IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 5, June 2025
Impact Factor: 7.67

Optimization of Machining Parameters on 7050 Aluminum Alloy for Surface Roughness

[1]Mr. Prashant Krushna Patil, [2]Dr. Kiran Kaware, [3]Dr. Vishal Sulakhe
Student, Department of Mechanical Engineering[1,2]
Head of Department, Department of Mechanical Engineering[3]
SOET, Sandip University, Nashik, India

Abstract: *This study investigates surface roughness in the end-milling process of aluminum alloy 7050-T7451, a material commonly used for extruded parts but with limited research on its machinability in this context. The core contribution is the development of a predictive model for surface roughness based on optimized cutting parameters. We employed two statistical methods: Taguchi's experimental design and the central composite design, to derive regression equations for surface roughness. Experiments were conducted using standard milling tools and a 3-axis CNC machine, adhering to manufacturer-recommended parameters. The research focuses on analyzing the impact of cutting speed, depth of cut, and feed on surface roughness. ANOVA analysis was utilized to compare predicted and experimental surface roughness values, with data processing performed using Minitab software. Finally, a comparative assessment of the advantages and disadvantages of both statistical methods is presented. This research offers significant industrial relevance by providing insights into achieving optimal product quality with minimized processing time.*

Keywords: CNC machine

DOI: 10.48175/568