

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
New Materials and Structural Concepts (4)

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LIGHTWEIGHT SANDWICH STRUCTURE FROM SOLID-STATE BONDED TITANIUM SHEETS

Abstract

It is known that sandwich structures are being used successfully for many of aerospace applications such as spacecraft, aircraft and turbine blades due to the high bending stiffness and strength to weight ratios. The objective of this study is to fabricate lightweight sandwich structures by blow forming of solid-state bonded Ti-6Al-4V sheets. The solid-state bonding process was conducted in selective areas of the sheets and gas pressure was applied to the core sheet in order to form center cells at 1148K. The microstructure of bonded region shows no indication of any discontinuous or heterogeneous microstructure at interface. It is shown that the blow forming of sandwich structure was successfully performed with solid-state bonded multiple sheets of titanium alloy. The result of configuration and thickness distribution measurement indicate that the FEM analysis can predict the forming behavior during blow forming process of solid-state bonded sheets.