Finite element analysis of fillet weld joints made of Q890 steel grade in different weld-to-load scenarios

**Abstract:** This paper was focused on finite element models of fillet weld joints made of Q890 steel grade combined with ER120 electrodes in different weld-to-load scenarios ranging from 0° to 90°, in 15° increment. And the current finite element model was validated to simulate the ultimate load capacity of the weld and the influence of weld-to-load angle compared with past experiments which were made of mild steel. The true stress-strain relationship for high strength steel Q890 grade was calibrated, which was based on a trial-and-error approach using simulation through comparing the load-deformation response. Good consistency on the load-deformation response between the simulation and the test was also validated. The calibrated material parameters were applied into the finite element models which were made of Q890 steel combined with ER120 electrodes. The difference between fillet weld joints made of mild steel and high strength steel was further discussed in this paper.

**Keywords**: High Strength Steel, Fillet Welds, Weld-to-load angle, Numerical Simulation