ABSORPTION AND STRENGTH OF CONCRETE CONTAINING OF WOODBLOCK AS PARTIALLY COARSE AGGREGATES

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Thesis submitted in fulfillment of the requirements for the award of the Bachelor Degree in Civil Engineering

Faculty of Civil Engineering and Earth Resources
UNIVERSITI MALAYSIA PAHANG

JAN 2019
ACKNOWLEDGEMENTS

By the Name of Allah, Most Gracious, Most Merciful. Thankful to Allah on the consent that has been given to prepare this thesis and It is hoped that all the knowledge acquired and learned throughout this study will be blessed by Allah S.W.T.

Firstly, I would like to thank Allah upon his blessing in giving me opportunity to complete my final year project in Universiti Malaysia Pahang. I would also like to thank my biggest supporter especially my family and friends who always by my side through thick and thin and always believe in me in completing this project.

Thank you very much to my supervisor, Puan Ezahtul Shahreen Ab Wahab and my Co supervisor, Puan Roslina Omar on the guide, ideas and time spent over the course of time completion of this project. This project will never be in completion or be presented if not by them guidance and encouragement.

Next, I wished to express my sincere gratitude to all the staff FKASA concrete laboratory En. Nurul Fakhri, En Hafiz and En Fadhil for helping me carried out my experiment in the lab. Lastly, I would like to thanks to my groupmates Nur Affini, Nurul Nadia and Siti Zul Norain who had help me to carry out the experiment together.
ABSTRAK

Recently, the use of high strength concrete is become increasingly popular in building construction. This is because concrete has a high strength to capture the load. However, a mixture of coarse aggregates is inaccessible and costly. Besides that, many researchers find the idea to overcome this problem by substituting another material to the concrete such a waste material especially wood and timber. The recycling of woodblock or wood Therefore, the study is to reduce the use of coarse aggregates and woodblock as a replacement of coarse aggregates. The woodblock obtain from the wood waste at the construction site and timber factory. This report shows the results of absorption and the compressive strength conducted on the normal strength concrete specimens 25 N/mm² containing 0%, 3% and 6% of woodblock by coarse aggregates weight. The period of curing of the concrete at 7 and 28 days. From the results of the compressive strength test and water absorption test for the replacement of coarse aggregates shows the 6% was the best results to replace it.
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<td>--------------</td>
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<tr>
<td>ASTM</td>
<td>American Society for Testing and Materials</td>
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<tr>
<td>BS</td>
<td>British Standard</td>
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<td>LWC</td>
<td>Light Weight Concrete</td>
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<td>OPC</td>
<td>Ordinary Portland Cement</td>
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<tr>
<td>PWP</td>
<td>Para Wood Particle</td>
<td></td>
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<td>RCA</td>
<td>Recycled Coarse Aggregates</td>
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<tr>
<td>RHA</td>
<td>Rice Husk Ash</td>
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<tr>
<td>RILEM</td>
<td>International Union of Testing and Research Laboratories for Materials and Structures</td>
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<tr>
<td>SSD</td>
<td>Saturated Surface Dry</td>
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CHAPTER 1

INTRODUCTION

1.1 Background Study

Concrete is a kind of composite material that is often used in construction. It is a combination of cement and aggregates such as sand, fine and coarse aggregates. These materials are added according to the specified mixing rates as specified.

Besides, concrete is one of the most important and most used building materials in a construction project. Therefore, the techniques used to produce good concrete need to be understood and carefully considered. The quality of the concrete produced depends on the quality of raw materials used such as cement, aggregates and water, mixing rate, how to mix, how to transport and how it is compressed. If the raw material used is no quality, then the resulting concrete will have a low quality and will result in the concrete being not strong and does not meet the specifications.

Concrete consists of several types which are normal weight concrete, high strength weight concrete and lightweight concrete. Normal weight concrete is concrete that has ingredient such as aggregates, water and cement. Basically, the development strength of the concrete starts after 7 days. In addition, normal concrete characteristics are strong in compression but weak in tension. High strength concretes are the concrete that has quality aggregates which are selected from the best materials and added with admixtures to strengthen the bond between cement and aggregates. Lightweight concrete is concrete which has substantially lower mass per unit volume then the concrete made of ordinary ingredients is called lightweight concrete. Usually, the
aggregates used in concrete is lighter or amount of the aggregate was reduced. This type of concrete suit for parapet wall, road lining and to reduce impose dead load.

Nowadays, lightweight concrete widely uses in many of construction because some of the lightweight concrete can bear load same with the high concentration concrete. some of the researcher want to produce sustainability concrete that can give benefit to human and eco-friendly to the environment.

1.2 Problem Statement

The construction industry is very rapidly developed in many countries especially countries that want to develop advance in their economy and others. For examples structure like skyscraper, tower, railway and others. Most of the building is construct because due to increasing growth of population. It gives high demand for construction materials such as cement, sand, gravel and granite. Gradually, the use of raw material decreasing due to the demand and one day it becomes the problem in the future to get the raw material such as sand, gravel and others. Next, in the recent research, wood waste was added as a supplement in concrete mix or as a replacement of ordinary Portland cement in concrete. Furthermore, the substitution of sand in the concrete is also important to study because of the depletion of raw materials. The replacement of sand by wood waste gives advantages of lightness and decreases carbon dioxide emissions in the field of construction.

However, the problem that identifies in woodblock aggregate is potentially incompatible with cement and wood to form a concrete. In this research, the percentage of woodblock aggregate influences the strength and water absorption in the concrete.

1.3 Objective of Study

The objectives of this research are:

i. To determine the properties of raw and coating woodblock as replacement material.

ii. To determine the initial and final water absorption of concrete using woodblock as partially coarse aggregates.

iii. To determine the strength of concrete containing different percentage of woodblock as partially coarse aggregates by using air and water curing.
1.4 **Scope and Limitation of Study**

The aim of this research to determine the durability and lifespan of the woodblock concrete. The woodblock will be used as aggregates substitute the coarse aggregates in this study. Ordinary Portland Cement (OPC) will use to produce a sample of woodblock concrete.

The ratio of the mixture based on concrete mix design to prepare the materials which are represented for water, cement and coarse aggregates. Therefore, the uses of woodblocks in the concrete mixture will be added according to the percent that will be used and at the same time percentage used of coarse aggregates will be reduced as a substitution. Replacement of woodblock as aggregates added in a mixture based on the percentage that fixed at rates 0%, 3% and 6%. The aim of replacement of aggregates woodblock is to identify the durability and the strength of the concrete.

1.5 **Significance of Study**

This study is based more on experimental is to identify the effective of woodblock concrete in building. While developing a new building material, it is hoped that the study will contribute to the process of developing more sustainable and affordable material that will have an easier impact on better housing and the fast delivery of housing to different income earners. The study aims to better understand the impact of housing expenditure on the affordability of housing in socio-economic groups, with the hope that it will contribute to the knowledge and appreciation of real housing conditions and lead to improved housing strategies.

Other than that, the environmental pollution it comes from waste material that cannot be sustained by landfill for the future. To save our world we have to generate idea to maintain our world in good condition. By using waste materials (woodblock, wood shaving and other waste material) in the production of the new and added value material, it offers a more sustainable approach to waste management practices that will be of immense environmental, economic and social benefit.
REFERENCES


