Effect of heat treatment on the grain structure and mechanical properties of Al-7075 friction stir weld

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Abstract
The fine grain structure of friction-stir welded aluminum alloys is unstable during post weld heat treatment and some grains abnormally grown. In this study, the sequence of abnormal grain growth during T6 heat

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treatment of Al-7075 friction-stir weld and its effect on mechanical properties of the weld was studied. The results showed that heat treatment in 510 °C resulted in drastic grain growth in stir zone and fine equiaxed grains in the stir zone of as-welded joint were substituted by millimeter-scale irregular grains. Post weld heat treatment resulted in decrease in the tensile elongation from about 10% to 1.5% although the joint tensile strength improved by 28%. In addition, post weld heat treatment changed the fracture location from the heat-affected zone to the stir zone.

**Keywords:** Friction-stir welding, Al-7075, Microstructure, Abnormal grain growth, Mechanical properties.