OPTIMIZATION OF SURFACE ROUGHNESS IN MILLING OF INCONEL ALLOY

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ABSTRACT

Tool flank wear during milling of Inconel super alloys adversely affects surface roughness and, therefore, their service performance of machined components. Surface roughness and machining accuracy deteriorate when tool wear progresses. In this paper, the effects of process parameters including cutting speed, feed, radial depth of cut, and tool flank wear, on surface roughness of Inconel 718 alloy (45 ± 1 HRC) by milling using PVD coated tools have been studied. Surface roughness in both feed and step-over directions under a variety of milling conditions was characterized. Three levels of tool flank wear (VB = 0, 0.1mm, 0.2mm) were used in the experiments. At each level of tool wear, the effects of cutting speed, feed, and radial depth-of-cut on surface roughness were investigated, respectively. Based on analysis of variance (ANOVA), a predictive model for optimizing surface roughness has been developed by incorporating tool wear and process parameters.

Keywords: End milling, surface roughness, optimization, end milling, Inconel alloy, tool wear

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