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LOADING AND ENVIRONMENT EFFECTS ON STRUCTURAL INTEGRITY

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The influence of heat input on the toughness and fracture mechanism of surface weld metal

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Abstract

Surface welding is a way to extend the exploitation life of damaged parts and constructions and the heat input has a major influence on the weldment properties. In this paper is shown the influence of the heat input on the toughness and the fracture mechanism of the surface welded joint. Surface welding of high carbon steel with self shielded wire was conducted with three different heat inputs (6 kJ/cm, 10 kJ/cm and 16 kJ/cm). Total impact energy, crack initiation and crack propagation energy were estimated at room temperature, -20°C and -40°C. Fracture analysis of fractured surfaces was also conducted and it has been found that increasing of heat input leads to an increase of share of transgranular brittle fracture, what is in complete accordance with the obtained energy values. Based on all obtained results, the optimum value of heat input for welding procedure applied was defined.

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Keywords: Heat input; Fracture mechanism; Toughness; Surface welding

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