

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF PROJECT

Nowadays, composite materials are commonly used for structure development. Composite material structures usually based on thin shells and plates. The strength of the structure is achieved by increasing the thickness of the material to support various natures of loadings.

Unlike other engineering materials, composite materials cannot be treated to increase the strength or performance. Therefore, the thickness of the structure is modified to get the specified strengths. Composite tubes are commonly used in many engineering applications. The tubes come in different thickness. The different thickness will give different strength performance of the composite tube. Therefore, this research will show that composite tubes with different thicknesses will be tested to monitor the performance change. The result will help the engineers and manufacturers to select the right thickness of composite tubes to support different loadings.

1.2 PROBLEM STATEMENT

Many construction industries that use composite materials do not have any guideline on the properties and the strength of the composite materials. That results in difficulties to achieve the designed specification of a construction. Therefore it is important for the industry to have the guideline that tells engineers and developers the relationship between the properties of the composite materials and the strength

acquired. The guide line will ensure designers and developers to choose the right properties for the required strength as specified.

Because of the structure that used composite materials are newly developed; measurement of through-thickness properties has seldom been addressed by researchers on composite materials. Some mechanical test such as direct tensile test on a through-thickness waisted or non-waisted specimen (Broughton and Sims, 1994 and Mespoulet, 1998), through-thickness shear using Iosipescu (Gipple and Hoyns, 1994), the torsion test on rectangular rods, tension or bending on a curved specimen (Broughton and Sims, 1994) are not reliable because of the difficulty to achieve homogeneous stress states in the specimens (Grédiac, 2000).

1.3 OBJECTIVE

To analyze the influence of thickness on composite strength.

1.4 SCOPES

The scopes of the project are limited to tissue matt e-glass fibre composite material, tube structure, three point bending test, flexural strength, and hand lay-up process.