

Effect of Welding Parameter on Fatigue Properties of Dissimilar Welds and Fatigue Life Evaluation Based on Singular Stress

Yuki Ogawa¹, Fumiya Nakahara², Hiroyuki Akebono², Kojiro Tanaka³, and Atsushi Sugeta²

¹National Institute for Materials Science

²Hiroshima Daigaku - Higashihiroshima Campus

³Mazda Motor Corporation

May 5, 2020

Abstract

Manufacturers have been promoting multi-material designs. So, the dissimilar material welding methods are being developed. We focused on heat welding technologies for friction stir spot welding of aluminum alloy and carbon fiber-reinforced plastic. This study investigated the effect of changes to jig constraint of joined members on the fatigue properties of joints. Also the fatigue life estimation was carried out by considering the singular stress at the welding joint interface. As a result, the fatigue strength of joint in a less constrained state is higher than that in a more constrained state. The singular stress intensity at the slit tip was uniformly predicted by the differences in welding parameters of joints.

Hosted file

FFEMS_Manuscript.docx available at <https://authorea.com/users/303522/articles/434878-effect-of-welding-parameter-on-fatigue-properties-of-dissimilar-welds-and-fatigue-life-evaluation-based-on-singular-stress>

Hosted file

FFEMS Figure.pptx available at <https://authorea.com/users/303522/articles/434878-effect-of-welding-parameter-on-fatigue-properties-of-dissimilar-welds-and-fatigue-life-evaluation-based-on-singular-stress>

Hosted file

Table1.docx available at <https://authorea.com/users/303522/articles/434878-effect-of-welding-parameter-on-fatigue-properties-of-dissimilar-welds-and-fatigue-life-evaluation-based-on-singular-stress>

Hosted file

Table2.docx available at <https://authorea.com/users/303522/articles/434878-effect-of-welding-parameter-on-fatigue-properties-of-dissimilar-welds-and-fatigue-life-evaluation-based-on-singular-stress>

Hosted file

Table3.docx available at <https://authorea.com/users/303522/articles/434878-effect-of-welding-parameter-on-fatigue-properties-of-dissimilar-welds-and-fatigue-life-evaluation-based-on-singular-stress>