

عنوان مقاله:

Finite Element Simulation of Tube Hydro-Forming Process and Prediction of Rupture Using Ductile Damage

محل انتشار:

سومین کنفرانس ملی مهندسی ساخت و تولید (سال: 1390)

تعداد صفحات اصل مقاله: 8

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خلاصه مقاله:

Hydroforming is a fabrication process in which a fluid medium is used to form a piece using high internal pressure. In tube hydroforming, a tubular blank is placed between two dies, sealed and pressurized water injected, deforming the tube walls in to cavity in the dies. Tubular hydroforming has widely been applied in automotive industries recently, and the finite element analysis is progressively being used as an effective tool of evaluation and optimization in design of hydroforming dies and processes. Successful hydroforming depends on selection of proper tubular blank, sound preform shape and internal pressure. In this paper, 3D model of hydro-forming process of a cross-shape tube has been simulated by finite element method. An integral ductile damage model, coupled with von Mises plastic criterion, has been applied to predict where and when the rupture occurs in the process. Because of bending effects and nonlinear strain paths assumptions, the ductile damage model has shown considerable results. Which may be proposed to be used as a reliable criterion in prediction of ductile fracture in sheet metal forming processes. All studies presented in this paper have been carried out on aluminium alloy EN AW-7108 T6

کلمات کلیدی:

Hydro-Forming, Finite Element Simulation, Ductile Fracture Criterion, Cross-shape tube, Aluminium Alloy EN AW-7108-T6

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