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LAPORAN PROJEK SARJANA MUDA

**DESIGN A NEW CONSTRUCTION FOR RESIDENTIAL BUILDING (HOSTEL)
BY FOCUSING THE GREEN BUILDING STRATEGIES**

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**This Report is submitted in Partial Fulfillment of Requirements for the Degree of
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2015

“I declare that this report entitle “Design a New Construction for Residential Building (Hostel) By Focusing the Green Building Strategies” is the result of my own research except as cited in the references. The report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree”.

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*Dedicated to my beloved parents, my siblings
Lectures and all my friends
For their love and sacrifice.*

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ABSTRACT

Nowadays, people can see a large energy have been consumed in Malaysia. One of the major reasons of this large energy consumed is due to the increasing of building construction. These building constructions are normally does not follow the green building strategies and it increases the environmental problem and global warming in the future. This report was written to deliver an overview of the installation of electrical equipment based on Green Building Index (GBI) for the residential construction of the building (hostel). Therefore, in this report the development and designing of a new green building construction (hostel) by focusing the green building strategies in term of energy efficiency performance is proposed in order to better development of green building to have a great life for environment and human in this world. The result of the project is to analyze the lighting system and calculate the electrical load by using Dialux software. For the conclusion, this project describes the basic study of indoor lighting performance at the hostel for the residential building development. Besides, the use of recycling and green plant for the projects can decrease the impact on the environment.

ABSTRAK

Pada masa kini, orang ramai dapat melihat tenaga yang besar telah digunakan di Malaysia. Salah satu sebab utama tenaga besar ini digunakan adalah disebabkan oleh peningkatan pembinaan bangunan. Pembinaan bangunan biasanya tidak mengikut strategi bangunan hijau dan ia meningkatkan masalah alam sekitar dan pemanasan global pada masa akan datang. Laporan ini telah ditulis untuk memberikan gambaran keseluruhan pemasangan peralatan elektrik berdasarkan Indeks Bangunan Hijau (GBI) untuk pembinaan kediaman bangunan (asrama). Oleh itu, dalam laporan ini pembangunan dan rekabentuk yang baru dalam pembinaan bangunan hijau (asrama) dengan memberi tumpuan strategi bangunan hijau dari segi prestasi kecekapan tenaga adalah dicadangkan untuk pembangunan yang lebih baik dalam pembinaan bangunan hijau agar memberikan kehidupan yang baik untuk alam sekitar dan manusia di dunia ini. Hasil daripada projek ini adalah untuk menganalisis sistem pencahayaan dan mengira beban elektrik dengan menggunakan perisian Dialux. Kesimpulannya, projek ini menerangkan kajian asas prestasi pencahayaan dalam bilik di asrama untuk pembangunan bangunan kediaman. Selain itu, penggunaan kitar semula dan tumbuhan hijau dalam projek ini boleh mengurangkan impak ke atas alam sekitar.

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CHAPTER 1

INTRODUCTION

1.1 Project Background

Based on [1], the problem that facing the world nowadays is global warming where it is involved over the world where the average temperature of the Earth's atmosphere has increased compared to the 19th century. Thus, the solutions for the global are required in order to face the challenges to planet, particularly on climate change and sustainable economic development. The construction sector, which is consumed about 40% of the world's energy, 12% of it is water and also gives 40% of the waste directed to landfill is the major part of this global problem.

Reference [2] said, the construction industry is one of the most important industries that have been penetrating the economic development of any country. This is because the nature of construction activities can change the natural landscape. For example, the Japanese construction industry is focused on decreasing environmental impact through extending infrastructure service life by increasing the sturdiness and considering life-cycle cost. Based on [3], although the significance of sustainable building was widely acknowledged, there are some researches that have been conducted in this specific area, specifically in respect to the developing countries like Malaysia.

The main criteria which is Energy Efficiency, Indoor Environment Quality, Sustainable Site Planning and Management, Materials and Resources, Water Efficiency, and Innovation is Malaysia's overall rating system for assessing the environmental design of Malaysian buildings. This Green Building Index, developed by PAM (Pertubuhan Arkitek Malaysia / Malaysian Institute of Architects) and ACEM (the Association of Consulting Engineers Malaysia).

According to [4], green Building is a structure that is designed, built, renovated, operated, or re-used in an ecological and resource efficient manner. Sustainable development is maintaining a delicate balance between the human need to improve lifestyles and feeling of well-being on one hand, and maintaining natural resources and ecosystems, and future generations depend.

Based on [32], to encourage sustainable building practice, The Malaysian Standard MS 1525:2007, Code of Practice on Energy Efficiency and use of Renewable Energy for Residential Buildings has been introduced. The standard briefly describes the engineering, architectural, landscaping and site planning aspects in designing to optimize the energy efficiency of a building.

Reference [26] said, the use of energy in buildings has increased in recent years because of the growing demand in energy used for heating, ventilating and air conditioning (HVAC) and lighting in buildings. Based on [27], „Green building“ methods use design and construction techniques to reduce the energy use and corresponding environmental impact of buildings. Based on [28], energy efficiency is energy intensity, which, in simple terms, refers to the use of less energy to provide the same level of energy service or to do more work with the same unit of energy. Besides, it will bring a lot of benefits for long term application and gives a lot of saving in ROI.

Every project has a problem statement that should be solved by a clear concise description of the issues that need to be addressed.

1.2 Problem Statements

Nowadays, people mutually recognize that global warming is actually a fact rather just a scientific theory and it has been fuelled up quickly as resulted from rapid urbanization. Rising demand for energy in the developing countries has initiated greater efforts among many organizations to balance between energy generation and energy consumption. With concern about energy saving, global warming and depletion of the planet non-renewable resources has produce the green building movement. In order to

overcome this problem, a hostel will be build based on the green buildings index by focusing on energy efficiency.

This project has an objective that should be achieved to complete the problem statement above.

1.3 Objective

The main objective is to design a new construction for residential building (hostel) by focusing the green building strategies. However, there are other objectives must be covered in order to accomplish this new construction for this residential building (hostel) which is:

- a) To analyze the lighting system by using DIALux software.
- b) To analyze the electrical load after implementing the GBI standards.
- c) To design all the layout of the plan such as lighting system, air-condition, switch socket outlet (SSO), protection system and cable selection in the residential building (hostel) based on the Malaysia's Green Building Index (GBI) using AutoCAD software.

The objective can be achieved by focusing on the scope of work that needed in this project.

1.4 Scope of Work

This project will focus on the study and development based on assessment of the Green Building index, which is Energy efficiency, Indoor Environment Quality, Sustainable Site Planning and Management, Materials and Resources, Water Efficiency, and Innovation. Besides, the plan of the hostel will be drawn using AutoCAD and the lighting will be shown using Dialux software. This residential building (hostel) consist of 10th level, it typically includes the following space which are office, lobby, discussion room, TV room, prayer room, principle house, toilet, felo house, washing room, corridor,

student rooms, activity room, briefing room, quarantine room, M&E room, hose reel pump room and EP room.

All spaces included inside the plan that is design using AutoCAD. After the design plan for this residential building is done, the electrical installation will be set up. This study will focus on the electrical installation including the lighting system, air-condition, switch socket outlet (SSO), protection system and cable selection to evaluate the energy saving performance.

Electrical installation in context of the sentences above will bring a meaning, every block, every room will doing the electrical installation to complete this building before all people can used it.



Figure 1.1: Layout Elevation

Figure 1.1 shows the layout elevation of the hostel that will be used in this project. This building consists of 10th floor with the area 12182.90 sq.m for the whole block.

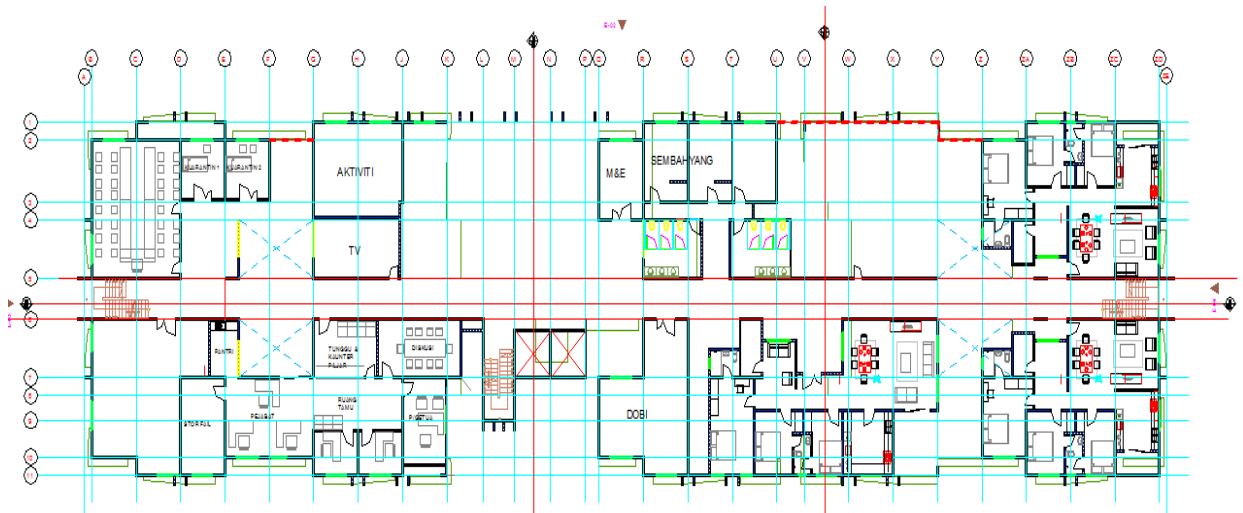


Figure 1.2: Layout Ground Floor

Figure 1.2 shows the layout for ground floor at the hostel, this level has a Felo house, Principle house, Office area, Student house, prayer room, washing room, activity room, TV room, lobby, and briefing room.

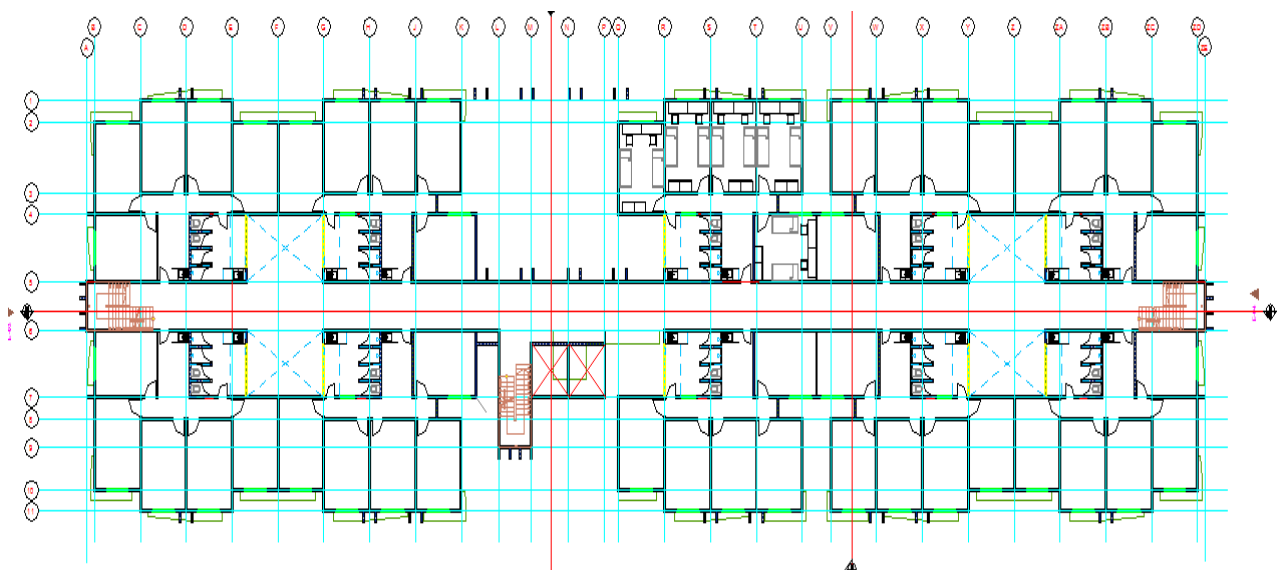


Figure 1.3: Layout First Floor – 10th Floor

Figure 1.3 shows the layout for first floor until 10th floor which has lobby and lift. It also has 11 Student House which consist of bedroom, pantry, toilet and other spaces.

To build this hostel, the rule of electrical installation must be follow as set by IEEE regulation, JKR electrical standard and Electricity Supply Application Handbook of Tenaga Nasional Berhad (ESAH TNB). The electrical installation of new construction building must follow the rule that based on regulation term and condition even though the

GBI is used in the implementation of the new construction residential building (hostel). For the constructability, the design of the hostel was developed to be constructible. The design of hostel is designed using AutoCAD, energy and cost data. The data is not limited to one particular state or town in order to provide a wide range of locations for the hostel to be built. The use of common, accessible construction materials and a repetitive design make the hostel simple and easy to manufacture.

CHAPTER 2

LITERATURE REVIEW

In this chapter, there will be detail about theory and basic principle in developing this system. Besides, there will be a case study where review of previous related works that similar with this project and do the summary and discussion of the review.

2.1 Theory and basic principles

2.1.1 Green Building Index (Residential)

Based on [6], green building is the structure and process that is environmentally responsible throughout a building life cycle from sitting to design, construction, maintenance, operation, modification, and deconstruction. Furthermore, green building design involves finding the balance between construction of building and sustaining environment. This requires close collaboration of the design team, the architects, the engineers, and the client at all project stages. Green building is also known as a high performance and sustainable building.

According to [7], the Green Building practice expands and complements the classical building design concerns of economy, utility, durability, and comfort. Table 2.1 shows the comparison between green buildings and non-green buildings of the development.

Table 2.1: Comparison between “Green Building” and “Non-Green Buildings” [7]

Building Type	Green Buildings	Non-Green Buildings
Energy consumption	Low	High
Indoor Environment Quality	Very good	Good
Emission	Low	High
Waste Management	Highly Efficient	Efficient
Building Material	Environmentally Friendly	Not Environmentally Friendly
Project Practices	Sophisticated	Normal
Feasibility	>5% than Threshold	Threshold

As shown in Table 2.1, based on [8], building types play an important role to ensure the criteria of the buildings reached the specification of green buildings.

Table 2.2 and Table 2.3 below shows the assessment criteria and green building index (GBI) classification for residential new construction:

Table 2.2: Assessment Criteria for Overall Points Score [8]

Part	Item	Maximum Point
1.	Energy Efficiency	23
2.	Indoor Environment Quality	11
3.	Sustainable Site Planning & Management	39
4.	Material & Resources	9
5.	Water Efficiency	12
6.	Innovation	6
	TOTAL SCORE	100

The points that gained in these criteria will mean that the building will likely to be more environment-friendly. Points will also be awarded under the GBI assessment framework, for achieving and incorporating environment-friendly features which are above present in industry practice. Buildings will award Platinum, Gold, Silver or certified ratings depending on the total score achieved (see Table 2.3).