AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERING
Architecture Engineering

Building Information Modeling and Maintenance Management (BIM-MM): A Tool for Enhancing University Buildings Environment

A Thesis submitted in partial fulfillment of the requirements of the degree of
Master of Science in Architectural Engineering
(Architecture Engineering)

by

Omar Abd El-Rahman Taher El-Feky

Bachelor of Science in Architectural Engineering
(Architecture Engineering)
Higher Institute of Engineering, El-Shorouk Academy, 2013

Supervised By

Prof. Dr. Ali Mohamed Fathey Aid

Professor of Architecture, Faculty of Engineering, Ain Shams University

Dr. Laila Mohamed Khodeir

Associate Professor of Architecture, Faculty of Engineering, Ain Shams University

Faculty of Engineering, Ain Shams University
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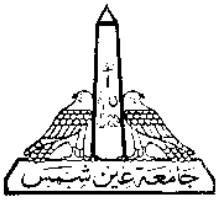

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Examiners' Committee

Name and Affiliation	**Signature**
Prof. Dr. Mohamed Mahmoued Oweida Architecture , Cairo University	……..
Prof. Dr. Hossam El-Din Hassan Elborombaly Architecture , Ain Shams University	……..
Prof. Dr. Ali Mohamed Fathey Aid Architecture , Ain Shams University	……..
Ass. Prof. Laila Mohamed Khodeir Architecture , Ain Shams University	……..

Date: 31 August 2019

Statement

This thesis is submitted as a partial fulfillment of Master of Science in Architectural Engineering, Faculty of Engineering, Ain shams University.

The author carried out the work included in this thesis, and no part of it has been submitted for a degree or a qualification at any other scientific entity.

Student name

Signature

…….....…….

Date: Jan 1, 2020

Researcher Data

Name	: Omar Abd El-Rahman Taher Salama
Date of birth	: 7-3-1991
Place of birth	: Cairo, Egypt
Last academic degree	:Bachelor of Science in Architectural Engineering
Field of specialization	: Architecture Engineering
University issued the degree	: El-Shorouk Academy
Date of issued degree	: 2013
Current job	: **Teaching Assistant** of Architecture Engineering at El-Shorouk Academy & **BIM Architect Engineer**

Abstract

The using of traditional two-dimensional (2D) drawing construction industry creates communication gaps among owners, architects, and contractors. These gaps exist in all phases of project, but are more evident in operation and maintenance management (O&MM). Universities administration is currently starting to explore and implement new methods to receive more valuable as-built information.

A BIM-MM is an emerging information maintenance technology that manages and promotes a collaborative process for the architectural engineering and construction. It can facilitate the exchange and interoperability of information management, and therefore could provide enhanced benefits to Universities' Buildings.

The aim of this thesis is to generated and design a SWOT analysis tool (Strengths, Opportunities, Weaknesses, Threats) that would preliminary evaluate feasibility for the application of enhanced BIM-MM approach in UBE in Egypt.

The research work consists of two main tools; questionnaire and interview. This questionnaire is structured to evaluate respondents experience to assess the actual practices

adopted in MM and the expected benefits from BIM implementation on University buildings. This questionnaire has been sent to more than 200 persons in different educational background (graduate, master degree and Ph.D.) in public and private Universities in Egypt. The objective of the tool is to leverage the existing data in BIM-MM to enhance the quality of University building environment.

The interviews have designed to determine the level of applying MM using BIM at Universities buildings environment. The interviews were applied with MM managers of three public Universities (Ain Shams University, Cairo University and Al-Azhar University) and three privet Universities (American University in Cairo, British University in Egypt and Arab Academy for Science, Technology & Maritime Transport). The interviews have involved the MM managers at the studied Universities to discuss the value of these parameters and attributes for enhancing University buildings environment at Egypt. This interview is structured to evaluate Universities experience (MM department manager) to assess the actual practices adopted in MM and the expected benefits from BIM implementation on Universities buildings

environment. Also, the results will be a guidance to upgrade and enhance the current situation at Egyptian Universities.

All paper-based systems, that used for capturing, measuring, controlling and reporting error to admin, have an adversely effect on maintenance prosses that insufficiently impact University building environment (UBE). however, computerized system, that used for capturing, measuring, controlling and reporting error to admin, have a great effect on maintenance prosses that adversely impact UBE.

The great influence of internal maintenance team on the speed of solving problems has noticed. hence, the internal maintenance team should develop and extent the scope of work to include most University maintenance requirements. Also, outsourcing maintenance team should annually check the devices and equipment to preserve it for a long time. while outsourcing maintenance team is still a slower way to solve problems.

It is important to use preventive maintenance to keep University's services and asset's services professional for enhancing UBE. however, hybrid maintenance enhances Universities services and assets serves in UBE.

Abstract

The significance of applying info sessions or announcements to learn how to deal with any problem, maintenance procedures for equipment/assets to keep it safe. The better time to fix problems is at 6pm:12pm that does not affect the UBE. The importance of supervisor daily checking the quality of building assets is to preserve the durability of assets and apply preventive more than corrective maintenance actions.

Going to problem place will take time to check if the problem is easy visible and take more time to check if the problem is hard visible, so the detection speed and situation identification of problem errors are easier in BIM.

The gap between respondents or users and MM department should be linked or more communicated to enhance UBE. Maintenance is a responsibility of everyone in the plant, not just the maintenance personnel.

For interviewed Universities that applying BIM for MM in UBE, BIM helps in visualizing for capturing, manage, report, measure and control any problem when happen and which means reducing time. Creating BIM helps to better understanding architectural systems (such as wall, floor, roof) and creating BIM helps MEP to better understanding architectural systems (such as

air terminals, duct, plumping). Implementing 3D modeling in BIM earns the MM-department team better understanding of University. The using of BIM has added value to the MM and enhance data exchange between software as common language.

Key words: BIM-MM - University buildings environment - University buildings in Egypt – maintenance management .

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Table of Contents