Experimental and Analytical Fatigue Life Prediction of Butt Weld Joints

Subjected to Cyclic Bending

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The paper presents a procedure to estimate the fatigue life for a butt weld connection subjected to the cyclic bending load. The Methodology of the fatigue life prediction used in this investigation will be based on Strain-Life method. Finite element analysis is carried out to determine the elasto-plastic stress and strain distribution in welded joint using ANSYS software three dimensional solid cubic finite elements. Applying residual stress as the initial condition in finite element analysis is an important part of the modelling. The stress and strain distributions at critical region caused by combination of residual stress and loading will be obtained for the specimen and subsequently used to determine the fatigue life. In order to compare and validate the predicted lives with the experimental data, several series of laboratory tests will be performed.

Keywords: Butt weld, Fatigue life, Finite element analysis, Strain-Life method, Residual stress,