Effect of Taper Pin Ratio on AA7075 Aluminium Alloy Friction Stir Welding

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ABSTRACT

This study focuses on the effect of pin taper tool ratio on friction stir welding of aluminum AA7075. Two pieces of AA7075 alloy with thickness of 6 mm were friction stir welded by using conventional milling machine. The shoulder diameter used in this experiment is fixed at 18mm. The taper pin ratio used are varied at 6:6, 6:5, 6:4, 6:3, 6:2 and 6:1. The rotational speeds that were used in this study were 1000 rpm, 1200 rpm and 1400 rpm, respectively. The welding speeds used are 60 mm/min, 80 mm/min and 100 mm/min. Microstructure observation of welded area was studied by using optical microscope. To evaluate the mechanical properties of this specimen, tensile test was used in this study. Welded specimens using taper pin ratio 6:2 shows higher tensile strength compared to other taper pin ratio up to 197 MPa. Moreover, specimens using taper pin ratio 6:1 showed better tensile test compared to the ones using taper pin ratio above 6:3. The optimum parameters were found to be taper pin ratio 6:2 with 1000 rpm of rotational speed and 60mm/min welding speed.

KEYWORDS: Aluminum 7075, Cylindrical Taper Tool, Friction Stir Welding, Taper pin Ratio

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