

Title of Thesis :

Study on New Pavement Rehabilitation Materials and Techniques

Key word : Pavement Materials, Rehabilitation Techniques, Semi-flexible Pavement, Interlocking Concrete Pavement, Ultra-thin Whitetopping.

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Abstract :

Since asphalt concrete and portland cement concrete have been successfully and widely adopted as our domestic highway and airport pavement materials, many most recent developments of pavement materials and techniques are often overlooked. The primary objective of this study is to not only investigate the material properties and structural characteristics of conventional pavement materials, but also introduce some of the new rehabilitation materials and technologies.

The material properties, design principles, structural characteristics, and potential problems of conventional pavement materials such as permeable pavement, drainable pavement, stone mastic asphalt (SMA) pavement, reclaimed asphalt pavement (RAP), rubber modified asphalt concrete (RMAC) pavement, and reclaimed concrete pavement materials are first investigated. Several new rehabilitation materials and technologies using semi-flexible pavement, interlocking concrete pavers (ICP), and ultra-thin whitetopping materials are also introduced. Through better understanding of their applicability, standard operating procedures, limitations and effectiveness, overlay design principles, and repair methods, this study attempts to assist in selecting more appropriate rehabilitation strategies to improve future pavement performance, reduce repair frequency, and prolong pavement's service life.

Several overlay design procedures including AASHTO, PCA, AI, and FAA are subsequently discussed. Some specific rehabilitation guidelines are also provided. A case study for the relevant cost analysis of various feasible rehabilitation options is conducted and compared. The applicability of the newly introduced rehabilitation materials and techniques shall be further validated through practical trial applications according to domestic conditions. The ultimate goal of this study is to promote technology transfer of new rehabilitation materials to assure the best use of our limited resources.