

Finite Element Modelling of Serrated Chip Formation During Turning AZ31 Magnesium Alloy

Abstract

Machining metal alloys such as AZ31 magnesium alloy involve thermomechanical behavior between workmaterial and cutting tools. The interaction between workmaterial and cutting tools has affected the chip formation in metal cutting and cutting performance. This paper developed a finite element model (FEM) by using Abaqus software to simulate the chip formation in cutting AZ31 magnesium alloy under dry condition. The study revealed that serrated chips were formed in dry condition. Chip segmentation increased proportionally with cutting speed as generated heat concentrated in a narrow zone, promoting the formation of an adiabatic shear band.

Keywords

ABAQUS; Cutting tools; Finite element method; Magnesium alloys; Shear bands; Turning