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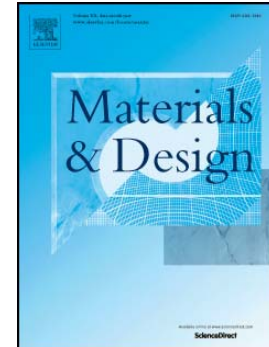
Microstructure and residual stress distributions in friction stir welding of dissimilar aluminium alloys

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Abstract

The aim of this investigation was to study the effect of welding heat input and post weld natural aging on residual stress, microstructure, and precipitation distribution in different zones of dissimilar friction stir welding of 8 mm thick plates of AA6082-T6 and AA7075-T6. It was found that atomic diffusion occurs at the interface of materials in the stir zone of joints. Transmission electron microscopic investigations showed that reprecipitation of fine Guinier-Preston zone, β' , and η' precipitates resulted in increased micro-hardness in the SZ after natural aging. An increase in welding heat input resulted in decreased maximum tensile residual stress and increased size of the tensile residual stress region. Natural aging within SZ and thermo-mechanical affected zone resulted in 15-20 MPa reduction of the residual stress in these zones.

Keywords: *Friction stir welding; Dissimilar aluminium alloys; Residual stress; Microstructures.*

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