

The effect of tool surface roughness in cold work extrusion

Abstract:

In this study, the influence of tool surface roughness on the metal flow in deformation areas was investigated by using a cold work plane strain extrusion apparatus. Two types of polished tools (taper die) were used in this experiment. The tool (taper die) had a 45-degree die half angle. The material of specimen (billet) was pure Aluminum Al 100. The lubricant used in this investigation was Refined, Bleached and Deodorized (RBD) palm olein. The extrusion process was done by using a hydraulic press machine. The extrusion load and piston stroke movement were recorded by using the load cell and displacement sensor, respectively. After the experiment, the billet was taken out and the surface roughness was measured. The u- and v- component velocities were calculated using the viscoplasticity method. As a result, the extrusion load and surface roughness of extruded material differed between the two types of taper die and influenced the metal flow in the deformation area of billets.