

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Concrete is a material that widely used in the construction as a primary materials for buildings and also special structures for special purposes, such as nuclear reactors or chimneys. It is possibly exposed to an unexpected fire of extreme temperatures. As the concrete had been used for a special purpose, there is increasing of risk of exposing it to a high temperatures. The physical properties such as colour and mechanical properties such as strength and performance must have some changes. The chemical composition of the concrete also change considerably. The strength of concrete reduce with increasing of temperature and rate of strength loss is influenced by compressive strength of the concrete.

Generally, concrete may provides the best resistance properties towards fire of any building materials. This good resistance is due to materials of concrete used which when they react with fire, the materials will has high heat capacity, low thermal conductivity, and also has low strength degradation with temperature. This low rate of heat transfer and loss of strength will enables the concrete to act as an effective fire resistance to protect itself from damage of fire and also between adjacent spaces. When a high temperature is subjected to a concrete structure, for example a building on fire, it is necessary and required that the people inside the building can leave safely before the structure of the building collapse.

1.2 PROBLEM STATEMENT

Depletion of natural fine aggregate has lead to production of concrete containing laterite sand as partial fine aggregate replacement. Laterite sand can be used as partial fine aggregate replacement in concrete. However, the effect of using laterite aggregate as partial fine aggregate replacement towards fire resistance is unknown. In this project, laterite rock is used as a partial fine aggregate replacement in concrete to see what will happen on physical and compressive strength properties when the concrete is subjected to an elevated temperature.

1.3 OBJECTIVES

The objectives of this project is :

- i. To study the effect of elevated temperature on physical properties of concrete containing laterite rock as partial fine aggregate replacement.
- ii. To identify the compressive strength properties of the concrete containing laterite rock as partial fine aggregate replacement.

1.4 SCOPE OF STUDY

To reach the objectives of this project, several analysis and testing were carried out in the laboratory to get the results. Variables of this project are temperatures and contents of laterite rocks used as partial fine aggregate. Two types of mix have been used that is plain concrete and laterite concrete of various percentage of laterite aggregate. The samples size about 150 x 150 x 150 mm were heated in the oven with different elevated temperatures from 28°C to 800°C for one hour. The changes in properties of samples for every temperatures were identify. Water cooling method were used to cool down the specimen after heating in the furnace.

1.5 SIGNIFICANCE OF RESEARCH

Concrete have a high probability to expose to an extreme or very elevated temperatures. The properties and behavior or the concrete at elevated temperatures also important to predict the safety of a building in particular conditions. The performance of laterite concrete elements used in a building such as columns, beams, and slabs that subjected to high temperatures would be known. This is why it is important to understand the effect of elevated temperatures on physical and compressive strength properties of the concrete containing laterite aggregate.