Issues Regarding Software And Manual Design Of Residential Building

Kishore G. Bhagat[1], Datta Kondiba Yeske [2], Swapnil Sunilrao Kulkarni [3], Khemachand Bhanudas Aswar [4],
Shubham Anilrao Kopekar[5]

[1] Assistant Professor Dept of Civil Engineering
[2, 3, 4, 5] Dept of Civil Engineering
[1, 2, 3, 4, 5] Padm.Dr.V.B.K.C.O.E.,Malkapur,Maharashtra, India

Abstract- *This project is designed as per INDIAN CODES- IS 1893-part2:2002, IS 456:2000. This analysis is carried out by considering severe seismic zones and behavior is assessed by taking type-II Soil condition. The auto cad plotting no.1 represents the plan of a G+3 building. The plan clearly shows that it is a combination of apartments. We can observe there is a combination between each and every apartment. The entire plan area is about 1570 sq.m. There is some space left around the building for parking of cars. The plan gives details of arrangement of various furniture like sofa etc.*

Keywords: ETABS, software, manual, Auto cad etc

I. INTRODUCTION

The building is designed as two dimensional vertical frame and analyzed for the maximum and minimum bending moments and shear forces by trial and error methods as per IS 456-2000. The help is taken by software available in institute and the computations of loads, moments and shear forces and obtained from this software. [1]

India is a developing country; huge construction projects are yet to come as undeveloped cities are needed to develop since so many years. In current century, many construction projects all over the world are going; time delay takes place which in turn affects the growth of the construction of huge projects. To avoid time delay and thereby the growth, economic construction methodology should be adopted. To economize the structure, structural optimization techniques should be used.

For large projects, it is necessary to go for structural optimization because it directly affects cost of construction. Many Metropolitan cities are facing vast growth of infrastructure whether it may be in terms of horizontal development or vertical development. Metropolitan cities like Delhi and Mumbai have high population and in forth coming years' land availability problems will increase tremendously which will in turn affect the overall growth of the city, so most of the builders in construction industries prefers vertical development of structures. As we increase number of stories or height of structure, huge lateral forces come into picture which will tend to increase the construction cost of the project in terms of consumption of steel, concrete and such other materials. Hence usually optimization techniques are adopted to economize the structure. New and different approaches to design have become possible through the increased speed of computers and software tools of optimization theory. The optimization exercise commences right from the architectural concept stage. Suggested grid dimensions by architecture usually do not result into most economical structural member sizes and reinforcement consumption. In general optimization includes discretization of a whole structure into a series of sub frames with slab, beams, columns and footings. The main parameters involved in the investigation of this project are fundamental time, base shear, volume of reinforcement and volume of concrete.[2]

These parameters are indirectly indicating the cost effectiveness of the individual technique and there by the structure. In 21st century, owing headed for massive inhabitants the numbers of areas in units are diminishing gradually. Few years sponsor the populations were not so vast as a result they used to stay in horizontal co-ordination system (due to large area available per person), however at the present days' people preferring vertical co-ordination System (high-rise building due to deficiency of area).[2,3] In high-rise buildings, we should concern about all the forces that act on a building, its weight as well as the soil behavior. For external forces that perform on the edifice beam, column, and reinforcement supposed to be good enough to counteract these forces lucratively. The soil ought to be superior enough to distributing the load effectively to the establishment. For loose soil, we preferred deep foundation (pile). Calculation for a high-rise construction manually then it will take extra time in addition to human individual errors possibly will be occurred. Consequently, the use of ETABS (Extended Three-Dimensional Analysis of Building Systems) and Build Master will make it easy.

II. LITERATURE SURVEY

At present ETABS and Build Master are the leading designing and modeling software in the market. We are

analyzing our structure using ETABS and modeling it done on Build Master. By analysis on ETABS we studied various forces and factors affecting on the structure. By Build Master we get the 3D model of structure, quantities of steel and other materials.[4]

Abhay Guleria (2014) presents the analysis of the multistoried building using ETABS reflected that the storey overturning moment varies inversely with storey height. Moreover, L- shape, I- shape type buildings give almost similar response against the overturning moment. Storey drift displacement increased with storey height up to 6th storey reaching to maximum value and then started decreasing. From dynamic analysis, mode shapes are generated and it can be concluded that asymmetrical plans undergo more deformation than symmetrical plans. Asymmetrical plans should be adopted considering into gap.

Arpit A. Bhusar and Ashish R. Akhare (2014) shows Building information models let structural engineers design, visualize, simulate, analyze, document and build projects more efficiently, accurately, and competitively. Among the most important benefits of BIM for structural engineer are productivity, coordination and consistency of data, and improved visualization and simulation of problems and situations. Structural engineers can easily spend more time coordinating a project than performing the structural analysis. With the use of BIM, the time spent in coordination is reduced, allowing structural engineers to focus all their efforts in solving problems, instead of having to constantly be checking for errors or coordinating changes made.[5]

Sonia Longjam et.al. (2014) publishes the paper that presents the plan, model, analyze and design of a vertical irregular shopping mall structure of G+10 storey and investigate its performance under various lateral loading conditions. The main goal is to assess current Indian Standard design practice and to provide design guidelines using ETABS, presents the manual design calculation satisfying the necessary requirements as per BIS specification as well as various Indian standard code specifications. The project is comparative study on design and analysis of multistoried building (G+10) by Etabs software. Etabs is one of the leading software for the design of structures. G+10 building is analyzed for finding the shear forces, bending moments, deflections &reinforcement details for the

The inflatable flexible membrane dams (IFMD, or rubber dams) were developed in the early 1950s - Flexidam - Imbertson. They are installed in stream and river beds, generally being bolted into a concrete foundation. They are used to divert water for irrigation, temporarily raising existing

dams, flood control, water retention for aquifer recharge, reducing or preventing salt water intrusion into fresh water areas, protect low-lying coastal areas from tidal flooding, enabling fish passage past diversion works, by deflation, and for sewage retention/separation during flood events.

structural components of building (such as Beams, columns & slabs) to develop the economic design. ETABS is also a leading design software in present days used by many structural designers. Analyzed the same structure using ETABS software for the design.Finally, an attempt to define the economical section of G+10 multistoried building using both Etabs and ETABS comparatively. By the intensive study come to know that the "economical sections" was developed using ETABS software.

S. Vijaya Bhaskar Reddy et. al. (2015), published a paper which describes the salient features of ETABS (i.e., Extended Three-Dimensional Analysis of Building Systems) and its various applications in civil engineering. In this paper, using E tabs software the analysis of two multi storied buildings is carried out with different heights (15m and 10m). Thus, it can help the consulting engineers, construction experts, research scientists and students in the analysis of concrete structures. The essential feature of ETABS is explained and the capability of the important concepts of effective memory management, plot options and user interface are described. Design of Flat Slab by Using ETABS Software, concludes that flat plate/slab can be designed and built either by conventional reinforced concrete or posttensioning. However, due to issues mentioned above with post- tensioning construction in India and its higher cost, conventional reinforced concrete design should be preferred choice for spans up to 10 meters. [6]

Nisarg M. Mistry et.al (2014) worked on Software for Building Information Modeling (BIM) for Project Management and Controlling. It can be concluded that Build Master helps to provide immediate competitive advantage, better coordination and quality, and can contribute to higher profitability for architects and the rest of the building team. It can also be concluded that BIM is an efficient and reliable tool of project management. Project management can be done more effectively by using this type of tool.Wei Peng (2014), the art of architecture refers to the law of beauty, and uses the unique architectural art language, so the building image has cultural value and aesthetic value, with symbolic and formal beauty, reflecting the national character and sense of the times. This paper takes the BIM building information modeling as integrated platform, through the Build Master data interface, and uses 3Ds max software to design the art shape of building structure.

Shashank R. Chandak (2016), presents the cost of optimization of construction projects using BIM Software Build Master. The projects conclude that by using BIM method 80% reduction in time to generate estimates 10% saving on construction cost through clash detection. 20% saving through construction cost simulation. Based on the afore-mentioned literature review it is observed that ETABS and Build Master are user friendly software's. Hence, we have decided to do analysis, designing, modeling and quantity estimation of a residential structure by ETABS.

Figure 1: Story Data and add Stories.

III. CONCLUSIONS

By the Modeling, analysis and design of structure on ETABS and Built-Master the following conclusions are obtained: The Structure Is Modeled And Analyzed On Etabs, And Verified The Design Using Build master.

This project report has sought to give details of the components of a multi-storey building and an idea of structural components can be achieved when structural drawings are read. ETABS was used for the analysis for all loading combinations since it reduces the time consumption and gives required accurate results.

The Detailing of Reinforcement is made as per IS code provision which provides Ductility to the Structure and hence better performance. All the structural components are checked to satisfy the serviceability criteria and hence provided dimension of all structural components are adequate. From the "Analysis and design", we can estimate the cost of whole structure before the work is to be executed. Hence the appropriate cost of whole building will be known in advance. Buid-Master was used for the design of slabs and beams and it seems very easy for designing process.

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