

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكرو فيلم

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A FRAMEWORK FOR DEVELOPMENT OF PERFORMANCE-RELATED SPECIFICATIONS FOR FLEXIBLE PAVEMENTS

By
SAMEH AHMED GALAL ABDELBAKI
B.Sc., M.Sc. in Civil Engineering

A Thesis Submitted to The Faculty of Engineering,
at Cairo University in Partial Fulfillment
of the Requirements for the Degree of
DOCTOR OF PHILOSOPHY
in Civil Engineering

Under the Supervision of

Prof. Dr. M. R. El-Mitiny
Professor of Highway and Traffic
Engineering, Faculty of Engineering
Cairo University

Mr. R. El-Mitiny

Prof. Dr. Galal M. Said
Professor and Dean
Faculty of Engineering
Cairo University, Fayoum

Galal M. Said

Prof. Dr. Essam A. Sharaf
Professor of Highway and Traffic
Engineering, Faculty of Engineering
Cairo University

Essam A. Sharaf

Y. T. Abdel

VP

Faculty of Engineering, Cairo University
Giza, Egypt
1999


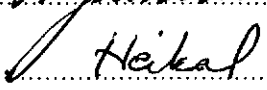
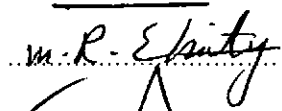

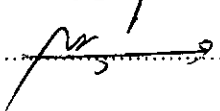
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Approved by the Examining Committee

1. Prof. Dr. Ahmed Atef Gadallah : 
2. Prof. Dr. Ali Zein Elabdin Heikal : 
3. Prof. Dr. Mohammed Rashad El-Mitiny :  (Supervisor)
4. Prof. Dr. Galal Mostafa Said :  (Supervisor)
5. Prof. Dr. Esam Abdel-Aziz Sharaf :  (Supervisor)

Faculty of Engineering, Cairo University
Giza, Egypt
1999

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Abstract

The research presented in this thesis has developed a performance-related specifications (PRS) for flexible pavement. The main objectives of this research are to : (1) develop a framework for performance-related specifications (PRS) that could be applied to materials and construction process of flexible pavement, and (2) demonstrate the validity of this framework. The main result from this research is the definition of a framework that can be used to develop performance-related specifications for highway materials and construction. Although, the framework is general in nature and can be applied to any types of materials and construction, the applications in this study are limited to flexible pavement.

This thesis describes the procedure which is used in the development of the prototype PRS. Previous studies on statistically-based specifications are reviewed, and this review is used as the basis for the prototype PRS. The theory governing the payment schedules produced under the specifications is presented including several applications on the use and sensitivity of the specifications.

The performance-related specifications considers the expected life-cycle cost of the as-constructed pavement as the overall measure of quality. This approach uses the measurement of *in situ* materials properties and take the variability of materials and construction variables into account in the development of payment schedules.

A computer program has been developed for use with the specification and in generating payment schedules. The program relates the materials and construction (M&C) variables to the annual costs. The payment schedule can be determined based on a comparison between the predicted performance of the as-designed and the as-constructed pavements. The program consists of a set of subroutines, each one deals with calculating the various elements of performance-related specifications. The primary output of the program is a pay factor and it includes two applications: (1) it compares the as-designed pavement with the as-constructed pavement to determine a single pay factor, and (2) it takes into account the variability of the M&C variables to obtain the distribution of the pay factor.

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