UNIVERSITI TEKNOLOGI MARA
PERAK BRANCH

LIGHTWEIGHT PASSIVE COOLING PHOTOVOLTAIC WALL PANEL

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Innovation project report submitted in partial fulfilment
of the requirements for the degree of
Bachelor of Science (Hons.) Construction Technology

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AUTHOR'S DECLARATION

I declare that the work in this innovation project report 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.

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ABSTRACT

Concrete has high thermal conductivity compared to other conventional material such as clay brick. Furthermore, the usage of a big portion of raw substances like clay, shale, natural stone and sand has led to useful resource depletion, environmental degradation, and power consumption. Moreover, the cement industry alone became envisioned to be liable for 5-10% of all anthropogenic CO^2 generated. Other than that, solar panels have high maintenance. This study is conducted to review the current issues related to building energy usage and environmental sustainability, to propose an innovative external wall to minimize the issue of building's energy usage and environmental pollution, and to evaluate the marketability potential of the Lightweight Passive Cooling Photovoltaic Wall Panel. The method used for this is study was mainly using desktop study, literature review, observation method, as well as simulation method. The simulation using SketchUp software has been used. It was found out that when compared to conventional brick wall panel, Lightweight Passive Cooling Photovoltaic Wall Panel is six times better in heat insulating, two times lighter, four times lesser in absorbing water, two times produce lesser carbon footprint, and uses 17.5 times lower energy during manufacturing process. Other than that, when compared with the conventional solar panel, the solar cladding on the innovated wall panel last two times longer, can resist three times higher temperature, produce two times lesser carbon footprint, and better in performing in overcast skies. The solar cladding has yield advantage over the conventional solar panel around 10% to 20%. However, there are few recommendations needed in order to apply the innovation with full accuracy which is, experiment conduction, reinforcement calculation, and building a prototype, in order to fully develop the innovation idea.