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ملاحظات:

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AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERING

Enhancement the Performance of Asphalt Mixtures Using Polymers Additives in Dry Process

A Thesis submitted in partial fulfilment of the requirements of the
degree of

Master of Science in Civil Engineering

(Public Works)

by

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Bachelor of Science in Civil Engineering

Military Technical College, 2011

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Statement

This thesis is submitted as partial fulfilment of Master of Science in Civil Engineering, Faculty of Engineering, Ain shams University.

The author carried out the work included in this thesis, and no part of it has been submitted for a degree or a qualification at any other scientific entity.

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Date: / / 2022

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Abstract

The majority of hot asphalt mixtures used in Egypt do not encounter the standard critical required performance. Resistance to fatigue and rutting surface deformation are two of the most common pavement surface defects in Egypt.

Furthermore, the significant increase in traffic loads, severe climate changes, and ultimate temperature variation have resulted in pavement surface defects in the short run. Over the last decade, researchers have attempted to increase flexible pavement's ability to withstand new loadings and performance challenges. Using asphalt mixture modifiers such as polymers led to improve the mechanical properties of asphalt mixtures and an increase in their service life.

Since bitumen is the primary component of asphalt concrete, expanding bitumen strength and elasticity is always one of the major strategies for producing a better mixture. Polymer is added to bitumen to improve performance using one of two methods: the wet process or the dry process.

Adapting dry process technique in modifying asphalt concrete performance is the main scope of this study. Performance evaluation processes were used in this study to establish the variation in asphalt mixture properties due to dry process modifications. Performance analysis included stability, flow, moisture susceptibility, indirect tensile strength, dynamic modulus test, and flow number.

SUPERPLAST mixture modifier was added to various asphalt mixtures at varying percentages. The properties of the SUPERPLAST-added asphalt mixture were compared to the properties of the conventional mixture (control mix). SUPERPLAST-enhanced mixtures performed better than conventional mixtures in all performance analysis tests. It was found that the optimal SUPERPLAST content was 5 to 10% of the bitumen weight.

Key words:

SUPERPLAST, Dry Process, Asphalt Mixtures, Marshall, Indirect Tensile Strength, Dynamic Modulus, Flow Number.

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Table of Contents

Statement.....	IV
Researcher Data	VI
Abstract.....	VIII
Acknowledgement	X
List of Figures	XIV
List of Tables.....	XVI
List of Abbreviations	XVII
Chapter One	1
Background	2
Problem Statement	3
Objectives of Research.....	4
Thesis Organization.....	4
Chapter Two.....	6
2.1 Introduction	7
2.2 Bitumen	7
2.2.1 Chemical Properties of Asphalt Binder	7
2.2.2 Physical Properties of Asphalt Binder.....	8
2.3 Hot Mix Asphalt.....	9
2.3.1 Hot Mix Asphalt Classification	9
2.4 Using Marshal Method for Mix Design.....	10
2.4.1 Marshall Method Procedure	10
2.4.2 Stability Test.....	11
2.4.3 Analysis of Results from Marshall Test	12
2.5 Mix Design Objectives.....	15
2.6 Polymer Science.....	15
2.6.1 History of Using Polymers in Paving Industry.....	16
2.6.2 Types of Polymers Being Used in Road Construction...	17

2.6.3 Using SUPERPLAST as a Modifier.....	18
Chapter Three.....	23
Materials and Experimental Work.....	23
3.1 Introduction.....	24
3.2 Materials.....	24
3.2.1 Coarse Aggregates.....	24
3.2.2 Fine Aggregates.....	25
3.2.3 Mineral Filler.....	26
3.2.4 Asphalt Binder.....	27
3.2.5 Job Mix Formula (JMF).....	28
3.2.6 Additives.....	28
3.3 Experimental Program.....	29
3.3.1 Asphalt Cement Tests.....	30
3.3.2. Hot Mix Asphalt (HMA) Tests.....	33
Chapter Four.....	46
Results and Analysis.....	46
4.1 Introduction.....	47
4.2 Conventional Asphalt Mixture.....	47
.....	51
4.3 Modified Mixture Tests.....	51
4.3.1 Marshall Stability, Flow, and Marshall Quotient.....	51
4.3.2 Moisture Susceptibility.....	53
4.3.3 Indirect Tensile Strength.....	54
4.3.4 Dynamic Modulus and Flow Number Tests.....	55
4.3.5 Summary of Test Results of Modified Mixture with a Percent of 10% SUPERPLAST.....	62
Chapter Five.....	63
Summary, Conclusion, And Recommendation.....	63