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Facility Management by Using Building Information Modelling and Current Status of BIM

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Abstract – *Building Information Modelling (BIM) is the latest software technology in the construction industry. This can be applied throughout the life cycle of the construction of a building. BIM is also applied by Facility Management (FM) team. Managing FM effectively is extremely difficult owing to various environments. One of the difficulties is the performance of 2D graphics when depicting facilities locations. BIM uses precise geometry and relevant data to support the facilities to describe 3D object. Conducting face to face interview with construction professionals to know the current status of BIM in the construction industry.*

Key Words: **Building Information Modelling (BIM), Facility Management (FM), Current Status, Space Utilization, Building Lifecycle, Operation and Maintenance, Construction Industry.**

1. INTRODUCTION

In BIM a digital representation of the building process can be used to facilitate the exchange and interoperability of information in digital format. It is expected that the BIM data is captured and used across the entire project life-cycle. While BIM has been predominantly used in design and construction purposes for many years due to its visualization and coordination capabilities, there is an ascending interest in professionals to use BIM in FM activities. Whatever graphical and non-graphical data of the facility is collected in BIM during the project life-cycle can be used for various FM activities such as commissioning and close out, quality control, energy management, and maintenance and. While there are other computer aided facilities management (CAFM) applications in which various data related with space management, assets, move management, O&M is created, updated, and pushed for FM activities, the sources of information in these systems vary during the project life-cycle, leaving information handover processes inefficient. BIM, in that case, has the potential to be a catalyst to improve efficiency by establishing the relationships between FM and other disciplines. Although BIM is emerging and gaining acceptance in design and construction phases, a recent survey of construction industry suggests that only 43% of construction professionals are BIM users and 57% are non-BIM users. There are some pioneering organizations that push the usage of BIM for FM. However, people still have been unable to recognize and quantify the benefits of BIM for FM. The requirements for successfully utilizing BIM for FM are not clearly understood in terms of interactions and interrelations between BIM and FM. This paper reviews BIM and FM literature to understand their functions, interrelations and interactions. The review focuses on identifying the gaps, and assessing the value adding potential and potential challenges in using of BIM for FM.

1.1 Objectives of the study

Developing a synchronization link between BIM model and FM system.

By reviewing related literature get an overall know-how about BIM/FM integration and related benefits and problems will describe it in a detail.

1.2 Scope of the study

- To know the current status of BIM in the construction industry.
- BIM application in the Facility Management.
- Creation of Model.

2. METHODOLOGY

To evaluate the current practice approaches of Building Information Modelling in the construction project. The previous studies is used to know the parameters used for making a model by BIM and for survey. Then questionnaire survey and personnel interviews are conducted among construction professionals to know the current status of BIM and to know the stages that BIM is used. The obtained data is analyzed. Parameters are identified from previous studies and is applied in the model created by using Revit. Adding information in the model to get a model that suitable for facility management.

2. RESULT AND DISCUSSION

The analysis of survey results on the current practice of Building Information Modelling (BIM) in construction projects. Data obtained from the questionnaire about experience of respondent get the current status of BIM in the construction industry and stages of BIM used.

2.1 Current Status of BIM

current status of the implementation of BIM in FM, and challenges and barriers to BIM implementation. The interviews resulted in distinct insights which provided a perspective of the industry on the topic. Interview results were used to design the survey questions, which aimed at understanding the status of BIM implementation in construction industry.

The survey suggests that only 47% of construction professionals are using BIM, and 57 % are non-BIM users, mainly people used BIM for design purposes and that the industry is not clear enough about BIM.

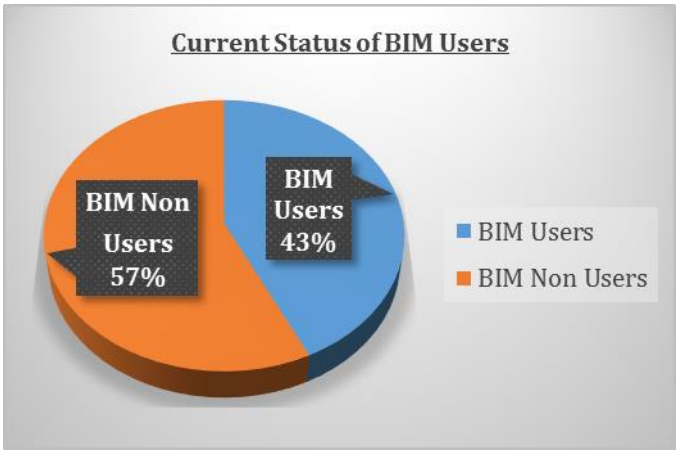

Chart -1: Current Status of BIM

2.2 Facilities Management Application Areas

Provides a detailed discussion on which application areas of facilities management BIM could be implemented and beneficial for, on the basis of the feedback gathered from the current and future implementers of BIM-enabled FM practices, and from persona interviews.

Locating Building Components

To perform commissioning or preventive and corrective maintenance, FM personnel regularly need to locate building components (equipment, materials, and finishes) and related information for prompt problem detection and resolution. Conventionally, on-site FM personnel rely on paper-based blueprints or on their experience, intuition, and judgment in finding and locating building equipment such as HVAC systems and electrical, gas, and water lines, which are located in places not readily visible such as above the ceilings, behind the walls, or under the floors. Locating the equipment is a repetitive and time- and labor-consuming task for either the repair technician or the equipment manager.

Facilitating Real-Time Data Access

Facilities management personnel perform preventive, predictive (planned), and corrective (repair) maintenance, respond to trouble calls (e.g., a room is too cold), replace obsolete items, and conduct predictive testing and inspection to maintain the built environment.

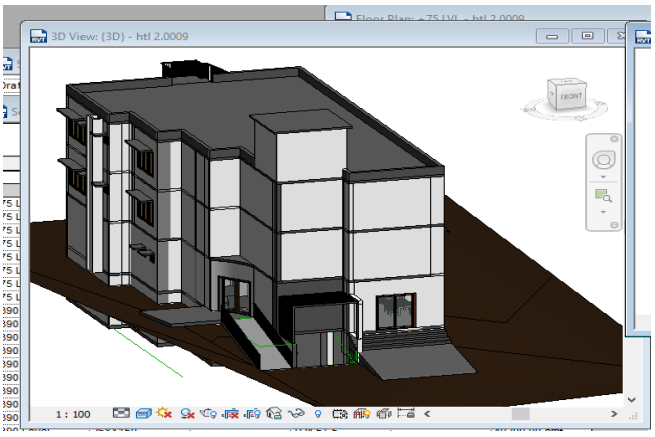

Fig -1: Model using Revit Architecture

Visualization and Marketing

The importance of BIM's visualization and coordination capabilities has been discussed and assessed in different construction projects. With its three-dimensional graphical interface and ability to integrate material texture, light sources, landscaping, and so on, BIM provides improved visualization of the space to facility managers.

Checking Maintainability

Maintainability is defined as the ability to achieve optimum performance throughout the life span of a facility with a minimum life cycle cost. Initial capital costs and schedules are given priority in most projects, ignoring the fact that over the whole life cycle the biggest costs come from operation and maintenance.

Space Management

Effective space management not only optimizes the physical utilization of the spaces and related assets, but also has a positive impact on the productivity of the people working in those spaces. To efficiently manage space during the occupancy stage, forecast space requirements, assign space, and streamline the move process, FM personnel need to maintain a representation of facilities with the attributes of each space, such as space numbers, descriptions, boundaries, areas (gross, assignable, and non-assignable), volume, intended use, and actual status. Traditionally, CAD files are used for managing space, and identifiers are utilized for fetching and displaying the space attributes. Inconsistent naming conventions and laborious attribute updates are two primary issues with current practice. Building information modeling can visualize space and host space attributes for immediate access to facilitate identifying underutilized spaces, forecast space requirements, simplify space analysis, manage the move process, and compare actual with planned space utilization.

Planning and Feasibility Studies for Noncapital

Construction

Remodeling, renovating, or demolishing existing buildings could be within the responsibilities of FM organizations, depending on the scale of the work and availability of resources. Building information modeling can potentially assist in planning, designing, analyzing, and simulating remodel, renovation, or demolition work. The planned work could be modeled in BIM at such a level of detail that the visual characteristics of exteriors and interiors of the work are well presented, the dimensions of major components are scaled, quantities of required building materials can be estimated, and type and model of equipment are identified.

Emergency Management

Types of emergencies include human-caused emergencies, natural disasters, internal disturbances, and attacks. Emergency management depends on data from a variety of sources. During an actual emergency, it is critical to have the data organized and displayed logically to respond and take appropriate actions.

2.3 Benefits of BIM and Facility Management Integration

- Improved data quality in FM systems so that paper files not required
- Reduced cost and time needed to address equipment problems
- Better building and equipment performance (reliability, energy use)
- Use of integrated system to plan building modifications

3. CONCLUSIONS

The paper explore the industry in implementing BIM for the complete building life cycle rather than just for the design and construction stages, and also to identify potential application areas and benefits of BIM. The findings summarized as 43% are BIM users and 57% are Non-BIM users. BIM in some of the application areas faster than in others. These application areas include locating components, facilitating real-time data access and checking maintainability. To guide and improve implementation of BIM in these application areas, this paper initiated identifying data and process requirements to facilitate a life cycle BIM implementation approach. And extent how BIM could support the effective and efficient

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