



**A STUDY OF THE EFFECTS OF CARBURIZING TIME ON FATIGUE  
CHARACTERISTIC OF A CANNON BARREL**

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## ABSTRACT

This project paper is a study of the mechanical properties on heat treatment of a weapon barrel for engineering utilization. The objective of the study is to analyze the effect of mechanical properties of weapon barrel using samples taken from the barrel of the Oto Melara 105mm Model 56 Pack Howitzers which is was given by the Ministry Of Defense, Malaysia.

This study consists of two sets carburizing time which consists of 4 hours and 8 hours duration undergoing a pack carburizing process at a temperature of 750<sup>0</sup>C. It is from these two different time sets, we analyze the samples using rotating bending machine to obtain the fatigue limit and S-N curves regarding surface fatigue failure. The hardness values of non carburized and carburized specimens are also determined by the use of Series 600 Rockwell Hardness Tester.

Microstructure analysis in the different type of specimens which are the non carburized and carburized at 4 and 8 hours indicate slight difference in the type of microstructures that are present.

## **TABLE OF CONTENTS**

<b>CONTENTS</b>		<b>PAGE</b>
	PAGE TITLE	i
	ACKNOWLEDGEMENT	ii
	ABSTRACT	iv
	TABLE OF CONTENTS	v
	LIST OF FIGURES	ix
	LIST OF TABLES	xii
	LIST OF ABBREVIATION	xiii
<b>CHAPTER I</b>	<b>OVERVIEW OF FINAL PROJECT</b>	
	1.0 Introduction	1
	1.1 Objective of Project	3
	1.2 Significance of Project	3
	1.3 Scope	3
	1.4 Methodology	4
<b>CHAPTER II</b>	<b>OTO MELARA 105mm MODEL 56 PACK HOWITZER</b>	
	2.1 Development	5
	2.2 Description	6
	2.3 Specification	7

## **CHAPTER 1**

### **OVERVIEW OF THE FINAL PROJECT**

#### **1.0 Introduction**

In many instances, it is desirable to produce a hard, wear-resistant surface or "case" over a strong, tough core. Treatment of this kind is known as "case hardening." This treatment may be accomplished in several ways; the principal ways being carburizing, cyaniding, and nitriding. In the case of our final year project, which is titled as "A Study The Effects of Carburizing on Fatigue Characteristics of Gun Barrel", we are to treat the gun barrel specimen by carburizing. The reason for this selection is because cyaniding compared to carburizing is applied to unimportant parts and nitriding compared to carburizing can only be used to treat certain special steel alloys, one of the essential constituents of which is aluminum.

So it is our hope that by carburizing the gun barrel sample, a harder, stronger surface could be achieved to withstand the wear and abrasion combined with a tough core to resist shock and fatigue. To understand the importance of the effects of carburizing on fatigue characteristics, we must understand the theory or concept of carburizing. But first we should ultimately understand why do we need to surface harden certain materials?