

**PROPERTIES OF MORTAR STRENGTH BY USING
FINE AGGREGATE PALM OIL CLINKER WITH
VARIATION OF WATER CEMENT RATIO**

by

JACKLINE MEDAN ANAK IKOM

Report submitted in partial fulfillment
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APPROVAL AND DECLARATION SHEET

This project report titled Properties of Mortar Strength By Using Fine Aggregate Palm Oil Clinker With Variation of Water Cement Ratio was prepared and submitted by Jackline Medan Anak Ikom (Matrix Number: 091200353) 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 Universiti Malaysia Perlis (UniMAP).

Checked and Approved by

**(EN.MD HADLI BIN ABU HASSAN)
Project Supervisor**

**School of Environmental Engineering
Universiti Malaysia Perlis**

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SIFAT-SIFAT KEKUATAN MORTAR DENGAN MENGGUNAKAN BATUAN HALUS KLINKER KELAPA SAWIT DENGAN VARIASI NISBAH AIR SIMEN.

ABSTRAK

Klinker kelapa sawit (POC) merupakan sisa-sisa terbuang dan berkos rendah boleh diperolehi dengan banyak, mempunyai potensi sebagai pengganti batuan halus dalam penyediaan dan penghasilan mortar. Kajian ini membincangkan kesan penggantian klinker kelapa sawit di dalam campuran mortar. Klinker kelapa sawit akan bertindak sebagai bahan pengganti untuk pasir dalam penghasilan mortar dengan kepelbagaian variasi nisbah simen air. Nisbah simen air yang berbeza dan yang paling sesuai untuk menguji kekuatan mampatan untuk menghasilkan mortar yang kuat. Terdapat empat pemalar dalam nisbah simen air yang digunakan dalam kajian ini iaitu pemalar 0.5 , 0.55 , 0.6 , 0.65. Setiap pemalar akan diuji dengan 5 sampel peratusan gantian klinker kelapa sawit iaitu 0%, 25%, 50%, 75%, 100%. Kepelbagaian peratusan klinker kelapa sawit dengan variasi nisbah simen air yang berbeza akan menghasilkan keputusan kekuatan mampatan yang berbeza. Hasil kajian ini menunjukkan bahawa kekuatan mampatan mortar memberi corak perbezaan dengan peratusan klinker kelapa sawit yang berbeza. Kajian ini menunjukkan bahawa mortar dengan kandungan peratusan klinker kelapa sawit yang berbeza dapat digunakan dalam industri binaan terutama untuk kerja-kerja pengabungan batu-bata dan juga proses pelepaan dinding. Kajian ini juga mendapati bahawa penggunaan klinker kelapa sawit sebagai bahan konkrit ringan.

ABSTRACT

Palm oil clinker (POC) is one of the waste material with a low cost that can found in the palm oil industry. POC has potential as a fine aggregate to replace the sand to produce mortar. This thesis was discusses about the impact of POC as a replacement material in a mortar mixture. POC will act as a substitute for sand in the production of mortar with water cement ratio variations diversity. The different of water cement ratio was used in this experiment to get the best result for compressive strength test. There was four different parameter to test the impact of the water cement ratio in the strength of mortar and the parameter is 0.5 , 0.55 , 0.6 , 0.65. Every type of parameter was test by using the different percentage replacement of POC. The percentage replacement of POC is 0%, 25%, 50%, 75%, 100%. The different percentage of POC with different variation of water cement content will produce different result of compressive strength. This thesis showed that the different percentage of POC with variation of water cement ratio can be used in the construction industry, especially for wall brick work and wall plastering work. The result was show that the POC can be used as a lightweight mortar and concrete.

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LIST OF SYMBOLS, ABBREVIATIONS OR NOMENCLATURE

ASTM	American Society for Testing and Material
ACI	American Concrete Institution
BS	British Standard
cm	centimeter
kg/m ³	kilogram per meter cube
LWC	Light Weight Concrete
mm	millimeter
NWC	Normal weight Concrete
N	Type of mortar 'normal strength'
N/mm ²	Newton per millimeter square
MPa	Mega Pascal
PCPC	Portland Cement Pervious Concrete
POC	Palm Oil Clinker
POCC	Palm Oil Clinker Concrete
w/c	Water Cement Ratio
%	percent

LIST OF EQUATIONS

Equation No.

- | | |
|-----|----------------------------|
| 2.1 | Water Cement Ratio |
| 3.1 | Compressive Strength |
| 3.2 | Percentage Water Absortion |

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