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## Pavement Preservation Studies Technical Advisory Guide

### Summary

## Preservation Approaches for High-Traffic-Volume Roadways

Transportation Research Board

# Climate Change, Energy, Sustainability and Pavements

**Springer** *Climate change, energy production and consumption, and the need to improve the sustainability of all aspects of human activity are key inter-related issues for which solutions must be found and implemented quickly and efficiently. To be successfully implemented, solutions must recognize the rapidly changing socio-techno-political environment and multi-dimensional constraints presented by today's interconnected world. As part of this global effort, considerations of climate change impacts, energy demands, and incorporation of sustainability concepts have increasing importance in the design, construction, and maintenance of highway and airport pavement systems. To prepare the human capacity to develop and implement these solutions, many educators, policy-makers and practitioners have stressed the paramount importance of formally incorporating sustainability concepts in the civil engineering curriculum to educate and train future civil engineers well-equipped to address our current and future sustainability challenges. This book will prove a valuable resource in the hands of researchers, educators and future engineering leaders, most of whom will be working in multidisciplinary environments to address a host of next-generation sustainable transportation infrastructure challenges. "This book proposes a broad detailed overview of the actual scientific knowledge about pavements linked to climate change, energy and sustainability at the international level in an original multidimensional/multi-effects way. By the end, the reader will be aware of the whole global issues to care about for various pavement technical features around the world, among which the implications of modelling including data collection, challenging resources saving and infrastructures services optimisation. This is a complete and varied work, rare in the domain." Dr. Agnes Jullien Research Director Director of Environmental, Development, Safety and Eco-Design Laboratory (EASE) Department of Development, Mobility and Environment Ifsttar Centre de Nantes Cedex- France "An excellent compilation of latest developments in the field of sustainable pavements. The chapter topics have been carefully chosen and are very well-organized with the intention of equipping the reader with the state-of-the-art knowledge on all aspects of pavement sustainability. Topics covered include pavement Life Cycle Analysis (LCA), pervious pavements, cool pavements, photocatalytic pavements, energy harvesting pavements, etc. which will all be of significant interest to students, researchers, and practitioners of pavement engineering. This book will no doubt serve as an excellent reference on the topic of sustainable pavements." Dr. Wei-Hsing Huang Editor-in-Chief of International Journal of Pavement Research and Technology (IJPRT) and Professor of Civil Engineering National Central University Taiwan*

# Introduction to Unmanned Aircraft Systems, Second Edition

**CRC Press** *The proliferation of technological capability, miniaturization, and demand for aerial intelligence is pushing unmanned aerial systems (UAS) into the realm of a multi-billion dollar industry. This book surveys the UAS landscape from history to future applications. It discusses commercial applications, integration into the national airspace system (NAS), System function, operational procedures, safety concerns, and a host of other relevant topics. The book is dynamic and well-illustrated with separate sections for terminology and web-based resources for further information.*

# Guidelines for the Preservation of High-traffic-volume Roadways

**Transportation Research Board** *TRB's second Strategic Highway Research Program (SHRP 2) Report S2-R26-RR-2: Guidelines for the Preservation of High-Traffic-Volume Roadways explores the state of the practice for preservation treatments on high- and low-volume asphalt and concrete roadways. The report also includes suggested guidelines on the application of preservation treatments on high-volume roadways.*

# Microsurfacing

**Transportation Research Board** *TRB's National Cooperative Highway Research Program (NCHRP) Synthesis 411: Microsurfacing explores highway microsurfacing project selection, design, contracting, equipment, construction, and performance measurement processes used by transportation agencies in the United States and Canada. Microsurfacing is a polymer-modified cold-mix surface treatment that has the potential to address a broad range of problems on today's highways --*

# Bearing Capacity of Roads, Railways and Airfields

## Proceedings of the 10th International Conference on the Bearing Capacity of Roads, Railways and Airfields (BCRRA 2017), June 28-30, 2017, Athens, Greece

**CRC Press** *Bearing Capacity of Roads, Railways and Airfields* includes the contributions to the 10th International Conference on the Bearing Capacity of Roads, Railways and Airfields (BCRRA 2017, 28-30 June 2017, Athens, Greece). The papers cover aspects related to materials, laboratory testing, design, construction, maintenance and management systems of transport infrastructure, and focus on roads, railways and airfields. Additional aspects that concern new materials and characterization, alternative rehabilitation techniques, technological advances as well as pavement and railway track substructure sustainability are included. The contributions discuss new concepts and innovative solutions, and are concentrated but not limited on the following topics: · Unbound aggregate materials and soil properties · Bound materials characteristics, mechanical properties and testing · Effect of traffic loading · In-situ measurements techniques and monitoring · Structural evaluation · Pavement serviceability condition · Rehabilitation and maintenance issues · Geophysical assessment · Stabilization and reinforcement · Performance modeling · Environmental challenges · Life cycle assessment and sustainability *Bearing Capacity of Roads, Railways and Airfields* is essential reading for academics and professionals involved or interested in transport infrastructure systems, in particular roads, railways and airfields.

## Focus

## Pavement Life-Cycle Assessment

# Proceedings of the Symposium on Life-Cycle Assessment of Pavements (Pavement LCA 2017), April 12-13, 2017, Champaign, Illinois, USA

**CRC Press** *An increasing number of agencies, academic institutes, and governmental and industrial bodies are embracing the principles of sustainability in managing their activities and conducting business. Pavement Life-Cycle Assessment contains contributions to the Pavement Life-Cycle Assessment Symposium 2017 (Champaign, IL, USA, 12-13 April 2017) and discusses the current status of as well as future developments for LCA implementation in project- and network-level applications. The papers cover a wide variety of topics: - Recent developments for the regional inventory databases for materials, construction, and maintenance and rehabilitation life-cycle stages and critical challenges - Review of methodological choices and impact on LCA results - Use of LCA in decision making for project selection - Implementation of case studies and lessons learned: agency perspectives - Integration of LCA into pavement management systems (PMS) - Project-level LCA implementation case studies - Network-level LCA applications and critical challenges - Use-phase rolling resistance models and field validation - Uncertainty assessment in all life-cycle stages - Role of PCR and EPDs in the implementation of LCA Pavement Life-Cycle Assessment will be of interest to academics, professionals, and policymakers involved or interested in Highway and Airport Pavements.*

## Environmental and Construction Engineering: Reality and the Future

### Selected Papers

**Springer Nature** *This book gathers the latest advances, innovations, and applications in the field of construction engineering, as presented by researchers and engineers at the International Conference Environmental and Construction Engineering: Reality and the*

*Future, held in Belgorod, Russia, on May 18-19, 2021. It covers highly diverse topics, including industrial and civil construction, building materials; environmental engineering and sustainability; machines, aggregates and processes in construction. The contributions, which were selected by means of a rigorous international peer-review process, highlight numerous exciting ideas that will spur novel research directions and foster multidisciplinary collaborations.*

## Airport Manager's Guide for the Maintenance of Asphalt Pavements of General Aviation Airports

## Concrete Pavement Preservation Workshop

## Reference Manual

*This document serves as the Reference Manual for the 1 1/2 -day FHWA workshop on concrete pavement preservation. The purpose of the document is to provide the most up-to-date information available on the design, construction, and selection of cost-effective concrete pavement preservation strategies. It concentrates primarily on strategies and methods that are applicable at the project level, and not at the network level, where pavement management activities function and address such issues as prioritizing and budgeting. Detailed information is presented on seven specific concrete pavement preservation treatments: slab stabilization, partial-depth repairs, full-depth repairs, retrofitted edge drains, load transfer restoration, diamond grinding, and joint resealing. In addition, information is provided on pavement evaluation techniques and strategy selection procedures.*

## Gravel Roads

# Maintenance and Design Manual

*The purpose of this manual is to provide clear and helpful information for maintaining gravel roads. Very little technical help is available to small agencies that are responsible for managing these roads. Gravel road maintenance has traditionally been "more of an art than a science" and very few formal standards exist. This manual contains guidelines to help answer the questions that arise concerning gravel road maintenance such as: What is enough surface crown? What is too much? What causes corrugation? The information is as nontechnical as possible without sacrificing clear guidelines and instructions on how to do the job right.*

# Practice Standard for Work Breakdown Structures - Third Edition

**Project Management Institute** *The Work Breakdown Structure (WBS) serves as a guide for defining work as it relates to a specific project's objectives. This book supplies project managers and team members with direction for the preliminary development and the implementation of the WBS. Consistent with A Guide to the Project Management Body of Knowledge (PMBOK® Guide)-Sixth Edition, the WBS Practice Standard presents a standard application of the WBS as a project management tool. Throughout the book, the reader will learn what characteristics constitute a high-quality WBS and discover the substantial benefits of using the WBS in everyday, real-life situations.*

# Testing and Characterization of Sustainable Innovative Bituminous Materials and Systems

# State-of-the-Art Report of the RILEM Technical

## Committee 237-SIB

**Springer** *This book presents the detailed results of five task groups of the RILEM technical committee TC 237-SIB on Testing and Characterization of Sustainable Innovative Bituminous Materials and Systems. It concentrates on specific new topics in asphalt binder and mixture testing, dealing with new developments in asphalt testing, in particular also in view of new innovative bituminous materials, such as hot and cold recycled mixtures, grid reinforced pavements and recycled Reclaimed Asphalt Pavements (RAP), where test methods developed for traditional asphalt concrete are not a priori applicable. The main objective is providing a basis for pre-standardization by comparing different test methods and showing ways for fundamental improvements. Thus, the book also points the way for a further advanced chemo-physical understanding of materials and their role in pavement systems relying on fundamental material properties and suitable models for describing and predicting the intrinsic mechanisms that determine the material behavior.*

## Bituminous Mixtures and Pavements VII

### Proceedings of the 7th International Conference

### 'Bituminous Mixtures and Pavements' (7ICONFBMP), June 12-14, 2019, Thessaloniki, Greece

**CRC Press** *Highway engineers are facing the challenge not only to design and construct sustainable and safe pavements properly and economically. This implies a thorough understanding of materials behaviour, their appropriate use in the continuously changing environment, and implementation of constantly improved technologies and methodologies. Bituminous Mixtures and Pavements VII contains more than 100 contributions that were presented at the 7th International Conference 'Bituminous Mixtures and Pavements' (7ICONFBMP, Thessaloniki, Greece 12-14 June 2019). The papers cover a wide range of topics: - Bituminous binders - Aggregates, unbound layers and subgrade - Bituminous mixtures (Hot, Warm and Cold) - Pavements (Design, Construction, Maintenance, Sustainability, Energy and environment consideration) - Pavement management - Pavement recycling - Geosynthetics - Pavement assessment, surface characteristics and safety - Posters Bituminous Mixtures and Pavements VII reflects recent advances in highway*

*materials technology and pavement engineering, and will be of interest to academics and professionals interested or involved in these areas.*

## Chip Seal Best Practices

**Transportation Research Board**

## Borough News

## Integrated Materials and Construction Practices for Concrete Pavement

## A State-of-the-practice Manual

*Manual of integrated material and construction practices for concrete pavements.*

## Cal/OSHA Pocket Guide for the Construction Industry

*The Cal/OSHA Pocket Guide for the Construction Industry is a handy guide for workers, employers, supervisors, and safety personnel. This latest 2011 edition is a quick field reference that summarizes selected safety standards from the California Code of Regulations. The major subject headings are alphabetized and cross-referenced within the text, and it has a detailed index. Spiral bound, 8.5 x 5.5"*

## Community Impact Assessment

# A Quick Reference for Transportation

*This guide was written as a quick primer for transportation professionals and analysts who assess the impacts of proposed transportation actions on communities. It outlines the community impact assessment process, highlights critical areas that must be examined, identifies basic tools and information sources, and stimulates the thought-process related to individual projects. In the past, the consequences of transportation investments on communities have often been ignored or introduced near the end of a planning process, reducing them to reactive considerations at best. The goals of this primer are to increase awareness of the effects of transportation actions on the human environment and emphasize that community impacts deserve serious attention in project planning and development-attention comparable to that given the natural environment. Finally, this guide is intended to provide some tips for facilitating public involvement in the decision making process.*

## Guide for Pavement Friction

**AASHTO** *This report contains guidelines and recommendations for managing and designing for friction on highway pavements. The contents of this report will be of interest to highway materials, construction, pavement management, safety, design, and research engineers, as well as others concerned with the friction and related surface characteristics of highway pavements.*

## Annual Report, Roadside Erosion Control & Maintenance Study

## Guide for the Planning, Design, and Operation of Pedestrian Facilities

**AASHTO**

## Flagging Handbook

# Design, Construction, and Maintenance of PCC Pavement Joints

**Transportation Research Board** *This synthesis report will be of special interest to pavement engineers and pavement construction and maintenance personnel responsible for portland cement concrete (PCC) pavement joints. Still pertinent information from NCHRP Synthesis 19 (1973), as well as new or updated information in the areas of joint design, construction, and maintenance are included. This report of the Transportation Research Board records the state of the practice with respect to the design, construction, and maintenance of PCC pavement joints. In addition, information on joint materials and sealing, the control of water on and in pavements, and the evaluation of pavement joint performance is provided.*

## Debris-control Structures

## Tyre, Road Noise

## Reference Book

## Roadside Design Guide

## Highway Subdrainage Design

## Urban Bikeway Design Guide, Second Edition

**Island Press** *NACTO's Urban Bikeway Design Guide quickly emerged as the preeminent resource for designing safe, protected bikeways in cities across the United States. It has been completely re-designed with an even more accessible layout. The Guide offers updated graphic profiles for all of its bicycle facilities, a subsection on bicycle boulevard planning and design, and a survey of materials used for green color in bikeways. The Guide continues to build upon the fast-changing state of the practice at the local level. It responds to and accelerates innovative street design and practice around the nation.*

## Hot Mix Asphalt Paving Handbook

## Bridge Scour and Stream Instability Countermeasures: Experience, Selection, and Design Guidance Third Edition

**Lulu.com** *The purpose of this document is to identify and provide design guidelines for bridge scour and stream instability countermeasures that have been implemented by various State departments of transportation (DOTs) in the United States. Countermeasure experience, selection, and design guidance are consolidated from other FHWA publications in this document to support a comprehensive analysis of scour and stream instability problems and provide a range of solutions to those problems. The results of recently completed National Cooperative Highway Research Program (NCHRP) projects are incorporated in the design guidance, including: countermeasures to protect bridge piers and abutments from scour; riprap design criteria, specifications, and quality control, and environmentally sensitive channel and bank protection measures. Selected innovative countermeasure concepts and guidance derived from practice outside the United States are introduced. In addition, guidance for the preparation of Plans of*

Action ...

## Regional Transportation Plan Guidelines

## Traffic-study Requirements

## Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities

## Bus Rapid Transit Practitioner's Guide

**Transportation Research Board** *Introduction -- Planning framework -- Estimating BRT ridership -- Component features, costs, and impacts -- System packaging, integration, and assessment -- Land development guidelines.*

## Pavement Management Guide

*" The anticipated primary audience for this guide is pavement management staff in the state departments of transportation. It is anticipated that most of the users of this guide will view it as a resource to address particular issues or concerns that arise as agencies face the challenges associated with managing pavements effectively. The guide's organization by pavement management components and functions should help support this use. However, the guide may also be used to assist those seeking general knowledge of pavement management concepts. Since pavement management is not a subject normally included in a civil engineering college curriculum, it is hoped that the structure of the guide will support this use as well. Pavement management is used to assess and justify funding needs for pavement preservation and rehabilitation, and to help set attainable pavement-related performance goals. These successes illustrate that when reliable technical information is presented effectively, it can go a long way towards overcoming the institutional issues that threaten the use of innovative and cost-effective strategies." -- publisher's description*

# Transportation Planning Handbook

**John Wiley & Sons** *A multi-disciplinary approach to transportation planning fundamentals* The Transportation Planning Handbook is a comprehensive, practice-oriented reference that presents the fundamental concepts of transportation planning alongside proven techniques. This new fourth edition is more strongly focused on serving the needs of all users, the role of safety in the planning process, and transportation planning in the context of societal concerns, including the development of more sustainable transportation solutions. The content structure has been redesigned with a new format that promotes a more functionally driven multimodal approach to planning, design, and implementation, including guidance toward the latest tools and technology. The material has been updated to reflect the latest changes to major transportation resources such as the HCM, MUTCD, HSM, and more, including the most current ADA accessibility regulations. Transportation planning has historically followed the rational planning model of defining objectives, identifying problems, generating and evaluating alternatives, and developing plans. Planners are increasingly expected to adopt a more multi-disciplinary approach, especially in light of the rising importance of sustainability and environmental concerns. This book presents the fundamentals of transportation planning in a multidisciplinary context, giving readers a practical reference for day-to-day answers. Serve the needs of all users Incorporate safety into the planning process Examine the latest transportation planning software packages Get up to date on the latest standards, recommendations, and codes Developed by The Institute of Transportation Engineers, this book is the culmination of over seventy years of transportation planning solutions, fully updated to reflect the needs of a changing society. For a comprehensive guide with practical answers, The Transportation Planning Handbook is an essential reference.

## Pavement Analysis and Design

For one/two-semester, undergraduate/graduate courses in Pavement Design. This up-to-date text covers both theoretical and practical aspects of pavement analysis and design. It includes some of the latest developments in the field, and some very useful computer software developed by the author with detailed instructions.