

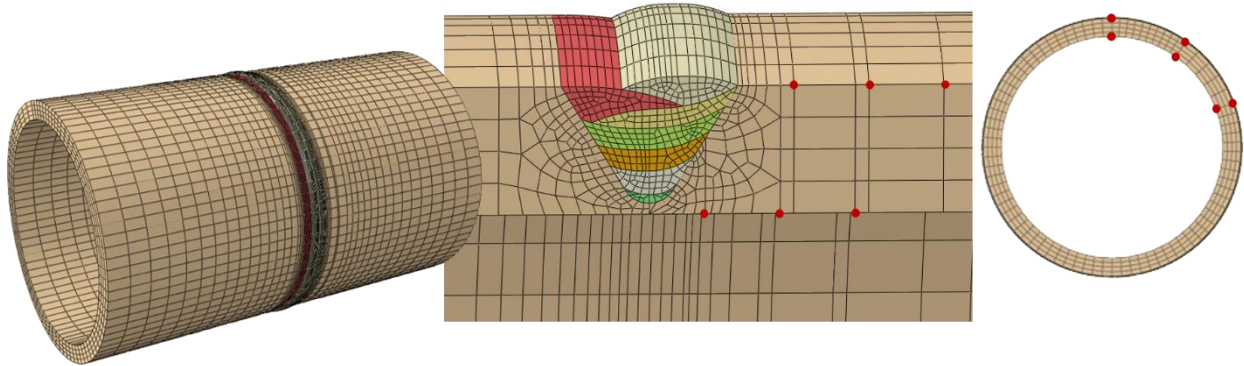
## EPRI Pipe Weld - Validation Brief

This brief describes the validation of QustomWeld by reproducing a model described in the EPRI round robin validation program.

Electric Power Research Institute (EPRI), Materials Reliability Program: Finite-Element Model Validation for Dissimilar Metal Butt-Welds, 2015 Technical Report, C-1 Model.

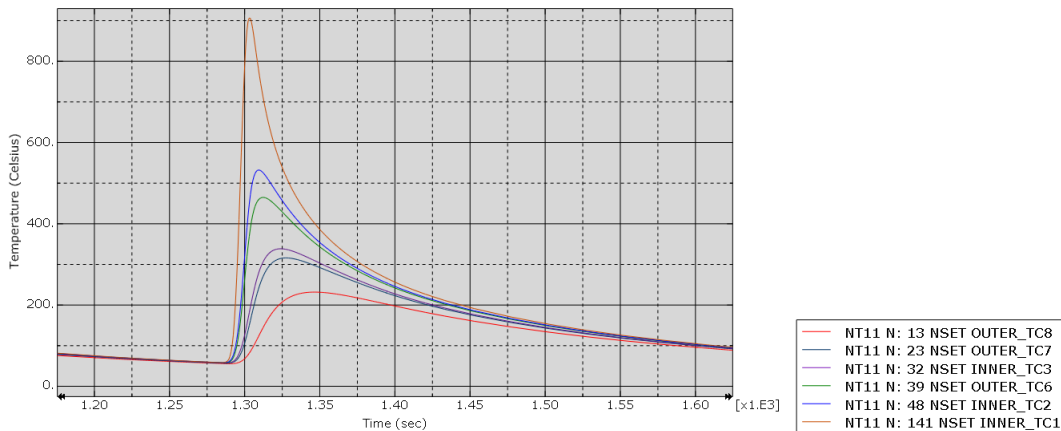
### Model Creation

The pipe, referenced as C-1 in the EPRI report, consists of seven beads in the center of the pipe. It's been created with a reasonable mesh on the weld itself, but a mesh biased to quickly coarsen further away from the weld. The model was built using a continuously placed beads utilizing a constant moving flux to model the torch. The points in red in the figure below represent thermo couple locations. The cross-section displayed shows the position of the thermo couples.



### Temperature History Plots

Below is shown a temperature history of the nodal temperatures at the thermocouple locations during the placement of the fourth bead. Although not shown, the experimental data from the EPRI report agree very well with the history points of the QustomWeld model.



### Measured Stress/Strain Data

A path plot of the line of nodes along the interior of the pipe is displayed below. The dots represent experimental data. The QustomWeld model shows consistent agreement the stresses through the thickness of the weld at a position 180 degrees from start of weld beads. The transverse experimental data is from the Contour method performed at Facility A and the longitudinal experimental data is from the Contour method, Facility C.

A contour plot of the mises stress is shown below. It shows the classic pipe contours showing a steady-state solution toward the center of the plate, but high stress concentrations at the two ends.

#### [For More Information:](#)

Please visit the [QustomApps.com](http://QustomApps.com) website for more details. For questions, contact Mike Shubert, [sales@QustomApps.com](mailto:sales@QustomApps.com), +1 469 968-7494.