UNIVERSITI TEKNOLOGI MARA

ECS 358
CIVIL ENGINEERING DESIGN PROJECT

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

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DIPLOMA

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ACKNOWLEDGEMENT

First and foremost, the success of completing this final year project is supported by the guidance of my lecturer ECS 358, Civil Engineering Design project, Sir Ahmad Idzwan bin Yusuf. I would like to express my special thanks of gratitude to my lecturer to guide me without any hesitated to complete this great project. I would like to give special thanks to all of my lecturer who always guide me in completing this project and explain all the misunderstanding about the designing of beam, slab, column, staircase and also pad footing. Every segment of this design process was delivered thoroughly and for that, I am very grateful for this blessing. Not to be forgotten either, also special thanks to my fellow friends that help me either in physical and mentally to complete this project within the time frame given. In addition, by completing this 2- storey house project, this helps me as preparation of myself as for industrial training for the next semester. This project also help me to increase my knowledge in Civil Engineering aspect on how this course take place in the real life and also this project gives the representation of Civil Engineering as it claimed all sort of the designing aspect as including the safety regulation, cost estimation and also all of the rules being use in the real life project. I hope all of this knowledge being used in the project will help me in the future to became the successful civilengineering.

Last but not least, I am very lucky that the people surrounding me give the motivation and encouragement to complete this project until it being 100 percent complete. Then, my thanks and appreciation also go to people that willingly to help me out in their abilities. I very grateful to gain more knowledge and information in this design project and hope that I can apply this precious knowledge in my future job as a civil engineer. To conclude, this project would not successfully complete without all of the assistance form lecturers and people who involved by my side. Therefore, I am expressing my biggest gratitude for showering me with blessing.

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1.1.1 REQUIREMENT OF BUILDING BY LAW, FIRE SAFETY REGULATIONS

Fire safety regulations need to take into consideration when designing the building and should comply with the requirements of Uniform Building by Law (UBBL). The designing of the architecture drawing needs to consider the preventative measure for the client's safety. Based on the UBBL, by law 242, firefighting access lobby, window openings or permanent ventilation areas shall be at least 25% of the lobby floor area, but if the ventilation is by means of openable windows, permanent ventilation with a free opening of 464 sq. cm shall also be provided instead of mechanical ventilation, mechanical pressurization may be used. All of the staircases shall have a fire-resistance rating of not less than 2 hours according to the by law 113, use of timber staircase. In addition, for every type of building, the exit door is needed in order to used as the emergency door when there is any emergency occur as the exit route is mean by a route where persons in a building can reach a place of safety outside the building that including the room, stairway and the list of that except the lift, escalator and revolving door. Since it leads the occupants out of the building, it is called Final Exit as per UBBL state.

Besides that, unless otherwise provided for in by-law 194, every compartment shall feature at least two storey exits that are as far apart as practicable, but no closer that 4.5 m and are positioned so as it does not exceed the travel distances stipulated in the Seventh Schedule to these By-laws. Other than that, this building complies with the UBBL regulations as it does not exceed two storey of first floor with 6m height for a provided single staircase. Furthermore, the fire walls of a terrace building should not less than 100mm total thickness. Based on the drawings, the thickness of the wall is 115 mm thick clay brick wall with 20mm thick plaster on both sides. This is called fire wall that not being a party wall or external wall of materials having the fire resistance as required under Part VII, of these by-laws and either used or constructed to be used for the separation of the adjoining building or the separation of parts of a building in such a manner to

3.1 SUMMARY OF DESIGN WORK

To sum it all, all of the calculations that being made for all of the structure for all elements are successfully obtained and approved by meeting its requirement in bending, shear, deflection and also cracking. All of the design structures are predicted to be stable along with its life span that basically 50 years in this design. The safety of the residents is taken into consideration as the purpose of the design is to maintain the building in a good condition with no fail detected and can withstand the maximum load it can sustain. Therefore, the design that allocated to each of the structure members are sufficient to resist any of failure and balanced in terms of reinforcing. Other than that, steel rods, wires, mesh, or cables can be inserted in concrete before it cures to enhance its overall strength.

Tensile forces are resisted by this reinforcement, also known as rebar. Reinforcement is typically installed in regions of the concrete that are prone to tension, such as the lower portion of beams. Thus, the usage of reinforced concrete in this project gives the stability and resistance to the compression and tension of the structure which can make it last longer and has high durability. The design also take the fire regulations into consideration as the building structure need to survives at least 60 minutes before it get effected by fire, thus the UBBL is take into this design. In addition, the use of nominal cover help the structure to make a distance between exposed concrete structure to the nearest reinforcement bar. Therefore, the reinforced concrete is usually used in this country as it gives the low maintenance and also can be used with similar applications. All of the design work were referred to the Malaysia National Annex for the validation of implication to the design of building. This gives the standardize to the engineers in order to avoid a wide range of solutions that could lead to an increase in the number of difficulties due to diverse methods. In order to detect the failure in the early stage of design, modification of design is taken into consideration. This leads to a better understanding of the importance of the suggested design's appropriateness during the estimating phase.Last but not least, all the data were extracted manually from different source to produce an acceptable design fro this project.