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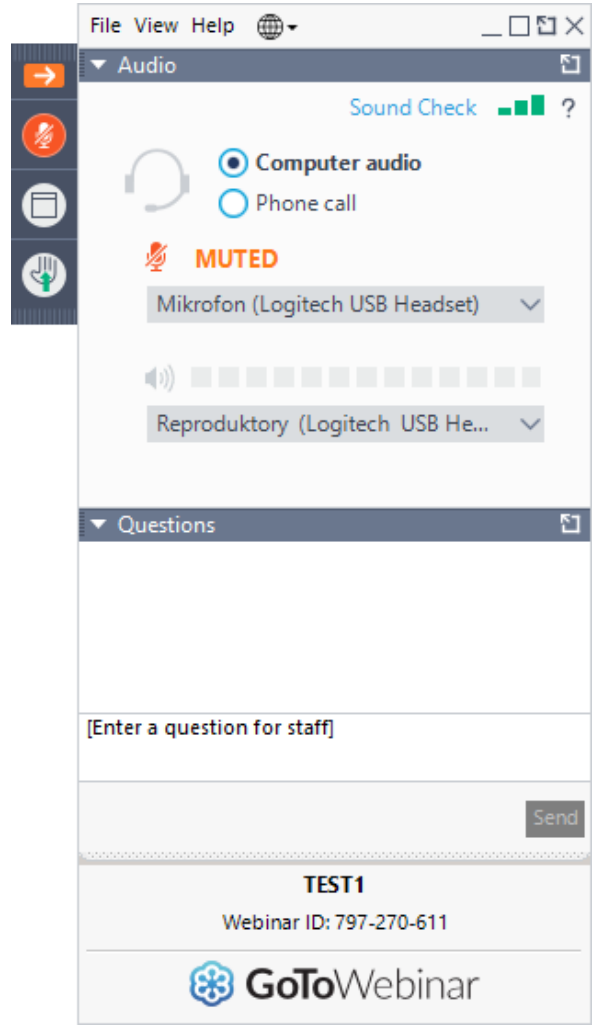
SUCCESS STORY:
METAL BUILDING CONNECTIONS
FLINT ENGINEERING COMPANY

Control Panel

When you first join a session, the Control Panel appears on the right side of your screen. Use the Control Panel to manage your session. To free up space on your desktop, you can collapse the Control Panel and use the Grab Tab to continue to manage your session.

- **Grab Tab**: From the Grab Tab, you can hide the Control Panel, mute yourself (if you have been unmuted by the organizer), view the webinar in full screen and raise your hand.
- **Audio Pane**: Use the Audio pane to switch between Telephone and Mic & Speakers.
- **Questions Pane**: Ask questions for the staff.

QUESTIONS



AGENDA

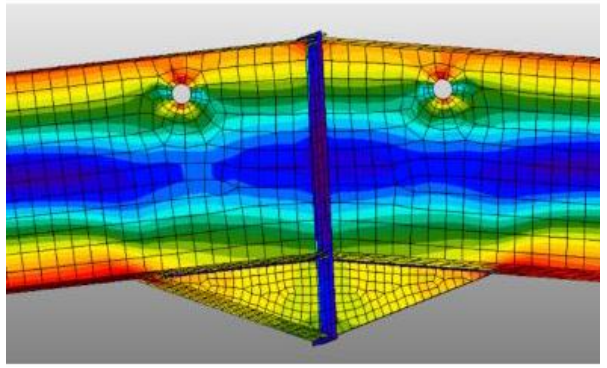
Colten Johnson and Flint Engineering Company

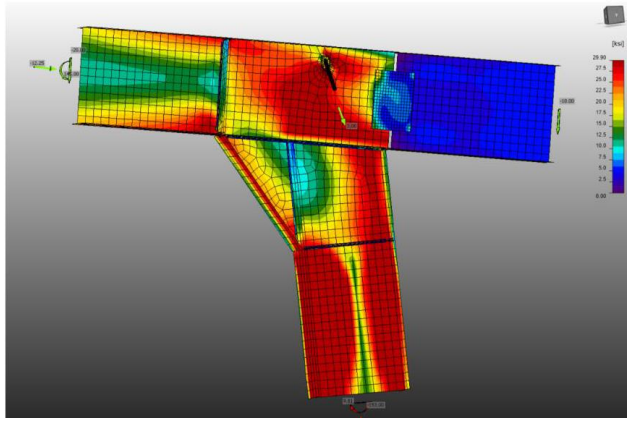
Project summary

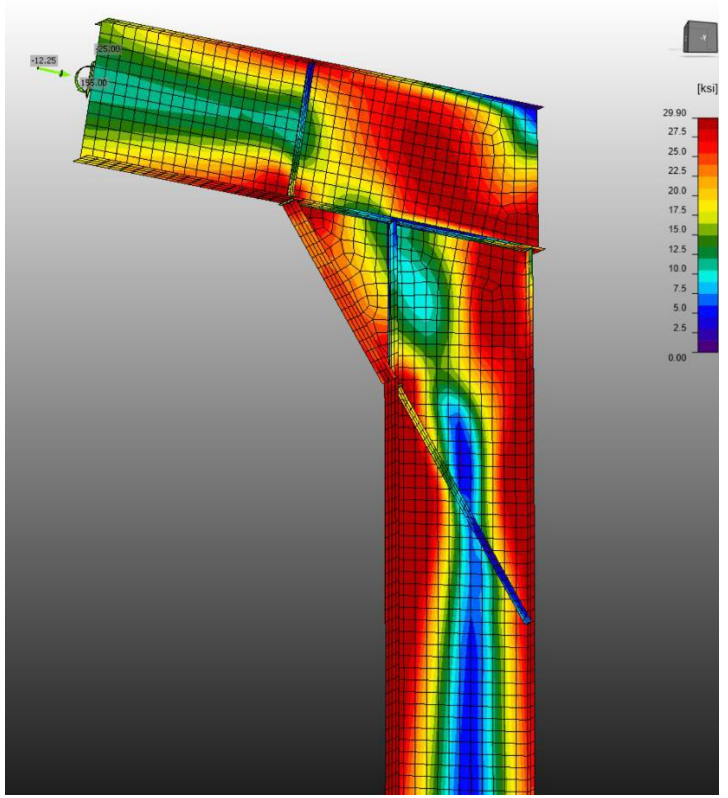
Metal building connections live demo

Summary

Q&A Session





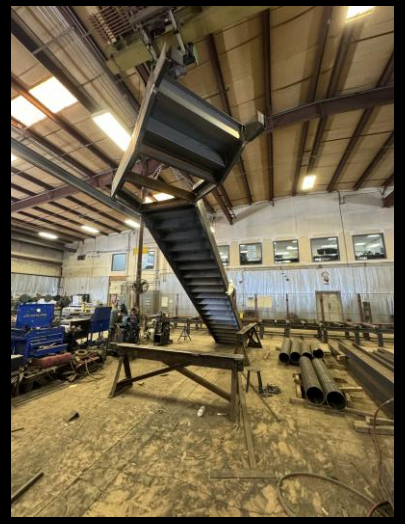


FLINT ENGINEERING COMPANY

FLINT ENGINEERING COMPANY

Colten Johnson, PE

Serving the Midwest with Structural Engineering Excellence in Commerical, Industrial, Gas & Oil, and Construction.



EASY BUTTON

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PROJECT: STEEL METAL BUILDING

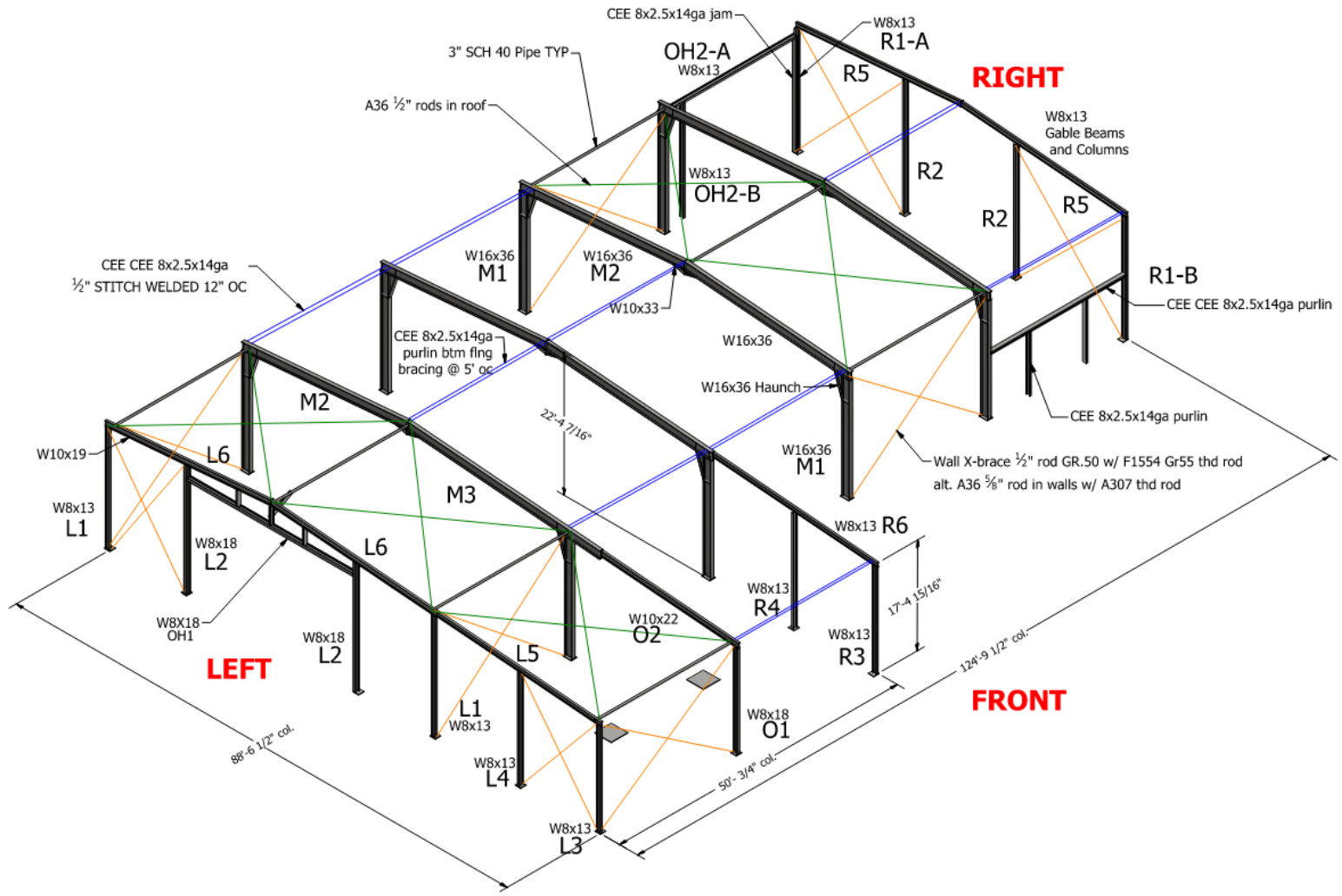
Area: ~8900 S.F.

Location: Near Wichita, KS

Typical Components: Hot-rolled wide flange shapes

Typical **Connection** Type: Welded

Scope of the Project: Design the Foundation and Steel Main Frame System



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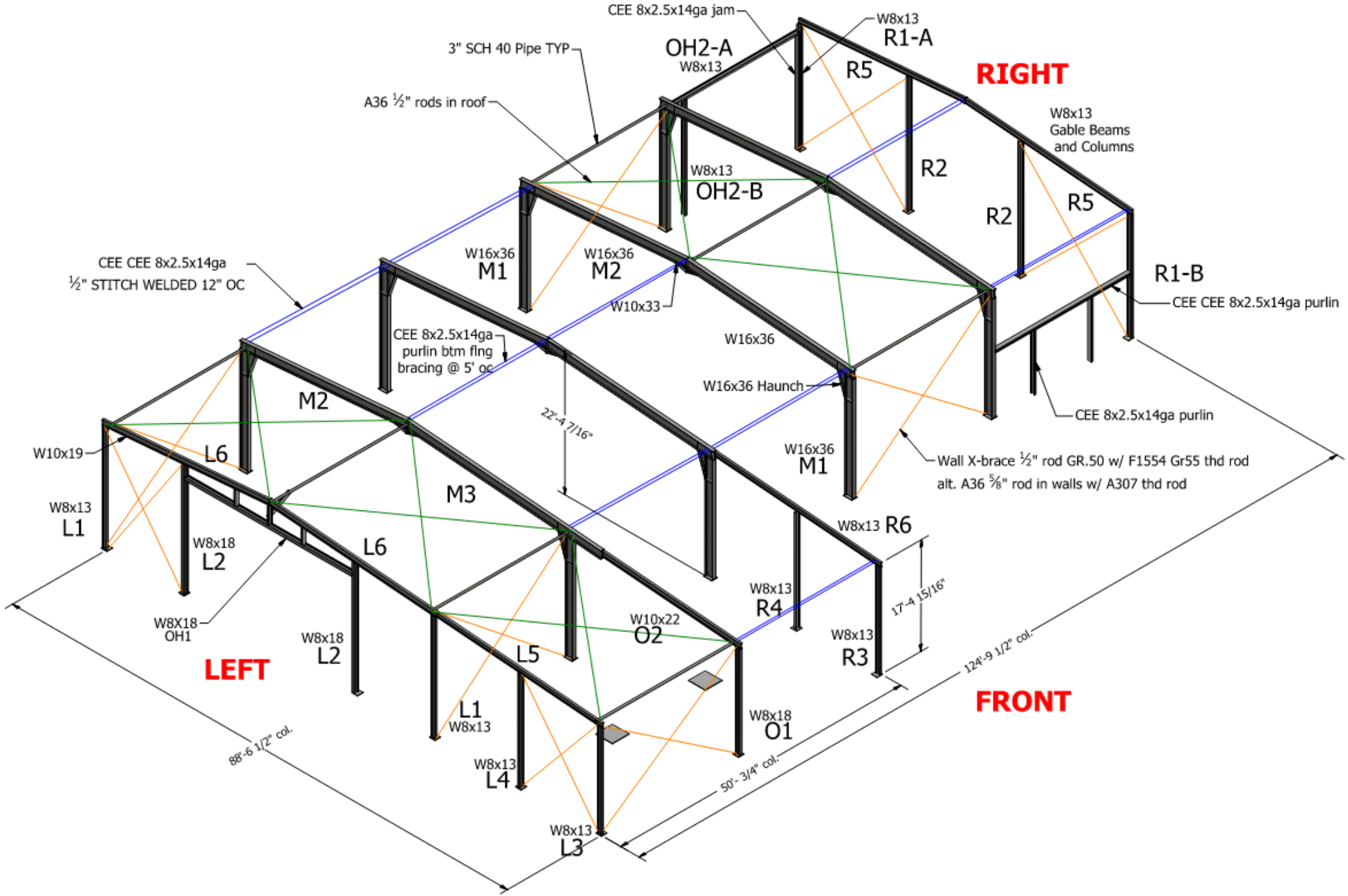
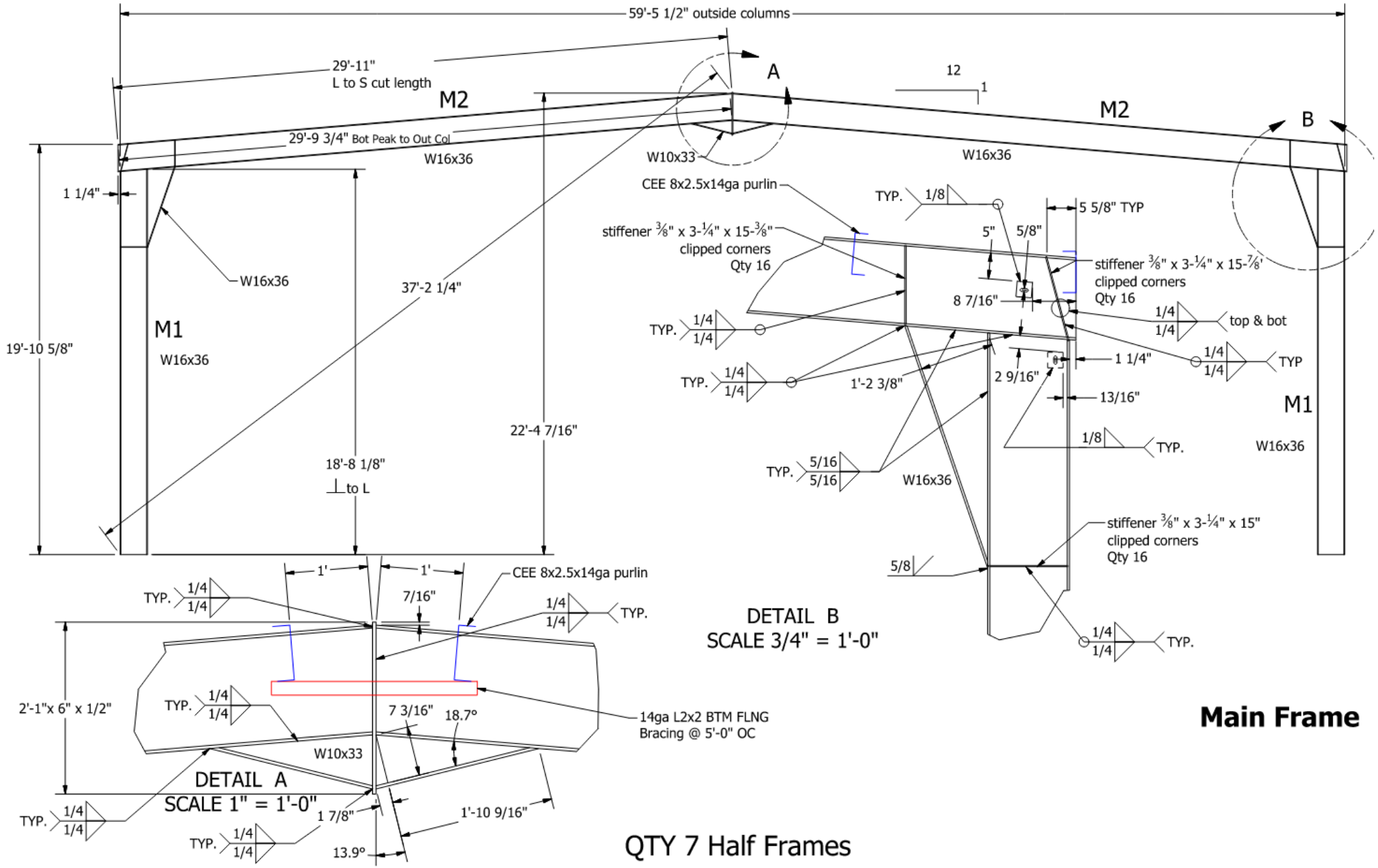

CEE 8x2.5x14ga jam
3" SCH 40 Pipe TYP
A36 ½" rods in roof
OH2-A
W8x13
W8x13
R1-A
R5
RIGHT
W8x13
Gable Beams
and Columns
W8x13
OH2-B
R2
R2
R5
R1-B
CEE CEE 8x2.5x14ga purlin
W16x36
M1
W16x36
M2
W10x33
CEE CEE 8x2.5x14ga
½" STITCH WELDED 12" OC
CEE 8x2.5x14ga
purlin btm flng
bracing @ 5' oc
W16x36
W16x36 Haunch
M2
22'-4 7/16"
W10x19
L6
M3
W16x36
M1
CEE 8x2.5x14ga purlin
Wall X-brace ½" rod GR.50 w/ F1554 Gr55 thd rod
alt. A36 ⅝" rod in walls w/ A307 thd rod
W8x13
L1
W8x18
L2
L6
W8x13 R6
W8x13
R4
17'-4 15/16"
W8X18
OH1
W8x18
L2
W10x22
O2
W8x13
R3
LEFT
L5
L1
W8x13
W8x18
O1
124'-9 1/2" col.
88'-6 1/2" col.
W8x13
L4
50'- 3/4" col.
W8x13
L3
FRONT

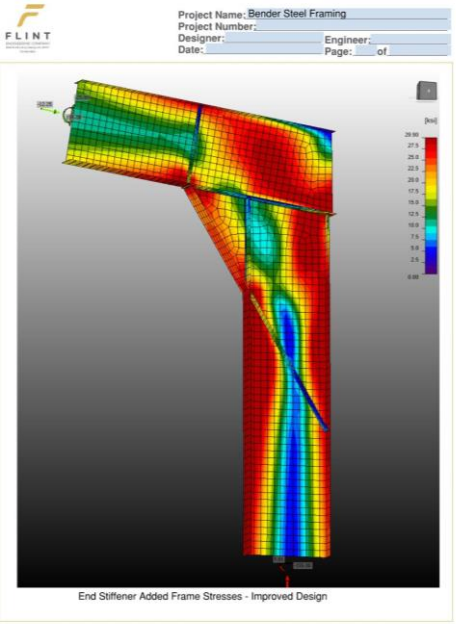


DETAIL A
SCALE 1" = 1'-0"

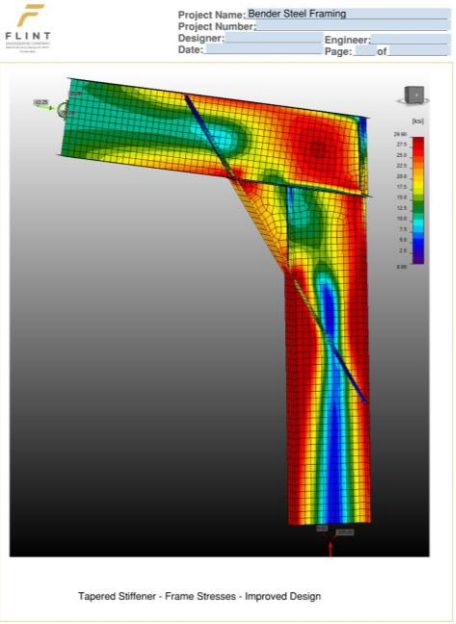
DETAIL B
SCALE 3/4" = 1'-0"

Main Frame

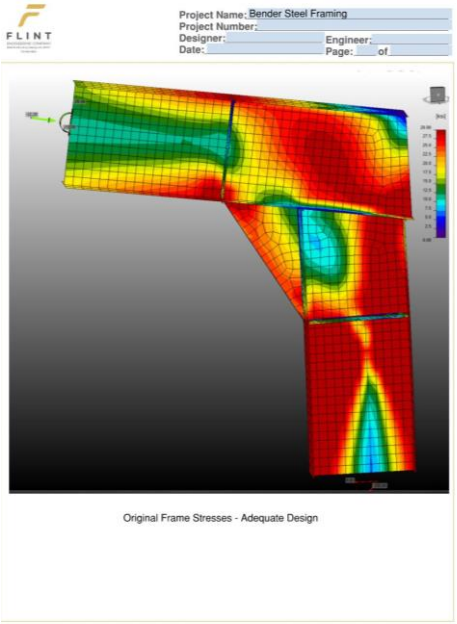
QTY 7 Half Frames



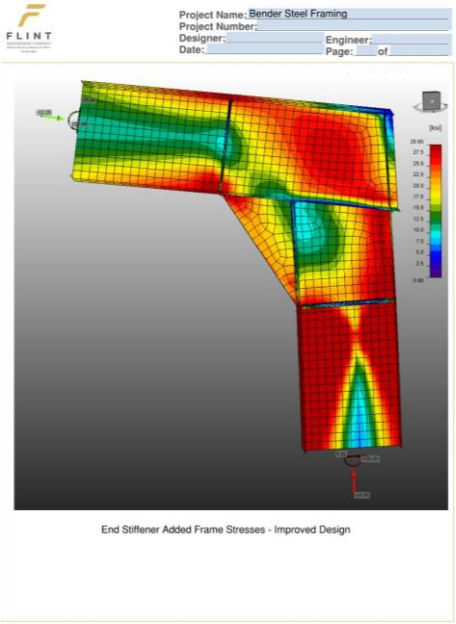
End Stiffener Added Frame Stresses - Improved Design



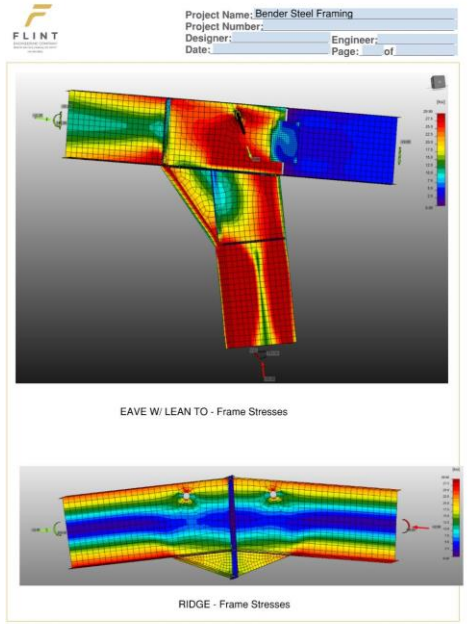
Tapered Stiffener - Frame Stresses - Improved Design



Original Frame Stresses - Adequate Design



End Stiffener Added Frame Stresses - Improved Design



EAVE W/ LEAN TO - Frame Stresses

RIDGE - Frame Stresses

LIVE DEMO

RIDGE BEAM CONNECTION

MOMENT FRAME CONNECTION

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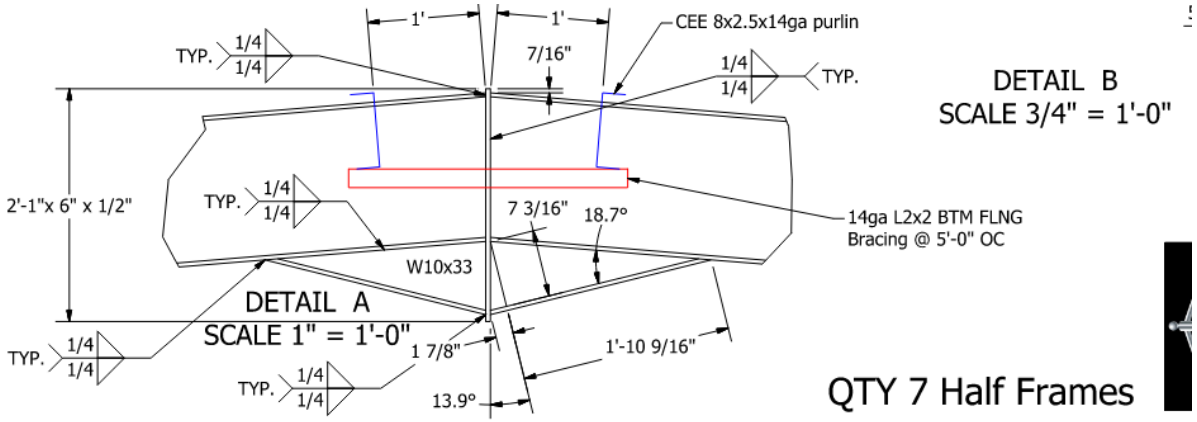
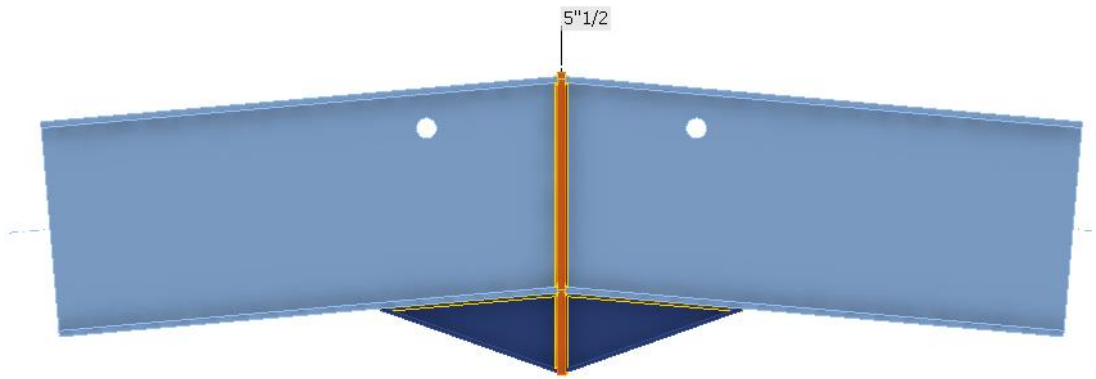
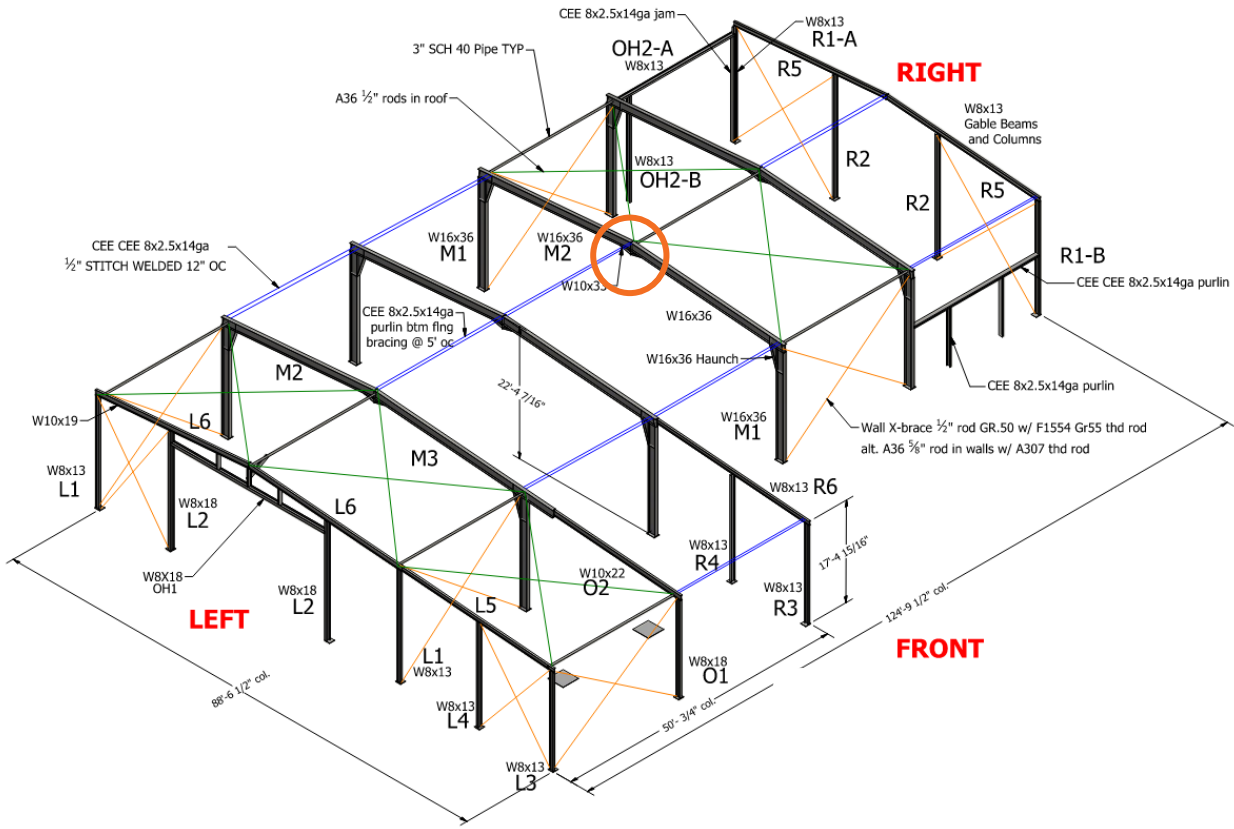
RIDGE BEAM CONNECTION



DETAIL B
SCALE 3/4" = 1'-0"

QTY 7 Half Frames





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SUMMARY

Modeling key operations:

Plate to plate – it can be bolted or welded

Stiffening member to create a haunch

Opening to represent the tension rods

Sections drawings for the detailer

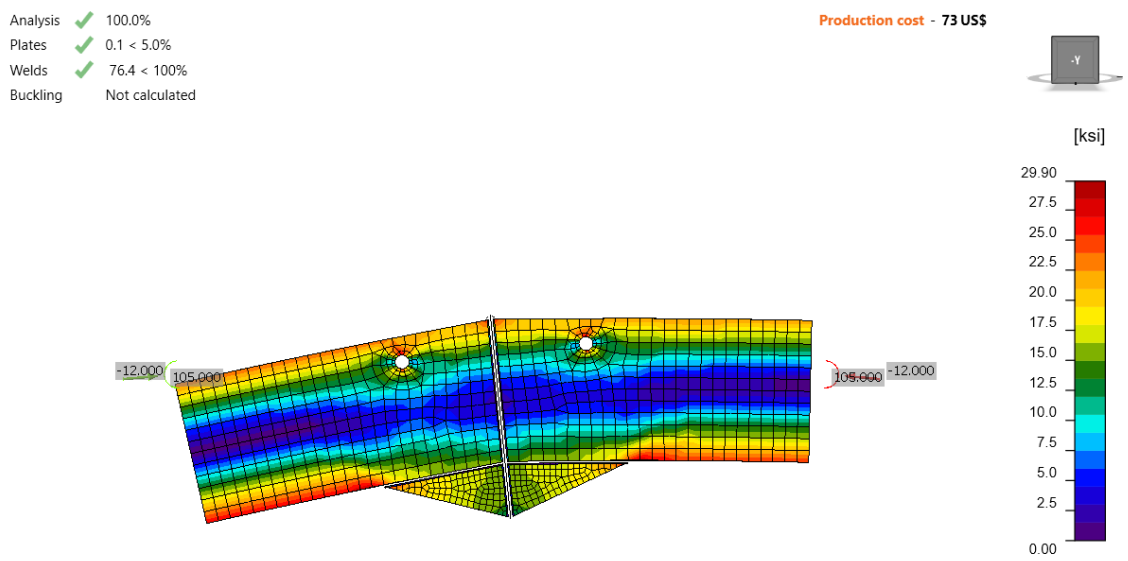

PLATE TO PLATE OPERATION

Connection to join two members

X position to move the connection out of the node

It can be bolted (two plates) and welded (one plate)

Bolts and welds set up in the operation

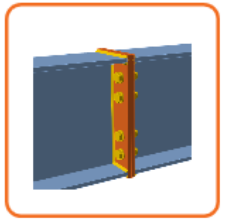

Plate to plate - mem

PP1 [Plate to plate] Autodesign Editor Copy Delete

Plate to plate

Member 1	B1
Member 2	B2
X - position [in]	0"
Material	A572 Gr.50
Thickness [in]	1/2
Connection type	Bolted
Dimensions	
Top [in]	Bolted / Welded
Left [in]	0"
Bottom [in]	6"
Right [in]	0"

Bolts

Type	3/4 A325
Top layers [in]	-1"3/4; -3"3/4
Left layers [in]	-1"3/16
Bottom layers [in]	-1"3/4; 1"; 2"15/16
Right layers [in]	-1"3/16
Shear plane in thread	
Shear force transfer	Bearing - tension/shear interaction

Welds

Flanges [in]	1/4		E70xx
Webs [in]	1/4		E70xx

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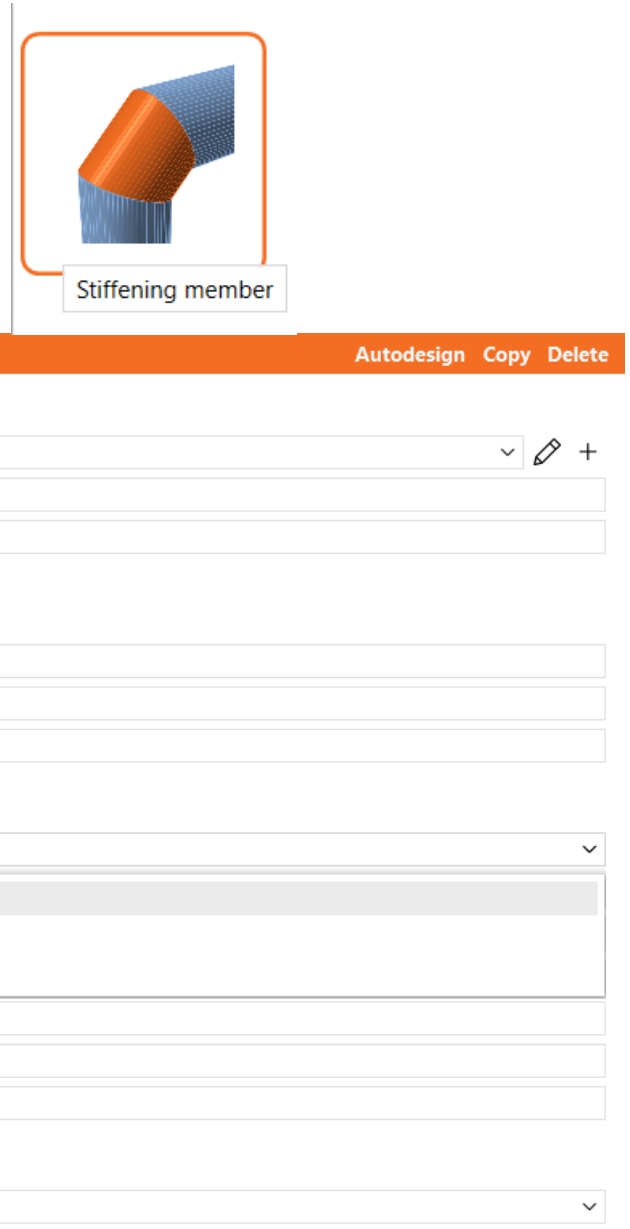
STIFFENING MEMBER OPERATION

Stiffening members are used to simulate a cross section as part of the connection elements

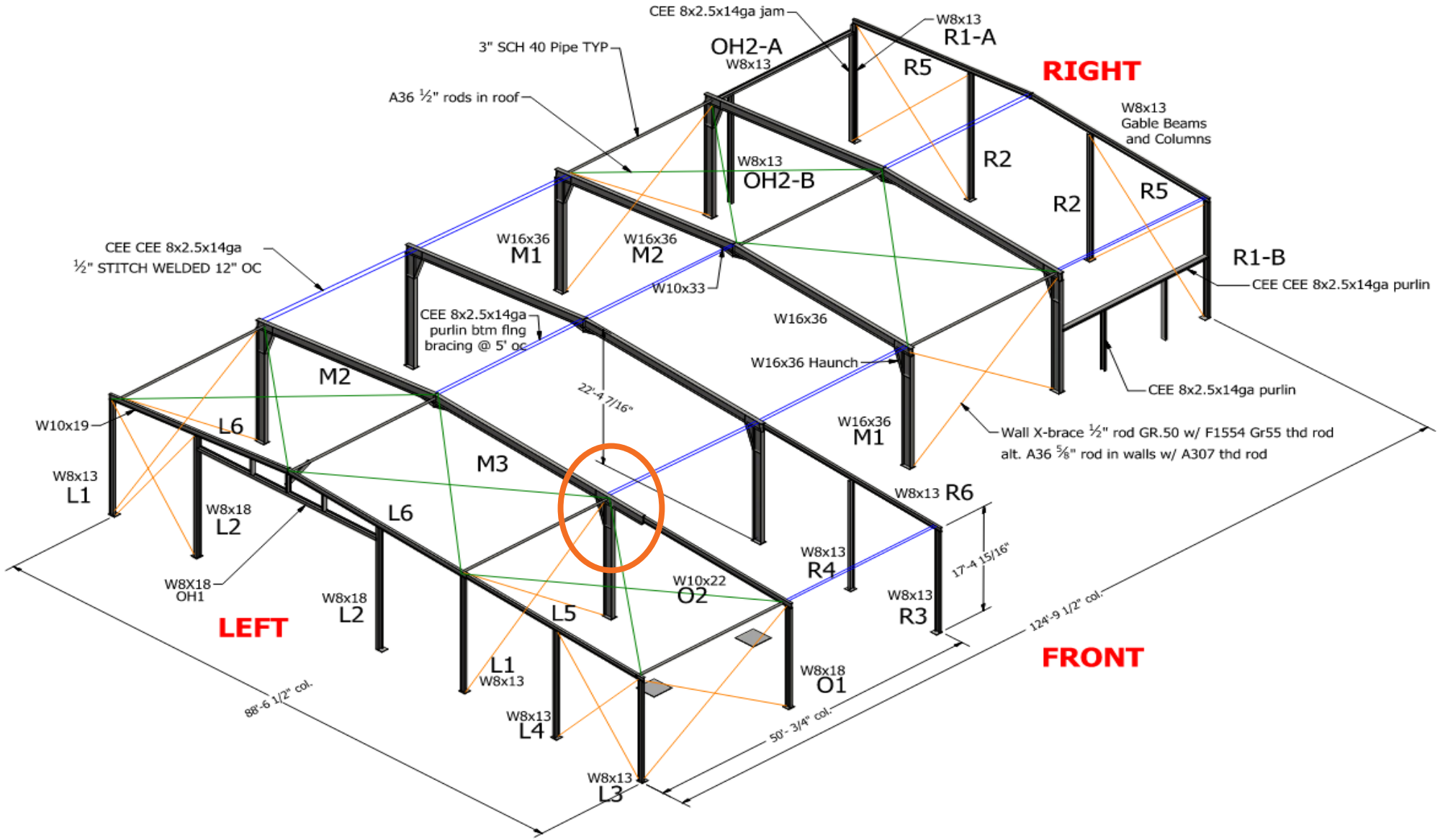
A stiffening member is not part of the original FEA 1D member analysis model

Length of the member input

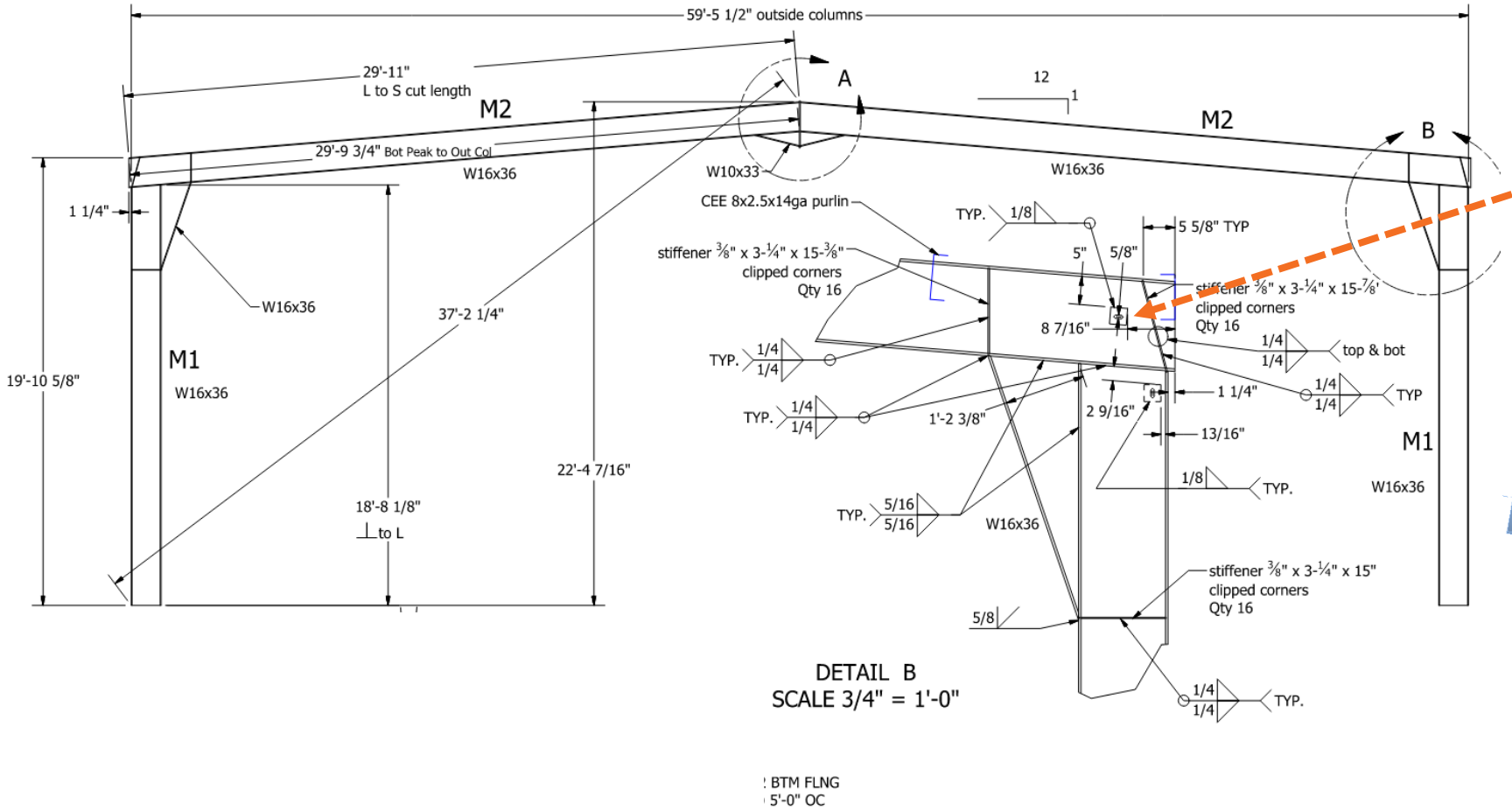
Forces or boundary conditions are not needed for these elements

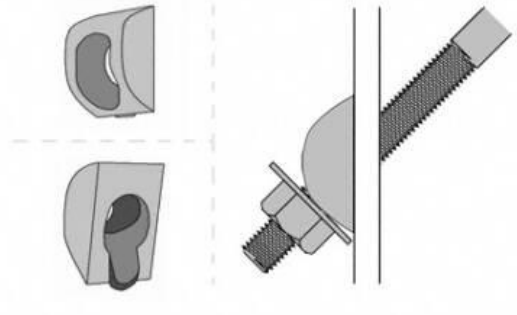


MOMENT FRAME CONNECTION

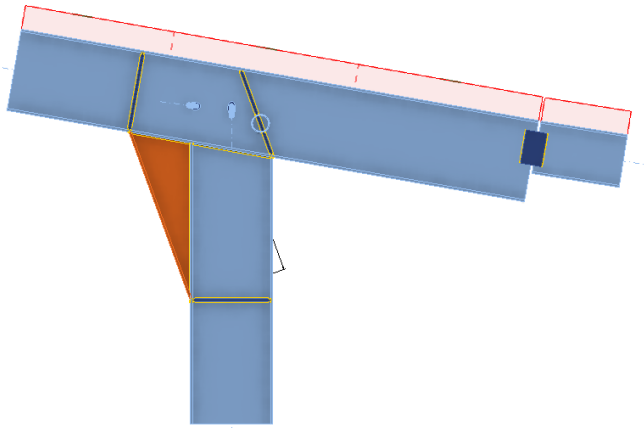


MOMENT FRAME CONNECTION





Hillside washers



Half Frame

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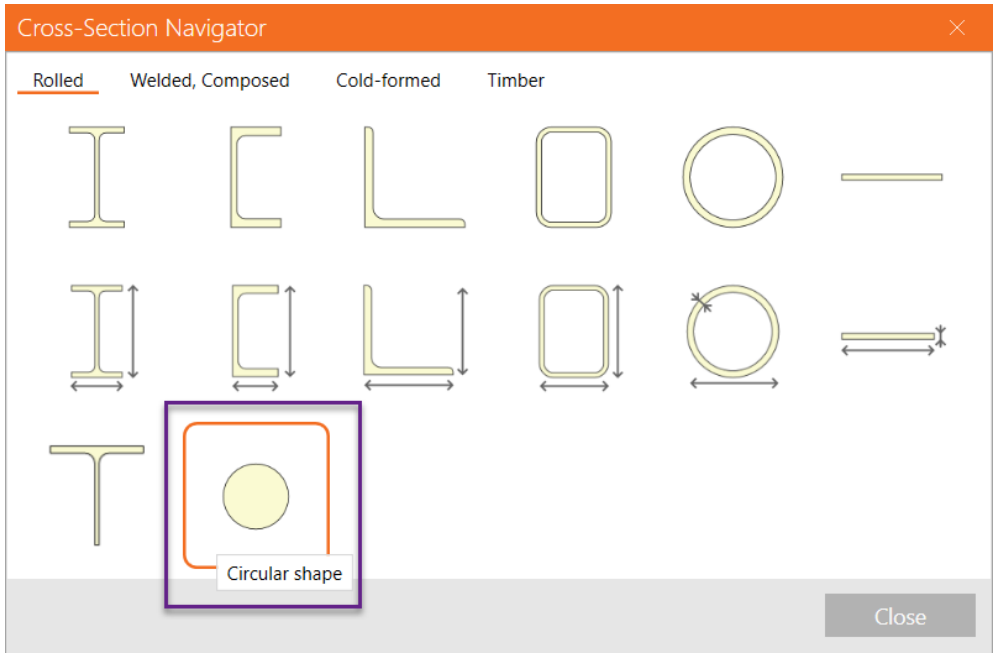
ROD CROSS SECTION

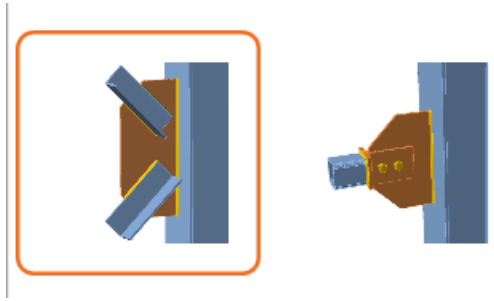
The rod cross-section is dedicated mostly to tension elements.

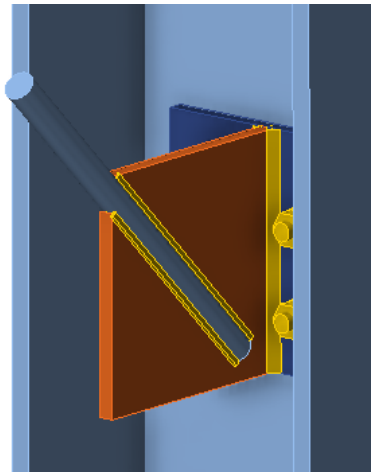
Model as 1D element

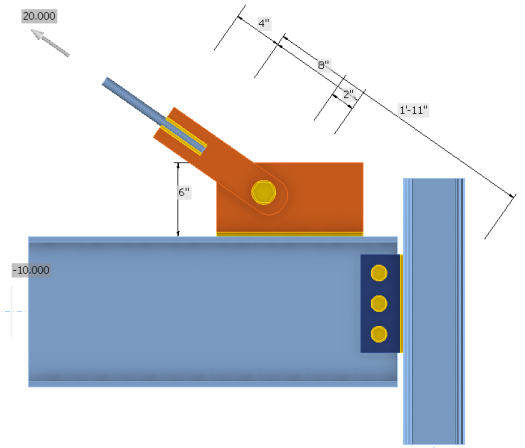
Model type: N-Vy-Vz

When using rod members, only **Connecting plate** or **Gusset plate** operation can be used







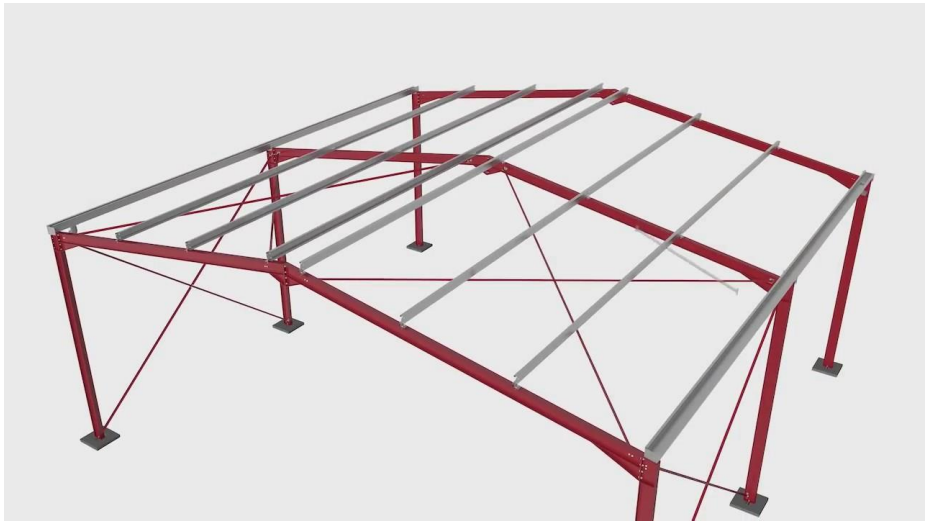


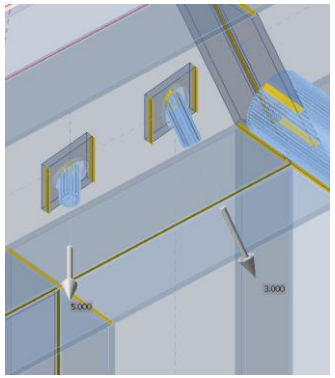
HOLLOW SECTION TO SIMULATE TENSION BRACING RODS

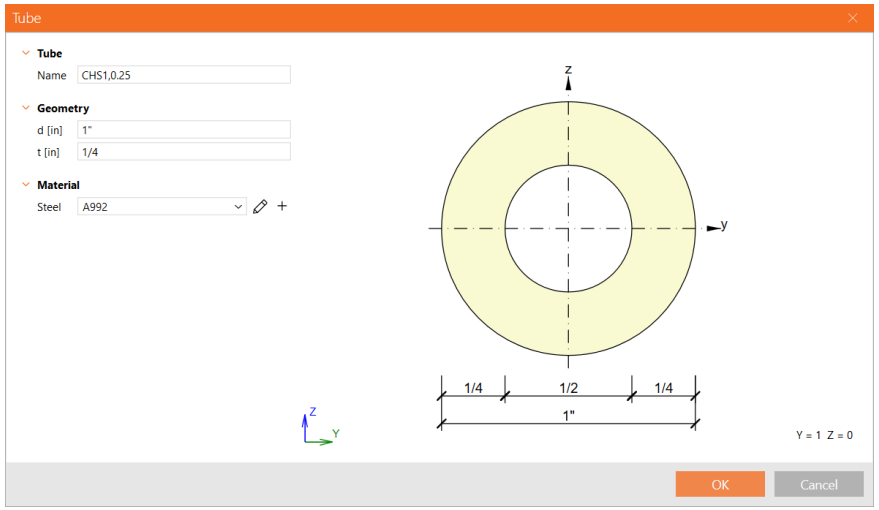
Thick hollow section to simulate the tension rod

Hollow sections can be used with all the operations available

Model type= N-Vy-Vz







SUMMARY

Modeling key operations:

Working plane and cut to extend members

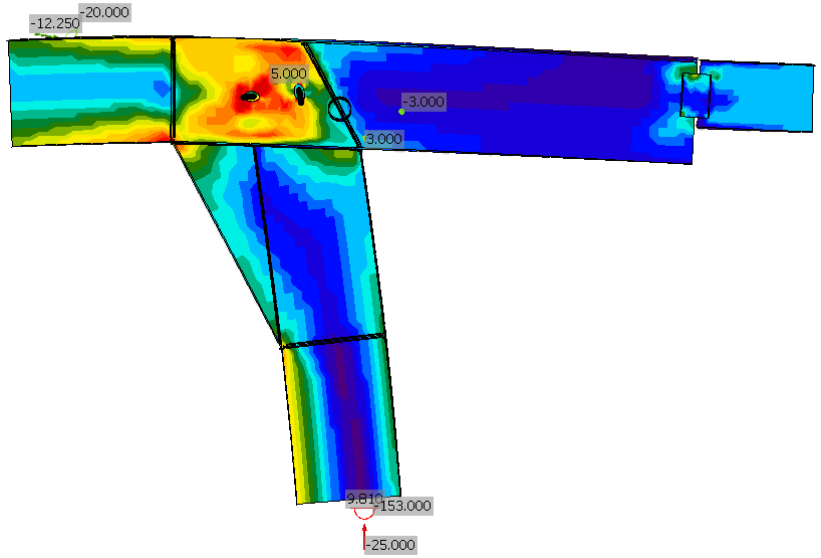
Stiffening member to create a haunch

Rod bracing – only tension: Use hollow section instead of rod

Hillside washer – represented with a plate

Contact operation is available for plates:

Surface to surface
Edge to edge
Edge to surface



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Q&A SESSION