



Speaker 9



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**ABSTRACT:**

It has been established in the technical literature that the assumption of a “fatigue limit” is not valid for steel welds, with fatigue failures commonly occurring in the gigacycle (1 billion stress cycles) regime. This research project aims to improve the scientific understanding of the gigacycle fatigue of structural steel arc welded joints. Conducting gigacycle fatigue tests within a feasible timeframe requires ultrasonic fatigue testing (UFT), where specimens are excited at 20 kHz. A novel weld specimen was designed which fulfils the natural frequency and size requirements for UFT but captures the geometric features of welds that make them susceptible to fatigue failure. Alongside this, fatigue tests were conducted at low frequency for comparison, as UFT can have a significant effect on the measured fatigue strength of materials. The research on the fatigue performance of flux-core arc welded butt joints of structural steel will be presented.



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