Chapter 1

Introduction to RISA-3D

Learning Objectives

After completing this chapter, you will be able to:

- *Understand the basic features of RISA-3D*
- *Start RISA-3D software*
- *Use different components of the user interface of RISA-3D*
- *Start a new project in RISA-3D*
- *Import different files to RISA-3D*

INTRODUCTION

RISA-3D is used for creating, analyzing, and designing any type of structure through its flexible modeling environment and user interface. The three basic activities which are to be carried out to achieve this goal are: model generation, calculations to obtain the analytical results, and result verification. All these activities are discussed individually in different chapters. RISA-3D is designed for engineers who understand the process of modeling, analyzing, and designing a structure.

BASIC FEATURES OF RISA-3D

The basic features of RISA-3D are listed below:

1) State-of-the art modeling environment such as multiple view interface, and advanced selection and drawing tools.

2) Ability to perform rapid structural analysis and design of buildings, racks, bridges, tanks, stadia, arenas, culverts, and so on

3) Ability to generate 2D/3D CAD models

4) Ability to model truss and beam members, plates, solids, linear and non-linear cables, and curvilinear beams

5) Advanced automatic load generation facilities for wind, seismic, and moving loads

6) Spreadsheet based features

7) Graphical and numerical visualization of results

8) Analysis and design link with Autodesk Revit

9) Ability to import and export files in DXF, STAAD, DESCON, and structural desktop format

STARTING RISA-3D

You can start RISA-3D by double-clicking on the RISA-3D icon available on the desktop. Alternatively, choose **Start > All Programs > RISA 3D > RISA-3D 14.0** from the taskbar (for Window 7), refer to Figure 1-1; the interface will be displayed.

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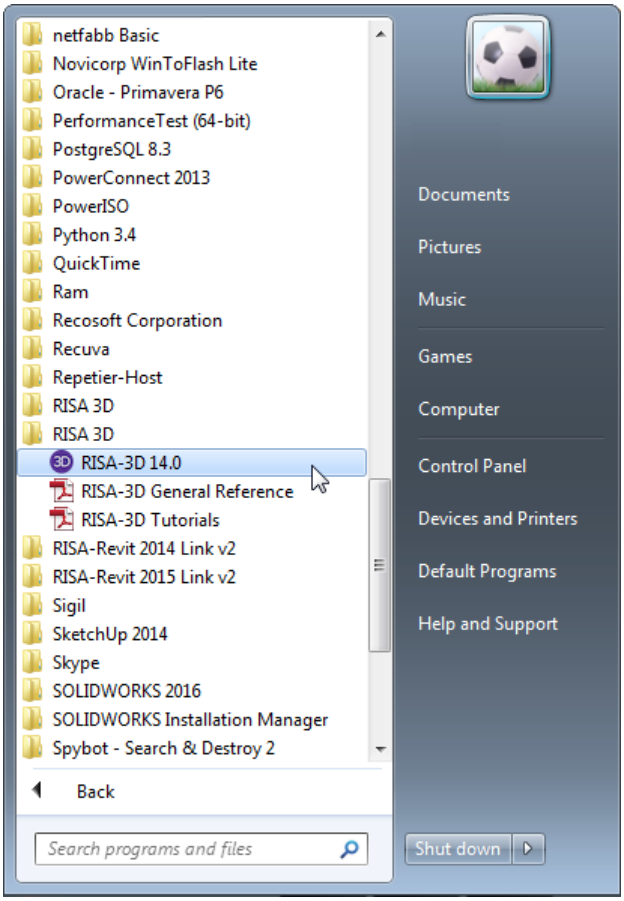

Figure 1-1 *Starting* ***RISA-3D 14.0*** *from the task bar*

USER INTERFACE

The user interface of RISA-3D consists of main menu, shortcut menus, toolbars, and keyboard shortcuts, refer to Figure 1-2. The interface elements are exclusively designed to provide an easy access to the tools and windows. These elements are discussed next.

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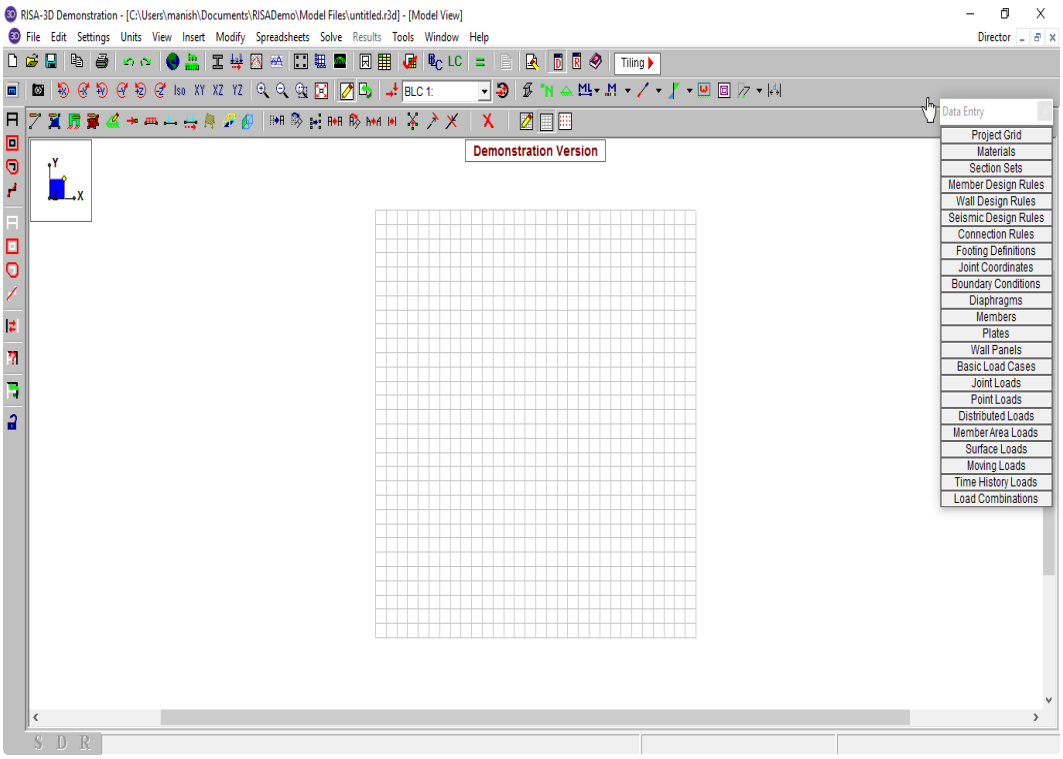

Figure 1-2 RISA-3D Interface

Menu Bar

The menu bar is located at the top of the interface. It comprises of different menus: **File**, **Edit**, **Settings**, **Units**, **View**, **Insert**, **Modify**, **Spreadsheets**, **Solve**, **Results**, **Tools**, **Window**, and **Help**. The menus in the menu bar are discussed next.

File

The **File** menu contains the options which are used for performing different file operations such as creating new files, opening an existing file, saving files, printing files, and so on. Figure 1-2 shows different options in the **File** menu.

The **New** option in the menu is used for creating a new file. On choosing this option, a new file will be opened in RISA-3D. The **Open** option is used for opening an existing file. The **Append** option is used to append another RISA-3D model into the current model. The **Print** option is used to print different files. The **Import** option is used to import data from other formats, such as RISA-2D file, DXF file, STAAD file, and Autodesk Revit Exchange file. The **Save** option is used to save the file. The **Exit** option is used to exit RISA-3D graphical environment.

Edit

The **Edit** menu contains the options that are used to perform editing operations such as copy, paste, undo, redo, insert new line into a spreadsheet, and so on. Figure 1-3 shows different options in the **Edit** menu. You can use the **Undo** and **Redo** options to undo/redo an operation.

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The **Copy** option is used to copy the selected object to clipboard. The **Paste** option is used to paste an object from the clipboard into RISA-3D. The **Insert Line**, **Delete Line**, **Repeat Line**, **Mark All Lines**, **UNMark Lines**, **Delete Marked Lines** options are used to perform operations in a spreadsheet. The **Find** option is used to locate an item in the spreadsheet.

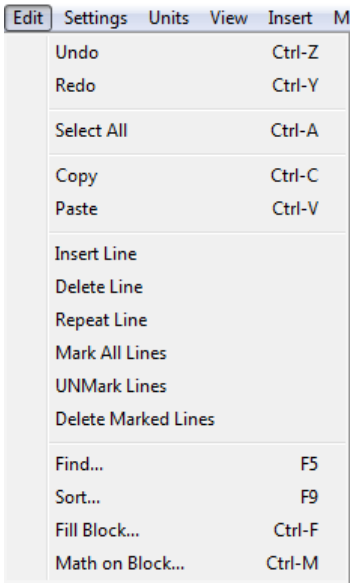

Figure 1-3 *Different options in the* ***Edit*** *menu*

Settings

The **Settings** menu invokes the **(Global) Model Settings** dialog box. This dialog box is discussed in detail in further chapters.

Units

The **Units** menu invokes the **Unit Settings** dialog box. This dialog box is discussed in detail in further chapters.

View

The **View** menu contains the options that affect the visibility or appearance of the model and various elements of the interface. Figure 1-4 shows different options in the **View** menu.

The **New View** option opens up a new model view. The **Save or Recall Views** option is used to save a view or recall any previously saved view. The **Refresh All** option refreshes all the windows that are open in RISA-3D. The **Select** and **Unselect** options are used to select or deselect the model elements. The **Save or Recall Selection States** option allows you to save or recall any previously saved element selections. The **Zoom** option allows you to zoom in and out the model. The **Rotate** option is used to snap the model view to global planes or an isometric view. The **Render** option allows you to toggle on or off between various rendered views of the current model. The **Drawing Grid** and **Project Grid** options are used to toggle the display on or off for

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the drawing and project grids. The **Axes**, **Boundaries**, and **Loads** options are used to toggle on or off the global axes, boundary conditions, and model loads, respectively. The **Joint Labels**, **Member Labels**, **Plate Labels**, and **Solid Labels** options are used to toggle on or off the labels for joints, members, plates and solids, respectively.

Insert

The **Insert** menu contains the options that are used to insert new items into the model. Figure 1-5 shows different options in the **Insert** menu.

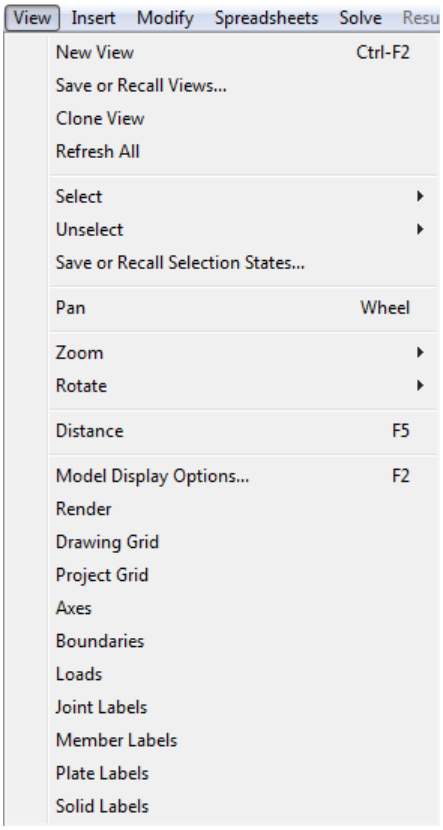

Figure 1-4 *Different options in the* ***View*** *menu*

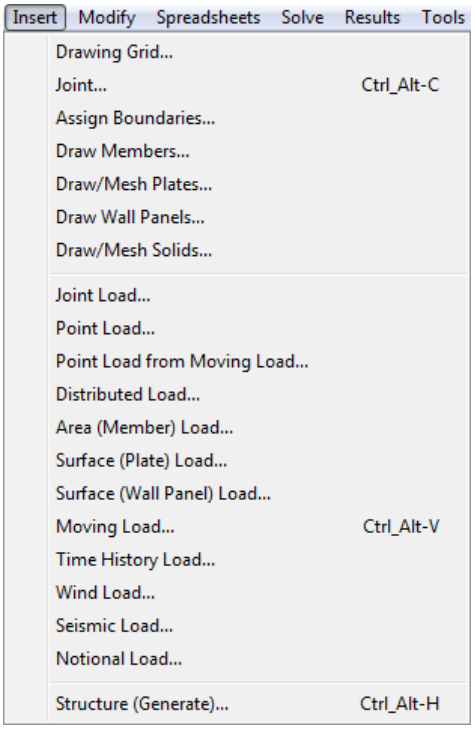

Figure 1-5 *Different options in the* ***Insert*** *menu*

Modify

The **Modify** menu contains the options that are used to modify the existing items in the model. Figure 1-6 shows different options in the **Modify** menu.

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Spreadsheets

The **Spreadsheets** menu contains the options that provides access to all the spreadsheets. Figure 1-7 shows different options in the **Spreadsheets** menu.

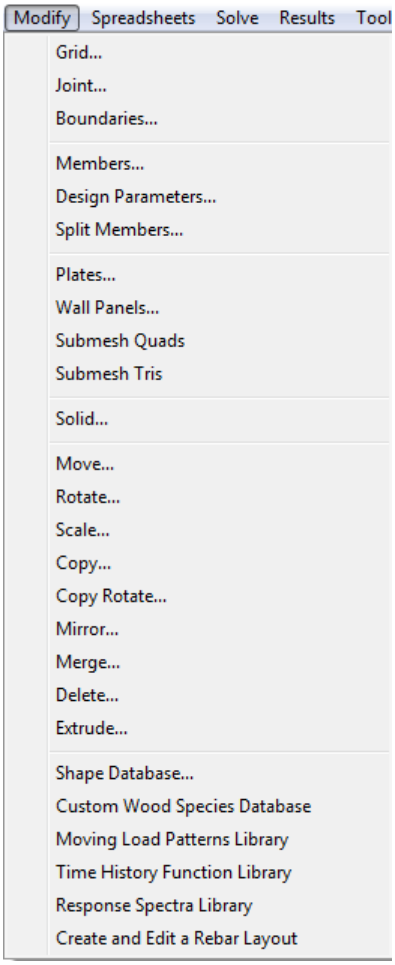

Figure 1-6 Different options in the ***Modify*** *menu*

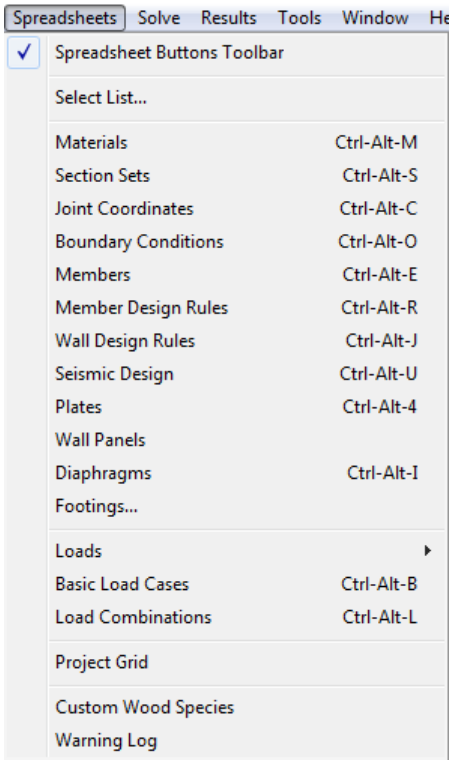

Figure 1-7 Different options in the ***Spreadsheets*** *menu*

Solve

The **Solve** menu is used to invoke the process of the analysis within RISA-3D.

Results

The **Results** menu contains the options that provide access to result spreadsheets. Figure 1-8 shows different options in the **Results** menu.

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Tools

The **Tools** menu contains the miscellaneous tools and options which are used for performing different tasks such as relabeling the elements, merging the models, aligning, axes swapping, and so on. Figure 1-9 shows different options in the **Tools** menu.

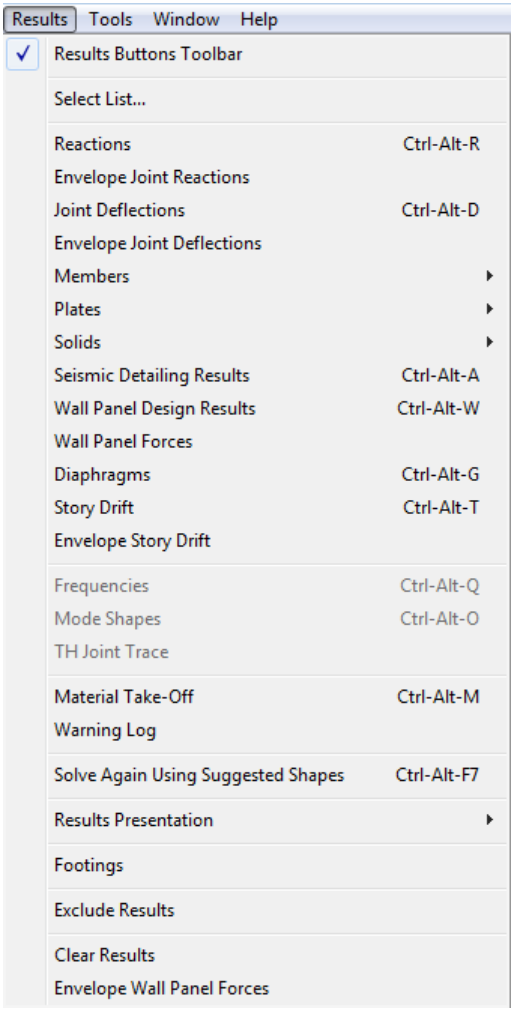

Figure 1-8 Different options in the ***Results*** *menu*

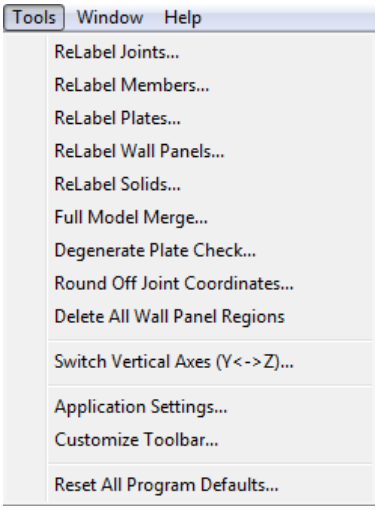

Figure 1-9 Different options in the ***Tools*** *menu*

Window

The options in the **Window** menu allow you to rearrange the open windows. Figure 1-10 shows various options in the **Window** menu.

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Help

The **Help** menu contains different options that are used to access offline help document, update services, and about RISA-3D. Figure 1-11 shows various options in the **Help** menu.

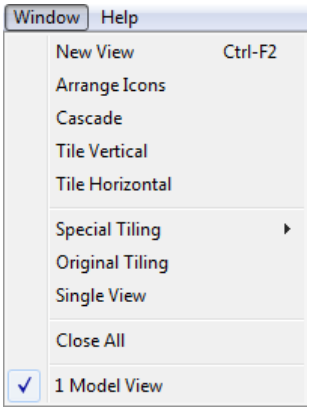

*Figure 1-10 Options in the **Window** menu*

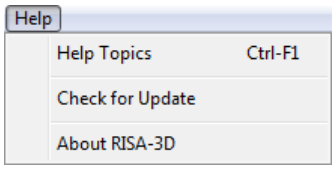

*Figure 1-11 Options in the **Help** menu*

Toolbars

RISA-3D comprises of various toolbars that are available in the interface. These toolbars contains various tools which are used for creating new file, opening an existing file, changing views, printing, rotating tools, viewing results, and so on. To know about any particular tool, hover the cursor over the tool; a pop-up menu will be displayed with the description of the tool.

RISA Toolbar

The RISA toolbar is located on the top of the interface and below the menu bar. It contains different tools which are used for accessing files and windows. Figure 1-12 shows various tools available in the RISA toolbar.

Figure 1-12 Tools in the RISA toolbar

Window Toolbar

The Window toolbar is located just below the RISA toolbar. The tools in this toolbar are displayed based on the active window. When the model window is active, the Window toolbar displays tools such as Rotate and Zoom tools. Figure 1-13 shows different tools available in the Window toolbar.

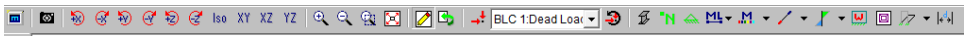

Figure 1-13 Tools in the Window toolbar

Drawing Toolbar

You can toggle on or off the Drawing toolbar using the **Activate the Graphic Editing Toolbar (Ctrl-G)** button located in the Window toolbar. This toolbar is located at the top of the model view. The tools available in this toolbar are used to draw, load, and modify the given model graphically. Figure 1-14 shows different tools in the Drawing toolbar.

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Figure 1-14 *Tools in the Drawing toolbar*

Selection Toolbar

This toolbar is located vertically on the left in the RISA-3D interface. The options available in this toolbar are used to select and unselect the model elements. Figure 1-15 shows different tools available in the selection toolbar.

Figure 1-15 *Tools in the Selection toolbar*

Model View Area

In RISA-3D, the model view area contains the model. In this area, you can graphically create and modify the model elements. Figure 1-16 shows the model view area.

Data Entry Floating Window

The **Data Entry** floating window can be placed anywhere on the screen. This window contains the buttons which are used to invoke the spreadsheets for entering the data. Figure 1-17 shows the **Data Entry** floating window.

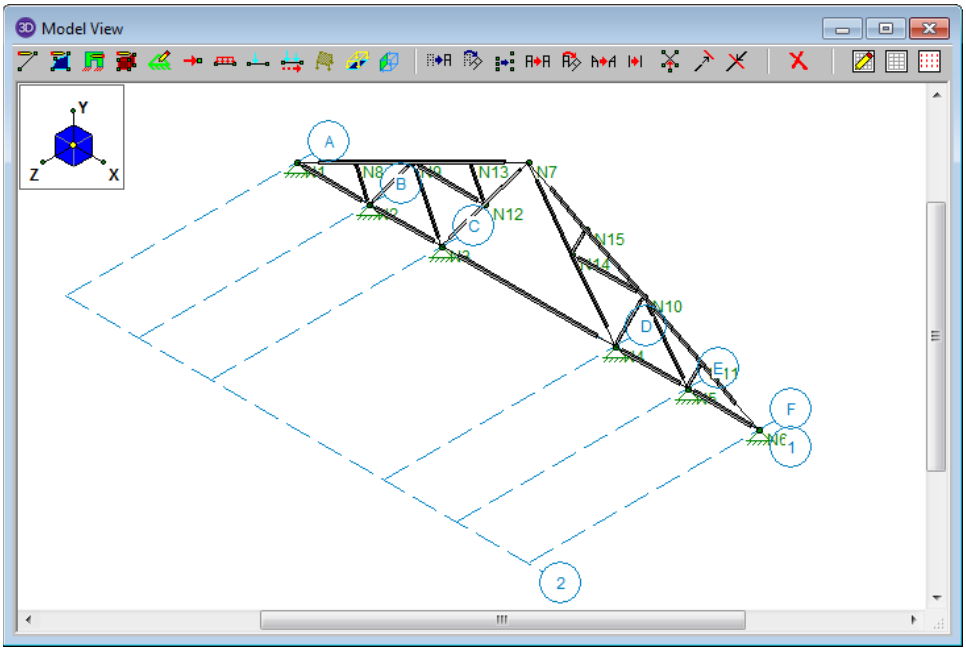

Figure 1-16 *The model view area*

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Results Floating Window

The **Results** floating window contains the buttons which are used to invoke the results spreadsheets. Figure 1-18 shows the **Results** floating window.

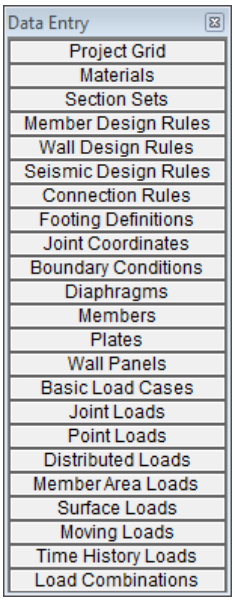

Figure 1-17 *Buttons in the* ***Data Entry*** *floating window*

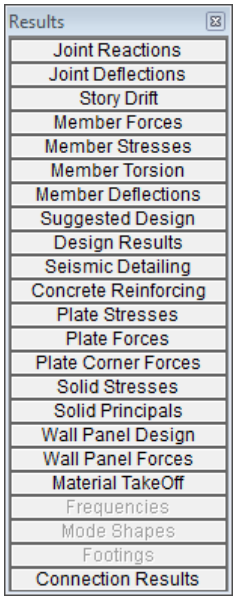

Figure 1-18 *Buttons in the* ***Results*** *floating window*

Self-Evaluation Test

Answer the following questions and then compare them to those given at the end of this chapter:

1. Which of the following formats are supported by RISA-3D?

   (a) **DXF** (b) **STAAD**
   (c) **DESCON** (d) All the above

2. Which of the following options from the menu bar is used to display the **(Global) Model Settings** dialog box?

   (a) **Units** (b) **View**
   (c) **Settings** (d) **Insert**

3. When the model window is active, the window toolbar displays tools such as _____ and_____.

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4. **Loads** options is used to toggle on or of the global axes. (T/F)

5. The **Solid Labels** options are used to toggle on or off the label for joints. (T/F)

Review Questions

1. The _____ option allows you to save or recall any previously saved element selection.

2. The **Axes** option is used to toggle on or off the boundary conditions. (T/F).

3. RISA-3D can generate 2D/3D CAD models. (T/F)

4. RISA-3D provides advanced automatic load generation facilities for wind, seismic, and moving loads. (T/F)

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Answers to Self-Evaluation Test