DESIGN AND SCHEDULING OF A MAJOR BUILDING PROJECT

V. Kavitha (Asst. Prof) [1]. Pattem Pavan. M Tech[2] Siddhartha Institute of Technology & Sciences (SITS)
Narapally village, Peerzadiguda, Hyderabad, Telangana 500088

ABSTRACT

The key objective of this research is to analyze and design a multistoried building project complex using STAAD Pro and then schedule the prime and necessary activities involved in the construction of the building complex with the help of Microsoft Project 2013 and then in the end using Autodesk Revit 2013 we are going to make 3d model of the buildings and take material takeoff for estimate of construction cost .The plan of building complex consists of 4 residential apartments of Six storey building. The design involves load calculations and generating load combinations and analysis of the structure with the help of STAAD Pro. IS: 456(2000) confirms all the design methods used in STAAD-Pro. Different work associated with the project are estimated and the activities are scheduled. Planned cost, time, and materials of the project are acquired by resource allocation. Various activities involved in the construction of this residential building project are estimated and the activities are scheduled, as project starts. Budgeted cost, time, and materials of the project are obtained by resource allocation.

Keywords: STAAD PRO, MSP 2013, Analysis, Design, Revit, Estimation.

INTRODUCTION

1.1 Outline of the Chapter

We humans from the beginning of era required buildings or structures for live in and to acquire that we want from time to time. But then again it's not only buildings but also to build structure efficiently so that it can fulfill its main purpose. So here comes the role of civil engineering and the role of design and analysis of structure.

This project is of analysis, design, scheduling and estimating construction cost of multistoried building project using a very popular designing software STAAD Pro, Microsoft Project 2013, Revit 2013. We are using STAAD Pro because of its listed below benefits:

1. Simple to utilize interface.
2. Verification with the IS codes.
3. Solving errors in a versatile manner.
4. Planning Precision.

STAAD Pro shows a modern UI, powerful analysis and design engines and picturing tools with advanced finite element and dynamic analysis capabilities. STAAD Pro is every professional's option for concrete design, steel design and cold-formed steel design of low and high-rise buildings for model generation, analysis and design and result verification.

Similarly Microsoft Project 2013 is chosen because of the following advantages:

1. It empowers the undertaking the executive's experts to deal with task portfolio speculations dependent on need, start ventures at the most punctual, and create result inside pre-decided spending plan.
2. Microsoft Project 2013 conveys precise outcomes and furthermore gets ready for the future to deal with monstrous and deficiencies over a skyline.
3. Microsoft Project 2013 conveys extends on time and pursues plan the board adequately. It additionally conveys a system to track the advancement of the undertaking.

Also and for designing the 3d project Revit software is chosen because of its following advantages:

1. Intelligent 3D-model-based design tools
2. BIM programming for designers, contractors, engineers and architects
3. Create an integrated model that contains genuine data
4. Great for demonstrating, clash recognition and change the management
5. Contains all important structure components just as maker, model, cost, and structure and phase data, among others.

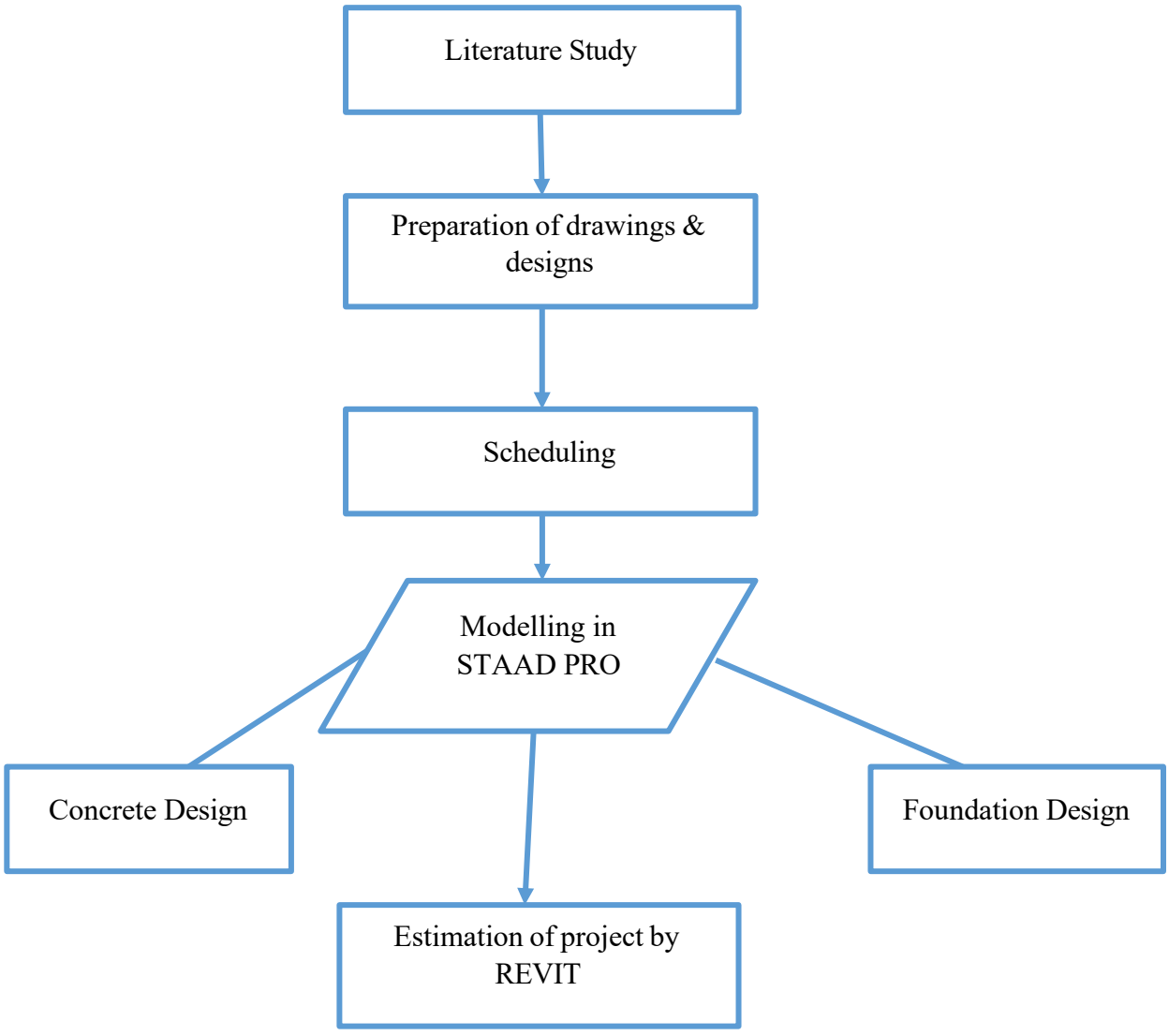
2.1 LITERATURE STUDY

Kumar K et al [2] Nations around the globe give significant inclination to the development business, as it contribute inconceivably to the development of a country, however utilization of conventional practices and ill-advised arranging diminishes the effectiveness of the development business which influences the venture as expanded span of the undertaking, this prompts the expanded overhead expense of the task and low quality of work. With the end goal to dispose of these imperfections in development venture, a powerful undertaking administration device is presented as Microsoft Project 2013 programming. In this investigation venture planning, estimation and asset designation are adjusted in MK Apartment private development venture utilizing MSP 2013 programming. Different work associated with the development of MK condo venture are evaluated and the exercises are planned, as undertaking beginning structure first Aug 2016 and completing on 29th July 2017. Planned cost, time, and materials of the venture are acquired by asset portion.

Methodology

1.1 Outline of Chapter

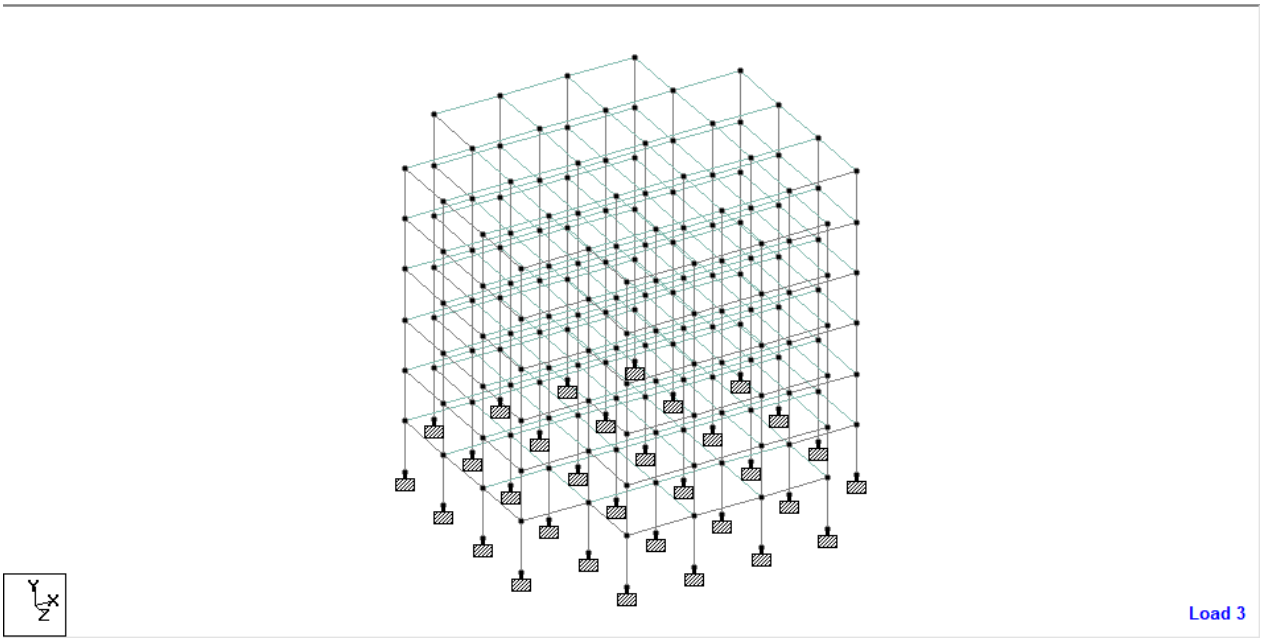
The fundamental step in the methodology includes designing, scheduling and cost optimization of the project. Designing phase includes Six storey building design in Staad pro which further includes loads calculations and concrete design. Then the scheduling phase is carried out by using Microsoft Project 2013, in which all the important activities occurring in a construction project are listed and a calendar is created specifying start date, finish date and exceptions etc. And lastly after all the resources and activities are allocated and scheduled respectively, cost of the materials, labor, and construction are calculated.



1.2 MODELLING:

1.2.1 Structure Generation

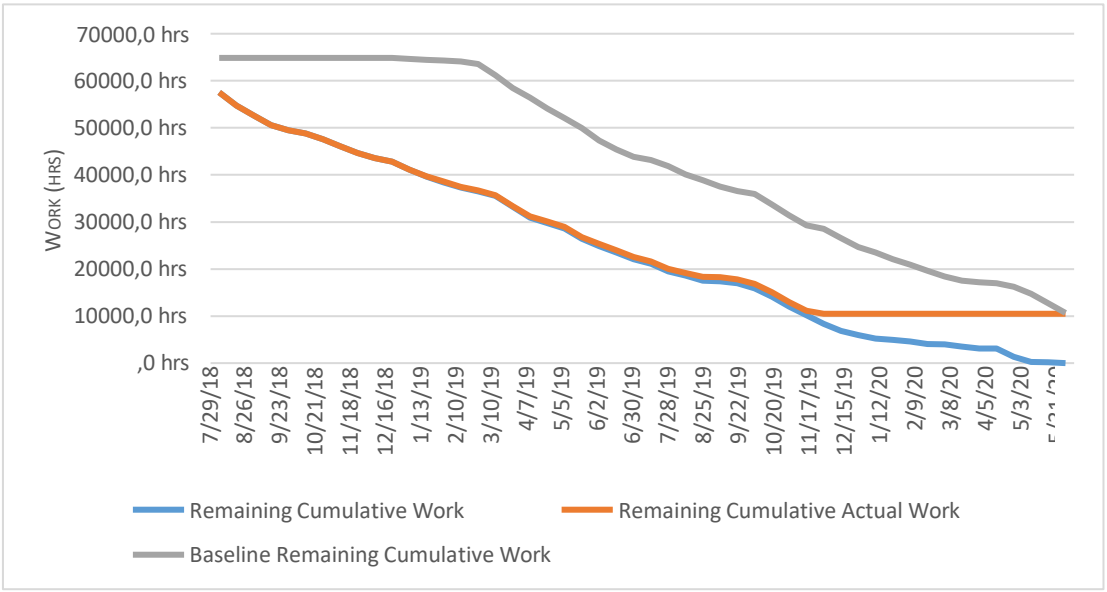
Plan of the building is designed in STAAD and after applying translational repeat no. of floor is given and frame model is generated. Fig. 3.2.1.1 shows the 3d frame model of structure.



Results and Discussions

1.1 SCHEDULING

Work Burndown - Shows how much work you have completed and how much you have left. If the remaining cumulative work line is steeper, then the project may be late.



From the beginning of the Project the resources are on use and track can be kept on it easily with the help of graphs and bar charts.

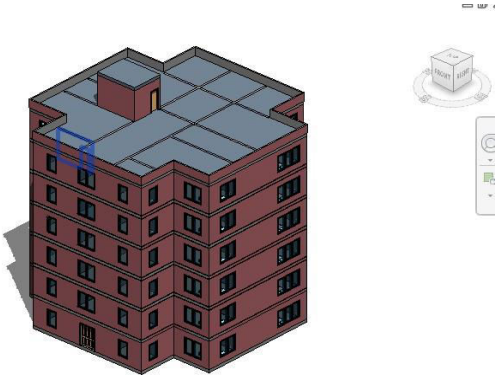


Fig. 4.10.1.2 Model of building complex

CONCLUSION

5.1 General

STAAD PRO gives us reinforcement requirement for concrete members and the project contains many members all designed as per IS: 456 (2000).

1. Max. Hogging and sagging moments are calculated for the design load and other active load cases. And every section is designed to resist the critical hogging and sagging moment.
2. Shear R/F is calculated to resist both S.F & torsional moments.

    2.1 Max. Deflection at different nodes < 30 mm.

    2.2 In shear & flexure structural components are safe of the building.

3. Increment in the quantity of analysis tools is an indication to the expanding significance of manageable plan in engineering and the need to enhance building execution is appropriate for conveying the sort of data that can be utilized to improve plan and building execution. REVIT arch. Systematizes the hard work of activities like Material Takeoff, Schedule/Quantities etc. whilst taking and coordinating data in the documents set.

    Total Construction Cost of whole Project = ₹ 86561292.8

    Total Project Duration = 524 days

4. Construction of structure utilizing Traditional path ends up being uneconomical and

expends additional time with numerous complexibility and gigantic mistake which affects actual execution of the Project. Customary way for planning doesn't sub separate the primary task like over allocation of assets, inappropriate judgment of assets for specific activities and so forth.

5.2 Future Scope

An effective construction project management must have varied plans & advanced concepts to benefit in advancing and managing numerous projects. It offers the basis for a career path in the construction industry and offers a good understanding of the theoretic ideas of construction practices.

And since technology is changing always and advancing similarly it is changing in the architecture, civil engineering or design field also. And since software play a very major role so having good knowledge of software like AutoCAD, STAAD Pro, 3ds Max, Revit, Primavera, Rhino etc. can help in a great way.

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