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BOOK OF ABSTRACT

ICMIT 2025

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Dr. Ashish Kumar Srivastava
Dr. Pramod Kumar
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MAY 24-25, 2025

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EDITORS

Dr. Ashish Kumar Srivastava
Department of Mechanical Engineering
Muzaffarpur Institute of Technology, Muzaffapur-842003, India

Dr. Pramod Kumar
Department of Mechanical Engineering
Muzaffarpur Institute of Technology, Muzaffapur-842003, India

Prof. (Dr.) Mithilesh Kumar Jha
Principal
Muzaffarpur Institute of Technology, Muzaffapur-842003, India

Prof. (Dr.) Sandeep Tiwari
Principal
Darbhanga College of Engineering, Darbhanga-846005

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Prof. Md. Irshad Alam
Department of Mechanical Engineering
Muzaffarpur Institute of Technology, Muzaffapur-842003, India

Prof. Gulshan Kumar
Department of Mechanical Engineering
Muzaffarpur Institute of Technology, Muzaffapur-842003, India

Prof. Irfan Haider
Department of Mechanical Engineering
Muzaffarpur Institute of Technology, Muzaffapur-842003, India

Prof. Pappu Kumar
Department of Mechanical Engineering
Muzaffarpur Institute of Technology, Muzaffapur-842003, India

Prof. Vikash Kumar
Department of Mechanical Engineering
Muzaffarpur Institute of Technology, Muzaffapur-842003, India

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Table of Contents

Track 1: Materials Processing and Manufacturing Techniques

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Impact of Process Variables on Roughness of Turned Surfaces using Biodegradable Cutting Fluids

Deepak Kumar[1,2], Rajeev Ranjan[1], Subhas Chandra Moi[1], Manoj Kundu[1]

[1]*Department of Mechanical Engineering, Dr. B. C. Roy Engineering College, Durgapur- 713206, India.*
[2]*Department of Mechanical Engineering, National Institute of Technology, Patna, 800005, India*
**Corresponding Author Email ID: deepakk.ph21.me@nitp.ac.in*

ABSTRACT

This research focuses on improving the surface finish during mild steel turning by optimizing cutting parameters, with a particular emphasis on the role of cutting fluids. The primary goal is to achieve better surface quality and enhance machining performance by determining the best combination of speed, feed, and depth of cut. An important aspect of the study was to evaluate how biodegradable cutting fluids affect the machining process. To measure performance, surface roughness was used as the key indicator. All experimental trials were performed on a center lathe under varying machining conditions. Various cutting fluids, including sunflower, coconut, and soyabean oils, were tested to determine their effectiveness in enhancing the surface finish. Statistical methods, including Response Surface Methodology (RSM), were utilized to refine the parameters and establish the relationship between machining conditions and surface roughness. The findings indicated that cutting speed and feed had a significant impact on surface quality. Additionally, biodegradable cutting fluids demonstrated a notable influence on the surface roughness of mild steel. The best cutting fluid and ideal cutting parameters have been identified in the study. A surface roughness value of 0.2858 microns was found to be minimum with soybean oil as the cutting fluid. The associated cutting speed was 25m/min. The corresponding feed-rate and cut-depth were 0.10mm/rev and 0.7879mm respectively.

***Keywords*:** Biodegradable Cutting Fluids, Turning Operations, Surface Roughness, Surface Finish Optimization, Response Surface Methodology (RSM)