Exploring Autodesk Revit 2023 for Structure

Includes Application of Robot Structural Analysis Professional 2023

(13th Edition)

CADCIM Technologies

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CADCIM Technologies

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To teachers, who make it possible to disseminate knowledge
to enlighten the young and curious minds
of our future generations

To students, who are dedicated to learning new technologies
and making the world a better place to live in

SPECIAL RECOGNITION

A special thanks to Mr. Denis Cadu and the ADN team of Autodesk Inc.
for their valuable support and professional guidance to
procure the software for writing this textbook

THANKS

To employees of CADCIM Technologies and
Tickoo Institute of Emerging Technologies (TIET)
for their valuable help

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Preface

Autodesk Revit 2023 for Structure

Autodesk Revit is a Building Information Modeling software developed by Autodesk. The structural tools in Revit are primarily used in structural engineering and they help the users to design structural models using both parametric 3D modeling and 2D drafting elements. The Revit building information model comprises of a physical representation of a building which is fully associated with analytical representation. The building information model in Revit can be used for structural designing, production of drawings, coordination of the project, and also for third party structural analysis application.

The **Exploring Autodesk Revit 2023 for Structure** textbook explains the concepts and principles of Revit Structure through practical examples, tutorials, and exercises. This enables the users to harness the power of BIM with Autodesk Revit for their specific use. In this textbook, the author emphasizes on physical modeling, analytical modeling, rebar modeling, and quantity scheduling. Also, this textbook covers the various stages involved in analyzing the model in Robot Structural Analysis software. This textbook is specially meant for professionals and students in structural engineering, civil engineering, and allied fields in the building industry.

In this textbook, special emphasis has been laid on the concepts of structural modeling, which have been explained using relevant graphical examples and illustrations. The accompanying tutorials and exercises, which relate to the real world projects, help you understand the usage and abilities of the tools available in Autodesk Revit for Structure. Along with the main text, the chapters have been punctuated with tips and notes to make various concepts clear, thereby enabling you to create your own innovative projects.

As you go through this textbook, you will work on tutorials and exercises that can be used to build a complete project. Each of these tutorials and exercises, though complete in themselves, will be a step toward accomplishing the larger projects.

The main features of this textbook are as follows:

- **Project-based Approach**
  The author has adopted a project-based approach and the learn-by-doing theme throughout the textbook. This approach guides the users through the process of creating the designs given in the tutorials.

- **Real-World Designs as Projects**
  The author has used real-world building designs and architectural examples as projects in this textbook so that the users can correlate them to the real-time designs.

- **Tips and Notes**
  Additional information related to various topics is provided to the users in the form of tips and notes.

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- **Learning Objectives**
  The first page of every chapter summarizes the topics that are covered in that chapter.

- **Self-Evaluation Test, Review Questions, and Exercises**
  The chapter ends with Self-Evaluation Test so that the users can assess their knowledge of the chapter. The answers to Self-Evaluation Test are given at the end of the chapter. Also, the Review Questions and Exercises are given at the end of the chapters and they can be used by the instructors as test questions and exercises.

- **Heavily Illustrated Text**
  The text in this book is heavily illustrated with about 200 line diagrams and screen capture images.

Symbols Used in the Book

Note



The author has provided additional information to the users about the topic being discussed in the form of notes.

Tip



Special information and techniques are provided in the form of tips that help in increasing the efficiency of the users.

Enhanced



This symbol indicates that the command or tool being discussed has been enhanced in this release.

Formatting Conventions Used in the Textbook

Please refer to the following list for the formatting conventions used in this textbook.

- Names of tools, buttons, options, browser, palette, panels, and tabs are written in boldface.
  Example: The **Beam** tool, the **Modify** button, the **Structure** panel, the **Home** tab, the **Properties** palette, **Project Browser**, and so on.

- Names of dialog boxes, drop-downs, drop-down lists, list boxes, areas, edit boxes, check boxes, and radio buttons are written in boldface.
  Example: The **Options** dialog box, the **Column** drop-down in the **Structure** panel of the **Structure** tab, the **Name** edit box in the **Name** dialog box, the **Chain** check box in the **Options Bar**, and so on.

- Values entered in edit boxes are written in boldface.
  Example: Enter **4'** in the **Offset** edit box.

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- Names of the files saved are italicized. Example: *c03_Industrial-Complex_tut2.rvt*

Ribbon: Modify | (Elements / Components) > Modify > Move
Shortcut Keys: MV

- When you select an element or a component, a contextual tab is displayed depending upon the entity selected. In this textbook, this contextual tab is referred to as **Modify | (Elements / Components)**

Naming Conventions Used in the Textbook

Tool

If you click on an item in a panel of the ribbon and a command is invoked to create/edit an object or perform some action, then that item is termed as **tool**.

For example:
Beam tool, **Structural Column** tool, **Isolated** tool
Filled Region tool, **Trim/Extend to Corner** tool, **Rotate** tool

If you click on an item in a panel of the ribbon and a dialog box is invoked wherein you can set the properties to create/edit an object, then that item is also termed as **tool**, refer to Figure 1.

For example:
Load Family tool, **Beam** tool, **Wall** tool
Structural Wall tool, **Visibility/Graphics** tool

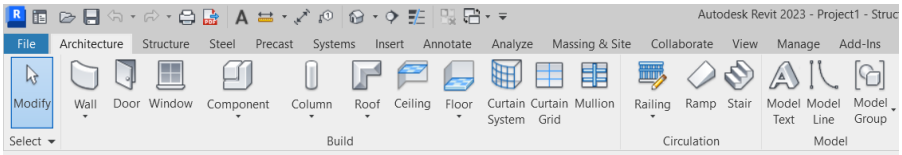

Figure 1 *Tools in the ribbon*

Button

The item in a dialog box that has a 3d shape like a button is termed as **button**. For example, **OK** button, **Cancel** button, **Apply** button, and so on. If the item in a ribbon is used to exit a tool or a mode, it is also termed as button. For example, **Modify** button, **Finish Edit Mode** button, **Cancel Edit Mode** button, and so on; refer to Figure 2.

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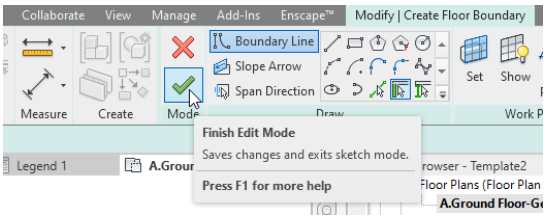

Figure 2 *Choosing the* ***Finish Edit Mode*** *button*

Dialog Box

In this textbook, different terms are used for referring to the components of a dialog box. Refer to Figure 3 for the terminology used.

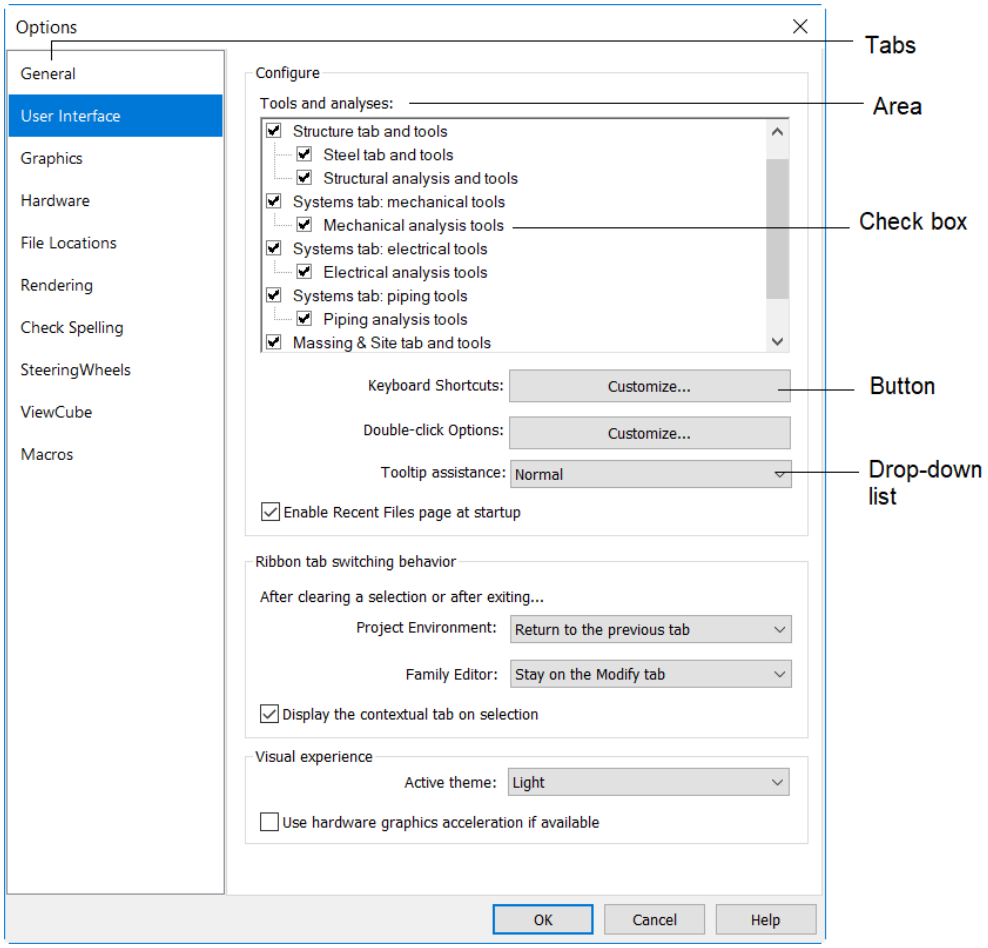

Figure 3 *The components of a dialog box*

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Drop-down

A drop-down is one in which a set of common tools are grouped together for creating an object or performing some action. You can identify a drop-down with a down arrow on it. These drop-downs are given a name based on the tools grouped in them. For example, **Wall** drop-down, **Component** drop-down, **Region** drop-down, and so on; refer to Figure 4.

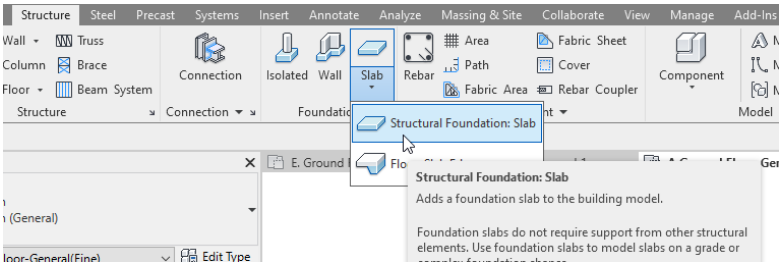

Figure 4 *Choosing a tool from the drop-down*

Drop-down List

A drop-down list is the one in which a set of options are grouped together. You can set various parameters using these options. You can identify a drop-down list with a down arrow on it. For example, **Type Selector** drop-down list, **Units** drop-down list, and so on; refer to Figure 5.

Options

Options are the items that are available in shortcut menus, drop-down lists, dialog boxes, drop-down lists, and so on. For example, choose the **Zoom In Region** option from the shortcut menu displayed on right-clicking in the drawing area; refer to Figure 6.

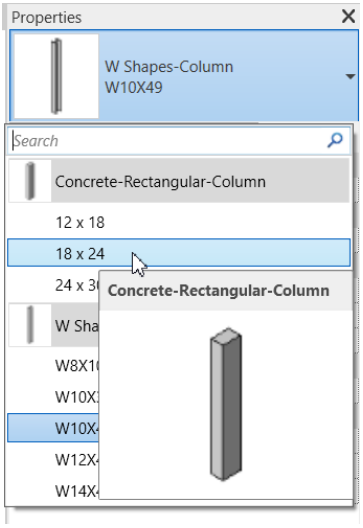

Figure 5 *Selecting an option from the* ***Type Selector*** *drop-down list*

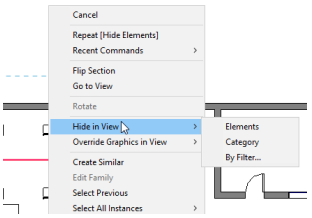

Figure 6 *Choosing an option from the shortcut menu*

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Free Companion Website

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The resources available for the faculty and students in this website are as follows:

Faculty Resources

- **Technical Support**
  You can get online technical support by contacting ***techsupport@cadcim.com***.

- **Instructor Guide**
  Solutions to all review questions and exercises in the textbook are provided in this guide to help the faculty members test the skills of the students.

- **Revit Files**
  The Revit files used in tutorials and exercises are available for free download.

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- **Technical Support**
  You can get online technical support by contacting ***techsupport@cadcim.com***.

- **Revit Files**
  The Revit files (*.rvt*) used in tutorials and examples are available for free download.

- **Learning Resources**
  Additional learning resources at *https://revitxperts.blogspot.com*

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