



FINAL PROJECT REPORT

DIPLOMA IN MECHANICAL ENGINEERING

FACULTY OF MECHANICAL ENGINEERING

UNIVERSITI TEKNOLOGI MARA

SHAH ALAM

SELANGOR DARUL EHSAN

**FACULTY OF MECHANICAL ENGINEERING (FKM) NEWLY
MODIFIED TENSILE TEST FIXTURE**

PREPARED BY :

**MOHD. FARRIZ BAHARULRAZI
98142072**

**FARAH HANI MOHAMAD ALLI
98144738**

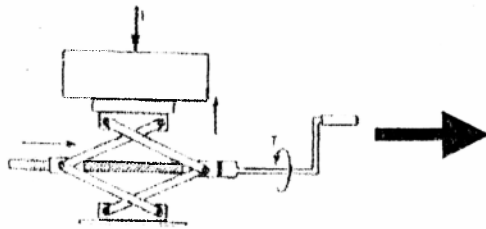
**ROSMARIA ABD. HAMID
98139227**

**ADVISOR:
EN. AHMAD KAMIL HUSSAIN**

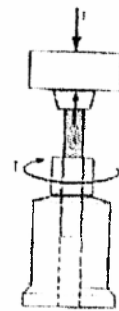
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OBJECTIVES

The main objective of this project was to modify the existing car jack that was used as the main component in a tensile testing machine previously designed by a group of Mechanical Engineering students. Basically our task was to replace the jack system schematically shown in picture 1(a) with the type of screw – gear system schematically shown in picture 1 (b). Both jacks were used to apply a tensile load to a test specimen.

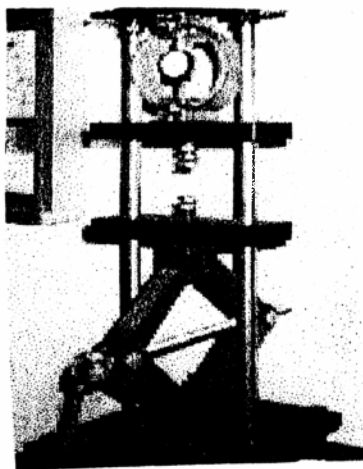


Picture 1 (a)



Picture 1 (b)

The educational tensile test fixture with the jack system is shown in picture 2(a) and the complete assembled of newly modified screw gear system is shown in picture 2(b).



Picture 2(a)



Picture 2(b)

In addition, we learned how to use lathe machine which was used to make threads and gears. We were exposed to the operation of milling machine. This provided good experience for us in understanding the operation of lathe and milling machines which is very useful for our studies and future career.

Besides, we learned how to fabricate a tensile specimen from a thin plate. The specimen was initially cut off using a metal cutting machine before it can be slotted in the 'blank' and stamped by compressive force to get a specimen of desired dimensions.

In this project we also improved our skills in using Microsoft Excel to draw graph to determine some mechanical properties for the materials i.e. yield stress, modulus of elasticity and tensile strength.

The other important aspect of performing this project was to fulfill the requirement of the Mechanical Engineering Programme for a diploma.

INTRODUCTION

As we already know, all materials are subjected to forces or loads when in service. It is necessary for us to know the characteristics of the materials and to design the member so that any resulting response, i.e. stress and deformation will not excessive and fracture will not occur.

The important mechanical properties of a material, among others are strength, ductility, stiffness and hardness. Understanding on these properties are important to ensure the materials are suitable to used in any machines or construction therefore the project will be in safe condition. The properties can be determine by making tests such as destructive or non-destructive tests which include compression, tensile, bending tests, etc.

In this report, we will discuss in chapter 1 the general remarks on testing. In chapter 2, we will briefly explain the components of gearing system which are the main components of our design as force application unit in a tensile testing machine.

In chapter 3, we will discuss the process of making specimen while in chapter 4 we will explain the main component of our design which are the gearbox, threaded shaft and worm gear.

The result and discussion on the experiment data obtained from various tensile test fixtures are discussed in chapter 5 and the total project cost is given in chapter 6.

We end the report with a conclusion and appendices.

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