

UNIVERSITI TEKNOLOGI MARA

**THE RELATIONSHIP BETWEEN
STRENGTH, WORKABILITY AND
ACOUSTICAL PROPERTIES OF
CONCRETE BLOCK MIXED WITH
POFA AS A REPLACEMENT TO
CEMENT**

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of the requirements for the degree of
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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledge as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.


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ABSTRACT

The usage of agricultural waste in form of ashes as one of the constituent materials in concrete has been done through the years. Outnumber of research on this particular waste due to the existence of silica which can be classified into pozzolanic materials. Pozzolanic material is important to uphold the strength and durability of the concrete. This ash can easily be found at any palm oil mill in Malaysia. The objectives of this research are to evaluate the concrete compressive strength using POFA as cement replacement and to evaluate the performance of concrete blocks using POFA in term of sound insulation. This was done by correlating the relationship between the strength, water absorption and acoustic properties of concrete block using the same proportion of concrete mix. For this research, five different concrete mixture using OPC. Generally, there are four different percentages of POFA replacement in concrete mixture which are 2.5%, 5%, 7.5% and 10% respectively. For compressive strength test and water absorption test, the concrete are tested on 7, 14 and 28 days. The same mixture also was used to conduct sound transmission loss test and sound absorption test. The concrete mixture was designed according to British standard with water cement ratio of 0.45. for compressive strength test and water absorption test, 9 cubes size 100mm x 100mm x 100mm were tested on 7, 14 and 28 days each. Meanwhile, for sound transmission loss test and sound absorption test, 20 concrete blocks size 240mm x 190mm x 100mm were tested on 7, 14 and 28 days for each test. Not to forget the slump test also was conducted for fresh concrete test. This research reveals the usage of POFA in concrete mixture can improve the compressive strength test and acoustical properties specifically for sound insulation. But the usage of POFA in concrete mixture strictly must not exceed 10% as it will decrease the performance of the concrete strength.

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