CHAPTER 1

INTRODUCTION

1.1 Background

During this era globalization, there a lot of extreme construction works all over the world. The construction industry has come up as a reference to show the growth of the economics of the country. In Malaysia, the construction industry has increased due to the foreign investment by build the commercial and residential property. Therefore, there are pros and cons in this industry, which are the pollution is the biggest problem that occurs widely. One of them, is the environmental pollution that will produce when the production of waste materials is increasing rapidly from day to day. As an example, nowadays sawdust is very abundant in the country (Paramasivam and Loke, 1980). Researchers have state that the quantity of sawdust are produce annually all over the world (Arends and Donkershoot-shooq, 1985). The pollution that arises during the manufacture of materials and products.

Malaysia as an emerging country also has no exception to receive new technology in the construction industry. Therefore, the making of lightweight cement sand brick that contain sawdust could be classified as waste material. Waste and their disposal have become enough substances of environmental concern worldwide especially when these waste are biodegradable to useful goods and services. So, by recycling these waste as building material, it can make solution to the increasing problem economic design of the building that cause the health and environmental. Clean sawdust without a large amount of bark has proved to be satisfactory. This does not introduce a high content of organic material that may upset the reactions of hydration (Neville, 2000). As a result, by utilizing sawdust as partial sand replacement in cement sand brick, it can be solved the problem of fine aggregate shortage and environmental problem can be reduced indirectly.

Sawdust is an industrial waste in timber industry. Malaysia has a massive demand on timber. Therefore, each year of the timber exportation is in large scale, although the production of logs decrease per year (MTIB, 2012). The rate of the timber production in Malaysia are equals to the rate of sawdust production (MTIB, 2012). Thus, the relation between timber and sawdust were observed which is the more timber produced, the more sawdust is occurred. So, there have an impact of sawdust to environment. The non-utilization of sawdust can create the disposal problem which can cause environmental concern (Ogunsawo, 2001). Therefore, the researchers suggest that finding an appropriate use of sawdust would help to reduce production costs and increase the profitability of saw milling operations (Zziwa, et al, 2006).

1.2 Problem Statement

Disposal of abundant agro-waste is a global problem especially in Malaysia. Most wastes are currently disposed in sanitary landfills or open dumped into uncontrolled waste pits and open areas (Turgut, 2007). Sawdust is a by-product of wood, which produced from sawing of timber. It also are generally discarded as waste and so is not utilized. Researchers have observed that the large quantities of sawdust can be found around sawmills and wood based industries (Badejo and Giwa, 1985). In order to dispose of the large sawdust hills around sawmills, that constitute visual blight to local environmental and also cause environmental pollution. Many sawdust burning produces smoke and offensive gases like carbon dioxide and carbon monoxide which are hazardous to human health.

On the other hand, sawdust without a large amount of bark can be usable as sand or fine aggregate replacement material. Sand is used for all kinds of things especially for construction projects due to its. The increasing demand of sand cause the environmental pollution such as sand dredged and people do not know where to throw it because it will cause higher charged when throw in the landfill. Economic development and human development efforts are increasingly constrained by environmental concerns, including degradation of forests and fisheries, lack of fresh water resources, and poor human health as a result of air and water pollution, largely resulting from human activities.

Sand mining is the process of sand and gravel where it becoming an imbalance ecosystem as the demand for sand increase in industry and construction (Ghose, 1989). It seems there are no strict rules to govern soil extraction. Deep and wide pits are left when pit sand and gravel are collected, riverbeds widen and deepen after removing river sand, affecting aquatic while gravel removal destroy ecosystems, forests and agricultural land. There seemed to be a problem of environmental alteration, ecosystem and agricultural land destruction as well as riverbed and bank degradation due to excessive removal of pit sand, river sand and gravel which prompted the researcher to investigate the depth of these environmental impacts.

1.3 Objectives of Study

The objective of this research is to look the performance of the sawdust cement sand brick. The specific objectives are follows:-

i) To investigate the compressive strength of cement sand brick containing sawdust as partial fine aggregate replacement.

ii) To investigate the flexural strength of cement sand brick containing sawdust as partial fine aggregate replacement.

iii) To determine the water absorption of cement sand brick containing sawdust as partial fine aggregate replacement.

1.4 Scope of Study

The scope of study basically to investigate the mechanical properties of cement sand brick containing sawdust as partial sand replacement. Two types of mix will be prepare in this research which is sawdust cement sand brick and plain cement sand brick as comparison purpose. Plain cement sand brick will be prepare as control and sawdust cement sand brick will have five samples with different percentage to be casted. The raw sawdust that is being used is actually from Gambang, Kuantan. The target characteristic strength of 3.45 N/mm^2 at 28 days of water curing. The size of cement sand brick is 215mm x 102.5mm x 65mm (BS 3921).

The mix proportions of cement and sawdust in the ratio is 1:5 by the volume of brick. The water ratio that will used in this study is 0.7 by the cement. Water curing is