



Application of Building Information Modeling to Study Construction Management of 7 Floor Building

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ABSTRACT

The Building Information Modelling (BIM) includes design and construction information. It is not only a visual presentation, but also a state construction simulation. The main application of BIM is to provide 3D animation, environmental analysis, green energy analysis, crash detection analysis, quantity & cost analysis, operation and maintenance information. The BIM model provides a platform for information integration. It is helpful for design evaluation and assisting designers to verify drawing correctness and consistency. All kinds of information can improve project management level. By analyzing relevant information of the construction process, the BIM model can provide a better way to the building operation management also. Therefore, many enterprises are starting to adopt BIM tools. So, in an educational context, the aim of the present work is to disseminate knowledge concerning the benefits provided when implementing BIM in several aspects within the construction activity. The text describes in detail some of the main topics, showing distinct use of BIM: Generation and use of a 4D/BIM model to support construction planning; coordination of construction projects based on BIM methodology; conflict analysis based on an architectural 3D/BIM model. This work contributed to demonstrate the advantages of employing BIM for building tasks purposes when compared with the traditional process, and in a didactic context the main objective is to add competitive skills in the training of future civil engineers.

Keywords: Building Information Modelling, 3D animation, visualization

INTRODUCTION

Building Information Modelling (BIM) is defined as the process of generating, storing, managing, exchanging, and sharing building information in an interoperable and reusable way. BIM represents the process of development and use of a computer generated model to simulate the planning, design, construction and operation of a facility. The resulting product, a Building Information Model, is a data-rich, intelligent and parametric digital representation of the building project. So, BIM can be considered as a digital representation of a building, an object oriented three-dimensional (3D) model, and a repository of project information to facilitate interoperability and exchange of information with related software applications. Therefore, the BIM data-rich model allows views and data, appropriate to various users' needs. The data can be extracted from the model and worked out to generate information that can support several analyses in order to make decisions and to improve the process of delivering the facility. With the development of the construction industry in recent years, the owner & developer's expectations are higher than before for their construction project. Because their requirements are increasing, such as the building quality, safety, earthquake resistance, green energy, environmental protection, work schedule control and the others. The construction design trend becomes complex. It needs more effective technology and tools to improve relevant work, such as 2D and 3D computer-aided design instruments, including the latest BIM technology.

OBJECTIVES

The objectives of project is to understand:

1. To exchange data processes more effectively.
2. Learning of software like AutoCAD, REVIT etc.
3. To execute the project on site simultaneously.
4. To plan and schedule the respective project more efficiently .
5. To know the idea of Building construction.

METHODOLOGY

This study applies the existing theoretical knowledge of BIM in the construction industry to a particular. Potential advantages of BIM over CAD were studied. This study was in the category of exploratory research which is undertaken to investigate an area where little is known or to consider the possibilities of undertaking a particular research study, i.e., factors affecting as potential barriers for implementing BIM in the Indian construction industry. In order to collect the essential data, the author reviewed scholarly articles and journals to enhance the theoretical knowledge of BIM and its significance in the Indian AEC industry.

BIM APPLICATIONS IN THE CONSTRUCTION INDUSTRY

The application of BIM 3D model: In the building construction activities, the site planning is the first stage of construction commencement work, including the site entrance, temporary fence, tower crane location, hoister location, temporary generator, temporary water tank, and the other. How to simulate the real facilities & equipment relationship in the virtual space is an important work for construction engineers. It needs tools to rehearse the relationship as much as possible in the virtual space. The BIM 3D model can show the various site components visually. Some of the site planning issues can be found out intuitively also. Lau, et al. (2018) have applied the BIM 3D technology during their pre-construction stage. Stober, et al. (2018) presented an example of the BIM for designing parametric objects to create a rich information model. Through the BIM 3D application, the main contractor participants can discuss the reasonable site plan according to construction conditions and optimize the allocation space of facilities, equipment, and material store area. This process is helpful to construction management to get suitable site layout and select a feasible construction plan.

FUNCTIONS

1) Auto-CAD :-

AutoCAD is computer-aided design (CAD) software that architects, engineers, and construction professionals rely on to create precise 2D and 3D drawings. Draft, annotate, and design 2D geometry and 3D models with solids, surfaces, and mesh objects. AutoCAD is used in industry, by architects, project managers, engineers, graphic designers, city planners and other professionals.

2) Revit :-

Revit is 4D building information modeling capable with tools to plan and track various stages in the building's lifecycle, from concept to construction and later maintenance and/or demolition. Revit supports a multidiscipline design process for collaborative design. Its powerful tools let you use the intelligent model-based process to plan, design, construct, and manage buildings and infrastructure

3) ETABS :-

Design and Analysis of the residential building which has (G+7) stories has been done. Analysis was done using ETABS software (2019) Version which proved to be good enough in the design for construction and the structural analysis of all the sections. All the elements of a structure like concrete wall, which retains the weight of soil are provided. As per soil investigation reports they provided isolated footing. This paper mainly deals with the analysis done by comparing the results which we have obtained from the analysis of a multi storied building structure through manual method as well as by using ETABS software

4) RCDC :-

STAAD Advanced Concrete Design (RCDC) is the industry leading concrete design & detailing software. It is a powerful software that delivers a completely seamlessly integrated process linking analysis to design & detailing, drawings, estimation and reporting. RCDC is used across a wide spectrum of industry including high rises, residential, commercial, industrial and infrastructure projects.

CONCLUSION

The schedule in BIM allows easier understanding of the project as well as helps to detect possible problems in it. Therefore, by integrating and displaying specification or recommendation and construction resource information, the schedule in BIM promotes interaction and collaboration among the project team members from different fields. By reading some of the journals we have come to know that BIM is the most function able application which makes the work easier and by application of BIM completion of the project take place smoothly. We also found that the BIM has a positive impact on environment and human as BIM give sustainable design and construction which include a program to protect workers from construction accident. With the help of BIM, we can develop a three-dimensional (3D) model mentally by visualizing the different components of the project. With the help of practical experience and visualization capabilities we can spend less time in developing 3D visuals.

REFERENCES

- J. Vinoth Kumar and Mahua Mukherjee "Scope of Building Information Modelling (BIM) in India" Journal of Engineering Science and Technology December 2009.

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- AartiNanajkar “Implementing Building Information Modelling at AEC Firms in India” Journal of Construction Management and Engineering, May 2014
 - Miss.Irin Ann Isac and Dr.Anoop C K “Analysis of Building Information Modelling and Scope of BIM in India” International Journal of Engineering Research and Technology, November 2019
 - ChristophMerschbrock , Bjorn Erik Munkvold “A Review of Building Information Modelling for construction in developing countries” Creative Construction Conference, June 2016
 - Yin Rui “Review of Building Information Modelling (BIM) Application in Construction Industry” International Journal of Innovative technology and Exploring Engineering, April 2009.
 - Riva Tomasowa “BIM design collaboration report” Research Gate, January 2015
 - AlciniaZitaSamponia “BIM as a Computer-Aided Design Methodology in Civil Engineering” Journal of Software Engineering and Application, October 2017
 - Professor Anthony Williams “- An integrated approach to BIM competency assessment, acquisition and application” Journal of Newcastle Research
 - Stefan Boeykens, Pauline Somer “Experiencing BIM Collaboration in Education”
 - Robert Eadie, Henry Odeyinkar, Mike Brown“Building Information Modelling Adoption: An Analysis of the Barriers to Implementation” Journal of Engineering and Architecture, March 2014