

# Process and application of BIM in Architecture, Engineering and Construction Industry with Effective Planning

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**Abstract:** This research has been undertaken to study the process and application of BIM in Architecture, Engineering and Construction Industry worldwide.

**Keywords – BIM architecture, Construction industry, planning.**

## I. INTRODUCTION - BIM 'FUTURE OF CONSTRUCTION INDUSTRY'

Building Information Modelling uses electronic and digital The team will be able to design an execution process which is well suited for each team member's business practices and typical organizational workflows. BIM Project Plan will help to outline additional training, resources, or other things necessary to successfully implement BIM for the information to manage the process of designing, constructing and operating a build asset. Instead of using paperwork, the BIM process prioritizes the collection and sharing of digital information, which can be used and re-used by an Architect, Contractor and Civil engineer, Facilities Manager or asset owner. Infrastructure data becomes more accessible and much more accurate.

BIM is a reliable process of Building Information concerning energy, sustainability and security objects and systems. This data is available in real time and allows individuals to make instant decisions backed by reliable intelligence. The model is dimensionally accurate and means that information about a built asset is correct at every stage of lifecycle. Using BIM, we can use the information in the model to improve our design before it's built. In fact, it gains faster buy-in and approvals with realistic visualization. Additionally it also improves efficiency and effectiveness of the construction phase, and also providing better understanding of building's future operations and maintenance.

### Project.

The Plan can set a benchmark which can help the future users who join the project. It can help to identify risk and implement risk response strategy. It can find and calculate earned value money during various stages of the project. It

can help procurement team to define a contract of procurement.

## II. DIFFERENT D'S IN BIM

### 1. 3D:- Geometry Modelling (Shape)

We're most conversant in 3 dimensional modelling - the method of making graphical and non-graphical information and sharing this information during a Common Data Environment (CDE).

### BIM in construction industry

With the construction industry being forecast to continually grow over the coming years, BIM has become a vital process which brings together information about every component of built asset. BIM is more than just working in 3D environment. The benefits of BIM can be seen thoroughly in the design and management phase.

### Benefits of developing BIM project plan

By developing a BIM project plan, one can achieve the following values- All the parties (Architect, Structural Engineer, Contractor and Client) will get transparency to the strategic goals. All the parties will understand their roles and responsibilities in the implementation of the project.

### 4D: - 3D + Duration, Timeline & Schedule Analysis

It adds up with extra information of schedule to the provided data. This data is synchronised with the components and gets updated because the project progresses.



Time-related information for a specific element might include information on time interval, how long it takes to install/construct, the time needed to become operational/harden/cure, the sequence during which components should be installed, and dependencies on other areas of the project.

### 3. 5D: - 4D + Cost Estimation, Budget Analysis

Drawing on the components of the knowledge model having the ability to extract accurate cost information is what's at the guts of 5D BIM. Considerations might include capital costs (the costs of buying and installing a component), its associated running costs and therefore the cost of renewal/replacement down the road. These calculations are often made on the idea of the info and associated information linked to particular components within the graphical model. This information allows cost managers to simply elaborate and calculate the quantities of a given component on a project, applying rates to those quantities, thereby reaching an overall cost for the event.

### 4. 6D:- 5D + Sustainability assessment (perform energy consumption)

Sometimes mentioned as integrated BIM or i\_BIM, 6D BIM involves the inclusion of data to support facilities management and operation to drive better business outcomes. This data includes all the knowledge and specifications of the merchandise, mark, cost, manufacturer, expiry date and handling instructions. It also includes performance and energy utilization.

### 5. 7D: - 6D + Management

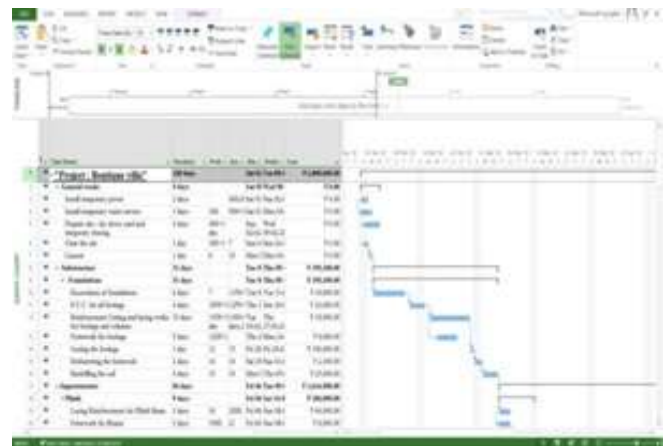
It is employed by managers within the operation and maintenance of the power throughout its life cycle. The 7D of BIM allows participants to extract and track necessary data associated with the component like its functionality, energy efficiency, etc. the use of 7D BIM technology may result in easier and quicker parts replacements, optimized compliance and a streamlined asset life cycle management over time.

## LET'S TAKE AN EXAMPLE WITH REAL PROJECT

The project was executed in Lonavala 'Farmhouse for Mr. Patil'. It is designed in Autodesk Revit for Landscape and Floor Plans with GFC and Schedule quantities.



The sheet consists of all Floor plans, sections, elevations, 3D views and quantity schedule. Here, 3D Geometry modelling is completed.



In BIM, the concept of 4D simulation has a great importance for generating. But sometimes, this approach makes difficult due to constant changes in design. Oracle has Assemble Systems recently announced integration between Assemble and Microsoft Project- Project Management.

The integration allows construction managers to combine the schedule and BIM data to communicate construction sequencing to owners and other partners. Users can easily create simulations and manage project changes.

### Uses

It is mainly used for Planning, Monitoring & Controlling and Reporting a project.

Used by planning engineers in Construction field.

### • Planning

It is used to create a project baseline program (set by planning manager with the help of site planning engineer). Also known as the Clause 14 program. This is the initial

program wont to find the particular sequence of activities to be followed for execution in site.

In Microsoft Project the resources are often loaded to activities. Thus it is easy to get a better picture regarding the yearly, quarterly, monthly, weekly and daily program.

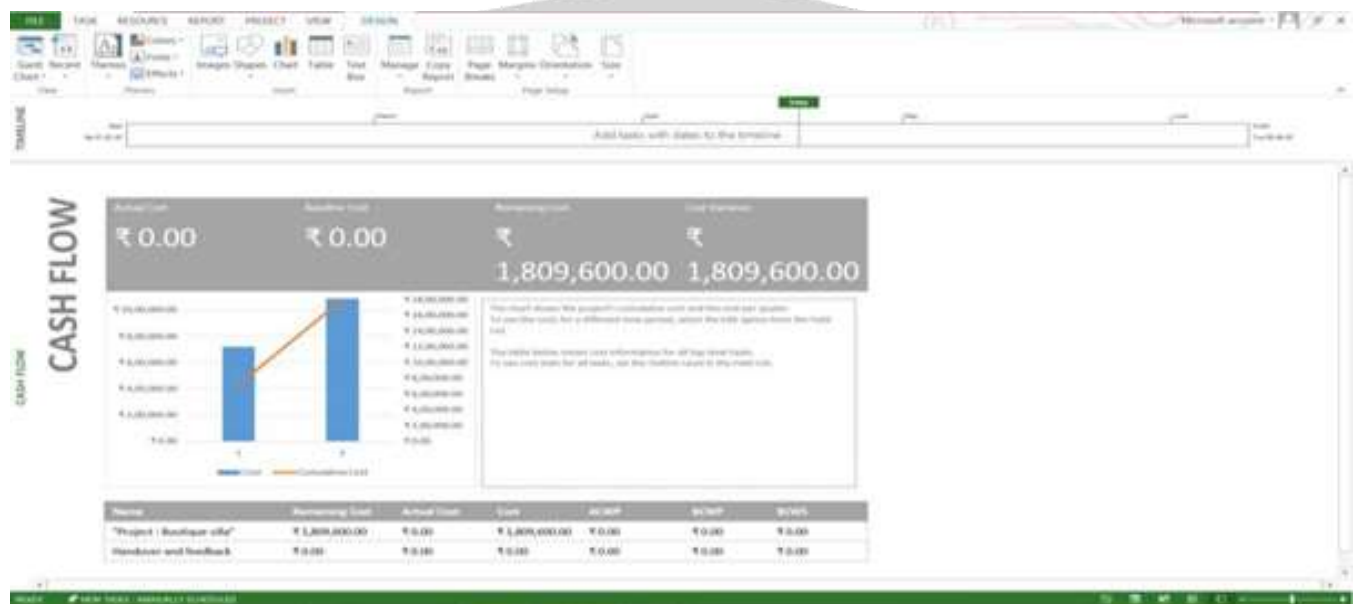
In Huge projects, this information acts vital to understand the sequence of activities to stop any delay within the project.

**• Monitoring (done by site planning engineer)**

Once the initial baseline program is set and finalised. We can now monitor the project very easily.

**• Reporting**

Reporting is formed easy in Microsoft Project because of its numerous in-built layouts and formats which are customizable.



**III. ENERGY OPTIMIZATION:-**

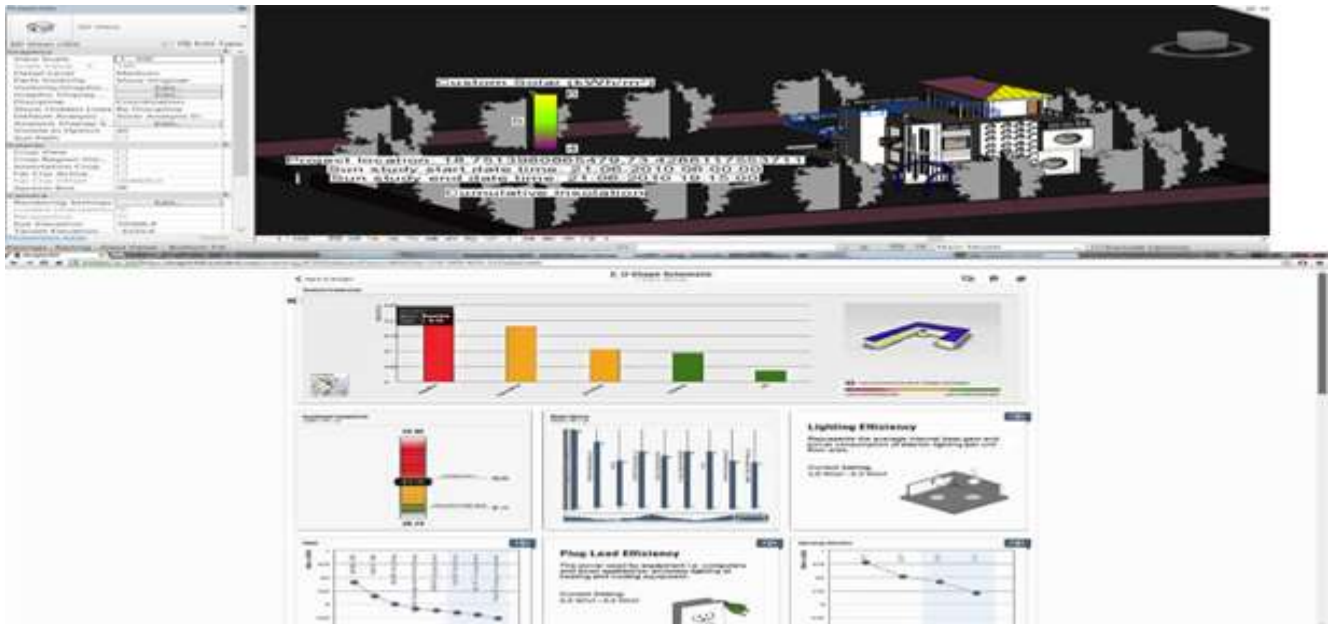
Building consumes a lot of energy produced in site location. With the speed of construction, it will be critical for Architects and Engineers to take pain and calculate energy performance in their designs. Insight-Pug in of Revit, allows designers to integrate lighting, energy and solar analysis in their project and leverage sophisticated simulation engines that empower to make smart, data driven design choices.

The Baseline program can now be set in the program and can be monitored. So this gives an actual site progress status.

This is comparatively very easy in Microsoft Project instead of the other softwares.

**• Controlling**

In Microsoft Project the entire Float, free float are often easily calculated at the press of a button. Hence it's very easy to spot the critical and sub critical activities and stop it from delay.



#### IV. CONCLUSION

This research helped us to understand BM process better than what we learned in the academics. We tend to implement the process in our practical life. Building information modelling (BIM) is a process that generates and manages digital representations of buildings, in terms of both physical and functional characteristics. Not only does BIM make construction more efficient, but it also helps cut materials costs. In all, we've to recognize future benefits of BIM and be market leaders. BIM should be made compulsory to compete international markets. The value for owners with BIM – saves **TIME, MONEY** during **BUILDING LIFE-CYCLE**.