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**EFFECT OF PRE-STRAIN ROLLING PATH ON ABNORMAL GRAIN GROWTH IN
FRICTION-STIR WELDED AL-MG-SI ALLOY**

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The fine-grained microstructures evolved during friction stir welding of aluminum alloys often exhibit abnormal grain growth during post-weld heat treatment. To avoid this undesirable phenomenon, a pre-strain rolling approach has been employed in the present study. The proposed method was based on the idea that the pre-strain rolling would promote recrystallization instead of the abnormal grain growth during the subsequent heat treatment. To validate this concept, the produced welds were cold rolled in two different directions – either parallel or perpendicular to the weld path – prior to the standard T6 tempering.

In both cases, the pre-strain rolling was found to be effective for suppression of the abnormal grain growth. Moreover, the revealed effect was sensitive to the rolling path. Specifically, the pre-rolling along the weld line resulted in the finest final grain size in treated-treated welds. This observation was explained in the terms of relatively high Taylor factor as well as low orientation stability of the stir zone texture for this rolling path, which enhanced recrystallization behavior during subsequent annealing.

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