



**UNIVERSITI  
TEKNOLOGI  
MARA**

**ECS358  
CIVIL ENGINEERING DESIGN PROJECT  
TECHNICAL REPORT**

**NAME : DAMIA IZZATI AKHTAR BINTI NOORAZAM**

**STUDENT ID : 2021828764**

**GROUP : J4CEEC1105J1**

**LECTURER : IR. DR. NORRUL AZMI**

**SEMESTER : OCTOBER 2023 – FEBRUARY 2024**

## **ACKNOWLEDGEMENT**

My journey through this project has been marked by the invaluable support and guidance of numerous individuals and organizations. We extend our heartfelt thanks to each one of them for their indispensable contributions.

First and foremost, our sincere gratitude goes to our supervisor, Sir Norrul Azmi, whose be my main reference and guidance also insightful consultations played a pivotal role in shaping the success of this assignment. His advice and encouragement were crucial in keeping our progress on track. I also extend our deepest appreciation to Pn Mayuze and the dedicated lecturers whose patient guidance and constructive feedback significantly enhanced the quality of our research work. Their enthusiasm and encouragement fueled our commitment to excellence.

A special acknowledgment is reserved for the technicians at the Faculty of Civil Engineering, UiTM Pasir Gudang, whose expertise proved instrumental in overcoming technical challenges, particularly in navigating the complexities of the Prokon and AutoCad programs. Our gratitude extends to our classmates and team members, whose insightful comments and suggestions provided inspiration for continuous improvement. To all those who directly or indirectly influenced and guided us in the development of this assignment, we express our deepest thanks.

This project stands as a testament to the collaborative spirit fostered by these individuals and organizations. I was sincerely grateful for the generous support that has shaped the successful outcome of our endeavors.

NO	CONTENT	PAGE
1	<b>PROJECT 1 - REINFORCED CONCRETE BUILDING DESIGN PROJECT</b>	
1.1	<b>1.1 Introduction</b>	
	1.1.1 Requirements of building-by-law, fire safety regulations	
	1.1.2 Architecture drawings of the building with TITLE BLOCK	
	1.1.3 Project background / details	
	1.1.4 Design parameters for every element (Materials strength, grades, etc.)	
	1.1.5 Weights of materials used in the building (list of Gk and Qk for slab panels and construction materials)	
1.2	Project Schedule	
	1.2.1 List of activities and time frame	
	1.2.2 Project schedule using Microsoft Project	
1.3	Design of Structural Elements (Manual Design)	
	1.3.1 Structural Key Plans of the building with TITLE BLOCK	
	1.3.2 Slab design calculations and detailing (AutoCAD with TITLE BLOCK)	
	1.3.3 Continuous beam design calculations and detailing (AutoCAD with TITLE BLOCK)	
	1.3.4 Column design calculations and detailing (AutoCAD with TITLE BLOCK)	
	1.3.5 Pad footing design calculations and detailing (AutoCAD with TITLE BLOCK)	
	1.3.6 Staircase design calculations and detailing (AutoCAD with TITLE BLOCK)	

### **1.1.1. Requirements of building-by-law and fire safety regulations**

Building-by-law and fire safety regulations is one of the most important things that need to be considered in doing construction work such as house construction. Uniform Building By-Law 1984 (UBBL 1984) is one of the laws that is established by local authorities to be applied in construction, renovation, and maintenance of buildings.

Uniform Building By-Law 1984 (UBBL 1984) will be used to control various elements of construction, including parameters such as building area, height, and architectural designs. This is to make sure the building constructed will give a positive impact towards society. By following this Uniform Building By-Law 1984 (UBBL 1984), it can avoid any environmental pollution and any possible hazards such as noise pollution, and fire hazards.

The UBBL have its own purposes such as in terms of safety, it will be use to protect the workers at the construction site. For example, when dealing with chemical material it can risk the life of the workers, so based on the UBBL the workers need to wear (PPE) Personal Protective. Not only that, by developing these laws, it ensures all the construction project is parallel with the urban planning goals. There are also several requirements of Uniform Building By-Law 1984 (UBBL 1984) such as height of building, lighting, and ventilation, building site and building materials:

#### **1. Building Site**

No building shall be erected on any site which has been filled with any matter impregnated with animal or vegetable matter until the entire surface of the ground or site the building has been made or rendered harmless and has been covered with a layer of hill soil, rigid, clinker, or solid crushed ash with a thickness of at least 0.305m. The ground on which any structure will be built must be carefully cleared of grass and other plant debris.

### 3.1 SUMMARY OF DESIGN WORK

First and foremost, the architectural drawings are important before starting the design process. From architectural drawings, structural drawings can be produced. The placement of column, beam and slab can be identified and evaluated whether it is suitable or not the placement of the structural member. After the placement is identified and evaluated, the size of each structural member can be calculated to make sure that each member can bear the load from the building.

Firstly, for slab design, the thickness that has been chosen was 120 mm. The diameter bar proposed was 8 mm and grade concrete that has been chosen was  $30 \text{ N/mm}^2$ . This was because since the slab that needs to be designed was big, it needs strong concrete. Since the grade concrete is strong already so the bar size chosen was 8 mm to reduce the cost as the smaller diameter of a bar the lower the price. The thickness of the slab can be considered as thin but from the calculation all of the checking pass and did not fail. Plus, the slab that needs to be designed was on the ground floor where there is no toilet, so a drop of 50 mm does not need to be considered.

Next, for beam design, the size of the beam was 150 x 239 mm. The diameter of bar and link was 12 mm and 8 mm respectively. The size proposed was based on the biggest slab that was connected to the beam. The size proposed for bar and link was proposed based on the size of the beam. Based on the calculation, the size proposed, diameter bar and link proposed satisfy requirements for a beam. It can support the load from the slab, brick wall if any, and its self-weight to be transported to the column.

Other than that, for column design, the size proposed was 300 x 450 mm, the diameter of bar and link was 25 mm and 10 mm. The size of column proposed was based on the value of axial loading from roof that the column needs to support. The bar size and link diameter proposed was based on the size of column. From the calculation, the size proposed passed the requirement which was the column must be a short and biaxial column. The column must need to be categorized as short column because the deflection was small and more suitable as the building that needs to be design was only a double story house.