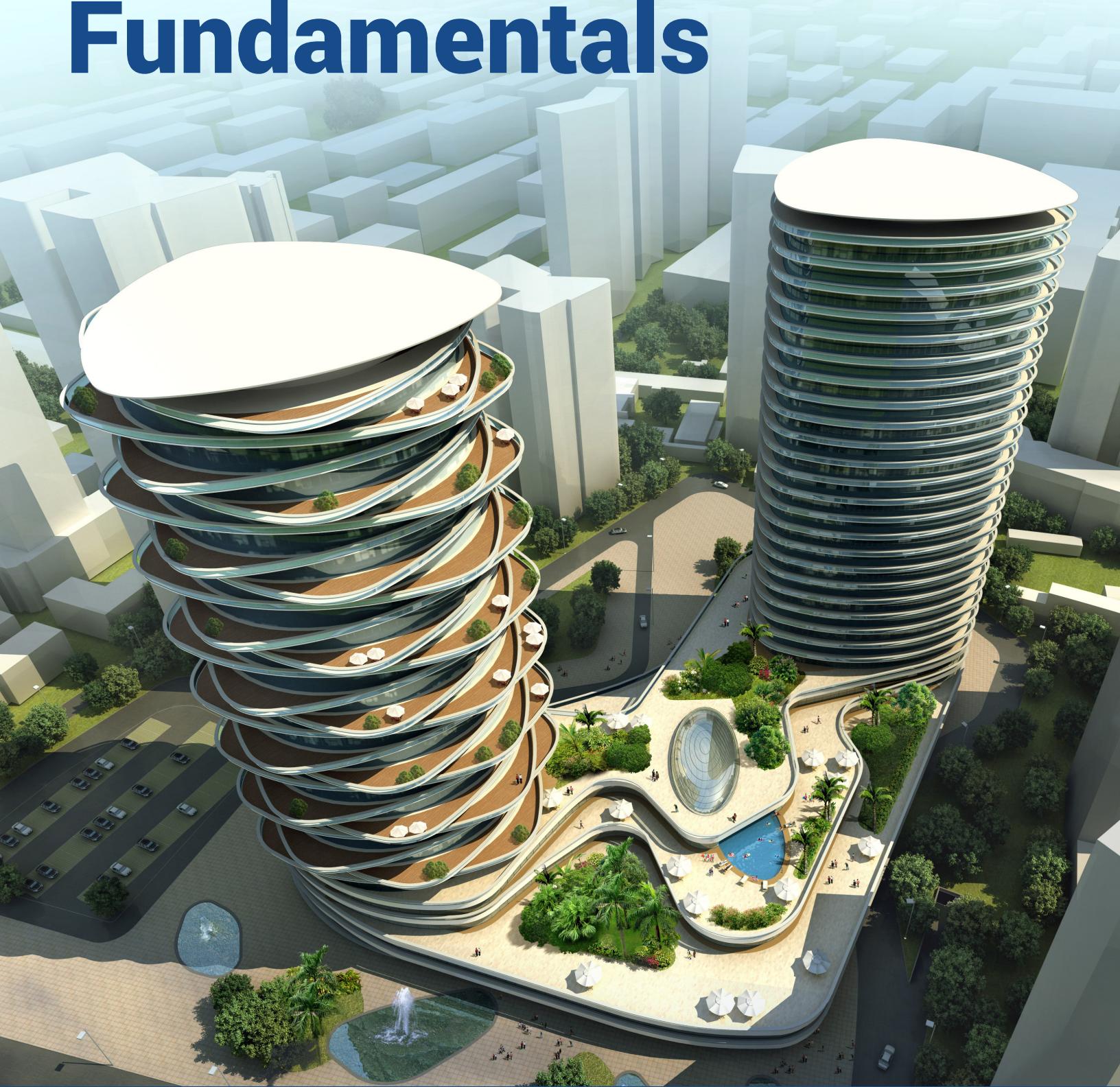


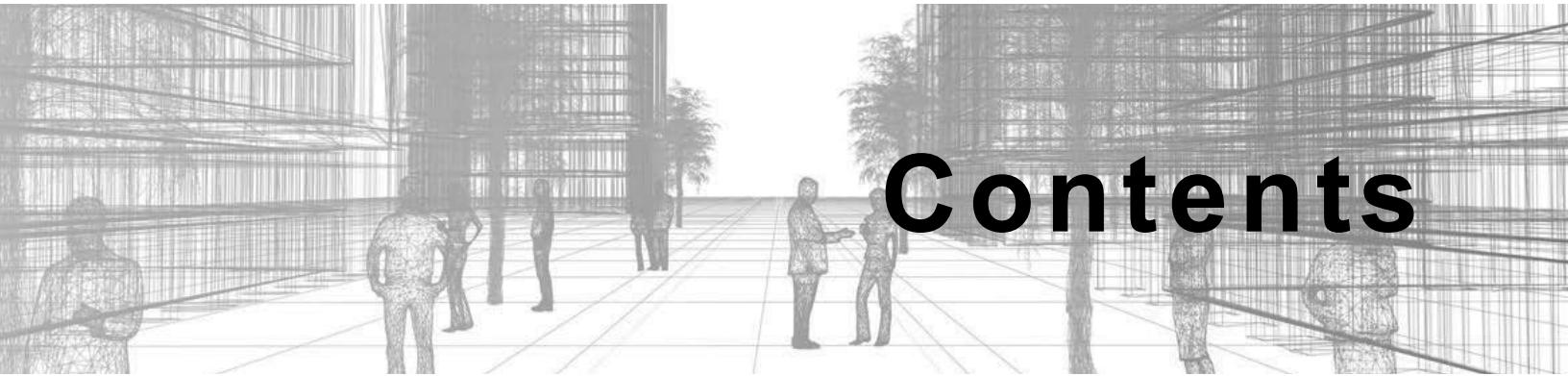
Autodesk®

# Revit® 2016 Structure Fundamentals



Visit the following websites to learn more about this book:





# Contents

<b>Preface .....</b>	<b>ix</b>
<b>In this Guide .....</b>	<b>xi</b>
<b>Practice Files .....</b>	<b>xv</b>
<b>Customizing the Interface .....</b>	<b>xvii</b>
<b>Chapter 1: Introduction to BIM and Autodesk Revit .....</b>	<b>1-1</b>
<b>1.1 BIM and Autodesk Revit .....</b>	<b>1-2</b>
Workflow and BIM .....	1-3
Revit Terms .....	1-4
Revit and Construction Documents .....	1-5
<b>1.2 Overview of the Interface .....</b>	<b>1-6</b>
<b>1.3 Starting Projects .....</b>	<b>1-18</b>
Opening Projects .....	1-19
Starting New Projects .....	1-21
Saving Projects .....	1-22
<b>1.4 Viewing Commands .....</b>	<b>1-24</b>
Zooming and Panning .....	1-24
Viewing in 3D .....	1-26
Visual Styles .....	1-30
<b>Practice 1a Open and Review a Project .....</b>	<b>1-32</b>
<b>Chapter Review Questions .....</b>	<b>1-39</b>
<b>Command Summary .....</b>	<b>1-41</b>
<b>Chapter 2: Basic Drawing and Modify Tools.....</b>	<b>2-1</b>
<b>2.1 Using General Drawing Tools .....</b>	<b>2-2</b>
Draw Tools .....	2-2
Drawing Aids .....	2-5
Reference Planes .....	2-8

<b>2.2 Editing Elements .....</b>	<b>2-9</b>
Selecting Multiple Elements .....	2-12
Filtering Selection Sets .....	2-14
<b>Practice 2a Draw and Edit Elements .....</b>	<b>2-16</b>
<b>2.3 Working with Basic Modify Tools.....</b>	<b>2-22</b>
Moving and Copying Elements .....	2-22
Rotating Elements .....	2-24
Mirroring Elements .....	2-26
Creating Linear and Radial Arrays .....	2-27
<b>Practice 2b Work with Basic Modify Tools .....</b>	<b>2-31</b>
<b>2.4 Working with Additional Modify Tools.....</b>	<b>2-38</b>
Aligning Elements .....	2-38
Splitting Linear Elements .....	2-40
Trimming and Extending .....	2-41
Offsetting Elements.....	2-42
<b>Practice 2c Work with Additional Modify Tools .....</b>	<b>2-44</b>
<b>Chapter Review Questions.....</b>	<b>2-47</b>
<b>Command Summary .....</b>	<b>2-51</b>
<b>Chapter 3: Starting Structural Projects .....</b>	<b>3-1</b>
<b>3.1 Linking and Importing CAD Files .....</b>	<b>3-2</b>
<b>Practice 3a Start a CAD-based Structural Project.....</b>	<b>3-6</b>
<b>3.2 Linking in Revit Models .....</b>	<b>3-9</b>
Managing Links .....	3-11
<b>Practice 3b Start a Model-based Structural Project.....</b>	<b>3-14</b>
<b>3.3 Setting Up Levels .....</b>	<b>3-17</b>
Creating Plan Views .....	3-19
<b>3.4 Copying and Monitoring Elements.....</b>	<b>3-20</b>
<b>Practice 3c Copy and Monitor Elements.....</b>	<b>3-22</b>
<b>3.5 Coordination Review .....</b>	<b>3-29</b>
<b>Practice 3d Coordinate Linked Models .....</b>	<b>3-32</b>
<b>Chapter Review Questions.....</b>	<b>3-35</b>
<b>Command Summary .....</b>	<b>3-37</b>
<b>Chapter 4: Structural Grids and Columns.....</b>	<b>4-1</b>
<b>4.1 Adding Structural Grids .....</b>	<b>4-2</b>
Modifying Grid Lines .....	4-3
<b>Practice 4a Add Structural Grids .....</b>	<b>4-6</b>

---

---

<b>4.2 Placing Structural Columns .....</b>	<b>4-11</b>
Modifying Columns.....	4-13
Loading Structural Column Types.....	4-14
<b>Practice 4b Place Structural Columns .....</b>	<b>4-16</b>
<b>Chapter Review Questions.....</b>	<b>4-18</b>
<b>Command Summary .....</b>	<b>4-19</b>
<b>Chapter 5: Foundations .....</b>	<b>5-1</b>
<b>    5.1 Modeling Walls .....</b>	<b>5-2</b>
Modifying Walls .....	5-4
<b>    5.2 Adding Wall Footings .....</b>	<b>5-6</b>
<b>Practice 5a Model Walls and Wall Footings.....</b>	<b>5-12</b>
<b>    5.3 Creating Piers and Pilasters .....</b>	<b>5-17</b>
<b>Practice 5b Create Piers and Pilasters.....</b>	<b>5-20</b>
<b>    5.4 Adding Isolated Footings .....</b>	<b>5-23</b>
Working with Custom Families.....	5-25
<b>Practice 5c Add Isolated Footings.....</b>	<b>5-27</b>
<b>Chapter Review Questions.....</b>	<b>5-33</b>
<b>Command Summary .....</b>	<b>5-35</b>
<b>Chapter 6: Structural Framing.....</b>	<b>6-1</b>
<b>    6.1 Modeling Structural Framing .....</b>	<b>6-2</b>
Beam Systems .....	6-4
Adding Bracing.....	6-8
Cross Bracing Settings.....	6-9
<b>Practice 6a Model Structural Framing.....</b>	<b>6-11</b>
<b>Practice 6b Add Bracing.....</b>	<b>6-16</b>
<b>    6.2 Modifying Structural Framing .....</b>	<b>6-19</b>
Sloping and Offsetting Beams.....	6-21
Adding Beam Cantilevers and Cutbacks.....	6-22
Changing the Cutback.....	6-23
Changing Justifications .....	6-24
Attaching a Column to a Beam .....	6-27
Applying Beam Coping.....	6-28
Editing Beam Joins .....	6-29
<b>Practice 6c Modify Structural Framing.....</b>	<b>6-31</b>
<b>    6.3 Adding Trusses .....</b>	<b>6-36</b>
Attaching Trusses to Roofs .....	6-37
Setting Framing Types in Trusses .....	6-38

---

<b>Practice 6d Add Trusses .....</b>	<b>6-40</b>
<b>Chapter Review Questions.....</b>	<b>6-46</b>
<b>Command Summary .....</b>	<b>6-48</b>
<b>Chapter 7: Working with Views .....</b>	<b>7-1</b>
<b>7.1 Setting the View Display.....</b>	<b>7-2</b>
Hiding and Overriding Graphics .....	7-3
View Properties .....	7-7
View Range .....	7-8
<b>7.2 Duplicating Views .....</b>	<b>7-12</b>
Duplication Types.....	7-12
<b>Practice 7a Duplicate Views and Set the View Display.....</b>	<b>7-15</b>
<b>7.3 Adding Callout Views .....</b>	<b>7-17</b>
Modifying Callouts.....	7-18
<b>Practice 7b Add Callout Views.....</b>	<b>7-20</b>
<b>7.4 Elevations and Sections .....</b>	<b>7-22</b>
Elevations.....	7-23
Sections .....	7-25
Modifying Elevations and Sections .....	7-26
<b>Practice 7c Create Elevations and Sections.....</b>	<b>7-32</b>
<b>Chapter Review Questions.....</b>	<b>7-38</b>
<b>Command Summary .....</b>	<b>7-41</b>
<b>Chapter 8: Adding Structural Slabs .....</b>	<b>8-1</b>
<b>8.1 Modeling Structural Slabs .....</b>	<b>8-2</b>
Modifying Slabs .....	8-6
Slab Edges .....	8-7
Joining Geometry .....	8-8
<b>Practice 8a Model Structural Slabs .....</b>	<b>8-9</b>
<b>8.2 Creating Shaft Openings .....</b>	<b>8-17</b>
<b>Practice 8b Create Shaft Openings .....</b>	<b>8-19</b>
<b>Chapter Review Questions.....</b>	<b>8-22</b>
<b>Command Summary .....</b>	<b>8-24</b>
<b>Chapter 9: Structural Reinforcement.....</b>	<b>9-1</b>
<b>9.1 Structural Reinforcement .....</b>	<b>9-2</b>
Setting the Rebar Cover Depth .....	9-3
Reinforcement Settings .....	9-4

---

---

<b>9.2 Adding Rebar.....</b>	<b>9-8</b>
Multi-planar Rebar.....	9-13
Rebar View Visibility.....	9-15
<b>9.3 Modifying Rebar .....</b>	<b>9-19</b>
Editing Plan and Section Profiles .....	9-24
<b>Practice 9a Add Rebar .....</b>	<b>9-25</b>
<b>9.4 Reinforcing Walls, Floors, and Slabs.....</b>	<b>9-32</b>
Area Reinforcement .....	9-33
Path Reinforcement .....	9-35
Fabric Reinforcement.....	9-37
Modifying Area, Path, & Fabric Reinforcement .....	9-42
<b>Practice 9b Reinforce Structural Elements.....</b>	<b>9-45</b>
<b>Chapter Review Questions.....</b>	<b>9-57</b>
<b>Command Summary .....</b>	<b>9-60</b>
<b>Chapter 10: Structural Analysis .....</b>	<b>10-1</b>
<b>10.1 Preparing Projects for Structural Analysis.....</b>	<b>10-2</b>
Structural Settings.....	10-3
<b>10.2 Viewing Analytical Models .....</b>	<b>10-10</b>
Graphic Overrides for Analytical Model Categories .....	10-12
<b>Practice 10a Analytical Settings and Views.....</b>	<b>10-15</b>
<b>10.3 Adjusting Analytical Models .....</b>	<b>10-21</b>
Analytical Justifications .....	10-22
Analytical Properties .....	10-23
Manually Adjusting the Analytical Model .....	10-25
Creating Analytical Links.....	10-27
<b>10.4 Placing Loads.....</b>	<b>10-29</b>
Boundary Conditions .....	10-29
Adding Loads .....	10-31
<b>Practice 10b Place Loads .....</b>	<b>10-35</b>
<b>Chapter Review Questions.....</b>	<b>10-41</b>
<b>Command Summary .....</b>	<b>10-44</b>
<b>Chapter 11: Project - Concrete Structure .....</b>	<b>11-1</b>
<b>11.1 Start a Structural Project.....</b>	<b>11-2</b>
<b>11.2 Create Foundation Elements .....</b>	<b>11-6</b>
<b>11.3 Frame a Concrete Structure.....</b>	<b>11-9</b>
<b>Chapter 12: Creating Construction Documents .....</b>	<b>12-1</b>
<b>12.1 Setting Up Sheets .....</b>	<b>12-2</b>
Sheet (Title Block) Properties .....	12-4

---

---

<b>12.2 Placing and Modifying Views on Sheets.....</b>	<b>12-5</b>
<b>Practice 12a Create Construction Documents .....</b>	<b>12-12</b>
<b>12.3 Printing Sheets.....</b>	<b>12-17</b>
Printing Options.....	12-17
<b>Chapter Review Questions.....</b>	<b>12-21</b>
<b>Command Summary .....</b>	<b>12-24</b>
<b>Chapter 13: Annotating Construction Documents .....</b>	<b>13-1</b>
<b>13.1 Working with Dimensions .....</b>	<b>13-2</b>
Modifying Dimensions .....	13-5
Multi-Rebar Annotation .....	13-9
<b>Practice 13a Work with Dimensions.....</b>	<b>13-12</b>
<b>13.2 Working With Text.....</b>	<b>13-16</b>
Spell Checking .....	13-19
Creating Text Types.....	13-20
<b>Practice 13b Work with Text.....</b>	<b>13-22</b>
<b>13.3 Adding Tags .....</b>	<b>13-25</b>
Tagging in 3D Views .....	13-31
Beam Annotations.....	13-32
<b>13.4 Adding Detail Lines and Symbols .....</b>	<b>13-35</b>
Using Symbols .....	13-36
Structural Specific Symbols .....	13-36
<b>Practice 13c Add Tags and Symbols.....</b>	<b>13-40</b>
<b>13.5 Creating Legends .....</b>	<b>13-44</b>
<b>Practice 13d Create Legends .....</b>	<b>13-46</b>
<b>Chapter Review Questions.....</b>	<b>13-51</b>
<b>Command Summary .....</b>	<b>13-53</b>
<b>Chapter 14: Creating Details.....</b>	<b>14-1</b>
<b>14.1 Setting Up Detail Views .....</b>	<b>14-2</b>
Referencing a Drafting View .....	14-4
Saving Drafting Views .....	14-5
<b>14.2 Adding Detail Components .....</b>	<b>14-8</b>
Detail Components.....	14-8
Repeating Details.....	14-10
<b>14.3 Annotating Details .....</b>	<b>14-12</b>
Creating Filled Regions .....	14-12
Adding Detail Tags .....	14-15
<b>Practice 14a Create a Detail Based on a Section Callout.....</b>	<b>14-17</b>
<b>Practice 14b Create a Bracing Detail.....</b>	<b>14-25</b>

---

---

<b>Practice 14c Additional Details .....</b>	<b>14-28</b>
<b>Chapter Review Questions .....</b>	<b>14-30</b>
<b>Command Summary .....</b>	<b>14-32</b>
<b>Chapter 15: Scheduling.....</b>	<b>15-1</b>
<b>15.1 Structural Schedules .....</b>	<b>15-2</b>
<b>15.2 Graphical Column Schedules .....</b>	<b>15-3</b>
Modifying Graphical Column Schedules .....	15-4
<b>Practice 15a Create a Graphical Column Schedule .....</b>	<b>15-7</b>
<b>15.3 Working with Schedules.....</b>	<b>15-10</b>
Modifying Schedules .....	15-11
Modifying a Schedule on a Sheet .....	15-12
<b>Practice 15b Work with Schedules .....</b>	<b>15-14</b>
<b>Chapter Review Questions.....</b>	<b>15-19</b>
<b>Command Summary .....</b>	<b>15-21</b>
<b>Appendix A: Introduction to Worksets .....</b>	<b>A-1</b>
<b>A.1 Introduction to Worksets.....</b>	<b>A-2</b>
Saving Workset- Related Files .....	A-4
<b>Command Summary .....</b>	<b>A-6</b>
<b>Appendix B: Additional Tools .....</b>	<b>B-1</b>
<b>B.1 Reusing Selection Sets .....</b>	<b>B-2</b>
<b>B.2 Placing Slanted Structural Columns .....</b>	<b>B-5</b>
<b>B.3 Creating Slab Types.....</b>	<b>B-8</b>
<b>B.4 Working with Guide Grids on Sheets .....</b>	<b>B-10</b>
<b>B.5 Revision Tracking .....</b>	<b>B-12</b>
Issuing Revisions .....	B-17
<b>B.6 Annotating Dependent Views .....</b>	<b>B-18</b>
Annotating Views .....	B-18
<b>B.7 Importing and Exporting Schedules .....</b>	<b>B-21</b>
<b>B.8 Creating Building Component Schedules .....</b>	<b>B-23</b>
Schedule Properties .....	B-29
Material Takeoff Schedules.....	B-30
<b>B.9 Creating a Repeating Detail .....</b>	<b>B-31</b>
<b>Command Summary .....</b>	<b>B-33</b>
<b>Appendix C: Autodesk Revit Structure Certification Exam Objectives...C-1</b>	
<b>Index .....</b>	<b>Index-1</b>

---

