

Comparison of Johnson-Cook and Barlat Material Model for 316L Stainless Steel

Authors : Yiğit Gürler, İbrahim Şimşek, Müge Savaştaer, Ayberk Karakuş, Alper Taşdemirci

Abstract : 316L steel is frequently used in the industry due to its easy formability and accessibility in sheet metal forming processes. Numerical and experimental studies are frequently encountered in the literature to examine the mechanical behavior of 316L stainless steel during the forming process. 316L stainless steel is the most common material used in the production of plate heat exchangers and plate heat exchangers are produced by plastic deformation of the stainless steel. The motivation in this study is to determine the appropriate material model during the simulation of the sheet metal forming process. For this reason, two different material models were examined and Ls-Dyna material cards were created using material test data. These are MAT133_BARLAT_YLD2000 and MAT093_SIMPLIFIED_JOHNSON_COOK. In order to compare results of the tensile test & hydraulic bulge test performed both numerically and experimentally. The obtained results were evaluated comparatively and the most suitable material model was selected for the forming simulation. In future studies, this material model will be used in the numerical modeling of the sheet metal forming process.

Keywords : 316L, mechanical characterization, metal forming, Ls-Dyna

Conference Title : ICCMF 2021 : International Conference on Commercial Metal Forming

Conference Location : Paris, France

Conference Dates : October 28-29, 2021