



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

1.1.1 Requirements of building-by-law, fire safety regulations

Before the gazette of Act 133 - the road, Drainage & Building Act, 1974, many parties, especially architects and engineers, had to review and implement the varying requirements of the various Local Authorities. To resolve the confusions and frustrations of getting too many local by-laws and regulations on buildings, the precursor of the Pertubuhan Akitek Malaysia [PAM], the Federation of Malaya Society of Architects [FMSA], initiated in 1963 the fixing of a consistent Building Legislation Committee to push for a nationwide uniform building by-laws. A parallel committee also was found out by the Commissioner of Town and Country getting to come up with a nationwide Uniform Planning Legislation Committee. In the construction industries, all parties involved will need to study and implement the varying requirements of the various Local Authorities. The objectives of the existence of the Uniform Building-By-law is to line a uniform building Set a uniform building regulations for the entire of Malaysia and applicable to all or any Local Authorities and building professionals, to Clarify line of legal responsibilities for buildings with clear definitions on the Principal Submitting Persons, to manage architectural, structural, health & safety, fire protection capabilities and constructional requirements of buildings; with clear references to the approved standards, to expedite the processing and building approvals and occupation of buildings.

There are exactly 9 main parts in the Uniform Building-By-Law. PART I explains the citations and interpretations used in the by-laws. PART II consists of the procedures for submitting plans to the Local Authorities for their approval for permanent and temporary buildings, advertisements and perimeter hoardings. PART III demands the required space [dimensions], light and ventilation to be provided in buildings which varies to the type of room and space. For example, a space that is used for guest purposes should allow more light coming in compared to a bedroom. Next, PART IV consists of the required temporary works during construction. For example, when any building operation is commenced, the person responsible for erection shall display a board with details about submitting person and contractor. After that, PART V involves Structural requirements and considerations. It basically stated all the structural requirements that needs to be fulfilled with specific reasons. As example, building materials, dead and imposed loads, and weight of part. Next, PART VI explains on the constructional requirement. For example, it emphasizes on the protection against soil erosion during and post construction. As for PART VII and PART VIII explains about the fire

1.1.3 Project Background

The project's main objective is to design a two-storey building in medina mukim Pulau, Johor Bahru, Johor. The client of this construction is Daiwa Sunway Develoement and the parties involved to construct this buildings is Archipedia PTE LTD as design consultant,ARIKITEK KDI SDN BHD as architect,BK DESIGN AND MANAGEMENT as civil and structural engineer and SKL TECHNICAL as mechanical and electrical engineer.Student are required to get the details about the building by collecting the architectural drawing for the two-story house.In this archictectural drawing include working drawings, schedules, and other sheets shown in the list below. Many architectural plan sheets are horizontal (section) views of the building. The most common plan sheets include floor plans, foundation plans, and roof plans.,The architectural drawing will be the main reference on designing the main structure of the building. Every details about the dimension of the building,materials and spifications are stated in the architectural drawing,it will aid the students to design their own structural drawing using AutoCAD software. During design the load distribution for the buildings it is important to refer the structural drawing because it will contain the dimension, dead loads and live loads value. Furthermore, the project schedule will be the first objective of this project. The main reason of project schedule is to avoid any confusion or clashes between activities during the construction. The list of activities is very important so that the people involved in the construction process does not meet with any confusion or casualties and do their job efficiently. The project schedule is done by using the Microsoft project software that is commonly used by engineers. This schedule also usually has the planned started and finish date, duration and resources assigned to each activity. The effective project scheduling is a critical component of successful time management. From the project schedule, the info shows the duration of the project is 166 days.Every details about the construction activities and timeline can be refer to the table that have been generate in the Microsoft Project software.

3. CONCLUSION

3.1 Summary of design works

The planning works are done on six different structures. Those structures are very essential to the development of the building. the foremost critical a part of the structure is taken from the planning key-plan so as to style the structure with the foremost suitable dimensions and reinforcements. Therefore, the procedure of the key-plan is crucial within the process of constructing a building. during this case, the development of a two-storey building is started with the proposal of the project schedule. The project schedule plays a serious role on keeping the work process smooth and avoiding any unwanted casualties. The project schedule also helps on reducing the development period of the building. After the project schedule is finished, the Structural key-plan of the building will happen to acknowledge and determine the positions of the structures in each floor.

The primary structure is that the slab with the most important area from the key-plan. A two-way restrained slab is analysed to work out the acceptable and therefore the most effective sort of reinforcement bars to be used. But first, the permanent load is decided by assuming the thickness of the slab. during this project, the thickness of the slab is 150 mm. The critical moment and therefore the critical shear at midspan and support also will be determined by pertaining to the planning appendix. it's crucial to work out the area or reinforcement bars because an area that's too small or overlarge can cause major failures on the structure. during this project, the sort of reinforcements bar used for the slab structure is H12-300 which suggests the diameter of the bar used are going to be 12 mm.

The second structure which will be designed is that the simply supported beam and therefore the continuous beam. For simply supported beam, there's just one span of beam which will be analysed and style . the dimensions estimated for the beam during this project is 450 mm tall and 250 mm in breadth . the planning load of the beam will then be determined to get the instant and shear value. then , the most reinforcements, and therefore the shear reinforcements of the simply supported beam are going to be determined by pertaining to the planning appendix. As for the continual beam, there are exactly six spans of beams involved and therefore the load analysis of the beam will involves the distribution table method so as to work out the worth of moments and shears across the six spans of beams in discussion. This way, the sort of reinforcement bars for both main reinforcements and shear reinforcements are often determined.

3.2 Recommendations/reflections

The structural design process of an entire construction project should be divided into three phases. Those phases are planning, design, and construction.

The planning phase will consider tons of things which will play an enormous influence on the layout and therefore the dimensions of the structures. The choices being made are going to be the result of the building. A correct planning will make the method tons easier and tons faster. There are any factors which will be taken into consideration to get the successful results. As an example, taking the aesthetics under consideration will attract more people. Aside from that, taking the environment factor under consideration also can benefit all parties.

Next is that the design phase. The structural design details of each building structure are determined. This is often important because the choices being made should be ready to maximize the investments poured into the project. The location conditions of the project should be taken into consideration. A number of the parameters that require to be investigated is that the bearing capacity of the soil, the utmost load capacity of the soil and therefore the requirement of soil improvements if necessary. Aside from that, the hundreds working on the structures of the beam is additionally an important part of the method. The dead loads is that the load thanks to the self-weight of structures, plastering or finishing, or brick wall loads. The superload however is loads which will be either static or dynamic in nature.

As for the development phase, the structural design project will involve tons of procurement of materials and equipment, labour movement, and therefore the erection process of the structure. Both parties should search for the foremost efficient equipment and manpower in order that the duration of the development and therefore the cost of the project can decrease.

Designing is prime to the introduction of technological innovations. This is often to make sure the standard and therefore the rationality of the project is about to a high standard. Shortening the execution period and therefore the lowering the value is certainly an enormous issue in any construction project. The anticipation of issues will help to propose solutions and a more adequate execution towards the problems.