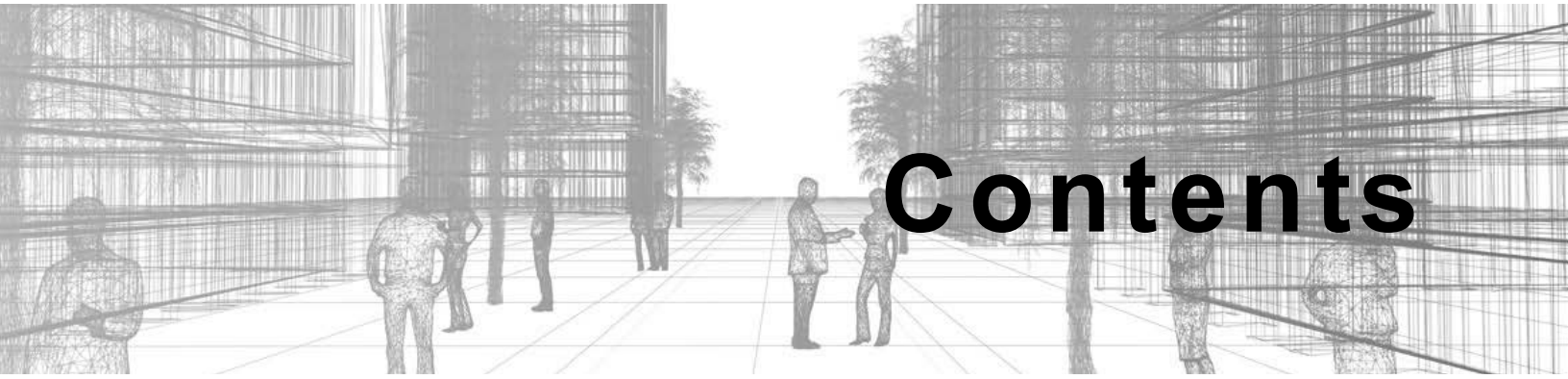
Autodesk®

Revit® 2022 Structure Fundamentals

SDC PUBLICATIONS

Better Textbooks. Lower Prices.
www.SDCpublications.com

Visit the following websites to learn more about this book:



Contents

Preface ..... **ix**

In This Guide ..... **xiii**

Practice Files ..... **xv**

Chapter 1: Introduction to BIM and Autodesk Revit **1-1**

1.1 BIM and Autodesk Revit **1-2**
Workflow and BIM 1-3
Revit Terms 1-4
Revit and Construction Documents 1-5

1.2 Overview of the Interface **1-6**

1.3 Starting Projects **1-22**
Opening Projects 1-23
Starting New Projects 1-25
Saving Projects 1-26

1.4 Viewing Commands **1-29**
Zooming and Panning 1-29
Viewing in 3D 1-31
Visual Styles 1-36

Practice 1a Open and Review a Project **1-38**

Chapter Review Questions **1-46**

Command Summary **1-48**

Chapter 2: Basic Sketching and Modify Tools **2-1**

2.1 Using General Sketching Tools **2-2**
Draw Tools 2-2
Drawing Aids 2-5
Reference Planes 2-8

2.2 Editing Elements **2-10**
Selecting Multiple Elements 2-13
Filtering Selection Sets 2-15

Practice 2a Sketch and Edit Elements 2-17

2.3 Working with Basic Modify Tools 2-24
Moving and Copying Elements 2-24
Rotating Elements 2-26
Mirroring Elements 2-28
Creating Linear and Radial Arrays 2-29

Practice 2b Work with Basic Modify Tools 2-33

2.4 Working with Additional Modify Tools 2-41
Aligning Elements 2-41
Splitting Linear Elements 2-42
Trimming and Extending 2-43
Offsetting Elements 2-45

Practice 2c Work with Additional Modify Tools 2-47

Chapter Review Questions 2-51

Command Summary 2-55

Chapter 3: Starting Structural Projects 3-1

3.1 Linking and Importing CAD Files 3-2
Introduction to Worksharing 3-7

Practice 3a Start a CAD-Based Structural Project 3-8

3.2 Linking in Revit Models 3-11
Managing Links 3-14

Practice 3b Start a Structural Project 3-16

3.3 Setting Up Levels 3-19
Modifying Levels 3-21
Creating Plan Views 3-24

3.4 Copying and Monitoring Elements 3-25

Practice 3c Copy and Monitor Elements 3-29

3.5 Coordinating Linked Models 3-35

Practice 3d Coordinate Linked Models 3-39

Chapter Review Questions 3-42

Command Summary 3-44

Chapter 4: Working with Views 4-1

4.1 Modifying the View Display 4-2
View Control Bar 4-2
View Properties 4-3
Hiding and Overriding Graphics 4-6
Temporarily Hide/Isolate 4-11
Using View Templates 4-13
Project Browser Organization 4-14

 © 2021, ASCENT - Center for Technical Knowledge®

4.2 Duplicating Views 4-17
Duplication Types 4-17
Practice 4a Duplicate Views and Set the View Display 4-20
4.3 Adding Callout Views 4-23
Working with Crop Regions 4-27
Plan Regions 4-28
Practice 4b Add Callout Views 4-31
4.4 Creating Elevations and Sections 4-33
Elevations 4-34
Sections 4-36
Modifying Elevations and Sections 4-37
3D Section Views 4-41
Practice 4c Create Elevations and Sections 4-45
Chapter Review Questions 4-52
Command Summary 4-55

Chapter 5: Grids and Structural Columns 5-1
5.1 Adding Grid Lines 5-2
Modifying Grid Lines 5-5
Practice 5a Add Grid Lines 5-8
5.2 Loading Components 5-13
5.3 Placing Structural Columns 5-16
Modifying Columns 5-18
Loading Structural Content 5-19
Purging Unused Elements 5-22
Practice 5b Place Structural Columns 5-23
Chapter Review Questions 5-25
Command Summary 5-26

Chapter 6: Foundations 6-1
6.1 Modeling Walls 6-2
Modifying Walls 6-10
Wall Joins 6-13
Wall Openings 6-14
6.2 Adding Wall Footings 6-16
Wall Profiles and Footings 6-18
Practice 6a Model Walls and Wall Footings 6-21
6.3 Creating Piers and Pilasters 6-26
Practice 6b Create Piers and Pilasters 6-28

6.4 Adding Isolated Footings 6-31
Working with Custom Families 6-33
Practice 6c Add Isolated Footings 6-35
Chapter Review Questions 6-42
Command Summary 6-44

Chapter 7: Structural Framing 7-1
7.1 Modeling Structural Framing 7-2
Beam Systems 7-4
Adding Bracing 7-8
Cross Bracing Settings 7-9
Practice 7a Model Structural Framing 7-11
7.2 Modifying Structural Framing 7-20
Sloping and Offsetting Beams 7-22
Adding Beam Cantilevers and Cutbacks 7-24
Changing the Cutback 7-25
Changing Justifications 7-27
Attaching a Column to a Beam 7-30
Applying Beam Coping 7-31
Editing Beam Joins 7-32
Practice 7b Modify Structural Framing 7-34
7.3 Adding Trusses 7-38
Attaching Trusses to Roofs 7-39
Setting Framing Types in Trusses 7-40
Practice 7c Add Trusses 7-42
Chapter Review Questions 7-48
Command Summary 7-50

Chapter 8: Adding Structural Slabs 8-1
8.1 Modeling Structural Slabs 8-2
Modifying Slabs 8-6
Slab Edges 8-8
Joining Geometry 8-9
Practice 8a Model Structural Slabs 8-10
8.2 Creating Shaft Openings 8-19
Practice 8b Create Shaft Openings 8-21
Chapter Review Questions 8-25
Command Summary 8-27

 © 2021, ASCENT - Center for Technical Knowledge®

Chapter 9: Structural Reinforcement 9-1

9.1 Structural Reinforcement 9-2
Setting the Rebar Cover Depth 9-3
Reinforcement Settings 9-5
Rebar Visibility 9-10

9.2 Adding Rebar 9-11
Sketching Rebar Shapes 9-18
Multi-planar Rebar 9-19
Free-Form Rebar 9-21

9.3 Modifying Rebar 9-23
3D Rebar Shapes 9-28
Rebar Coupler 9-31

Practice 9a Add Rebar 9-33

9.4 Reinforcing Walls, Floors, and Slabs 9-41
Area Reinforcement 9-42
Path Reinforcement 9-45
Fabric Reinforcement 9-47
Modifying Area, Path, and Fabric Reinforcement 9-53

Practice 9b Reinforce Structural Elements 9-56

Chapter Review Questions 9-66

Command Summary 9-69

Chapter 10: Structural Analysis 10-1

10.1 Preparing Projects for Structural Analysis 10-2
Structural Settings 10-3

10.2 Viewing Analytical Models 10-13
Graphic Overrides for Analytical Model Categories 10-16

Practice 10a Analytical Settings and Views 10-19

10.3 Adjusting Analytical Models 10-24
Analytical Justifications 10-25
Analytical Properties 10-26
Manually Adjusting the Analytical Model 10-28
Creating Analytical Links 10-31

10.4 Placing Loads 10-33
Boundary Conditions 10-33
Adding Loads 10-35

Practice 10b Place Loads 10-39

Chapter Review Questions 10-48

Command Summary 10-51

© 2021, ASCENT - Center for Technical Knowledge®

Chapter 11: Creating Construction Documents 11-1

11.1 Setting Up Sheets 11-2
Sheet (Title Block) Properties 11-4

11.2 Placing and Modifying Views on Sheets 11-5

Practice 11a Create Construction Documents 11-12

11.3 Printing Sheets 11-19
Printing Options 11-19
Export Views and Sheets to PDF 11-23

Chapter Review Questions 11-24

Command Summary 11-26

Chapter 12: Annotating Construction Documents 12-1

12.1 Working with Dimensions 12-2
Modifying Dimensions 12-5
Setting Constraints 12-9
Multi-Rebar Annotation 12-14

Practice 12a Work with Dimensions 12-17

12.2 Working with Text 12-22
Editing Text 12-25
Spell Checking 12-29
Creating Text Types 12-29

Practice 12b Work with Text 12-31

12.3 Adding Tags 12-37
Tagging in 3D Views 12-45
Beam Annotations 12-46

12.4 Adding Detail Lines and Symbols 12-49
Using Symbols 12-50
Structural Specific Symbols 12-50

Practice 12c Add Tags and Symbols 12-54

12.5 Creating Legends 12-58

Practice 12d Create Legends 12-61

Chapter Review Questions 12-66

Command Summary 12-68

Chapter 13: Creating Details 13-1

13.1 Setting Up Detail Views 13-2
Referencing a Drafting View 13-5
Saving Drafting Views 13-6

© 2021, ASCENT - Center for Technical Knowledge®

13.2 Adding Detail Components 13-9
Detail Components 13-9
Repeating Details 13-12
13.3 Annotating Details 13-13
Creating Filled Regions 13-13
Adding Detail Tags 13-16
Practice 13a Create a Detail Based on a Section Callout 13-19
Practice 13b Create a Bracing Detail 13-27
Practice 13c Additional Details 13-30
Chapter Review Questions 13-33
Command Summary 13-35
Chapter 14: Scheduling 14-1
14.1 Structural Schedules 14-2
14.2 Graphical Column Schedules 14-3
Modifying Graphical Column Schedules 14-4
Practice 14a Create a Graphical Column Schedule 14-7
14.3 Working with Schedules 14-10
Modifying Schedules 14-11
Modifying a Schedule on a Sheet 14-13
Split a Schedule Across Multiple Sheets 14-14
Practice 14b Work with Schedules 14-16
Chapter Review Questions 14-23
Command Summary 14-24
Appendix A: Introduction to Worksharing A-1
A.1 Introduction to Worksharing A-2
Worksharing Definitions A-2
Saving a Workshared Project A-6
Command Summary A-8
Appendix B: Additional Tools B-1
B.1 Selection Sets B-2
B.2 Placing Slanted Structural Columns B-5
B.3 Editing Wall Joins B-8
B.4 Creating Slab Types B-10
B.5 Creating Rebar Types B-12
B.6 Editing Plan and Section Profiles B-14
B.7 Working with Guide Grids on Sheets B-16

B.8 Revision Tracking B-18
Issuing Revisions B-23
B.9 Annotating Dependent Views B-24
Annotating Views B-25
B.10 Importing and Exporting Schedules B-28
B.11 Creating Building Component Schedules B-30
Schedule Properties B-39
Material Takeoff Schedules B-39
B.12 Creating a Repeating Detail B-41
Command Summary B-43

Appendix C: Project - Concrete Structure C-1
C.1 Start a Structural Project C-2
C.2 Create Foundation Elements C-6
C.3 Frame a Concrete Structure C-9

Index Index-1

© 2021, ASCENT - Center for Technical Knowledge®