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شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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بالرسالة صفحات
لم ترد بالاصل

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

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Giza, Egypt
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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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