CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Rapid development causes insufficient of natural sources which increased demand on construction materials. Therefore, construction industry need to find alternative material from natural sources or industrial waste which can be use as construction material. Introducing waste material in concrete will improved some mechanical and chemical properties of concrete. Waste materials such as wood chipping, paper mill, crumb rubber, broken glasses, silica fume, blast furnace slag and coal fly ash were used in concrete (Eurocode2, 2003). In year 2000, Aldridge found that palm oil clinker crushed materials as partial replacement of aggregate can be useful mixture.

Palm oil clinker is a waste from palm oil industry and normally dumped without wisely used. Malaysia plays big role in this palm oil industry and produces largest amount of palm oil products as well as its waste.

Studies found that lightweight concrete can be produced by using Palm Oil Clinker (POC) as an aggregate. The mechanical properties of POC was alike the normal aggregate. The POC was crushed and sieve to obtain desired particle size. Particles with size less than 5 mm are considered as fine aggregate and particles with size in the range of 5 mm to 14 mm are considered as coarse aggregate. The compressive strength of Palm Oil Clinker Concrete (POCC) is more than 17 MPa and meet the requirement for structural lightweight concrete as stated in ASTM: C330 (Bashar S. Mohammed, 2013).
The change in concrete properties due to high temperature depends on the type of coarse aggregate used. The cause aggregate in concrete can be classified into three types. The first type was carbonate aggregates include dolomite and limestone. The second type was siliceous aggregate include materials consisting of silica and include granite and sandstone. The third type was lightweight aggregates are usually produce by heating shale, slate, or clay. The weakness of the concrete is, it lost is compressive strength when expose to fire. The percentage of losses depend on temperature and hours of burning. Lightweight concrete has a potential to be use as non-load bearing structural element such as a dividing wall in a building and it will directly expose to the high temperature during fire.

Fire resistance can be defined as the ability of structural elements to endure fire or to dive protection from it. This embrace the ability to confine a fire and also to continue to perform a given structural function. Fire resistance classification is defined as the duration of time that an assembly of floor, beam column and roof that can withstand a standard fire as defined in ASTME 119.

The fire-resistive properties of building components and structural assemblies are determined by fire test methods. The most widely used and nationally accepted test procedure is that developed by the American Society of Testing and Materials (ASTM). It is designated as ASTM E 119, Standard Methods of Fire Tests of Building Construction and Materials. A standard fire test is conducted by placing a full size assembly in a test furnace. Floor and roof specimens are exposed to a controlled fire from beneath, beams are exposed from the bottom and sides, walls from one side, and columns are exposed to fire from all sides. The temperature is raised in the furnace over a given period of time in accordance with ASTM E 119 standard time-temperature curve. The assembly is evaluated for its ability to contain the fire by limiting flame spread and heating of the unexposed surface while maintaining the applied load. The assembly is given a rating, expressed in hours, based on these conditions of acceptance, (Eurocode 1: Part 1-2)

This study, about compressive strength of POCC were expose to five various burning temperature for an hour. In other hand, to determine the optimum burning temperature on POCC by compressive strength lost after burning process.
1.2 OBJECTIVES OF STUDY

The objective of this study are:

i) To determine the strength of palm oil clinker concrete (POCC) when exposed to five different burning temperature.

ii) To determine the lost in compressive strength of POCC after exposed to fire.

1.3 PROBLEM STATEMENT

Nowadays, construction industries having a lot of revolution in using of light weight concrete. There are many researches have been done in order to find renewable materials to replace the original materials used in concrete. POC one of the new renewable materials used to replace fine and coarse aggregates.

Course Aggregate the main ingredient in concrete provision because it demands rising in construction field therefore, in future the source may runoff by fully used (Jan Philip Plog, 2015). POCC came as a solution for this complication but before it been used in construction field some test need to satisfied the requirement for an example the compressive strength of POCC due to various burning temperature and also the losses in compressive strength of POCC.

1.4 SCOPE OF STUDY

This study will focus on laboratory test to determine the compressive strength of POCC due to different burning temperature and to determine the lost in compressive strength of POCC after exposed to fire Table 1.1 shows the summarize of sample and tests were done in this project.

i) According to Rasel Ahmmad, 2015 the POCC replace the coarse aggregate by 100%.