

The effect of weld profile and geometries of butt weld joints on fatigue life under cyclic tensile loading

Abstract

The fatigue life of welded joint was calculated based on numerical integration of simple Paris' law and a reliable solution of the stress intensity factor (SIF). The initial crack length (a_i) was assumed to be equal to 0.1 mm in case of weld toe. This length was satisfactory for different butt joints geometries. The comparisons with the available data from standards and literature were demonstrated. It was shown numerically that the machining of weld reinforcements will increase the fatigue life. The increase of plate thickness decreases the fatigue strength (FAT) and the number of cycles to failure when using the proportional scaling of crack length. The validation processes of the current calculations have been shown. Therefore, it can be concluded that it will prevent the unnecessary waste of time consumed to carry out the experiments.