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Building Information Modelling for Construction and Facility Management

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Abstract:- Building Information Modeling (BIM) is the growing technology in the construction. BIM has a wide range of advance than traditional methods used for construction design and operations. Tis study enables the use of BIM in the construction industry than traditional for Facility Management purposes and others. A model is created using Revit to apply Facility Management in formations. Many large building owners see great benefits for developing and maintaining lifecycle data for its facilities. The overall purpose of utilizing BIM for data handover and facility management is to enable facility owners to leverage design and construction data to provide safe, healthy, effective and efficient work environments.

Keywords:- *Building Information Modelling; Facility Management; Building Lifecycle; Construction Industry***.**

I. INTRODUCTION

Building Information Modeling (BIM) latest software technology widely accepted by the construction industry**.** Practitioners and researchers have developed new uses for BIM and BIM implementation approaches are expanding their scope beyond conventional design activities to include pre-construction, estimation, safety, operations, and maintenance. In recent years, facilities management and operations have focused on the use of BIM as a key technology to support facility management (FM). A BIM for facility management provides visualization, access to the precise location and relationships of building systems and equipment, and access to accurate existing condition attribute data. BIM provides several advantages over traditional 2D drawings. BIM is a data-rich, object-based, intelligent and parametric digital representation of the facility.

By integrating BIM into FM, two major benefits can be achieved.

- Operations and maintenance staff will be able to use 3D models to graphically visualize all major aspects of the facility for planning, asset management, scheduling and analysis.

- Ability that BIM provides to bring data directly into a facilities management system. BIM models can serve as intelligent repository of facility data generated across the facility life cycle. This data can be queried, searched then extracted and linked to FM saving owners time and money spent looking for the data at the end of construction. 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.

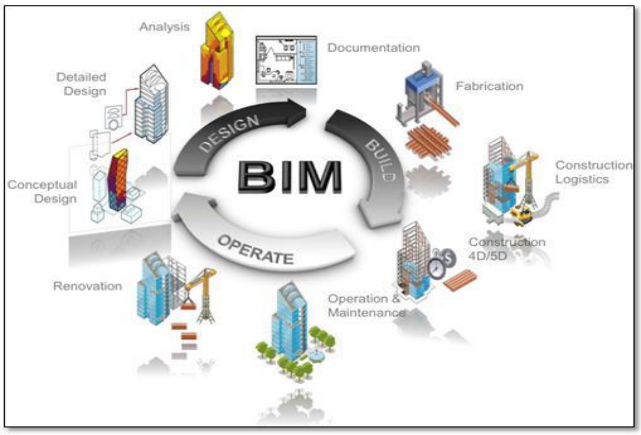

Fig 1:- BIM Through the Lifecycle of a Building

II. AIM

To know the importance of the BIM in the construction industry and Facility Management applications.

III. THEORY

Facilities management (FM) can be defined as an integrated approach to operating, maintaining, improving and adapting building and infrastructure assets in order to support the primary objectives of the occupants, owners and facility managers.FM constitutes an extensive field encompassing multidisciplinary and independent disciplines whose overall purpose is to maximize building functions while ensuring occupants wellbeing.FM functions require extensive data and information from various fields and disciplines in order to fulfil their purpose.

IV. METHODOLOGY

A. Revit Model Setup By BIM Integration

Throughout the history of computer aided building design, the programs, applications and software have continued to specify and improve for different reasons. All components of the design, construction and operation of a building can be documented and displayed through software. Depending on the need of the user and purpose of the information, certain types of programs are more suitable than others. This section explores the software of BIM, FM and integrators: their purposes, features, benefits and capabilities.

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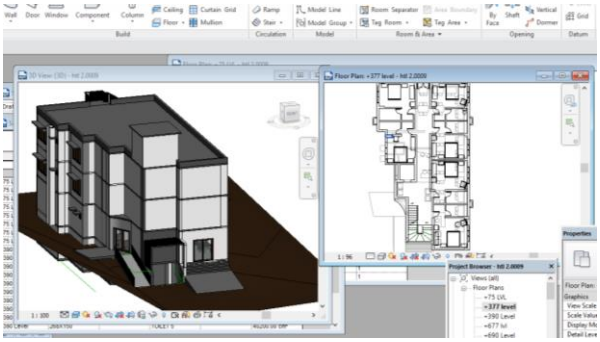

Fig 2:- Revit Model

B. Adding Facility Management Information in Model

This can be determining the information that was needed from the existing BIM models to be useful for facilities management operations. Each asset carried its own desired attribute list. An example of the assets and attributes is the duplex air compressor which had desired attributes. These attributes ranged from amperage to motor manufacturer to model number. These asset and attributes list was then compared to the corresponding assets and the desired attributes in the BIM models. To more efficiently cross reference the information, schedules from the BIM models were created. For each unique parameter listed in the asset list, a parameter field was created. Through the "Shared Parameters" function in Revit, the name and type of entry for the parameters were designated. Once created, the parameter was then assigned to the appropriate categories for the objects it had to identify. Also in this step, it could be designated under which section of the object properties the parameter would be located. In Figure 3, the "Shared Parameters" function is being used to add a parameter. The figure is adding the manufacturer parameter to the Shared Parameters list.

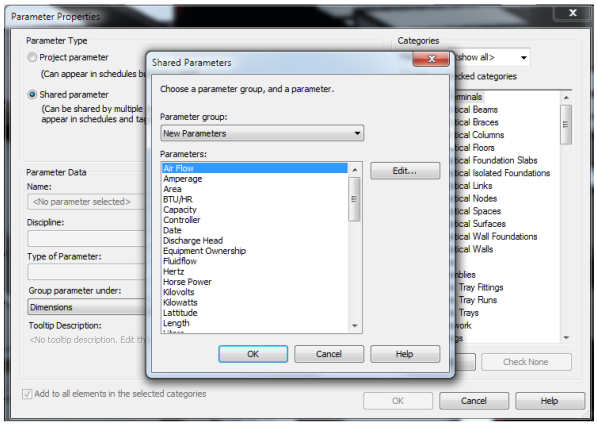

Fig 3:- Adding Parameters for FacilityMnangement

C. Space Management

A process in which BIM is utilized to effectively distribute, manage, and track appropriate spaces and related resources within a facility. A facility building information model allows the facility management team to analyze the existing use of the space and effectively apply transition planning management towards any applicable changes. Such applications are particularly useful during a project's renovation where building segments are to remain occupied. Space Management and Tracking ensures the appropriate allocation of spatial resources throughout the life of the facility. This use benefits from the utilization of the record model. This application often requires integration.

- More easily identify and allocate space for appropriate building use
- Increase the efficiency of transition planning and management
- Proficiently use of current space and resources
- Assist in planning future space needs for the facility

The figure 4 shows the space utilization schedule of the Residency. Calculating each area of building by assigning the schedule. And the total can be calculated. The level, department of each room, size, area, etc. can be shown. In the schedule. And assignable and non-assignable can be provided to show completed and in-completed works.

D. Improved Process

The work developed and intended to produce a model that can be used by Facility Management; however, this was done after the design and construction BIM models were created. Since most of the design and construction was done without the involvement of the facility management team, the asset information need by FM was not included. This cause an extra step of tagging and recording the data for the assets of the building, which is redundant and time consuming since it is information that was much more accessible when the BIM models were being created. Also, generally the information collected from the tagging is not always incorporated into the models, so the models are never completed to the extent which facility management needs. The solution proposed is an established template that may be given to the different contractors or designers for a project.

E. Facility Management Operations

While considering solutions for the overarching problem of interoperability between software, integration research was made to look into other possible options. The team investigated various software and processes to consider for facility management use. Each option was further researched and numerous benefits and limitations were determined. The below chart displays the some possible integration tools and their evaluation.

V. CONCLUSION

The present study identified the use of BIM for FM and practices. In the study compared the traditional with BIM. And creation of BIM for FM. The contract language for construction of new facilities may then be modified to incorporate BIM technology in the construction of new facilities.

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