Literature Search: Cost estimate of B versus C grade oils
Date: April 22, 2020

Most Relevant Results
None

Result added on 7/22/2020 supplementing literature review:
Title: Short Study on Pavement distresses using different asphalt mix types
Author: Vizoli, Peter; Getaneh, Ayalew
Date: March 2016.
The purpose of this study is to investigate and compare the pavement conditions for three resurfacing pilot projects that used different types of asphalt mixes for pavement and especially the behavior of steel slag and performance grade type "E" oil in asphalt mixtures in comparison with more traditional mixtures that currently the City of Minneapolis uses for pavement projects.

Least Relevant Results
Title: Evaluation of Bio-Fog Sealants for Pavement Preservation
Author: Ghosh, Debaroti, Turos, Mugur, Marasteanu, Mihai
Publisher: MnDOT; MN LRRB, 2016
Abstract: Pavement preservation is playing an increasingly significant role in maintaining aging pavement infrastructure. One important component is the application of sealants to the pavement surface. In a joint study between Minnesota Department of Transportation (MnDOT) and the University of Minnesota, the field performance and mechanical properties of asphalt mixtures from pavement sections treated with a number of new products, called bio sealants, is investigated. The objective of the study is to obtain relevant properties of treated asphalt materials to understand the mechanism by which sealants improve pavement performance. Laboratory testing was performed on treated asphalt binder and mixtures. For binders, a dynamic shear rheometer and a bending beam rheometer were used to obtain rheological properties of treated and untreated asphalt binders. Field cores from both untreated and treated sections were collected and thin beam specimens were prepared from the cores to compare the creep and strength properties of field-treated and laboratory-treated asphalt mixture. It is observed that the oil-based sealants have a significant softening effect on the control binder compared to the water-based sealants. For asphalt mixtures, different trends are observed for the field samples compared to the laboratory prepared samples.

Title: Rheological Characterization of Asphalt Binders Treated with Biosealants for Pavement Preservation
Author: Ghosh, Debaroti, Turos, Mugurel, Johnson, Ed, Marasteanu, Mihai
Publisher: Transportation Research Board 95th Annual Meeting, 2016
Abstract: Pavement preservation is playing an increasingly significant role in maintaining our aging pavement infrastructure under severe budget constraints. One important component is the application of surface treatments based on application of sealants. Recently, a number of new products, called bio sealants, have been used to treat aging pavement surfaces. The objective of this study is to investigate rheological properties of the binders treated with these materials to understand the mechanism by which they may improve pavement performance. One plain asphalt binder and four types of sealants, two oil-based and two water-based, were used in the experimental work. The results obtained using a dynamic shear rheometer and a bending beam rheometer were used to determine the changes in rheological properties and the change in performance grade. It was observed that the oil-based sealants have a significant softening effect of the control binder compared to the water-based sealants.

Title: Assessing Bio-Based Fog Seal for Asphalt Pavement Preservation
Authors: Yang, Bo, Zhang, Yang, Ceylan, Halil, Kim, Sunghwan
Publisher: 12th International Conference on Low-Volume Roads; TRB Circular E-C248
Abstract: All types of roads, including those with asphalt pavements, steadily deteriorate over time because of repeated mechanical (traffic) and climatic loadings. Pavement preservation consists of applying a suitable treatment on deteriorated roads to maintain good conditions and extend their service lives. Fog seal is a low-cost application of liquid asphalt or emulsion derived from petroleum or coal tar to slow down microcracking propagation, prevent oxidation, and seal against water infiltration. The conventional fog sealers need heating before spraying on the pavement surface, and the recommended spray temperature should be between 52°C and 71°C (125°F and 160°F). Although such petroleum-based traditional fog sealers have been successfully used to maintain road surfaces for many years, they not only need a long curing time, which results in delayed traffic opening, but they can also cause health issues from chemical components such as polycyclic aromatic hydrocarbons. Furthermore, the use of fossil fuel-based products increases the risks associated with an energy crisis and environmental contamination. In recent years, a few bio-based fog sealers have been developed as sustainable alternatives to traditional petroleum-based sealers; soy-based fog sealant derived from agricultural oil is one such product. The manufacturers of the bio-sealant claim that it protects asphalt from oxidation, potholing, edge rutting, and cracking and can extend the life of paved asphalt surfaces when applied every
3–5 years; the other advantages and disadvantages are summarized in Table 1. States such as Missouri and Ohio have reported success in using bio-based products for county road preventive maintenance. Even though the reported observations include quick shedding of water from roadways treated with bio-sealant while retaining the skid resistance of normal pavement, documentation of construction and performance experience is limited. Based on the successful use of bio-sealant in other states, this study aimed at evaluating a bio-based product as a fog sealant for low-volume asphalt pavements in Iowa.