

UNIVERSITI TEKNOLOGI MARA

ECS 358

CIVIL ENGINEERING DESIGN PROJECT

REINFORCED CONCRETE BUILDING DESIGN PROJECT

&

PROJECT BASED LEARNING

(CASE STUDY)

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1.1 : INTRODUCTION

In the era of globalization, we know that the world is commonly involve in construction works because nowadays, people always build the new building that can give other people benefits and make the country more beautiful with the high quality of building. The world of construction industry usually involve with the uses of reinforcement concrete. Reinforcement concrete plays a big part in this industry for the building work. After the modern technology introduce to the world, the Engineer start to construct the buildings by using the manual calculation. A lot of research had been made by the Engineer in order to construct the buildings to reduce the failure.

Concrete is a brittle material. This is because it is strong under compression but low in tension. The strength of concrete can be increase by adding steel bar, wires, mesh or cables can be install in concrete before it sets. This reinforcement, often known as rebar, resists tensile forces. When the concrete is combined with steel bar it will formed a strong bond together, the two materials are able to resist a variety of applied forces, effectively acting as a single structural element.

For this project, we are required to find the complete Architectural drawings with title block in A1 and A3 paper. After that, re-draw the key plan of ground floor, first floor and roof floor of Architectural drawing in the A3 tracing paper. In the tracing paper, we must consider to add the structural beam, column and rectangular slab. This is because to easier the calculation and assuming in designing the structural element.

After that, we must propose the critical slab at ground floor level and first floor level. Then, the critical beam must be determined at x and y axis that lay beside of the critical slab. There were 6 beam that has to be analyse from ground floor to roof floor. Next, the critical column is the column that lay on the critical slab and critical beam that we choose. The critical pad footing are in line with the critical column. All of the critical structure element must be design by using manual calculation and Esteem. While, stairs can be design by using manual calculation only.

We are also required to complete the case study. The case study are the proposal for Soil Bearing Capacity and the proposal for Water Demand and Water Tank Size. We need to complete the case study in order to experienced and learned the appropriate solutions to improve the infrastructure of the proposed site and to improve/enhance the public health and safety.

In conclusion, designing and implementing the most efficient floor system is the key to create optimal building structures. Small changes in the design of a floor system can have significant impact on material costs, construction schedule, ultimate strength, operating costs, occupancy levels and end use of a building. Without reinforcement in constructing modern structures with concrete material it would not be possible.

3.0 : CONCLUSION

3.1 SUMMARY OF THE DESIGN WORKS

In conclusion, the uses of reinforcement concrete are widely used in construction industry. Most of the modern building use reinforcement concrete to increase the strength of the buildings. The Civil Engineer are the main backbone to design the building. If the Civil Engineer make a mistake in their decision for the designing of buildings, the buildings may be fail or not long lasting.

This project shows me that, the structural design by using Esteem is more accurate than manual calculation. The assuming value made by Esteem is more precisely because it had been set and programmed by details. On the other hand, the manual calculation occurs more error because lacks of detail information put on the designing.

Other than that, I can manage to complete the details for the list of activities, time frame and project schedule. The project is completed by using Work Breakdown Structure (WBS) in Microsoft Project. The list of activities and time frame had been managed in the Gantt Chart. The details information for project schedule had been managed in Network Diagram for the division of work according to the resources and duration of time to completed the project on time.

Then, I had learned to estimate the costing of project from Bill of Quantities by using Esteem and manual calculation. The important part that must be consider is the rate of price use for the specific year and area. The rate of price use can be referred to the Jabatan Kerja Raya (JKR) Price Rate and CIDB Price Rate for Malaysia Standard price rate.

In addition, I can handle to propose the Soil Bearing Capacity and propose for Water Demand and Water Tank Size. The value of Soil Bearing Capacity is important in determining the size of pad footing in order to prevent the buildings from failure. The Water Demand in the buildings is calculated based on the estimated size of the family in the and each section area of the buildings. The value of Water Demand can be used to estimate the size of the water tank that suitable for the water demand of the specific area.

Last but not least, I learned a lot about the scope of work to construct the buildings from the beginning until the project finished. After all!, the Civil Engineer task is challenging and tough whether at the construction site and outside of the construction site. This is because the Civil Engineer responsibilities on the strength of the buildings, material used and make sure the buildings are safe for people.