PROPERTIES OF CONCRETE CONTAINING COCONUT SHELL AS REPLACEMENT OF SAND

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by

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Report submitted in partial fulfillment
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ACKNOWLEDGEMENT

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APPROVAL AND DECLARATION SHEET

This project report titled Identification Properties of Concrete Containing Coconut Shell as Replacement of Sand was prepared and submitted by Mohammad Affiq Mohd Aminudin (Matrix Number: 101201614) and has been found satisfactory in terms of scope, quality and presentation as partial fulfillment of the requirement for the Bachelor of Engineering (Building Engineering) in University Malaysia Perlis (UniMAP).

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SIFAT-SIFAT KONKRIT YANG MENGANDUNGI TEMPURUNG KELAPA SEBAGAI GANTIAN KEPADA PASIR

ABSTRAK

Zaman sekarang, manusia semakin menitikberatkan isu kemapanan dalam bidang pembinaan. Maka, jurutera menkaji cara-cara untuk meningkatkan kualiti konkrit dengan menggunakan bahan buangan atau kitar semula. Salah satu cara yang dikaji ialah mencampurkan konkrit dengan tempurung kelapa. Dalam kajian ini, tempurumg kelapa- bahan buangan dari bahagian kelapa digunakan. Kajian ini dijalankan untu menentukan kekuatan fizikal konkrit dan juga kekuatan kejuruteraan konkrit untuk dibandingkan dengan konkrit biasa. Kajian akan ditambahkan dalam kuantiti 5%, 10% dan 15 % daripada berat pasir yang dugunakan. Ujian makmal yang dijalankan termasuk ujian kejatuhan konkrit, ujian ketumpatan, ujian serapan air dan ujian kekuatan mampatan. Semua ujian adalah merujuk kepada Status British (BS) kecuali ujian konsistensi normal yang merujuk kepada Status Amerika (ASTM). Saiz konkrit yang digunakan ialah 100mm x 100mm x 100mm dibuat untuk ujian permukaan dan warna, ketumpatan, serapan air dan kekuatan mampatan. Daripada ujian yang dijalankan, konkrit yang mengandungi lebih banyak nisbah peratusan tempurung kelapa mempunyai kebolehkerjaan yang lebih rendah. Bagi kekuatan mampatan, konkrit dengan 5% kandungan tempurung kelapa mempunyai kekuatan paling tinggi jika dibandingkan dengan peratusan yang lain tetapi masih lebih rendah daripada set kawalan. Dengan keputusan ujian mampatan sebanyak 30.197 MPa. Pengurangan nisbah memberi keputusan yang baik, konkrit yang mengandungi 5% boleh digunakan pada bahagian lantai binaan untuk menampung beban yang kecil.

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ABSTRACT

Nowadays, people are paying more attention on the sustainability in construction field. Therefore, the engineers are finding the ways to improve the quality of the concrete using recycle or waste product. One of the methods is to mix the coconut shell with the concrete. In this research, coconut shell-waste material from coconut part is used. The research sample are measured in physical and engineering and then compared to the standard concrete. Coconut shell was added in the proportion of 5%, 10% and 15% by weight of the sand. The laboratory test includes slump test, density, water absorption and compressive strength. All tests methodology is referring to British Standard (BS) except normal consistency test is refer to American Standard (ASTM). Concrete cubes of size 100mm x 100mm x 100mm were casted for colour and surface, density, water absorption and compressive strength. From test, it was found that concrete with higher percentages of coconut shell has lower workability. For compressive strength, concrete with 5% coconut shell content provides the highest strength with 30.197 MPa compared to the other percentages but still lower compared to the control set. Since the test show good result with reducing the ratio, the concrete of 5% can be used in the slab that support small load.

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TABLE OF CONTENTS

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Pages

Pages

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LIST OF TABLES

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LIST OF FIGURES

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LIST OF SYMBOLS, ABBREVIATIONS OR NOMENCLATURE

List of Symbols

CS Standard Concrete

C5 5% Coconut shell concrete replacement with sand

C10 10% Coconut shell concrete replacement with sand

C15 15% Coconut shell concrete replacement with sand

CaO Calcium oxide

SiO^2 Silicon dioxide

Al^2O^3 Aluminum oxide

Fe^2O^3 Ferric oxide

H_2O Water

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LIST OF EQUATION

Equation No		Pages
$\rho = m / V$	Equation Density of the Concrete Cube	23
$f_c = P/A$	Equation Compressive Strength	41

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