



BOOK OF ABSTRACT

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SURFACE ROUGHNESS ANALYSIS: A COMPARATIVE STUDY ON THE EFFECTS OF CUTTING FLUID IN TURNING & SHAPING OPERATIONS

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Abstract

Surface roughness is a critical factor influencing the quality, performance, and durability of machined components. This project presents a comparative study on the effects of different cutting fluids on surface roughness during turning and shaping operations. Both processes are widely used in manufacturing for producing precise geometries, but the choice of cutting fluid can significantly impact the final surface quality. The study investigates various cutting fluids, including conventional oils, water-based emulsions, and eco-friendly alternatives, examining their influence on surface finish under different cutting conditions. Experimental trials were conducted on a centre lathe for turning and a shaping machine for shaping operations, with surface roughness measured using a Surface roughness tester. Parameters such as cutting speed, feed rate and depth of cut were varied to assess their interaction with the type of cutting fluid used. The results provide a detailed analysis of how different fluids affect surface roughness in both turning and shaping processes. The findings of this study offer valuable insights into selecting appropriate cutting fluids to optimize surface finish, improve machining efficiency, and reduce environmental impact. This research aims to enhance the understanding of cutting fluid selection and its role in achieving high-quality surface finishes in turning and shaping operations.

Keywords: turning, shaping, surface roughness, variable feed rates, cutting speed, depth of cut.