

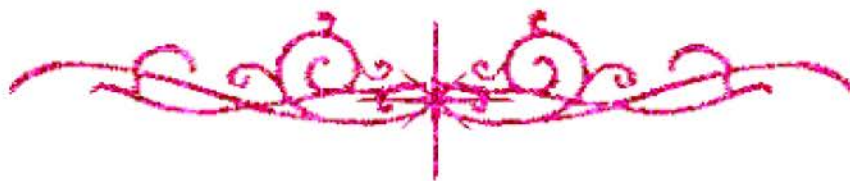
بسم الله الرحمن الرحيم





شبكة المعلومات الجامعية

التوثيق الالكتروني والميكرو فيلم



جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

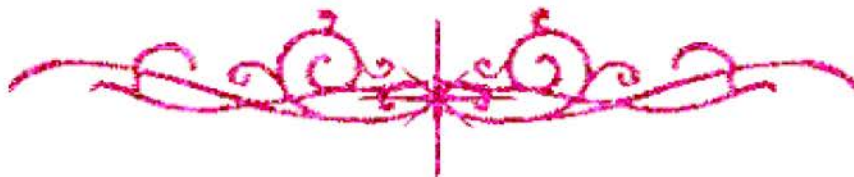
قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات



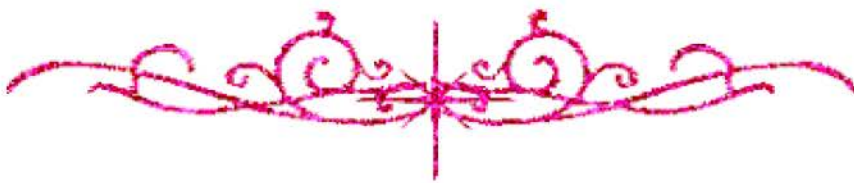
يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



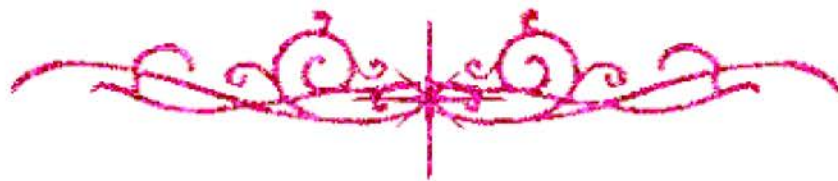


بعض الوثائق الأصلية تالفة





بالرسالة صفحات
لم ترد بالأصل



624, R

BIV I V N

**A PROPOSED BRIDGE MANAGEMENT SYSTEM FOR EGYPT:
DEVELOPMENT OF THE DATABASE, STRUCTURAL
ANALYSIS, AND RATING MODULES**

by:

Eng. Iman Metwally Hasan Abu-Hamd
B. Sc. in Civil Engineering 2003

**A Thesis Submitted to the
Faculty of Engineering at Cairo University
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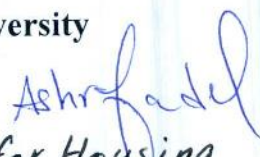
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Approved by the Examining Committee


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To everyone who had helped this work come to reality ... Thank you

Hoping this thesis would be a step towards a better understanding of our current needs and a better development of our country.

Iman

ABSTRACT

In Egypt, a large number of existing bridges needs constant maintenance, rehabilitation, or replacement. An appropriate bridge management system is necessary for maintenance of existing bridges, as well as for proposing construction of new bridges. The thesis investigates the bridge management subject, especially in Egypt. First, an introduction to bridge management systems is presented with a literature review of the bridge management systems present in North America, South America, Europe, and Asia. The status of bridges in Egypt is then discussed, with the most common distresses and repair systems highlighted.

An integrated bridge management system for Egypt is proposed, taking into account the local status of funds, technologies, and experience. A detailed discussion of the proposed system and its main modules (Database, Inspection and Condition Assessment, Maintenance Process, and Cost modules) is included. Three modules of the proposed system are designed in details: Database module, Structural Analysis sub-module, and Condition Assessment (Rating) sub-module.

The database module contains twenty four tables for saving and retrieving bridge inventory, geometric, structural, navigation, inspection, maintenance, and rating data. It also contains input forms for enhancing and simplifying the data-entry process. A bridge coding system is also proposed.

The structural analysis sub-module is developed using a commercial database software and structural analysis software. The database software is used to retrieve saved data for the required bridge and inspection, and then write the analysis input file. The structural analysis software is used to run the input file and obtain analysis results. One form of bridge deterioration is modeled: steel bridges corrosion. ECP truck and distributed live loads are used in the analysis process. Some assumptions are made to ease the bridge modeling process. Various options are available for each bridge item property. The two programming languages Visual Basic (VB) and Visual Basic for Applications (VBA) are used in preparing the analysis module.

The rating sub-module reads the analysis output files and calculates the bridge rating factors based on the AASHTO Allowable Stress Rating Method (Manual for Condition Evaluation of Bridges, 1994). The section capacities calculations are modified to suit the ECP allowable stresses. Two rating levels are available: Inventory level rating and Operating level rating.

Finally, a case study from the Egyptian bridges (Kafr ElZayyat Bridge) is used for the application of the proposed system. A full bridge record is added to the database, and then the bridge is analyzed and rated based on both the inventory and operating rating levels.

Key Words: Bridge Management System, Egypt, Modules, Inspection, Database, Analysis, Corrosion, Rating, Kafr ElZayyat, VB, VBA