



**OPTIMIZATION OF TURNING OPERATION
TOWARD SURFACE QUALITY USING RESPONSE
SURFACE METHODOLOGY (RSM)**

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DECLARATION BY THE CANDIDATE

“I declare that this thesis is the result of my own work except the ideas and summaries which I have clarified their sources. The thesis has not been accepted for any degree and is not concurrently submitted in the candidature of any degree.”

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ABSTRACT

Turning operation plays significant role in manufacturing industry especially to fabricate machined parts. Meanwhile surface quality is one of the important aspects to measure the performance of lathe machine. This research experimentally investigated the effect of turning parameters which are feed rate, cutting speed and depth of cut toward surface roughness and machining time by using Response Surface Methodology (RSM). Central Composite Design (CCD) was chosen to design 15 set of experiments for 3 continuous factors. The mild steel was chosen as work material and had been turning under hot facing operation on conventional JET Lathe machine. The cutting tool used for this experiment was Tungsten Carbide insert. The experimental results were analyzed using a statistical Analysis of Variance (ANOVA) and developed mathematical model for surface roughness. With accuracy of 94.3% by compared experimental and theoretical data, the model can be verified as valid. The results indicate that feed rate give most influence factor to the surface roughness rather than cutting speed and depth of cut. Furthermore, for optimize condition, maximum cutting speed, minimum feed rate and depth of cut can increase the surface quality of machined parts. In addition, the analysis also generated the relationship between cutting parameters and machining time. It is show that the feed rate and cutting speed influenced the machining time.

TABLE OF CONTENTS

CHAPTER	CONTENT	PAGE
	DECLARATION BY THE CANDIDATE	i
	SUPERVISOR CERTIFICATION	ii
	ACKNOWLEDGEMENT	iii
	ABSTRACT	iv
	TABLE OF CONTENTS	v
	LIST OF FIGURES	viii
	LIST OF TABLES	x
	LIST OF APPENDICES	
	LIST OF ABBREVIATIONS	xii
CHAPTER 1		
	INTRODUCTION	
	1.1 Project background	1
	1.2 Problem Statement	2
	1.3 Objectives	3
	1.4 Scope of Work	3