**Summary:** Results are compiled from the databases named above. Links are provided for full-text, if applicable, or to the full record citation. I completed my searches using the following terminology: Portland cement concrete, preventive maintenance, service life. The results are divided into most relevant and less relevant.

### Most Relevant Results

**Mukherjee, Amlan; Cass, Darrell.** *Carbon Footprint for Hot Mix Asphalt and Portland Cement Concrete Pavements.* Michigan Technological University; Michigan Technological University, Houghton; Michigan Department of Transportation; Research and Innovative Technology Administration, 2011, 107p  
[https://trid.trb.org/view/1120965](https://trid.trb.org/view/1120965)  
*Abstract:* Motivated by the need to address challenges of global climate change, this study develops and implements a project based life cycle framework that can be used to estimate the carbon footprint for typical construction work-items found in reconstruction, rehabilitation and Capital Preventive Maintenance (CPM) projects. The framework builds on existing life cycle assessment methods and inventories. The proposed framework considers the life cycle emissions of products and processes involved in the raw material acquisition and manufacturing phase, and the pavement construction phase. It also accounts for emissions due to vehicular use and maintenance operations during the service life of the pavements. The framework also develops and implements a method to calculate project level construction emission metrics. Finally, the research provides a web-based tool, the Project Emission Estimator (PE-2) that can be used to benchmark the CO2 footprint of highway construction projects. In conclusion, the research suggests ways of implementing the proposed framework within MDOT to help reduce the CO2 footprint of highway construction projects.

**Luhr, D; Kinne, C; Uhlmeyer, J S; Mahoney, J P.** *What we don’t know about pavement preservation.* International Conference on Pavement Preservation, 1st, 2010, Newport Beach, California, USA, Issue 22, 2010, 15p  
[https://trid.trb.org/view/1150334](https://trid.trb.org/view/1150334)  
*Abstract:* Any economical extension of pavement service life has a significant benefit for long-term life-cycle costs. Preventive maintenance activities can substantially extend the pavement service life (or keep it from prematurely failing). The simple concept of higher costs for deferred maintenance becomes more difficult when the objective is quantifying the cost tradeoffs, and selecting among maintenance alternatives. The focus of this paper is to examine why this task is difficult, and to evaluate what we need to learn in order to improve our procedures for analyzing maintenance tradeoffs. The paper will be limited to asphalt concrete pavements (ACP), but the concepts are very similar for portland cement concrete pavements (PCCP). Current budget constraints in Washington State necessitate the development of new strategies with regard to preventive maintenance. Even if the optimum long-term rehabilitation plan for a particular section of roadway calls for a capital construction rehabilitation project, there may not be funds available to complete the construction. This situation has resulted in the development of preventive maintenance strategies for the purpose of delaying or avoiding capital construction spending. These strategies include: 1. addressing early distress; 2. correcting short distressed sections; 3. maintaining and holding sections that are currently due for rehabilitation, and 4. integrating preventive maintenance with rehabilitation strategies.


[Note: This appears to be the same report as the one previously listed.]

Luhr, David R; Kinne, Chuck; Uhlmeyer, Jeffrey S; Mahoney, Joe P. What We Don't Know About Pavement Preservation. First International Conference on Pavement Preservation, California Department of Transportation; Federal Highway Administration; Foundation for Pavement Preservation, 2010, pp 611-625
https://trid.trb.org/view/919250

Abstract: Any economical extension of pavement service life has a significant benefit for long-term life-cycle costs. Preventive maintenance activities can substantially extend the pavement service life (or keep it from prematurely failing). The simple concept of higher costs for deferred maintenance becomes more difficult when the objective is quantifying the cost tradeoffs, and selecting among maintenance alternatives. The focus of this paper is to examine why this task is difficult, and to evaluate what we need to learn in order to improve the procedures for analyzing maintenance tradeoffs. The paper will be limited to asphalt concrete pavements (ACP), but the concepts are very similar for portland cement concrete pavements (PCCP). Current budget constraints in Washington State necessitate the development of new strategies with regard to preventive maintenance. Even if the optimum long-term rehabilitation plan for a particular section of roadway calls for a capital construction rehabilitation project, there may not be funds available to complete the construction. This situation has resulted in the development of preventive maintenance strategies for the purpose of delaying or avoiding capital construction spending. These strategies include: (1) addressing early distress, (2) correcting short distressed sections, (3) maintaining and holding sections that are currently due for rehabilitation, and (4) integrating preventive maintenance with rehabilitation strategies.

An Early Going.
Pourteau Chris
Roads & Bridges. 2010/1. 48(1) pp 40-43(3 Phots.)
The Texas Transportation Institute conducted "Develop Guidelines for Routine Maintenance of Concrete Pavement" (Texas Department of Transportation project 0-5821). Project objectives included: identifying portland cement concrete pavement distresses requiring preventive maintenance; providing a pavement repair method list, as well as pavement repair method description, associated effectiveness, and method of use; providing guidelines on optimum repair strategy formulation for repair cost minimization and pavement life maximization; providing repair detail sheets and special specifications for optimization process support; and providing training materials for project product implementation. The results were presented in a user-friendly, practical field manual for use by pavement engineers. The manual has three main sections: nondestructive test procedures for surface layers; discussion of each maintenance stage, with promotion of best standard practices and specifications used across the United States by state departments of transportation; and a step-by-step repair method and decision making process for preventive maintenance, functional or structural concrete pavement repair, or full resurfacing. This project's improved diagnostic tools can lead field personnel to more accurately diagnose problems, which in turn helps to yield more appropriate, cost-effective interventions. Transferring knowledge from experienced engineers to those just entering the field is perhaps the most important aspect of the outcome of this project.
Publication Year
2010

Least Relevant Results

https://trid.trb.org/view/1511323

Abstract: The City of Calgary (The City) has a multimillion-dollar sidewalk replacement backlog. The condition-based preventive maintenance and the corrective maintenance are faced with challenges with limited manpower to conduct condition assessments and funding for sidewalk maintenance. A survey of the current sidewalk designs specified across major municipalities in Canada confirmed that the sidewalk structure in Calgary, including concrete thickness and the use of granular base materials, is one of the thinnest. The most common sidewalk damage/failure patterns in cold climates are well recognized, but the impact of the sidewalk design on the service life and the maintenance needs relies predominantly on limited inspections and reporting process for the asset. The structural assessment of different sidewalk designs was conducted using the finite element analysis (FEA). The model inputs were selected based on local climate and variations in concrete thickness, base material thickness, and soil conditions. A total of 36 models were analyzed for
structural adequacy and the findings of the FEA formed the basis for the Best Construction Practices recommendations for concrete sidewalks in Calgary. The rationale behind the recommended changes to the sidewalk structure is discussed in conjunction with the need for a more stringent quality assurance and verification process. The life cycle cost analysis of selected designs is provided. The importance of data management to assess the effectiveness of the sidewalk repairs and to determine the rate of sidewalk deterioration is recognized.