

CRACK PROPAGATION BEHAVIOUR OF A PUDDLE IRON UNDER CONSTANT AND VARIABLE AMPLITUDE LOADING

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ABSTRACT

Structural integrity assessments of old steel riveted bridges are more and more frequent. Most of these structures were built between the end of the 19th century and beginning of the 20th century. Fatigue is one major concern for these structures since they show a long operational period with increasing traffic intensity. Despite the S-N approach is widely used to assess the fatigue damage for riveted steel structures, fracture mechanics appears as an alternative approach to perform residual lifetime calculations. Therefore, this paper proposes crack propagation data for a sample of original puddle iron removed from the Portuguese Fão bridge. Constant amplitude crack propagation data is evaluated for several stress R-ratios. The Walker's correction is used to describe the stress R-Ratio effects. Furthermore, crack propagation rates are evaluated for overloading tests. A modified version of the crack propagation model proposed by Wheeler is used to correlate the retardation effects after an overload application.