Effect of Machining Parameters on Surface Quality of Aluminium Puncher for Microchannel Fabrication Using Micro Cutting Process

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ABSTRACT:

Precision and surface finish plays an important role in modern industry. Both of these elements are more challenging to achieve in micro-sized machining due to their extremely small size and ease of damage. The quality of surface roughness and accuracy is directly influenced by the machining parameters used. The present work involves a detailed experimental analysis of surface quality for microchannel fabrication. This experiment was formed using the Response Surface Methodology (RSM) method by using three main machining parameters namely spindle speed (r/min), feed rate (mm/min), and depth of cut (μm) to produce an Aluminium microchannel puncher. The results of the study show that the best surface roughness is obtained by the combination of the following parameters; spindle 14,000 r/min, feed rate of 90 mm/min, and depth of cut 50 μm. This study concludes that the surface roughness of Al6061 steel is greatly influenced by two main parameters, namely depth of cut and feed rate.

KEYWORDS:

Surface quality; Micro machining; RSM

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