

## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 BACKGROUND OF THE STUDY**

In many developed countries, due to the increasing cost of raw materials and the continuous reduction of natural resources, the use of waste materials is a potential alternative in the construction industry. This will have the double advantage of reduction in the cost of construction material and also as a means of disposal of waste. It can be used as building materials of high quality and can be used in construction in the near future.

Recycling or use of solid waste generated from most agricultural and manufacturing industries is very profitable. The anxiety about enormous waste production, resource preservation, and material cost has focused attention for the reuse of solid waste. Material recovery from the conversion of agricultural wastes and industrial wastes into useful materials has not only environmental gains, but may also preserve natural resources. It is desirable that a study on the use of various types of solid waste effective has received greater attention in the last few decades.

The palm oil industry in Malaysia accounts for more than half of the total world production of palm oil and is expected to rise again as a result of the increase in global demand for vegetable oil. However, it is also a main contributor to the pollution problems in the country, covering 2.6 million tons of annual production of solid waste in the form of oil palm shell (OPS) (M.N. Amiruddin, 1998). contributing to the many

environmental problems associated with diverse ecosystem (Tomas U. Ganiron Jr, 2013).

OPS are hard endocarp surrounding the palm kernel. Wide availability of resources is still not used commercially. The practice of burning waste disposal in the industry is usually done in a way that is not under control and many contribute to environmental pollution.

OPS are light and naturally-sized, they are best suited to replace the aggregate in concrete construction. Become hard and organic origin, they will not contaminate or leach to produce toxic substances when they are bound in a matrix of concrete. OPS concrete can be potentially used in concrete applications that require low medium strength such as path and infill panel for floorings and walls. The use of oil palm shell will cause lighter concrete because of the low density (Mannan, M. A and Ganaphaty, C, 2002).

One of the suggestions in the forefront has been the sourcing, development and use of alternative, non-conventional local construction materials including the possibility of using some agricultural wastes and residues as construction materials. As the natural fibres are agriculture waste, manufacturing natural product is, therefore, an economic and interesting option. Palm oil shows diversity in size, weight, shape and colour, depending on genetic diversity and maturity of the nut at harvest (Ohler, 1999).

## **1.2 PROBLEM STATEMENT**

The development of the industry intensified today has brought a lot of revenue and the rest of the industry such as oil palm shells. The rest of the industry should be dealt with a perfect or original use the rest of the waste material this by generating a new product.

Additionally, this natural raw material resources increasingly limited means of disposal is the need to have other alternatives to make natural material waste to useful materials. One way is by using the Palm shells to replace the course aggregate in concrete. However, the test needs to be done in advance against the concrete to make sure it went through the concrete specifications has been defined in terms of strength and long-term durability. Example, desert sand generally not suitable to use for

construction because the wind erosion of sand in the desert results in smooth and desert. The next problem is noise pollution from the quarry of sound emitted as a result of fragmentation of rocks to produce aggregate. With the availability of replacement of natural ingredients such as palm oil shell, then the use of the aggregate can be reduced and can reduce breakage of rocks on a hill and necessarily will reduce noise noisy as a result of bombs breaking and machinery used.

### **1.3 OBJECTIVES OF STUDY**

The main objective of this study is to determine the effectiveness of using oil palm shells in the product of concrete. The following are some of the objectives set to achieve the goals:

- (a) To determine the workability of concrete using oil palm shells as partial of coarse aggregate compare to normal concrete.
- (b) To determine the flexural strength and compressive strength of concrete using oil palm shells as partial of coarse aggregate compare to normal concrete.
- (c) To investigate the optimum percentage for oil palm shells concrete which affect the flexural strength and compressive strength.

### **1.4 SCOPE OF STUDY**

Scope of this study focus on the influence of using oil palm shells as partial replacement of coarse aggregate in concrete production. This study is also focusing on the characteristics of concrete grade C25/30 using Oil Palm shells as coarse aggregate in concrete material spare parts to replace the granite at a different percentage replacement 0%, 5%, 10%, and 15% of the coarse aggregate volume. Studies using the cube size 150mm x 150mm x 150mm and prism size 150mm x 150mm x 750mm. The study carried out for comparison with normal concrete made in terms of strength, workability, and mode of failure. C25/30. The concrete mix was using Composite Portland cement. The cube test and flexural test for concrete were tested within the range of 7, 14 and 28 days according to the curing period.