

CHAPTER I
INTRODUCTION



In the past years, plastic was inferior to other metallic materials in many ways. Now, plastic has the important roles in our daily life. Because of the technical improvement and suitable application, plastic which is even inferior to the metals in strength is worldwide used. Plastic is non-rusty, light weight, good looking, easy to be shaped for various purposes, and good insulator. The technique to improve plastic strength to the strength of metal is reinforcing plastic with specific materials which have high strength and toughness quality.

Plastic which is improved by this technique is called the reinforced plastic. The material used for reinforced plastic must have good property in softness and toughness so it can stand the decay, heat and provide good electrical insulation. In order to reduce the production cost resulting from high cost of glass fibre reinforcement and to make use of local material. The jute was used in this experiment since some properties of jute are the same as properties of glass fibre. Thermosetting plastic is quite suitable for this work such as Polyester, Epoxy and Polyuratane. These plastics are resin which must be blent with catalysts when being used

and this reaction is called Polymerization. The temperature from this reaction is more than 200°C and the material will be changed to hard plastic which can not be reprocessed.

The purpose of this thesis is to study the mechanical properties of jute reinforced plastic and the other properties which will be influenced by the jute reinforcement for engineering application.

The first part of the experiment is to make three kinds of specimens, namely pure plastic, glass fibre reinforced plastic, and jute reinforced plastic. Glass fibre reinforced plastic and jute reinforced plastic are divided into three types; 3-ply, 4-ply, and 5-ply of reinforcing materials. There are two types of reinforcement, lengthwise and crosswise. 2 types of glass fibre and jute which have the same weight per unit area; 450 grams per square meter type and 600 grams per square meter type were used. Each type of specimens was made by moulding. The specimens were tested to evaluate tensile strength, Young's modulus, flexural strength, flexural modulus, coefficient of thermal conductivity, Poisson's ratio and specific gravity. To study tensile strength, flexural property and specific gravity 216 specimens were employed in each study. Only 16 and 20 specimens were used in the study of Poisson's ratio and coefficient of thermal conductivity.

Study of Poisson's ratio was kindly conducted by Science Service Department. The detail of the experiment is in the steps of the experiment.

The second part is to design mould in order to make 2 closed tanks, cylindrical tank with hemispherical ends. The first tank was made of glass fibre reinforced plastic by using 1 ply of 450 grams per square meter glass fibre. The second tank was made of jute reinforced plastic by using 1 ply of 450 grams per square meter jute. The air was pressed into the tank and increased step by step. The strain gages were bonded to the surface around the tank so at each level of pressure the various values could be obtained. The detail of the experiment in the step of the experiment.

The usefulness of this thesis is to know the technique of increasing tensile strength of plastic by using these materials; glass fibre and jute. The jute can be used to reinforce to improve some mechanical properties of plastic. The jute reinforced plastic is cheaper than the other materials reinforced plastic such as glass fibre which has the same tensile strength. Moreover, the specific values of some mechanical properties obtained from this thesis can be used in engineering design and be a reference for further studying.