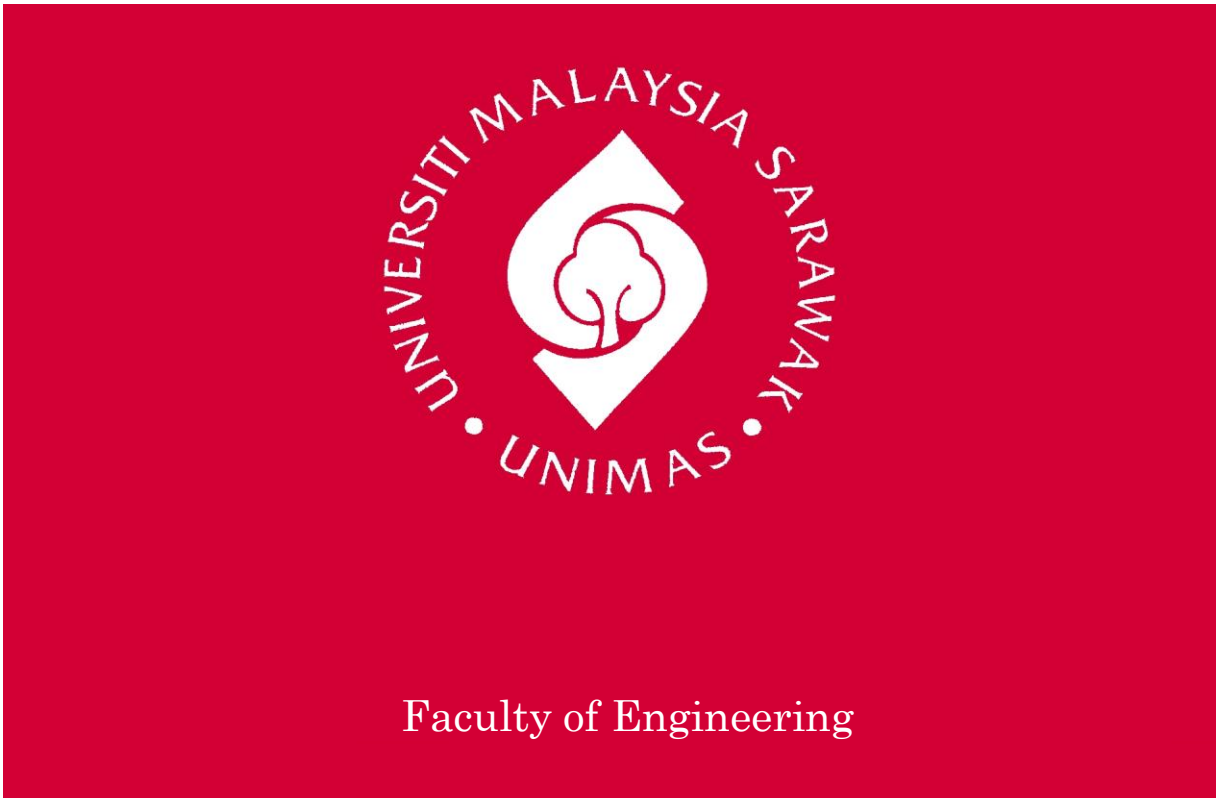

ENERGY EFFICIENCY IN PUBLIC WORKS DEPARTMENT (PWD) SAMARAHAN DIVISIONAL BUILDING

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Bachelor of Engineering with Honours
(Civil Engineering)
2017

UNIVERSITI MALAYSIA SARAWAK

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Final Year Project Report ☑

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ENERGY EFFICIENCY IN PUBLIC WORKS DEPARTMENT (PWD) SAMARAHAN DIVISIONAL BUILDING

NURUL NADZATUL FARHANA BINTI ABDUL HALIM

This project is submitted in partial fulfillment of
the requirements for the degree of Bachelor of Engineering with Honors
(Civil Engineering)

Faculty of Engineering
UNIVERSITI MALAYSIA SARAWAK

2017

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Dedicated to my late mother, beloved family, and friends;

Thank you for being by my side.

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First and foremost, all praises to Almighty Allah S.W.T. for giving me strength and keeping me inspired throughout finishing and preparing this Final Year Project (FYP) report. Next, I would like to express my deepest appreciation to my supervisor, Associate Professor Dr Azhaili Baharun for his encouragement, guidance, and understanding to me. I also wish to thanks the staffs at Public Works Department (PWD) Samarahan Divisional building which has been involved in this project as I am indebted to them for their hospitality, kindness and readiness to share the needed data and also their thoughts, while extending valuable guidance and encouragement to me. Lastly, I would like to place on record, my sense of gratitude to one and all, which directly or indirectly helped me throughout finishing up my Final Year Project (FYP).

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ABSTRACT

This project was initiated to study the energy efficiency in Public Works Department (PWD) Samarahan Divisional building. As the title stated, the study was carried out at Public Works Department (PWD) Samarahan building which is a commercial building, due to the fact that this type of building commonly operate at its maximum capacity during the day, whereas residential buildings function oppositely by having their maximum capacity during the evening and night. From this study, the aim to be achieved was to examine the energy efficiency in the Public Works Department (PWD) Samarahan Divisional building and to determine the status of the said building whether it is energy efficient building or not by calculating its building energy index (BEI). In addition, studies on thermal comfort (relative humidity and temperature readings) and luminance level in the said building were also done in this project. From calculation done in the study, the current Building Energy Index (BEI) of the building gained is 148.98 kWh/m^2/yr, thus, as according to Malaysian Standard (BEI MS 1525:2007 Standard) which stated that the recommended Building Energy Index (BEI) for non-residential building in Malaysia as 136 kWh/m^2/yr, the building could not be considered as an energy efficient building. On the other hand, the overall average luminance level, relative humidity and temperature readings in the building are 165.10 lux, 63.92%, and 24.28^oC respectively which achieve the standard range. In the latter part of this report, recommendations in order to further improve the energy efficiency, thermal comfort and luminance level of the Public Works Department (PWD) Samarahan Divisional building were provided.

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ABSTRAK

Projek ini telah dijalankan untuk mengkaji kecekapan tenaga dalam bangunan Jabatan Kerja Raya (JKR) Bahagian Samarahan. Seperti yang dinyatakan dalam tajuk, kajian ini telah dijalankan di Jabatan Kerja Raya (JKR) Bahagian Samarahan yang merupakan bangunan jenis komersial, disebabkan bangunan jenis komersial biasanya beroperasi pada kapasiti maksimum pada siang hari, manakala bangunan jenis kediaman berfungsi berlawanan dengan beroperasi pada kapasiti maksimum sepanjang petang dan malam. Daripada kajian ini, matlamat yang ingin dicapai adalah untuk mengkaji kecekapan tenaga dalam bangunan Jabatan Kerja Raya (JKR) Bahagian Samarahan dan untuk menentukan status bangunan tersebut sama ada ia adalah bangunan yang cekap tenaga atau tidak dengan mengira indeks tenaga bangunan (BEI) bangunan tersebut. Di samping itu, kajian menegenai tahap keselesaan (kelembapan relatif dan bacaan suhu) dan tahap kecerahan dalam bangunan tersebut juga telah dilakukan dalam projek ini. Dari kiraan yang dilakukan dalam kajian ini, indeks tenaga bangunan (BEI) semasa bangunan tersebut yang diperoleh adalah 148.98 kWh/m^2/yr, di mana, dengan merujuk kepada Malayian Standard (BEI MS 1525:2007 Standard) yang menyatakan bahawa indeks tenaga bagunan (BEI) yang dicadangkan untuk bangunan bukan jenis kediaman ialah 136 kWh/m^2/yr, bangunan tersebut tidak dapat dianggap sebagai bangunan cekap tenaga. Tambahan, purata keseluruhan tahap kecerahan, kelembapan relatif dan bacaan suhu di dalam bangunan tersebut yang diperoleh masing-masing adalah 165.10 lux, 63.92%, dan 24.28^oC di mana bacaan-bacaan ini mencapai tahap yang ditetapkan. Dalam bahagian akhir laporan ini, cadangan dalam usaha untuk meningkatkan lagi kecekapan tenaga, tahap keselasaan dan tahap kecerahan dalam bangunan Jabatan Kerja Raya (JKR) Bahagian Samarahan telah disediakan.

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