Effective Analysis of Highrise Structure Buildings in Autodesk Revit Bim (Building Data Modeling) vs Autocad

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Abstract— Hand-drafted print, sketching and hand modeling were the quality for building styles before the appearance of pc power-assisted style (CAD) systems. These days CAD systems area unit higher understood, their adoption redoubled till the second, 3D CAD system and therefore the video game system became the norm. Their natural evolution has given rise to a replacement and additional complicated generation of building style tools referred to as building data modeling, or BIM.

There is meager clarity regarding what BIM is, though this can be up, and there's a lot of shared understanding. There's agreement that BIM isn't simply software system. BIM is collaboratively generated and maintains information made data supply for the lifetime of the look method and on the far side. During this paper, we tend to gift concisely the best worth derived from BIM within the use and maintenance of buildings. Building data Modeling (BIM) CAD pc aided style MEP Mechanical, Electrical & Plumbing TRNSYS Transient Simulation Program. Building data Modeling (BIM) is the method of generating and managing building information throughout its life cycle exploitation 3 dimensional, real-time, dynamic building modeling software system to decrease wasted time and resources in building style and construction. This method produces the building data model (also abbreviated BIM), that encompasses building pure mathematics, abstraction relationships, geographic data, and quantities and properties of building elements, together with the life-cycle processes of construction and facility operation.

Keywords— *BIM, CAD, Design, Building, Infrastructure, Management, Modeling*

1. INTRODUCTION

1.1 General

BIM is one amongst the foremost promising developments that permits the creation of 1 or additional correct virtual digitally created models of a building to support style, construction, fabrication, and procural activities through that the building is complete.

Building data modeling is digital illustration of physical and practical characteristics of a facility making a shared data resource for data regarding it and forming a reliable basis for choices throughout its life cycle, from earliest conception to demolition. it's basically worth making collaboration through the complete life-cycle of AN plus, underpinned by the creation, collation and exchange of shared 3D models and intelligent, structured information hooked up to them.

"Built environment" refers to buildings, structures and infrastructure in our surroundings that give the setting for the community's activities.

BIM is gaining quality amongst professionals at intervals the Indian designed setting sector. It enjoys most quality among practiced professionals since they need a much better appreciation of the worth proposition of BIM.

BIM is additional well-liked in giant organisations, with an oversized strength of technical employees, hinting that BIM implementation is additional useful in giant and complicated comes.

BIM is essentially in its 'experimentation' introduce India as compared to the developed world particularly once the maturity and level of implementation area unit taken into consideration.

BIM quality and usage seems relatively weak within the region of India. No single market leader has emerged and there's some skepticism as success stories don't seem to be wide accessible. Not solely this, what makes BIM therefore powerful is, the approach or manner data is contained at intervals every building part or object.

Earlier it absolutely was sent through hand drafting. The medium was two-dimensional i.e. within the kind of arrange, elevations and sections.
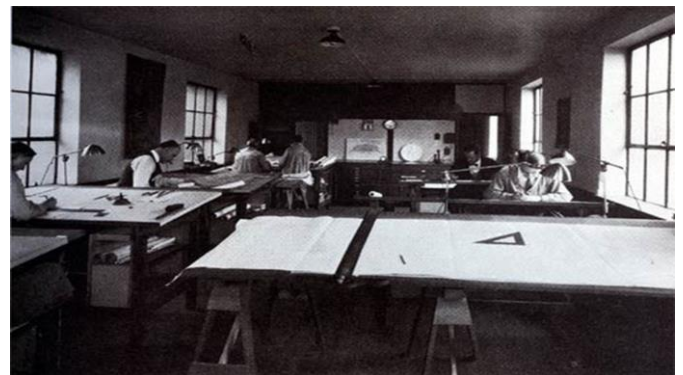

Fig 1: Earlier it absolutely was sent through hand drafting. The medium was two-dimensional

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Then, came AutoCAD which was merely an electronic medium to speak data against that done via hand drafting. the method until remained same i.e. in 2- dimension (plans, elevations and sections)
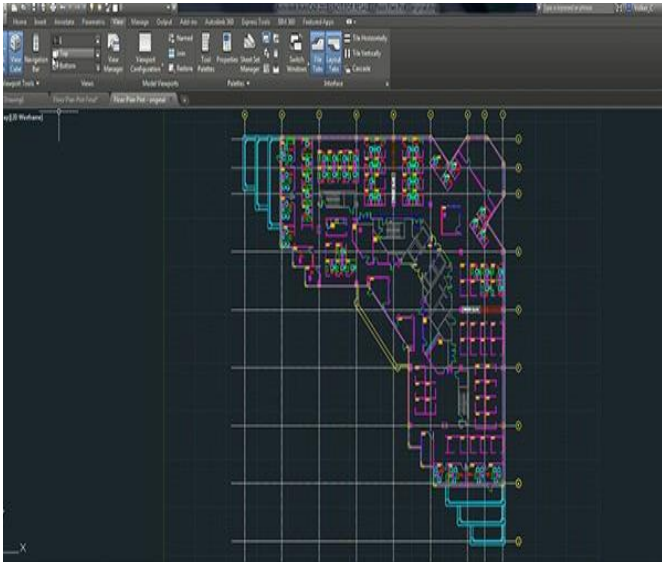
Fig 2: Then came AutoCAD. This was merely AN electronic medium to speak data against that done via hand drafting. the method until remained same i.e. in 2- dimension (plans, elevations and sections)

1.2 Difference between CAD & BIM

In CAD platform, everything may be a composition of points, lines and arcs. These compositions area unit won't be represented by completely different building components by individual discipline (Architects, Structural Engineers, and Service Engineers etc.)

Whereas, in BIM platform every Building part or Infrastructure (in cases wherever BIM is getting used for infrastructure project) part may be a distinctive identity in itself.

1.3 Parametric Objects

The pure mathematics in BIM based mostly platforms is ruled by the values provided in varied parameters related to a component. for instance, the below snap is of a wall. This wall has bound properties like 'Base Constraint', 'Base Offset', 'Top Constraint' & 'Top Offset' that area unit wont to govern the peak of this wall.

The advantage of operating with parameters is that, these operate as a information of data, which may be extracted or given in numerous ways in which. Like for instance, the parameters of a door may be created to schedule within the kind of a table. Any modification within the worth of the parameter, can at the same time update the model conjointly the} schedule and also the other place where that specific data is displayed.

Besides having constant quantity parameters, the weather at intervals BIM models even have bound set of Rules/ Behaviors embedded at intervals them.

Taking AN example of a door- A door desires a wall to be placed. If there's no wall, then you can't place a door at intervals BIM models. Secondly, the instant you place a door, it mechanically cuts/ deducts a little of wall adore its size.

This paper stress on the elemental distinction between BIM & CAD based software system applications. In BIM based mostly software system application, the tools accessible for getting ready a building area unit the particular components which fits into that building.

1.4 Applications of BIM

BIM software has following applications:
- Improved data flow
- Higher style visualization
- Improved value estimating
- Improved energy analysis
- Reduced construction costs

BIM (Building data Modeling) has modified the approach architects share data for construction comes. Now, we'll be able to have additional data regarding product which will be used furthermore because the style, provision or maintenance of the project. Several countries are still at the terribly starting of developing and deploying their own BIM methods.

2.0 MATERIALS AND METHODS

2.1 Autodesk Revit - It is a building data modeling software system for architects, landscape architects, structural engineers, MEP engineers, designers and contractors. The initial software system was developed by river software system, based in 1997, renamed Revit Technology Corporation in 2000, and bought by Autodesk in 2002. The software system permits users to style a building and structure and its elements in 3D, annotate the model with 2nd drafting parts, and access building data from the building model's information. Revit is 4D BIM capable with tools to set up and track numerous stages within the building's lifecycle, from conception to construction and later maintenance and/or demolition.

2.2 Revit MEP- MEP Fundamentals has been designed to grasp the essential HVAC, electrical, and plumbing/piping elements that create Revit MEP a robust and versatile engineering modeling tool.

2.3 Revit Structure: It is Autodesk's BIM software system answer for structural engineering corporations and structural engineers, that gives a feature wealthy tool set serving to to drive economical style processes during a BIM (Building data Modeling).

2.4 Navisworks: It permits users to open and mix 3D models, navigate around them in period and review the model employing a set of tools together with comments, redlining, viewpoint, and measurements. a range of plug-ins enhances the package adding interference detection, 4D time simulation, photorealistic rendering and PDF-like business enterprise.

2.5 Archicad: It is subject BIM CAD software for Macintosh and Windows developed by the Hungarian company Graphisoft. It offers PC power-assisted solutions for handling all common aspects of aesthetics and engineering throughout the full style method of the engineered surroundings — buildings, interiors, urban areas, etc.

The methodology involves the coordination of various technologies for project management through one 3D digital model that shortens the days of each the look and therefore the production, and thus it reduces prices. It conjointly implies a brand new means of coordinating the various groups concerned, up the standard of the engineering comes, design and construction.

In this paper, there is process to disaggregate the changes that have taken place within the operating and project development strategies, optimizing the method, streamlining phases of the project and achieving a lot of linear and cooperative work flow.

In the early stages, wherever the project evolves and is being generated, the BIM methodology helps America to simply extract floors and sections from one 3D model. This model is that the germ of the project and due to the assorted displays, it permits the understanding of the various proposals by the client and by our own team, and every one that in real time.

Because of the importance of the project's implementation on its place and its adaptation to the surroundings, is effective the data locomotes the energy analysis of the building. during this means from the initial phases comparatives of various property solutions square measure generated, permitting America to pick the foremost applicable from the abstract section. For this, we have a tendency to use the BIM model to check the optimum orientation of the rooms, the number of radiation and lower environmental impact (6D). We may, if necessary, export the model to specific tools that complement the data obtained from the native model.

The coordination of the look team begins gaining importance within the intermediate stages. From the beginning, domains and therefore the ability to switch the various style parts of every team member ought to be managed. BIM model associated an open surroundings, permits numerous style groups at the same time style completely different elements of the project, while not obtaining interference and expediting the method.

During the foremost advanced stages of the look, the employment of open standards permits the employment of the most effective specific tools within the calculation and size of structures and facilities. First of all, the export to International Finance Corporation of the subject model permits engineers to import into their programs modeling and analysis for analysis and approval by the project organizer. Afterwards BCF file sharing permits the transmission of comments and observations additionally as trailing the modifications to the project that facilitates its traceability.

The International Finance Corporation files also are accustomed federate or integrate the various partial models of the project, and check the degree of collisions between them. By victimization verification tools we have a tendency to find ahead doable anomalies that will cause conflict later in work, and so avoiding a lot of expensive changes throughout the execution of the work.

When it involves elaborate the work's documentation, the employment of BIM methodology ensures the right coordination between the three-dimensional model (3D), the two-dimensional planes exported to varied formats (2D). Likewise, the employment of displays of the model – with specific applications for mobile devices – permits a way a lot

of completed and updated reading of the project. This data is often at the disposal of labor team and therefore the shopper. Finally, we will conjointly export the International Finance Corporation file model to activity and budgeting programs (5D) and conjointly simulation, designing and construction management (4D) to finish the data that we will extract from the model. Once the project is constructed, the BIM model will still be accustomed do the great management of services and building maintenance (7D).

The BIM methodology is certainly not a technological transformation by itself isn't a software system, it's a modification of mentality. Client access to any or all data during a easy and sensible means in real time, is today doable and fascinating.

3.0 RESULTS AND DISCUSSIONS

The model was made using the software named Autodesk Revit showing a Structural Model of a building.
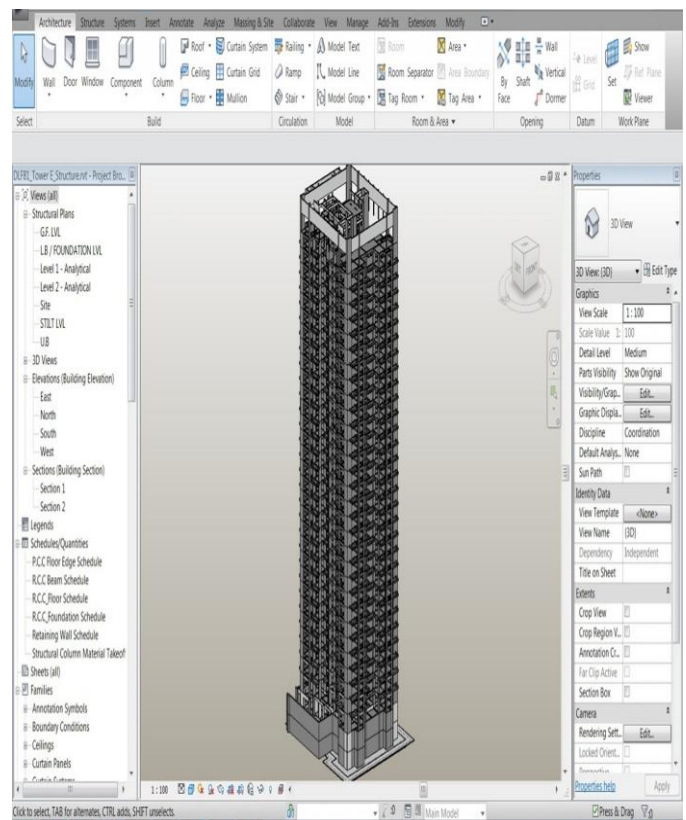

Fig 3: This is a still from Autodesk Revit showing a Structural Model of a building..

To every part modeled during a BIM primarily based software system applications, its quantities is at the same time extracted during a tabular type (called as SCHEDULES in Autodesk Revit). Here the quantities square measure Structural Framing i.e. Beams

Here, the concrete quantities of RCC floor have been scheduled that too floor wise:

This is a BIM primarily based Construction Estimating software system CostX. Here model writing cannot happen, however post-processing for amount extraction, cost-estimation etc. activities square measure done.
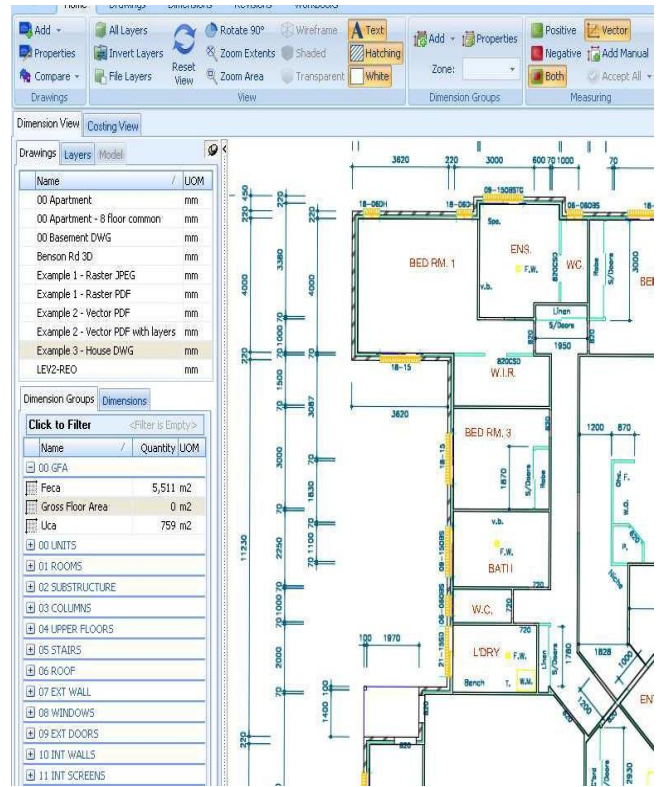
Talking regarding CostX, it conjointly supports 2 dimension CAD primarily based amount Take-Off (as shown within the image).

This tool (and different similar tools) supports BOQ preparation, value estimation etc. in excel/ program format (as shown within the image).

Vico Take-off Manager can be another tool serving the sooner mentioned purpose and even a lot of. This software

system tool has mechanically calculated many quantities associated with steel Framing.

The figure shows what all quantities this tool calculates for a floor part (which has been modeled during a BIM primarily based software system application.
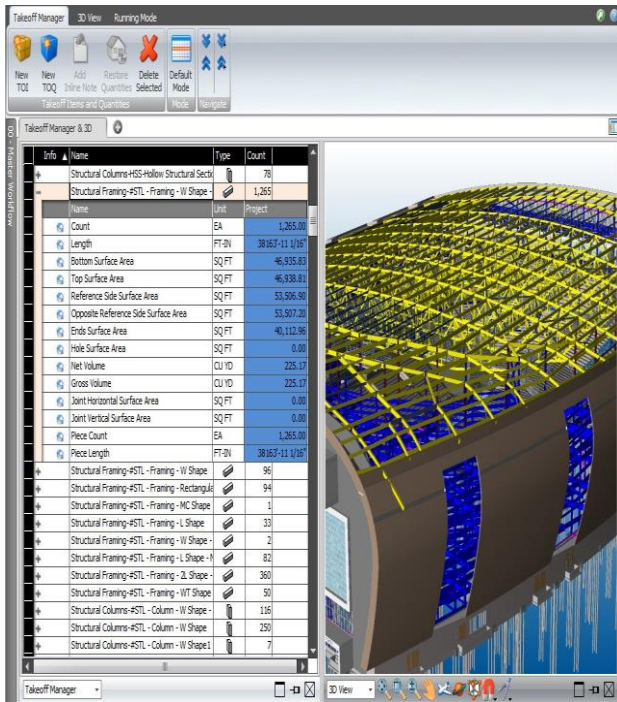

Fig 8 Vico Take-off Manager

4.0 CONCLUSION

A methodology was developed for BIM implementation at intervals structural engineering corporations (SEC). this technique clearly and objectively shows the way to do implementation and includes processes for analysis and designation, rethinking of objectives, identification of needs, planning, and observance of the proposal.

The methodology created express the instruments to perform the in-depth company analyses and embody steps for gathering data on current expectations, processes, and resources so as to obviously determine the potential of the corporate with a read to BIM restructuring.

The requirements for the adoption of BIM are careful and contemplate roles of the work team, technologies and house distribution, BIM-focused work flow, protocols, and different specific parts necessary for the success of the implementation. this permits corporations to spot implementation gaps and, afterwards, real needs for optimizing current resources.

Points that should be thought-about whereas designing a BIM implementation were raised with regard to general strategy, parallel and progressive varieties of implementation, work with pilot comes, diversifications to BIM work flow, economical assignment of roles, technological and physical transforming plans, coaching ways, standardising and creation of parts in BIM platforms, and therefore the

generation of a BIM Protocol for the corporate with follow-up and assessment actions.

The projected methodology, though considers tools and technology that ought to be used, doesn't specify however they connect directly with one another and don't detail the technical aspects for it to figure. it's been prioritized during this paper to point out however BIM ought to be enforced in method terms, as long as it's thought-about essential within the success of the incorporation of BIM. The technical are relative to the process tools used and can vary in every case.

In general, stress is placed on the way to address every of those things that ought to contemplate a structural engineering company, with a read to determination its productive inefficiencies, related to cooperative work and interconnection, and clear actions were delivered that result in a palmy implementation.

Finally, the implementation of the delineated methodology ought to be administrated in pilot corporations, for its sensible validation.

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