

PRECISION TURNING EFFECT ON SURFACE PROFILE PARAMETERS AND FATIGUE LIFE

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ABSTRACT

The main objective of this paper is to investigate the effect of precision turning parameters; namely, cutting speed, feed rate, tool rake angle and tool nose radius on both surface profile parameters and fatigue life. A series of cutting tests were carried out using a computerized numerically controlled CNC turning machine. The response surface method (RSM) was used to minimize the number of experiments to be conducted without loss of accuracy for results. The experimental results reveal that the precision machining parameters effectively improve the surface characteristics and fatigue life. The highest fatigue life was obtained with a combination of a low speed, low tool nose radius, medium feed and medium tool rake angle. Also, high number of cycles to failure was obtained at the combination of high tool rake angle with high tool nose radius.

KEYWORDS: Fatigue Life, Precision Turning, Response Surface Methodology, Surface Profile Parameters