

Paraffinic mineral oil lubrication for cold forward extrusion: Effect of lubricant quantity and friction

Abstract

In this paper, Finite Element (FE) and experimental analyses have been developed on the deformation of aluminium billet over a tool. Effect of friction resulted from the use of additive-free ISO460-compliant paraffinic mineral oil with kinematic viscosity of 455.192 mm²/s at 40 °C in amounts of 0.1, 1, 5, and 20 mg were examined. The time behaviour of displacements on the billet in the experiment was used as inputs for the FE model. The FE analysis results for load-displacement behaviour of the extrusion were compared with the experimental results. It was shown that significant differences exist between the four lubricant quantities on friction and contact pressure distribution.