ARCHITECTURAL MODELING USING REVIT

INTRODUCTION TO BIM

INTRODUCTION

1.1 What is BIM?

Building Information Modelling (BIM) is a systematic and coordinated process of planning, design, construction, and operation of a facility with the help of a digital prototype.
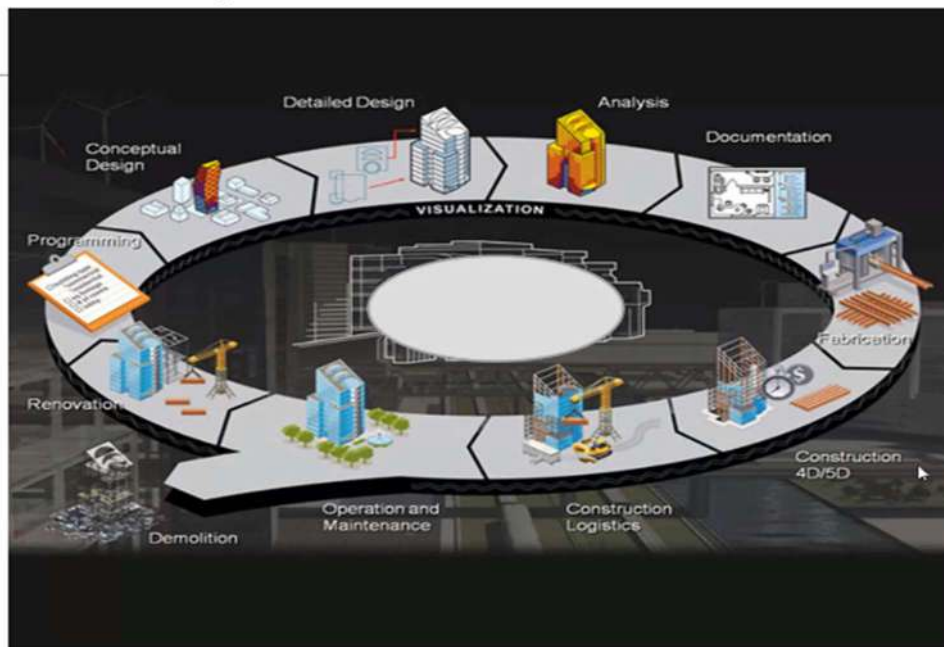
BIM is a process! NOT Software!!
The BIM process is based on a digital model, created by using the software.

1.2 DETAILS OF BIM :

There are different phases in the BIM project.

Workflow of a Project:

The workflow of BIM projects has come across different phases like planning, design, construction, and operation.

The first thing in the workflow of a BIM project is programming.

1.2.1 PROGRAMMING:

To construct any building we have to know the particular requirements, whether it is a residential, commercial, or any educational building.

All the requirements should be taken into consideration.

1.2.2 CONCEPTUAL DESIGN:

Conceptual design is phase one of Detail design and engineering in which drawings are the main output. During the conceptual design stage, the consultant team will develop-
- The Design concept
- Outline specifications
- Schedule of accommodation
- Planning strategies
- The cost plan.

1.2.3 DETAILED DESIGN:

Detailed design is the phase where the design is refined and plans, specifications, and estimates are created. Detailed design will include outputs such as 2D and 3D models, Cost Buildup estimates. This phase is where The full cost of the project is identified.

1.2.4 ANALYSIS:

The analysis is the determination of the effects of loads on physical structures and their components. Structures subject to this type of analysis must withstand loads, such as buildings, bridges. Structural analysis is thus a key part of the engineering design of structures.

1.2.5 DOCUMENTATION:

Design documentation is a set of documents that are necessary for the building and use of construction work including specifications, technical drawings, instructions on maintenance, and other relevant documents (explanatory diagrams, tables, and charts for drawings, expert opinions, and survey reports and other documents).

1.2.6 FABRICATION:

Fabrication is a process of bending, cutting, and molding steel structures to create beams, columns, and steel members. Structural steel is cost-effective, durable, and highly stable for construction.

1.2.7 CONSTRUCTION 4D/5D:

In today's digitalized world 4D and 5D BIM modules are set to bring the revolution in the construction industry. By integrating information-rich 3D BIM models with additional dimensions of scheduling and cost and material estimations, 4D and 5D BIM modules manage better the effect on project costs and scheduling.

1.2.8 CONSTRUCTION LOGISTICS:

Logistics management is the process of planning, implementing and controlling supply chain resources, generally from the point of origin, such as raw material accumulation, to the point of destination.

1.2.9 OPERATION & MAINTENANCE:

Operations and maintenance typically include the day-to-day activities necessary for the building/built structure, its systems and equipment, and occupants/users to perform their intended function. Operations and maintenance are combined into the common term O&M because a facility cannot operate at peak efficiency without being maintained; therefore the two are discussed as one.

1.2.10 RENOVATION:

Renovations (also called remodeling) are the process of improving a broken, damaged, or outdated structure. Renovations are typically either commercial or residential.

1.2.11 DEMOLITION:

We know that every structure is designed for a specific life period, generally 100 years. The existence of the structure after the service life period is very dangerous to its occupants and surrounding buildings. Therefore it becomes essential to demolish the building.

1.3 DIMENSIONS OF BIM:

BIM MEANS 3D…?!

As we know earlier 1D and 2D are all about the project requirement and layout of the building. Then we will go for the models of the building where the BIM process and BIM dimensions actually get started.

There are different dimensions of BIM:
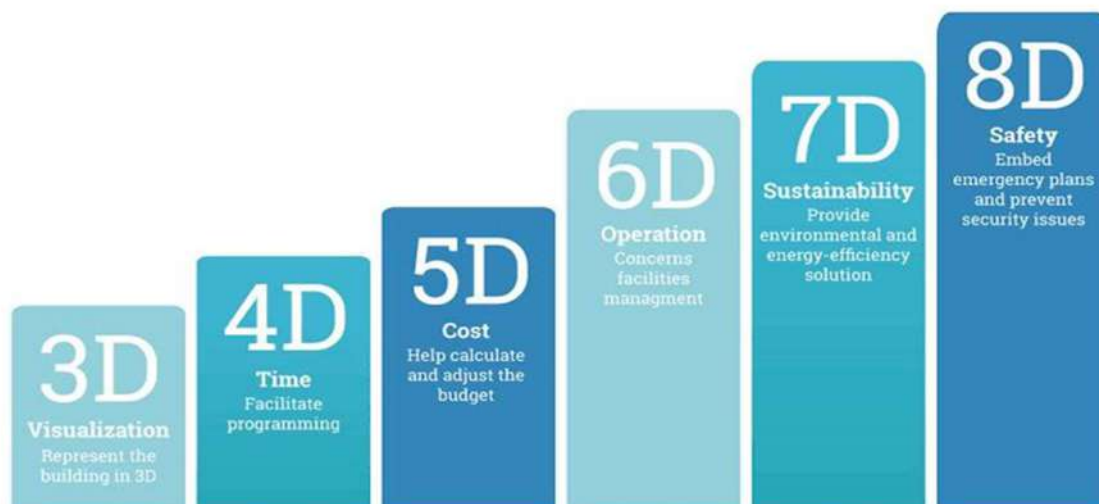
1.3.1 3D MODELS:

Representing a building in 3D, while guaranteeing a realistic rendering of the aesthetic appearance and excellent geometric adherence of the modeled elements.

1.3.2 4D TIME:

Time management represents a fundamental aspect of construction planning.

Construction site or project time management has certain limits and critical issues:

- Data loss from designer to company.
- Lack of communication between works management and suppliers.
- The effective presence of materials on the construction site.
- The progress of the work execution.

These are just some of the reasons that cause delays and inefficiencies with the consequent need to review what has been planned up until that particular point.

1.3.3 5D COST:

The focal point of 5D BIM is the "Quantity Take Off", which consists in the measurement extraction from a project to define the material/quantity necessary for the construction.

Once this operation has been completed, it is necessary to choose the price items to be assigned to the construction works, with the relative unit price, and then determining the amount.

1.3.4 6D OPERATIONS:

6D BIM involves the inclusion of information to support facilities management and operation to drive better business outcomes. If the materials are effectively present on the construction site, then the faster operation is possible.

If there is a lack of materials then there will be a delay in the operation of the project. The 6D mainly concerns with the facility management.

1.3.5 7D SUSTAINABILITY:

BIM integrated with other analysis & evaluation tools are used to track building performance data, which can be compared with specified sustainable standards to identify the flaws in the building systems. Facility's sustainability program can be improved to better match the sustainability goals.

1.3.6 8D SAFETY:

An effective means of preventing hazards in the construction industry is 8D BIM. Construction professionals can detect risks in the early design stage of projects. Hence, one of the most competent means of dealing with a hazard is to eliminate it at the source by preventing design errors.

1.4 CAPABILITIES OF BIM
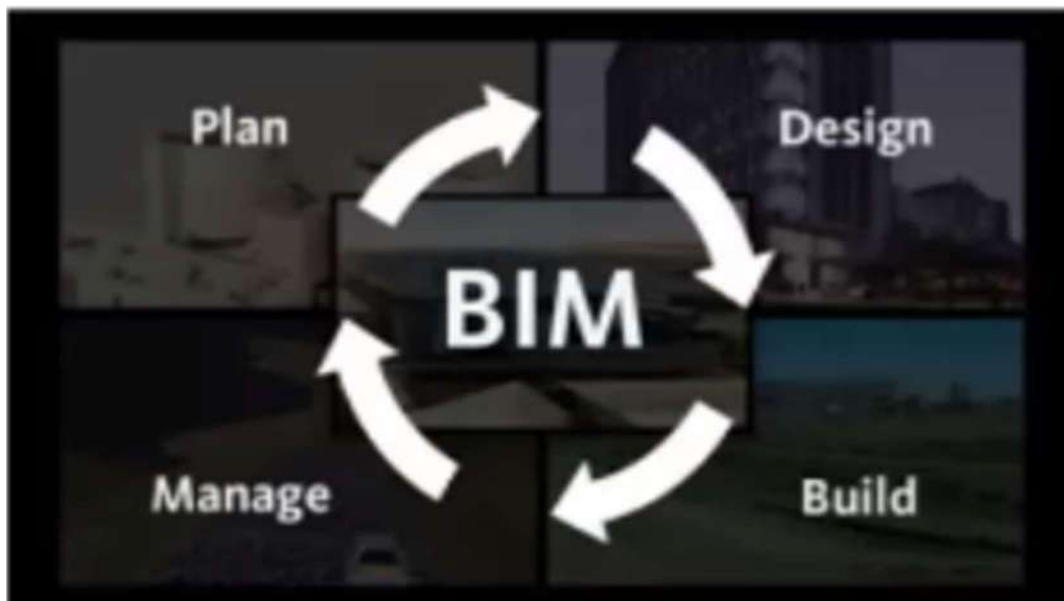
BIM provides a collaborative single platform for Architectural, Engineering, Construction & Operation team which leads to:

- Better coordination and clash detection
- Eliminating on-site conflicts and rework
- Better decision in early stages
- Cost reduction with material quantities
- We can reduce wastage, rework, cost, and time
- Stronger Facility management and project handover.

1.5 SUMMARY:

BIM is a model based technology in which cloud allows different members of a cross functional team to work on the same project. In the BIM process we can use the different softwares at the different levels to support the project and to execute the project perfectly.