CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Nowadays, world organization are getting more concerned about environmental management and construction industry are also not an exception to this. Waste is one of the biggest treat to environment and if it does not been manage wisely, it may cause negative impact in the future. Waste can come from many sources and the largest waste come from industrial waste. Malaysia is an industrial country and one of the biggest industry in Malaysia is palm oil industry. According Malaysia Palm Oil Board (MPOB, 2015), Malaysia palm oil industry produces about 90 million tons of palm oil in 2014. Large number production come with large number of waste. One of the waste produced is palm oil clinker (POC).

Palm oil clinker considered as a by-product waste produced from burning of palm oil fibre and oil palm shell inside the boiler under high temperature in order to generating steam engine for extracting palm oil (Abutaha et al, 2016). Physically palm oil clinker (POC) are porous, grey in color, irregular in shape and much lighter compare to normal aggregate (Kandasan and Razak, 2015). POC can be found in large quantities and have small commercial value in Malaysia. Hence, this industrial waste can be converted into
potential construction material and one of the suggested material that can be replace by POC is sand. Sand is one of the material that largely used in construction industry and due to high demand of this material, the price for sand has been increases lately. Using POC as a potential sand replacement might be a positive move for construction industry since the price for POC is cheaper compare to natural sand and at the same time able to preserved the environment.

1.2 PROBLEM STATEMENT

Awareness of an environmental problem of waste disposal and high demand toward construction material like natural sand are a proof that construction industry need to find and accept partial material replacement especially from recycle material or waste material. Using a waste material in construction industry is one of the right ways to ensure that waste material been manage correctly and it does reduce the area to dispose waste material. Palm oil clinker (POC) is one of the waste material that is available in Malaysia. Around 2.6 million tons of solid waste was produced annually by the palm oil industry which mostly composed of POC and palm oil shell (Basri et al., 1999). With amount of palm oil industry are expected to increase in the future, using POC as an alternative construction material is a right step to preserve the environment.

Reducing the number of natural sand used is also one of the ways to preserve the environment since natural sand is obtaining near river and it is not a renewable material. Overuse of natural sand from river can causes river channel degradation and erosion, head cutting, increased turbidity, stream bank erosion and sedimentation of riffle areas (Kondolf, 1993). Thus, study on uses of palm oil clinker (POC) as an alternative sand in brick industry with a view of effective utilization of the resources and environmental protection is necessary. In order to examine the effectiveness of POC as a partial sand replacement in cement sand brick and it applicability, few lab testing were conducted and the result will be compare with plain cement sand brick.
1.3 **OBJECTIVE**

This study is conducted to achieve the following objective:

i) To investigate the effect of palm oil clinker content as partial sand replacement on compressive strength of cement sand brick.

ii) To investigate the effect of palm oil clinker content as partial sand replacement on flexural strength of cement sand brick.

iii) To investigate the effect of palm oil clinker content as partial sand replacement on water absorption of cement sand brick.

1.4 **SIGNIFICANCE OF RESEARCH**

Study about this knowledge will enlighten the society about the use of waste materials for brick production. This study will give a further information about using palm oil clinker (POC) as partial sand replacement in the production of cement sand bricks. This study will contribute to green technology development in Malaysia. Succeeding in this research will decrease the number of sand mining activity thus as the same time preserved the environment. The information is expected to contribute to better understanding about the behavior of the brick contain POC that acts as a partial sand replacement.

1.5 **SCOPE OF RESEARCH**

This study concentrate on the behavior of brick that contain various percentage of palm oil clinker (POC) as the partial sand replacement. The test covered about compressive strength, flexural strength, and moisture absorption of the brick. Two types of mixes were prepared during this study and the mixes are control mix and modified mix. The control mix consist 0% of palm oil clinker with 100% used of natural sand. The modified mix consist varies percentage of palm oil clinker.