



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكرو فيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



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شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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Cairo University

Enhancing Maintainability in Hospitals Systems Using BIM and Business Intelligence

By

Mahmoud Mustafa Hanafy Mahmoud

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
INTERDISCIPLINARY - MASTER OF SCIENCE
in
Integrated Engineering Design in Construction Projects

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Under the Supervision of

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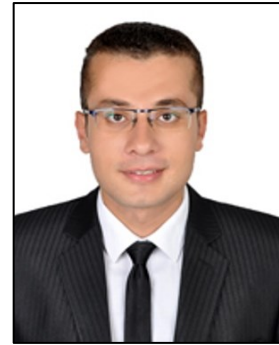
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Enhancing Maintainability in Hospitals Systems Using BIM and Business Intelligence

Key Words:

Hospital systems; Maintainability Assessment; Building Information Modeling (BIM); Business Intelligence (BI).

Summary:

Maintainability consideration is becoming one of the most demanding aspects in designing of healthcare facilities in recent years. Operation and maintenance costs represent almost 80% of the overall hospital's life cycle cost. Maintenance cost needs to be planned and managed carefully from the early design stages. To archive this objective, a framework is proposed in this research to collect the required data from all business parties. These data to build the Maintainability Information Database (MID) which contains all the maintainability information including six regular service systems of hospital buildings for better maintenance planning. This database is attached to the BIM models of the hospital for better collaboration. Also, a maintainability assessment is introduced based on pre-selected eight maintainability indices through an extensive literature review. Moreover, the AHP model is used to determine the relative weights of the maintainability indices. Then, an integrated system is introduced which combines a BIM-based tool developed by C# programming language and Revit API with a Business Intelligence (BI) dashboard developed using Microsoft Power BI to enhance the process of the maintainability assessment. The outputs are linked with a BI dashboard to analyze and visualize the data to aid in decision-making regarding maintainability planning.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

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