



# **Structural Analysis & Design Software**



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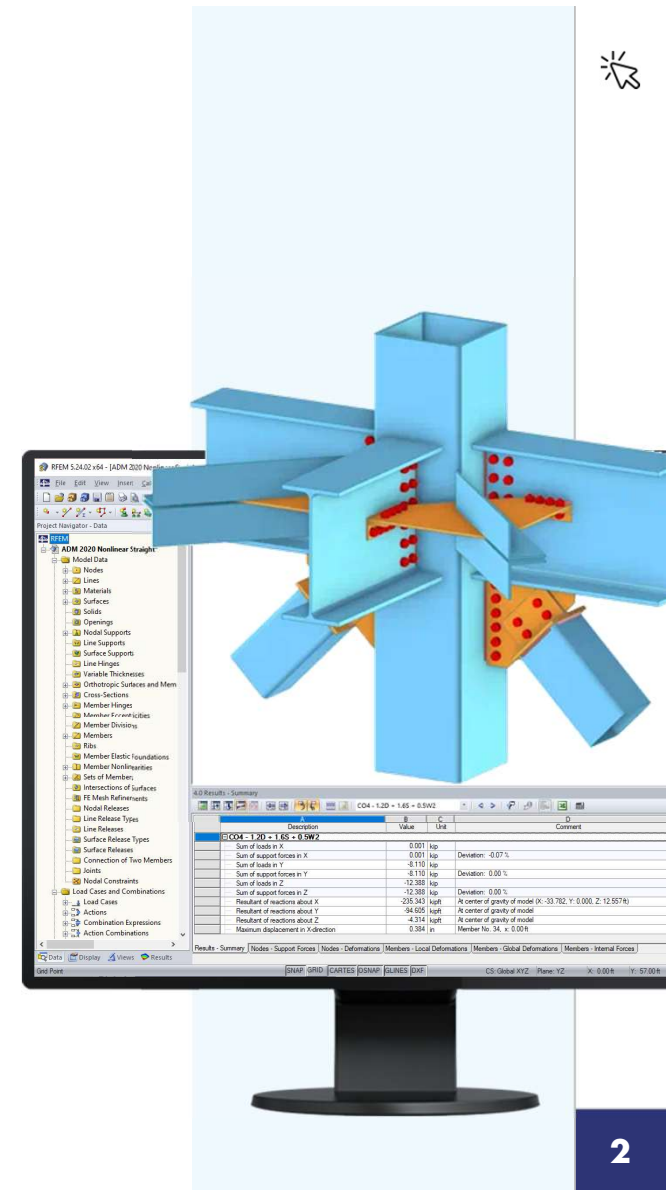
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**Webinar**

# AISC 360-16 Steel Connection Design in RFEM 6



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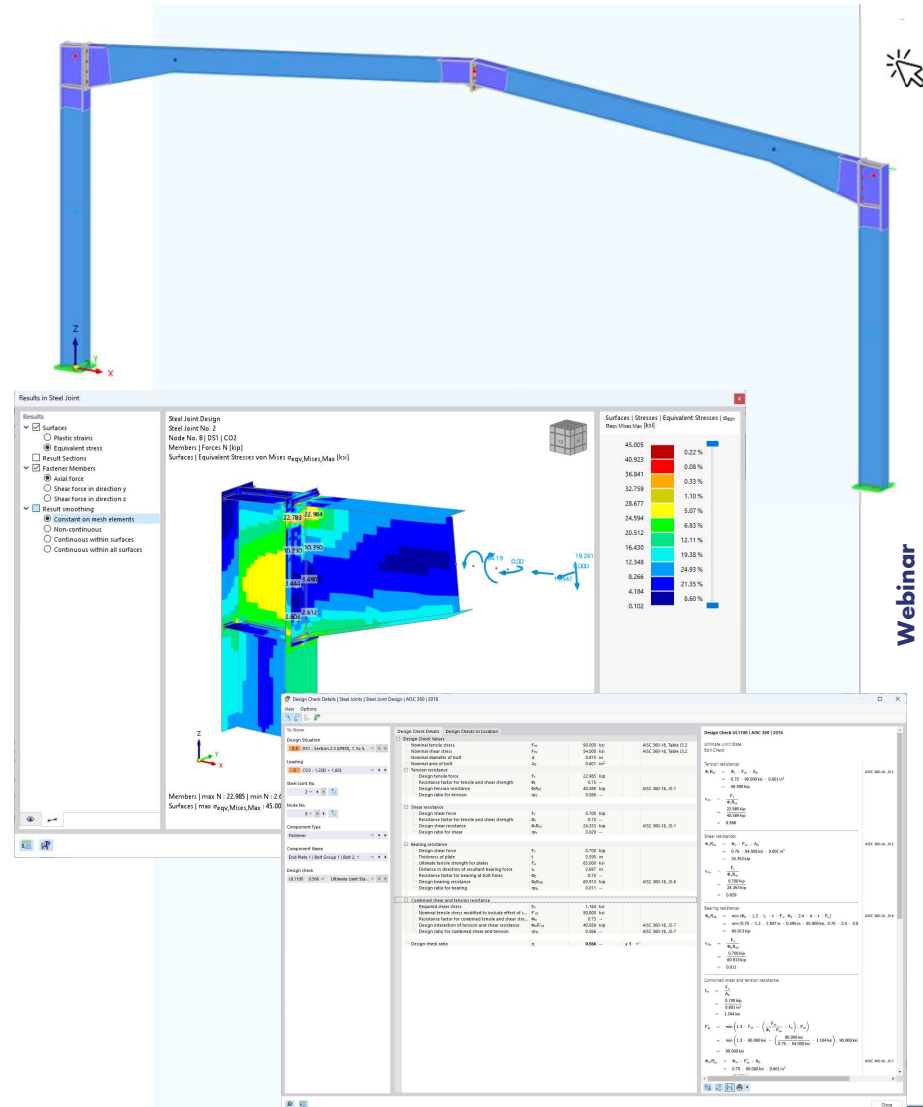
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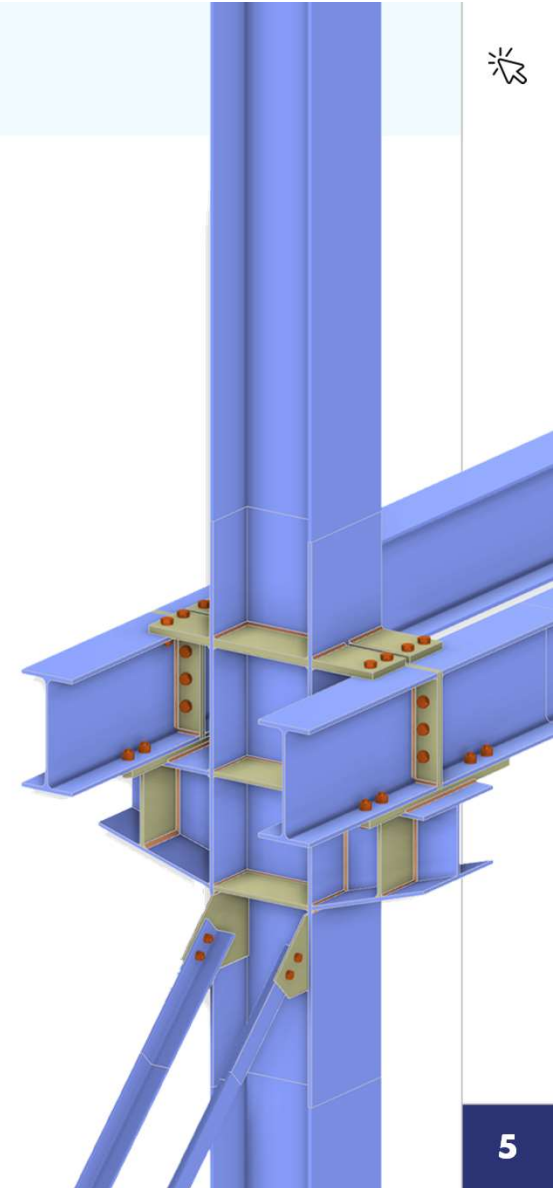
# Content

- 01 FEA connection design concept
- 02 Connection component input in Steel Joints Add-on
- 03 Joint template or user-defined options
- 04 FEA submodel results review including buckling analysis
- 05 Steel member design integration in Steel Design Add-on



## Why FEA for Steel Connection Design?

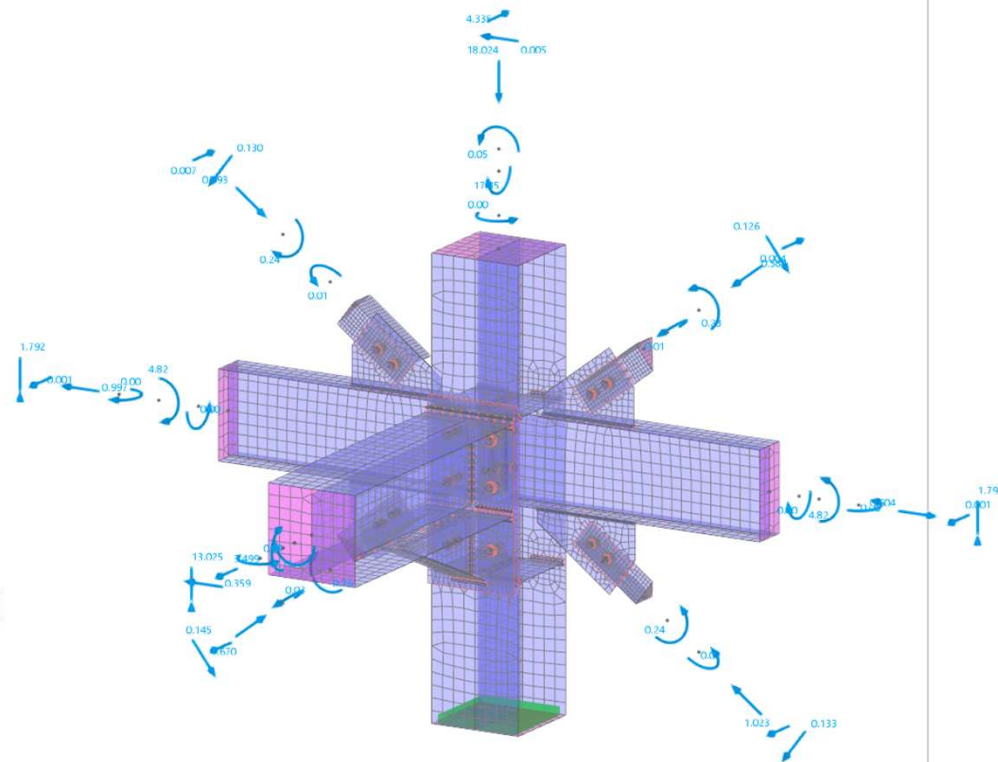
- Design of non-standard connections
- Components/members both in-plane and out-of-plane
- Consideration of complex loading
- Automatic submodel generation requiring minimal expertise level
- Additional buckling analysis submodel
- More precise results with less assumptions
- Validation tool for non-standard connections





# RFEM Steel Connection Design Concept

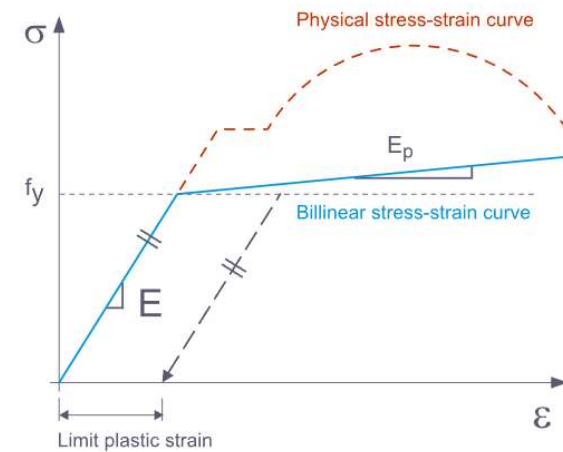
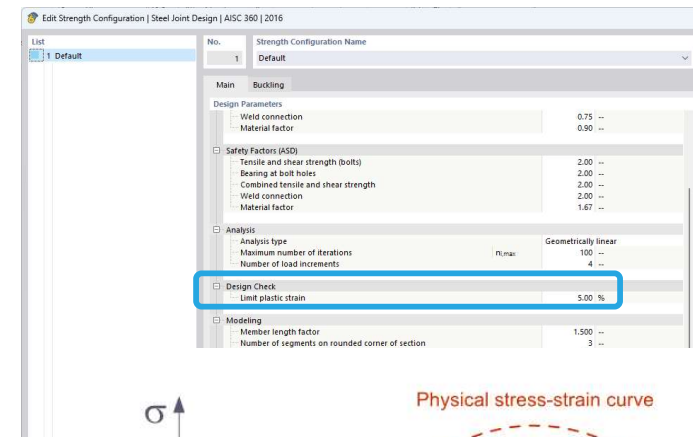
- Automatic FEA submodel generation
- 1D member elements → 2D elements
- Bolts and welds → 1D and 2D elements
- Linear elastic material → Nonlinear plastic material
- Geometric nonlinearities
- Automatic member end force transfer
- AISC plate, bolt, and weld design
- Buckling submodel with failure modes and critical load factors
- Integrated member design in RFEM





# Plate Design Check – Plastic Strain Limit

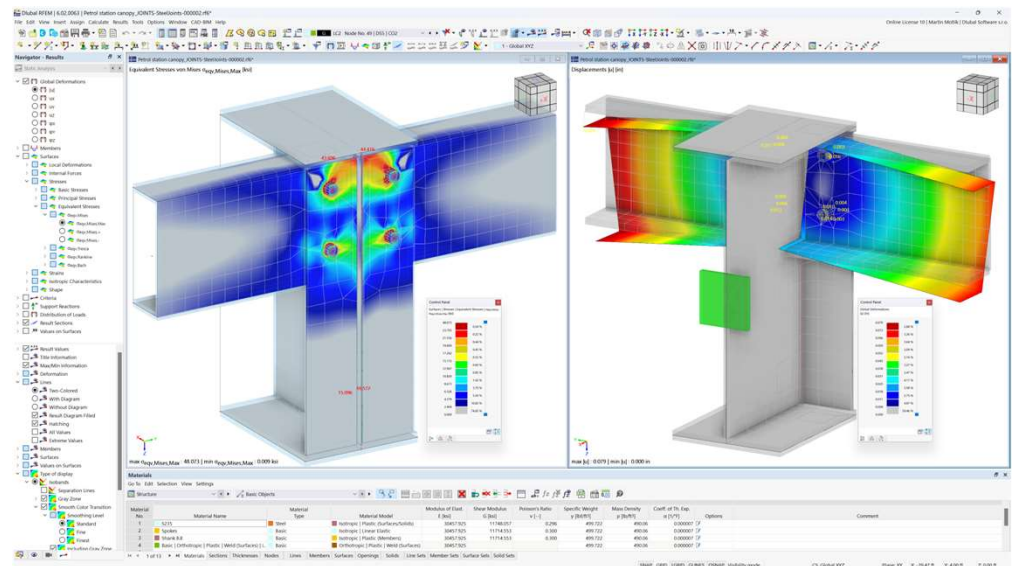
- Plastic strain limit is the strength limit state criteria
- Flanges, webs, plates, etc. converted to 2D surfaces
- Nonlinear plastic material model assigned
- Von Mises yield criterion stress failure hypothesis
- $E_p = E/1000$  of steel material
- Utilize plastic behavior of steel with internal force redistribution after slight yielding
- Default value  $\varepsilon_{p\text{-limit}} = 5\%$  (EN 1993-1-5 Annex C.8 Note 1)
- Relevant correlation to actual steel plate behavior





# Steel Joints Add-on Future Developments

- Support of round HSS sections
- Preloaded bolt input (slip-critical connections)
- AISC 360-22 standard updates
- Joint stiffness export to RFEM model
- Base plate design
- BIM integration
- Timber member connection design
- AISC 341/358 design checks





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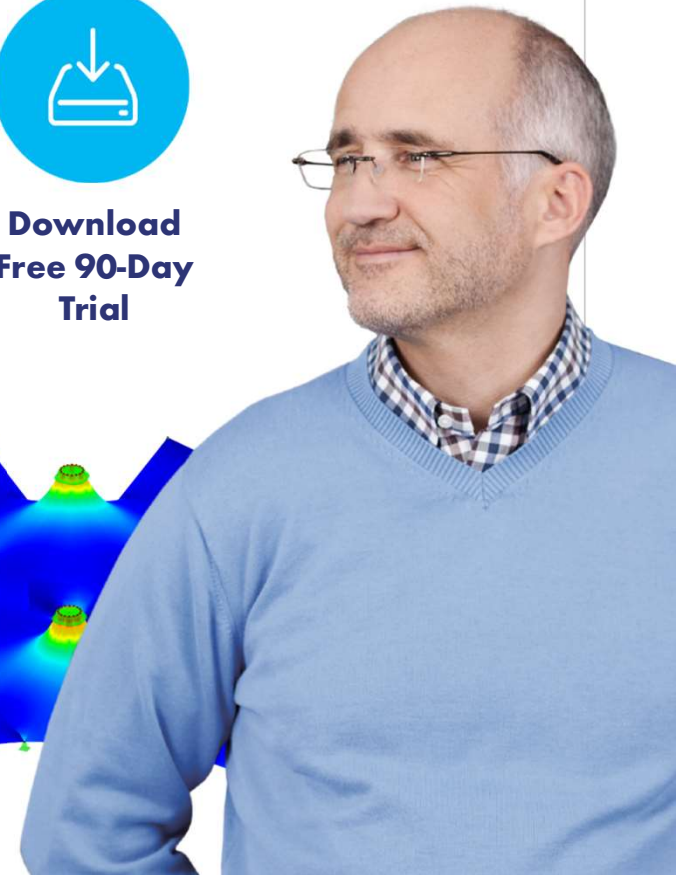
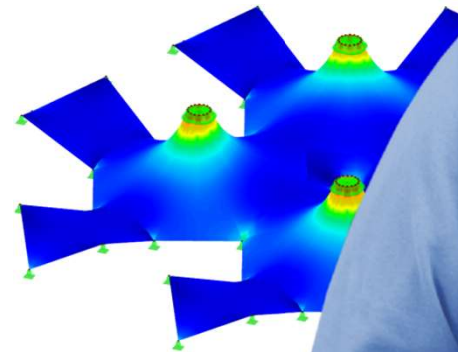
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