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STEEL WEBINAR

Solve design issues, RFIs, and retrofit challenges faster than ever!

February 27, 2025

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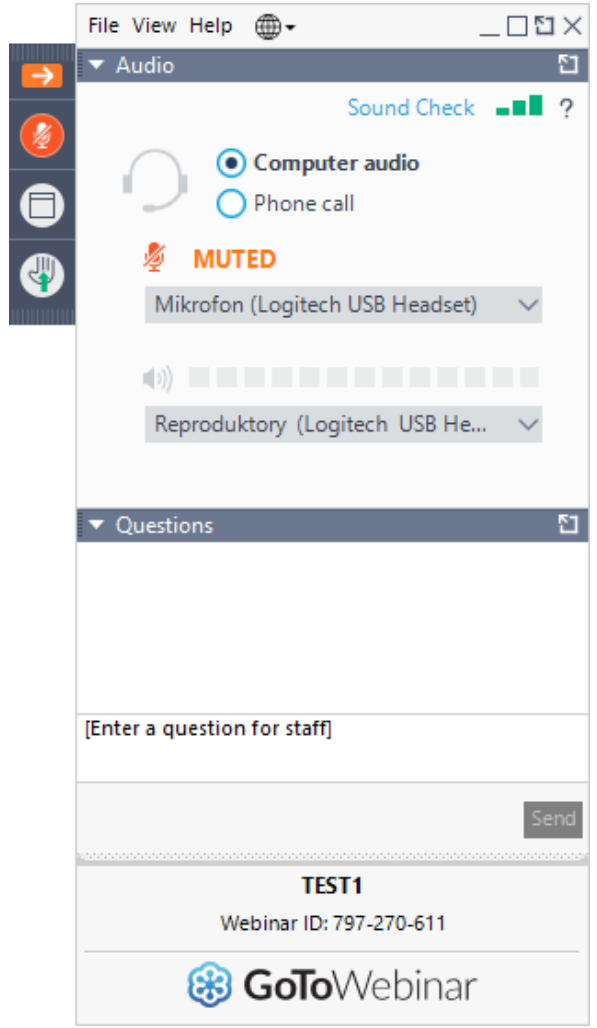
QUESTIONS HANDOUT



AGENDA

Design, Construction and repair challenges

Skewed connections

On site interferences

Steel connection retrofit

Q&A

NEXT EVENTS

In person events:

Roadshow – Minneapolis, TBD

AISC NASCC – Louisville, KY

Booth 106

Online events

Webinar – March 26

Webinar – April 30

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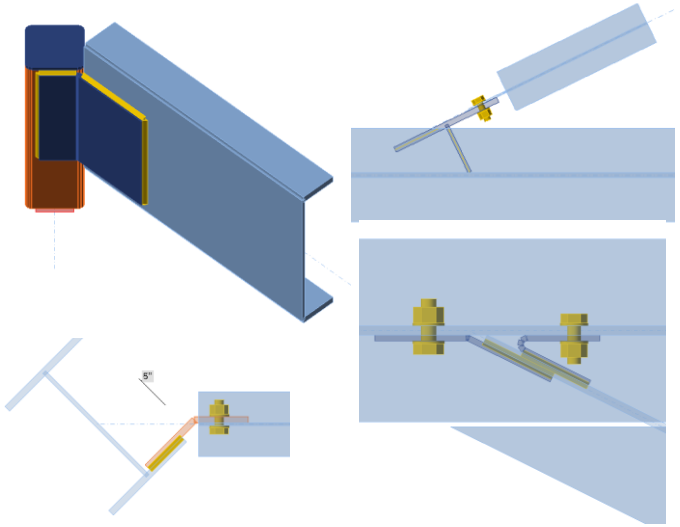
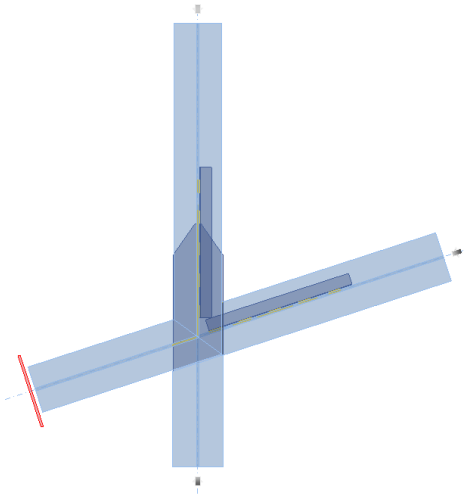
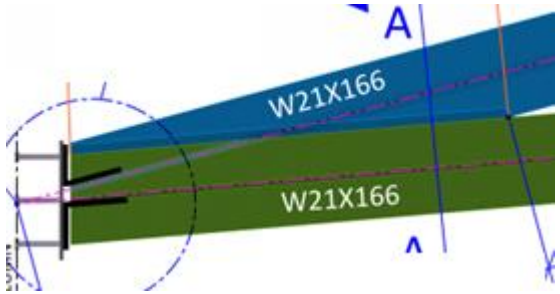
DESIGN, CONSTRUCTION & REPAIR CHALLENGES SOLVED with IDEA StatiCa



Skewed connections: bent plates, extended shear tabs, WT, double bent plates



Skewed moment connection



Skewed beams connection to concrete

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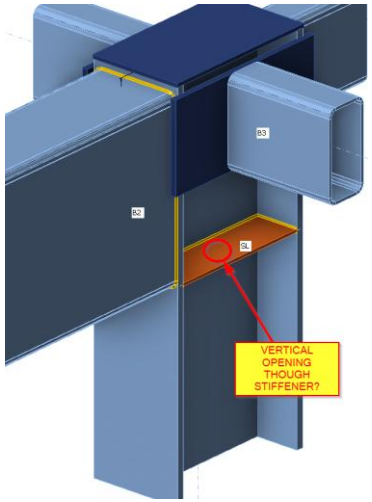
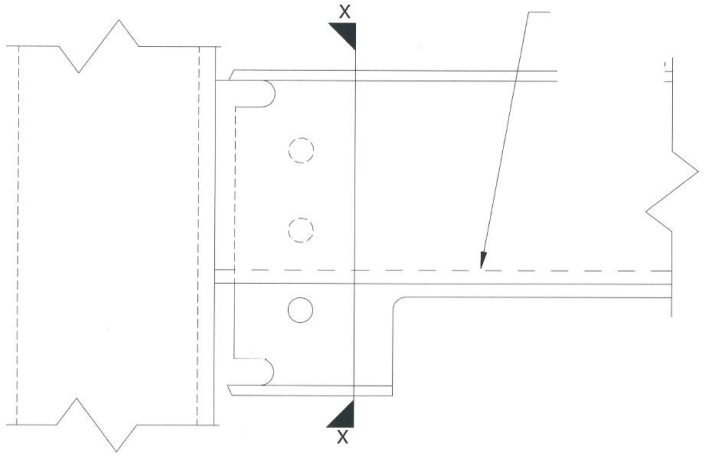


Construction phase

Interference - Openings in plates

Construction phase

On site clashes



Construction phase

Notches close to the connections

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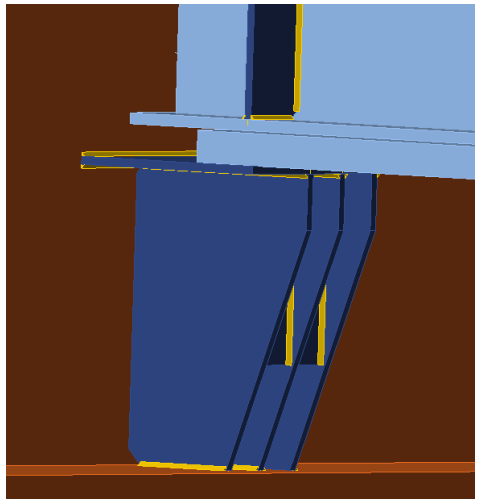
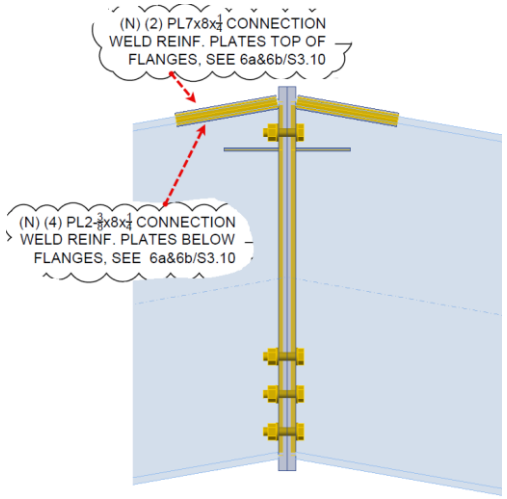
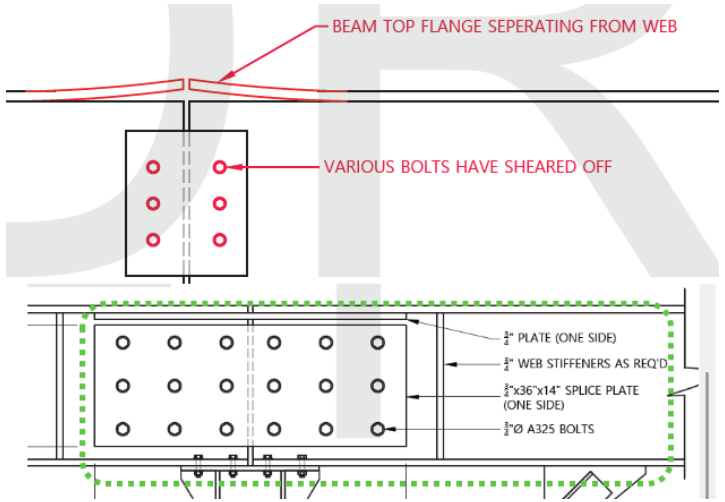


Beam seat to an existing connection

Reinforcement to take larger load



Retrofits to pre-manufactured steel buildings



Crane beam that is having some failure

Strengthen beam splices

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SKEWED CONNECTIONS

Skewed members are more common in projects due to the increased complexity of projects

Skewed connections are known during the design process

Due to the geometry constraints, notches are required and verified during the design process

Constructability needs to be verified for skewed connections

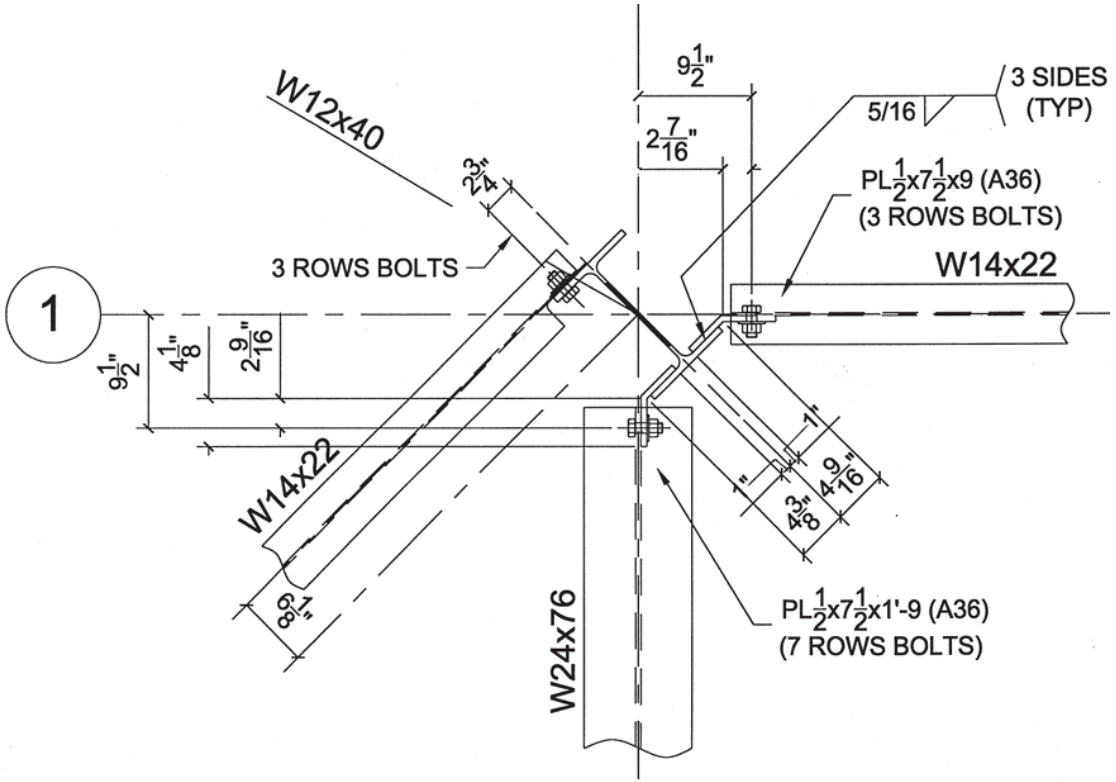

Fig. 17. Typical skewed connection arrangement.

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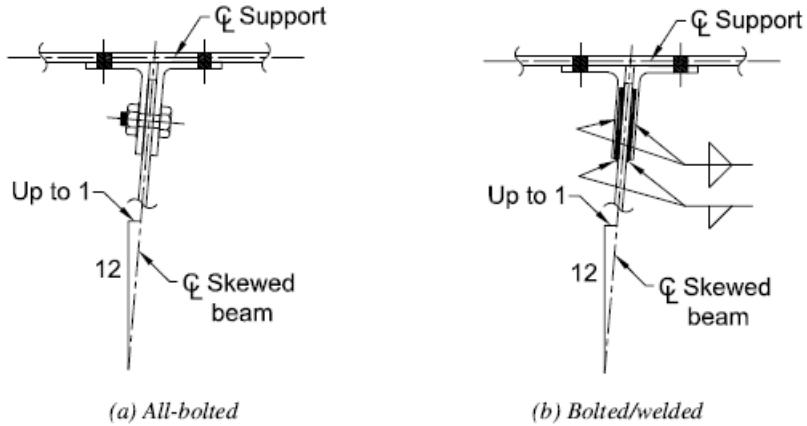
SKEWED CONNECTIONS – AISC MANUAL

Skewed connections are discussed in the AISC manual p.10-86

Recommended connections:

When the skew angle is less than 5° – bent double angles

When is more than 5° – bent plates may be a more practical solution



(a) All-bolted *(b) Bolted/welded*

Fig. 10-34. Skewed beam connections with bent double angles.

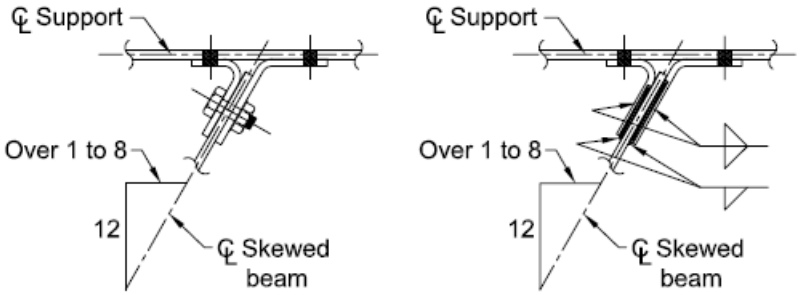


Fig. 10-35. Skewed beam connections with double-bent plates.

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How IDEA StatiCa can help?

No limitation in the skew angle for beams or other members

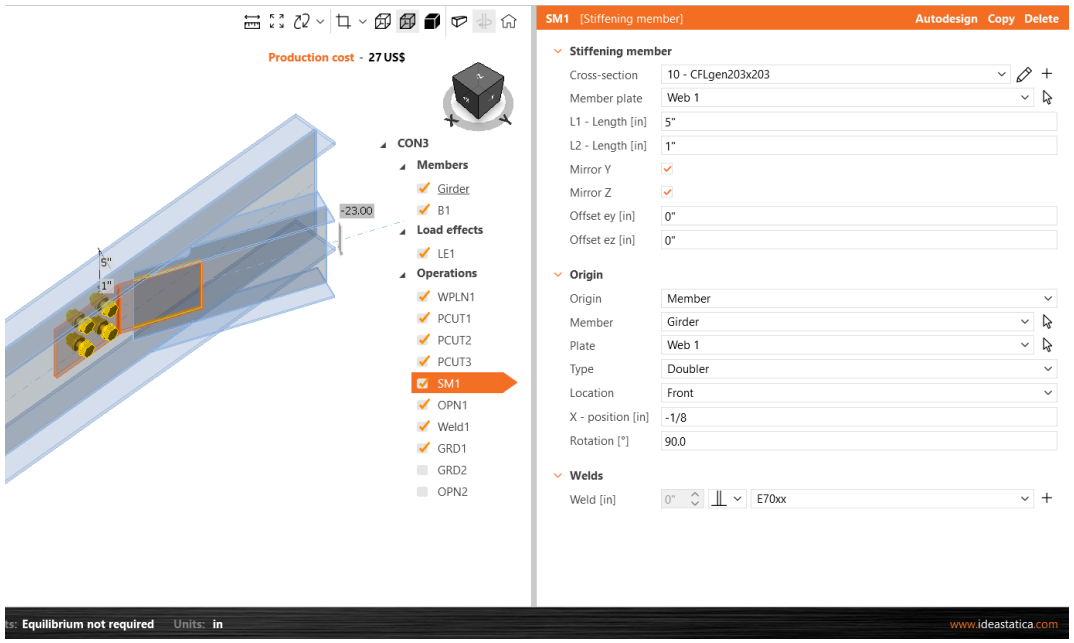
Align member tool to adjust top of steel beams

Bent plate modeling using a stiffening member

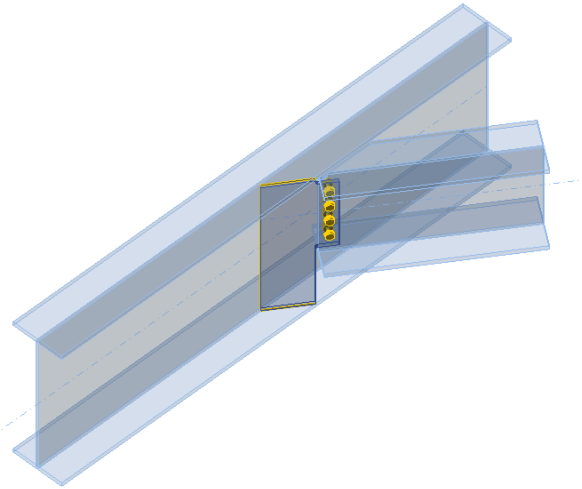
Use cut operation together with working plane to notch flanges

Set up the working point – Force position

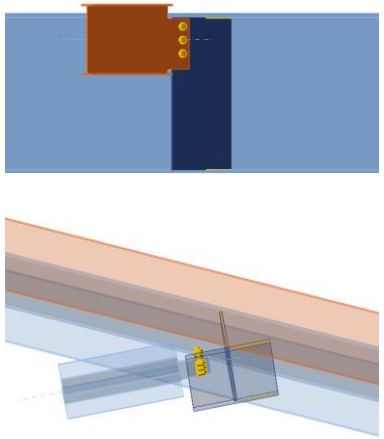
Buckling analysis to avoid buckling due to long notches



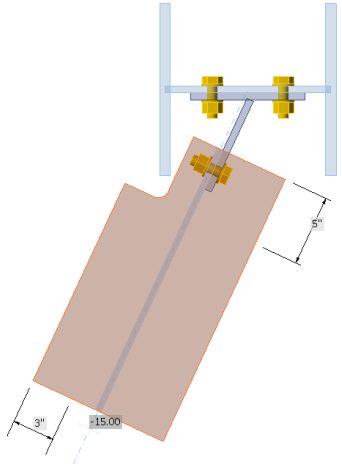
OTHER CONFIGURATIONS



Extended shear tab



WT Section



End plate - shear tab

https://connectionlibrary.ideastatica.com

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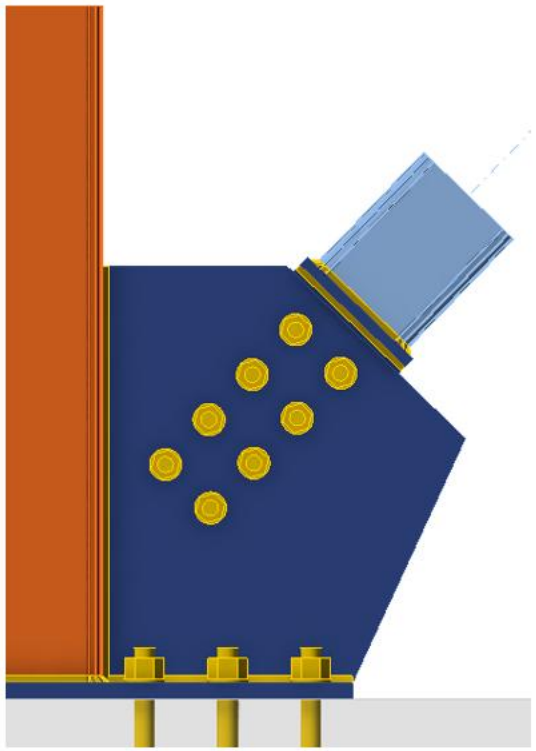
ON SITE INTERFERENCES

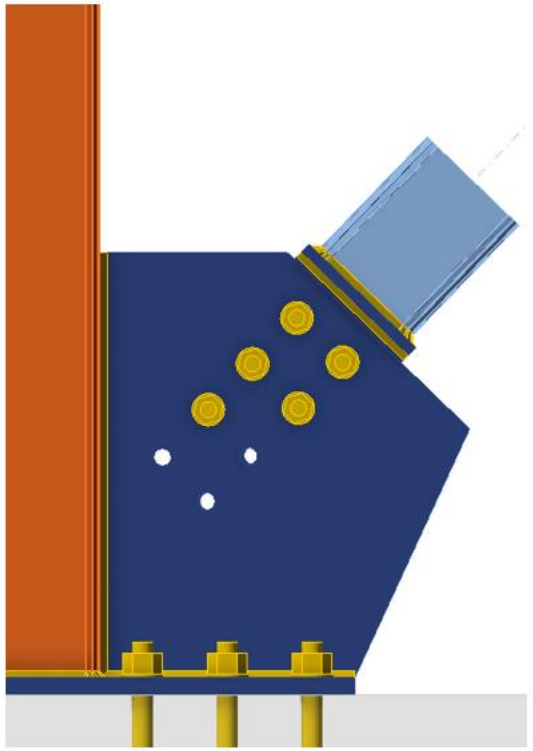
Structural members need to accommodate unexpected elements such as:

- Utility pipes or ductwork,
- Other structural or non-structural elements clash interference
- Height adjustments - notches on the beams
- See some examples of interference in steel structure construction presented in this AISC session.



Original design

Structural element interference



Modified design

How IDEA StatiCa can help?

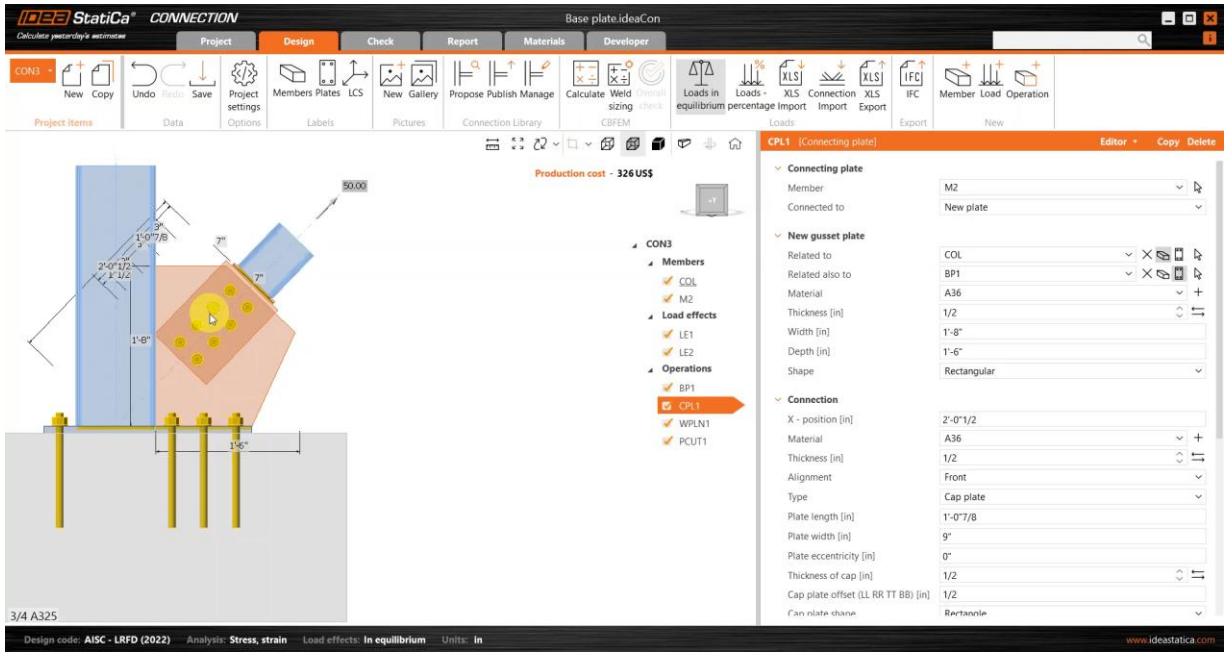
Modify plate shape using the editor

Delete or modify bolts position using editor

Cut sections of the model using negative volume

Plate cuts using working planes

Use opening operations and add stiffeners



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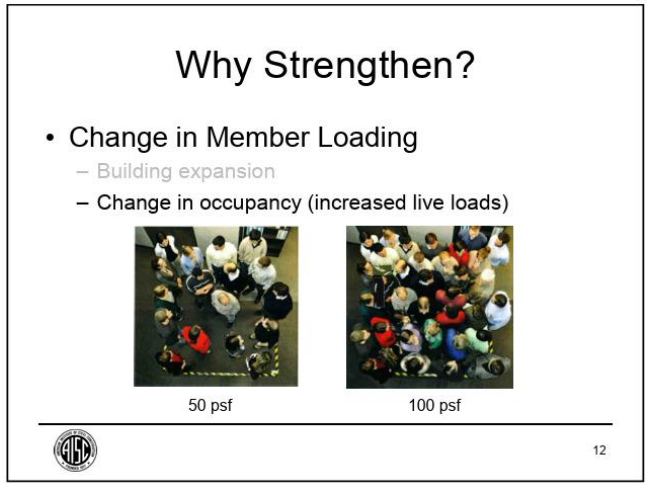
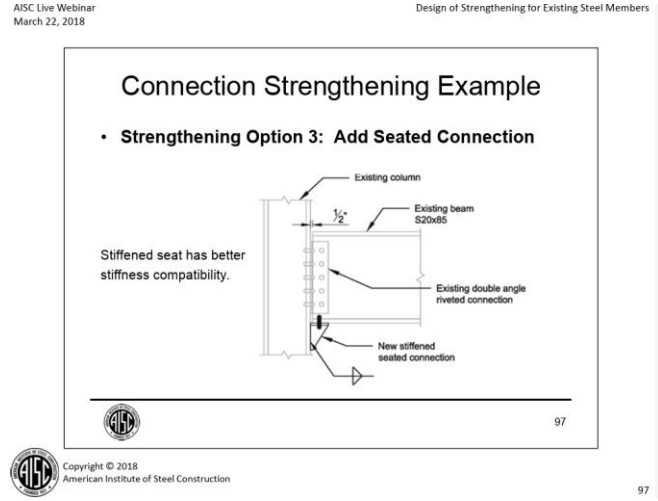
STEEL CONNECTION RETROFIT

There are many reasons to evaluate existing steel structures. AISC described very well the most common ones in their AISC webinar a few years ago:





Live or dead loads change

Building expansion

Change in occupancy

New equipment in the building

Reframing: new openings, column removal

Repairs

Failures due to fire or impact

Corrosion

Seismic retrofit

Solutions

Replace rivets with bolts

Add weld reinforcement

Add a welded/bolted stiffened seat connection

Add plate reinforcement

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How IDEA StatiCa can help?

Joint design resistance – Learn the maximum capacity of the connection

Modify materials and bolts properties to match old data

Pick historic cross sections

Add weld operation to reinforce the connection

Use stiffening plates or members to test the planned reinforcement

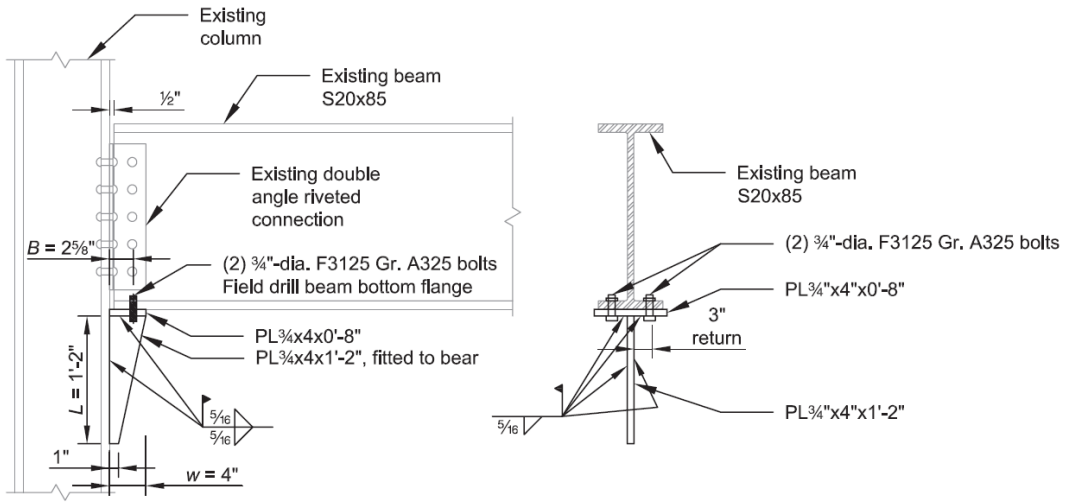
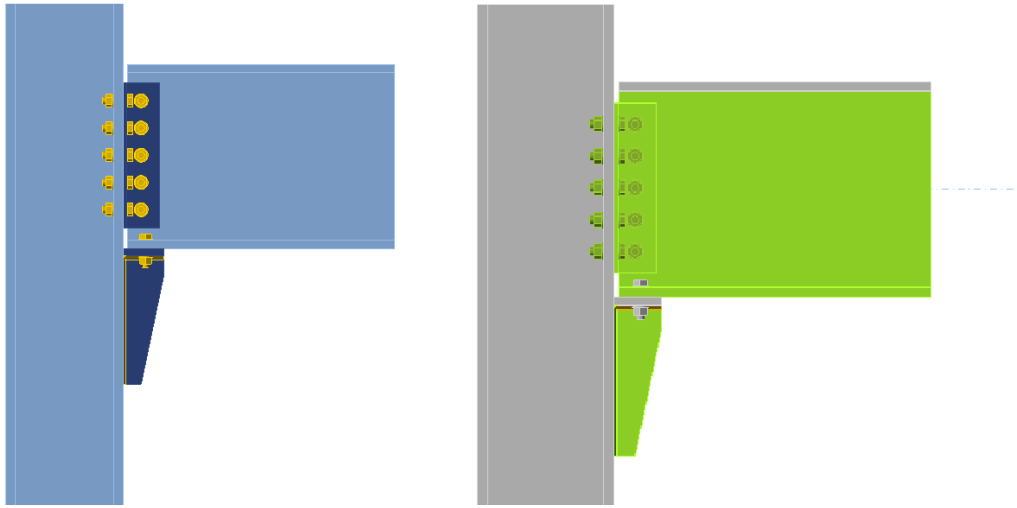


Fig. 6-39. Final connection reinforcement design for Example 6.3.4 using stiffened seat.



Q&A - NEXT STEPS

Tech support through user portal:
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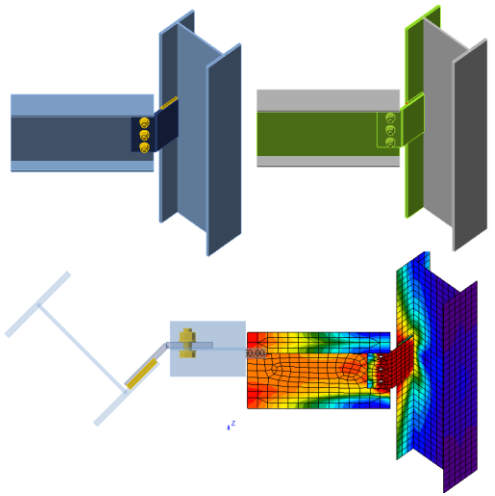
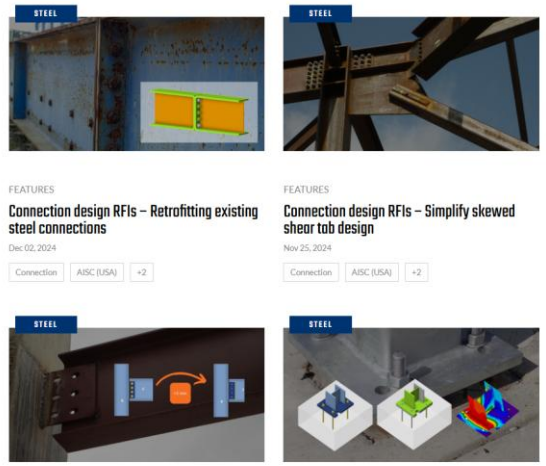


Trial version:
https://www.ideastatica.com/free-trial



Blog series Connection design RFIs
https://www.ideastatica.com/blog?label=connection_design_rfis