Concrete Modeling Using Revit Structure

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House Keeping

- Please put your cell phones to silent mode

- Please make sure you don’t slam the door shut when leaving the presentation midway

- Questions: Please hold off till the end
Shruti Harve, MS, LEED AP

- Senior Application Specialist at Ideate, LEED AP

- Masters in Architecture with a concentration in Computing from University of Strathclyde in U.K.

- Experience working as a Designer, 3D Modeler, Drafter in Architectural and Engineering firms in the San Francisco Bay area, UK and India

- Revit User for over 7 years

- Train/Implement Building Information Modeling solutions for AEC firms in the Bay area
What best represents your role?

- Principal / Project Manager
- Structural Engineers
- CAD/BIM Specialists
- CAD/BIM Manager
- General Contractor/Design-Build Professional
Your experience with using Revit Structure?

- 0-2 years
- 2-4 years
- Over 4 years
Class Summary

‘Solid’ & ‘Concrete’ Modeling

This class focuses on learning the use of Solid and Surface modeling tools in Revit Structure to model structures built of Concrete & Precast Concrete.
Learning Objectives

- Quick Review: Solid & Surface Modeling tools

- Concrete/Precast Concrete Components, Structures
  - Precast Concrete Void Slab
  - Precast Warped Double Tee
  - Thin Shell Concrete Roof (Hyperbolic Paraboloid)
  - Custom Rebar Shape; Rebar schedules

- Tips and Tricks

- Questions
Overview of Solid and Surface Modeling tools in Revit
Revit Families

Revit families are groups of elements of the same type. All the elements in a family have a common set of parameters, identical uses, and similar graphical representations.

**System**
- Walls
- Floors
- Roofs
- Ceilings

**Component**
- Beams
- Braces
- Columns
- Stiffeners

**In-Place**
are created and edited solely within a project and depends on that project model.
Solid Modeling Tools for Families

- Create solid shapes that represent the overall form of the family

- Five types of forms can be created

Solid Extrusion  Solid Blend  Solid Revolve  Solid Sweep  Solid Swept Blend
Void Tools for Families

- Create subtractive solid shapes that form a void in the solid mass by subtracting material away from the solid
- Five types of void forms can be created
Massing Tools

Draw profiles and paths to GENERATE FORMS:
Modeling a Precast Concrete Beam Slab/Void Slab Component

Learning Objectives:

1. Working in the Family Editor
2. ‘Structural Framing’ Template
3. Solid & Void Extrusion
Which Structural Framing Template?

1. Structural Framing Beams & Braces.rft

2. Structural Framing Complex & Trusses.rft

2. Material for Model Behavior

3. Symbolic Representation
Reference Planes in the Structural Framing: Beams & Braces

Reference Planes:
Left/Right: Full Extent of the geometry, Controls the length of Framing

Member Left/Member Right:
Physical Geometry Edge/Cut back, Controls Cut Length

Stick Symbol Left/Right: Extents of stick representation when symbolic representation is set to "From Family"
‘Symbolic Representation’ in the Structural Framing Template

**Symbolic Representation:**

**From Family:** Stick Symbol is not auto created/auto generated

**From Project Settings:** Revit generates the stick symbol and follows the project ‘symbolic cut back’ settings under Manage>Structural Settings
‘Material for Model Behavior’ in Structural Framing Template: Beams & Braces

Controls the Joining behavior of these members in a project, Example: Concrete beams auto join whereas Precast Concrete beams do not.
Warped Double Tee

Learning Objectives:

1. Understanding and working with Family Profiles
2. Nesting Families
3. Using the ‘Swept Blend’ Geometry Creation tool
Thin Shell Concrete Roof (Hyperbolic Paraboloid)

Learning Objectives:

1. Working in the Massing Family Template
2. Using the Massing tools
3. Create ‘Roof’ by Face
Modeling Rebar

Two Primary Methods:

1. Place/Model Reinforcement using Reinforcement tools in Revit
2. OR use Extensions (download from Subscription Center)
Custom Rebar Shape

Learning Objectives:

1. Working in the Reinforcement family Template
2. Create Custom Rebar Shape
3. Create parameter labels to control the rebar dimensions
Rebar Data: Concrete Beam Schedules
Ideate BIMlink 2013: Rebar Host Data in Rebar Schedules
Tips & Tricks

• Understanding Join Geometry in Revit Structure
  - Joins & vs./ attachment
  - Graphic appearance of joined vs. non joined concrete elements
  - Joining Multiple items at once
• Pre cast Tilt up Panels (Using Parts)
• Flat Slab with Sloped Soffit
• Thickened Slab Edges
Graphic Appearance of Joined vs. Not Joined Concrete
Joining Multiple Components
Concrete Expansion Joints

- Use Opening by face (time consuming)
- Create a face based/line based void family
- Change the ‘Material for Model behavior in the family template to ‘Precast Concrete or Other’
Concrete Tilt up Panels

- Create Concrete wall and use ‘split with gap’ tool
- Use the PARTS tool
Flat Soffit: Top of Slab Sloped
Thickened Slab Edges
What we covered today…….

- Overview of the Solid & Surface modeling tools in Revit Structure
- Learning how these apply to modeling Concrete Components & Structures
  - Modeling a Precast Concrete Void Slab
  - Modeling a Precast Warped Double Tee
  - Modeling Thin Shell Concrete Roof (Hyperbolic Paraboloid)
  - Creating Custom Rebar Shape; Rebar schedules
- Tips & Tricks
- Questions