

**0708-F-035 LATHE MACHINE OPTIMUM CUTTING SPEED FOR DIFFERENT
MATERIALS**

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A report submitted in partial fulfillment of
The requirements for the award of the degree of
Bachelor of Mechanical Engineering
With Manufacturing Engineering

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We hereby declare that we have checked this project and in our opinion this project is satisfactory in terms of scope and quality for the award of the degree of Bachelor of Mechanical Engineering with Manufacturing Engineering.

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To my Beloved Mother and Father

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LIST OF SYMBOLS/ ABBREVIATIONS

N	Rotational speed of the workpiece
f	Feed
v	Feed rate, or linear speed of the tool along workpiece length
V	Surface speed of workpiece
l	Length of cut
Do	Original diameter of workpiece
Df	Final diameter of workpiece
Davg	Average diameter of workpiece
d	Depth of cut
t	Cutting time
Ra	Average deviation of mean surface
Rt	Maximum roughness height
Rz	Root mean square value
SFPM	Surface feet per minute
MRR	Material removal rate
FEM	Finite element analysis
BUE	Built-up-edge

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This project is to investigate the Lathe Machine optimum cutting speed for the three chosen materials. Previous research done on the impact of cutting parameters that affect surface roughness suggest us that among cutting parameters (cutting speed, feed rate, and depth of cut), cutting speed has the biggest impact on the surface roughness [3]. Cutting speed is defined as the speed at which the work progress with respect to the tool. Feed rate is defined as the distance the tool travels during one revolution of the part. Besides surface finish, Cutting speed and feed also determine the power requirements and material removal rate. The primary factor in choosing feed and speed is the material to be cut. However, one should also consider material of the tool, rigidity of the work piece, size and condition of the lathe, and depth of cut.[4] In high-volume production, machining parameters have amplified impacts on the machine performance in terms of productivity (cycle time), reliability (tool life), and product quality (surface finish). In addition, production parameters become critical in high-volume production since they directly impact the overall order fulfillment (production makes pan and delivery reliability)[1]. The three material with different hardness are chosen in this project, they are Aluminum, Mild steel and Carbon steel. [4]