

Effect of Cutting Speed and Feed Rate on Surface Roughness in CNC Machining

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Abstract

Surface roughness is an important indicator of machining quality and has a significant influence on the functional performance, dimensional accuracy, and service life of machined components. This study investigates the effects of cutting speed and feed rate on surface roughness during CNC machining. A series of machining experiments are conducted by varying cutting speed and feed rate while maintaining other machining conditions constant. The resulting surface roughness values are measured using an appropriate surface roughness measuring instrument. The experimental results are analyzed to determine the influence of each cutting parameter and to identify suitable machining conditions for achieving improved surface finish. The study is expected to provide useful guidelines for selecting machining parameters that improve product quality while maintaining efficient machining performance. The findings can assist manufacturers in reducing surface defects, improving productivity, and optimizing CNC machining operations.

Keywords: CNC machining, cutting speed, feed rate, surface roughness, machining parameters, surface finish, manufacturing.

