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2023 RESEARCH PROJECT STATEMENT

Research Topic:

Effect of Asphalt Binder Source in Asphalt Mixture Performance

Research Budget and Timeline:

- \$400,000
- 24 months (of which final 3 months are for review)

Problem Statement and Objectives

The variability of an asphalt binder and the effect of that variability on an asphalt mixture's performance is not widely understood. Asphalt binders vary between sources, as well as a source's individual lots thus the binder used for a mixture design may not be the same as what is used during production. There is a need to understand how asphalt binder variability affects the mixture's overall performance between laboratory and paving settings. This project will investigate how binder source, lot, and modification affects mixture performance and lifecycle cost. It will look to establish specifications for allowable tolerances and provide recommended updates to MassDOT specifications.

The objectives are the following: 1) Determine which binder properties display significant variation between different production lots and sources, 2) Determine which changes in binder properties significantly alter a mixture's laboratory performance, 3) Perform a life cycle cost analysis based on the binder property variations and a mixture's performance, 4) Establish specifications for allowable binder property tolerances once a mixture design has been approved, and 5) Provide a roadmap for MassDOT to update the asphalt pavement specifications to incorporate new binder testing protocols during the mix design approval process and during construction.

Anticipated Outcomes and Deliverables:

Outcomes: The outcome of the project will be a report which provides answers to the research objectives. It will outline the test methods that MassDOT should focus on when evaluating the suitability of an asphalt binder in a mixture. It will identify where the current specifications can be modified and whether the current PG system is still suitable when determining a binder's ability to perform under design conditions.

Deliverables:

1. Determination of which test methods MassDOT should focus on when evaluating the suitability of an asphalt binder in a mixture.
2. Revisions to the specifications for asphalt binder, defining whether the current PG system is still suitable when determining a binder's ability to perform under design conditions.
3. Recommendations to the MassDOT hot mix asphalt material specifications and Quality Assurance program during both mix design and production.
4. Final presentation.
5. A workshop to explain the project findings and recommendations.
6. Final report summarizing research activities, results, and recommendations.