

The Effect of Tool Type on Surface Morphology of FSJ Joint

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Abstract : An attempt is made here to join 2024 aluminum alloy plate by friction stir joining (FSJ) using different types of tools. Joint surface morphology was observed, and both arc line spacing and flash were measured. Study is carried out on the effect of pin, shoulder and eccentricity of the tool on the surface topography of the joint and the formation of the joint surface topography is analyzed. It is found that, eccentric squeezing action of the tool is the mainly motive power to form arc lines contour and flash structure. Little flash appears in the advancing side but with severe deformation, while the flash in the retreating side is heavy but with soft deformation. The pin of tool has a deep impact on the flash on the advancing side of the joints. Shoulder can widen the arc lines, refine arcs structure, reduce flash in the retreat side, but will increase the flash in the advancing side. Increasing the amount of eccentricity, it has litter effect on the arc line spacing but will destroy the arc lines morphology in the joint surface and promote the formation of filamentous flash structure in the joint.

Keywords : FSJ, surface morphology, tool, joint

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