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شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
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Flexible Pavement maintenance Based on Calibrated Performance Curve

A Thesis
Submitted to the Faculty of Engineering
Ain Shams University for the
Fulfillment of the Requirement of The Master of Science Degree
In Civil Engineering

Prepared by

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The M. Sc. Degree in Civil Engineering

(Highways and Traffic Engineering)

By

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Date: …../…../ 2021

DEDICATION

I would like to dedicate this work to ***My Mother Samia Taha*** for help, support, patience, and encouragement to finish this work,
GOD BLESS HER.

I would also like to thank both of my Brothers ***Mr.Ahmed Baheeg*** *and* ***Dr.Baheeg Baheeg*** for their big support and help in my work.

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Statement

This dissertation is submitted to Ain Shams University, Faculty of Engineering, public works department for the degree of The Master of Science Degree in Civil Engineering (Highways and Traffic).

The work included in this thesis was carried out by the author in the department of Public Works, Faculty of Engineering, Ain Shams University, from 2017 to 2021.

No part of the thesis has been submitted for a degree or a qualification at any other University or Institution.

The candidate confirms that the work submitted is his own and that appropriate credit has been given where reference has been made to the work of others.

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Abstract

Any pavement management system's capacity to accurately predict pavement deterioration is vital to its success. A effective pavement condition prediction technique is a critical tool for maintenance and rehabilitation activity planning and cost allocation.

The main aim of this research is to develop a performance model based on Benkelman Beam (BB) and traffic results by using prediction models derived from the data for the Pavement Condition Index (PCI) that was obtained from three districts belonging to the General Authority for Roads, Bridges and Land Transport (GARBLT) which consist of about Central district (26sections), Middle-Delta (22 sections), and East-Delta (14 sections) with a total length of 124 Kilometers.

The proposed model was validated by comparing the predicted values with actual (PCI) with a coefficient of determination R^2 equals 0.87. The structural examination of in-service pavements is an important activity for both project and network-level pavement management systems. The deflection was measured using the Benkelman Beam. At a distance of 1.5 metres from the pavement's edge, test points were obtainedThe pavement temperature was recorded for subsequent changes to the deflection values because the deflections measured by the Benkelman Beam are influenced by pavement temperature and seasonal climate variations.

Since the Structure Number (SN) evaluation including in pavements is such an important component of both the Structural Condition Index and the Structural Condition Index (SCI), the resulting deflections from (BB)

were converted to a structural number (SN) using a model and the validity has been checked by taking samples from the pavement layers, which revealed a strong correlation between them with a coefficient of determination (R^2) of 0.62.

The structure number in 2018 is predicted from the proposed model and then compared with actual field measurements for the same year. A conclusion is made regarding the validity of the proposed prediction model with a coefficient of determination (R^2) equals 0.91. Because the (BB) reading is crucial in determining the value of the Pavement Condition Index (PCI). The developed prediction model recognized two causal factors in defining pavement performance. They were the pavement age and pavement structure number with age being the most significant factor where the structure number was of minor importance.

Key Words:

Benkelman Beam (BBD), performance curve, prediction model, pavement condition index (PCI), Paver, structure Number (SN).

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