UNIVERSITI TEKNOLOGI MARA PERAK BRANCH

HYDRONIC COOLING SYSTEM FOR PRECAST FLOOR SLAB

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Innovation project report submitted in partial fulfilment of the requirements for the degree of

Bachelor of Science (Hons.) Building Construction Technology

Department of Built Environment Studies and Technologies

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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.

In the event that my innovation project report, be found to violate the conditions mentioned above, I voluntarily waive the right of conferment of my degree and agree be subjected to the disciplinary rules and regulations of Universiti Teknologi MARA.

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ABSTRACT

To deliver great comfort while optimising energy savings, hydronic cooling systems require optimum control techniques. The operational management of a hydronic cooling system with a direct-ground cooling source and displacement ventilation (DV) systems was investigated using the field measurement approach. The floor surface temperature in relation to the interior air dew point temperature, the range of indoor/outdoor air temperature and humidity, and the indoor thermal and humidity loads to be countered were the three parameters on which the control techniques for the composite system were presented. The fans that move the cool air through the thermal distribution system pull a sizeable portion of the electrical energy utilised to cool non-residential buildings using all-air systems. By separating the functions of ventilation and thermal conditioning, hydronic cooling systems minimise the volume of air moved through the building. Because of the physical characteristics of water, hydronic systems may transmit a certain amount of heat energy while using less of the fan energy that would otherwise be required. The energy consumption and peak-power requirements of the air conditioning system are greatly reduced by this change alone. This study's objective is to compare the benefits of hydronic cooling with hydronic thermal distribution systems to those of more widely used all-air systems. The development, thermal comfort problems, and cooling effectiveness of the hydronic systems are all covered in the paper. Additionally, the peak-power requirements for hydronic systems and traditional all-air systems are contrasted.