

**TO OBTAINED THE OPTIMUM PARAMETERS FOR WELDING OF  
COPPER AND CARBON STEEL USING FRICTION WELDING  
TECHNIQUE**

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## ABSTRACT

The aim of this study is to obtain the optimum bonding parameters that needed to join two dissimilar metals of copper and carbon steel by Friction Welding technique. The four parameters that were examined in this study were Heating Pressure, Heating Time, Forging Pressure and Forging Time. The project initially was to find which material was best on the fixed side and which material was best on the rotated side. This experiment done to find the optimum parameter based on one parameter at a time. First optimum parameter to be obtained is the Heating Time parameter, then Heating Pressure parameter, next is Forging Pressure parameter and finally Forging Time parameter. After the optimum values are known, the values were used for fine tuning test and again the value of Tensile Strength is obtained. The tests that carried out in this study are tensile test, bending test, visual inspection, macro test and radiographic inspection. From the study it is found that the optimum friction welding parameters to weld copper and carbon steel for diameter 10 mm are as follow: heating time is 2.5s; heating pressure is  $60\text{kg/cm}^2$ ; forging time is  $5\text{kg}^{\text{cvc}}$ ; and forging time is 5s.

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