

Influence of tool eccentricity on the material flow and microstructural properties of AA6061 aluminum alloy friction stir welds

Luqman Hakim Ahmad Shah^{a,b}, Abdelbaset R. H. Midawi^a, Scott Walbridge^c, Adrian Gerlich^a

^a Centre of Advance Materials Joining, Department of Mechanical and Mechatronics Engineering, University of Waterloo, University Avenue West, Waterloo, N2L 3G1, Ontario, Canada

^b Faculty of Mechanical and Automotive Engineering Technology, Universiti Malaysia Pahang, 26600, Pekan, Pahang, Malaysia

^c Department of Civil and Environmental Engineering, University of Waterloo, University Avenue West, Waterloo, N2L 3G1, Ontario, Canada

ABSTRACT

The effect of tool eccentricity on friction stir welding of AA6061-T651 aluminum alloy plates is evaluated. Microstructural characterization reveals that surface roughness of the weld bead is increased, while material flow and mixing in the stir zone is enhanced with increasing tool eccentricity. Moreover, grain size of examined regions are refined with increased tool eccentricity. Softening at the lower region of the stir zone was observed using both an aligned and 0.2 mm eccentric setup, where a high density of platelet-shaped precipitates are present.

KEYWORDS

Friction stir welding; Aluminum alloy; Tool eccentricity; Microstructural properties; Material flow; Kinematics

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