

Appendix: Flange-to-flange double-tee connections subjected to vehicular loading, part 1: Numerical assessment approach

Robin Hendricks, Clay Naito, and Andrew Osborn

This appendix contains additional figures for “Flange-to-Flange Double-tee Connections Subjected to Vehicular Loading, Part 1: Numerical Assessment Approach,” by Robin Hendricks, Clay Naito, and Andrew Osborn, which appears on pages ##–## in the July–August 2018 issue of *PCI Journal*.

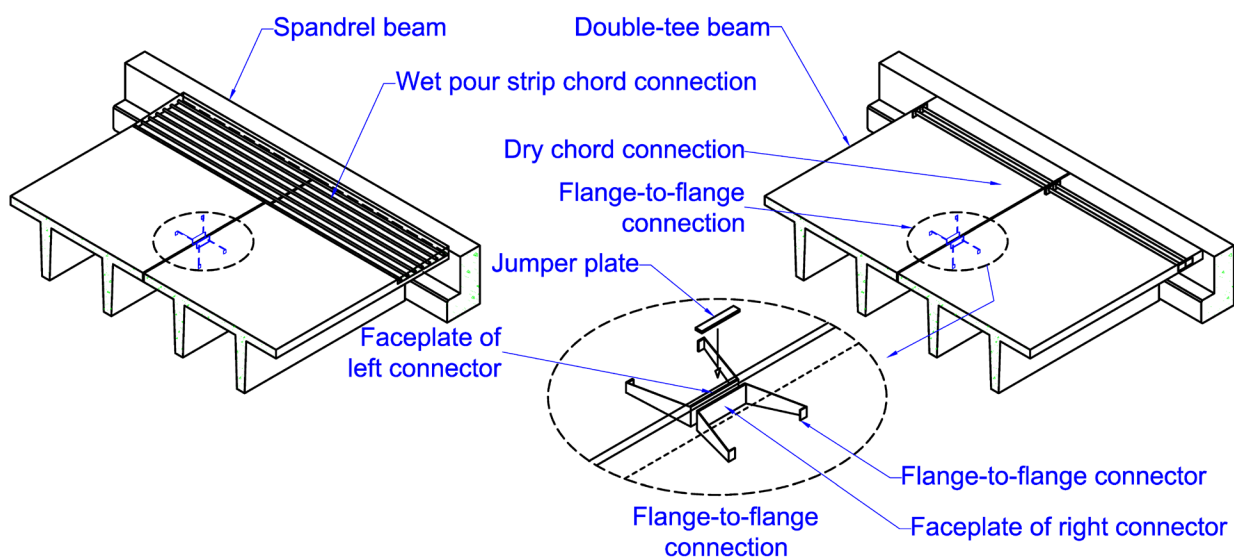


Figure A1. Precast concrete double-tee connections.

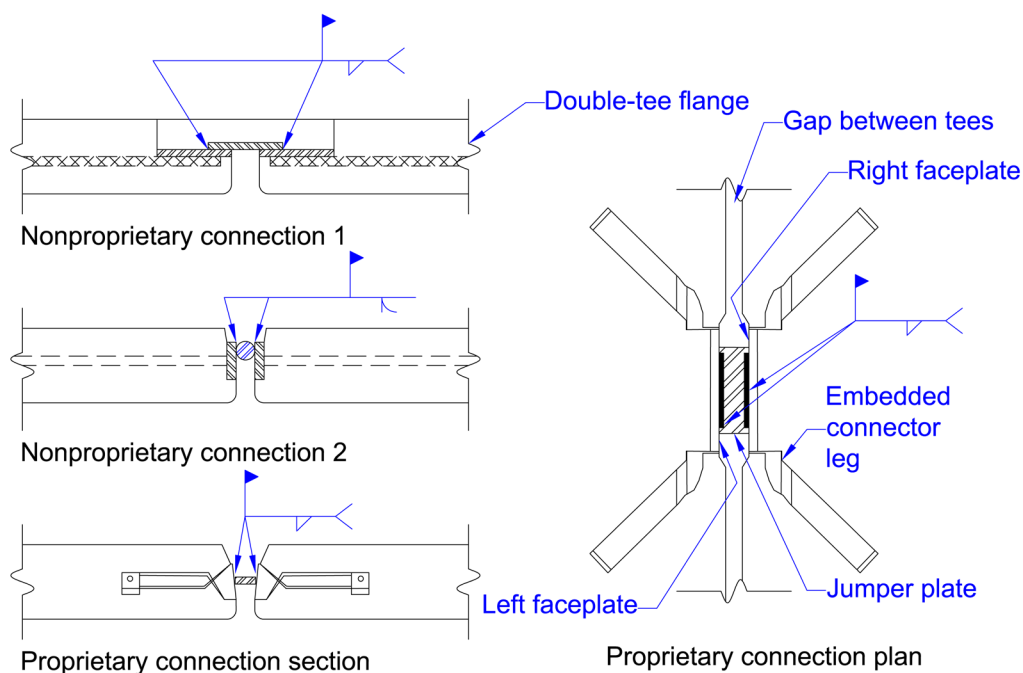


Figure A2. Proprietary and nonproprietary flange connections.

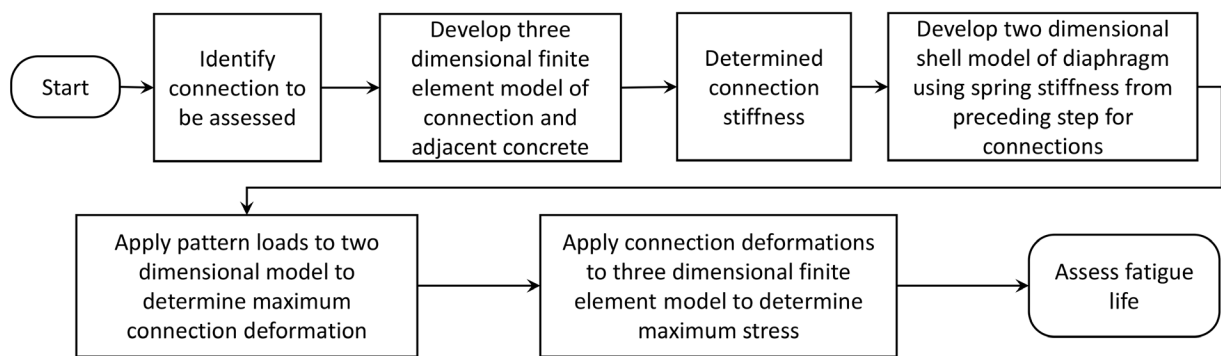


Figure A3. Connection assessment methodology.

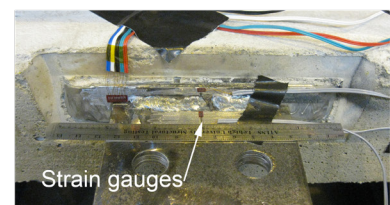
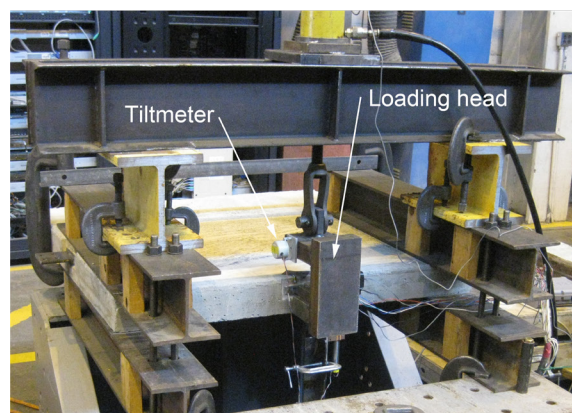
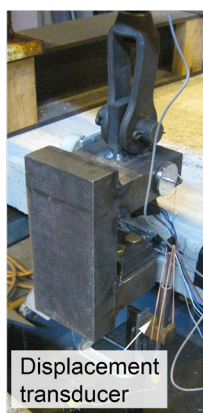


Figure A4. Overall single-connector test setup details.

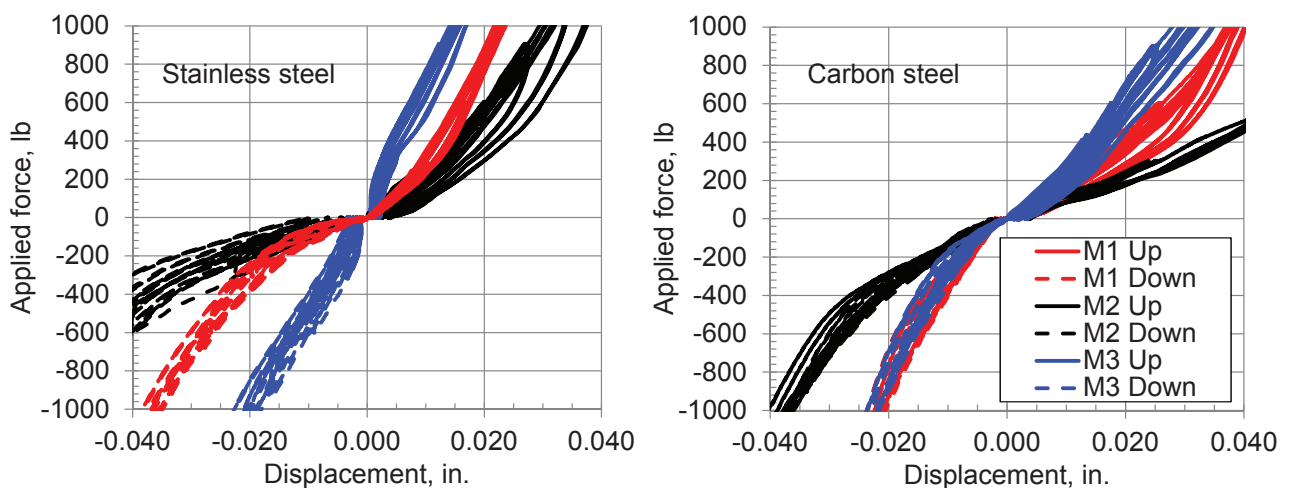


Figure A5. Vertical response of connectors: elastic range. Note: 1 in. = 25.4 mm; 1 lb = 4.448 N.

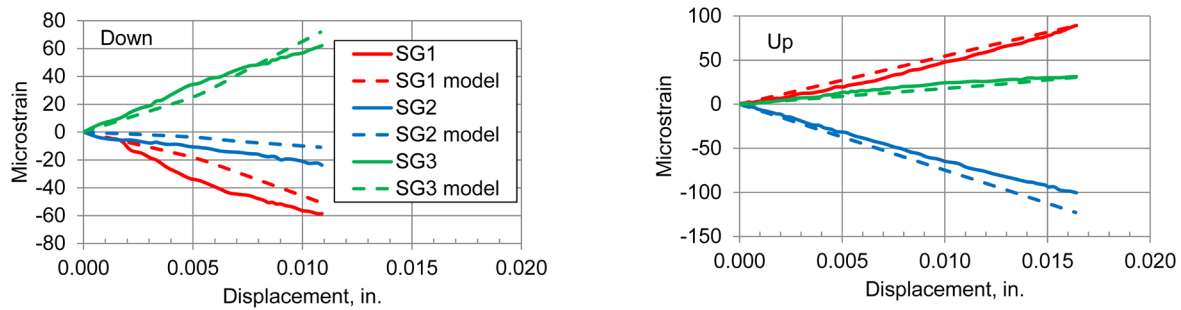


Figure A6. Comparison of numerical model with strain-displacement experimental results for manufacturer 2. Note: 1 in. = 25.4 mm.

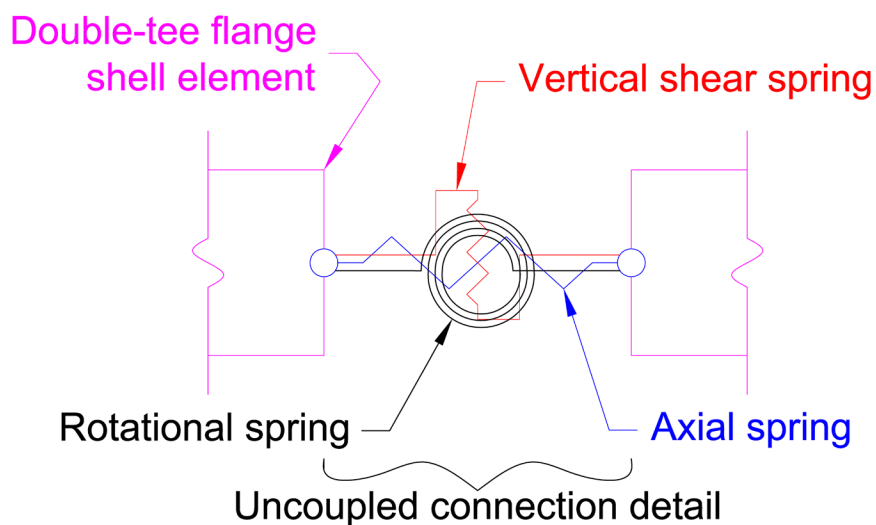
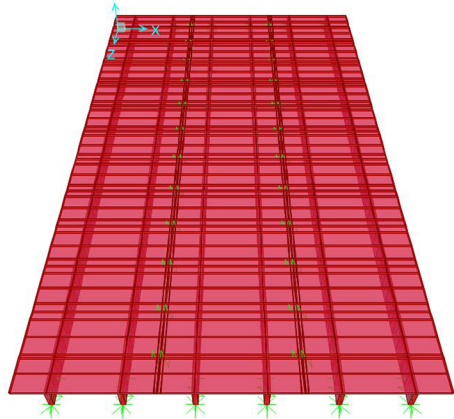


Figure A7. Uncoupled connection model.

Isometric view of shell model with connections



Detail of connection spring at double-tee flange

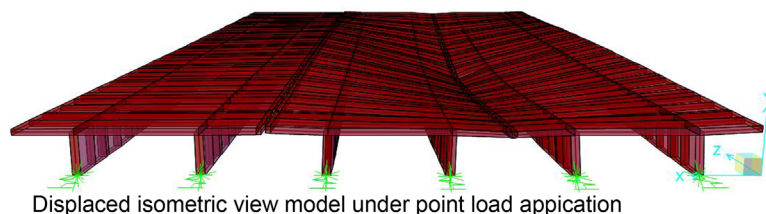
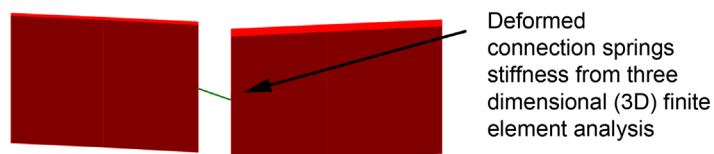


Figure A8. Overall view of shell/spring finite element model.

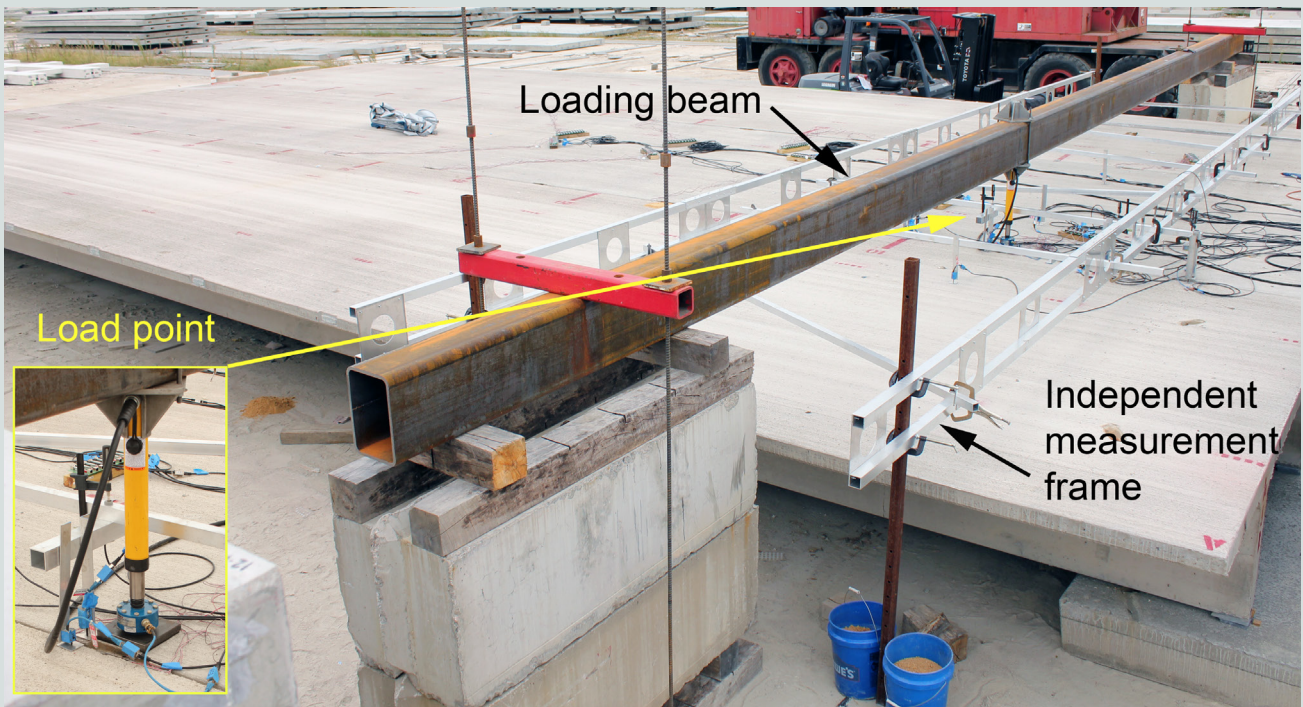


Figure A9. Testing setup on full-scale double-tees for load application Bi-7.5.

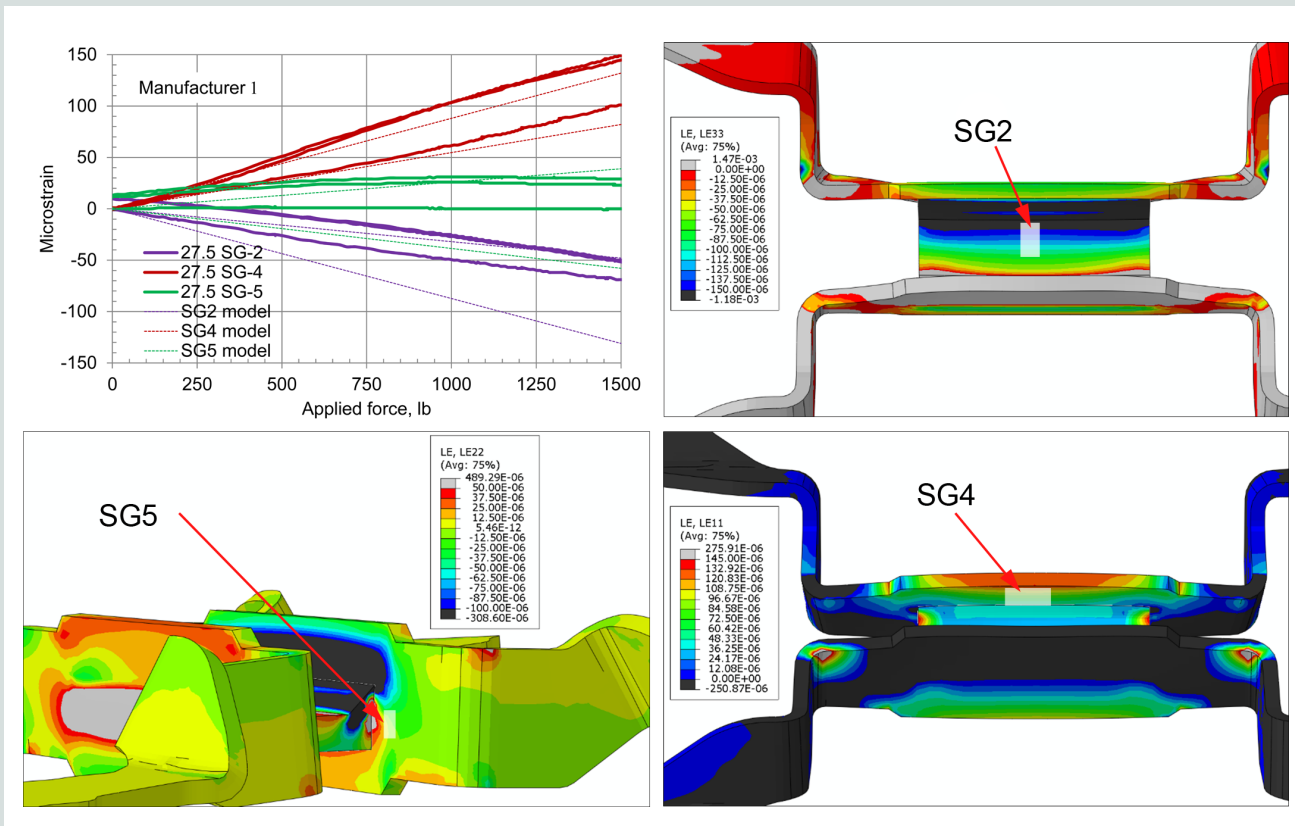


Figure A10. Comparison of measured and modeled strains for load case T-Bo-27.5. Note: 1 lb = 4.448 N.

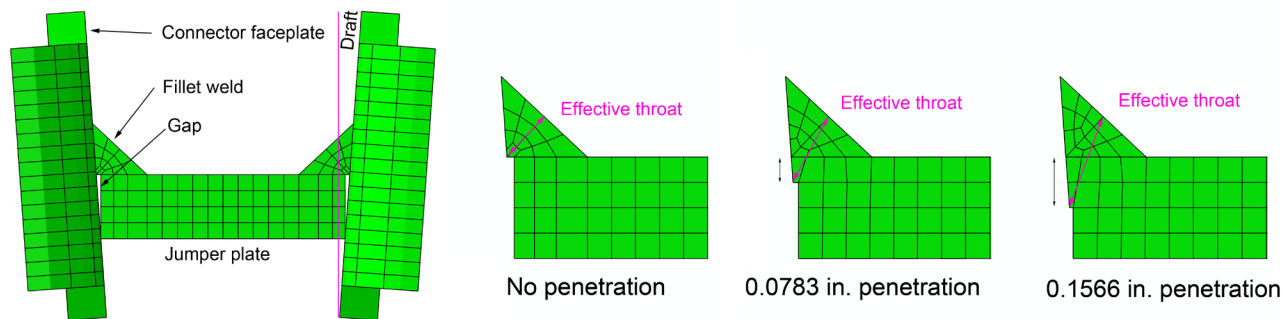


Figure A11. Weld profiles with mesh with varying levels of weld penetration. The effective throat length is shown in red.

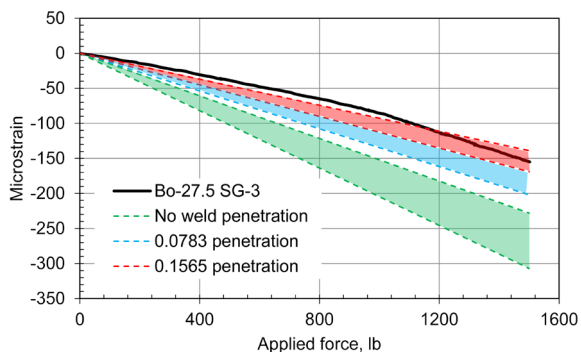


Figure A12. SG3 with comparison of modeled strains for varying levels of weld penetration. Note: 1 lb = 4.448 N.

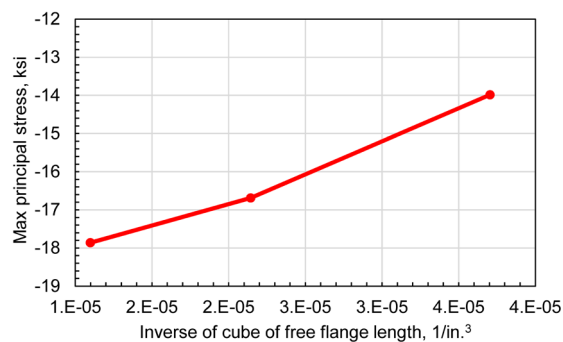


Figure A13. Effect of free flange length on connection weld stress. Note: 1 in. = 25.4 mm; 1 ksi = 6.895 MPa.

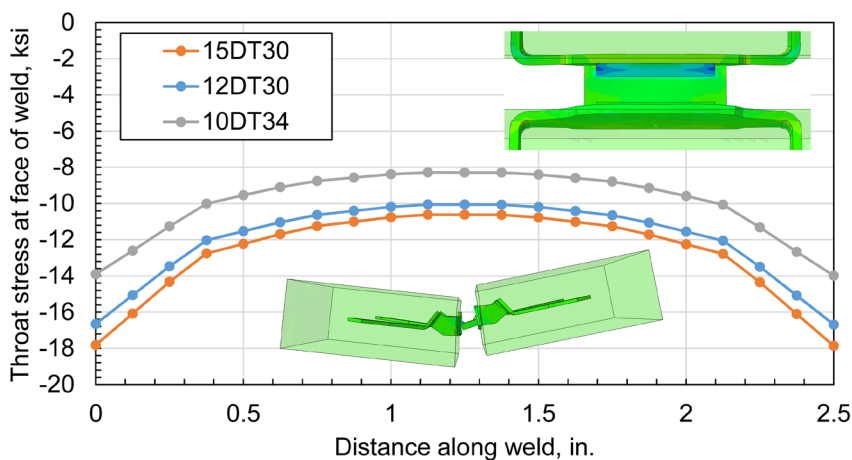


Figure A14. Midspan connection minimum principal stress variation along face of weld for different double-tee sizes. Note: 1 in. = 25.4 mm; 1 ksi = 6.895 MPa.