سامية محمد مصطفى

شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

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شبكة المعلومات الجامعية

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التوثيق الالكتروني والميكروفيلم

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التوثيق الإلكتروني والميكروفيلم

قسم

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

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بالرسالة صفحات

لم ترد بالأصل

ZAGZIG UNIVERSITY, BANHA BRANCH,
SHOUBRA FACULTY OF ENGINEERING

EVALUATION OF BOND CHARACTERISTICS BETWEEN ASPHALT CONCRETE LAYERS

by

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A thesis
Presented to Zagazig University in fulfillment of the Partial
Requirements for the Degree of Master of Science
In Civil Engineering

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STATEMENT

This dissertation was carried out by the author. No part of this thesis has been submitted for a degree or a qualification to any other University or Institution.

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ABSTRACT

The effect of shear strength on the distress of asphalt pavements has not been considered when the main causes of pavement distress are investigated. At present, many analytical and experimental research works showed that the shear strength of asphalt mixes can have an impact on the performance of the asphaltic concrete pavements in the field.

This thesis introduces a new mechanical characteristics, namely shear strength of the mix, and the shear bond strength, which must be considered when asphalt pavements are designed and constructed. The importance of determination of such mechanical characteristics can be shown when the distress and failure of asphaltic concrete pavements are considered.

Based on the results of laboratory specimens and cores recovered from the field, a comprehensive analytical investigation is conducted. The finite element analysis indicates that relative rigidity of the multi-layer system has a significant influence on the induced stresses and strains and it should be considered in the design and construction of asphalt concrete pavements. The elastic multi-layer analysis shows that, unlike tensile and compressive strengths, shear strength of asphalt concrete can be used as a performance indicator.

The findings of the analytical investigation provide the input to verify the effect of mix type, the asphalt content, and the type of the aggregate on the shear strength of asphalt concrete pavements, and consequently the their long term performance. This requirement leads to the development of the shear test facility, which is used to measure the shear strength of the mixes and the shear bond strength between layers. The developed shear

test facility provides a powerful tool to evaluate the performance of asphalt concrete pavements as well as a new reliable parameter for Pavement Management System (PMS). Also, the test facility demonstrates the effect of mix type on its measured shear strength.

This thesis shows that design methods should be developed to deal with this fundamental mechanical property nominated "shear strength". Also, the profession can achieve better quality control by using the developed shear test machine. The results of the shear test suggest that the shear test machine will function as effective pavement analysis tool and can constitute a significant advancement towards the performance based evaluation procedure.