Temperature Distribution in Friction Stir Welding Using Finite Element Method

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Abstract : Temperature distribution in Friction Stir Welding (FSW) of 6061-T6 Aluminum Alloy is modeled using the Finite Element Method (FEM). In order to obtain temperature distribution in the welded aluminum plates during welding operation, transient thermal finite element analyses are performed. Heat input from tool shoulder and tool pin are considered in the model. A moving heat source with a heat distribution simulating the heat generated by frictions between tool shoulder and workpiece is used in the analysis. Three-dimensional model for simulated process is carried out by using Altair HyperWork, a commercially available software. Transient thermal finite element analyses are performed in order to obtain the temperature distribution in the welded Aluminum plates during welding operation. The developed model was then used to show the effect of various input parameters such as total rate of welding speed and rotational speed on temperature distribution in the workpiece.