



S A D S

What's New

Version 17.0

Gold Sun

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1 Introduction FLS in SADS v17

According with Clause 2.1.2 and Clause 2.2.3, we should check the effect of the design fire.

SADS v17 can check the Ultimate Limit State(ULS), Serviceability Limit State(SLS) and Fire Limit State(FLS) according the requirement of the building structures.

When checking the FLS, the strength of concrete and reinforcement should be based on the values given in clause 3.6, and the partial safety factors for loads and materials should be based on the values given in clauses 2.3.2.7 and 2.4.3.2 respectively.

The data structure has a limited changes from **SADS v16**. Users can do the FLS checking by **SADS v17**. The following topics introduce the changes of input data.

1.1 Master Data

We add Enforce Fire Limit State checking check box.

The screenshot shows the 'Master Data' dialog box with the following sections:

- Available Diameters:** A table with columns 'No' and 'Diameter'. Row 1 is selected with diameter 6.
- Lateral Load Direction:** A table with columns 'No', 'Wind', 'Dynamic', and 'Soil'. Rows 1-4 are populated with 'X', 'Y', 'U', 'V' respectively.
- Options:**
 - Designation of high tensile bar: Y
 - Density of reinforced concrete: 24.0
 - Consider flange of beam in analysis
 - Automatic print description
 - Print core program information
 - Print BD reference number
 - Bi-direction of wind and dynamic load
 - Enforce PNAP 173
 - Lock Auto field
 - Enforce Fire Limit State checking**
- Concrete Cover:** Measured to Main Bar, Measured to Stirrup
- Marking Beam Section:** Width x Depth, Depth x Width
- Position of Lateral Bending Moment:** Center of Support, Edge of Support
- Shear Value:** Calculated by M/L Formula, Taken from Analysis Output
- Block Region for Inclined Members:** Block from 120.0 to 300.0

This is a main switch for FLS checking. You can un-check this check box to skip all FLS checking if you find the checking is not necessary for your project.

1.2 Floor Data

When we check the Enforce Fire Limit State checking check box, we add design temperature for FLS checking on each floor.

Floor Information

Floor Data

| No | Fl.Code | Floor Name | Alternative | Level | Cl.Cover | Wl.Cover | Cl.Concrete | Wl.Concrete | Temper. | Batch C. |
|----|---------|-------------|--------------------------|--------|----------|----------|-------------|-------------|---------|----------|
| 1 | UR/F | UPPER ROOF | <input type="checkbox"/> | 55.900 | 25 | 25 | C40 | C40 | 500.0 | UR |
| 2 | RF/F | ROOF FLOOR | <input type="checkbox"/> | 52.700 | 25 | 25 | C40 | C40 | 500.0 | RF |
| 3 | 13/F | 13TH. FLOOR | <input type="checkbox"/> | 49.500 | 25 | 25 | C40 | C40 | 500.0 | 13 |
| 4 | 12/F | 12TH. FLOOR | <input type="checkbox"/> | 46.300 | 25 | 25 | C40 | C40 | 500.0 | TF |
| 5 | 11/F | 11TH. FLOOR | <input type="checkbox"/> | 43.100 | 25 | 25 | C40 | C40 | 500.0 | TF |
| 6 | 10/F | 10TH. FLOOR | <input type="checkbox"/> | 39.900 | 25 | 25 | C40 | C40 | 500.0 | TF |
| 7 | 09/F | 9TH. FLOOR | <input type="checkbox"/> | 36.700 | 25 | 25 | C40 | C40 | 500.0 | TF |
| 8 | 08/F | 8TH. FLOOR | <input type="checkbox"/> | 33.500 | 25 | 25 | C40 | C40 | 500.0 | TF |
| 9 | 07/F | 7TH. FLOOR | <input type="checkbox"/> | 30.300 | 25 | 25 | C40 | C40 | 500.0 | TF |
| 10 | 06/F | 6TH. FLOOR | <input type="checkbox"/> | 27.100 | 25 | 25 | C40 | C40 | 500.0 | TF |
| 11 | 05/F | 5TH. FLOOR | <input type="checkbox"/> | 23.900 | 25 | 25 | C45 | C45 | 500.0 | TF |
| 12 | 04/F | 4TH. FLOOR | <input type="checkbox"/> | 20.700 | 25 | 25 | C45 | C45 | 500.0 | TF |
| 13 | 03/F | 3RD. FLOOR | <input type="checkbox"/> | 17.500 | 25 | 25 | C45 | C45 | 500.0 | TF |
| 14 | 02/F | 2ND. FLOOR | <input type="checkbox"/> | 14.300 | 25 | 25 | C50 | C50 | 500.0 | 2F |
| 15 | 01/F | 1ST. FLOOR | <input type="checkbox"/> | 10.300 | 25 | 25 | C50 | C50 | 500.0 | 1F |

Global Change
 Old Code:
 New Code:

Important Note:
 If beam, column, wall and lintel data have been input, the floor code in the grid can not be changed directly on the grid, otherwise some data can not be retrieved from database. Please use global change to change this floor code.

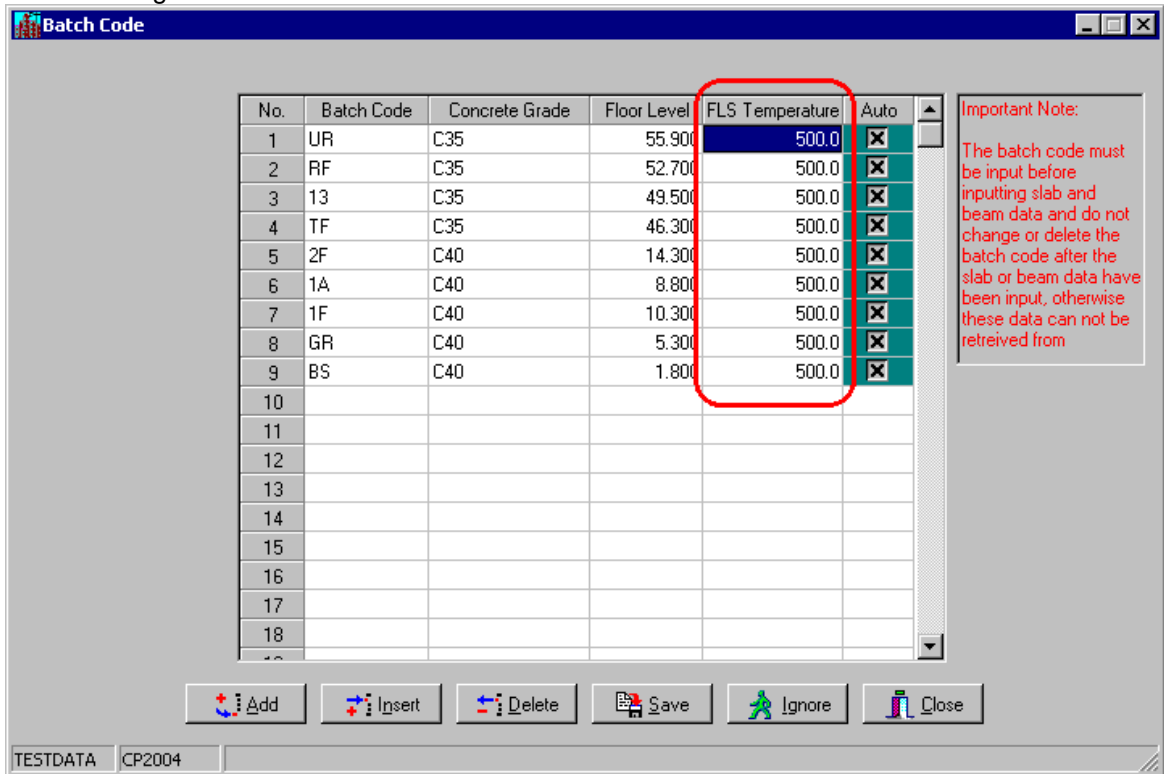
TESTDATA CP2004

You can enter the design temperatures on different floors. If you enter zero on a specific floor, the FLS checking on this floor will be skipped.

When we un-check the check box, the new Temperature data will be hidden.

1.3 Batch Code

When we check the Enforce Fire Limit State checking check box, we add design temperature for FLS checking in each batch.



The screenshot shows a software window titled "Batch Code" with a table of data. A red box highlights the "FLS Temperature" and "Auto" columns for rows 1 through 9. The "Auto" column contains checkboxes, all of which are checked. The "FLS Temperature" column contains the value "500.0" for all rows. To the right of the table, there is an "Important Note" box with red text.

| No. | Batch Code | Concrete Grade | Floor Level | FLS Temperature | Auto |
|-----|------------|----------------|-------------|-----------------|-------------------------------------|
| 1 | UR | C35 | 55.900 | 500.0 | <input checked="" type="checkbox"/> |
| 2 | RF | C35 | 52.700 | 500.0 | <input checked="" type="checkbox"/> |
| 3 | 13 | C35 | 49.500 | 500.0 | <input checked="" type="checkbox"/> |
| 4 | TF | C35 | 46.300 | 500.0 | <input checked="" type="checkbox"/> |
| 5 | 2F | C40 | 14.300 | 500.0 | <input checked="" type="checkbox"/> |
| 6 | 1A | C40 | 8.800 | 500.0 | <input checked="" type="checkbox"/> |
| 7 | 1F | C40 | 10.300 | 500.0 | <input checked="" type="checkbox"/> |
| 8 | GR | C40 | 5.300 | 500.0 | <input checked="" type="checkbox"/> |
| 9 | BS | C40 | 1.800 | 500.0 | <input checked="" type="checkbox"/> |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | | | |
| 15 | | | | | |
| 16 | | | | | |
| 17 | | | | | |
| 18 | | | | | |

Important Note:
The batch code must be input before inputting slab and beam data and do not change or delete the batch code after the slab or beam data have been input, otherwise these data can not be retrieved from

Buttons: Add, Insert, Delete, Save, Ignore, Close

TESTDATA CP2004

You can enter the design temperatures on different batches. If you enter zero on a specific batch, the FLS checking on this batch will be skipped.

When we un-check the check box, the new Temperature data will be hidden.

1.4 Slab Data

When we check the Enforce Fire Limit State checking check box, we add Permanent Imposed Load check box in slab data.

The major different of data structure between USL and FLS is Imposed load (live load). In USL, all live loads have the same load factor γ_f for the same load combination, please refer to Table 2.1 in clause 2.3.2.1. In FLS, the permanent imposed load has different load factor γ_f than non-permanent imposed load, please refer to Table 2.2 in clause 2.3.2.7. So, we need to use this check box to specify the load factor γ_f of each slab. For slab with $\gamma_f = 1.0$, you should check this check box. For slab with $\gamma_f = 0.8$, you should un-check this check box. For additional point load, you should provide point live load (N) - non-permanent and point live load (P) - permanent when you check the Enforce Fire Limit State checking check box.

1.5 Beam Data

When we check the Enforce Fire Limit State checking check box, we split the live load to non-permanent and permanent.

Maintain Beam Data

Batch Code: ALL

Existing Beams: 13B1, 13B2, 13B3, 13B4, 13B5, 13B6, 13B×1, 13B×10, 13B×2, 13B×3, 13B×4, 13B×5, 13B×6

Option: Inheriting Data

Beam Data

Mark: 13B×1, Flange Width: 0, Exposure Class: C, Support Area: 0.00
 Span: 6.000, Flange Depth: 0, Contact Surface: N, Segment No.: 12
 Width: 300, Bottom Cover: 25, Load Class: 1~5, 7, Section Design
 Depth: 450, Top Cover: 25, Load Width: 0.000
 Width Diff.: 0, Side Cover: 25, Concentrated Qk: 4.500

Beam Load

| No | Name | Type | Attr | Flag | D.L. | LL(N) | LL(P) | a(M) | b(M) | c(M) | Auto |
|----|---------|------|------|------|-------|-------|-------|-------|------|------|-------------------------------------|
| 1 | Own W. | 0 | W | R | | | | | | | <input type="checkbox"/> |
| 2 | 100WALL | 0 | | | 6.600 | 0.000 | 0.000 | | | | <input type="checkbox"/> |
| 3 | 13B1 | 1 | B | L | | | | 3.000 | | | <input checked="" type="checkbox"/> |
| 4 | | | | | | | | | | | <input type="checkbox"/> |
| 5 | | | | | | | | | | | <input type="checkbox"/> |
| 6 | | | | | | | | | | | <input type="checkbox"/> |
| 7 | | | | | | | | | | | <input type="checkbox"/> |
| 8 | | | | | | | | | | | <input type="checkbox"/> |
| 9 | | | | | | | | | | | <input type="checkbox"/> |

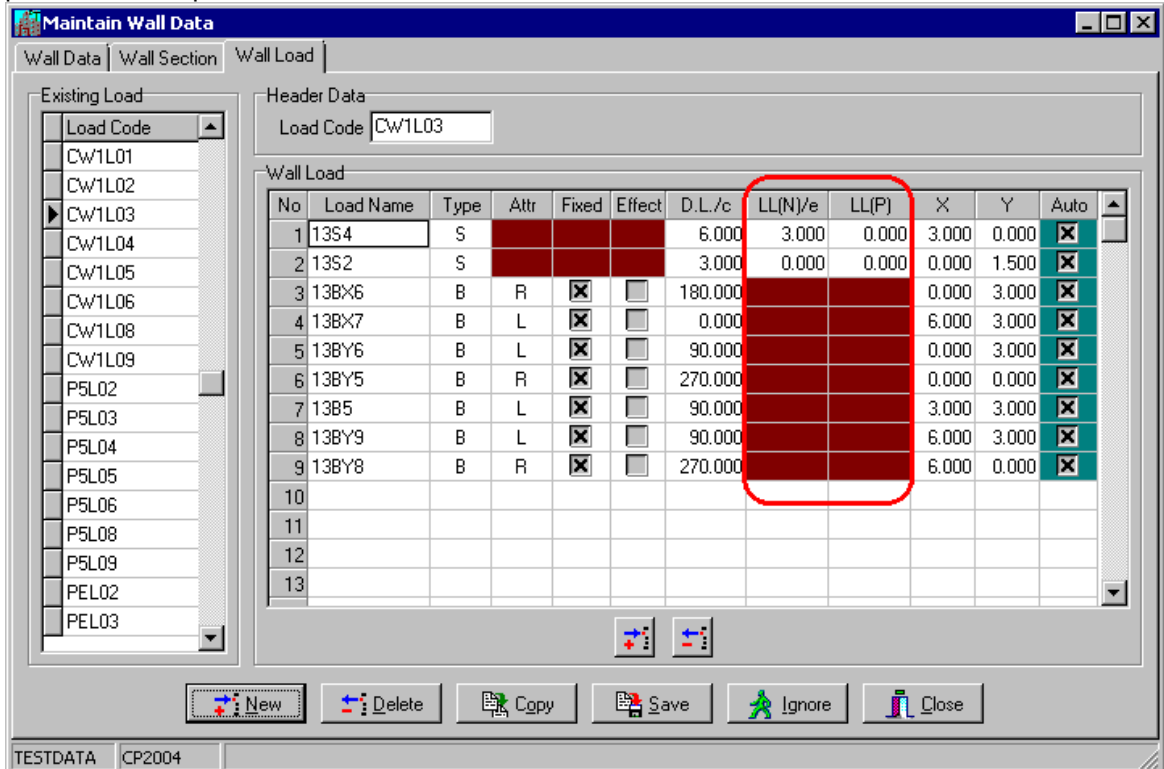
Buttons: New, Delete, Copy, Save, Ignore, Close

TESTDATA CP2004

We need provide the non-permanent and permanent imposed loads of beam load with the Attr flag be blank only. For beam loads that transferred from slabs, beams and columns, the non-permanent and permanent imposed loads are split automatically.

1.6 Wall Load

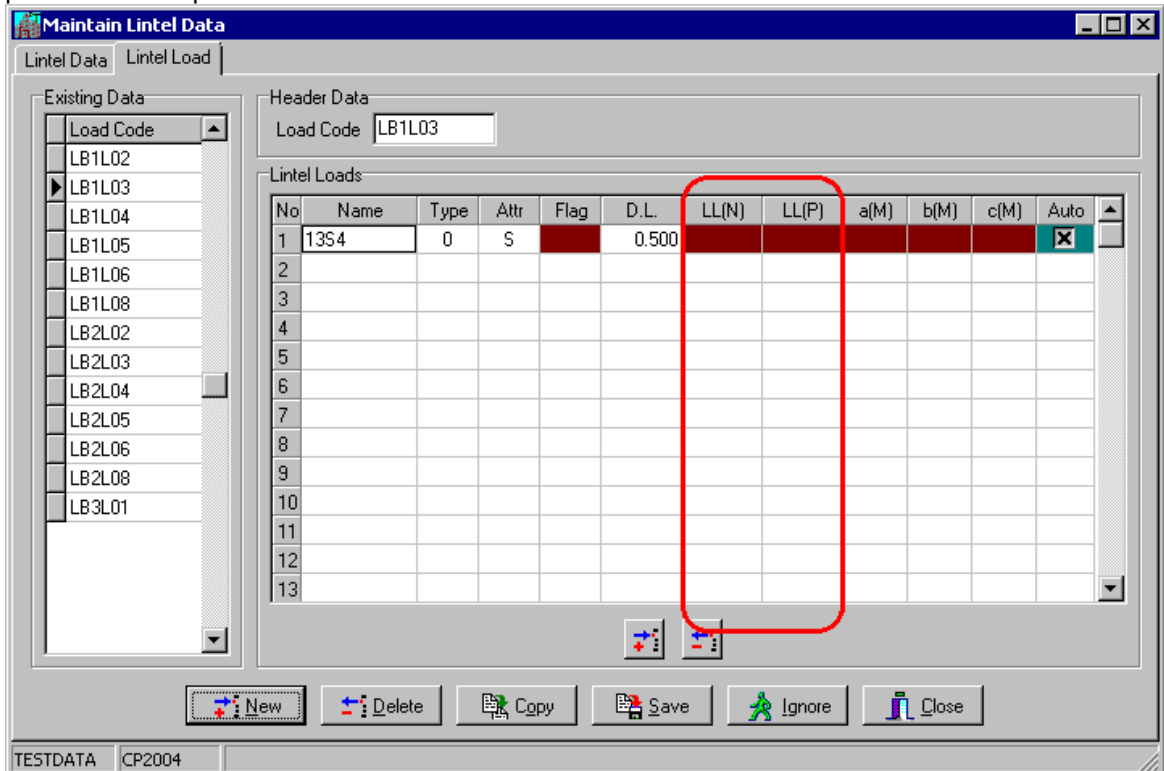
When we check the Enforce Fire Limit State checking check box, we split the live load to non-permanent and permanent.



We need provide the non-permanent and permanent imposed loads of wall load with the Type flag be blank only. For wall loads that transferred from slabs, beams and columns, the non-permanent and permanent imposed loads are split automatically.

1.7 Lintel Load

When we check the Enforce Fire Limit State checking check box, we split the live load to non-permanent and permanent.



We need provide the non-permanent and permanent imposed loads of lintel load with the Attr flag be blank only. For lintel loads that transferred from slabs, beams and columns, the non-permanent and permanent imposed loads are split automatically.

1.8 Corbel Data

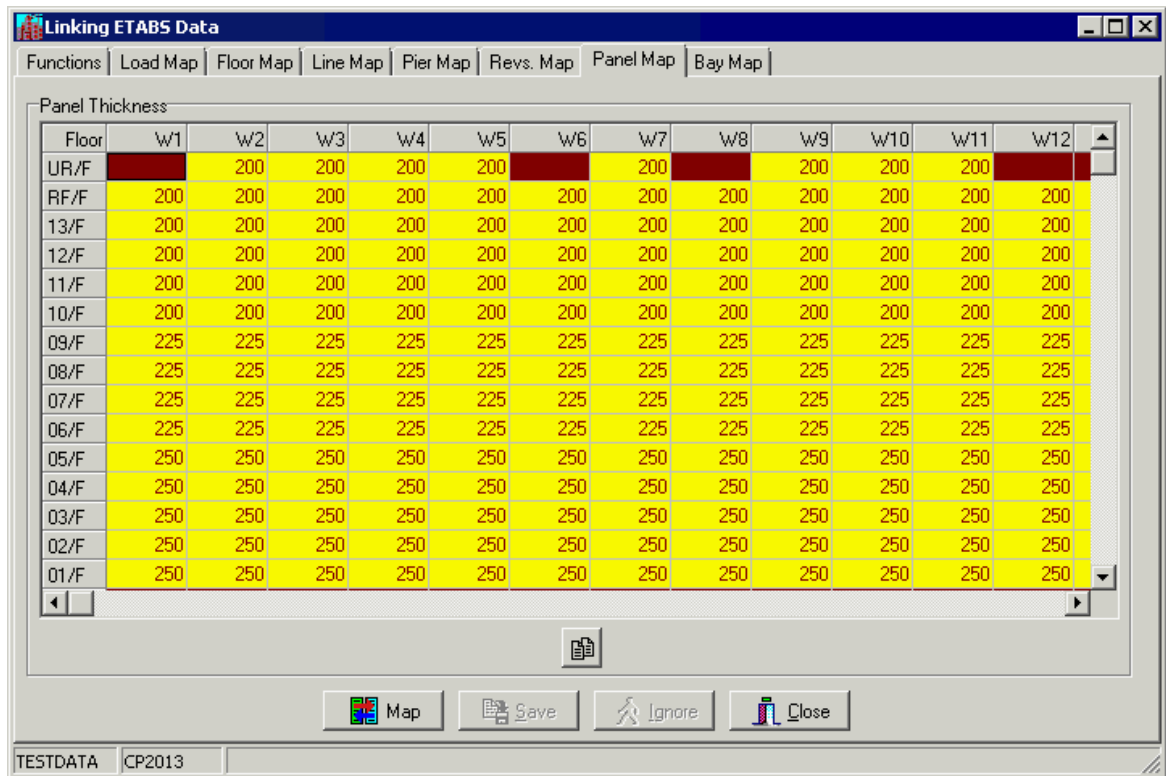
When we check the Enforce Fire Limit State checking check box, we split the live load to non-permanent and permanent.

| No | Name | Type | D.L. | L.L.(N) | L.L.(P) |
|----|------|------|---------|---------|---------|
| 1 | B1 | E | 56.350 | 62.320 | 0.000 |
| 2 | B2 | E | 123.560 | 63.540 | 0.000 |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |

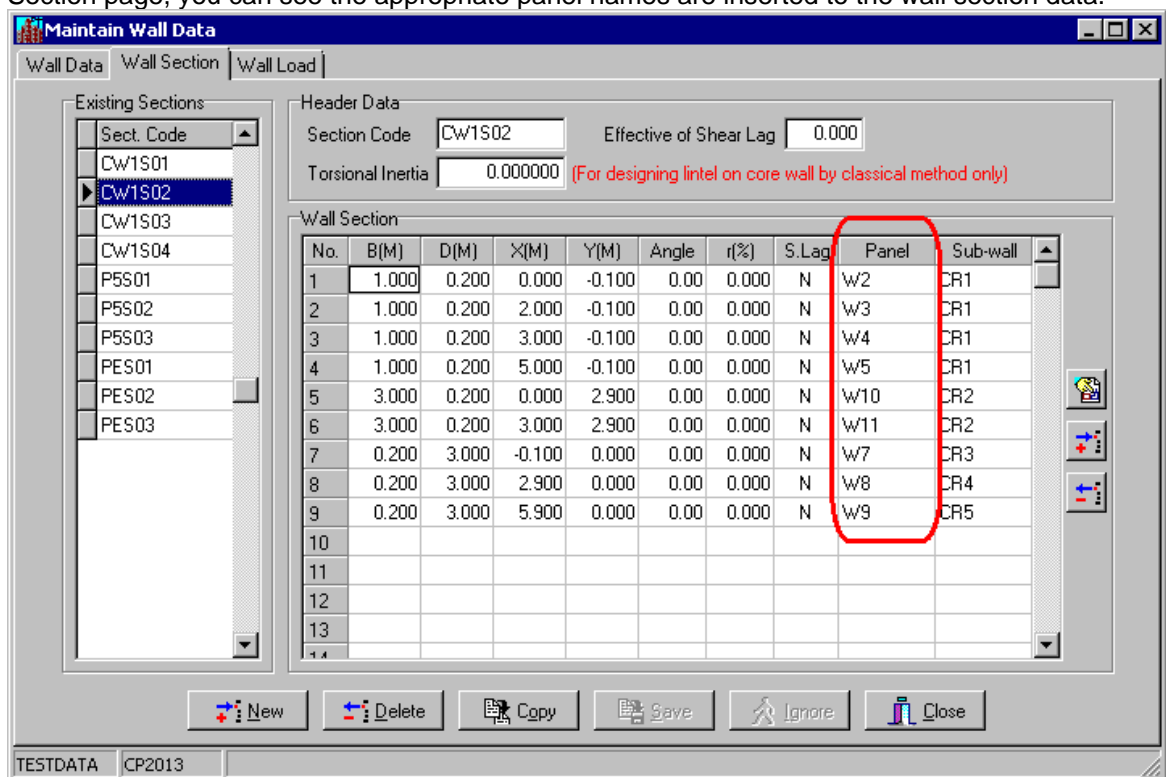
We need provide the non-permanent and permanent imposed loads of corbel loading with the Attr flag is "E" only. For corbel loading that transferred from slabs, beams and columns, the non-permanent and permanent imposed loads are split automatically.

2 Synchronize Thickness of Walls

When you change the thickness of elements of wall section and you want to update the e2k file in Linking ETABS Data Sub-command, you should manually change the thickness of panels. **SADS v17** provides a use full matching function to synchronize the thickness of panels with the thickness of wall elements automatically.



When you click the Map button, **SADS** matches the thickness of panels and the thickness of wall elements. If the matching is success, the text color is changed to red and the background color is changed to yellow. If you run the Maintenance Wall Data Sub-command and open the Wall Section page, you can see the appropriate panel names are inserted to the wall section data.



These panel names can synchronize the thickness of panels and thickness of wall section elements. You may try to change any thickness of wall elements in Wall Data Sub-command and check the appropriate thickness of panels in Panel Map of Linking ETABS Data Sub-command, you can see these thickness of panels are updated according the modified thickness of wall

elements automatically.

3 Manually Input End Conditions

The effective height of column can be calculated using By Table option defined in Master data. The end condition is defined by **SADS** according with the section size of column and beams. If you prefer to define these end condition numbers by yourself, you can enter the end condition numbers to following grid.

Maintain Column Data

Existing Columns

Column Mark: C1

Angle: 0.0

Footing: Hinge Fixed

Transfer plate connection Auto Generate

Bracing: Braced in X-X Braced in Y-Y

| Floor | B(mm) | D(mm) | Hx(M) | Hy(M) | R.F. | Fix | Ext | Check |
|-------|-------|-------|-------|-------|-------|-------------------------------------|--------------------------|-------|
| UR/F | 0 | | 3.200 | 3.200 | | | | |
| RF/F | 450 | 450 | 3.200 | 3.200 | 0 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | S |
| C7 | 13/F | 450 | 450 | 3.200 | 3.200 | 0 | <input type="checkbox"/> | N |
| C8 | 12/F | 450 | 450 | 3.200 | 3.200 | 10 | <input type="checkbox"/> | N |
| C9 | 11/F | 450 | 450 | 3.200 | 3.200 | 20 | <input type="checkbox"/> | S |
| C10 | 10/F | 450 | 450 | 3.200 | 3.200 | 30 | <input type="checkbox"/> | N |
| C11 | 09/F | 500 | 500 | 3.200 | 3.200 | 40 | <input type="checkbox"/> | N |
| C12 | 08/F | 500 | 500 | 3.200 | 3.200 | 40 | <input type="checkbox"/> | S |
| C13 | 07/F | 500 | 500 | 3.200 | 3.200 | 40 | <input type="checkbox"/> | N |
| C14 | 06/F | 500 | 500 | 3.200 | 3.200 | 40 | <input type="checkbox"/> | N |
| C15 | 05/F | 550 | 550 | 3.200 | 3.200 | 40 | <input type="checkbox"/> | S |
| | 04/F | 550 | 550 | 3.200 | 3.200 | 40 | <input type="checkbox"/> | N |
| | 03/F | 550 | 550 | 3.200 | 3.200 | 40 | <input type="checkbox"/> | N |

| # | Beam Mark | Flag | Angle | Auto |
|----|-----------|------|-------|-------------------------------------|
| 1 | N | R | 180.0 | <input type="checkbox"/> |
| 2 | TBX1 | L | 0.0 | <input checked="" type="checkbox"/> |
| 3 | N | R | 270.0 | <input type="checkbox"/> |
| 4 | TBY1 | L | 90.0 | <input checked="" type="checkbox"/> |
| 5 | 1 | X | 0.0 | <input type="checkbox"/> |
| 6 | 2 | Y | 0.0 | <input type="checkbox"/> |
| 7 | N | R | 0.0 | <input type="checkbox"/> |
| 8 | N | L | 0.0 | <input type="checkbox"/> |
| 9 | N | L | 0.0 | <input type="checkbox"/> |
| 10 | N | L | 0.0 | <input type="checkbox"/> |

Vehicular Load Info on 12/F

Load Class: N/A

Loaded Length: 0.000

Distributed qk: 0.000

Buttons: Add, Insert, Delete, Copy, Save, Ignore, Close

TESTDATA CP2013

In the line #5, the end condition 1 in X-X direction is defined. In the line #6, the end condition 2 in Y-Y direction is defined.

4 Default Values in Floor Data

In **SADS** previous version, the height of lowest columns are hard coded to 1.5 M. In **SADS v17** You can define the height of lowest column in Floor Data Sub-command.

Floor Information

Floor Data

| No | Fl.Code | Floor Name | Alternative | Level | Cl.Cover | Wl.Cover | Cl.Concrete | Wl.Concrete | Temper. | Batch C. |
|----|---------|------------|--------------------------|--------|----------|----------|-------------|-------------|---------|----------|
| 1 | UR/F | UR/F | <input type="checkbox"/> | 55.900 | 25 | 25 | C40 | C40 | 650.0 | UR |
| 2 | RF/F | RF/F | <input type="checkbox"/> | 52.700 | 25 | 25 | C40 | C40 | 650.0 | RF |
| 3 | 13/F | 13/F | <input type="checkbox"/> | 49.500 | 25 | 25 | C40 | C40 | 650.0 | 13 |
| 4 | 12/F | 12/F | <input type="checkbox"/> | 46.300 | 25 | 25 | C40 | C40 | 650.0 | TF |
| 5 | 11/F | 11/F | <input type="checkbox"/> | 43.100 | 25 | 25 | C40 | C40 | 650.0 | TF |
| 6 | 10/F | 10/F | <input type="checkbox"/> | 39.900 | 25 | 25 | C40 | C40 | 550.0 | TF |
| 7 | 09/F | 09/F | <input type="checkbox"/> | 36.700 | 25 | 25 | C40 | C40 | 550.0 | TF |
| 8 | 08/F | 08/F | <input type="checkbox"/> | 33.500 | 25 | 25 | C40 | C40 | 550.0 | TF |
| 9 | 07/F | 07/F | <input type="checkbox"/> | 30.300 | 25 | 25 | C40 | C40 | 550.0 | TF |
| 10 | 06/F | 06/F | <input type="checkbox"/> | 27.100 | 25 | 25 | C40 | C40 | 550.0 | TF |
| 11 | 05/F | 05/F | <input type="checkbox"/> | 23.900 | 25 | 25 | C45 | C45 | 550.0 | TF |
| 12 | 04/F | 04/F | <input type="checkbox"/> | 20.700 | 25 | 25 | C45 | C45 | 550.0 | TF |
| 13 | 03/F | 03/F | <input type="checkbox"/> | 17.500 | 25 | 25 | C45 | C45 | 550.0 | TF |
| 14 | 02/F | 02/F | <input type="checkbox"/> | 14.300 | 25 | 25 | C50 | C50 | 550.0 | 2F |
| 15 | 01/F | 01/F | <input type="checkbox"/> | 10.300 | 25 | 25 | C50 | C50 | 550.0 | 1F |

Lowest Dimension
Options:
 Length
 Level

Global Change
Old Code:
New Code:

Important Note:
If beam, column, wall and lintel data have been input, the floor code in the grid can not be changed directly on the grid, otherwise some data can not be retrieved from database. Please use global change to change this floor code.

Add Insert Delete Save Ignore Close

TESTDATA CP2013

In Lowest Dimension group box, you can define the height of lowest columns in this project. If you select Length option, you can enter the height to the edit box directly. If you select Level option, you can enter the level of the top of pile cap. The height of lowest columns are equal to the distance between the level and the level of upper floor.