

UNIVERSITI TEKNOLOGI MARA



**BACHELOR OF ENGINEERING
(HONS.) MECHANICAL**

FACULTY OF MECHANICAL ENGINEERING

**FKM TORSION TEST MACHINE
(A STUDENT MODEL)**

**AZROL HISHAM ABDULLAH
99758323**

OCTOBER 2003

UNIVERSITI TEKNOLOGI MARA



**BACHELOR OF ENGINEERING
(HONS.) MECHANICAL
FACULTY OF MECHANICAL ENGINEERING**

“DECLARATION OF ORIGINAL WORKS”

I, AZROL HISHAM ABDULLAH, I/C NUMBER:

SID: 99758323

Hereby, declare that:

- ❖ This work has not previously has been accepted in substance for any degree, locally or overseas, and is not being concurrently submitted for this degree or any other degrees.
- ❖ This project paper is the result of my independent work investigation, except where otherwise stated.
- ❖ All verbatim extracts have been distinguished by quotation marks and sources of my information have been specifically acknowledged.

Signature: _____

(AZROL HISHAM ABDULLAH)

Date: **OCT 31, 2003**

TABLE OF CONTENTS

CONTENTS	PAGE
DECLARATION OF ORIGINAL WORK	i
LETTER OF TRANSMITTAL	ii
ACKNOWLEDGEMENT	iii
LIST OF FIGURES	x
LIST OF TABLES	xi
CHAPTER 1:	
1.0 INTRODUCTION	1
1.1 An Overview	1
1.2 Scope of Work	1
1.3 Objective of The Project	3
CHAPTER 2:	
2.0 INTRODUCTION TO TORSION	4
2.1 The Theory	4
2.2 Torsion Definitions	5
2.2.1 Angle of Twist	5
2.2.2 Modulus of Rigidity	6
2.2.3 Yield Limit	6
2.2.4 Modulus of Rupture	6
2.2.5 Plastic Limit at Rupture	6
2.3 Consideration of The Concept	7

CHAPTER 3:

3.0	IDEA OF DESIGN, FABRICATION AND MODIFICATION	8
3.1	Phases of Process	8
3.2	Introduction	8
3.3	Recognition of Need	9
3.4	Definition of Problem	10
3.5	Synthesis and Optimization	10
3.6	Evaluation	11
3.7	Presentation	11

CHAPTER 4:

4.0	METHODS OF TESTING	13
4.1	Testing Specimen	14
4.2	Mild Steel Torsion Test	14
4.3	Methods of Testing	15
	4.3.1 Procedures Description	15
4.4	Test Results	17
	4.4.1 Sample Calculation	19
4.5	Result Analysis	20
4.6	Discussion	20

CHAPTER 5:

5.0	RESULTS AND DISCUSSION	21
5.1	Torsion Test A (Using Prototype Model)	21
5.2	Test Results for Test A	21
5.1	Results Analysis	22
5.2	Discussion	22
5.3	Results Interpretation and Comments	23

CHAPTER 1

1.0 INTRODUCTION

1.1 An Overview

Engineering training involves classroom-learning, lab works, and industrial training. These elements are essential for preparing engineering graduates when entering into professional areas.

Most of the time, a subject is taught with greater emphasis on the theoretical viewpoint rather than practical aspect. However students are exposed on experimental works to relate the theoretical concept to the technical work. It is known that studies become more effective with the aid of practical applications and experimental works. As a result, a fresh engineering graduate, on entering the job-market would gain some amount of practical knowledge.

With this in mind, an attempt has been made to design a testing apparatus that is useful for engineering students. Students can utilize this work project to perform a series of torsion testing using the modified design torsion test machine.

1.2 Scope of Work

The project main purpose was to design and fabricate a torsion test machine. The new machine must be an educational type, i.e., simple, easy to handle, cheaper to fabricate and most importantly functional and effective. The first phase of this project was to design and fabricate a prototype