

1542421 Final plagi

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BIM IMPLEMENTATION PROCESS

1.0 Introduction

BIM (“Building Information Modelling”) ¹ is the process which is supported by different technologies, tools and the contracts that involves management and generation of the functional and physical characteristics of different places. This is the process of workflow used for design, planning, management and construction of the building and its infrastructure. The model of BIM is the virtual form of the project outcome generated from the concept to the completion in its entire lifecycle. With the use of BIM that allows the completion of the project in an economical and efficient manner causing less impact to the environment.

2.0 Discussion

Section 1: Building Information Modeling

1.0 BIM & its importance in construction industry

BIM is a technological method for the management of information. With the use of a BIM model that allows collaboration of different members of the team, information sharing and monitoring the cost of the project. The application of digital tools have made management of the project easy in a streamlined manner and silos are avoided. The potential hazards that can be caused can be predicted using this software and thus necessary adjustments are made using the software.

The management of construction is a complex process which requires open communication between the construction and design teams (Dakhil *et al.* 2019). On occurrence of miscommunication, delays and errors, that can highly impact the overall cost of the project. This issue is solved using the BIM software. This has helped to make better decisions of design and improve the performance of the building. Digitization of the construction site and the information are connected through handover. This also helps in the improvement in predictability, workflow profitability and enhanced productivity. It supports successful delivery of the project by improving the design quality and collaboration. In this way adopting BIM for the operational and capital phase of the auditorium project will be beneficial. Revit is the single application for BIM with different features like architectural design, structural engineering and MEP.

2.0 Requirement for interoperability of BIM

BIM interoperability is the capacity to data exchange among different applications, allows standard workflows and the automation process is simplified. BIM interoperability that allows working of two systems together and allows information exchange. Interoperability in the computing that enables working and interaction of one software with the other that have made the process simpler.

Different organizations and teams are able to share the required data of a project to all the stakeholders. This has only become possible due to BIM interoperability. Thus, the required information of the project is stored in the single place and accessed by different disciplines using different tools. It indicates data exchanging ability with different systems by introducing major modifications. BIM allows the techniques for visualization like augmented reality to fulfill different targets like management of defects, previewing of built environment and facility management.

BIM Modeling: BIM modeling is the digital representation of the functional and physical characteristics of the facilities.

Field Analysis: A process in which the tools of BIM are utilized for the property evaluation in the area given for determining the most suitable site location for future project purpose.

Visualization: It helps to better understand the design solution and helps to make proper modification as per the requirements.

Collaboration: The 3D model allows better understanding of the project. Effective communication with the project stakeholders which ensures alignment of the construction process requirements.

Planning: The interoperability approach enables working together of the persons having the same software and the similar information can be accessed by all. Different stakeholders involved with the project require data access. BIM allows information exchange across different ranges of software thus the interoperability is provided.

Operation: Interoperability is necessary at the initial stage of the project.

Section 2: Supporting BIM500

3.0 BIM dimension

The dimension of the BIM influences the outcome of the project. There are different dimensions like 3D, 4D, 6D, 5D and 7D dimensions of the model of BIM. These dimensions help in the improvement of the data related to the model, which will enhance the transparency and comprehension level regarding the building project. BIM basically helps in reducing the building materials wastage that helps to assess the project risk. It helps in clash detection which ensures that there is no mistake over the site.

2D Dimension of BIM: It is the past model of construction. This mainly comprises the Y- axis and X- axis. These types are mostly made using the hand or using CAD drawings.

3D dimension of BIM: It is the popular dimension of BIM which is widely used. The classroom auditorium was designed on a 3D model. 3D structure represents the geographical structure in 3 dimensions, which includes X- axis, Z- axis and Y- axis. 3D BIM involves creating non- graphical and graphical building information which can be shared into the “common data environment (CDE)”.

4D dimension of BIM: The BIM model of 4D that provides dimensional information additionally like the time or data element. This model initiates with 3D BIM that includes a time element. It is basically 3D BIM and schedule.

5D dimension of BIM: It is basically 4D BIM and cost estimation. The main function of 5D modeling is integration of the schedule, cost and the design in a 3D output. This predicts the finance flow and the progress is visualized.

6D dimension of BIM: 6D BIM involves the addition of other information supporting operations and present information.

7D dimension of BIM: The 7D BIM which mainly consists of 3D, time schedule, cost intelligence and sustainability. 7D BIM is utilized for the operation and maintenance of the project in its whole life cycle.

4.0 BIM Execution Plan

BIM Execution Plan is helpful in the management of the auditorium classroom project. For the successful implementation of BIM, the execution plan is required. The plan defines building of the construction project form designing, facility management construction also collaboration process for BIM execution. It helps in management and quality control of the deliverables of BIM. Pre contract BEP are created by the prospective vendors that provide details about the competency, strategy, competence and capacity for satisfaction to the information requirements of the employees. The BIM execution plan that helps in timely delivery of the project and within the budget, ensures proper communication and collaboration, transparency. The execution plan consists of the team's responsibilities and roles, project milestones, “Project Information Plan (PIP)”, work process and many more.

Project Stakeholder

Discipline	Role Code	Organization	Originator code	Key Contact
Architect	A	ABC Company	XYZ	Shyam Prasad

Civil Engineer	B	ABC Company	XYZ	S. Singh
Building Surveyor	C	ABC Company	XYZ	K. Yadav
Facility Manager	D	ABC Company	XYZ	M. Singh
Structural Engineer	E	ABC Company	XYZ	B. Yadav
Interior designer	F	ABC Company	XYZ	K. Singh

3 Project Milestones

RIBA Plan of Work	Period	Project Milestone	BIM Deliverable
Strategic Definition	5	Understanding the project requirement.	The requirement of the project is understood clearly.
Brief Preparation	8	Project plan is prepared.	Proper planning of the project is performed.
Concept Design	9	Design of the auditorium classroom.	Auditorium classroom is designed in the Autodesk Revit software.
Developed Design	10	Proper modification of the developed design.	Developed design is modified properly.
Technical Design	20	The chairs of the classroom auditorium is designed to accommodate maximum number of peoples.	The chairs are aligned properly after design development.
Construction	25	After the planning stage, the auditorium is constructed.	Auditorium is constructed finally.
Handover & Closeout	5	Project is delivered finally.	Project is delivered finally.

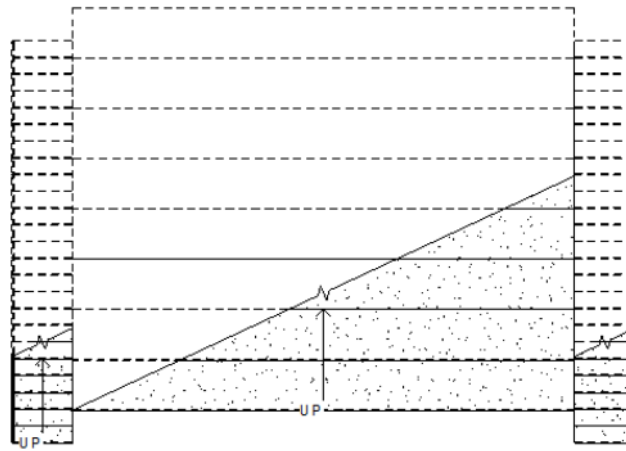


Figure 1: Classroom Auditorium Plan
 (Source: Self- created in Revit)

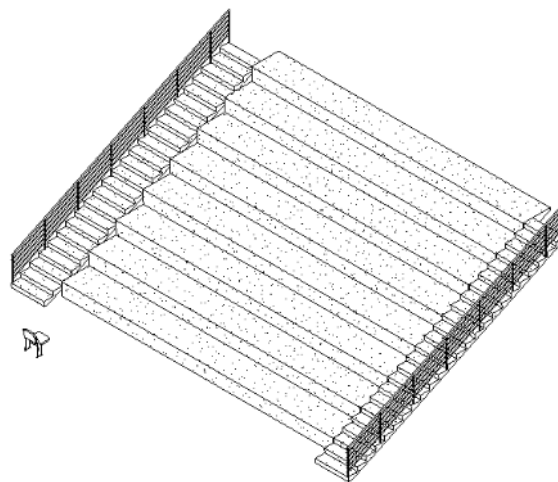


Figure 2: 3D View of Classroom Auditorium
 (Source: Self- created in Revit)

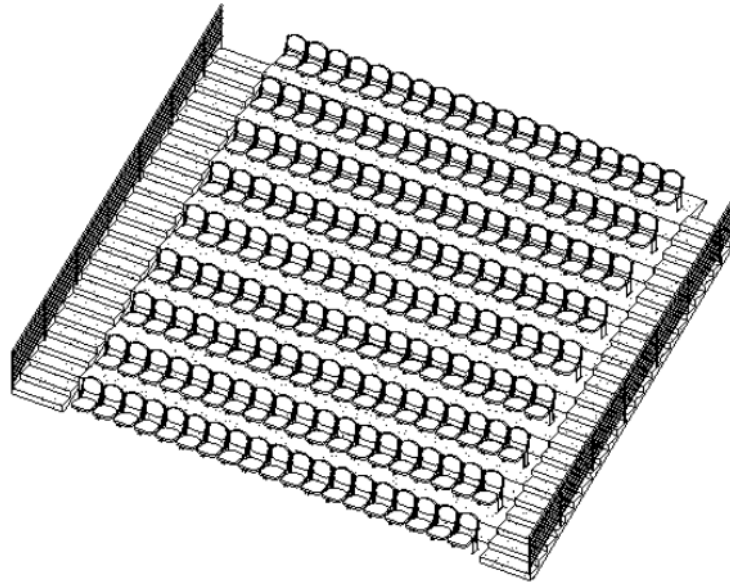


Figure 3: Classroom Auditorium

(Source: Self- created in Revit)

Section 3: BIM Process750

5.0 Main difference between modern and traditional process of management

- Traditional management of design that follows the process of massive batching with the use of schematic design, construction documentation and design development.
- The information that results from the batching leads to the formation of different assumptions on the basis of the outdated knowledge.
- In the construction and design industry, misunderstandings are primarily a contributor in waste generation.
- The outcome obtained from the traditional management process will result in delays and inaccurate design.
- Traditional process of management affects the performance and cost of the project.

6.0 Positive outcomes

The different events of BIM offer positive outcomes to the design team. The significant benefits achieved in the construction process are resource and cost savings, great efficiency and short life cycle of the project, improved coordination and communication process, opportunities for modular construction and prefabrication and also helps in obtaining quality results.

- **Resource and cost saving:** It provides reliable estimation of the cost of construction. Tools like BIM 360 Docs are used for cost estimation of the materials, prefabricated shipping, material shipping and labor cost.
- **Great efficiency and short lifecycle of project:** Fast the completion of construction process that involves less cost of the project.
- **Improved communication:** The communication is improved among the contractors, architects and other parties associated with the project. BIM relies on a single information source that includes estimates and models to be stored and shared in the single place.
- **Modular construction & Prefabrication:** The BIM software is used for creating detailed models of production to be prefabricated later on off- site.
- **High quality result:** BIM have also helped to improve the quality of building by making accurate and detailed calculations.

7.0 Process of BIM implementation

The process of creation, management and sharing of the information due to BIM implementation of the classroom auditorium. This are as follows:

Pre- design phase: This phase involves considering different decisions related to the project. The classroom auditorium plan is developed considering the design requirements.

Design Phase: In the design phase which involves additional parts of the BIM like estimation and scheduling (5D and 4D). Scheduling ensures timely delivery of the classroom auditorium and estimation which ensures that the project is aligned within the predetermined budget. Collaboration plays a crucial role in the delivery of the design process.

Construction Phase: The designed plan is then constructed as per the design. Simulation that allows accurate estimation of the project.

8.0 Detailed appraisal of responsibilities as Information Manager

- The protocol of BIM suggests selection of an information manager by the client who is responsible for management and setting up of the environment of shared data.
- The main responsibility of the information manager is acting as the gatekeepers for the process, monitoring the environment of shared data in order to check if it is adhered to the existing protocols and ensures safe keeping of the data.

- However, Information Managers are not the BIM coordinator as it is not responsible for the clash detection, model coordination or design. They are also not responsible for designing purposes.

Detailed responsibilities of the Information Manager are as follows:

- Creating an environment of shared data with integrity, workflows and security.
- Establishing standards, model structure, conformance and output format of the information.
- Establishing different information and detailed responsibility in every stage of the project in accordance to the requirements of the employer's information.
- Allowing integration of the project team and coordination of the leading designer.
- Supports sharing of project information.
- Keeping of records, change control are the services performed by the Information Manager.

They are involved to host the environment of shared data.

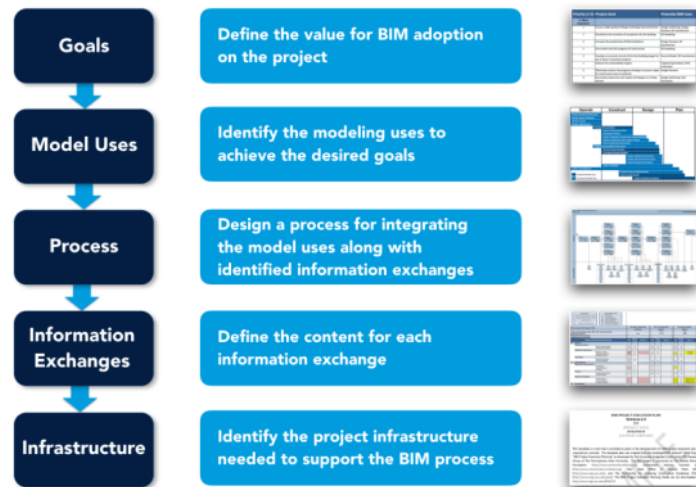
3.0 Conclusion150

From the study it can be concluded that the entire project is focused on the implementation of BIM in the design process. BIM, or "Building Information Modeling," is a process that manages and generates the functional and physical characteristics of various locations. It is supported by a variety of technologies, tools, and contracts. This workflow procedure is used for the infrastructure of the building as well as its design, planning, and management. The project outcome developed from conception to completion over the course of a project's complete lifecycle is represented virtually by the BIM model. With BIM, the project may be completed more cheaply and effectively while having a smaller environmental impact.

Reference List

Appendices

Appendix 1: BIM Execution Plan



(Source: <https://psu.pb.unizin.org>)

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