

Article Abstract

Title:	Optical strain measurements and its finite element analysis of cold workability limits of pure aluminium
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Abstract:	In the present research work a new method of optical strain measurement (Machine vision system) was proposed for the analysis of flow behaviour of pure aluminium as a function of friction, aspect ratio and specimen geometry. Implementation of this new method reduced the extent of experimentation. Eight standard shapes of the axisymmetric specimens of cylindrical with aspect ratios 1.0 and 1.5, ring, flanged and tapered were selected for the present investigation. Specimens were deformed in compression between two flat platens to predict the metal flow at room temperature. A 4 X 4 mm square grid was marked at mid plane of the standard specimens. Online video images of square grid were recorded during the deformation process till the crack initiation. The distortions of grid from recorded images were analyzed offline. Finite element software ANSYS has been applied for the analysis of the upset forming process. The FEA results were compared with the analytical results of various stresses from the experimental measurements of axial, circumferential strains and found to be in good agreement. Ring compression tests with its finite element analysis were carried out to determine the friction factor (m) between the die and work piece and same found to be 0.3.
Keywords:	Friction, Upsetting, Machine vision system, Finite Element Analysis