CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Concrete is a composite static material containing of aggregates, water and cement. Concrete has been created a long time ago for constructing various structures around the world, such as, buildings, bridges, dams and etc. Nowadays, some countries are undergoing rapid infrastructure development, thus increase the demand of concrete. As an example, the mass rapid transit project that are being construct in Malaysia required to use mass volume of concrete. The cost of concrete at these days are currently so high probably because of the increasing of demand. Besides, the strength of concrete is important to avoid the natural disasters, such as, earthquake, tsunami, tornadoes and flooding which may cause the people to get hurt or death. So, to overcome this problem, the cheap locally available waste material need to be adopt.

Nowadays, the construction industries have been searching the alternatives product that can help to minimize the cost of concrete. There are some waste material that have been identified which can help to reduce the volume of materials in concrete, such as, coconut shells, egg shells, and etc. Among of the waste material that have been identified, there are known to have good characteristic in increase the strength of the concrete which results in reducing the amount of waste and materials in concrete.

Oil palm is truly a golden crop of Malaysia. Oil palm is grown for its oils. As vegetable oil seed crop, the oil palm is an efficient converter of solar energy into biomass. Besides being a prolific producer palm and kernel oil, it also generates a number of residues and by product. The residues of oil palm industry are from the field and mill.
Palm kernel shells are one of the wastes from palm oil industry, which have long been used as fuel in boiler to produce steam and electricity for mill processes. Palm kernel shell is the hard shell of the oil palm fruit seed that is broken to take out the kernel used for extracting palm oil. Thus, it is the by-products of palm oil processing during which the palm oil is extracted.

1.2 PROBLEM STATEMENT

For thousands of years, sand and gravel have been used in the construction of roads and buildings. Today, demand for sand and gravel continues to increase. Mining operation, in conjunction with cognizant resource agencies, must work to ensure that sand mining is conducted in a responsible manner. Excessive instream sand and gravel mining causes the degradation of rivers and lowers the stream bottom, which may lead to bank erosion. Besides, depletion of sand in the streambed and along coastal areas causes the deepening of rivers and estuaries, thus enlargement of river mouths and coastal inlets. In addition, sand mining also lead to increase of sea level, saline-water intrusion from the nearby sea, and loss to the system.

To overcome this problem, this study will studied the feasibility of using the palm kernel shell as a partial replacement of fine aggregates to reduce the problems.

1.3 OBJECTIVES OF STUDY

i. To determine the workability of concrete when replace with 1%, 2% and 3% of palm kernel shell as a replacement of fine aggregates in concrete.

ii. To determine the compressive strength of concrete when replace with 1%, 2% and 3% of palm kernel shell as a replacement of fine aggregates in concrete.

iii. To determine the flexural strength of concrete when replace with 1%, 2% and 3% of palm kernel shell as a replacement of fine aggregates concrete.
1.4 SCOPE OF STUDY

Based on the objective, this study was conducted to determine the workability and strength of concrete when replace of fine aggregate with 1%, 2% and 3% of palm kernel shell. The scope of work mainly focuses on:

i. The experiments that will be conducted are slump test, compression test and flexural test.

ii. All the testing conducted will be follow British Standard.

iii. The compression test and flexural test will be conducted at 7 days, 14 days and 28 days to get the strength of concrete.

iv. The size of concrete cube will be 150mm x 150 mm x 150 mm.

v. The size of concrete beam will be 100mm x 100 mm x 500 mm.

vi. The cement-aggregates ratios will be 1:2:4, that means, one part of cement, 2 part of fine aggregates and 4 part of coarse aggregates.

vii. The size of palm kernel shell that used were passing sieve 2.36mm.

viii. The percentage of palm kernel shell that will be replace fine aggregate at 1%, 2% and 3% replacement by volume of fine aggregate.

1.5 SIGNIFICANCE OF STUDY

This research will be carried out to examine the feasibility of using the palm kernel shell as a partial replacement of fine aggregates in concrete. This research also determine the workability, compressive strength and flexural strength of concrete when replace with 1%, 2% and 3% of palm kernel shell as a fine aggregates in concrete in order to reduce the demand of sand and the effect of sand mining to ecosystems.