ARCH 2431. Building Technology III

Building Information Modeling with Revit

Steel Connections #6 Diagonal Bracing



DESIGN · CONNECT · OPTIMIZE

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Diagonal Bracing Connections

- New Family
- Structural France
 Beams & Brace
- W18 x 59
- Rotate 90
- Reference Planes & Parameters
- Load into Project
- Place & Align
- Rotate
- New Family
 Bracing Endplat
- Load into Project
- Place & Alig
- Сору
- Isometric ViewSheet Views

Diagonal Bracing Connections





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Diagonal Bracing Connections

Diagonal bracing and solid concrete shear walls add lateral stability to buildings. Building made of concrete typically use only concrete shear walls. Steel frame buildings may either make use of concrete shear walls or diagonal bracing connected to the steel beam and column structure.



https://skyciv.com/technical/bolts-vs-welds-vs-rivets-for-steel-connections/

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Building

R B B B 0 - 5 - - - B = - 2 0 A 6 - 0 Architecture Structure Steel Systems Insert Annotate SP Creates a Revit file. New Project Creates a Revit project file. - Open Family Creates a set of custom components to use in projects. **I D** R New Family - Select Template File - C X L Views -Look in: English_1 Date modified Name Spot Lighting Fixture wall based.rft 3/22/2019 11:20 PM Spot Lighting Fixture.rft 3/22/2019 11:20 PM Structural Column.rft 3/22/2019 11:20 PM 2/2019 11:20 PM Structural Framing - Beams and Braces.rft 3/22/2019 11:20 PM Structural Framing - Complex and Trusses. 3/22/2019 11:20 PM Structural Stiffener Line Based.rft 3/22/2019 11:20 PM Structural Stiffener.rft 3/22/2019 11:20 PM Structural Trusses.rft 3/22/2019 11:20 PM Telephone Device Hosted.rft 3/22/2019 11:20 PM Telephone Device.rft 3/22/2019 11:20 PM Window - Curtain Wall.rft 3/22/2019 11:20 PM Window with trim.rft 3/22/2019 11:20 PM Window.rft 3/22/2019 11:20 PM File name: Files of type: Family Template Files (*.rft) Tools . Open Cancel



- We will repeat this for each component of the Steel Connection Assembly
- Create a new Family •

Creating a new 3D Family File

- File > New > Family
- Structural Framing Beams & Braces
- Save and Name the File



- Select an appropriate directory
- Name the file as follows: •
 - Initials- Description
 - PK Steel W 18 x 50 Diagonal Bracing

Designation	n	Dimensions									
Imperial (In x Ib/It)		Depti h (in)	1	Width W (in)	Web Thickness ^t w (in)	Flang Thickn t _f (in)	je iess	Sectional (in ²)	Area	Weight (16/11)	
W 18 X 60	18.2	7.56	0.415	0.695	17.6	60	984	50.1	108	13.3	
W 18 x 55	18.1	7.53	0.390	0.030	10.2	55	890	44.9	98.3	11.9	
W 18 x 50	18	7.5	0.355	0.570	14.7	50	800	40.1	88.9	10.7	
W 18 x 40	18.1	6.00	0.000	0.005	13.5	40	740	22.5	70.0	7.4	

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Structural Framing Beams & Bracing Family





W 18 x 50 for diagonal bracing

beam will be rotated 90 degrees on axis



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 Sheet Views

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W18 x 50 Beam for Diagonal Bracing

Use W 18 x 50 for diagonal bracing beam will be rotated 90 degrees on axis

Depth = 8'' Web .355''



Width=7.5"

Flange = 0.570"

	Designation Imperial (in x Ib/fr)	Depth h	Width w (in)	Web Thickness t _w <i>(in)</i>	Flange Thickness t _f <i>(in)</i>	Sectional Area (in ²)	Weight <i>(lb_f/ft)</i>	Static Parameters			
								Moment of Inertia		Elastic Section Modulu	
								I _x	I _v	S _x	S _v
	((In)						(in ⁴)	(in ⁴)	(in ³)	(in ³)
	W 27 x 178	27.8	14.09	0.725	1.190	52.3	178	6990	555	502	78.8
	W 27 x 161	27.6	14.02	0.660	1.080	47.4	161	6280	497	455	70.9
	W 18 X 65	18.4	7.59	0.450	0.750	19.1	65	1070	54.8	117	14.4
	W 18 x 60	18.2	7.56	0.415	0.695	17.6	60	984	50.1	108	13.3
Ì	W 18 x 55	18.1	7.53	0.390	0.630	18.2	55	890	44.9	98.3	11.9
	W 18 x 50	18	7.5	0.355	0.570	14.7	50	800	40.1	88.9	10.7
	W 18 x 46	18.1	6.00	0.300	0.005	13.5	40	712	22.5	78.8	7.4
	W 18 x 40	17.9	6.02	0.315	0.525	11.8	40	612	19.1	68.4	6.4
_	W 40 - 05	477	0.02	0.000	0.405	40.0		540	45.0	57.0	5.4

· West 90 degrees EQ EQ Parameters for Depth & Ref. Level 0' - 0" Width ō B ò Ref. Level Width С Ш 0'-09/16" 0' - 0 9/16" 1 1/2" = 1'-0" 🗌 🔂 👯 🔊 🖓 🖼 🛒 <

To make it easier to work set the Depth to 1'-0" and the Width to 8"

Create the beam rotated 90 degrees

Add parameters for Depth and Width while editing the extrusion

Adjust the width to 8"

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Place & Align diagonal bracing (Structure Level 2)

В 5 H A . Align Align top & with bottom with Grid 1 face of nes 8 (lock) columns Level 2 Structure View (do not lock) Drag Diagonal Brace into view Space bar to rotate and place 10 07/10 H X - East Properties re keft Level 1 2 1 emporary Hide/Isolat PK - Steel W 18 x 50 Diagonal Bracing - Eli Edit Type Structural Framing (Other) (1) Constraints в Reference Level Level 2 Work Plane Level : Level 2 H Align top & 0. 0. Start Level Offset End Level Offset 0. 0. bottom to face Norma Level 2 Structure View Cross-Section Rotation 0.005 Geometric Position Start Extension 0' 0" Use Space Bar to of columns Properties help **Rotate 90 Degrees** roject Browser - PaulKing Connections Arch2431.SP20 Pr... > (do not lock) PK - Steel Splice Plate Double PK - Steel Splice Plate Double PK - Steel W 21 x 62 Beam H PK - Steel W 21 x 62 Beam Notched Steel W 24 x 162 H PK PK - Steel W 24 x 162 Baseplate A -0-07/12 PK - Steel W 24 x 162 Baseplate н Align with Grid 1 Structural Framing Building PK - Steel W 18 x 50 Diagonal Bracing PK - Steel W 18 x 50 Diagonal Bracing Technology III 2 -Walls H Windows 🗄 🖾 Groups CityTech.CUNY.edu Revit Links 1/8" = 1'-0" 🖾 🗃 😪 🙀 🙀 🏟 🖼 9 🗔 👘 🖬 4

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Rotate the Beam from South View



Create New Family for Diagonal Bracing Endplate



- Diagonal Bracing Connections
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Create New Family for Diagonal Bracing Endplate

Level 1 Structure View

Drag Family close to column

Properties	3	X [] Ref. Level	Er Left	E L	
PK - Steel Diagona	il Bracing EndPlate	Temporary Hide/Iso	late	-	-
Structural Connections (1)	B Eait Type	e			
Constraints	* .	^	anan baha		1
Default Elevation 0' 0	0"	Level	1 Structure		
Identity Data	*				
Type Image		Dro	a Endalata		
Keynote		Dia	y Enuplate		
Model		close	e to column	-	
Manufacturer					Y. Y
Type Comments					· · · · ·
URL		~			
Project Browser - PaulKing Conn PK – Steel Baseplate PK – Steel Baseplate PK – Steel Diagonal PK – Steel Fin Plate PK – Steel Fin Plate PK – Steel Splice Plate PK –	Adjustable plate Adjustable plate Adjustable I Bracing EndPlate onal Bracing EndPlate Slotted late Slotted ate Double e Plate Double 2 Beam 2 Beam Notched 62 62 Baseplate ix 162 Baseplate	× A)		



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Add Diagonal Bracing Endplate

- Align endplate with face of brace and face • Align of square column
- Copy endplate to other side of brace







- Diagonal Bracing Connections
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- Rotate 90
- Reference nes 8 Param
- ito Project load

Copy Bracing over then up to Level 2

- Copy Endplates up to top of diagonal bracing
- Copy diagonal brace and all four endplates up from level 1 to level 2
- Align and lock to Column and Beam



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Isometric Views of the Project File



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 Sheet View

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Updated Sheet - Add Additional Sheets



- Create additional sets of 4 views of connections & develop details
- Annotate with Notes & Leaders, Dimensions, Hatch & Detail Items

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Building Information Modeling with Revit

AUTODESK® REVIT®

The End

AAAA

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