



**STUDY THE MATERIAL OF FISHING ROD AND THEIR
STIFFNESS AND ELASTICITY STRENGTH USING BENDING**



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**BACHELOR OF ENGINEERING TECHNOLOGY
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**Faculty of Mechanical and Manufacturing Engineering
Technology**



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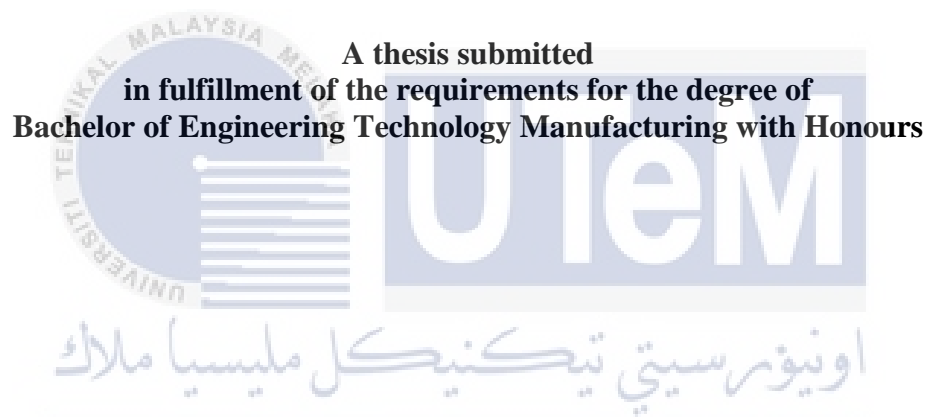
EJAYKUMAR A/L VEJAYA KUMAR

Bachelor of Engineering Technology Manufacturing with Honours

2023

**STUDY THE MATERIAL OF FISHING ROD AND THEIR STIFFNESS AND
ELASTICITY STRENGTH USING BENDING TEST**

EJAY KUMAR A/L VEJAYA KUMAR



**A thesis submitted
in fulfillment of the requirements for the degree of
Bachelor of Engineering Technology Manufacturing with Honours**

Faculty of Mechanical and Manufacturing Engineering Technology

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2023

DECLARATION

I declare that this research entitled “ Study the material of fishing rod and their elasticity and stiffness using bending test” excepted as noted in the references, this is the result of my own research. This research has not been accepted for any degree and is not being considered for any other degree.

Signature

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Date


: 8/1/2023

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APPROVAL

I hereby declare that I have reviewed this thesis and believe that it is adequate in scope and quality for the award for the Bachelor of Mechanical and Manufacturing Engineering Technology (BMMW) with Honours.

Signature : 

Supervisor Name : TS, DR. OMAR BIN BAPOKUTTY

Date : 23/1/2023



DEDICATION

First and foremost, I would like to express my heartfelt gratitude to everyone who has assisted me with this project. To begin, I would like to express my heartfelt gratitude to my most respected supervisor, Ts. Dr. Omar bin Bapokutty, for his unwavering support of my Final Year Project, as well as his patience, motivation, enthusiasm, and vast knowledge. I could not have asked for a better project supervisor. Aside from my supervisor, I am grateful to my loving parents, Vejaya Kumar A/L Kunjiraman and Chandra A/L Subramaniam, for their words of encouragement and push for tenacity. My completion of this project would not have been possible without the help of my friends. I thank them for the stimulating discussions, the sleepless nights we spent working together before deadlines, and for lending me their hands until I finished my proposal completely. It is a pleasure to express gratitude to those who, directly or indirectly, made this proposal possible.

ABSTRACT

This study is to research the different on the properties of different material used in making fishing rods. The most common material used are bamboo, fibreglass, graphite, and carbon fiber. This material will be examine in terms of their stiffness and elasticity by using bending and. Bending tests are used to assess the behaviour of materials when subjected to simple beam loading. With some materials, it is also known as a transverse beam test. The test is used to determine a material's Young's modulus. From the experiment, we can get the result of elasticity and stiffness of the material. When the forces causing the deformation are removed, the ability of a deformed material body to return to its original shape and size is referred to as elasticity. A body that has this ability is said to be elastic. Meanwhile, stiffness are the extent to which an object resists deformation in response to an applied force. Material testing is important in manufacturing for a variety of reasons, including satisfying regulatory requirements, selecting acceptable materials and treatments for a given application, reviewing product design or enhancement parameters, and confirming a manufacturing process. As for this research, the result from this testing will help the anglers to get the better information on knowing the ability of the fishing and choosing which is the best rod.

ABSTRAK

Kajian ini adalah untuk mengkaji perbezaan sifat-sifat bahan yang berbeza digunakan dalam membuat pancing. Bahan yang paling biasa digunakan ialah buluh, gentian kaca, grafit, dan gentian karbon. Bahan ini akan dikaji dari segi kekukuhan dan keanjalannya dengan menggunakan ujian lenturan dan kilasan. Kaedah ujian lenturan mengukur kelakuan bahan yang tertakluk kepada beban rasuk mudah. Ia juga dipanggil ujian rasuk melintang dengan beberapa bahan. Ujian ini digunakan untuk mengukur modulus Young bagi sesuatu bahan. Ujian kilasan melibatkan pemisahan sampel di sepanjang paksi dan merupakan ujian yang berguna untuk memperoleh maklumat seperti tegasan ricih kilasan, tork maksimum, modulus ricih dan sudut pecah bahan atau antara muka antara dua bahan. Daripada kedua-dua eksperimen, kita boleh mendapatkan hasil keanjalan dan kekukuhan bahan. Keanjalan merujuk kepada keupayaan badan bahan yang cacat untuk kembali kepada bentuk dan saiz asalnya apabila daya yang menyebabkan ubah bentuk dikeluarkan. Badan yang mempunyai kebolehan ini dikatakan berkelakuan elastik. Sementara itu, kekakuan ialah sejauh mana objek menentang ubah bentuk sebagai tindak balas kepada daya yang dikenakan.. Pengujian bahan adalah penting dalam pembuatan untuk pelbagai sebab, termasuk memenuhi keperluan kawal selia, memilih bahan dan rawatan yang boleh diterima untuk aplikasi tertentu, menyemak reka bentuk produk. atau parameter peningkatan, dan mengesahkan proses pembuatan. Bagi kajian ini, hasil daripada ujian ini akan membantu pemancing untuk mendapatkan maklumat yang lebih baik untuk mengetahui keupayaan pancing dan memilih joran yang terbaik.

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LIST OF SYMBOLS AND ABBREVIATIONS

D,d	-	Diameter
	-	
	-	
	-	
	-	
	-	
	-	
	-	
	-	



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CHAPTER 1

INTRODUCTION

1.1 Background

Fishing poles

A fishing pole is a thin, long pole. that fishermen use to help catching fish with a fishing line with a hook attach at the end of the line. A fishing poles, in its most basic form, is a straight, stiff stick with one end linked to a line. However, contemporary fishing poles are generally bendble, with the line saved in a roll placed in a machine attached at the rod handle, which is manually hand rotated to controls the line retrieval, as well as many line- confining rings that aid damping by distributing bending stress along the rod and help line trouncing and trapping. Baits are attacted on to one or more hooks tighted to the line to attract fish, and a bite index is used, some of which may be included into the rod itself.

Fishing poles principally functions as a substitute switch and allows the trawler to boost line movements while solociting and pulling the fish. It also increases casting distance by adding the terminal tackles' launch speed as a longer swing compass corresponds to lesser bow speed at the tip with the same angular velocity. The length of fishing poles generally between 0.5 and 4.5 m depends on the fashion of inclination, while the Guinness World Record is 22.45m.

Fishing poles are fashioned from a variety of materials, including metal and wood. Each material has unique properties and characteristics that it imparts to the rod and, as a result, to your fishing, such as sensitivity and precise casting. Bamboo, fibreglass, graphite, carbon fibre, and composite are the most common materials used to make fishing rods.

Bending

In applied mechanics, bend is a thin structural element's behaviour when exposed to an external stress applied perpendicular to the element's longitudinal axis. It is assumed that the structural element has at least one dimension that is a tiny fraction of the other two, frequently 1/10 or less. When the length of an element is significantly greater than its width and thickness, it is referred to as a beam. A sagging closet rod caused by the weight of clothes on hooks is an example of a bending beam.



1.2 Problem Statement

Fishing rod have many types and it is made of many materials. There is always a question on which is the best and how to choose a fishing rods among anglers. To explain about this, I had perform an experiment for bending and that will analyze the material properties of different type of material of fishing rod. From studies, we can differentiate the stiffness and elasticity of type of material used to making fishing rod and which is the best material.

1.3 Research Objective

The primary goal of this study is to:

- a) To study the difference between the material used in making the fishing rod
- b) To conduct bending test of the fishing rod in order to investigate the material's mechanical characteristics
- c) To analyze bending test of the fishing rod in order to investigate the material's mechanical characteristics

1.4 Scope of Research

Scope of research is to investigate the mechanical characteristics of fishing rod which is stiffness and elasticity. These fishing rod comes in many types and made by many materials. Some types of fishing rod share the same materials, so the type of material have to be considered first before studying about the type of fishing rods. The test that will be performed on the material is bending test to study the stiffness and elasticity. This research focusing for different type of material used such as fiberglass, bamboo, graphite, carbon fiber and composite.

1.5 Significant of study

The goal of this study is to compare the mechanical properties of material used to make fishing rods through bending test. The comparison of the stiffness and elasticity on the material will determine which material is the best in making fishing rods. The knowledge and information on mechanical properties can be useful for the angles to choose fishing rods through this research.

1.6 Thesis outline

Overall, the study will be done over the course of two semesters. In general, the study is summarized into five chapters. For the first semester, chapter 1 until chapter 3 are covered.

- The first chapter provides a description of the research study, including the materials used, as well as the procedures or approaches used to determine material attributes. The issue statement, objectives, scope, and general technique are also included in this chapter.
- The mechanical qualities, types of fishing rods, and materials used to create fishing rods are all discussed in Chapter 2. The study's findings provided a broad notion and information for conducting the experiment and demonstrating the best strategy to employ in the project.
- The project's flow is discussed in Chapter 3. It also described the steps that must be followed in order to complete the project.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

A fishing pole is a thin, long rod used by fishermen to help catching fish with a fishing line with a hook attached at the end of the line. A fishing rod, in its most basic form, is a straight stiff stick/pole with a line tied to one end. Contemporary rods, on the other hand, are usually elastic, with the line is kept in a reel attached to the rod handle, which is hand-rotated and regulates line retrieval, as well as several line-restricting rings that disperse bending stress throughout the rod and assist prevent line whipping and tangling. Baits or lures are dressed onto one or more hooks attached to the line to better tempt fish, and a bite indicator is employed, some of which may be included into the rod itself. The angler while tempting and hauling the fish, use the fishing rod as an extended lever to increase line motions. It also increases casting by raising the launch speed of the final tackles, as well as a larger swing radius equates to a faster arc speed at the tip when the angular velocity is increased which is kept constant. Depending on the type of angling, fishing rods are normally between 0.5 and 4.5 m (2 and 15 feet) long.

Weight and action, power, stiffness, shape, number of parts, balance, length, and strength are all characteristics of fishing rods. The stiffness and durability of fishing rods made of various materials are the main subject of this research.

Stiffness

Stiffness is the degree to which an object resists deformation in response to an applied force. Flexibility, also known as pliability, is a related concept whereas the more flexible something is, the less stiff it is.

Elasticity

Elasticity refers to the ability of a distorted material body to return to its original shape and size after the forces that caused the deformation are removed. A body with elastic behaviour is one that has this ability.



2.2 Mechanical properties

Mechanical properties are physical properties that a material exhibits when forces are applied to it. There are many types of mechanical behaviour but as for the research the main concerned properties are

- I. Elasticity
- II. Ductility
- III. Stiffness



2.2.1 Elasticity

Elasticity refers to the ability of a distorted material body to return to its original shape and size after the forces that caused the deformation are removed. A body with elastic behaviour is one that has this ability.

Most solid materials exhibit elastic behaviour to some degree, but the quantity of the force and the extent to which elastic recovery is possible for any given material as a result of the resulting deformation is limited. This limit, known as the elastic limit, is the maximum stress or force per unit area that a solid material can withstand before permanent deformation occurs. Stresses that exceed a material's elastic limit cause it to yield or flow. The elastic limit denotes the transition from elastic to plastic behaviour in such materials. In most brittle materials, stresses that exceed the elastic limit result in fracture with little or no plastic deformation.

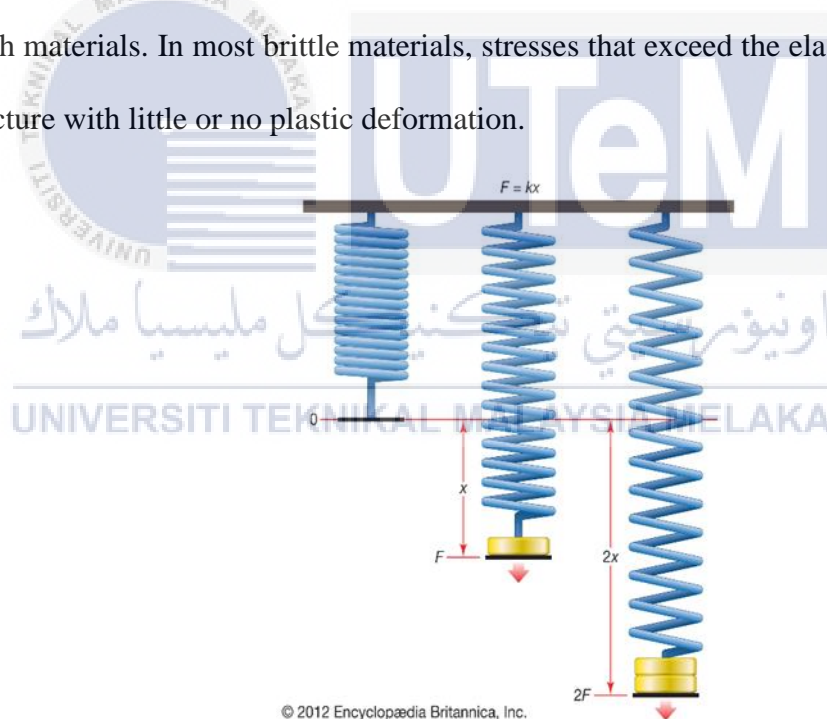


Figure 1 Elasticity