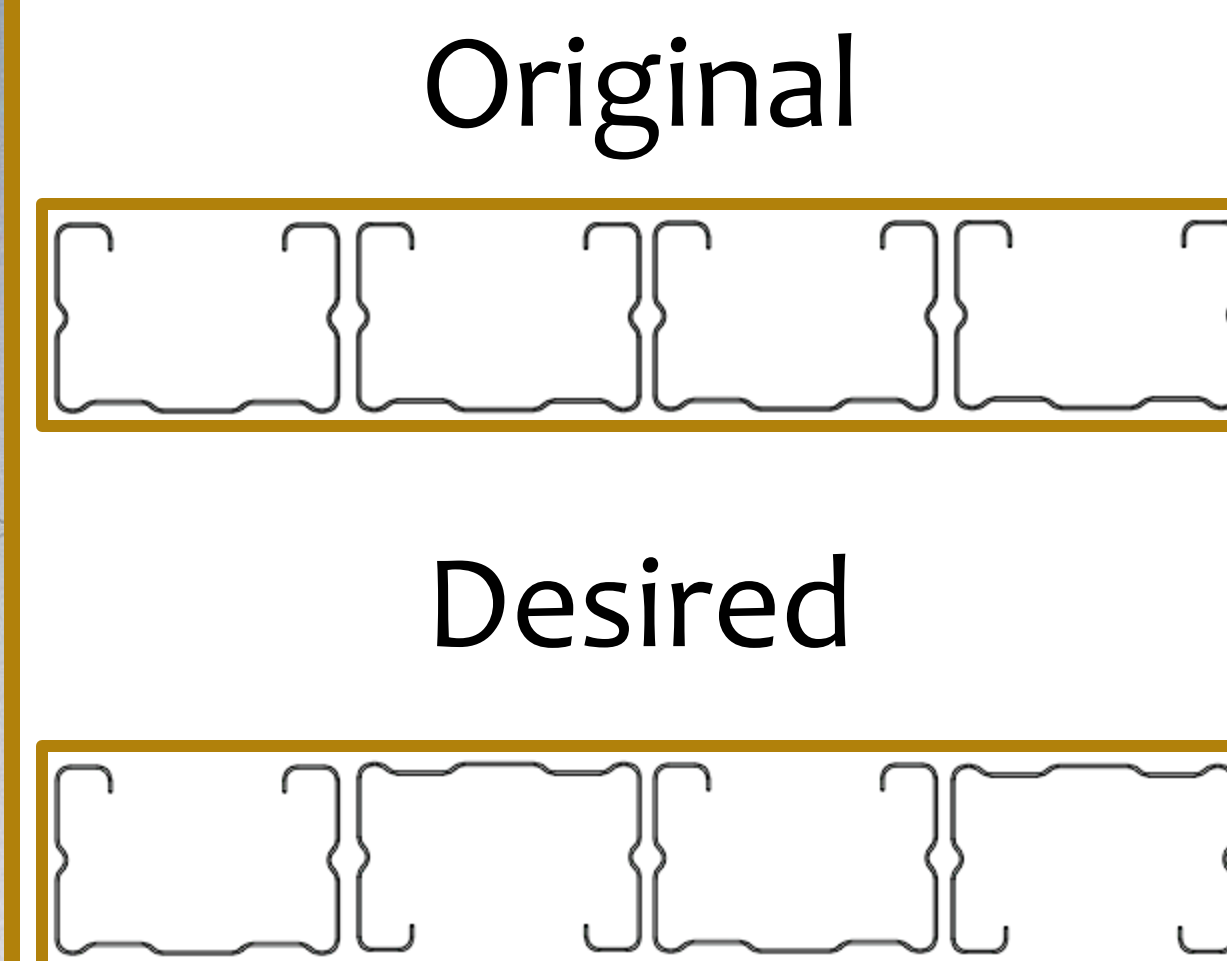
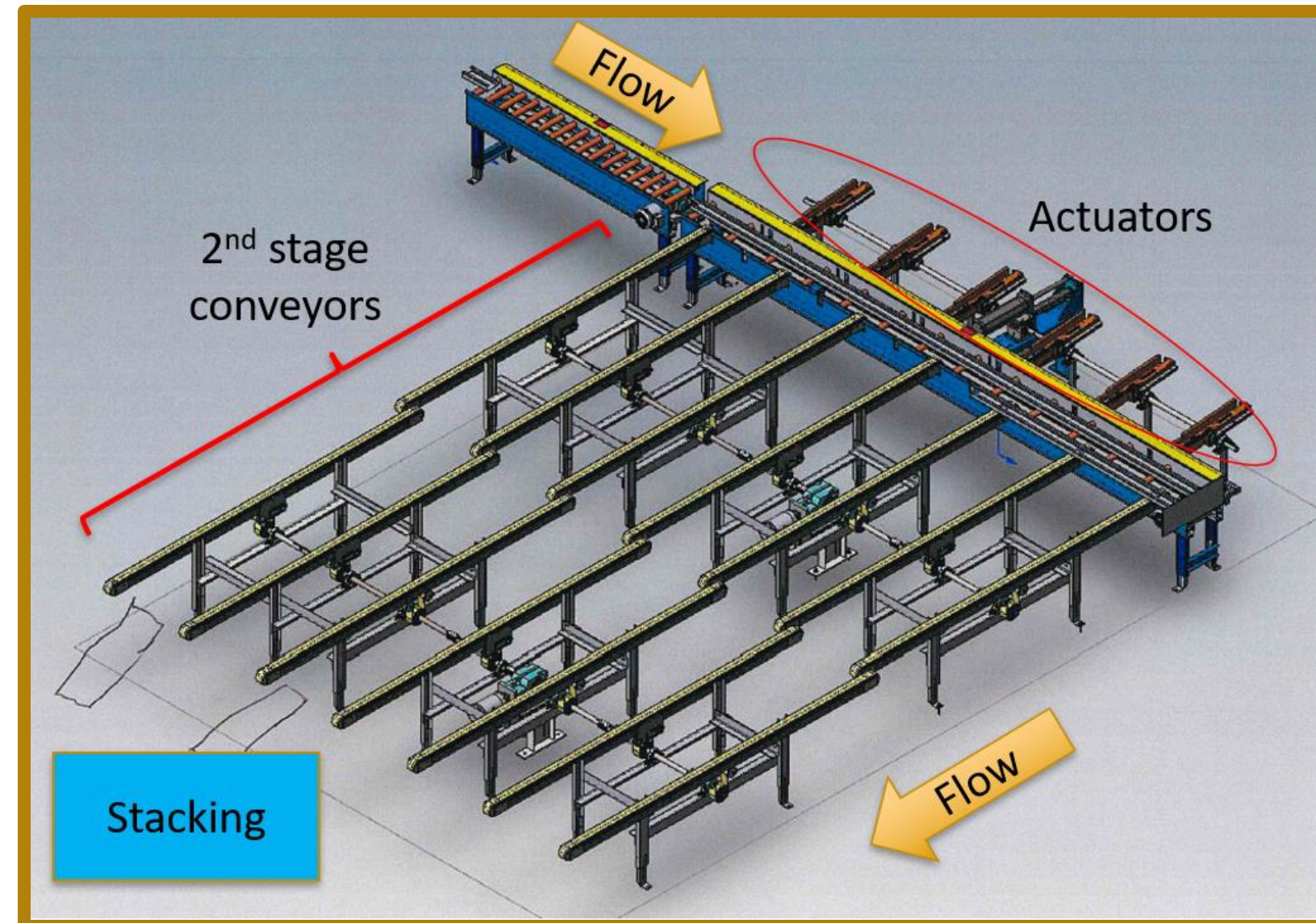


Problem Statement



Improve the efficiency of the roll forming line by effectively flipping every other part to be nested at the end of the line

Customer Requirement

- Flip 8-20 ft length brackets
- Keep up with line speed
- Reduce manual labor cost

Engineering Specifications

- Width: Less than 3 ft
- Height: Less than 36 in
- Speed: 3.75 RPM
- Torque: 360 lbs-in

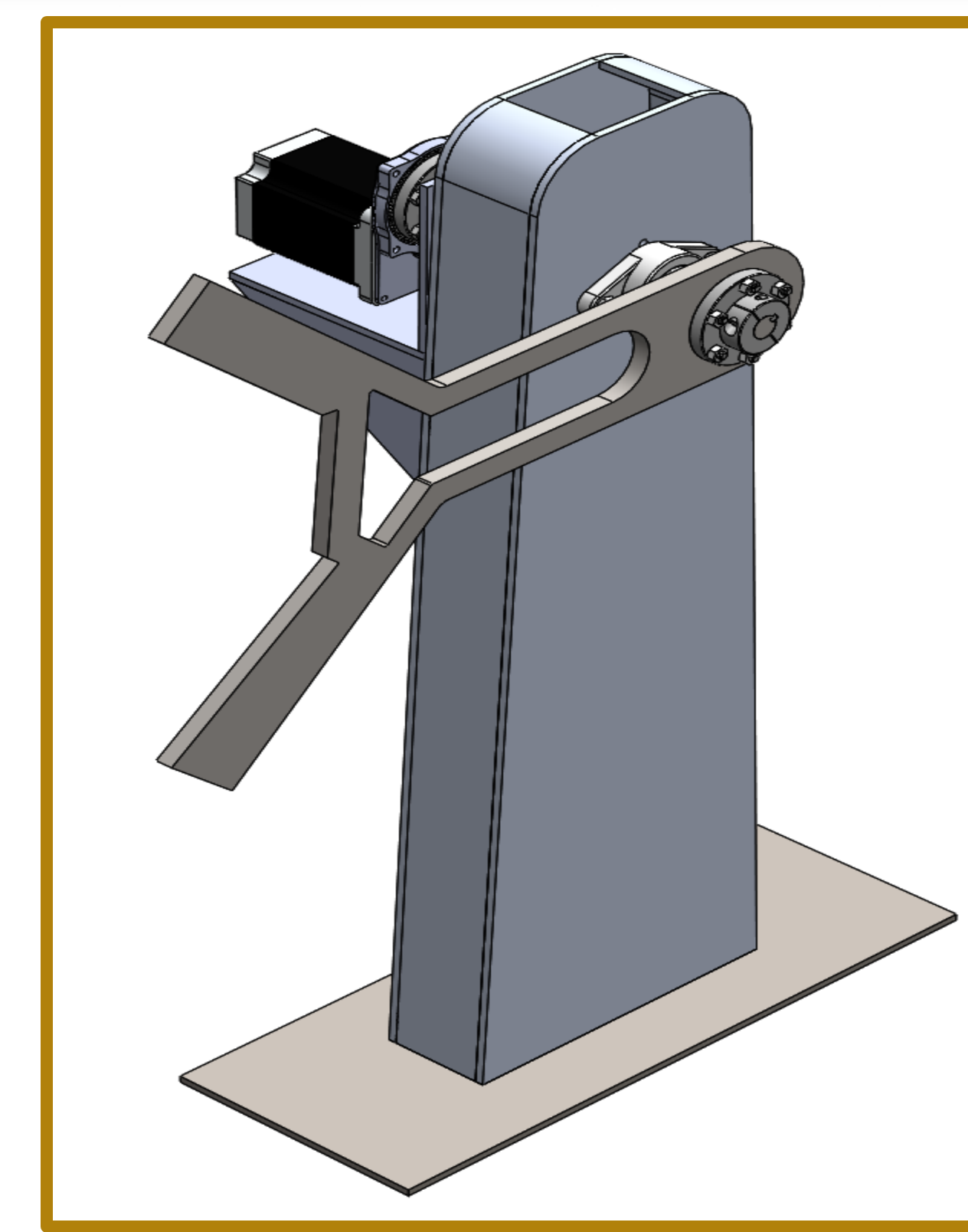
Design Specifications

- Weight: ~90 lbs
- Size: 34.5 x 15 x 20 in
- Max Speed: 250 RPM
- Max Torque: 464 lbs-in

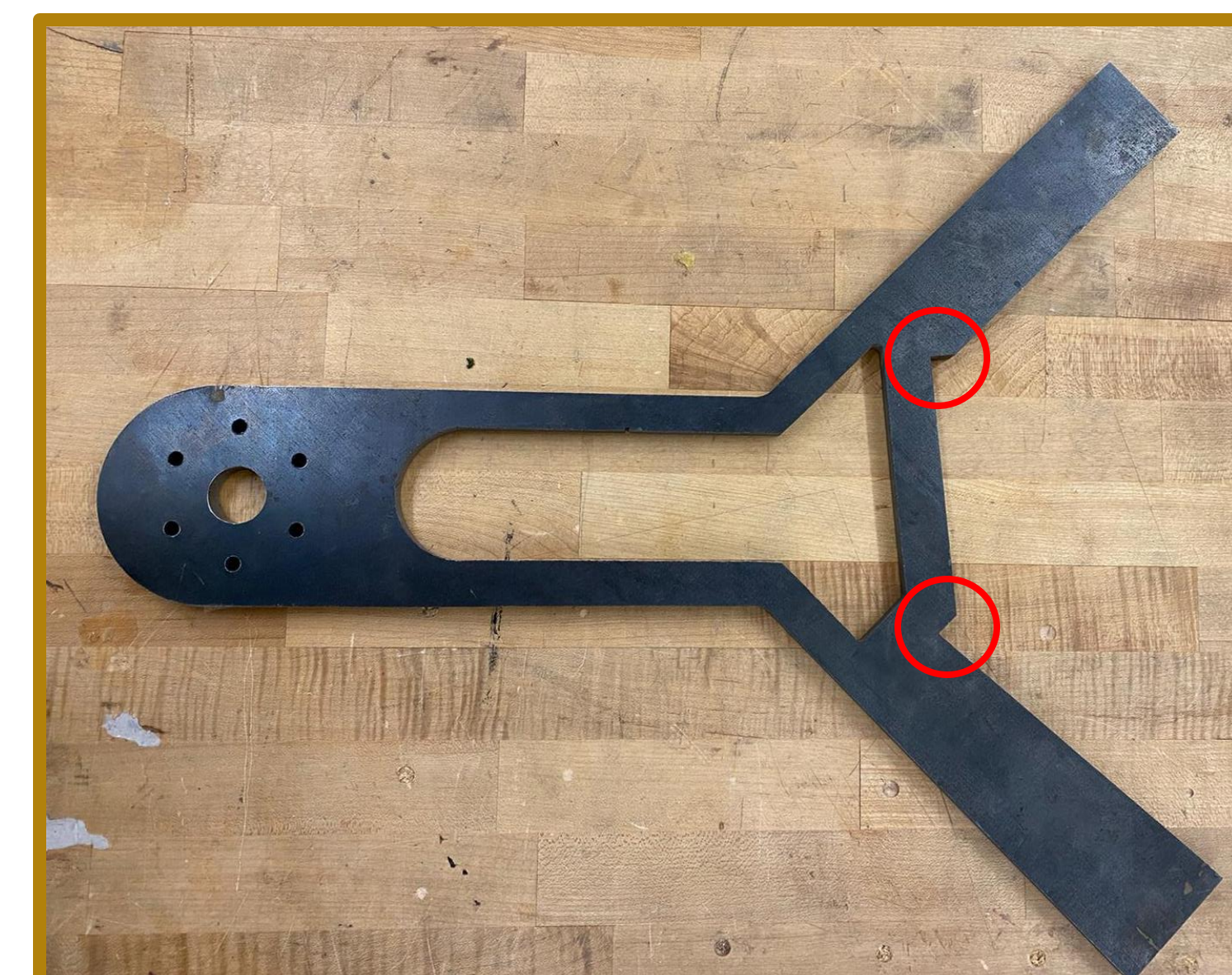
Design



Full Assembly

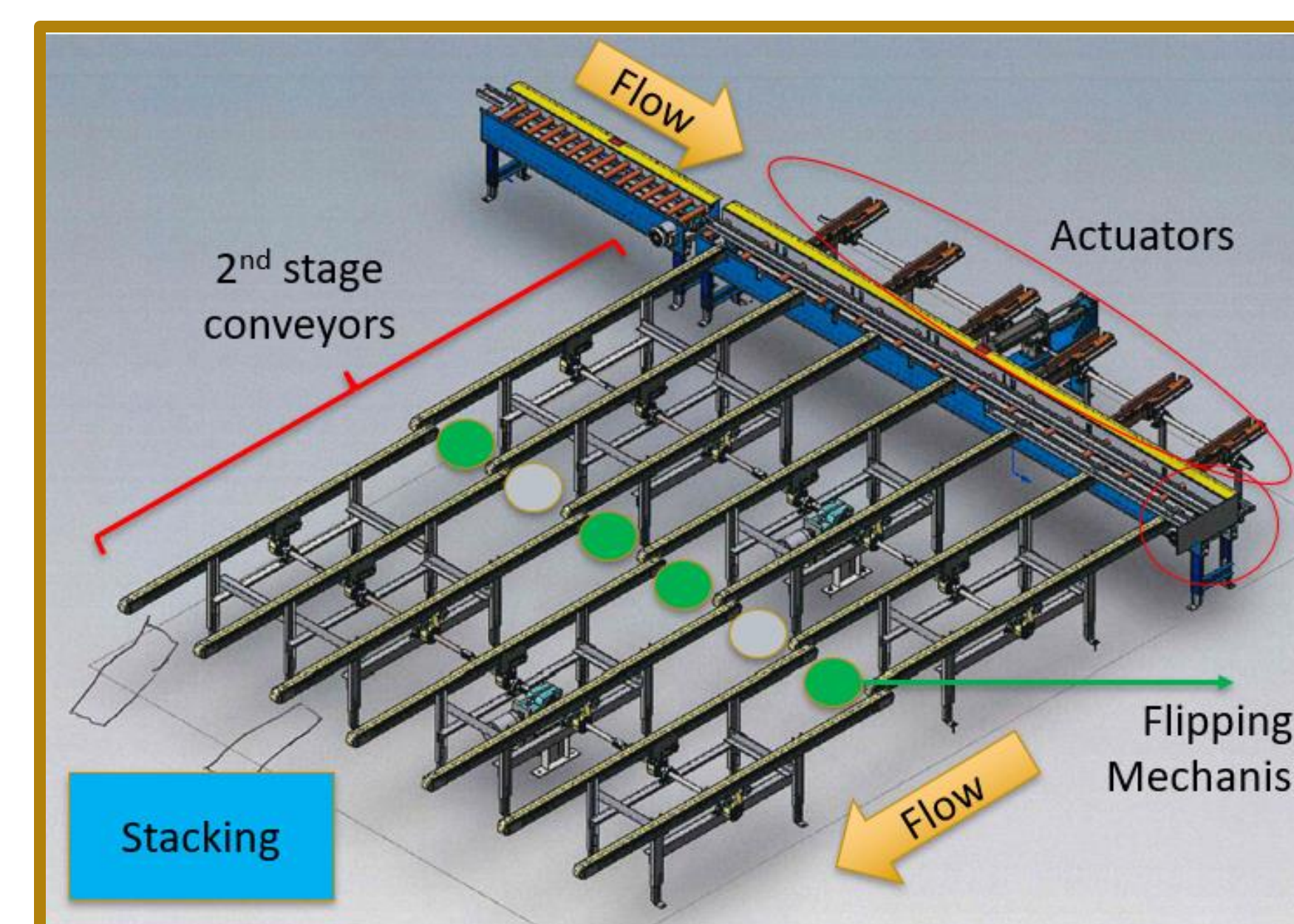


Full Assembly
CAD Model



L-Bracket: double-tip design to flip parts 180 degrees in 90 degree motion

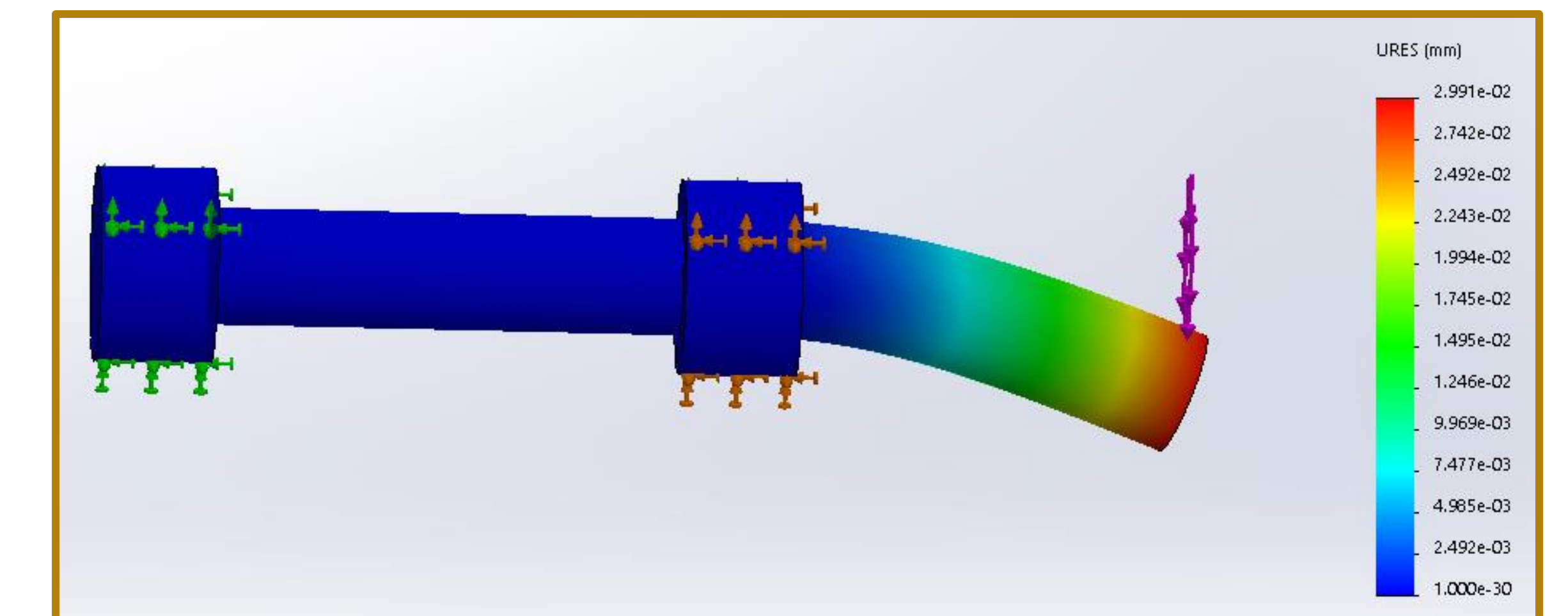
Position of flipping mechanisms in the roll forming line conveyers



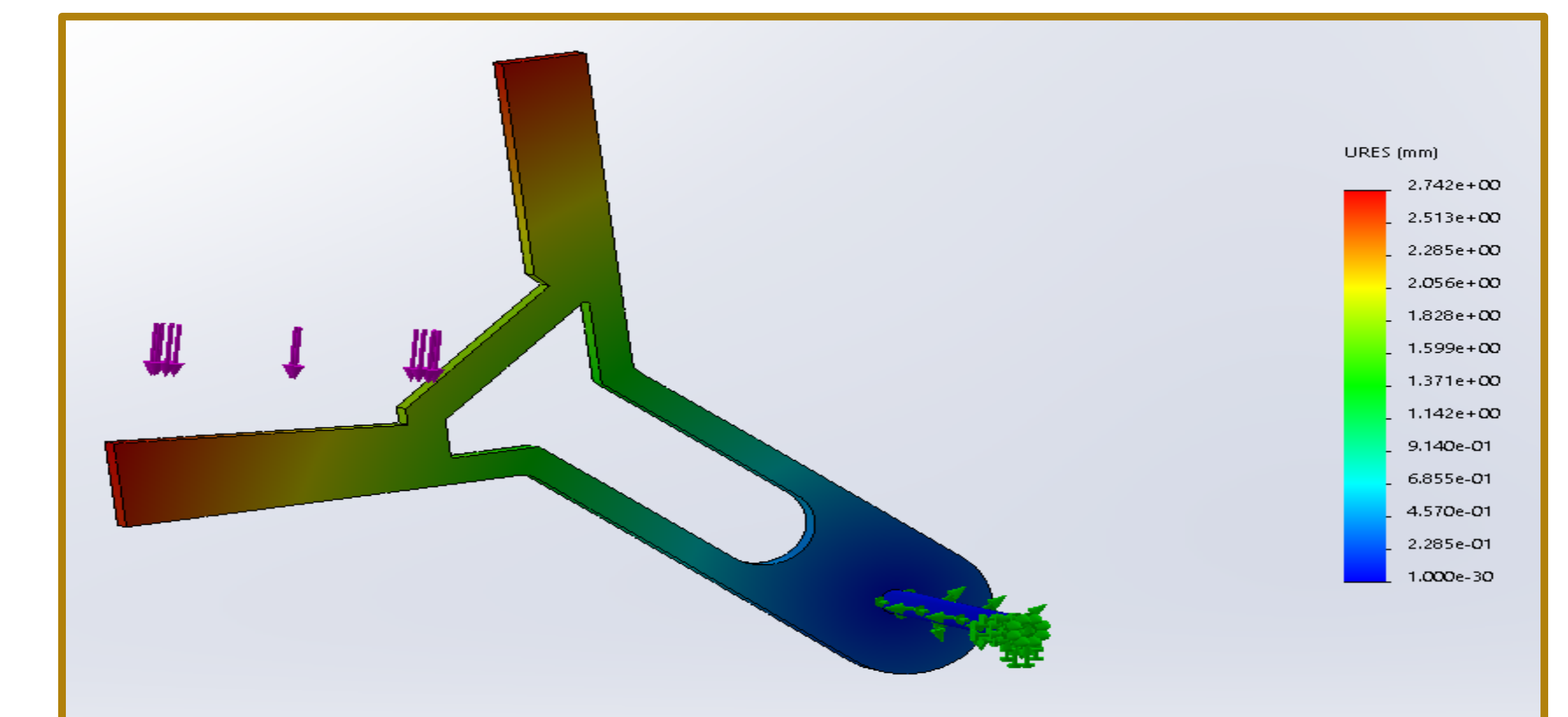
Flipping mechanism in action

Engineering Analysis

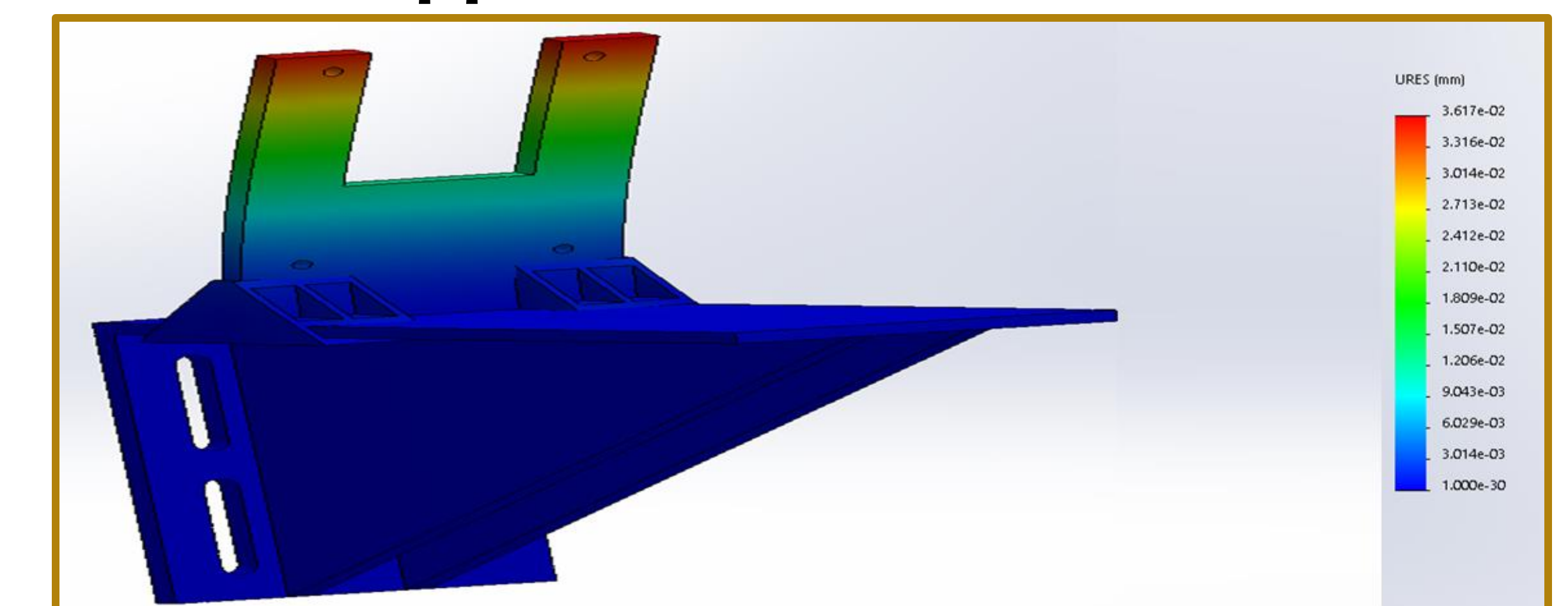
Shaft Deflection FEA



L-Bracket Deflection FEA



Motor Support Deflection FEA



Future Improvements

- Improve motor support design
- Adjustable height support

Acknowledgements

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