Most Relevant Results

Burnham, Thomas; Izevbekhai, Bernard; Huerta, Santiago; Gallagher, Joseph. Development of Performance Curves for Whitetopping in Minnesota. Minnesota Department of Transportation; Minnesota Department of Transportation, 2019, 307p
https://trid.trb.org/view/1602587

Abstract: Whitetoppings, now commonly referred to as bonded concrete overlays on asphalt (BCOA), are growing in popularity as an option for rehabilitating existing asphalt pavements. It was the objective of this study to develop predictive performance models, based on measured performance of existing whitetopping projects in Minnesota, which will eventually be adopted into MnDOT’s pavement management project selection process. In this project, 26 whitetopping projects in service throughout Minnesota were examined to determine their historical performance to date. Each of the projects were visited periodically from 2015 to 2018 to gather supplemental performance data. Based on this and other historical data, performance curves were developed to highlight the current trends in Minnesota whitetopping performance in terms of MnDOT pavement index parameters. An analysis of the effect of specific design parameters on performance was also carried out. Finally, two predictive performance models, based on only International Roughness Index (IRI), were developed for undoweled whitetoppings in MN.

The objective of this research is to identify changes in service life resulting from time, vehicular, and environmental wear on asphalt and concrete pavements. The goal is to provide updated performance curves to model future conditions by studying new construction, existing pavements, and treatment types currently employed by SCDOT for preservation and/or rehabilitation.

Description: Due to their high performance, composite pavements have been used by highway agencies as a cost-effective alternative for high traffic volume roadways. In the North Carolina DOT Pavement Management System (NCDOT PMS), however, a function to allow engineers to select the composite pavement as the best pavement alternative for a particular project is lacking. The reason is that, historically, composite pavements have been classified as conventional asphalt pavements in North Carolina, even though these two types of pavements probably perform differently. This study will be conducted to address this issue. Researchers will identify composite pavement sections in the PMS, develop distress models and performance models for composite roadway families, and determine threshold values that can trigger appropriate treatments. The findings of this study will enable researchers to build a composite pavement branch that can be added to the existing decision trees. This new branch, together with the existing asphalt and jointed concrete pavement (JCP) branches, will provide engineers with a wider selection of pavement types and allow them to recommend appropriate treatments for maintenance and rehabilitation activities.

Timm, David H; May, Richard W; Taylor, Adam Joel; Tran, Nam; Robbins, Mary M. Structural Design of Sulfur-Modified Warm-Mix Asphalt. Transportation Research Board 89th Annual Meeting, Transportation Research Board, 2010, 16p
https://trid.trb.org/view/911227
Abstract: It has been well documented that flexible pavement material stiffness significantly influences fatigue cracking and rutting performance. Therefore, choosing high-modulus asphalt concrete has the potential to increase the overall life of the pavement. One such material, sulfur-modified asphalt concrete, stems from 1970s sulfur-extended asphalt (SEA) technology in which hot liquid sulfur replaced a fraction of the asphalt binder. Recently, the SEA technology has been improved; sulfur pellets and warm-mix asphalt (WMA) additives are introduced into the mixing drum to produce sulfur-modified WMA, thereby eliminating the use of hot liquid sulfur, reducing production temperatures and fume emissions. Benefits also include the improvement of the pavement performance, structurally. Based on the laboratory experiment, dynamic modulus testing of four sulfur-modified WMA mixtures resulted in an overall increase in the stiffness relative to three control hot-mix asphalt mixtures, with significant improvements observed at high temperatures. Beam fatigue testing of these laboratory mixtures generated fatigue performance curves, indicating slightly shorter fatigue lives for high strain levels relative to a control mixture. The Mechanistic-Empirical Pavement Design Guide was used to evaluate eight hypothetical cross-sections comprised of sulfur-modified WMA relative to a control section planned for further full-scale testing at the National Center for Asphalt Technology’s (NCAT) Test Track. This analysis predicted improvements in fatigue cracking and rutting in all eight sulfur-modified cross-sections over the control section. Additionally, it was found that among the sulfur modified mixes, increases in the amount of sulfur and the design air voids further improved predicted performance relative to the control cross-section.
Least Relevant Results

Khurshid, Muhammad Bilal; Irfan, Muhammad; Ahmed, Anwaar; Labi, Samuel. **Multidimensional benefit-cost evaluation of asphaltic concrete overlays of rigid pavements.** Structure and Infrastructure Engineering, Volume 10, Issue 6, 2014, pp 792-810  
https://trid.trb.org/view/1302493  
Abstract: Using the data from a national study in the USA, this study demonstrated a comprehensive and multidimensional pavement treatment evaluation methodology and used the methodology to evaluate the short-term and life cycle cost-effectiveness (CE) of five rigid pavement rehabilitation treatments. Four measures of effectiveness were used in this study: the sudden decrease in surface roughness, treatment service life, increase in average pavement condition over the service life and the area bounded by the performance curve. This study established relationships that quantify the influence of pre-treatment condition on treatment effectiveness. Also, the models were developed to describe the treatment effectiveness as a function of traffic loading and climatic severity. It is seen that at high traffic loading, there is relatively little difference in treatment effectiveness across various climate severities. This study suggests that superior effectiveness of a treatment does not necessarily translate into superior CE. Also, the treatment location was found to influence the relative effectiveness of the treatments. Overall, the results suggest that treatment ‘crack-and-seat and 8-in. asphalt concrete overlay’ is the most cost-effective.

https://trid.trb.org/view/1249479  
Abstract: In 2001, the Ministry of Transportation Ontario (MTO) constructed its first full depth reclamation with expanded asphalt stabilization project on the Trans Canada Highway, between Sault Sainte Marie and Wawa, in Northern Ontario. The project incorporated three different expanded asphalt mix designs and a control section of full depth reclamation with hot mix overlay. The project has been monitored annually over the past 10 years using the Ministry's Automated Road Analyser (ARAN), which measures International Roughness Index (IRI) and rutting. Roughness data indicates a significant difference between the expanded asphalt stabilized base test sections and the control section. The expanded asphalt stabilization has delivered superior performance over the conventional full depth reclamation with hot mix overlay. Performance curves for the different treatments are compared to the ministry's average performance curve for full depth reclamation projects, and to the performance of treatments on adjacent projects. This project demonstrates the exceptional performance of the expanded asphalt mixes, with 10 years of proven superior pavement condition and ride. (A) For the covering abstract of this conference see ITRD record number 201211RT334E.

Pooledfund.org  
National Partnership to Determine the Life Extending Benefit Curves of Pavement Preservation Techniques (MnROAD/NCAT Joint Study – Phase II)  
https://pooledfund.org/Details/Study/627