Chapter 22
Maintenance Management for Public Buildings Using Building Information Modeling BIM

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ABSTRACT

Building maintenance is gaining an increasing attention in the various fields of scientific research and there was a need for the use of new technologies in maintenance management, as the facility management deal with a large amount of information relating to maintenance, which includes drawings and specifications, lists, and reports, and the use of paper files leads to decrease the efficiency and create a shortage of data and information. The authors offer in this research tool to manage the maintenance process by using the BIM through linking deterioration models and three-dimensional model of the facility to be maintained and compensate the external investigation data for maintenance work in these models to get at the end of this research and with the help of the possibilities offered by Revit database to an upcoming maintenance items and arrange them according to their importance and impact on the facility and the estimated budget for the periodic maintenance and distribution of this budget on the various construction elements and the development of resources plan for next year.

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INTRODUCTION

Maintenance is defined as a continuous process and a constant activity to preserve the buildings and the maintenance of the equipment in the best case for normal use. The maintenance includes the entire building with its various construction, sanitary, mechanical, electrical, ventilation (Akasah, 2007).

There were many views that the maintenance process is complex and requires high costs (Akasah, 2007). but it leads to a longer life of the establishment if implemented according to the correct schedule (Arditi & Nawakorawit, 1999).

There are two types of maintenance:

1. Preventive maintenance, which is a normal activity and is regularly and includes a process of repair of equipment and to ensure the continuation and prolong life expectancy (Sabri, 2007);
2. Corrective maintenance and defined as an emergency work done after damage or malfunction (Abdel Aty, 2012).

The cost of regular maintenance of the equipment is small compared with the unexpected maintenance work resulting from a malfunction which requires replacement of the damaged component instead of repairing it.

Facilities management, including maintenance management, is a difficult and complicated process and usually uses papers or an information system to record the maintenance work done at the facility. In any case, it is not easy for the facility management to adopt 2D drawings as an information base in the maintenance of facilities, Such as lack of integration of information through two-dimensional projections and lack of cooperation between different parties and different specializations.

To overcome these difficulties, we propose that BIM modeling be used to manage maintenance. BIM can be used as a tool for visual representation of the various physical components of the facility and to provide modern communication technology to the various parties involved in the project. BIM has provided an opportunity to achieve a more advanced level of management plans by:

1. Integration of all information and components;
2. Exchange of information between all parties;
3. Best visualization of the facility.

BACKGROUND

There has been a lot of recent research on the use of BIM in maintenance management. A research was carried out at the University of Taiwan (Wang & Chen, 2011) aimed at improving the management of maintenance in buildings, including tracking and sharing information using BIM applications. Realistic analysis, in turn, leads to cost and risk reduction events for the project through the ability to perform more accurate geometric simulation and applied this research to the maintenance work carried out in a school building in Taiwan.

BIM approach preserves construction information in digital format and facilitates the process of transferring and updating information to a 3D environment, using 3D information that enables project