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A Comparison of Double Sided Friction Stir Welding in Air and Underwater for 6mm S275 Steel Plate

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Abstract : This study compared the mechanical and microstructural properties produced during friction stir welding(FSW) of S275 structural steel in air and underwater. Post weld tests assessed the tensile strength, micro-hardness, distortion, Charpy impact toughness and fatigue performance in each case. The study showed that there was no significant difference in the strength, hardness or fatigue life of the air and underwater specimens. However, Charpy impact toughness was shown to decrease for the underwater specimens and was attributed to a lower degree of recrystallization caused by the higher rate of heat loss experienced when welding underwater. Reduced angular and longitudinal distortion was observed in the underwater welded plate compared to the plate welded in air.

Keywords : Charpy impact toughness, distortion, fatigue, friction stir welding(FSW), micro-hardness, underwater
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