In-phase multiaxial fatigue experimental analysis of welded cylindrical 6063-T66 aluminium alloy specimens

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This paper is concerned with an experimental and numerical study of the fatigue behaviour of cylindrical 6063-T66 welded specimens subjected to biaxial loading. In-phase torsion-bending fatigue tests under constant amplitude loading were performed in a standard electromechanical machine with a suitable gripping system. The experimental part was focused on the modeling of combined biaxial loading and determining the number of cycles to fracture in the region of low-cycle fatigue. In-phase loading can be treated fairly well using the conventional hypotheses (von Mises or Tresca) on basis of the nominal, structural or local strains or stresses. Based on the experimental results the fatigue design curves are compared to the fatigue data from base metal and weldments.

Keywords: multiaxial fatigue, computational analysis, experimental analysis, aluminium alloy, welding

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