

UNIVERSITI TEKNOLOGI MARA

**DEVELOPMENT OF UNFIRED CLAY
BRICK USING OIL BASED
TREATMENT SLUDGE (OBTs)**

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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 acknowledged as referenced work. This thesis has not been submitted of 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

Wastes or secondary products produce by manufacturing industries has a direct impact to the environment. The high increasing of these materials is not only give a burden to the industry, but also has adverse effects on the environment. The storage of such wastes remain at the disposal would pollute the air, water resource and agricultural fields. There is a huge opportunity for recycling and it uses large quantities of wastes to minimise the environmental impact. It can be solved by recycling an industrial waste into the construction components. The use of the industrial waste as a target material for the construction components (brick) is a practical solution to the management of wastewater sludge and to the environment. This research work reports on Oil Based Treatment sludge (OBTs) to develop unfired clay building materials for sustainable building construction. The research aim is to develop unfired clay bricks for sustainable construction components using Hydrated Lime, Portland cement (PC) and activated industrial by-product Ground Granulated Blast-furnace Slag (GGBS) to stabilise Laterite Clay (LC) and OBTs as a target material. The research has investigated the effectiveness of using OBTs as sustainable construction components (unfired clay bricks). This also include the evaluation on the physical and mechanical properties, and environmental properties and the scheduling of environmental profile the OBTs bricks. The brick specimens with dimension 215mm×102.5mm×65mm were manufactured in industrial scale by using conventional mixer and mechanical press at Majpadu Bricks Sdn Bhd, Klang, Selangor. These target materials were stabilised using Lime, Portland cement (PC) on its own and the combination of Ground Granulated Blast-furnace Slag (GGBS) to the lime and PC respectively at the ratio of 50:50 and 30:70, at 10%, 20% and 30% stabiliser dosage to the lime and PC respectively. The brick specimens were tested on 7 and 28 days of curing period. Compressive strength, flexural strength, water absorption, thermal conductivity and Toxicity Characteristic Leaching Procedure (TCLP) test were conducted and compared with the relevant standards. It was found that it is feasible to utilise OBTs as unfired bricks from the sustainable environmental point of view as it will conserve natural resource, protect the environment from waste disposal, and low carbon construction components.

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