

## **Thermo-Mechanical Analysis of Dissimilar Al/Cu Foil Single Lap Joints Made by Composite Metal Foil Manufacturing**

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**Abstract :** The paper presents a new additive manufacturing process for the production of metal and composite parts. It is termed as composite metal foil manufacturing and is a combination of laminated object manufacturing and brazing techniques. The process has been described in detail and is being used to produce dissimilar aluminum to copper foil single lap joints. A three dimensional finite element model has been developed to study the thermo-mechanical characteristics of the dissimilar Al/Cu single lap joint. The effects of thermal stress and strain have been analyzed by carrying out transient thermal analysis on the heated plates used to join the two 0.1mm thin metal foils. Tensile test has been carried out on the foils before joining and after the single Al/Cu lap joints are made, they are subjected to tensile lap-shear test to analyze the effect of heat on the foils. The analyses are designed to assess the mechanical integrity of the foils after the brazing process and understand whether or not the heat treatment has an effect on the fracture modes of the produced specimens.

**Keywords :** brazing, laminated object manufacturing, tensile lap-shear test, thermo-mechanical analysis

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