

COMPUTATIONAL MODELLING OF FRICTION STIR WELDING – INITIAL PLUNGING PHASE

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ABSTRACT

Friction Stir Welding (FSW) is a solid-state joining process used for joining alloys that cannot be welded easily by fusion processes. The solid-state nature of FSW leads to several advantages over fusion welding methods since problems associated with cooling from the liquid phase are avoided. One of the key benefits of this new technology is that it allows easily welding of different aluminum alloys. Defects such as porosity, solute redistribution, solidification cracking or liquation cracking do not occur during FSW. The process is applicable to aerospace, shipbuilding, aircraft and automotive industries.

The paper introduces an original FEM model of Friction Stir Welding stationary/dwelling phase. The outputs are the temperature and Cauchy stresses fields. Thermo-mechanical behaviour simulation of Aluminium AA6061-T4 welded by FSW is analyzed and compared for different time steps.

KEYWORDS: Computational model, FSW, process simulation.

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