CHAPTER 1

INTRODUCTION

1.1 Background

Malaysian is a country that is rapidly developing from economically. Therefore, Malaysia must have a building and good infrastructure facilities to attract more investors to come to Malaysian. In order to meet the needs of the many building projects and infrastructure conducted, this will lead to a high demand for concrete.

Concrete is the basic material in the construction of a building. Concrete used to build the foundation, column, floors and more. Generally, the basic material for producing concrete is cement, fine aggregate, coarse aggregate, water and additives.

Coarse aggregate is one of the materials in design the concrete mix. It is a mixture of the base material where the content consists of three-quarters of design the concrete mix. Since the total quantity of aggregate in design the concrete mix is something large, then the strength and durability of a concrete depends on the characteristics of coarse aggregate itself. Among important characteristics of a coarse aggregate are the bond strength, compressive strength, size, shape, permeability and chemical inertness.

Furthermore, the physical properties of coarse aggregate is density, density friable, porosity, lush, soundness and resistance to acid attack and alkaline, which also affects the strength. Therefore, we also know the concrete strength will be reduced due to increase of water content in concrete design mix.
Nowadays, there are many studies that have been done to find suitable material to replace the coarse aggregate in the concrete mix. The use of waste material as a substitute to replace the coarse aggregate in the concrete mix can be beneficial to humans. Coconut is one of the alternatives that can be used to replace the supply of coarse aggregate.

Coconut is grown in more than 93 countries. Southeast Asia is considered to be the origin of the coconut (Maninder and Manoreet, 2012). Malaysian has around 646,932 tons of coconut produced. The domestic demand for coconut produced taken in the form of fresh coconut, tender coconut, coconut oil and processed cream powders.

Malaysian has exported coconut and coconut products worth RM 466,210,137 and is willing to continue to grow with increasing global demand. However, it is also a major contributor to the pollution problem in the country as solid waste. Coconut shell affects serious disposal problems for the local environment. This solid waste can be used as potential or material substituents on aggregate in the concrete mix. Hence the aggregate replacement should be tested to ensure the use of appropriate or at least have the same properties as the existing aggregate.

1.2 Problem Statement

Since past, the construction industry in Malaysian increased. Therefore, the use of concrete will also increase because the concrete is widely used in building construction to make beams, floors, columns, slabs and more. A high demand on the concrete also will involve the growing demand for coarse aggregate.

In this situation, is not good if we just rely on one source of coarse aggregate demand as it was feared that the continued increase would cause a shortage and unable to cope with demand in the future. Therefore, some alternative must be established to cover the coarse aggregate demand in the future.

Of the results of the observations made, there are few studies conducted to generate an alternative of coarse aggregate. Mostly, an alternative of coarse aggregate
generated through waste materials such as concrete waste, tires, bricks destroyed and many others. Some of the results have been known from the previous study of student in construction industry.

For the purposes of this study, conducted on an alternative production of coarse aggregates from waste that will be used is coconut shell. Almost all Malaysians use coconut in cooking and coconut shells will usually throw away or burned. Coconut shell has the potential to replace the aggregate because the chemical composition is similar to wood. Coconut shells become hard and not easily deteriorate.

However, due to environmental issues recently and waste disposal are increasingly becoming important because we lack of natural resources and the lack of a place to dispose of waste. Besides solving the above problems, this study is to find alternative materials to replace the coarse aggregate and adjust with the objectives to be achieved.

1.3 Objective of Study

The research objectives of this study are:

i. Determine the compressive strength of coconut shells concrete.

ii. Determine the flexural strength of coconut shells concrete

1.4 Scope of Study

This study, focus on the alternatives coarse aggregate replacement from wasted materials of coconut shells. Coconut shells easily to get in Malaysia because mostly people use coconut in cooking and coconut shells are discarded or burned. Coconut shells easy to get in the market or a store that sells coconut milk.

Therefore, this study uses concrete grade C25 / 30 as standard mixture to control the percentage change of coconut shell as an alternatives coarse aggregate in the concrete. For this study, samples of concrete produced in the form of cubes and prisms.