Industrial Engineering Journal
ISSN: 0970-2555
Volume : 53, Issue 1, No. 3, January : 2024

USE OF BIM IN COST CONTROLLING AND SCHEDULING OF THE CONSTRUCTION PROJECT

Mrs. Mona Khosla, Assistant Professor, Dept. Of Civil Engineering, IIMT College of Engineering, Greater Noida
Mr. Saurav Yadav, Student, Dept.Of Civil Engineering, IIMT College of Engineering, Greater Noida
Ms.Rakhi Jha, Student, Dept. Of Civil Engineering, IIMT College of Engineering, Greater Noida

Abstract
It is very important for a construction to look at each and every aspect of construction in an efficient and diversified way. Researches are made to make construction process more cheap, accurate, efficient, effective, safe and fast as well as well organized. Now to achieve all of these things we require a tool known as BIM. In this thesis we have tried to make a comparison between old auto cad technique and BIM. Data of BIM can be used for optimization purpose and fastening of the project delivery processes and can make it more efficient and reliable but the major problem in BIM is it's high cost, it means it is not cost effective.By the help of this thesis we want to bring your kind notice upon the future use of BIM for optimization and beneficiation of project of construction or to describe to reduce cost and manage time of projects for the beneficiation of project holder.Buildings made from old configuration was to a great extent depending on two-dimensional specialized technical drawings (plans, areas, elevations, sections and so on.). BIM broadens this past 3D, expanding the three essential spatial measurements (width, depth and height) with time as the fourth measurement (4D) and the cost as the fifth measurement (5D).

Keywords: **– BIM,3D,4D,5D**

Introduction

As we all know that the largest growing industry in today's era is industry of AEC i.e Architecture, Engineering and construction so it is very important for us to make each and every process of this industry very effective and efficient but this industry is considered to be very low-tech and low efficiency industry. To make profit out of this business we need to implement modern tools and technique. We want to reach maximum economic target in this industry but we have to consider that this industry has no guarantee of ultimate profit. So as to ensure profit we need to see that project is to be completed within time and budget. We need to understand what makes a project successful in essence with quality output + economic benefit + to be completed within time.

1.1 Definition of BIM

Through out the years, the industry has popularized BIM towards compositional related experts, nonetheless, the genuine reason and advantages of BIM identify with all development industry experts. The 3D portrayal of the structure and now utilized in streets and utilities as well and is outfitted towards all development experts, and every one of you are in charge of understanding the procedure and take an interest in giving contribution to the product. BIM makes a solid advanced portrayal of the structure accessible for structure basic leadership, excellent development archive creation, development arranging, execution forecasts, and cost gauges. Not just, that BIM can likewise be utilized by the property proprietors, when the development procedure has finished, to The structure data demonstrating process covers geometry, space, light, geographic data, amounts, and properties of structure parts. BIM can be utilized to exhibit the whole structure life cycle, including the procedures of development and office task.BIM isn't simply Building Information Modeling yet in basic words

it's a reconciliation of best practices regarding Software/s utilized in each order of Project Management. For example Plan (3D Modeling), Project Budgeting and Project Scheduling.

OBJECTIVE OF PAPER

- To study the history of BIM.
- To study the comparison between 2D CAD v/s 3D BIM.
- To study the role of BIM in project management in the field of cost controlling and time management.
- To study the software used in BIM.

2. 1 **History of BIM**

- First conceptual idea by Douglas C. Englebart in 1962.
- Earlier modeling software created based on SAGE graphical interface and Ivan Sutherland's Sketchpad program in 1963.
- Main solid modeling methods of 1970s and 1980s
- constructive solid geometry (CSG)
- boundary representation (brep)
- ArchiCAD software developed in 1982 is the first BIM software which is available in personal computer Building Design Advisor, developed at Lawrence Berkeley National Lab in 1993.

Revit software is the first software developed in 2000 by Charles River Software in Cambridge.

2-D CAD v/s 3-D BIM:

- Numerous experts still utilize the customary 2D CAD innovation for speaking to their plan thoughts to customers. This implies despite everything they like to draw incalculable lines, polylines and nonexclusive geometrical shapes to speak to their items (doors, windows, dividers, segments, and so on) in the project's working illustrations, for example, floor plans, height level, cross-areas, and so forth.
- On account of a 3D BIM, building configuration is cultivated by embeddings graphical articles with their own practical attributes and properties. These sort of keen articles enable the planner to create itemized working illustrations and development archives consequently. So staying away from to need to draw those fantastically intricate illustrations, loaded with lines and poly-lines by hand.

2.3.1 **BIM modelling for time management of the project- (3D to 4D)**

The utilization of the term 4D is proposed to refer to the fourth measurement; time, i.e.4D is 3D+Schedule (time). The job of 4D BIM is to add another measurement to 3D CAD Drawings or Solid modeling.

2.3.2 **BIM modelling for cost controlling of the project- (3D to 5D)**

The utilization of the term 5D is proposed to refer to the fifth measurement; Cost, i.e.5D is 3D+Cost (Quantity Take Off). The significant advantage of this framework is to exercise distinctive plan alternatives those can be analyzed and afterward go about as a supporting base for basic leadership. Moreover, when associated with time angles the model can encourage cost control continuously, allowing administrators the chance to monitor cost improvements during projects.

2.4 **Software used in BIM-**

- Autodesk BIM 360.
- Tekla BIM sight
- AUTODESK Revit Architecture
- Navis works
- BIM object

- BIMx
- ARCHICAD
- AECO sim Building Designer

Literature

Following are the list of researchers who has worked in that area:

- KATRINE NYBERG, FREDRIK KULLVÉN (From Division of Construction Management, CHALMERS University of Technology, Sweden) et al. explained in detail about Possibilities with BIM in relation to cost estimation and scheduling, in their thesis in the Master's Programme of Design and Construction Project Management.
- Juan Franco,Hussein Abaza, Faiza Mahdi Department of Construction Management, Kennesaw State University mentioned about Using (BIM) for Estimating and Scheduling, Adoption Barriers, in their Paper published in Universal Journal of Management
- A Thesis submitted by Dalu Zhang from North Dakota State University Of Agriculture and Applied Science give basics about PROJECT TIME AND COST CONTROL USING BIM.

RESEARCH METHODOLOGY

Our research methodology is an efficient outcome of the magnificent thesis, research papers and online lectures that we have read. Our methodology was followed as under:

- The fundamental reason for this examination is to lead a pilot and contextual analysis of utilizing BIM technique to help to control the project's time and cost.
- The main goal of this investigation are to inspect the advantages of utilizing BIM for project time and cost control.
- Study of past research on BIM Applications for Project Scheduling and Quantity Take Off/Costing.
- Study of winning industry researches for getting ready 2D/3D Drawing, Project Scheduling and Quantity Estimation/Cost Estimation.
- Study of BIM Framework in connection with Modeling (3D), Project Scheduling (4D) and Quantity Take Off/Costing (5D)

CASE STUDY

A sample 2D drawing of Room is prepared in AutoCAD and thereafter 3D Model is prepared using AUTODESK Revit Architecture. Today, most amount data is delivered physically from 2D illustrations. This is a tedious procedure and there is plausibility of missteps, it might type error or recipe botch, this can prompt incorrect amount data. Cost overrun is the primary issue in AEC industry. Peeters and Madauss (2008) expressed the greatest reason for cost overwhelm is incorrect estimation toward the start of the project. This disadvantage is overwhelmed by utilizing BIM, by utilizing Revit 2017, amount is extricated from a model and exchanges it for cost estimation. This can spare time and it is precise moreover. In any case, for getting exact amount, model ought to be required exceptionally precise and all specifying require to appear in model.

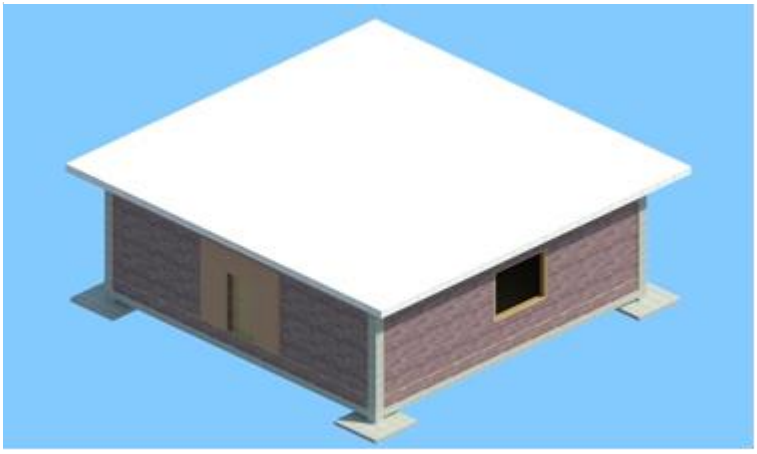

Fig 01- Sample of 3D rendered image

Conclusion

The general goal of this investigation was to check whether BIM can diminish project time and control cost. By utilizing BIM for estimation there is 80% decrease in time as contrast with estimation by traditional method. It spares times. The usage of BIM in AEC industry can make the business progressively adaptable, innovative and powerful.BIM model with minor details is time costly, however then cost control process is particularly beneficial with BIM than an old 2D CAD technique all through the project cycle.

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