Simulation of Temperature Flow in Friction Stir Butt Welding of AA3003 and AA5052 Aluminium alloys by Using ABAQUS.

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- **Abstract:** In an effort to model the friction stir welding simulation of AA3003 and AA5052 for the analysis of temperature flow during the process, an attempt was made to model the simulation. Widely utilized aluminium and alloys in a variety of industrial settings. Aluminium is replacing steel in industrial applications where strength to weight ratio is essential due to its low weight and high mechanical strength. It is possible to connect aluminium alloys by welding since the recrystallization temperature is considerably below that of the metal. Friction stir welded AA5052 and AA3003 alloys were studied using ABAQUS to simulate their thermal behaviour. Modeling and analysis of mechanical assemblies, as well as visualising the FEM result, are all done using it. Tool rotation speed of 1200 rpm and welding speed of 300 mm/min both have temperature distribution and effective strain distribution issues that need to be addressed. A discrepancy between the thermophysical characteristics of the two distinct materials caused discontinuous and uneven temperature profiles in the AS, RS, upper and lower edges of the work components. Step times of 5 and 30 were used to evaluate the temperature profiles of the two materials. The mechanical characteristics of various weld zones have been compared to those of the base metal based on factors such as temperature and strain distribution. To better comprehend the simulation results, an energy vs. time graph was created for each part of the model.

- **Keywords:** ABAQUS, AA3003, AA5052, Friction Stir Welding