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Development of BIM for Building Projects

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ABSTRACT

Building Information Modeling (BIM), also called n-D Modeling or Virtual Prototyping Technology, is a revolutionary development that is quickly reshaping the Architecture- Engineering-Construction (AEC) industry. BIM is both a technology and a process. The technology component of BIM helps project stakeholders to visualize what is to be built in a simulated environment to identify any potential design, construction or operational issues.The paper presents an overview of BIM with focus on its core concepts, applications in the project life cycle.The paper also elaborates risks and barriers to BIM implementation and future trends.The issues of introduction of building information modeling (BIM) in construction industry are considered.

I.   INTRODUCTION
Concept of BIM(Building Information Modeling)?

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. It is a smart 3D modeling process used to efficiently plan, design, construct, and manage buildings or infrastructure. By keeping a shared resource of project data, BIM helps keep workers, managers, and stakeholders on the same page.It is a process for creating and managing information on a construction project across the project lifecycle. One of the key outputs of this process is the Building Information Model, the digital description of every aspect of the built asset. This model draws on information assembled collaboratively and updated at key stages of a project. Creating a digital Building Information Model enables those who interact with the building to optimize their actions, resulting in a greater whole life value for the asset.

BIM is information modelling and information management in a team environment, all team members should be working to the same standards as one another. BIM creates value from the combined efforts of people, process and technology.

BIM brings together all of the information about every component of a building, in one place. BIM makes it possible for anyone to access that information for any purpose, e.g. to integrate different aspects of the design more effectively. In this way, the risk of mistakes or discrepancies is reduced, and abortive costs minimized.

II.OBJECTIVES
1.   To study the concept of BIM.
2.   Discuss some BIM software and its implementation.
3.   Development of BIM for created projects.
4.   Development of planning of residential and commercial building projects.
5.   Discussion and suggestion for effective BIM development for building projects.
6.   To study challenges and risks in BIM project.

III.DETAIL STUDY ABOUT SOME BIM SOFTWARES:
a)Autodesk Revit

In primitive times, AutoCAD is the fundamental core program needed by .the engineers, architects and construction professionals for functional expertise on projects. But with the emergence of Autodesk Revit software, it can make work for professionals easier and create a better environment for each discipline.

Revit is an architectural design and documentation software program used by architects and engineers for managing building design and detailing the model. Sooner, many countries came across that BIM is better than CAD as the model

was accurate and quickly developed.

BIM Services is a process and not an application beneath the umbrella is Revit software. It is creating models which are used for planning, design, construction and management of building a design to make the construction projects faster, economical with causing less harm to the environment. BIM Model makes the exterior and interior elements which can be changed and stay updated while any third party personnel can work in it.

b)Google sketchUp

SketchUp is an intuitive 3D modeling application that lets you create and edit 2D and 3D models with a patented "Push and Pull" method. The Push and Pull tool allows designers to extrude any flat surface into 3D shapes. All you have to do is click an object and then start pulling it until you like what you see.

SketchUp is a program used for a wide range of 3D modeling projects like architectural, interior design, landscape architecture, and video game design, to name a few of its uses.

The program includes drawing layout functionality, surface rendering, and supports third-party plugins from the Extension Warehouse. The app has a wide range of applications, including in the worlds of architecture, interior design, landscaping, and video game design. Sketchup has also found success with people who want to create, share, or download 3D models for use with 3D printers.

Sketchup was created in 1999 by @Last Software. In 2006, Google acquired SketchUp after @Last Software created a plugin for Google Earth that caught the eye of the tech giant. In 2012, Trimble Navigation (now Trimble Inc.) acquired Sketchup from Google and expanded the app by launching a new website that hosts plugins and extensions.

IV.CREATED PLANS IN BIM SOFTWARES: 3D REVIT ARCHITECTURAL PLAN

Isometric view1

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Isometric view 2

left side view

Right side view

Front side

Back side

V.DIFFERENCES WHILE DESIGNING RESIDENTIAL AND COMMERCIAL BUILDINGS:

Both residential and commercial building design require similar planning and infrastructural integrity. But there are key differences between the two, which can be summed up in three main differences.

Building Needs

Residential buildings are for people to live in. Commercial buildings, on the other hand, have many purposes that can affect the design.Some commercial buildings are businesses or retail stores, which require specific design elements like:
1.   Storerooms
2.   Offices
3.   Meeting rooms
Other examples of commercial buildings are schools, hospitals, police stations, and government buildings. Each of these would require different architecture to accommodate the building's needs.For example, hospitals would need operating rooms, while schools would need a gymnasium. Each building also requires different electrical and plumbing planning.

Unique Requirements

Many commercial buildings will have more people in them at one time. This alters the building codes and the safety elements compared to a residential building housing only 5 people.Commercial buildings often have other unique additions that residential buildings don't have, like:
1.   Elevators
2.   Escalators
3.   Parking structures
4.   Cafeterias
5.   Gyms
6.   Restaurant kitchens
7.   Large bathrooms
8.   Conference rooms Size

We mentioned how commercial buildings often have more people in them than residential buildings. Why are there usually more people within commercial buildings? Simple: commercial buildings and architecture projects are usually larger than residential buildings. To accommodate more people, commercial buildings are made to be larger. The larger size definitely has an effect on the architectural design compared to designing a home.While residential and commercial architecture design do have some common ground, there are key differences that change how different buildings are designed.

VI.KEY FEATURES OF BIM

1.   Uses 3D models to capture, explore, and maintain consistent and coordinated planning, design, construction, and operational data.
2.   Provides greater project insight for cost, schedule, and constructability.
3.   Uses and shares consistent data whether you're at your desk or in the field.

4.   Enables prompt response to change with processes that are smarter and faster.

VII.CONCLUSION

1.   BIM is efficiently used for residential, commercial, high rise buildings, industries etc in current scenario.

2.   Adopting BIM may be less risky and less cost-effective than not doing so.Construction Companies since the existence of BIM have been trading their hands-on with example Revit software, which creates 3D BIM Model to enhance building design and construction projects.

3.   Gained more knowledge and learned benefits about the tools including all the views of the model by creating Revit & Google sketchup 3D models.

4.   While residential and   commercial architecture design do have some common ground, there are key differences that change how different buildings are designed.

5.   Developing an organizational BIM Project Execution Plan before project inception can decrease project planning time.

6.   Shifting to BIM does involve spending on software, training, and time. A thing to look at, though, is that the potential benefits outweigh the costs - those who have adopted BIM tend to report that the results have been better that they anticipated.

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