CHAPTER 1

INTRODUCTION

1.1 Background

Lightweight concrete is the current trend in construction to make the concrete lighter than the regular concrete. By using the lightweight concrete in construction, it may reduce the construction cost in term of transporting the goods and also reduce the duration of the construction work. Concrete is the mixture of cement, fine aggregate, course aggregate and water. A lot of additional material had been identified to produce the lighter concrete mix. Sawdust is one of the additional materials that can be substitute with coarse aggregate to produce a lighter concrete. By using sawdust as the substitute for coarse aggregate, the concrete can be utilized to promote the green and sustainable environment.

1.2 Problem Statement

The mixing of sawdust concrete requires a lot of water and affects the hardening time because it has high rate of water absorption. The addition of cockleshell as concrete material will affect the increasing the strength of concrete. By adding cockleshell powder can also improve mechanical strength of concrete due to the existence of calcium carbonate in cockleshell (Muthusammy and Sabri, 2012). By adding the lime to the sawdust concrete, it should neutralize the acid constituents of the wood and prevent a possible effect that might have on the hydration process of the cement. (Johnson et al., 1930). From the previous study, water curing method shown that it is not suitable for the sawdust concrete. The method of casting also gives the impact for the compressive strength of sawdust concrete. Moreover, by using manual
casting, the compaction that carried out by hand rodding or tamping sometimes does not completely remove the air bubbles during the casting method. Nevertheless it is important to do a pretreatment process to the sawdust.

1.3 Objectives

The important point of this study is to determine the compressive strength of the sawdust concrete sample and the mixing of additive material in sawdust concrete mixtures. The objectives of this study are:

i. To determine the compressive strength of sawdust lightweight concrete between the treated and non-treated by using lime as the pretreatment.
ii. To determine whether soil can improve the brittleness of sawdust concrete or not.
iii. To study the effect of adding cockleshell as an additive on the strength of sawdust lightweight concrete.

1.4 Scope of Study

The foremost thing of this study is to determine the compressive strength of the sawdust lightweight concrete. The pretreatment process and adding the soil to improve the brittleness of the sawdust lightweight concrete is tested. Concrete that having the higher strength will be tested by adding the cockleshell as an additive into the concrete mix. In this study, the sawdust will be used as the concrete mixture instead of course aggregate.

i. Prepare the control mix specimen of 1:1:3 (by volume) of cement, sand, sawdust to determine the compression strength of specimen sample.
ii. The ratio of cockleshell amounts of cockleshell that will be add are 0.33, 0.67 and 1.00
iii. 42 cube samples will be produced. Six sample of each as three for seven days and three for 28 days which are listed below will be produce:
a) 1:1:3 control sample (cement: sand: non-treated sawdust)
b) 1:1:3 treated sample (cement: sand: treatment sawdust)
c) 1:1:0.5:2.5 (cement: sand: soil: non-treated sawdust)
d) 1:1:0.5:2.5 (cement: sand: soil: treated sawdust)
e) 1:1:0.5:2.5:0.33 (cement: sand: soil: non-treated sawdust: cockleshell)
f) 1:1:0.5:2.5:0.67 (cement: sand: soil: non-treated sawdust: cockleshell)
g) 1:1:0.5:2.5:0.10 (cement: sand: soil: non-treated sawdust: cockleshell)

iv. Pre-treat the sawdust with lime solution before the casting process.
v. The cube will undergo cube production by compaction.
vi. For the curing process, it will be the saturated wet covering method (covering with wet gunny sack)
vii. The compressive strength value will be taken at day 7 and day 28.

1.5 Significance of Study

The expected outcome of this study is the potential of sawdust as the replacement of coarse aggregate to produce brick concrete for structural construction. The additional of cockleshell in the sawdust concrete mixture will give the positive result of the concrete strength of the concrete.