

Table of Contents

Dedication	iii
Preface	xii

Chapter 1: Introduction to Autodesk Revit Structure 2012

Introduction to Autodesk Revit Structure	1-2
Autodesk Revit Structure as a Building Information Modeler	1-2
Basic Concepts and Principles	1-3
Understanding the Parametric Building Modeling Technology	1-4
Terms Used in Autodesk Revit Structure	1-4
Creating a Structural Model Using Parametric Building Elements	1-6
Visibility/Graphics Overrides, Scale, and Detail Level	1-8
Extracting Project Information	1-8
Creating a Structural Drawing Set	1-8
Creating an Unusual Building Geometry	1-8
Flexibility of Creating Special Elements	1-9
Creating Structural Layouts	1-9
Working on Large Projects	1-9
Working in Large Teams and Coordinating with Consultants	1-9
Starting Autodesk Revit Structure 2012	1-10
User Interface	1-11
Title Bar	1-12
Ribbon	1-12
Application Frame	1-14
Status Bar	1-16
View Control Bar	1-16
Options Bar	1-17
Type Selector	1-17
Drawing Area	1-17
Project Browser	1-18
Keyboard Accelerators	1-18
Properties Palette	1-18
Dialog Boxes	1-19
Multiple Document Environment	1-20
Interoperability of Autodesk Revit Structure	1-20
Project Storm for Autodesk Revit Structure <i>New</i>	1-21
Building Information Modeling and Autodesk Revit Structure 2012	1-23
Worksharing Using Revit Server <i>New</i>	1-23
Linking Analytical Model to Analysis <i>Enhanced</i>	1-25
Autodesk Revit Structure Help <i>Enhanced</i>	1-25
Using the Local Revit Structure 2012 Help	1-25
Using the Autodesk WikiHelp	1-27
Using the Context Sensitive Help	1-28

Chapter 2: Getting Started with Revit Structure

Starting a New Structural Project	2-2
Setting Project Units	2-3
Common Unit Type	2-4
Structural Unit Type	2-6
Structural Settings	2-8
The Symbolic Representation Settings Tab	2-8
Snaps Tool	2-14
The Dimension Snaps Area	2-15
The Object Snaps Area	2-15
The Temporary Overrides Area	2-16
Saving a Project	2-17
Using the Save As Tool	2-17
Using the Save Tool	2-18
The Options dialog box <i>Enhanced</i>	2-19
The General Tab	2-19
The Graphics Tab	2-20
The File Locations Tab	2-21
The Rendering Tab	2-21
The Spelling Tab	2-22
The SteeringWheels Tab	2-23
The ViewCube Tab	2-24
The User Interface Tab	2-26
Closing a Structural Project	2-26
Exiting a Structural Project	2-26
Opening an Existing Structural Project	2-27
Opening an Existing Project Using the Open Tool	2-27
Using the Windows Explorer to Open an Existing Project	2-29
Tutorial 1 - Commercial Complex	2-29
Tutorial 2 - Industrial Complex	2-32
Self-Evaluation Test	2-34
Review Questions	2-35
Exercise 1 - Academic Institution	2-36
Exercise 2 - Factory Shed	2-36

Chapter 3: Starting a New Project

Project Template	3-2
Creating a Custom Project Template	3-2
Settings for the Project Template	3-4
Using Levels	3-12
Understanding Controls in a Level	3-13
Adding Levels	3-14
Instance and Type Properties of a Level	3-15
Changing the Level Parameters	3-18
Controlling the Visibility of Levels	3-19

Grids	3-20
Creating Grids	3-21
Modifying Grids	3-27
Customizing the Grid Display	3-27
Controlling the Visibility of Grids	3-28
Working with Reference Planes	3-28
Working with Work Planes <i>Enhanced</i>	3-29
Setting a Work Plane	3-29
Controlling the Visibility of Work Planes	3-29
Using the Workplane Viewer Window	3-30
Working with Project Views	3-30
Viewing a Building Model	3-30
Controlling the Visibility of Elements in Views	3-31
Scope Box	3-31
Creating a Scope Box	3-31
Applying a Scope Box to Datum Elements	3-32
Controlling the Visibility of a Scope Box	3-32
Tutorial 1 - Commercial Complex	3-33
Tutorial 2 - Industrial Complex	3-44
Self-Evaluation Test	3-55
Review Questions	3-56
Exercise 1 - Academic Institution	3-57
Exercise 2 - Factory Shed	3-57
Exercise 3 - Residential Building	3-59

Chapter 4: Creating Structural Elements-I

Structural Columns <i>Enhanced</i>	4-2
Types of Structural Column	4-2
Loading Structural Column Families	4-3
Adding Structural Columns to a Project	4-4
Creating Openings in Structural Columns	4-10
Modifying the Element Properties of Structural Columns	4-12
Architectural Columns	4-19
Adding Structural Column to an Architectural Column	4-20
Difference between a Structural Column and an Architectural Column	4-21
Structural Walls <i>Enhanced</i>	4-21
Adding Structural Walls	4-21
Modifying Structural Walls	4-33
Tutorial 1 - Commercial Complex	4-34
Tutorial 2 - Industrial Complex	4-44
Self-Evaluation Test	4-48
Review Questions	4-48
Exercise 1 - Academic Institution	4-49
Exercise 2 - Factory Shed	4-49
Exercise 3 - Residential Structure	4-51

Chapter 5: Creating Structural Elements-II

Foundations	Enhanced	5-2
Foundation Wall		5-2
Shallow Foundations		5-3
Structural Floors		5-19
Adding Structural Floors		5-19
Modifying Structural Floors		5-23
Adding Openings to a Structural Floor		5-24
Beams		5-24
Adding Beams		5-25
Modifying Beams		5-26
Adding a Structural Beam System		5-27
Tutorial 1 - Commercial Complex		5-29
Tutorial 2 - Industrial-Complex		5-41
Self-Evaluation Test		5-49
Review Questions		5-50
Exercise 1 - Academic Institution		5-50
Exercise 2 - Factory Shed		5-51
Exercise 3 - Residential Building		5-52

Chapter 6: Using Editing Tools

Selecting Elements	Enhanced	6-2
Selecting a Single Element		6-2
Selecting Multiple Elements		6-3
Restoring a Selection		6-5
Selecting Elements Using the Filter Tool		6-5
The Filter Icon		6-6
Moving Structural Elements		6-7
Moving Elements by Changing Temporary Dimensions		6-7
Moving Elements By Dragging		6-7
Dragging End-joined Components		6-7
Moving Elements Using the Move Tool		6-8
Copying Structural Elements		6-9
Copying Elements Using the CTRL Key		6-9
Copying Elements Using the Copy Tool		6-10
Using the Create Similar Tool		6-11
Copying Elements Using the Clipboard		6-12
Rotating Structural Elements	Enhanced	6-15
Mirroring Structural Elements		6-16
Mirror - Pick Axis Tool		6-16
Mirror - Draw Axis Tool		6-17
Array Structural Elements		6-17
Linear Tool		6-17

Radial Tool	6-18
Resizing Elements	6-20
Pinning Elements	6-21
Aligning Elements	6-22
Matching Type Properties	6-23
Trimming and Extending Elements	6-24
Trim/Extend to Corner Tool	6-24
Trim/Extend Single Element Tool	6-24
Trim/Extend Multiple Elements Tool	6-24
Offsetting Elements	6-26
Deleting Elements	6-27
Grouping Elements	6-28
Creating Groups Using the Group Editor	6-29
Creating a Detail Group	6-30
Placing Groups	6-30
Modifying Groups	6-30
Excluding Elements from a Group	6-31
Saving and Loading Groups	6-31
Tutorial 1 - Commercial Complex	6-31
Tutorial 2 - Industrial Complex	6-37
Self-Evaluation Test	6-44
Review Questions	6-45
Exercise 1 - Academic Institution	6-45
Exercise 2 - Factory Shed	6-46
Exercise 3 - Residential Building	6-48

Chapter 7: Documenting a Structural Model

Dimensioning <i>Enhanced</i>	7-2
Types of Dimension	7-2
Using Temporary Dimensions	7-3
Entities in a Dimension	7-4
Adding Permanent Dimensions	7-5
Modifying Dimension Parameters	7-12
Locking Permanent Dimensions	7-14
Converting Temporary Dimensions into Permanent Dimensions	7-14
Text Notes	7-15
Adding Text Notes	7-15
Editing Text Notes	7-17
Adding Tags	7-19
Tagging Elements by Category	7-19
Tagging all Elements in a View	7-21
Beam Annotations	7-23
Tutorial 1 - Commercial Complex	7-28
Tutorial 2 - Industrial Complex	7-34
Self-Evaluation Test	7-39
Review Questions	7-40

Exercise 1 - Academic Institution	7-41
Exercise 2 - Factory Shed	7-41

Chapter 8: Creating Standard Views, Details, and Schedules

Elevation Views	8-2
Creating a Building Elevation View	8-2
Creating a Framing Elevation View	8-6
Section Views	8-7
Creating a Section View	8-7
Callout Views	8-10
Creating a Callout View	8-11
Displaying a Callout View	8-11
Modifying the Properties of a Callout View	8-11
Creating a Drafting View	8-14
Drafting a Detail	8-14
Duplicate Views	8-14
Creating Duplicate View as Dependent View	8-15
Graphical Column Schedules	8-16
Creating Graphical Column Schedule	8-16
Using Schedules in a Project <i>Enhanced</i>	8-16
Generating a Schedule	8-17
Editing a Schedule	8-20
Generating the Material Takeoff Schedule	8-20
Tutorial 1 - Commercial Complex	8-22
Tutorial 2 - Industrial Complex	8-29
Self-Evaluation Test	8-36
Review Questions	8-36
Exercise 1 - Academic Institution	8-37
Exercise 2 - Factory Shed	8-38

Chapter 9: 3D Views, Sheets, Analyses, and Reinforcements

Three-Dimensional (3D) views	9-2
Creating Orthographic 3D Views	9-2
Creating Perspective Views	9-2
Generating Shadows <i>Enhanced</i>	9-5
Solar Study	9-6
Sheets	9-9
Adding a Drawing Sheet to a Project	9-9
Adding Views to a Drawing Sheet	9-10
Modifying a Building Model in Sheets	9-13
Adding Schedules to a Drawing Sheet	9-13
Analytical Models <i>Enhanced</i>	9-14
Instance Parameters for an Analytical Model	9-15
Settings for an Analytical Model	9-20
Loading in Analytical Model	9-22

Setting Boundary Conditions	9-30
Analytical Model Tools	9-33
Adding Reinforcements	9-37
Place Rebar Parallel to Work Plane Tool	9-37
Cover Tool	9-39
Area Tool	9-40
Path Tool	9-41
Linking Building Models and Sharing Coordinates	9-41
Linking or Importing Models	9-41
Structural Analysis Interoperability <i>New</i>	9-43
Linking the Analytical Model for Analysis and Code Check	9-43
Tutorial 1 - Commercial Complex	9-46
Tutorial 2 - Industrial Complex	9-54
Self-Evaluation Test	9-57
Review Questions	9-58
Exercise 1 - Industrial Complex	9-59
Exercise 2 - Factory Shed	9-60
Student Project	1
Index	I-1