CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

In accordance with conservation efforts, this research focuses on ceramic tile waste as partial aggregates replacement for concrete production prevention of environmental pollution and considers the elements of sustainable and cost-saving construction projects, especially material usage. As a developing country, construction sector is one sector that can build our economy and produce successful contractors. Despite this industry brings a lot of advantages to the country such as creating more job opportunity and brings a positive economic growth, but there are some issues that need attention from the public as well. Most of the construction and demolition waste in our country are not recycle but end up in landfills occupying valuable land not to mention the cost incurred in landflling (Wen, 2007). However, many of the construction industry in Malaysia produce construction waste that contributes largely of solid waste. In general, solid waste material is a result of the construction work waste material or residual results from renovation of the building such as stone, wood, iron, cement and other waste materials. This research will focused on ceramic wastes obtained from the industry in Malaysia. Presently in ceramic industry the production goes as waste, which is not undergoing the recycle process yet. Conventionally, the coarse aggregate used in concrete productions are gravel, crushed stone, granite, and limestone.
1.2 PROBLEM STATEMENT

The demand of construction materials for project is increasing. Therefore, there is a need to explore alternative building materials from industrial waste materials that can be recycled. Ceramic tiles are often discarded as waste after defined as useless. But it can be recycled and can be used as a construction material in present world which is seeking for alternative construction materials which are economical, environment friendly as well as provides same quality as that of a normal aggregate made of regular aggregates (Jalali, 2010). Ceramic wastes can be used safely with no need for dramatic change in production and application process.

1.3 OBJECTIVES OF STUDY

This study was conducted to achieve the following objectives:

i) To study the strength developments hardened concrete with waste ceramic coarse aggregate.

ii) To determine the effect of various percentage of ceramic waste as partial coarse aggregates replacement towards compressive strength of concrete.

iii) To determine the water absorption of ceramic aggregate concrete containing various content of ceramic tile as partial coarse aggregates replacement material.

1.4 SCOPE OF STUDY

Ceramic tile waste use in this research was taken from old site factory. The scope of concrete use is in Malaysia construction industry. The experiment is only limit to five lab tests, Slump test, compression test, ultrasonic pulse velocity test, Rebound hammer test and water absorption test.

Slump test is used to determine the correct hydration of a batch of concrete. The slump is the distance the wet concrete settles after the slump cone is lifted off. It is essential test to test the workability of fresh concrete, this test very useful in detecting
variations in the uniformity of a mix of given nominal proportions. All of the specimens were subjected to immerse in water tank for curing process for being test. Compressive test is to determine the strength of the concrete cube at the 3rd, 7th and 28th day of the casting period. The value obtained from the test must be higher than the standard specified strength for the concrete cube to pass.

Non-destructive test also need to be carry out (rebound hammer test and UPV test). Then, graph that plot from these tests need to be analyze to know the optimum percentage of Ceramic tile waste used in ceramic concrete.

Ultrasonic pulse Velocity test basically consists of transmitting the mechanically generated pulses through concrete cube with the help of electro-acoustic transducers and measuring the velocity of the longitudinal waves generated by the applied pulses. UPV can be correlated to much desirable information pertaining to concrete, such as elastic modulus, strength and uniformity of concrete.

The main reason of water absorption is to determine the water characteristics in ceramic concrete compare to typical concrete or control concrete.

1.5 SIGNIFICANCE OF STUDY

There are many inquiry and study that had carried carry out to improvise the quality of concrete production and to create various types of concrete that will be used for different purposes according to its suitability. Many researches had been conducted to intensify the quality or properties of the regular concrete by mixing or adding other materials into the natural conventional concrete. For this study, ceramic tile waste is used as partial coarse aggregates replacement to natural coarse aggregates. The study is essential because the proposed material to replace coarse aggregates is waste product from construction. If ceramic waste is suitable, it can be used in concrete production. This will reduce the waste material from construction as ceramic tile waste can be recycled for concrete production purposes. Besides, we can cut down the uses of natural aggregates that are produced from quarrying process which is non-environmental process and harmful to environment. The concrete's production cost can be reduced because the alternative material is waste material that is very low in cost.