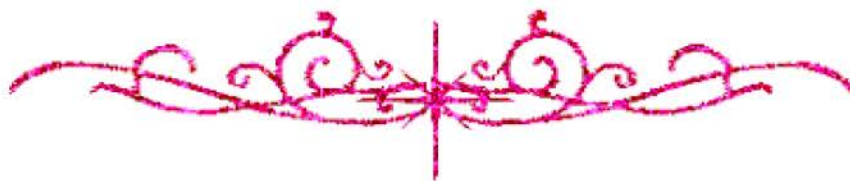


بسم الله الرحمن الرحيم





شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

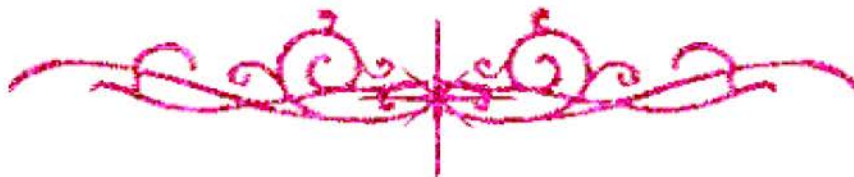
قسم

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

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Cairo 2021



Flexible Pavement maintenance Based on Calibrated Performance Curve

A Thesis For

**The M. Sc. Degree in Civil Engineering
(Highways and Traffic Engineering)**

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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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Table of Contents

Statement.....	I
Abstract	II
Acknowledgment	IV
List of Figures	V
List of Tables.....	Error! Bookmark not defined.I
List of abbreviations.....	Error! Bookmark not defined.II
Chapter One: Introduction.....	1
1.1 Background	1
1.2 Statement of the problem	2
1.3 Scope of work and methodology	3
1.4 Identifying significant variables in prediction models.....	3
1.5 Data collection and reduction.....	4
1.6 Variability of field measurements of pavement performance	4
1.7 Data analysis	5
1.8 Validation of a proposed model.....	5
Chapter Two: Literature Review	7
2.1 General Background.....	7
2.2 Pavement management system (PMS) and pavement maintenance management system (PMMS)	8
2.2.1 The concept of the pavement management system (PMS)	8
2.2.2 The concept of pavement maintenance management system (PMMS).....	12
2.3 Pavement condition index (PCI) and pavement condition rating (PCR)	13
2.3.1 Correlation between PCI and PCR for all surfaced pavement sections survey	15
2.4 Data Acquisition.....	18
2.5 Pavement Evaluation	20
2.5.1 Introduction	20
2.5.2 Visual Condition Surveys	20
2.5.2.1 Determination of the PCI For The Pavement Distress	22
2.5.2.2 Determination of the Pavement Condition Structural Capacity Index (PCI Structure)	27
2.5.3 Non-Destructive Evaluation of Pavement Functional Properties.....	27
2.5.3.1 Pavement Deflection Measurement Devices.....	27
2.5.3.2 Measurement	28
2.5.3.3 Measurement Techniques	28
2.5.3.3.1 Static Deflection Equipment	29
2.5.3.3.2 Steady-State Deflection Equipment	30
2.5.3.3.3 Impact (Impulse) Load Response.....	34
2.5.3.4 Correlations between Deflection Measuring Equipment	36
2.5.3.4.1 Benkelman Beam to FWD	37
2.5.3.4.2 Benkelman Beam to Dynaflect	37
2.5.3.4.3 Benkelman Beam to Road Rater	38
2.5.4 Destructive Evaluation of Pavement Structural Properties	39

2.5.5 Overall Pavement Condition Index.....	39
2.6 Pavement condition prediction	42
2.6.1 New Techniques for Pavement Condition Prediction	43
2.6.1.1 Pavement Family Grouping.....	44
2.6.1.2 Filter Procedure	45
2.6.1.3 Outlier Analysis	46
2.6.1.4 Family Condition Prediction.....	46
2.6.1.5 Pavement Section Condition Prediction.....	47
2.8.1.6 Benefits of the New Procedures	48
2.7 Automated PCI calculation.....	48
2.7.1 Paver and micro Paver.....	48
2.7.1.1 Inventory.....	50
2.7.1.2 Field Inspection	50
2.7.1.3 Prediction Modeling	51
2.7.1.4 Condition Analysis	52
2.7.1.5 M&R Work Planning.....	53
Chapter Three: Methodology	55
3.1 General	55
3.2 Data sources	59
3.3 Data Elements	59
3.3.1 Pavement performance data:.....	59
3.3.2 Pavement section age:	62
3.3.3 Traffic volume date	63
3.4 Input Data for Prediction Model Analysis	64
3.5 Data for Model Validation.....	65
3.5.1 Development of pavement condition distress index	65
3.5.2 Development of pavement condition structural capacity index	65
3.5.2.1 Pavement structural number	66
3.5.2.2 Pavement layers data:	66
3.5.3 Surface deflection	67
Chapter Four: Results and Discussion	70
4.1 Pavement performance data:	70
4.2 Pavement section age:	75
4.3 Homogeneous sections	77
4.4 Deterioration Prediction Model	81
4.5 Validation of the Prediction Model	87
4.6 Variability of pavement condition index measurements.....	87
4.6.1 Development of Pavement Condition Index	89
4.6.1.1 Development of pavement condition distress index.....	89
4.6.1.1.1 Comparing Actual PCI's With Predicted Values.....	91
4.6.1.2 Development of pavement condition structural capacity index	92
4.6.1.2.1 Comparing Actual SN With SNeff Predicted Values	93
4.6.1.3 Benkelman Beam.....	95
4.6.1.3.1 Comparing SNeff With SN Predicted Values	100
4.7 DEVELOPMENT OF PCI PREDICTION MODELS.....	102
4.7.1 Model Development.....	102

4.7.2 Preliminary Regression Analysis.....	103
4.7.2.1 Input data	103
Chapter Five Summary, Conclusion and Recommendations	113
5.1 Summary	113
5.2 Conclusions.....	114
5.3 Recommendations for Future Research	115
References	117
APPENDIX A	122
APPENDIX B.....	129
APPENDIX C	142
APPENDIX D	155
APPENDIX E.....	162
APPENDIX F.....	168
APPENDIX G	176