CHAPTER 1

INTRODUCTION

1.1 Introduction

Sand mining is of great importance to the Malaysian economy. The processes of prospecting, extracting, concentrating, refining and transporting minerals have great potential for disrupting the natural environment (Rabie et al,. 1994). Sand mining activity also will deepen the river and can cause many environmental problems. Stream sand mining resulted in channel degradation and erosion, head cutting, increased turbidity, stream bank erosion and sedimentation of riffle areas (Rabie et al,. 1994). Therefore, something should be done to minimizing sand mining activity to ensure that the environment is protected.

The waste clay brick are usually can come in different ways. Some are from the industries during and after the production process as a result from human mistakes. Other than that, it also can come from the destroying old building and in construction project. The result from both can finally form the large of waste material. One of the waste construction materials that have been identified is the waste clay brick. Waste clay brick able to provide high permeability and absorption on the durability performance of lightweight concrete (Mohamed, 2014). Therefore, the used of waste material like waste clay brick need to be done as alternative to partial sand replacement and this is also can approach to avoid the waste clay brick end up as waste products.

1.2 Problem statement

Since the sand mining activity have increase and have a great impact to the environmental. According to government report in 2011 disclosed that 1,036 permits were issued in 11 states for the extraction of sand and gravel amounting to a total 37,339,082 tonnes and in 2007, 22,369,000 tonnes of sand were extracted based on 887

permits (Shankar, 2013). In order to reduce the sand mining activity, one of the methods is to recycle the waste material like waste clay brick as partial sand replacement. Other than that, this method also can replace some quantity of sand in the concrete since the sands that dredge from the river can deepen the river and can have many environmental problems. Sand mining also will badly effect environment if to overly dependence on river sand as construction material. Waste clay brick are normally dumped as waste by the contractor at the construction project. Therefore the research of waste material like waste clay brick as a partial sand replacement needed as alternative to reduce sand mining and also can approach to avoid the wastes clay brick end up as waste products.

1.3 Objective

This study is conducted to achieve the following objective:

i) To investigate the effect of clay brick waste as partial sand replacement on workability of the concrete.
ii) To investigate the effect of clay brick waste as partial sand replacement on compressive strength of the concrete.
iii) To investigate the effect of clay brick waste content as partial sand replacement on flexural strength of the concrete.

1.4 Significance of research

The knowledge obtained from this study will enlighten the society about the use of recycled materials for concrete production. This research also aims to minimize the dependency of Malaysia construction to sand mining in production of concrete since our construction is keep increasing in upcoming years. From this research, we also are able to discover the performance of concrete containing waste clay brick as partial sand replacement. The information is expected to contribute better understanding on workability, compressive strength, and flexural strength of concrete that contain waste clay brick as partial sand replacement.

1.5 Scope of study

This study concentrate on the behaviour of concrete subjected to various percentages of wastes clay brick as the partial sand replacement. Fundamentally, this research is focusing on investigating the effect of waste clay brick content as partial sand replacement material. The concrete is tested to the workability, compressive strength, and flexural strength. At the first stage of study, the plain concrete is produced as a control specimen. The mix design of plain concrete consists of only Ordinary Portland Cement (OPC), water and sand. Then, there are five sets of mix consist of OPC, water, sand and various contents of waste clay brick as partial sand replacement.

The percentage of waste clay brick that used as partial sand replacements were 10%, 20%, 30%, 40%, and 50%. The concrete is casted and poured into mold. The mixes are conducted for 7, 14 and 28 days by water curing and three samples for each test. After subjected to water curing, compressive strength and flexural strength test will be conducted to determine the best performing percentage of waste clay brick.

1.6 Layout of thesis

Chapter one contains the introduction and problem statement of the research. The objective, significance and scope of research were also highlighted to describe the purpose of research. Chapter two elaborates about the characteristics of waste clay brick and it influence on concrete. In this stage, all the data will be collected about the effect of sand mining and the waste clay brick as waste in Malaysia.

Chapter three describes the experimental details. The methodology begins with the elaboration on the preparation of material such as waste clay brick and then followed by the concrete preparation according to mix design. At the end of this chapter, the discussion of the testing method adopted in order to investigate the performance of the brick due to its workability strength, compressive strength, and flexural strength.

Result obtain from the experiment conduct will be discuss in chapter four. The mass of the hardened concrete is discussed in early part of this chapter 4. This chapter also will discuss about workability strength, compressive strength, and flexural strength