PDHonline Course G191 (3 PDH)

Concept of Building Information Modeling

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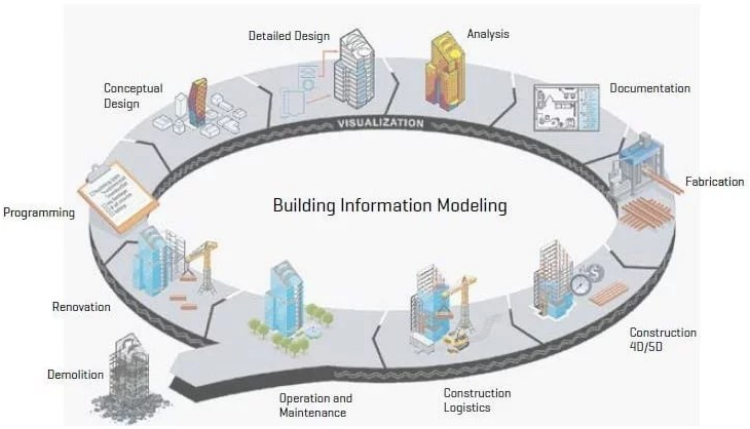
What is BIM?

Building Information Modeling (BIM) is a digital representation of physical and functional characteristics of a facility. A BIM is a shared knowledge resource for information about a facility forming a reliable basis for decisions during its lifecycle; defined as existing from earliest conception to demolition.

Building Information Modelling (BIM) is both a new technology and a new way of working. BIM is a term that has been around for a while in manufacturing and engineering industries, and has made an impact in the construction sector.

The term 'building model' (in the sense of BIM as used today) was first used in papers in the mid-1980s. However, the terms 'Building Information Model' and 'Building Information Modeling' (including the acronym "BIM") did not become popularly used until some 10 years later. In 2002, Autodesk released a white paper entitled "Building Information Modeling," and other software vendors also started to assert their involvement in the field.



Source: theconstructor.org

Today, design and construction professionals have Building Information Modeling tools like Revit, Tekla structure, Bentley BIM suite and DProfiler etc.. These software are very well accepted and are capable of 3D detailed architectural, structural, mechanical, electrical, and generative components modeling.

BIM involves much more than simply implementing new software. It is a different way of thinking. This requires a move away from the traditional workflow, with all parties (including architects, surveyors and contractors) sharing, and effectively working on, a common information pool. This is a substantial shift from the more traditional convention where parties often work on separate information pools using several different (and usually incompatible) software packages. In essence, BIM involves building a digital prototype of the model and simulating it in a digital world.

The process of implementing BIM moves away from using conventional word-processing and CAD into the increased use of common standards and product orientated representations. BIM changes the emphasis by making the model the primary tool for documentation, from which an increasing number of documents, or more accurately “reports”, such as plans, schedules and bills of quantities may be derived.

Essentially, BIM combines technology with new working practices to improve the quality of the delivered product and also improve the reliability, timeliness and consistency of the process. It is equally applicable to asset and facilities management as it is to construction. In its purest form, BIM provides a common single and coordinated source of structured information to support all parties involved in the delivery process, whether that be to design, construct, and/or operate. Because all parties involved with a BIM project have access to the same data, the information loss associated with handing a project over from design team to construction team and to building owner/operator is kept to a minimum.

A BIM model contains representations of the actual parts and pieces being used to construct a building along with geometry, spatial relationships, geographic information, quantities and properties of building components (for example manufacturers' details). BIM can be used to demonstrate the entire building lifecycle from construction through to facility operation.

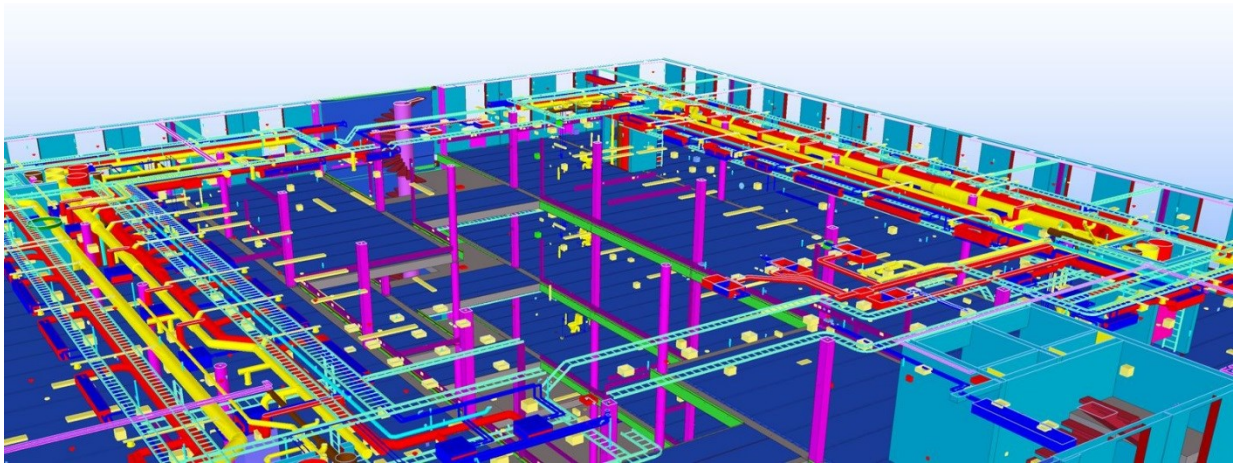
Often (mistakenly) referred to as 3D, 4D or nD, BIM should not be confused with the number of dimensions used to represent a building. At its simplest level, BIM provides a common environment for all information defining a building, facility or asset, together with its common parts and activities. This includes building shape, design and construction time, costs, physical performance, logistics and more. More importantly, the information relates to the intended objects (components) and processes, rather than relating to the appearance and presentation of documents and drawings.

BIM changes the traditional process by making the model the primary tool for the whole project team. This ensures that all the designers, contractors and subcontractors maintain their common basis for design, and that the detailed relationships between systems can be explored and fully detailed. Working with BIM will require new skills and these will have to be learned from practice.

BIM is not a panacea – it remains just as possible to produce a poor model, in terms of its functionality, its constructability or its value, as it is to produce poor drawings, schedules or any other, more traditional, form of information. Also, in the absence of any pro-active collaborative management effort, models may end up being prepared to suit the originator as opposed to being structured and presented with all parties to the design and construction team in mind. Ensuring that there is an agreed structure and exchange protocol in place to suit all parties will improve certainty, confidence and consistency. By moving to a shared information model environment, project failures and cost overruns become less likely. BIM certainly means having a better understanding and control of costs and schedules as well as being able to ensure that the right information is available at the right time to reduce requests for information, manage change and limit (or even eliminate) unforeseen costs, delays and claims.

Clients are often in the best position to lead the introduction of BIM. Understanding the value of building information and its impact on the client's own business is leading many clients to require BIM to specify the standards and methods to be used in its adoption. Clients can also provide clear requirements for facilities management information to be handed over at project completion more easily with BIM. Some international clients are even now going so far as to penalize lack of information (or the lack of its provision at established points in the construction process).

More recent experience indicates a trend in large clients and government agencies across the globe to mandate the use of BIM, not only for delivery of the building, but also as a tool to manage operationally. BIM is equally applicable to support facility and asset management as it is to design and construction. Indeed, the output of the design model may well replace the need for traditional O&M manuals. Being able to interrogate an intelligent model, as opposed to searching through outdated manuals, perhaps linked to interactive guidance on the repair and/or maintenance process has obvious advantages.



Source: Constructible.trimble.com

BIM is a relatively new technology in an industry typically slow to adopt change. Yet many early adopters are confident that BIM will grow to play an even more crucial role in building documentation. Proponents claim that BIM offers:

- Improved visualization
- Improved productivity due to easy retrieval of information
- Increased coordination of construction documents
- Embedding and linking of vital information such as vendors for specific materials, location of details and quantities required for estimation and tendering
- Increased speed of delivery
- Reduced costs

BIM also contains most of the data needed for building performance analysis. The building properties in BIM can be used to automatically create the input file for building performance simulation and save a significant amount of time and effort. Moreover, automation of this process reduces errors and mismatches in the building performance simulation process.

In summary, Building Information Modeling (BIM) is an intelligent 3D model-based process that gives architecture, engineering, and construction (AEC) professionals the insight and tools to more efficiently plan, design, construct, and manage buildings and infrastructure.