

**CRACK BEHAVIOUR OF MORTAR
PRISM CONTAINING POFA AS
PARTIALLY SAND REPLACEMENT
USING ACOUSTIC EMISSION
TECHNIQUE**

NURUL SYAHIRAH BT NOOR RAZALI

**Bachelor of Engineering (Hons) Civil
(Infrastructure)
UNIVERSITI TEKNOLOGI MARA
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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 results of my own work, unless otherwise indicated or acknowledged as referenced work. This topic 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 Under Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

Candidate Name : Nurul Syahirah Bt Noor Razali
Candidate I.D. No. : 2017419704
Programme : Bachelor of Engineering (Hons) Civil (Infrastructure)
Faculty : Civil Engineering
Thesis Title : Crack Behaviour of Mortar Prism Containing Pofa as
Partially Sand Replacement Using Acoustic Emission
Technique

Signature of Author :
Date : SEPTEMBER 2020

ABSTRACT

Issues on preservation of natural river sand from being used excessively in construction industry has led to the efforts of utilizing palm oil fuel ash (POFA), a by-product from palm oil industry as partial sand replacement in production of mortar. Thus, this study investigates the strength of mortar containing POFA as partially sand replacement at 5% compared with plain mortar. As the common investigation on strength of mortar contain POFA by using compression test and flexural test give lack of data on crack behavior, a new characteristic of mortar contain POFA under 3-point loading using Acoustic Emission (AE) technique was utilized. The crack behavior of mortar prism was monitored by AE technique and AE signals were collected. AE characteristics of mortar specimen with 5% POFA as partially sand replacement and plain mortar were studied. The behavior of the mortar specimen was analysed by AE energy and AE cumulative energy. Outcome of this study shows that strength of 5% POFA contain in mortar was reduced compared to plain mortar. The AE cumulative energy of 5% POFA contain in mortar is higher compared to plain mortar. Thus, 5% POFA contain in mortar also give more brittle material than plain mortar. However, it was noted that there was strong connection and correlation between visual observation of crack behavior and AE signal strength. Significant of the finding was POFA as partially sand replacement in mortar can be apply for construction of infrastructure such as rigid pavement and drainage system. Meanwhile, using AE technique provide an early prediction on structural performance ensuring safety for public used.

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