

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Composite is a material which is made out of two or more physically diverse stages that aggregates in the mix produces total properties that are not the same as of its constituents. Nowadays, the composite has become one of the very important materials used in the industrial area due to its attractive properties. They are more simply obtained at the macro-scale level by simple mixing techniques. The combination of the natural and synthetic fibers gives best result reinforced composites and are possible to achieve the combination properties that are not only attainable with metals, ceramic and polymers alone (Ashik K.P et al., 2015).

1.2 PROBLEM STATEMENT

In the recent years, many of the researchers have been studied about the combination of the natural fiber and synthetic fiber reinforced composite which is more environmentally friendly and also due to the availability of the sources of the natural fiber and its low cost (Ashori, 2010). This is because the raw materials that satisfy the necessities of the world business sector have been expanding investigated lately. This combination of fibers in the hybrid composite is increasingly applied in many different areas of technology and innovation due to its excellent physical properties and much cheaper in processing it (Begum, 2013). Natural fibers are being considered as new renewable resources, so it is completely renewable, high specific

strength, bio-degradability and also low cost. Therefore, natural fibers have become the most appealing to specialist and researchers as other ways for fiber reinforced composites (Ashik K.P et al., 2015).

Natural fibers are treated as most major material in various applications because of its great properties. Last few thousand years, life has been accounted in various fields of the usage of natural fibers as reinforced materials (Bledzki, 1997). A new method to develop hybrid composites is by combining together lamina reinforced using different fibers. Natural fibers alone cannot give the better result in mechanical properties due to some limitations such as low water absorption resistance compared to synthetic fiber. Hence, the combination of these fibers is being developed. However, it not an easy process to substitute the synthetic fiber to natural fiber as natural fiber have low strength and poor moisture resistance. The main contrast of natural fibers compared to synthetic fibers is their non-consistency, assortment of measurements, and their mechanical properties.

Hybrid composite with synthetic fiber such as glass fiber and carbon fiber always draw a good mechanical performance (Sapiai N. et al., 2015). A review on the hybridisation of natural and synthetic fibers as reinforcement in hybrid composites has shown major impacts on the change of mechanical properties for the substitution of high cost and non-renewable materials (Silva RV et al., 2008). Originally, natural fibers are classified as flora and fauna based. The mechanical and physical properties of hybrid and carbon composite were quite same while natural fiber appeared a quite low quality result. This concept of hybridisation is effective if the natural fiber composite in terms of reducing water absorption.

The usage of natural fibers in various purposes gives researchers more confront of developing suitable techniques to get high properties of the fibers that are required by the common, for them to use as reinforce polymer composites. Comparing synthetic and fiber natural fiber reinforcing composite found that natural fibers were very useful for industrial purposes (Nuna S. et al., 2012). Hybrid composite has proved the balancing effect of the fibers. There are many studied revealed on hybridisation of synthetic-synthetic fiber, natural-natural fiber and natural-synthetic fiber (Anuar, H. et al., 2008). However, it is realised that research

study on the kenaf-carbon hybrid reinforced polyester resin composite has not being done by other researchers. Hence, the primary purpose of this research is to studies on properties of the hybrid reinforced composite using carbon fiber and kenaf fiber that using less synthetic fiber at the same time maintained the properties of synthetic fiber. The scope of the studies is including manufacturing of the hybrid composite, mechanical, and physical properties of kenaf-carbon fiber reinforced composite.

1.3 OBJECTIVES OF RESEARCH

1. To study the preparation of making hybrid composite kenaf-carbon fiber composite.
2. To discover the mechanical and physical properties of new hybrid composite of kenaf-carbon hybrid composite.

1.4 SCOPES OF RESEARCH

Hybrid composite by using hybridisation of natural and synthetic fibers is a new research area which is more towards the green environment that using less synthetic fiber at the same time maintained the properties of synthetic fiber. Among the natural fibers, kenaf fibers are better displayed and excellent properties for reinforcement in a composite such as light weight, relatively stronger, safer towards health, cost effective and better formability but there are some limits such are water absorption, strength degradation and also lack in thermal stability that low impact property. Therefore, by combining with the carbon fibers from the synthetic fibers that are good in mechanical properties will produce excellent properties of the hybrid composite of synthetic fiber and natural fiber. Hence, this certain significant drawbacks can be enhanced and overcome by hybridisation with a combination of the natural and synthetic fiber. The combination between these two natural and synthetic fibers will gives the excellent result in the reinforced composite properties. Finally it is expected that utilization or usage of the hybrid composite can lead to better properties of kenaf-carbon fiber reinforced composites.