CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Nowadays, construction industries have been commonly used concrete as the main material to construct bridges, buildings, dams, highways and other structures. Concrete is known as a composite material contain of cement, water, fine aggregate and also coarse aggregate. The concrete can be cast up to 50 MPa, so it can withstand some of the natural disaster such as hurricanes and also earthquakes.

The new developments continue in the advance of concrete materials. There are many researchers used natural fiber as fibrous material to increase the concrete strength. The investigation has been carried out using several natural fibers as fibrous materials such as bamboo, banana, eggshell and also coconut fiber. In addition, the natural fiber is known to have good characteristic in increasing the flexural strength of the lightweight concrete and also in reducing the amount of waste. Nowadays, many studies had been done to utilize natural waste as additive in concrete mixture. As an example, the addition of coconut fiber significantly improved many of the engineering properties of the concrete in toughness and tensile strength (Yalley and Kwan, 2009).
Coconut fiber is a fibrous material found in fibrous husk of the coconut palm. From Ramakrishna studies in 2005, coconut fiber can enhance concrete and mortar, and proved to improve the toughness of the concrete and mortar. Yalley and Kwan (2009), found the addition of coconut fiber significantly improved many of the engineering properties of the concrete in toughness and tensile strength. So, used of fibrous material like coconut fiber as additive in concrete will produce high flexural strength concrete. The practice will also results in reducing the cost of raw materials which directly maximize the use of waste materials and it is also reduce the total cost of construction.

1.2 PROBLEM STATEMENT

As the year passing, the demands of the concrete have been increasing day by day. The problem that occur is the concrete is highly used in construction site which increasing the cost of construction. Besides that, it is also affecting the environmental problem in construction industry.

Agriculture waste material can be used to increase the flexural strength of concrete. The source of natural fiber as fibrous material are found in plant and they are readily environmental friendly as well as cheap. In addition, natural fibers such as coconut fiber an excellent potential to improve the properties of materials, and could be also used effectively to improve the performance of concrete.

To solve the problem from continuously occur, a study will be carried out to determine the use of an agriculture waste material which is coconut fiber as an additive in concrete mixture for construction industry. Coconut fiber used to minimize the construction cost, reducing the environmental problem and also maximize usage of waste materials.
1.3 Objectives of study

i. To determine the workability of concrete when added with 1% and 2% of coconut fiber in the concrete mixture.

ii. To determine the compressive strength of concrete when added with 1% and 2% of coconut fiber in the concrete mixture.

iii. To determine the flexural strength of concrete when added with 1% and 2% of coconut fiber in the concrete mixture.

1.4 Scope of study

This study was conducted to determine the strength of concrete added with coconut fiber. In addition, coconut fiber has an excellent potential to improve the performance of concrete. The scope of work mainly focuses on:

i. In this study, grade concrete 15 MPa using 0.55 w/c ratio were design. The mixture is contains fine aggregates, coarse aggregates, cement and water.

ii. Specimens of coconut fiber concrete will be added with two different percentages of coconut fiber (1% and 2%).

iii. This study will compare the strength of concrete between coconut fiber concrete and control concrete.

iv. The slump test will be carried out to determine the workability of concrete according to British Standard (BS EN 12350: Part 2 (2009)).

v. The compression test will be carried out to know the compressive strength of concrete according to British Standard (BS 1881: Part 116: 1983) and ASTM C 39-03. The size of cube that will be cast is 150mm x 150mm x 150mm for 27 cubes.

vi. The flexural test will be carried out to know the flexural strength of concrete according to British Standard (BS 1881: Part 118) and ASTM C 78-02. The size of beam is 100mm x 100mm x 500mm for 27 beams.

vii. The concretes will undergo curing process for 7, 14 and 28 days in water curing.