

Effect of the Initial Billet Shape Parameters on the Final Product in a Backward Extrusion Process for Pressure Vessels

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Abstract : In this numerical study, we have proposed a method for evaluation of backward extrusion process of pressure vessel made up of steel. Demand for lighter and stiffer products have been increasing in the last years especially in automobile engineering. Through detailed finite element analysis, effective stress, strain and velocity profile have been obtained with optimal range. The process design of a forward and backward extrusion axe-symmetric part has been studied. Forging is mainly carried out because forged products are highly reliable and possess superior mechanical properties when compared to normal products. Performing computational simulations of 3D hot forging with various dimensions of billet and optimization of weight is carried out using Taguchi Orthogonal Array (OA) Optimization technique. The technique used in this study can be used for newly developed materials to investigate its forgeability for much complicated shapes in closed hot die forging process.

Keywords : backward extrusion, hot forging, optimization, finite element analysis, Taguchi method

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