



New York City College of Technology Division of Continuing Education

Building Information Modeling with Revit 2014 Module 06: FH.03

Firehouse Beams, Trusses, Structure & Slabs



Professor Paul C. King, RA, AIA, ARA Prof.Paul.King@Gmail.com

http://professorpaulking.wordpress.com/ http://openlab.citytech.cuny.edu/bim101-sp14/

http://students.autodesk.com/

Firehouse 03

Concrete Beam

- Add
- Framing Tags
- Delete
- Resize

Structural Plans

- Apply Template
- S-100

Concrete Slab

- New Type
- Locate

Steel Columns

- Add at grids
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof

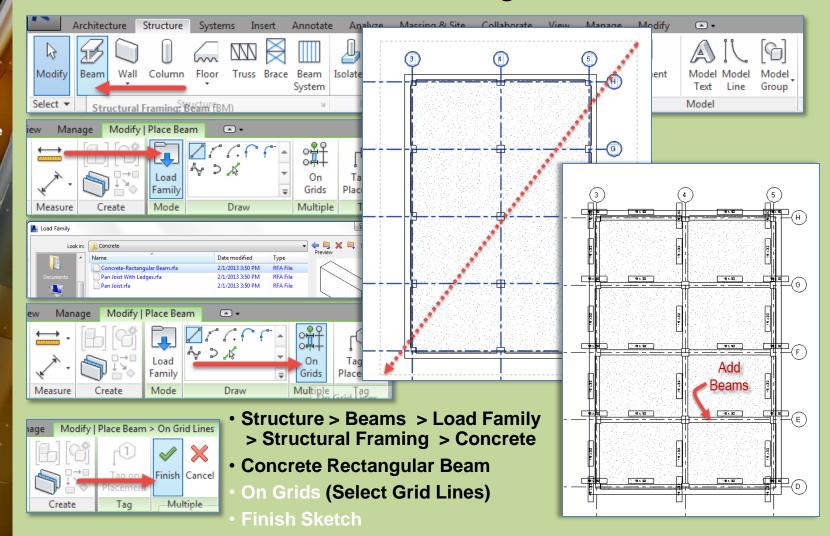
Review 1 2

Wrap Up

Revit Introduction

Division of Continuing Education

Add Beams: Concrete Rectangular Beams



Firehouse 03

Concrete Beam

- Add
- Framing Ta
- Delete
- Resize

Structural Plans

- Apply Template
- S-100

Concrete Slab

- New Type
- Locate

Steel Columns

- Add at grids
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof

Review 1 2

Wrap Up

Revit Introduction

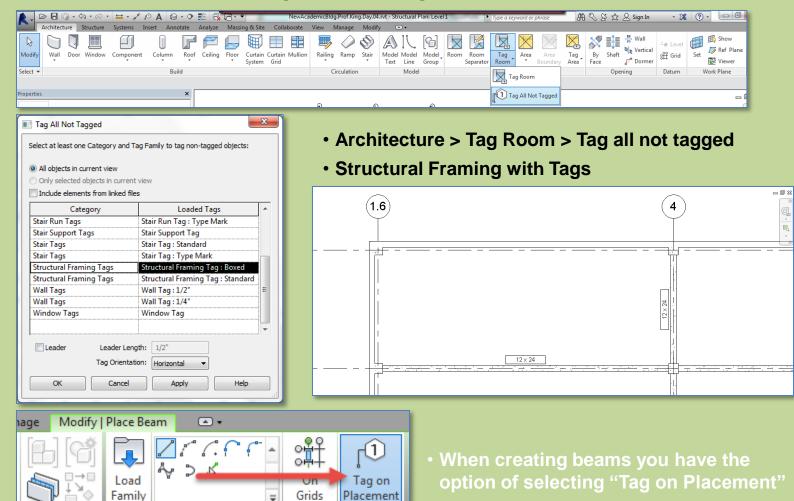
Division of Continuing Education

Create

Mode

Draw

Structural Framing with Tags



Multiple

Tag

Firehouse 03

Concrete Beam

- Add
- Framing Ta
- Delete
- Resize

Structural Plans

- Apply Template
- S-100

Concrete Slab

- New Type
- Locate

Steel Columns

- Add at grids
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof

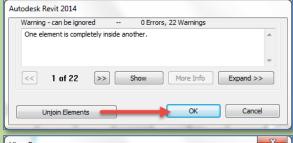
Review 1 2

Wrap Up

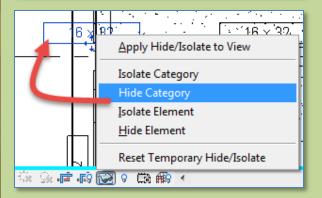
Revit Introduction

Division of Continuing Education

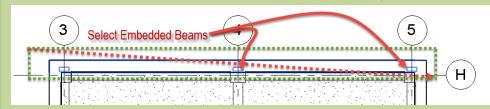
Delete embedded Beams







Use "within" Window Selection (left to right)

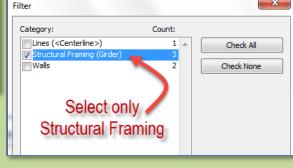


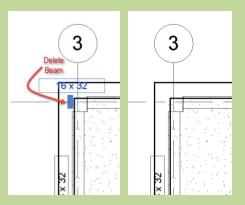






- Select Tags by window & delete
- When done all extra beams & tags should be gone





Firehouse 03

Concrete Beam

- Add
- Framing Ta
- Delete
- Resize

Structural Plans

- Apply Template
- S-100

Concrete Slab

- New Type
- Locate

Steel Columns

- Add at grids
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof

Review 1 2

Wrap Up

Revit Introduction

Division of Continuing Education

Add Beams for Sizing Concrete Beams

DII		$^{\circ}$	16
ĸυ	LE	OF	TO

	SPAN IN	SPAN IN	DIVIDE	ROUND	WIDTH OF	WIDTH OF BEAM
	FEET	INCHES	BY 16	UP	BEAM 1:2	ROUND UP
	8	96	6	6	3	3
	9	108	6.75	7	3.375	4
	10	120	7.5	8	3.75	4
	11	132	8.25	9	4.125	5
	12	144	9	9	4.5	5
	13	156	9.75	10	4.875	5
	14	168	10.5	11	5.25	6
	15	180	11.25	12	5.625	6
	16	192	12	12	6	6
	17	204	12.75	13	6.375	7
18'-0"	18	216	13.5	14	6.75	7
	19	228	14.25	15	7.125	8
	20	240	15	15	7.5	8
	21	252	15.75	16	7.875	8
	22	264	16.5	17	8.25	9
	23	276	17.25	18	8.625	9
23'-8"	24	288	18	18	9	9
	25	300	18.75	19	9.375	10
	26	312	19.5	20	9.75	10
	27	324	20.25	21	10.125	11
	28	336	21	21	10.5	11
	29	348	21.75	22	10.875	11
	30	360	22.5	23	11.25	12

- Span in inches / 16 = depth in inches
- 10' span = 10 x 12 = 120 inches divided by 16 = 7.5 inches
- Round up to (8)
- Height/Width = 2/1
- Divide height by 2 = 8/2 = 4
- Width of Beam should be a minimum of 4" to allow for rebars with enough room between for aggregate to be evenly distributed and for enough coverage from rebars to face of concrete

Firehouse 03

Concrete Beam

- Add
- Framing Ta
- Delete
- Resize

Structural Plans

- Apply Template
- S-100

Concrete Slab

- New Type
- Locate

Steel Columns

- Add at grids
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof

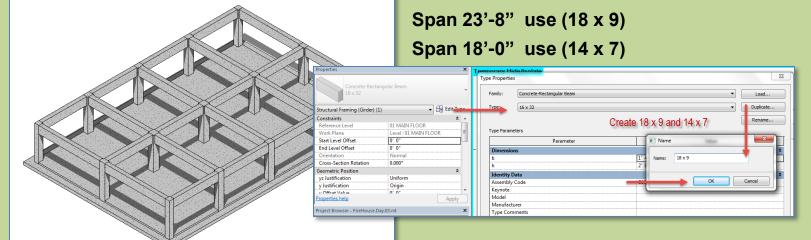
Review 1 2

Wrap Up

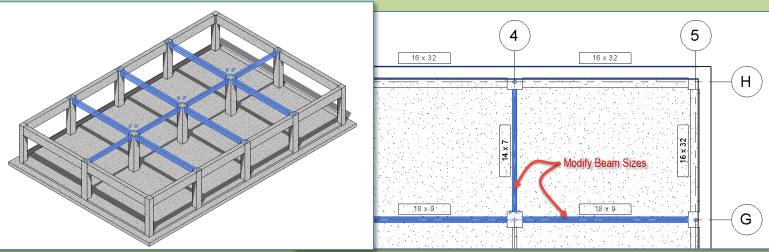
Revit Introduction

Division of Continuing Education

Properly Size Concrete Beams



Select Beam > Edit Type > Duplicate



Firehouse 03

Concrete Beams

- Add
- Framing Tags
- Delete
- Resize

Structura

- Apply/Template
- S-100

Concrete Slab

- New Type
- Locate

Steel Columns

- Add at grids
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof

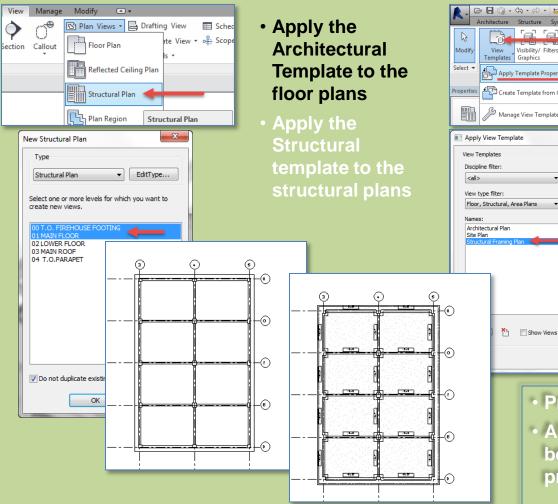
Review 1 2

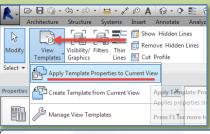
Wrap Up

Revit Introduction

Division of Continuing Education

Add Structural Plans: Apply Template





View Properties

View Scale

Scale Value 1:

Display Model

Parts Visibility

V/G Overrides Model

V/G Overrides Annotati

V/G Overrides Analytic

V/G Overrides Import

V/G Overrides Filters

Photographic Exposure

Underlay Orientation

Model Display

Shadows

View Range

Orientation

Detail Level

Parameter



 Always propagate extents to be certain the grid displays properly

Number of views with this template assigned: 0

1/8" = 1'-0"

Show Original

Edit..

Edit..

Edit...

Edit...

Edit.. Edit.

Apply Properties

Project North

Cancel

Normal

Coarse

Include

V

1

V

7

V

V

V

V

V

V

1

1

Firehouse 03

Concrete Beams

- Add
- Framing Tags
- Delete
- Resize

Structural Plans

- Apply Templat
- S-10

Concrete Slab

- New Type
- Locate

Steel Columns

- Add at grids
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof

Review 1 2

Wrap Up

Revit Introduction

Structural Plan: 00 T.O. FIREHOUSE FOOTING

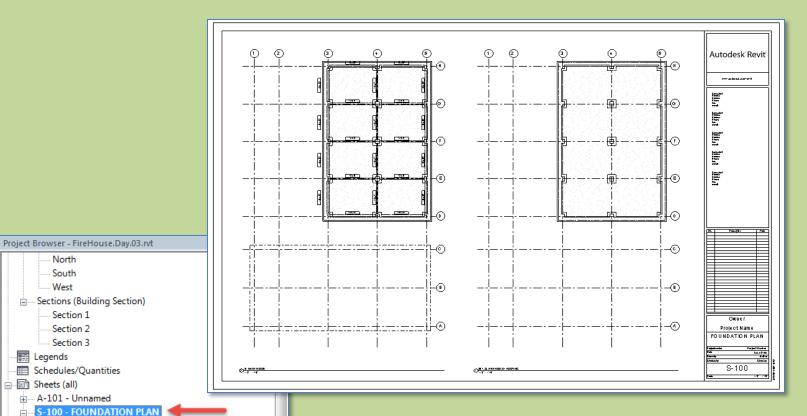
Structural Plan: 01 MAIN FLOOR

Families
Groups

Revit Links

Division of Continuing Education

Structural Plans: Foundation & Framing



Add sheet S-1001/8" = 1'-0" to your drawing set

Firehouse 03

Concrete Beams

- Add
- Framing Tags
- Delete
- Resize

Structural Plans

- Apply Template
- S-100

Concrete Slab

- New Type
- Locate

Steel Columns

- Add at grids
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof

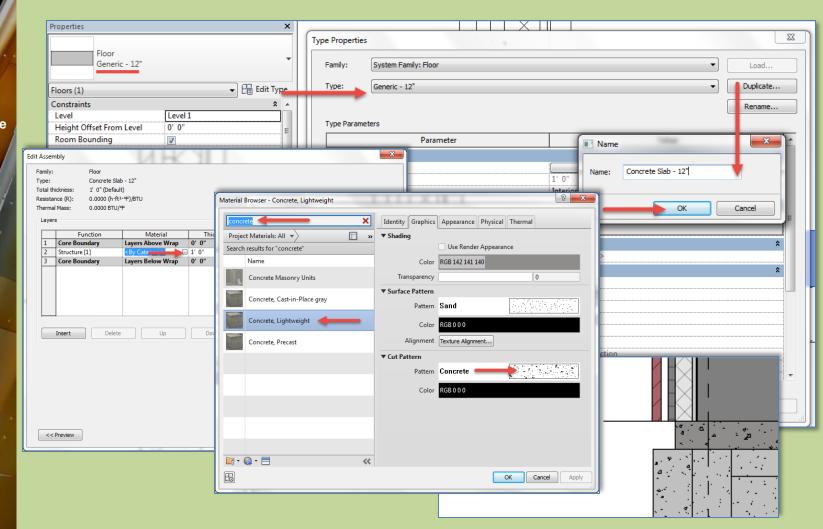
Review 1 2

Wrap Up

Revit Introduction

Division of Continuing Education

Create Slab New Type "Concrete Slab 12"



Firehouse 03

Concrete Beams

- Add
- Framing Tags
- Delete
- Resize

Structural Plans

- Apply Template
- S-100

Concrete Slab

- New Type
- Locate

Steel Columns

- Add at grids
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof

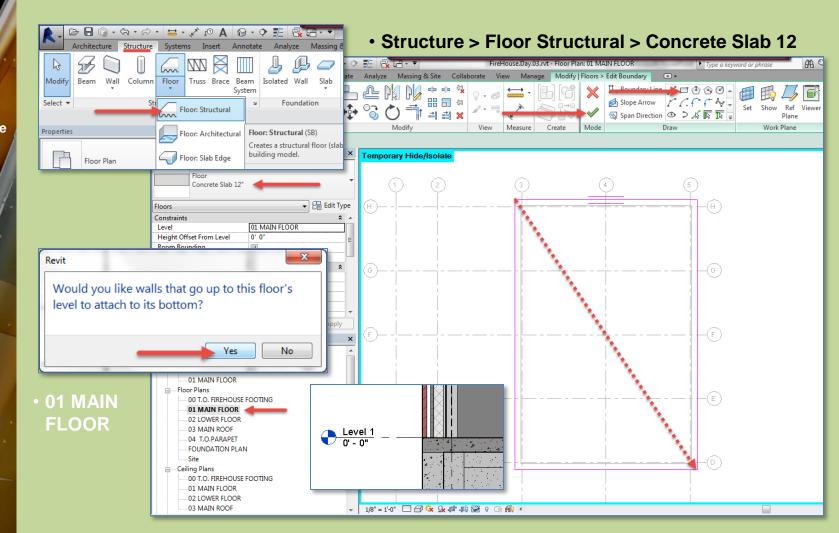
Review 1 2

Wrap Up

Revit Introduction

Division of Continuing Education

Locating the Structural Slab:



Firehouse 03

Concrete Beams

- Add
- Framing Tags
- Delete
- Resize

Structural Plans

- Apply Template
- S-100

Concrete Slab

- New Type
- Locate

Steel Columns

- Add at grids
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof

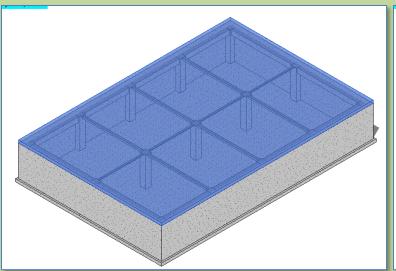
Review 1 2

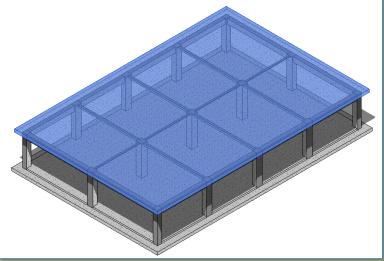
Wrap Up

Revit Introduction

Division of Continuing Education

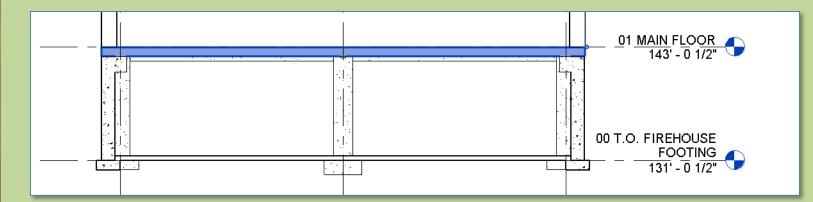
Locating the Structural Slab:





• 01 MAIN FLOOR

Structure > Floor Structural > Concrete Slab 12



Firehouse 03

Concrete Beams

- Add
- Framing Tags
- Delete
- Resize

Structural Plans

- Apply Template
- S-100

Concrete Slab

- New Type
- Locate

Steel Column

- Add at grid
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof

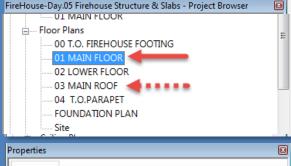
Review 1 2

Wrap Up

Revit Introduction

Division of Continuing Education

Main Floor Structural Steel Columns



- Floor Plan: MAIN FLOOR

 Referencing Detail

 Extents

 Crop View

 Crop Region Visible

 Annotation Crop

 View Range

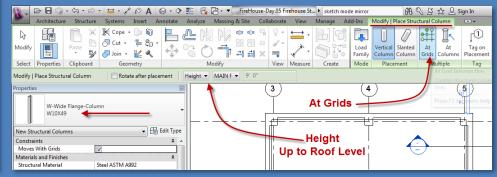
 Associated Level

 Floor Plan:

 Flo
- × View Range Primary Range Offset: 7 6" Top: Associated Level (MAIN FLC ▼ Offset: 4' 0" Cut plane: Associated Level (MAIN FLC > Offset: 0' 0" Bottom: Associated Level (MAIN FLC ▼ View Depth Level Below (T.O.FIREHOU! ▼ Offset: 0' 0" Level: Unlimited Help

- Current View: 01 Main Floor
- Modify View Range > View Depth
- View Depth > Associated Level
- Structure > Column > W10x49
- Height & Up to Roof Level
- At Grids





Firehouse 03

Concrete Beams

- Add
- Framing Tags
- Delete
- Resize

Structural Plans

- Apply Template
- S-100

Concrete Slab

- New Type
- Locate

Steel Column

- Add at grid
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof

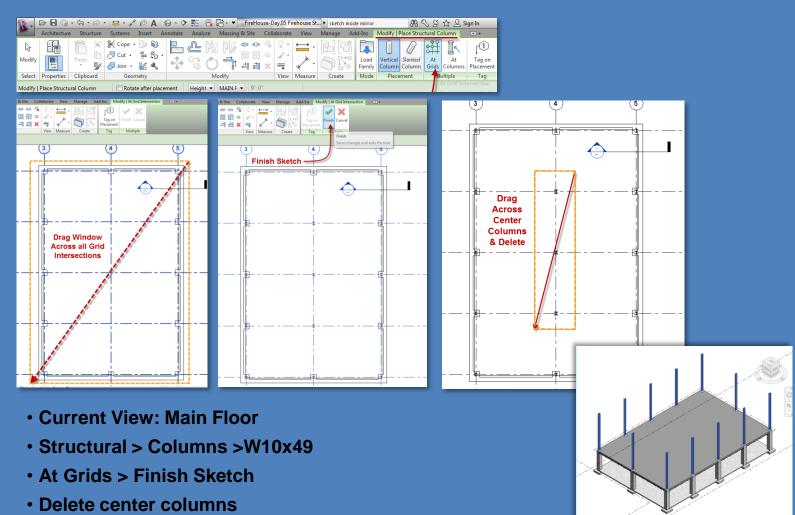
Review 1 2

Wrap Up

Revit Introduction

Division of Continuing Education

Main Floor Structural Steel Columns



Firehouse 03

Concrete Beams

- Add
- Framing Tags
- Delete
- Resize

Structural Plans

- Apply Template
- S-100

Concrete Slab

- New Type
- Locate

Steel Column

- Add at grid
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof

Review 1 2

Wrap Up

Revit Introduction

Division of Continuing Education

Main Floor Structural Steel Columns



- Filter

 Category: Count:

 Floors 1 A Check All

 Grids 8

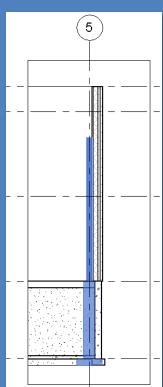
 Lines (<Centerline>) 4

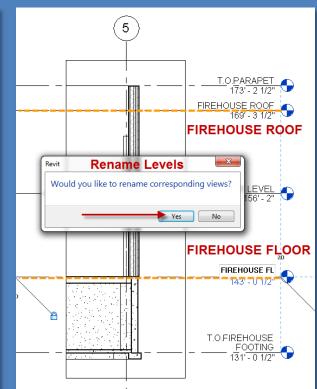
 V Structural Columns 12

 Views 1

 Walls 4
- × Properties W-Wide Flange-Column W10X49 Number Selected → High Edit Type Structural Columns (12) Constraints Column Location Mark Base Level MAIN FLOOR Base Offset 0' 0" Add MAIN ROOF Top Level Top Top Offset -4' 0"-Column Style Vertical Offset Moves With Grids Materials and Finishes Structural Material Steel ASTM A992 Structural Top Connection None Base Connection None F----- A---- 4:-- 1 NA----- 1 Properties help Apply

- Filter Selection > All Steel Columns
- Top Offset to -4' (to allow for truss)
- Rename Levels
 - 03 Main Roof to 03 Firehouse Roof
 - 01 Main Floor to 01 Firehouse Floor





Firehouse 03

Concrete Beams

- Add
- Framing Tags
- Delete
- Resize

Structural Plans

- Apply Template
- S-100

Concrete Slab

- New Type
- Locate

Steel Column

- Add at grid
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof

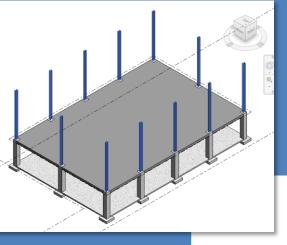
Review 1 2

Wrap Up

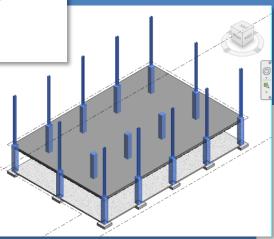
Revit Introduction

Division of Continuing Education

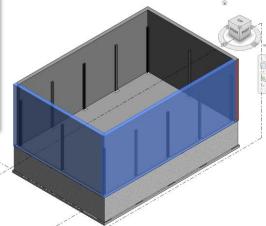
Main Floor Structural Steel Columns



Steel Columns on Main Level



Steel Columns &
 Concrete Columns Below



 Steel columns offset below roof level to allow room for truss

Firehouse 03

Concrete Beams

- Add
- Framing Tags
- Delete
- Resize

Structural Plans

- Apply Template
- S-100

Concrete Slab

- New Type
- Locate

Steel Columns

- Add at grids
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof

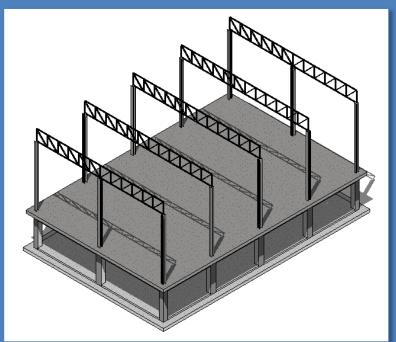
Review 1 2

Wrap Up

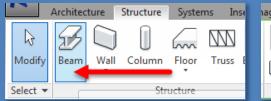
Revit Introduction

Division of Continuing Education

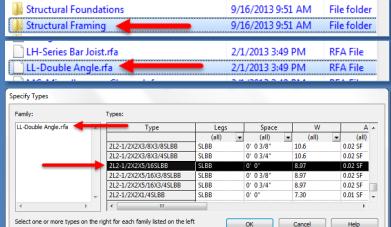
Structural Truss (Pratt Flat Truss)

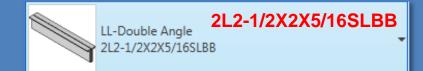


The cross section of a truss is based on the last beam created.
Since our last beam was concrete
the trusses added will be concrete unless we first select a steel section for Beams.



- Modify | Place Beam
 Load
 Family
 Create
 Mode
- Structure > Beam
- Load Family > Structural Framing > LL-Double Angle





Firehouse 03

Concrete Beams

- Add
- Framing Tags
- Delete
- Resize

Structural Plans

- Apply Template
- S-100

Concrete Slab

- New Type
- Locate

Steel Columns

- Add at grids
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

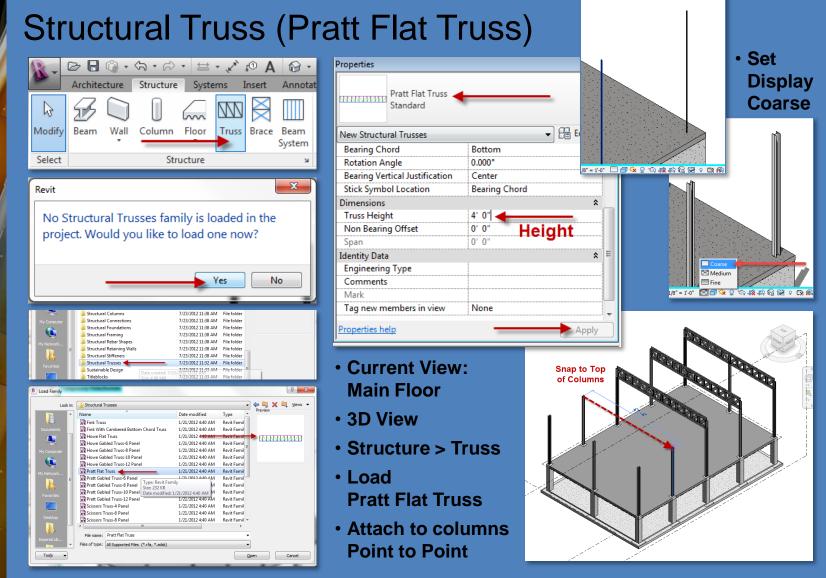
Firehouse Roof

Review 1 2

Wrap Up

Revit Introduction

Division of Continuing Education



Firehouse 03

Concrete Beams

- Add
- Framing Tags
- Delete
- Resize

Structural Plans

- Apply Template
- S-100

Concrete Slab

- New Type
- Locate

Steel Columns

- Add at grids
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof

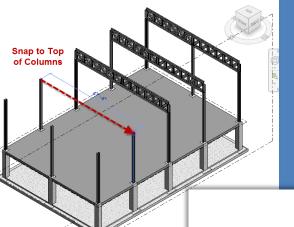
Review 1 2

Wrap Up

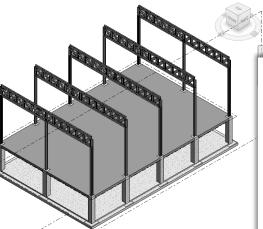
Revit Introduction

Division of Continuing Education

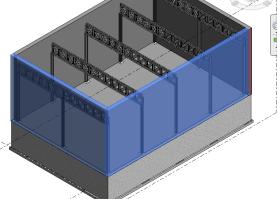
Structural Truss (Pratt Flat Truss)



Add Trusses & Attach to tops of columns



Add 5 Trusses



 Steel columns with trusses below roof level

Firehouse 03

Concrete Beams

- Add
- Framing Tags
- Delete
- Resize

Structural Plans

- Apply Template
- S-100

Concrete Slab

- New Type
- Locate

Steel Columns

- Add at grids
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof

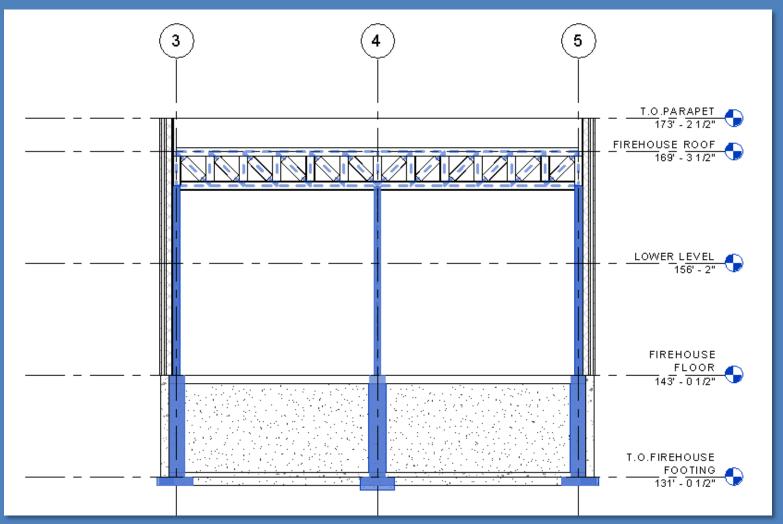
Review 1 2

Wrap Up

Revit Introduction

Division of Continuing Education

Structural Truss (Pratt Flat Truss)



Firehouse 03

Concrete Beams

- Add
- Framing Tags
- Delete
- Resize

Structural Plans

- Apply Template
- S-100

Concrete Slab

- New Type
- Locate

Steel Columns

- Add at grids
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof

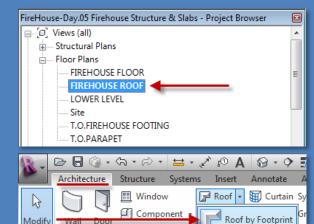
Review 1 2

Wrap Up

Revit Introduction

Division of Continuing Education

Firehouse Roof



Column -

Select

Properties

Graphics

Floor Plan

Floor Plan: FIREHOUSE ROOF

Roof by Extrusion

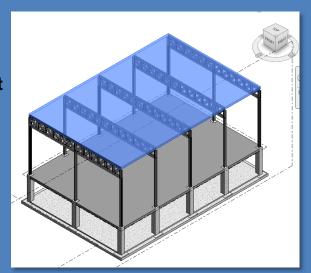
Roof by Face

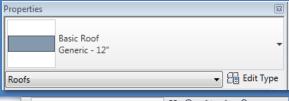
Roof: Fascia

Roof: Soffit

Roof: Gutter

- Current View: Firehouse Roof
- Roof by Footprint
- Define Slope off
- Overhang 0
- Pick walls
- Finish Sketch







Firehouse 03

Concrete Beams

- Add
- Framing Tags
- Delete
- Resize

Structural Plans

- Apply Template
- S-100

Concrete Slab

- New Type
- Locate

Steel Columns

- Add at grids
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof

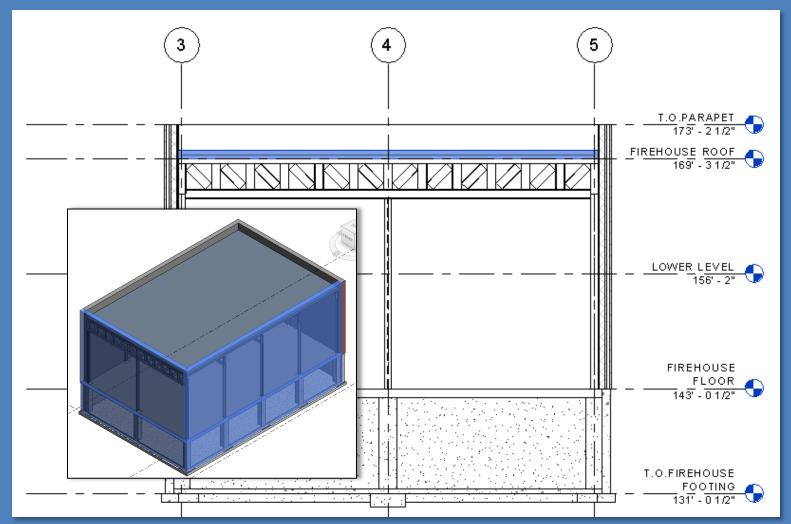
Review 1 2

Wrap Up

Revit Introduction

Division of Continuing Education

Structural Truss (Pratt Flat Truss)



Firehouse 03

Concrete Beams

- Add
- Framing Tags
- Delete
- Resize

Structural Plans

- Apply Template
- S-100

Concrete Slab

- New Type
- Locate

Steel Columns

- Add at grids
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof

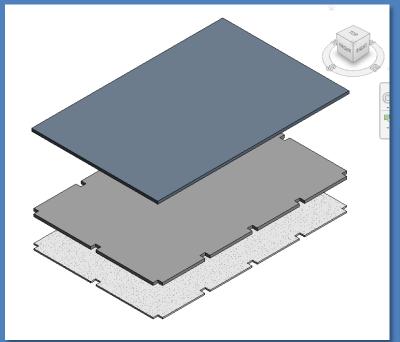
Review 1 2

Wrap Up

Revit Introduction

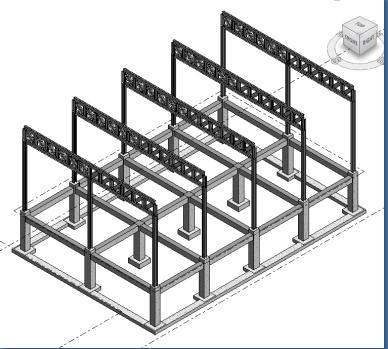
Division of Continuing Education

Overview



- Roof Slab
- Slab on Concrete Beams
- Slab on Grade

- Pratt Flat Truss
- Steel Columns
- Concrete Columns
- Concrete Isolated Footings & Foundation



Firehouse 03

Concrete Beams

- Add
- Framing Tags
- Delete
- Resize

Structural Plans

- Apply Template
- S-100

Concrete Slab

- New Type
- Locate

Steel Columns

- Add at grids
- Delete
- Modify
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof

Review 1 2

Wrap Up

Revit Introduction

Division of Continuing Education

Firehouse Day 03 - Wrap Up

Concrete Beams

- -Add
- Framing Tags
- Delete
- Resize

Structural Plans

- Apply Template
- **-**S-100

Concrete Slab

- New Type
- Locate

Steel Columns

- Add at grids
- Delete
- Modify Vertical Offset -4'
- Overview

Steel Truss

- Attach
- Copy
- Section

Firehouse Roof