



RAIL SHEAR TESTING

MOHD SABRI BIN DERAMAN

(98713575)

A thesis submitted in partial fulfillment of the requirements for the award
of Bachelor Engineering (Hons)(Mechanical)

**Faculty of Mechanical Engineering
Universiti Teknologi MARA (UiTM)**

SEPTEMBER 2002

ACKNOWLEDGEMENT

In the name of ALLAH
The Compassionate, the Merciful,
Praise be to Allah, Lord of the Universe,
And Peace and Prayers be upon,
His Final Prophet and Messenger

This thesis is the effort of a number of people. Here I would like to express my sincere thanks to each and everyone whom involved in the development of this project.

Firstly, I am particularly grateful for my parents and family for their encouragement and continuous support during my study.

I wish to express my deepest gratitude to my project advisor, Prof. Madya Ahmad Kamil Hussain who provided constant assistance and guidance during completion of the project.

I also wish to thank to Encik Abu bin Kassim, Encik Mustafa bin Yassin and other lab technicians for leading me the equipment of the machines and their willingness to guide me during my fabrication and experimentation stage.

ABSTRACT

In this project, we are interested to design a new fixture for shearing test method that uses a thin plate a test specimen. We found that the idea has already been practiced in ASTM D4255/D4255M-83 (Reapproved 1994). Since the method was almost the same, but the test fixture was a modified version, we agreed to follow the ASTM D4255 standard as a reference. In this project modifications on the test fixture are done.

This project consists of the design concept including the design process and fabrication of the rail shear test fixture. An analysis step that is part of design is described and the experimental results using the newly modified fixture are also discussed. The comparison has been made between the modified fixture and the ASTM method.

TABLE OF CONTENTS

CONTENTS		PAGE
	AUTHOR DECLARATION	i
	PROJECT ADVISOR CERTIFICATION	ii
	HEAD OF PROGRAM CERTIFICATION	iii
	PAGE TITLE	iv
	ACKNOWLEDGEMENT	v
	ABSTRACT	vii
	TABLE OF CONTENTS	viii
	LIST OF TABLES	xii
	LIST OF FIGURES	xiii
	LIST OF SYMBOLS	xv
CHAPTER 1	INTRODUCTION	
1.1	An Overview	1
1.2	Scope of Work	2
1.3	Objective of the Project	3
CHAPTER 2	LITERATURE REVIEW	

2.1	Shearing Stress	5
	2.1.1 Shearing strain	6
	2.1.2 Relationship between Shear Stress and Shear Strain	7
2.2	Methods of Shearing Test	8
	2.2.1 Short Beam Shear Test Method	8
	2.2.2 Iosipescu Shear Test Method	10
2.3	Rail Shear Test Method	11
	2.3.1 Scope	11
	2.3.2 Modification of the design	13

CHAPTER 3

THE IDEA OF DESIGN AND FABRICATION

3.1	Design Process	14
	3.1.1 The Phases of Design	14
3.2	Recognition of Need	15
3.3	Definition of Problem	16
3.4	Synthesis, Analysis and Optimization	17
3.5	Evaluation	18
3.6	Presentation	18
3.7	Fabrication Process	19

CHAPTER 4

THE TEST FIXTURE

4.1	Introduction to Fixture	21
4.2	The Principle Requirements	22
4.3	Assembling and Fabrication of the Fixture	23
4.4	The Detail Fixture	25