

Surface quality and chip formation in turning of LM6 aluminium alloy and particulate reinforced metal matrix composite

ABSTRACT

Majority of the components of aerospace and automotive vehicles need different machining operations, mainly for the assembly requirements. The components have to present both high dimensional precision and surface quality. This present work is concerned with the effect of cutting parameters (cutting speed, feed rate and depth of cut) on the surface roughness and the chip formation in turning process. The machining results are compared with LM6 aluminium alloy and TiC reinforced metal matrix composite under the same cutting conditions and tool geometry. The cutting condition models designed based on the Design of Experiments Response Surface Methodology. The objective of this research is to obtaining the optimum cutting parameters to get a better surface quality and also the chip formation and furthermore does not hazardous to the worker and the machined products quality. Results shows that Surface roughness values of LM6-TiC composite are higher as compared LM6 alloy at similar cutting condition. With increasing in cutting speed improves the surface quality. The surface quality increases with decrease of the feed rate and the depth of cut. There are difference chip forms for LM6 aluminium alloy and Al-TiC composite for a similar of cutting condition. Generally, chip formations of both materials are acceptable and favourable for the worker as well as the products and the tools.

Keyword: Aluminium LM6; Chip formation; Metal matrix composite; Surface quality; Turning process