Department of Aerospace

ABAQUS Project

End-plate steel Monotonic connection

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Project Outline

Material Property

Mesh

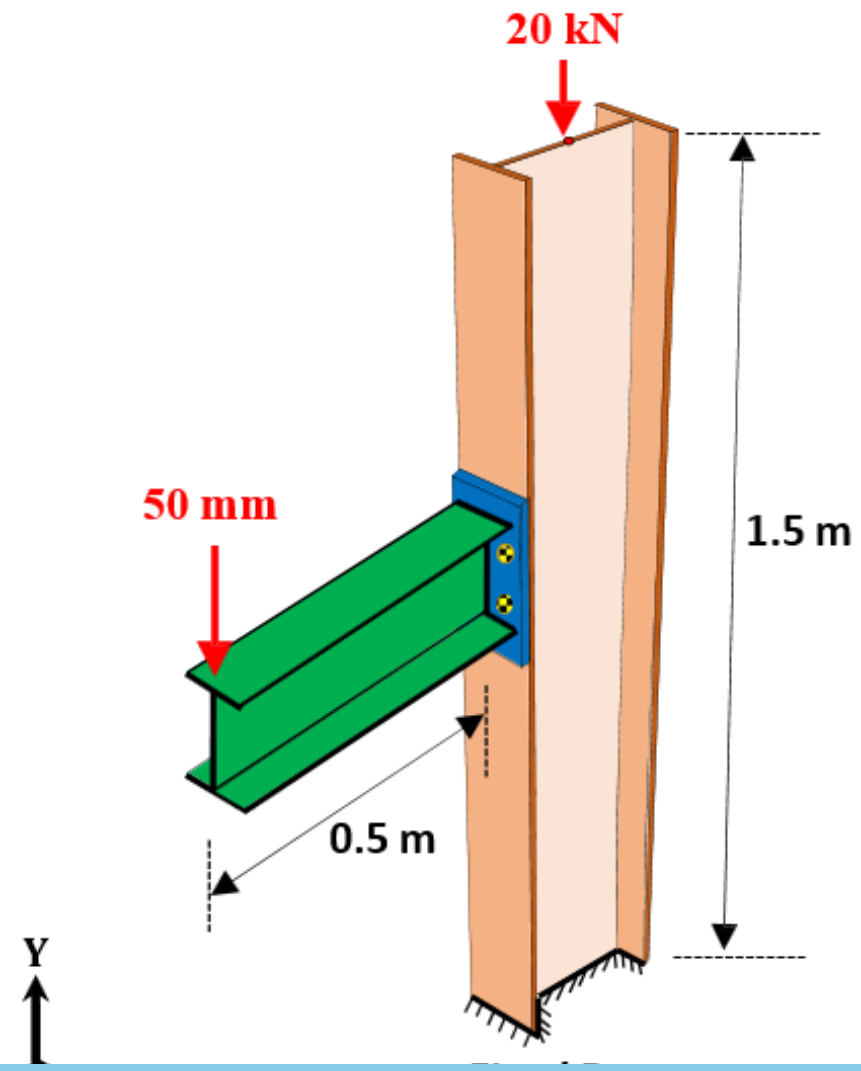
Results

Project Outline

❖ **Modeling a Steel Beam-to-Column Subassembly**

- **Parts module** (Defining geometry)
- **Property module** (Defining Materials and cross-sections)
- **Assembly module** (Parts assembly)
- **Step module** (Defining analysis steps type and parameters)
- **Interaction module** (Defining interactions & constraints)
- **Mesh module** (Defining mesh size and mesh element type)
- **Job module** (Running and monitoring the analysis)
- **Visualization module** (Visualizing displacements, strains and stresses)

Model Geometry



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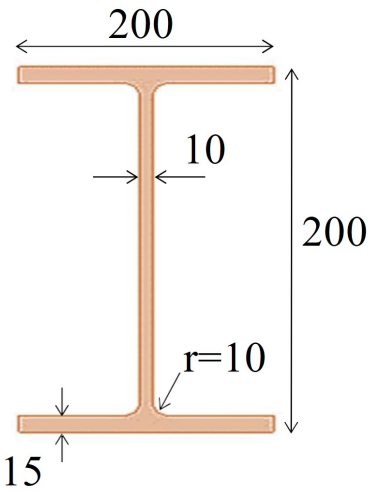
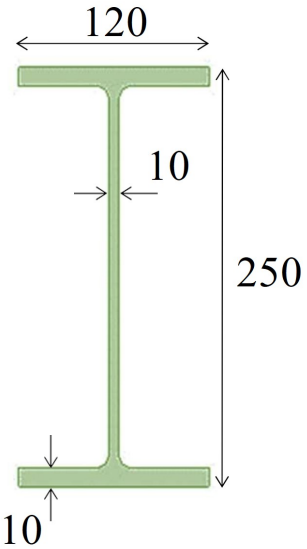
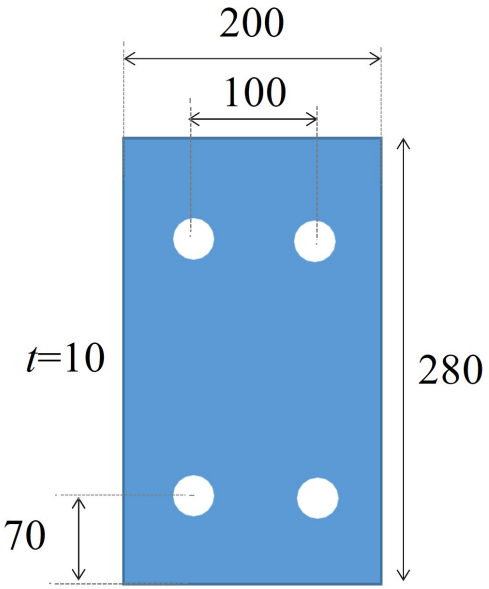


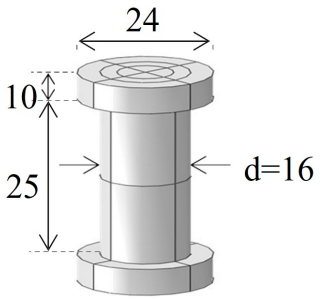
Column
(Solid elements)



Beam
(Shell elements)

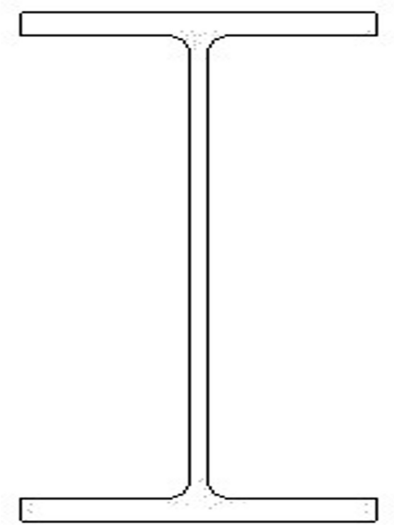


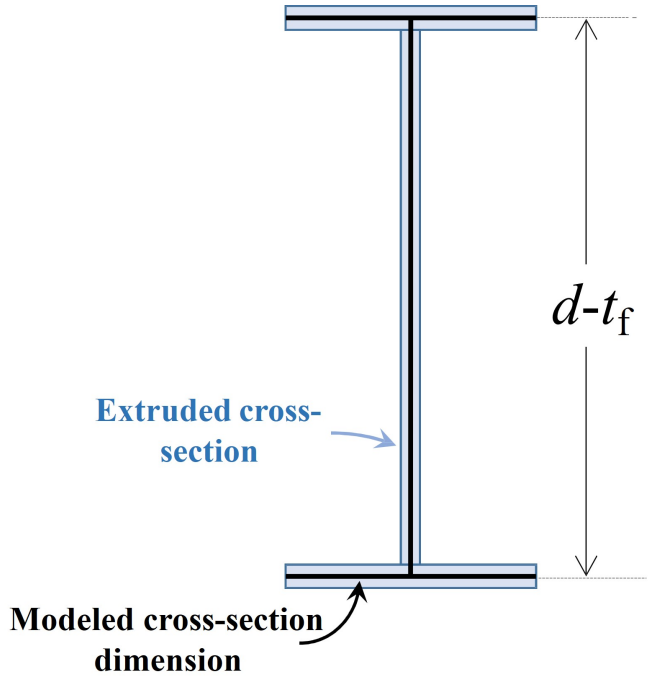
End-Plate
(Solid elements)



Bolt
(Solid elements)

Cont...





Solid Part
(sketch section outline)

Shell Part
(sketch section centerline)

Abaqus Model

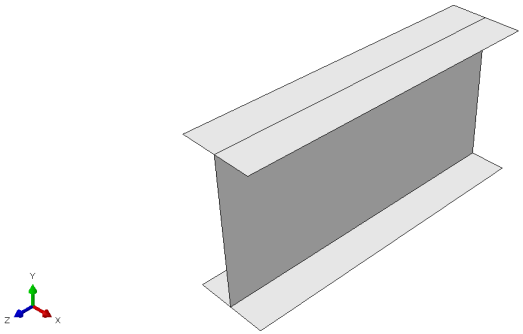


Figure: Beam Part

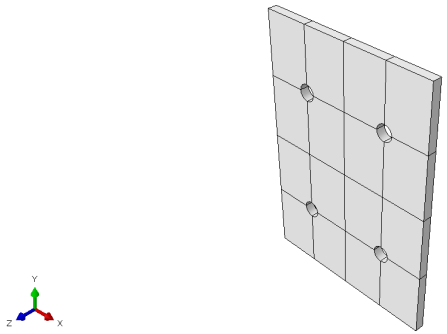


Figure: Plate Part

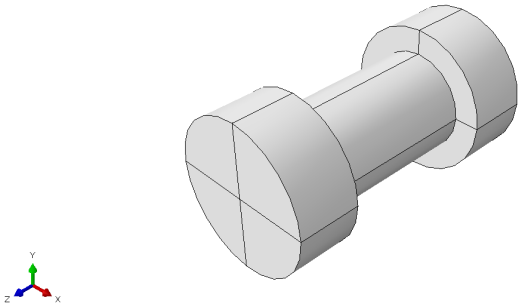


Figure: Bolt Part

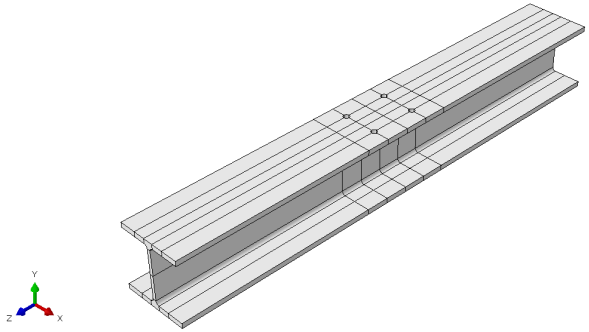


Figure: Column Part

Material Property

Bilinear with a hardening branch

S355 Steel

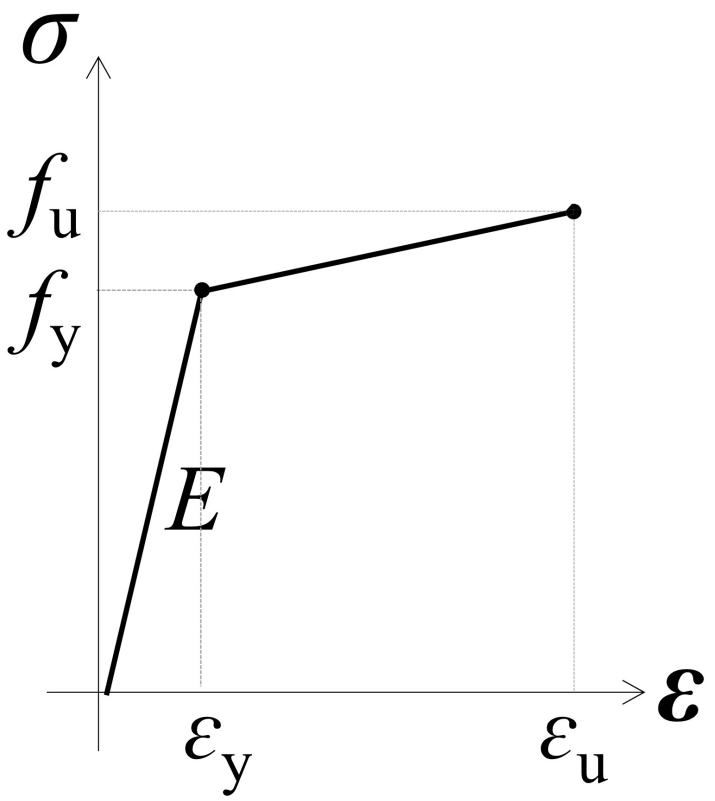
$E = 200{,}000$ MPa

$\nu = 0.3$

$f_y = 355$ MPa

$f_u = 470$ MPa

$\varepsilon_u = 0.18$



Mesh

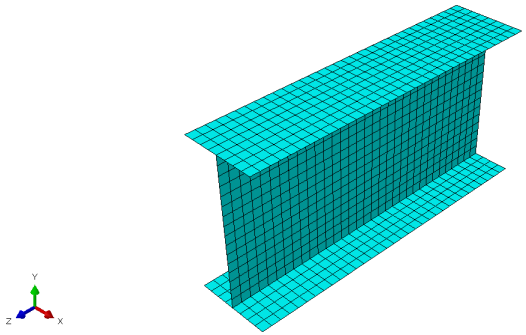


Figure: Beam Mesh

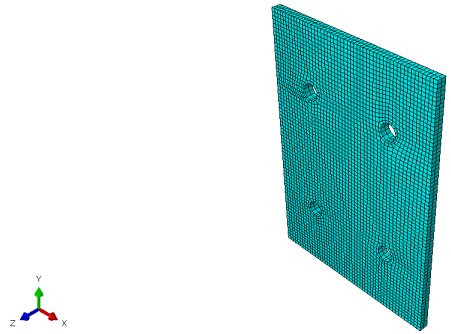


Figure: Plate Mesh

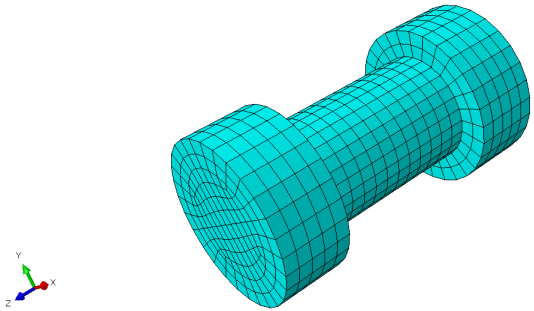


Figure: Bolt Mesh

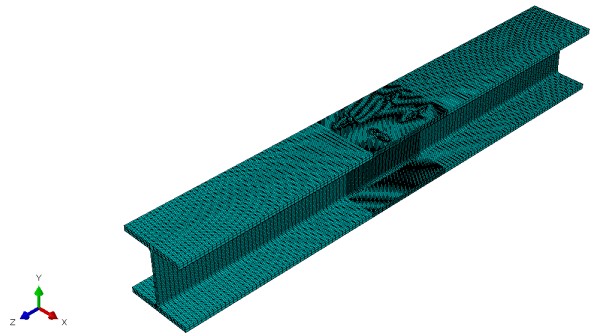


Figure: Column Mesh

Results

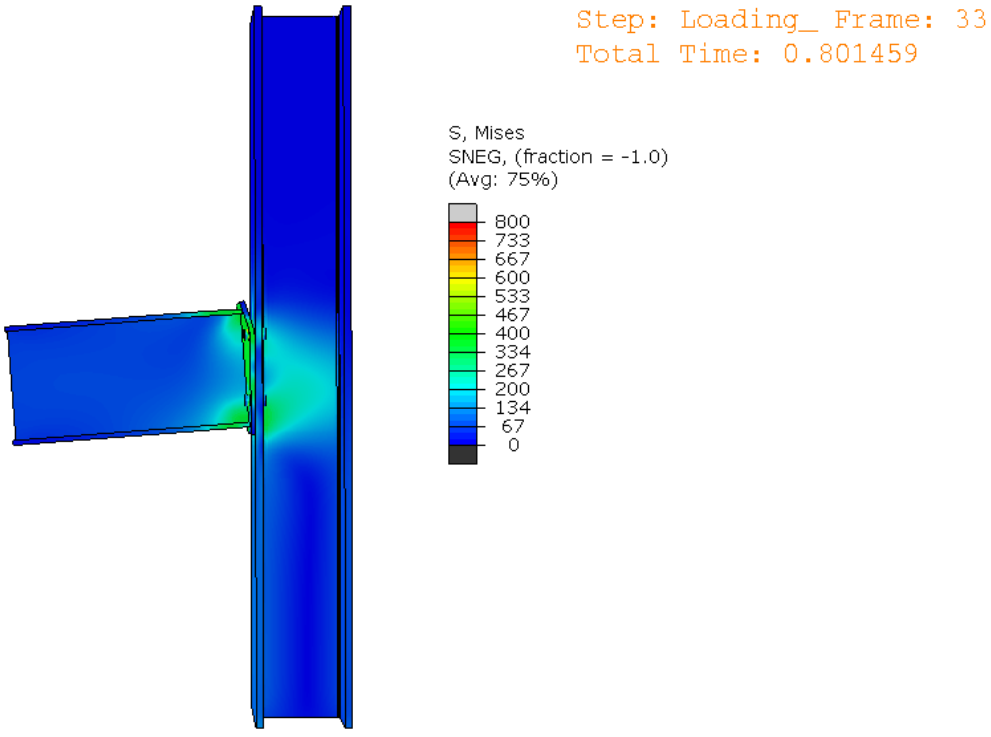


Figure: Stresses

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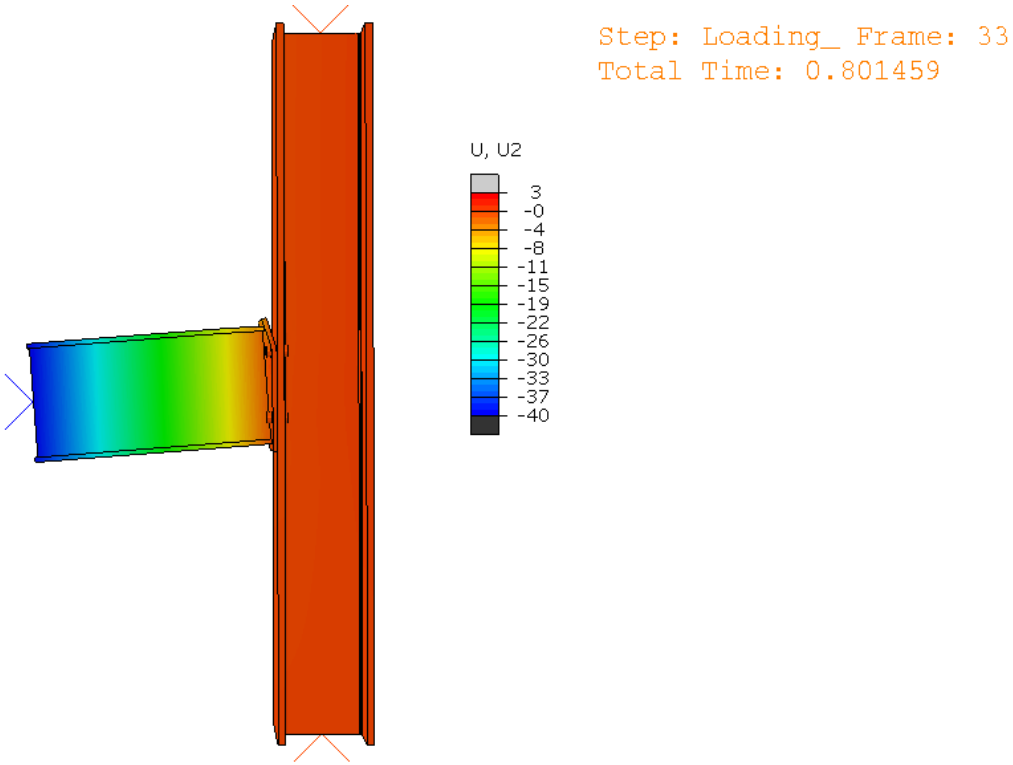

Figure: Displacement

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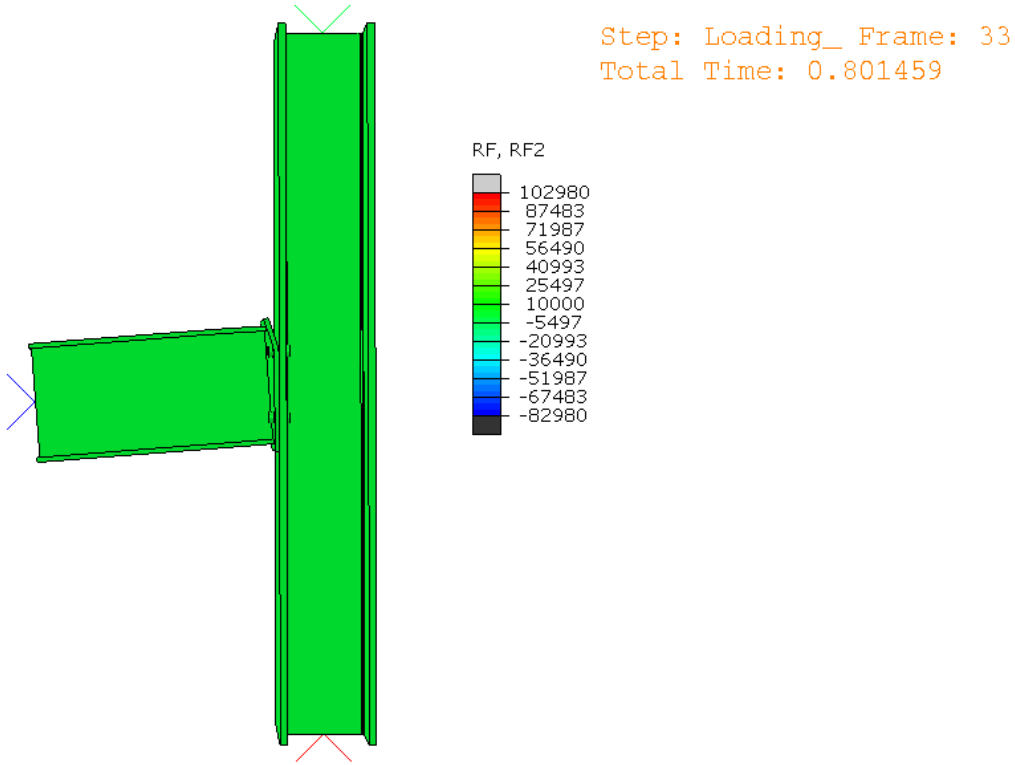

Figure: Reaction Force

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