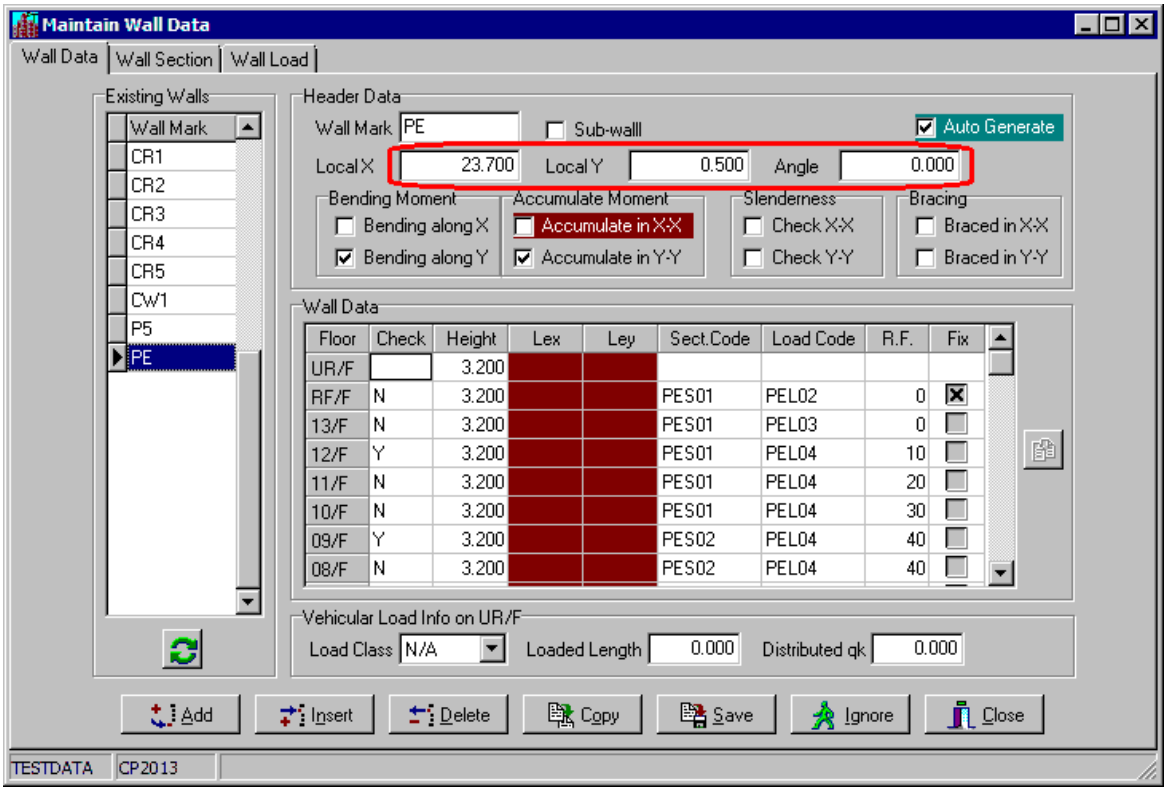
You can select the lower batch to show more columns on the framing plan. The most possible errors are the positions of columns. You can compare these positions with your paper framing plan. If you find an error, you can check the coordinates of these columns in column data window and fix the error. In this window, the coordinate X of column C12 should be 18.0 and coordinate y should 18.0 also.



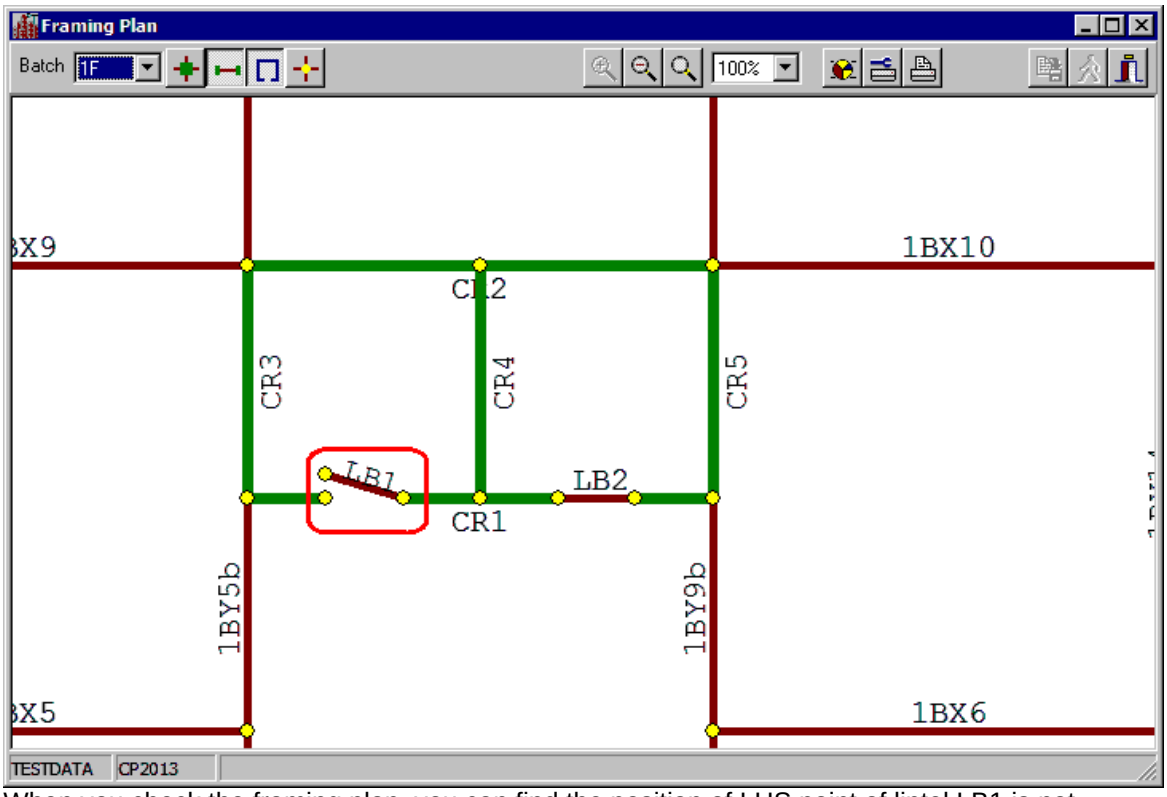
Validate walls.



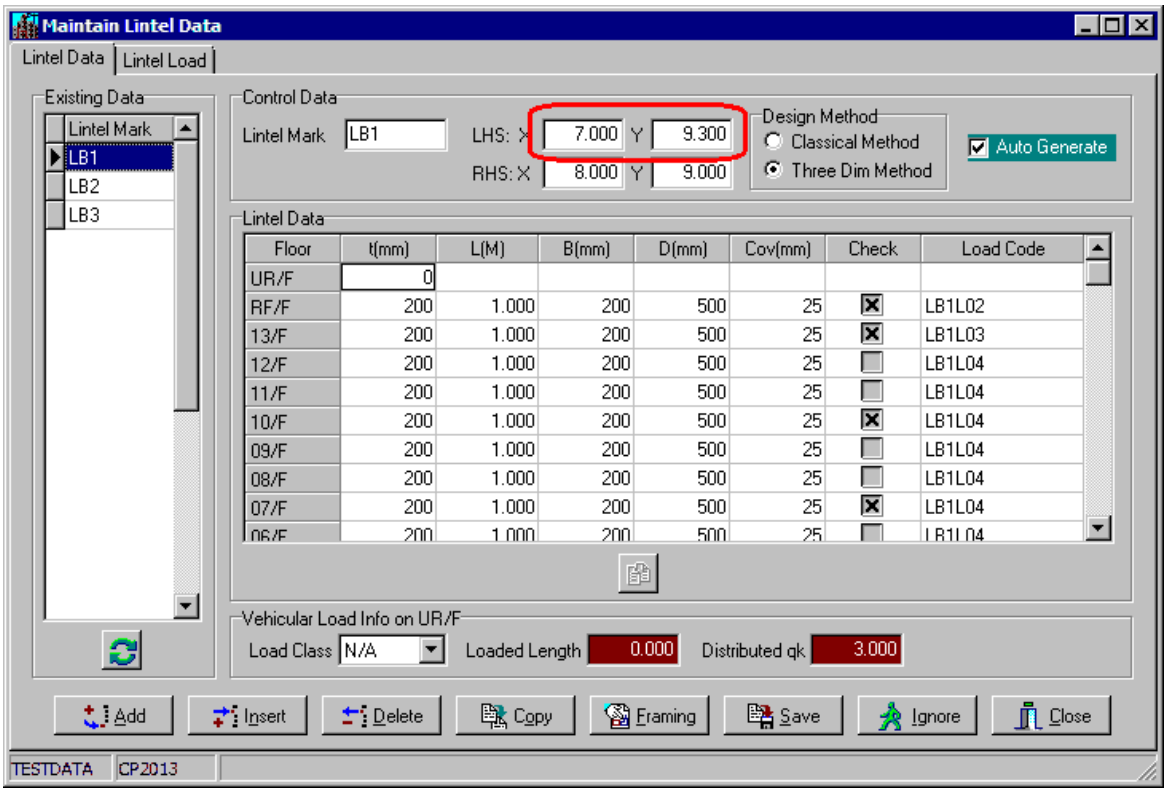
When you check this framing plan, you can find the position of wall PE is switched to up and left side. The coordinate X of wall PE should be 24.0 and Y should be 0.0..



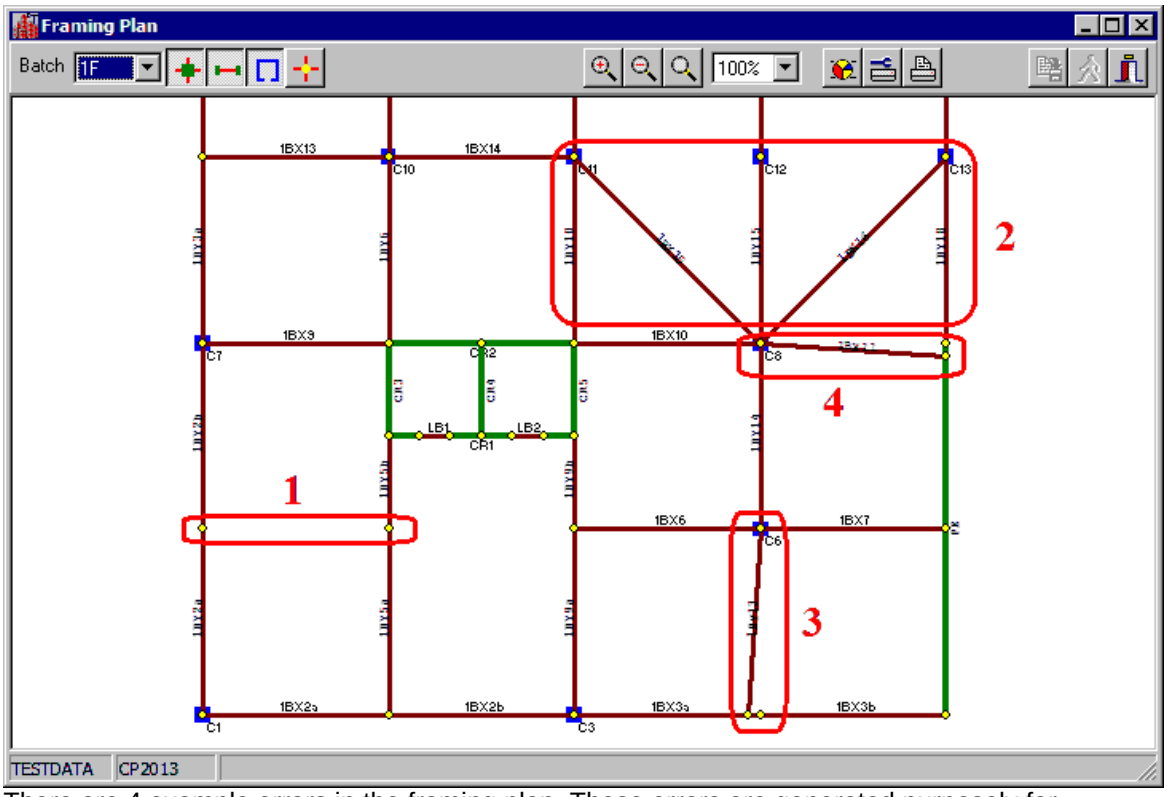
Validate lintel.



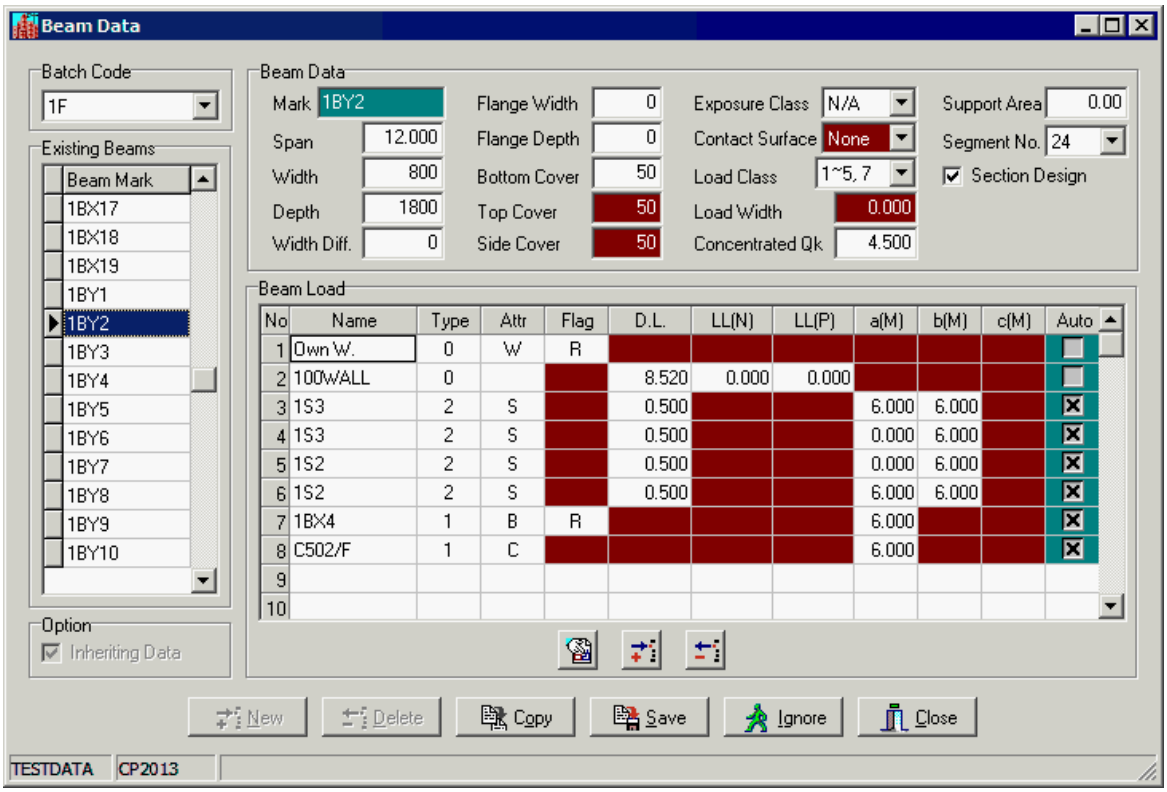
When you check the framing plan, you can find the position of LHS point of lintel LB1 is not correct. The coordinate Y of lintel LB1 should be 9.0.



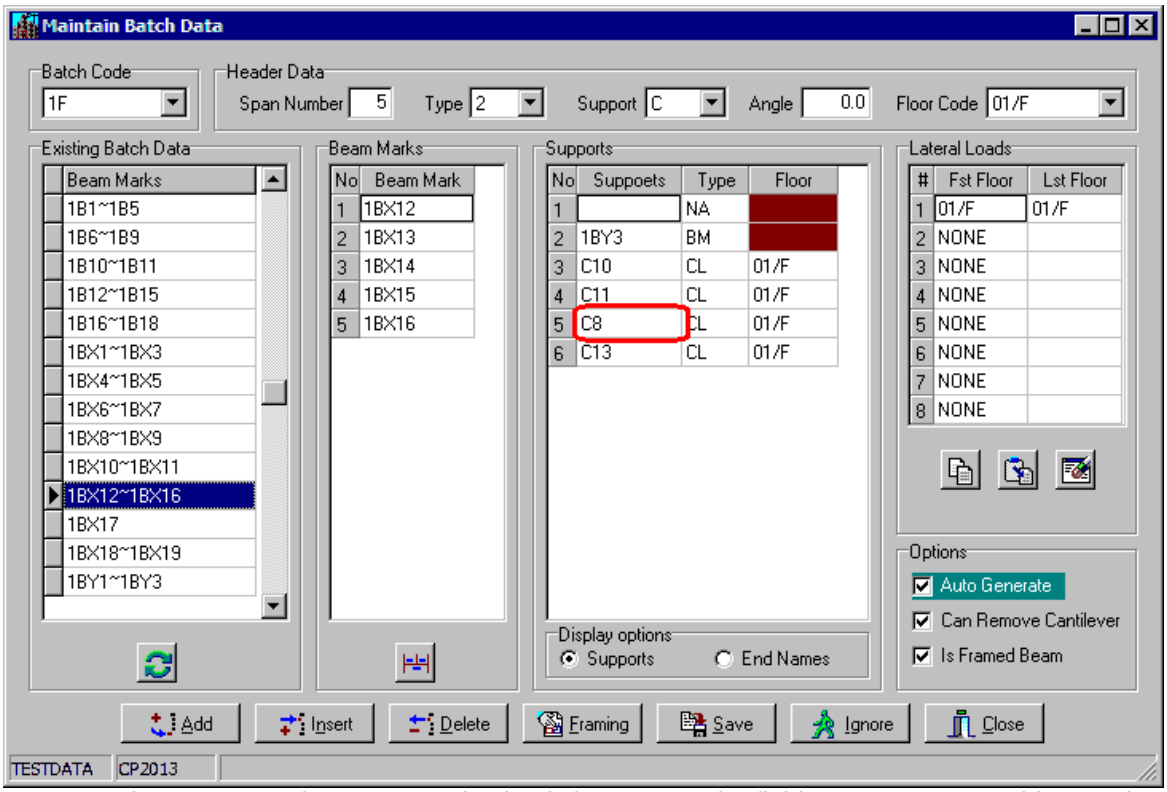
Validate beams.



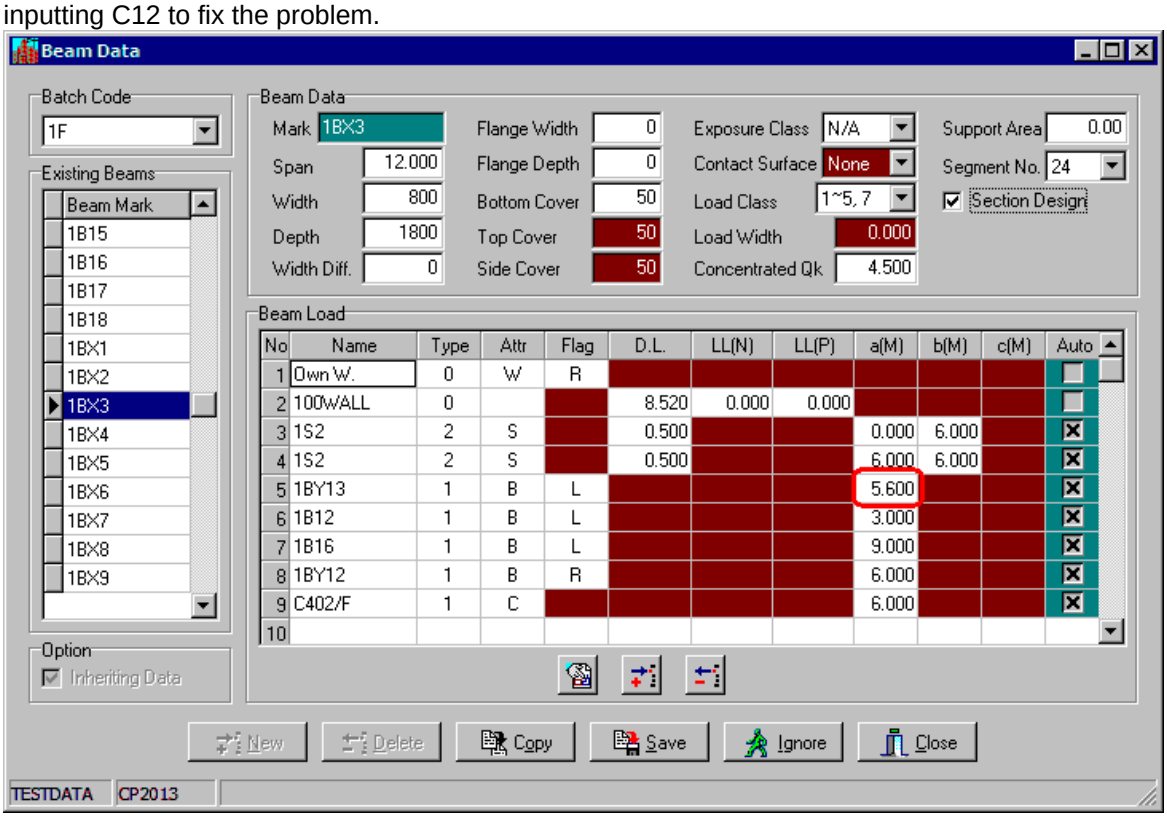
There are 4 example errors in the framing plan. These errors are generated purposely for demonstration and shown as below.



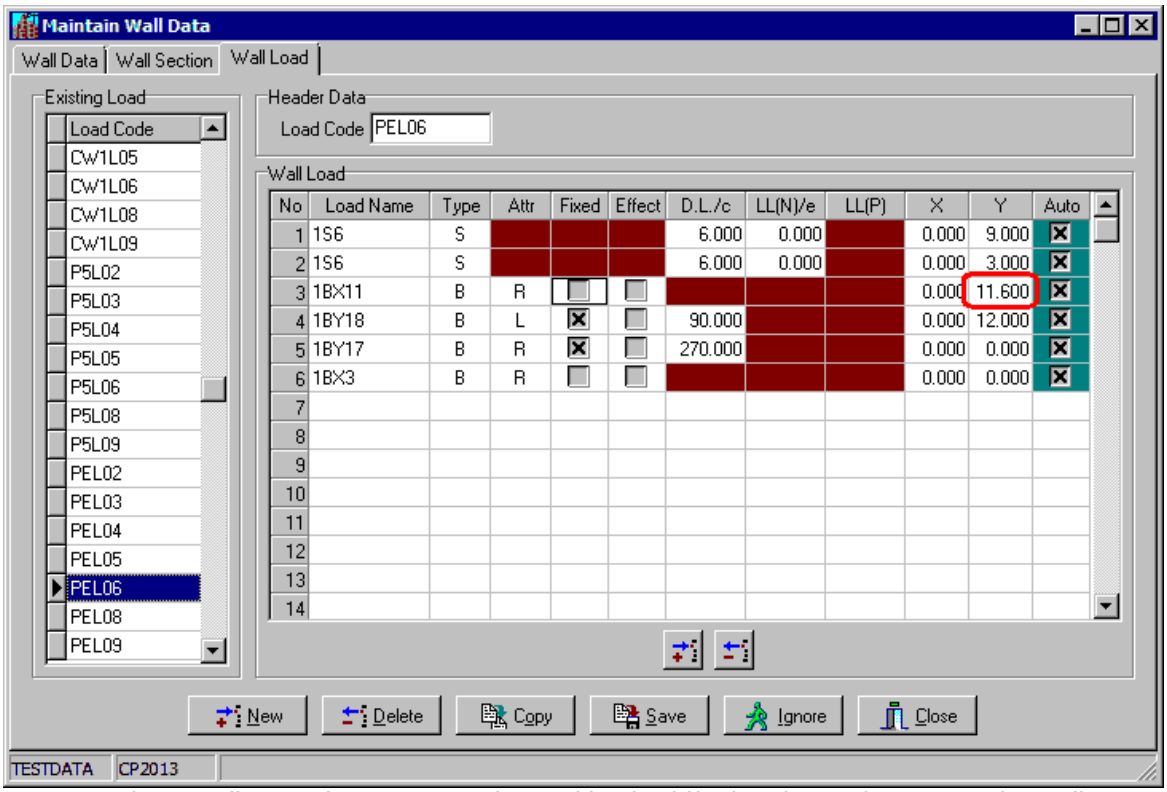
Error #1: The missing beam is 1BX5 that support on beams 1BY2 and 1BY5. SADS expects the load 1BX5 to be shown on loading list of beam 1BY2 and 1BY5. We purposely ignore these loadings for demonstrating this kind of errors. SADS can't define the location of beam 1BX5. So, the beam 1BX5 can't be shown in framing plan. You must add the missing load 1BX5 to beam 1BY2 and/or 1BY5 to fix this problem.



Error #2: The support #5 is C12. We mistakenly input C8 to the field. You can correct this error by inputting C12 to fix the problem.



Error #3: The load position a(M) is wrong. It should be 6.0. So, the position is shifted to left. If you are using online function, the beam load that carrying framed beam, all data - name, type, attr., flag and a(M) are important. Any error in these fields may generate different problems. You may try it.

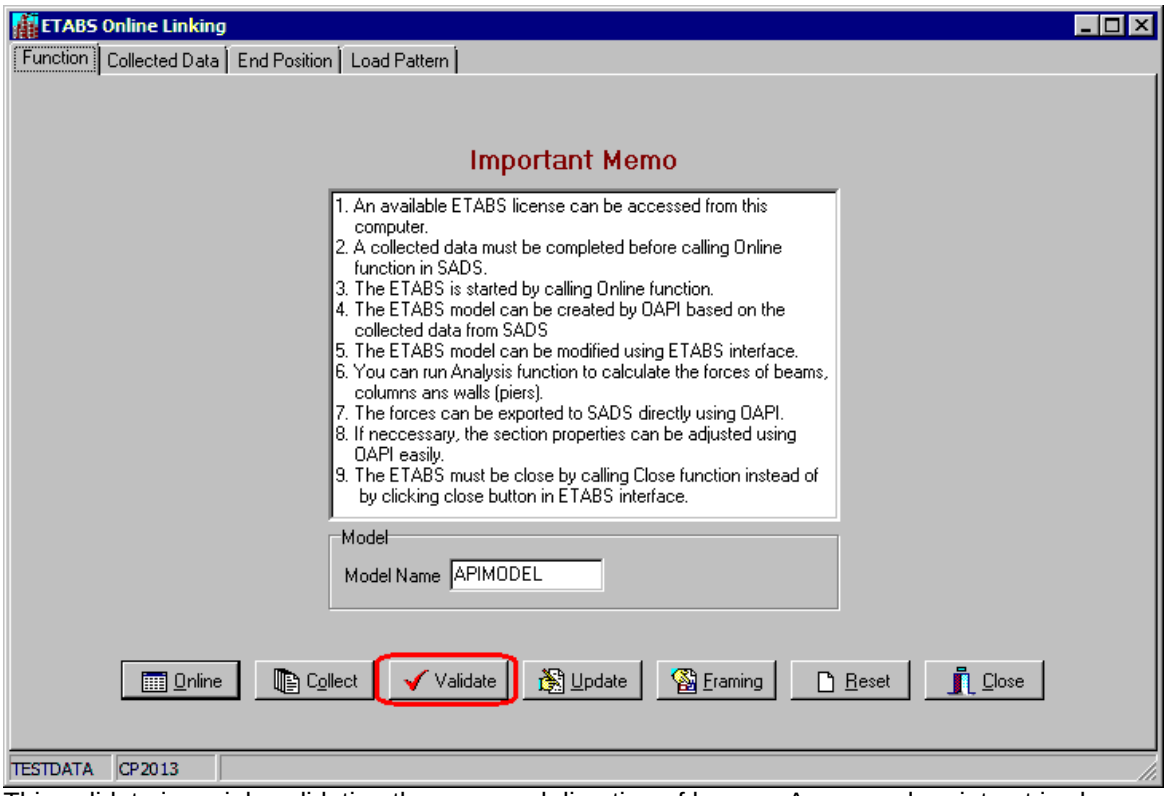


Error #4: The coordinate Y is wrong. So, the position is shifted to down. If you are using online function, the wall load that carrying framed beams, all data - load name, type, attr., X and Y are important. Any error in these fields may generate different problems. You may try it also.

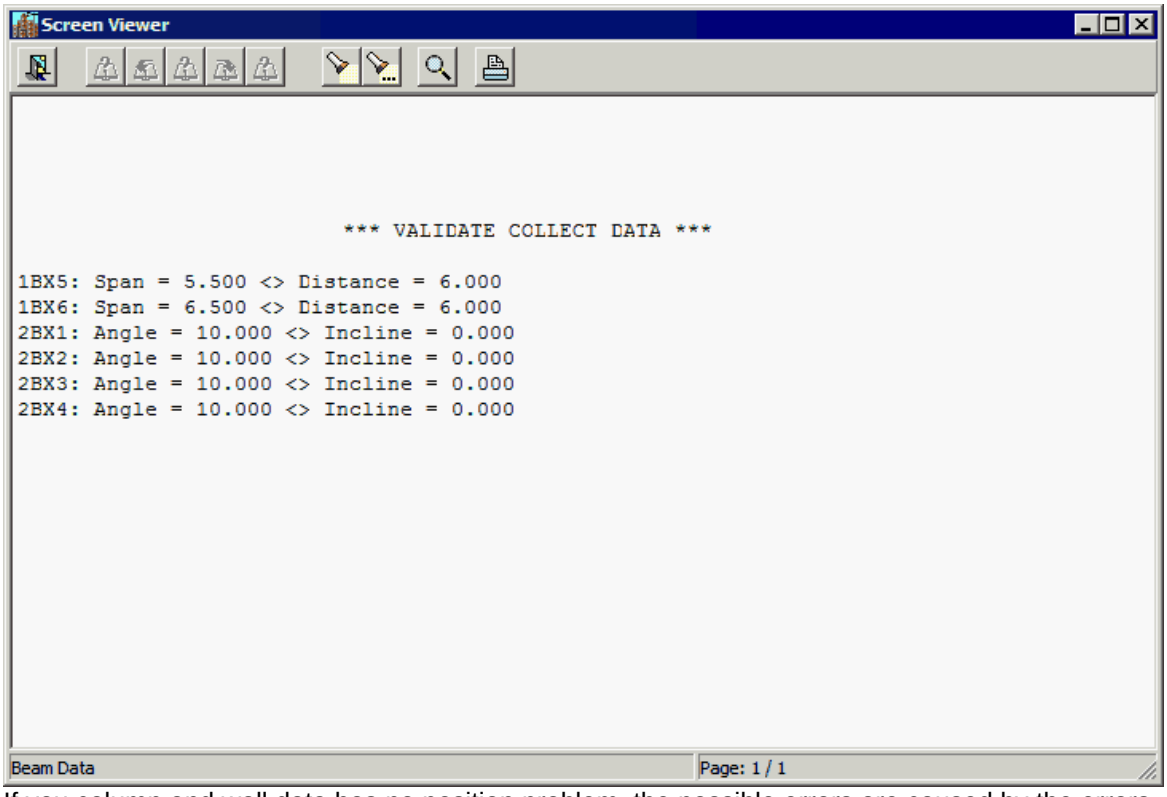
These errors shown above are for demonstration only. You may type in false data purposely to understand how SADS validates the collected data.

4.4 Validation by Validate Button

You can click the Validate button to validate all collected data.



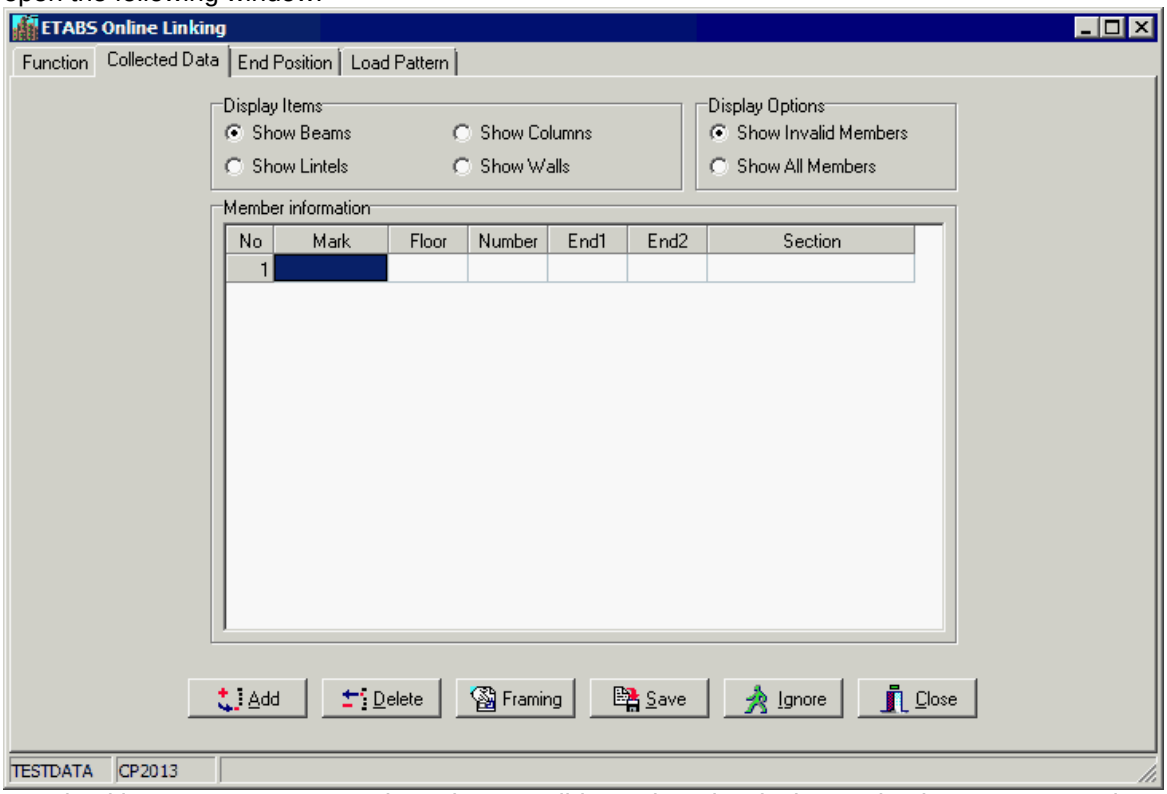
This validate is mainly validating the span and direction of beams. An example print out is shown as below.



If you column and wall data has no position problem, the possible errors are caused by the errors in beam span and direction in batch data. You can fix these data errors.

4.5 Validation by Showing Collected Data

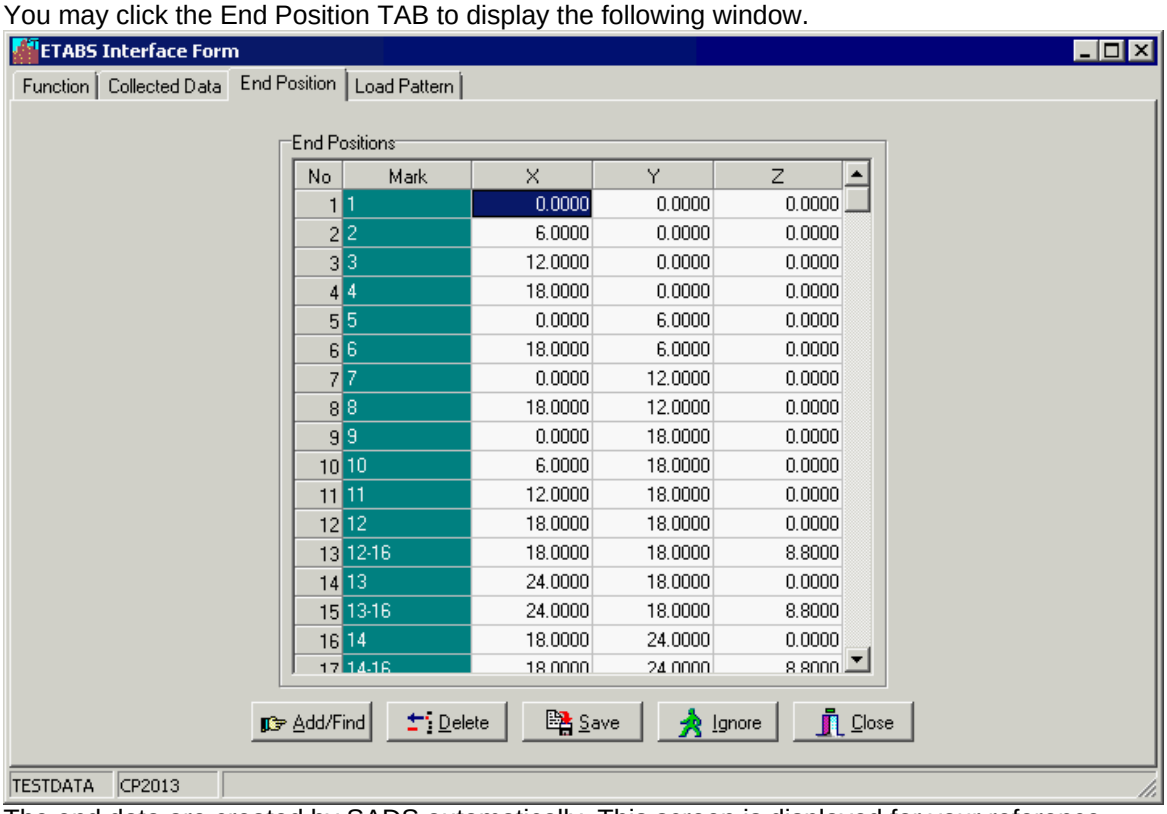
After you validate collected data using previous method, you can click the Collected Data TAB to open the following window.



For checking errors, you may select Show Invalid Members in Display Option box. You can select Show Beams, Show Lintels, Show Columns and Show Walls one by one. The major checking in this method is finding the beams that missing point label EndI or EndJ. SADS can't show these beams on framing plan. You can write down or print out these beam marks and find the locations of these beams on your paper framing plan. You can use Validation by Framing Plan method to find the problem of your project data and fix it.

4.6 End Position

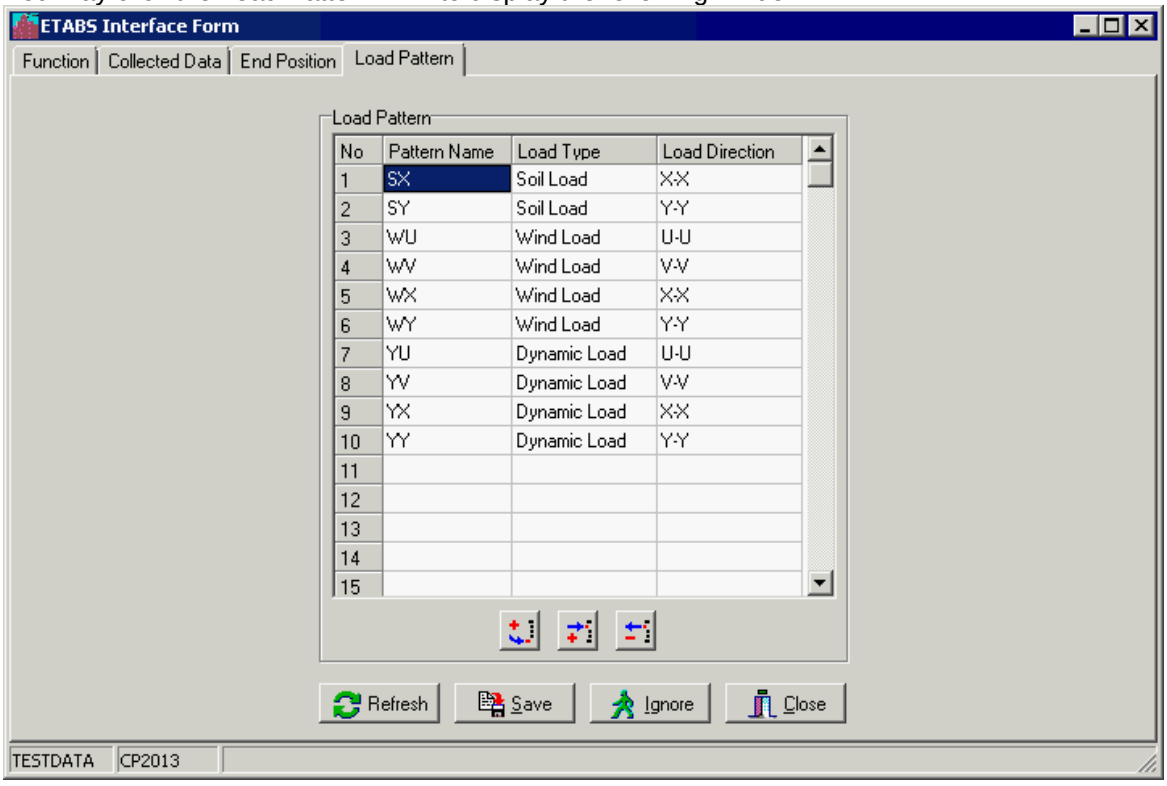
You may click the End Position TAB to display the following window.



The end data are created by SADS automatically. This screen is displayed for your reference only.

4.7 Load Pattern

You may click the Load Pattern TAB to display the following window.



These load patterns are retrieved from Lateral Load Sub-command. You may add, insert or delete the load pattern. All load patterns you selected will be transferred to ETABS model.

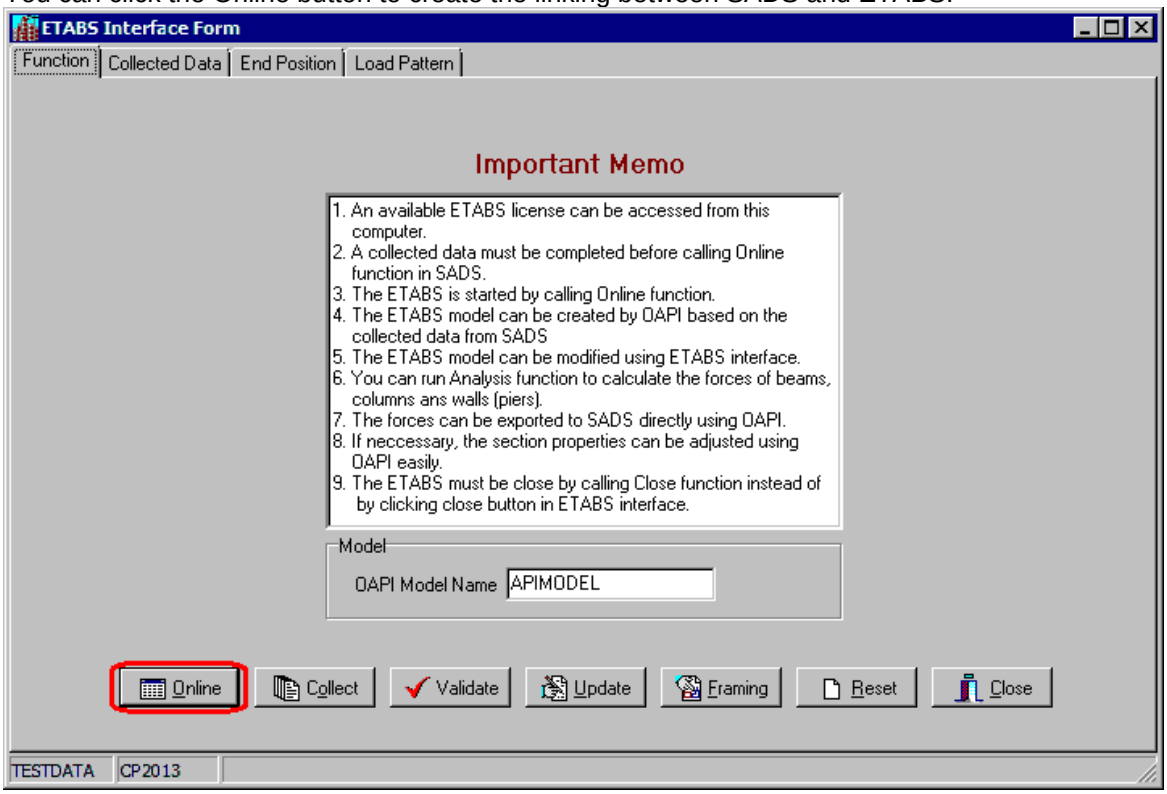
5 Linking ETABS

5.1 Overview

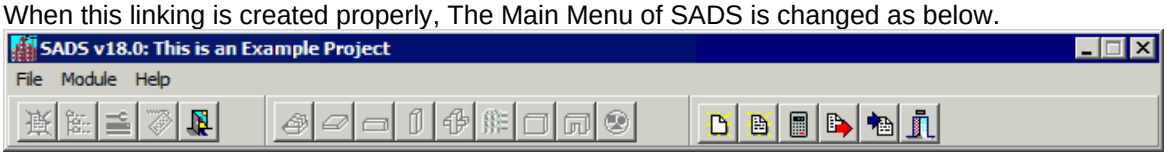
After you have collected data and used framing plan and validate function to check all data, you can now link SADS with ETABS.

5.2 Link to ETABS

You can click the Online button to create the linking between SADS and ETABS.



When this linking is created properly, The Main Menu of SADS is changed as below.

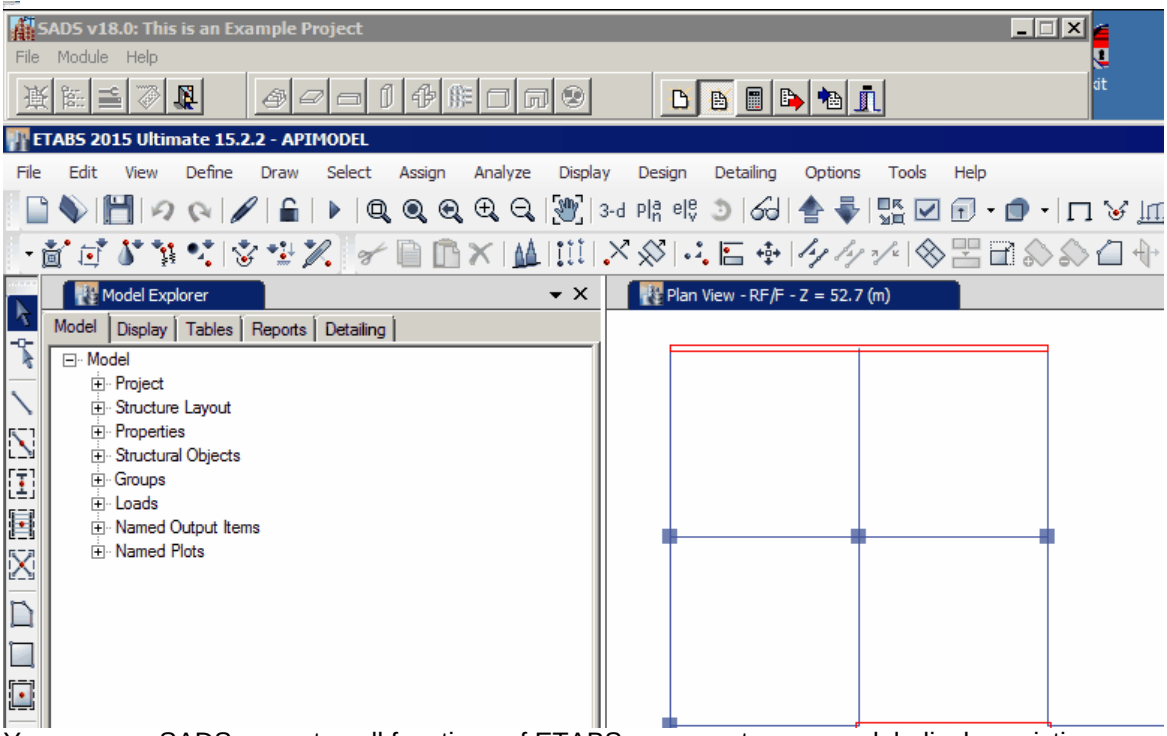


Most of original speed buttons are disabled to prevent users run other commands and sub-commands. The speed buttons of sub-commands are changed as below.

- Create Model button - Click this button to create a new ETABS model using the collected data.
- Open Model button - Click this button to open an existing ETABS model.
- Run Analysis button - Click this button to configure the load cases option and run model analysis.
- Import Forces button - Click this button to import beam, column, wall and lintel forces from ETABS to SADS.
- Export Properties button - Click this button to Export section and material properties from SADS to ETABS.
- Close Linking button - Click this button to close the ETABS application and return to SADS original menu.

The ETABS interface window is displayed below the new SADS main menu. You can align the top of ETABS window to the bottom of SADS main window, align the bottom of ETABS window to the top of Task Bar, align the left and right side of ETABS window to the side of your desktop to

maximize the ETABS interface window.

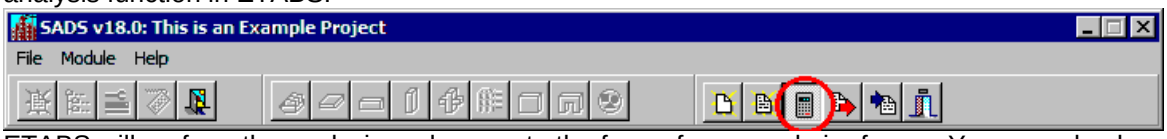


You can use SADS menu to call functions of ETABS, e.g. create new model, display existing model, run model analysis, export frame forces and pier forces, import section properties and material properties of frame members and piers, etc. Also, you can go into ETABS interface window to check the connectivity of frame object and area object, etc.

The first window of ETABS is blank model. You may try to click the Create Model button to experience how SADS creates a new model - APIMODEL. Then, you can check the created model using ETABS interface. You can check the story data, material data, section data, connectivity data, load data etc.

5.3 Run Analysis

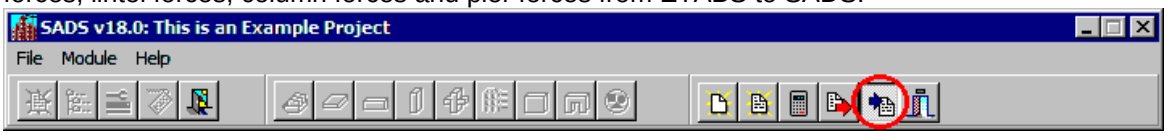
After you find the model is created without error, you can click the Run Analysis button to call the analysis function in ETABS.



ETABS will perform the analysis and generate the frame forces and pier forces. You may check the analyzed results by ETABS interface.

5.4 Import Forces

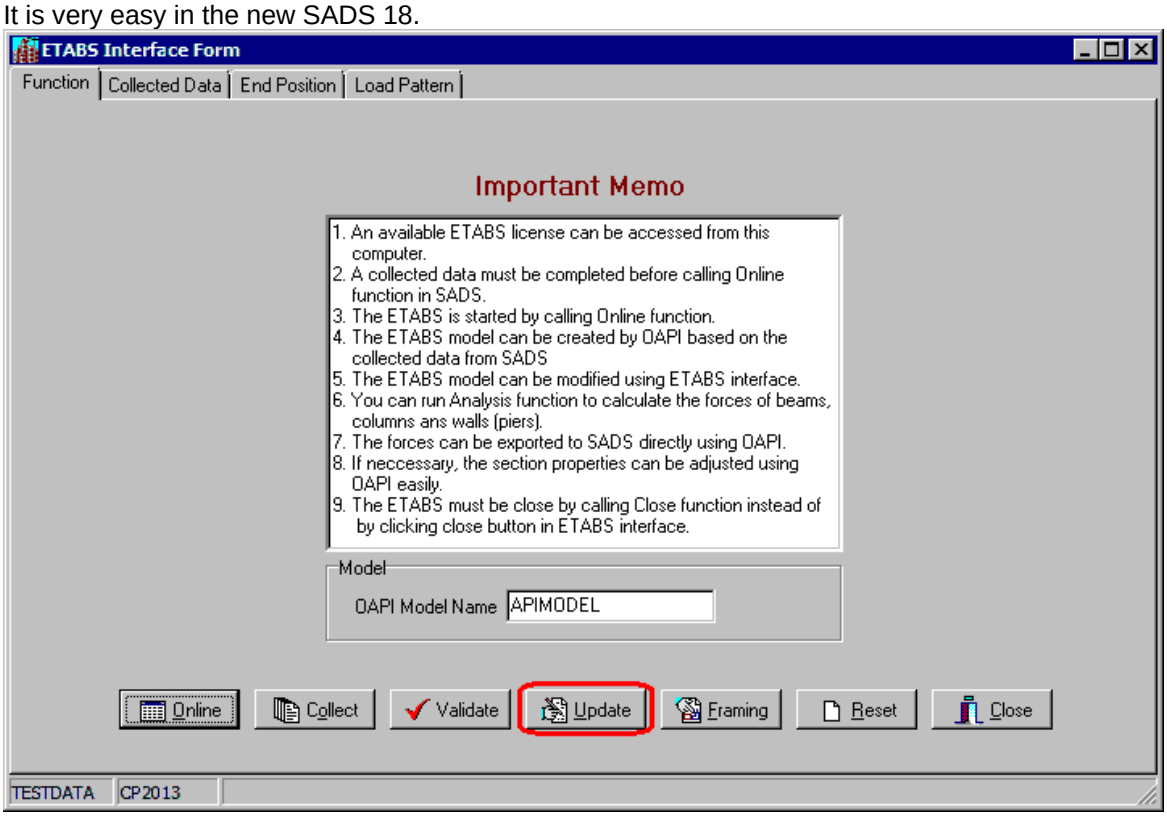
After you check the analysis results, you may click the Import Forces button to transfer the beam forces, lintel forces, column forces and pier forces from ETABS to SADS.



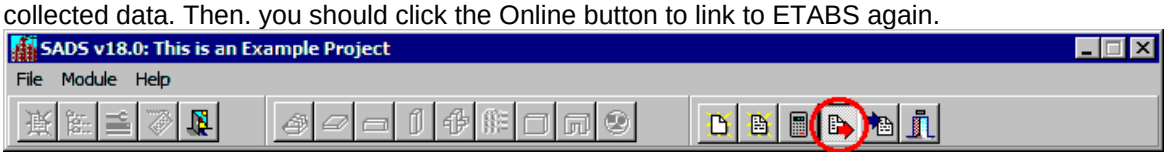
Then, you can click Close Linking button to release the linking of ETABS and return to **SADS**.

5.5 Export Properties

After you import frame forces and pier forces to SADS, you can run Beam Pre-design Sub-command, Column Pre-design Sub-command, Wall Pre-design Sub-command and Lintel Pre-design Sub-command. You may find many sections that you set in original data are not justified with code of practice requirement. You need to adjust the sizes of sections and / or adjust the grades of concrete. After these adjustments are made, you may re-analyze the model in ETABS. It is very easy in the new SADS 18.



In this screen, you can click Update button to update section properties and material properties in collected data. Then. you should click the Online button to link to ETABS again.



You should click the Export Properties button to export section properties and material properties from SADS to ETABS and update the section and material properties in frame objects and area objects. The OAPI model is updated. You may check this update using ETABS interface.

Then, you can re-run the analysis function in ETABS and re-import frame forces and pier forces from ETABS to SADS. Of cause, you can close the linking and return to SADS. In SADS, you can re-predesign all beams, columns, walls and lintels.

5.6 Close Linking

You can't close ETABS application by clicking Close menu item in ETABS. You must click the Close Linking button in SADS main menu. Otherwise, some problem may happen.