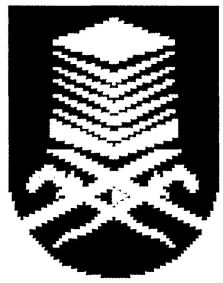

TO OBTAIN THE OPTIMUM PARAMETERS FOR WELDING OF COPPER AND ALUMINUM USING FRICTION WELDING TECHNIQUE

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ABSTRACT

Friction welding is one of the most simple, economical and highly productive method to join similar and dissimilar metals. Welding dissimilar metals is one of the biggest challenges faced by manufacturers and users because of difficulty to find the suitable welding parameters to cause good bonding to happen. The aim of this project is to focus on the finding of optimum parameters of friction welding technique to desired welding quality. In the present work, pure copper was friction welded to aluminum alloy (6061 Al). The diameter and length of both rods are 10mm and 60mm respectively. Surfacing is done on the copper to ensure that bonding occurred at the interface of the welded joint. Copper is the rotational part due to its hardness, while aluminum is the stationary part. Four parameters that need to be determined are the heating pressure, the heating time, the upset/ forging pressure, and the forging/ weld time, which will be obtained in sequence. On the other hand, the warm up pressure, warm up time, and the rotational speed are set to be constant. Five samples are used to determine each parameter. Various tests such as Visual Inspection, Tensile Test, Bending, Macro Structure Test, and Radiographic Test would be conducted to meet the weld quality requirement. It is found that the best optimum welding parameters between copper and aluminum are as follow; warm-up pressure = 10kgf/cm^2, warm-up time = 1sec, heating pressure = 45kgf/cm^2, heating time = 4sec, forging pressure = 65kgf/cm^2, the, and forging time = 5sec.

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