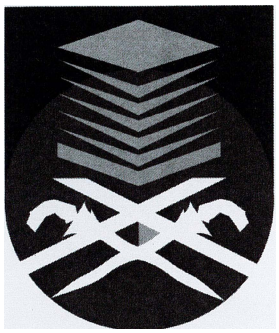

UNIVERSITI TEKNOLOGI MARA

ECS 358

CIVIL ENGINEERING DESIGN PROJECT

REINFORCED CONCRETE BUILDING DESIGN PROJECT & PROJECT BASED LEARNING (CASE STUDY)

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ACKNOWLEDGMENT

The success of completing this project is supported by the guidance from my ECS 358 lecturer, Sir Idzwan Yusuf throughout this entire semester. All segments in this design process were delivered thoroughly and I am very grateful for this blessing. I would like to express my gratitude to my friends for helping and supporting physically and mentally in order to finish this project within the time frame given. This opportunity given to me are very well taken as a preparation for my practical training which will be faced next semester. This project gives the overall representation of the Civil Engineering industry as it touches all sorts of elements from design, safety and cost estimation. All the knowledge received throughout this entire 5 semesters in Diploma of Civil Engineering will be kept and used for the better future.

Last but not least, I am very fortunate for the people surrounds me that gives motivations and knowledge willingly and I am forever be in debt to them. This include all mySemester 5 lecturers who are very helpful to help us as they all specialize in different major. This project would not be completed without all of them by my side. Therefore, I am expressing my biggest gratitude for showering me with blessings and care to be a successful Civil Engineer soon.

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PROJECT1: REINFORCED CONCRETE BUILDING DESIGN **1**

1.1.1 UNIFORM BUILDING BY LAW (UBBL)

According to the Fire Safety Regulations, a building's design must conform with the Uniform Building Code by including any safety elements. The chosen structure is a modest residential structure as defined by the Amendment of Fifth Schedule UBBL 2012, which is a detached, semidetached, or terraced private residence. Any preventative measures for the inhabitants' safety should be considered in the architect's design. According to the architectural drawing, each room's windows are part of the evacuation safety measures. In the event of a fire, this might be the exit route. According to the UBBL, the exits are considered Final Exits since they lead the residents out of the building. On the other hand, the ground floor level displays two entrances, one in the front and one in the back. This provides alternative path for evacuation if one is inoperable.

Aside from that, this structure complies with UBBL requirements since it does not exceed two storeys or a first floor with a height of 6 meters for a single staircase. Next, the overall thickness of the party wall for a terrace house constructing should not be less than 100mm. The architect specifies a thickness of 115mm with 19mm cement plaster based on the design. This is to create separations to prevent the fire from spreading to other parts of the house. Smoke controls, fire extinguishers, and sprinklers are examples of fire safety systems that should be fitted prior to usage to enhance their safety. Meanwhile, according to 211A, finishes, roofs, walls, and ceilings should not be composed of plastic. Non-plastic is employed for various applications, as can be seen in the project. As a result, the UBBL was followed. Last but not least, because this home design does not have a whole slab covered, the path for smoke to climb up is acceptable. Overall, the Architect carefully considers these details specifications in order to construct a safe unit that complies with the Uniform Building Code.

3.1 SUMMARY OF DESIGN WORKS

To sum up, the design calculations for all structural elements were obtained successfully by meeting the requirements in bending, shear, deflection, and cracking.

Elements	Dimension	Proposed	Remarks
Slab	150	H10-300	All checking passed
Simply Beam	160 x 400	2H12	All checking passed
Continuous Beam	160 x 400	2H12	All checkingpassed
Column	160 x 160	4H16	All checking passed
Foundation	1500 x 1500	14H12s	All checking passed
Staircase	150	H10-300	All checking passed

The designs are expected to be stable, strong, and rigid when in use over their lifetime. An engineer's priority is the safety of the users; consequently, the design materials allocated for each element are sufficient to withstand any failure and balanced in terms of reinforcements. Economical design is also taken into account by choosing the appropriate number and size of steel bar because it costs differently. The use of reinforced concrete in this project design provides both compression and tensile resistance, allowing it to last longer and be more durable. As a result, it is employed for residential house design instead of steel because it has a low maintenance cost and can be used for all structural elements with similar uses such as beams, slabs, foundations, and so on. Because these design works were recommended to the Malaysian National Annex, they are valid for the real implication procedure. This enables engineers to standardize design work in order to avoid a wide range of solutions that may increase the number of different problems to different methods. Design changes were also done earlier in the process when failures were discovered. This improves understanding and emphasizes the significance of the suggested design's appropriateness throughout the estimating phase. Finally, all data in this project was manually pulled from various sources in order to provide an acceptable design and result.