



**Developing Pavement Maintenance and Rehabilitation
Management System of Desert Highway in Jordan Using Micro
PAVER v. 7.0.9 Software**

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The Thesis was submitted in Partial Fulfillment of the Requirements for Master's
Degree in Engineering Projects Management

Faculty of Engineering

Isra University

August 2019

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Dedication

الإهداء

إلى من بدعائهما تحققت الأحلام وتبددت الصعاب...
إلى الذين أرتكز عليهم إذا ضاقت بي الدنيا، حتى تنجلي الأحران وتعمّ الافراح، ببركة دُعائهما
وجُهدٍ جهيد... الحبيبة أمي الغالي أبي.

إلى الذي تحمل كل شيء دون كلل، فكان سنداً وائزان، تجاوزتُ بدعمه كل عوائق الطريق،
فكان سلوى كل ضيق، أعبُرُ به ظلام الطريق، نحو أملٍ مُشرقٍ ومجدٍ كبير... زوجي الحبيب.

إلى من أهداها الله لي أمّاً بحنانها، إلى التي أغدقتني عطفاً وحباً حتى أصابت في قلبي القمم ... أم
زوجي بل أمي الثانية، حيثُ يليقُ بها هذا النداء العظيم.

إلى الذين لم أوفيهم حقاً ولم أعطيهم ما يستحقون، وقتاً وحناناً، فتحملوا معاناة البُعد والاحتياج
العظيم... أولادي حيدر وماس.

إلى من دعموني بالحب والدعاء، فخففوا عني حملاً ثَقيل ... إختوتي وأختوات.

إلى من أهداهم الله لي أهلاً عوضوني عن كلّ بعيد.

إلى من أهداهم لي الله دونَ اختيار، فكانوا لي رفقاء الطريق.

إلى كل من قدم دعماً علمياً رائعاً ودُعاءً متواصلأً عن ظهر غيب، حتى وصلنا إلى ما نطمحُ
إليه.

إلى من حق علي ذكرهم هنا، فلم يُسعفني المقام والتفكير.

أهدي هذا الإجهاد ...

Acknowledgement

Writing this academic work has been a very important part of my life. I would like to thank all those who helped and encouraged me during my study. I greatly appreciate their advice and continual support throughout the completion of this thesis.

First of all, I am highly indebted to my university Supervisor professor Dr. Basim Jrew & Associate Prof. Dr. Majed Msallam as a Co-Supervisor for the cooperation, perceptive remarks, support, kindness, and useful guidance they have continually given me over the period of the study.

I am very grateful to His Excellency the former Minister of Public Works and Housing Professor Mohamed Talib Obaidat for guidance and advice.

My thanks, gratitude and appreciation to the members of the Committee (Prof. Dr. Saad Abo-Qadai and Assistant Prof. Dr. Moawiah Alnsour) for their valuable assistance in reviewing this thesis.

I would also like to thank all my teachers, instructors, and professors in my universities; Anbar University and Isra University. Their support have helped me a lot and helped me to be what I am now.

Lastly, and most importantly, thanks to my friends who were beside me during this period in which I had the honor to meet new and distinguished colleagues from different Arab countries, I wish them all success.

Table of Contents

Committee Decision	i
Authorization Form.....	ii
Dedication	iii
Acknowledgement.....	iv
Table of Contents.....	v
List of Figures	x
List of Tables.....	xiii
List of Abbreviations	xiv
List of Appendices.....	xv
Abstract.....	xvi
1 Chapter One: Introduction.....	1
1.1 Introduction	1
1.2 Study Area.....	2
1.3 Research Problem	4
1.4 Research Objectives.....	5
1.5 Research Methodology	6
1.6 Organization of the Thesis	7
2 Chapter Two: Literature Review	8
2.1 Introduction	8

2.2	Importance of Pavements Maintenance System.....	10
2.3	History of Pavement Management System	11
2.4	Types of Maintenance Management System	13
2.5	Levels of Pavement Management System	14
2.6	Pavement Maintenance Management System Components	15
2.6.1	Inventory.....	15
2.6.2	Pavement Condition Assessment	18
2.6.3	Prediction Model for Pavement Performance	36
2.6.4	Flexible pavement maintenance and Rehabilitation Strategies	37
2.7	System Analysis Tools.....	40
2.8	Pavement Maintenance Management System Benefit.....	47
2.9	Micro PAVER Pavement Management System software overview	49
2.9.1	Database development.....	50
2.9.2	Data collection tools.....	51
2.9.3	Pavement condition rating in PAVER	51
2.9.4	Calculation of the PCI.....	52
2.10	GIS Management System Software Overview	52
3	Chapter Three: Methodology and Data Collection.....	53
3.1	Introduction	53
3.2	Research Methodology and Justifications.....	53

3.2.1	Research Approaches	54
3.2.2	Research Methods	55
3.2.3	Research Strategies	55
3.2.4	Data Collection Method	56
3.3	Overview of Research Methodology	56
3.3.1	Jordanian Desert Highway Network	58
3.3.2	Dividing the Network into Manageable Units	60
3.3.3	Network Data Collection	61
3.3.4	Condition Assessment and Prediction	62
3.3.5	Maintenance Strategy and Cost	62
3.3.6	Maintenance Prioritization	63
3.3.7	Documenting and Reporting	63
3.3.8	Condition Evaluation of Highway	63
3.3.9	Prediction Models for Pavement Performance Deterioration	65
3.3.10	Determine Maintenance and Rehabilitation Alternative	66
3.4	Micro PAVER v. 7.0.9 Software	66
3.4.1	Data Collection Requirements	68
3.4.2	Micro PAVER Capabilities	69
3.5	Linking PAVER v. 7.0.9 with ArcGIS	74

3.6	Field Data Collection	76
3.6.1	Pavement condition	76
3.6.2	Visual Survey.....	76
3.7	Data Component	78
3.7.1	Data Inventory	78
3.7.2	Pavement Condition Survey	78
4	Chapter Four: Data Analysis and Results.....	85
4.1	Introduction	85
4.1.1	Current Pavement Evaluation	85
4.1.2	Typical sample manual calculation of PCI:.....	89
4.1.3	Analysis of Distresses Distribution.....	95
4.1.4	Prediction of Pavement Condition for next five years (yr.2023).....	97
4.1.5	Prediction of Pavement Condition for next ten years (yr.2028):.....	101
4.2	Maintenance Plan Component.....	104
4.2.1	Existing year (2019) M&R plan	111
4.2.2	Five years M&R Plan (Short-term).....	112
4.2.3	Ten years M&R Plan (Medium-term).....	113
4.3	Implementation Component.....	115
4.4	Development of Proposed Pavement Maintenance Management System.....	116
4.4.1	Application of Micro PAVER Management Software	117

4.4.2	Determination of M&R plan for Five Years:	126
4.4.3	Determination of M&R Plan for Ten Years:	129
4.4.4	Application of Geographic Information System Software	135
4.5	Project Management in pavement	146
4.5.1	Pavement Management System	147
5	Chapter Five: Conclusions and Recommendations	148
5.1	Conclusions	148
5.2	Recommendations	150
	References	152
	Appendices	157

List of Figures

Figure 1-1: Study Area, from Amman Intersection to Aqaba district (Google Map).....	4
Figure 2-1: Modular System Framework (Haas, 2001)	9
Figure 2-2: Effect of treatment timing on repair costs (Sarsam, 2016).....	11
Figure 2-3: Individual Present Serviceability Rating (Msallam et al., 2014).....	20
Figure 2-4;Concept of pavement performance using present serviceability index (PSI) (MOROVA et al., 2013).....	21
Figure 2-5: IRI Roughness Scale (SALEM, 2012).....	22
Figure 2-6: MN/DOT's Pathway Services, Inc. Video Inspection Vehicle (VIV) (SALEM, 2012).....	23
Figure 2-7: close-up of cameras used to record pavement distress (SALEM, 2012)	24
Figure 2-8: Close-up of lasers used to measure roughness, rutting & faulting. (SALEM, 2012)	24
Figure 2-9: Pathway Services, Inc. computerized video workstation (Google)	25
Figure 2-10:Relationship between Pavement Condition and Different Categories of Pavement Treatment. (Schnebele et al., 2015).	38
Figure 2-11: Schematic Representation of PMMS Modules	41
Figure 2-12: Typical Pavement Condition Life Cycle (Sarsam and Abdulhameed, 2014)..	48
Figure 3-1: Onion Tree of Methodology (The Researcher)	54
Figure 3-2: Research Methodology Step	57
Figure 3-3: Network Plan (Eight Branch's, Four in Each Branch).....	59
Figure 3-4: Section Plan	59
Figure 3-5: Pavement distress survey form (PAVER Software)	64
Figure 3-6: Main Screen of Micro PAVER v.7.0.9 software	68
Figure 3-7: Using GIS/Tabular Import and Update in Micro PAVER v.7.0.9.....	74
Figure 3-8: GIS-PMS Database Integration.....	75
Figure 3-9: Pavement Condition Index (PCI), Rating Scale, and Suggested Colors (ASTM D 6433-07).....	76
Figure 3-10: A Typical Section of the Selected Highway (15), (By using ArcGIS)	77
Figure 3-11: The Selected Sample Units for Inspection	80
Figure 3-12: Sample of Data Inspection for Sample Unit No. 1, 2 and 3 in branch of section H1-3.....	82
Figure 3-13: Sample of Data Inspection for Sample Unit No. 4, 5 and 6 in branch of section H1-3.....	83
Figure 3-14: Sample of Data Inspection for Sample Unit No. 7, 8, 9 and 10 in branch of section H1-3.....	84
Figure 4-1: Percentage of condition at Last Inspection for Branch B-15 (7/13/2019)	87
Figure 4-2: Relation between PCI condition and Number of Sections	88
Figure 4-3: Data Inspection for Sample Unit No. 6 from section B-15-3	90
Figure 4-4: Deduct value curve of Alligator Cracking(Karim et al., 2016).....	91
Figure 4-5: Deduct value curve of Block Cracking(Karim et al., 2016).....	92
Figure 4-6: Deduct value curve of Lane/Shoulder drop off Cracking(Karim et al., 2016)..	92
Figure 4-7: Deduct value curve Potholes Cracking(Karim et al., 2016).....	93
Figure 4-8: Deduct value curve of Rutting Cracking(Karim et al., 2016)	93

Figure 4-9: Corrected deduct value curve for highways and parking lots(Karim et al., 2016)	94
Figure 4-10: Extrapolated Distresses for section H1-3	96
Figure 4-11: All Distresses Type in Desert Highway Network	97
Figure 4-12: Future pavement condition for five years	98
Figure 4-13: Condition Distribution Graph for the next five years	99
Figure 4-14: Section H1-1 Condition Prediction Graph (2019-2023)	100
Figure 4-15 :Future pavement condition for ten years	101
Figure 4-16: Section H1-1 Condition Prediction Table for the next ten years	102
Figure 4-17: Section H1-1 Condition Prediction Graph (2019-2028)	104
Figure 4-18: PCI above the PCI Critical for Pavement Section (Butt et al., 1994)	106
Figure 4-19: PCI below the PCI Critical for Pavement Section (Butt et al., 1994)	106
Figure 4-20: Total Funded Plot for 2019 year	111
Figure 4-21: Five Years PCI Plot Before and After Repair (2019-2023)	112
Figure 4-22: Five Years Estimation Budget in Tow Direction	113
Figure 4-23: Ten Years PCI Plot Before and After Repair (2019-2028)	114
Figure 4-24: Ten Years Estimation Budget in Tow Direction	115
Figure 4-25: Proposed PMMS Component	116
Figure 4-26: Proposed PMMS Software	117
Figure 4-27: home screen of the Micro PAVER software	118
Figure 4-28: Case study Network Name and ID Establishment in the Micro PAVER Software	119
Figure 4-29: B15-1 Branch Definition in the Micro PAVER Software	120
Figure 4-30: B15-2 Branch Definition in the Micro PAVER Software	120
Figure 4-31: Section H1-1 Definition in the Micro PAVER Software	121
Figure 4-32: Section H1-1 Inspection Data Entry in the Micro PAVER Software	122
Figure 4-33: Condition Assessment of Section H1-1	122
Figure 4-34: Condition Performance Analysis (selection criteria and duration of the analysis)	123
Figure 4-35: Annual Condition Analysis Report for the Desert Highway	124
Figure 4-36: Condition Distribution Analysis Report for the Desert Highway	125
Figure 4-37: Selection Criteria Applied, Start Date, Number of Plan Years and the Plan Type	126
Figure 4-38: Selection the Plan Mode Budget for Five Years	127
Figure 4-39: Select M&R Categories for Five Years	127
Figure 4-40: Five Years M&R Plan	128
Figure 4-41: Avg. of Condition Before and After Work for Five Years	129
Figure 4-42: Selection Criteria Applied, Start Date, Number of Plan Years and the plan type	129
Figure 4-43: Selection Criteria Applied, Start Date, Number of Plan Years and the plan type	130
Figure 4-44: Selection of the Plan Mode Budget for Ten Years	131
Figure 4-45: Select M&R Categories for Ten Years	131
Figure 4-46: Ten year M&R Plan	133
Figure 4-47: Avg. of Condition Before and After Work for Ten Years	134
Figure 4-48: Desert highway in Google earth	135

Figure 4-49: Desert highway in Google earth	136
Figure 4-50: Road Branches	137
Figure 4-51: Map of Jordan and major road network as shown in ArcGIS software	138
Figure 4-52: Road branches and beginning stations in ArcGIS software	139
Figure 4-53: Attribute Table Definition for the Branch's Properties at ArcGIS	140
Figure 4-54: Road Branched ID in ArcGIS software.....	141
Figure 4-55: Road Branched ID in ArcGIS software.....	142
Figure 4-56: Branches Condition Statement.....	144
Figure 4-57: Branches Condition Statement.....	145
Figure 4-58: Management Triangle.....	147

List of Tables

Table 2-1:Major Classes and Component types of Pavement Data (Kafi Farashah, 2012) .	16
Table 2-2:Pavement Distress Types Used to Determine the Surface Rating (SR)	27
Table 2-3: summarizes the various types of distress and unit of measurement.....	28
Table 3-1: List of the distresses that are used by Micro PAVER (M. Y. Shahin and Walther, 1990).....	72
Table 4-1: Pavement Condition Assessment Criteria	86
Table 4-2: Current PCI Output for Branch B-15, for All Sections(Attoh-Okine and Adarkwa, 2013).....	86
Table 4-3: Current PCI output for Random Sample Units In section B-15-3	89
Table 4-4: Calculation of total of quantity and percentage of density for each distress type	91
Table 4-5: Individual and total of deduct value with quantity and corrected deduct value for each distress type.....	95
Table 4-6: Condition distribution for the next five years (2019-2023/short-term).....	99
Table 4-7: Section H1-1 Condition Prediction Table for the next five years	100
Table 4-8: Condition distribution for the next ten years (2019-2028/mid-term).....	102
Table 4-9: Section H1-1 Condition Prediction Table for the next ten years	103
Table 4-10: List of Activities Used in the Study and its Cost	108
Table 4-11: Safety M&R policy (M. Y. Shahin and Walther, 1990).....	109
Table 4-12: Preventive M&R policy (M. Y. Shahin and Walther, 1990)	110
Table 4-13: Existing Year Estimation Budget.....	111
Table 4-14: Average of the PCI before and after work plan for the next five years.....	112
Table 4-15: Average of the PCI before and after work plan for the next ten years.....	114
Table 4-16: Management prediction maintenance cost for(Existing, short term and medium term)	134
Table 4-17: Paver Exported Data into Excel	143

List of Abbreviations

Abbreviation	Meaning
AASHTO	American Association of State Highway and Transportation Officials
AC	Asphalt Concrete
ADT	Average Daily Traffic
APWA	American Public Works Association
VIV	Video Inspection Vehicle
ASTM	American Society for Testing and Materials
SR	Surface Rating
CDV	Corrected Deducted Value
LCD	Last Construction Date
CPATT	Centre for Pavement and Transportation Technology
DOD	Department of Defense
DV	Deduct Value
ACP	Asphalt Concrete Pavement
PCC	Portland cement Concrete
RCI	Riding Comfort Index
CS	Condition Score
GIS	Geographic Information System
PQI	Pavement Quality Index
HMA	Hot Mix Asphalt
IRI	International Roughness Index
RDI	Rutting Depth Index
M&R	Maintenance and Rehabilitation
SRI	Skid Resistance Index
AUPC	Area Under the Performance Curve
PDIM	Pavement Distresses Identification Manual
PCI	Pavement Condition Index
PMMS	Pavement Maintenance Management System
PMS	Pavement Management System
PSI	Present Serviceability Index
PCR	Present Condition Rating
SCI	Structural Condition Index
TDV	Total Deducted Value
TX/DOT	Texas Department of Transportation
MN/DOT	Minnesota Department of Transportation

List of Appendices

Appendix Number	Appendix Titles
Appendix A	Pavement Distress
Appendix B	Condition Survey Data for Samples Units
Appendix C	Current Condition Table for Sample Units
Appendix D	Analysis of Distresses Distribution
Appendix E	Prediction of Pavement Condition for Five Years (2019-2023)
Appendix F	Prediction of Pavement Condition for Ten Years (2019-2028)
Appendix G	Maintenance and Rehabilitation Plan for Existing Year (2019)
Appendix H	Maintenance and Rehabilitation Plan for Five Years (2019-2023)
Appendix I	Maintenance and Rehabilitation Plan for Ten Years (2019-2028)

Developing Pavement Maintenance and Rehabilitation Management System of Desert Highway in Jordan using Micro PAVER v. 7.0.9 Software

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Abstract

Highways are both major parts of the transportation infrastructure in Jordan and play a significant role in the development of the local economy and community.

After Extensive study in this field, many problems were found. Initial from shortage in the documentation, weakness in the database and usage, the system was not sufficiently and not flexible to deal with defects. Finally, the system was not effectively helping decision maker in provide right decision.

The main aim of this research is to develop a Pavement Maintenance Management System (PMMS), which provides a systematic process for maintaining, upgrading and operating the pavements and tools to facilitate a more flexible decision-making approach to meet the expectations of highway users.

The system developed has four major components: data collection, analysis, maintenance plan, and implementation. In addition, it is based on the direct integration of Micro PAVER pavement software and ArcGIS mapping software. A case study of about 240 km of Desert highway was inspected to analyze the proposed PMMS. A visual survey was conducted on the field, condition analysis was done and decisions were executed by Micro PAVER software to determine maintenance needs, budgets, and priorities for present and future conditions. Desert highway is considered a major rural arterial consisting of two lanes in each direction with heavy traffic. The selected highway was divided to zone, branch and section. Sampling procedure was selected randomly as input data required in to Micro PAVER computer software.

The updated Micro PAVER v.7.0.9 software was used for the assessment and prediction of the condition of highway pavement and maintenance cost for existing conditions (year of the study-2019), short-term conditions (2019-2023) and medium-term conditions (2019-2028). The study shows that the PCI of the existing conditions was rated as (very poor) with 2, 200, 996. 48\$ maintenance cost. The PCI of short-term condition was rated (very poor) with 220, 304, 278. 00\$ maintenance cost whereas the PCI of medium-term condition was rated (very poor) with 223, 283, 912. 00\$ maintenance cost. The Desert highway network in Jordan needs to be reconsidered for future maintenance plans to improve the quality of its service.

Keyword: PAVER software, Pavement Maintenance Management System (PMMS), Pavement Management System (PMS), Maintenance and Rehabilitation (M&R), Present Serviceability Index (PSI), Geographic Information System (GIS), Pavement Condition Index (PCI), and International Roughness Index((IRI).