

**Comparison of the stress intensity factor of load-carrying cruciform welded joints with different geometries**

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Abstract

The investigation of fatigue strength needs an accurate solution and reliable values of the stress intensity factor (SIF). In this study, SIF of load-carrying cruciform welded joints has been evaluated using finite element method (FEM), and compared with the available solutions from literature. Load-carrying cruciform welded joints with isosceles triangles and non-isosceles triangle fillet weld shapes were considered and have been analyzed by the FEM-based simulator FRANC2D program. Moreover, the effects of plate thickness and penetration depth have been considered. The aim of this work was to study the effects of these geometrical variables on fatigue SIF of the load-carrying welded joints with lack of penetration. The ability of FRANC2D to find an appropriate SIF solution is shown and compared with available solutions.