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Sponsor

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Project Title

Determining Presence and
Amount of Recycled As-
phalt Pavement (RAP) Ma-
terial for Flexible Pave-
ments

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Project Summary

Technology Transfer Outreach Publication

A Standard Procedure for Measuring Recycled Asphalt Pavement

The aging infrastructure of American roadways places increasing demands on the transportation industry for an efficient, environmentally sound, and economically feasible repair plan. Recycled Asphalt Pavement (RAP) use within rehabilitated roadways is an increasingly popular solution to reducing roadway construction costs and reducing landfill wastes. RAP has shown promising results in rehabilitating roadways; however, transportation officials and contractors disagree on the presence and the amount of RAP to use. To solve these issues a uniform method that can measure the amount of RAP within pavement mixtures is needed.

Currently RAP is identified mainly through asphalt extraction techniques, which involve extensive training and possible health hazards. To remedy these problems, further research is urgently needed to identify the best means for verifying the most effective percentage of RAP within rehabilitated roadway mixtures.

Research Objective

The objective of this research project is to develop a standard procedure for testing RAP percentage in post-constructive asphalt.

Methodology

The research team will determine and identify RAP percentage in a mechanistic manner using Superpave™ mixture characterization tests. The proposed methodology includes:

- Complete a comprehensive literature review detailing the methods of RAP production and detection within flexible pavement structures
- Measuring void properties of HMA samples using the Superpave™ gyratory compactor
- Determining RAP mixture behavior under dynamic loading conditions using dynamic modulus testing
- Testing asphalt mixture tensile strength properties using indirect tensile testing
- Development of a linear regression model will be constructed using VMA, VFA, E*, and asphalt mixture compressive strength

Project Summary

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University Facts

Total Enrollment	6,550
Graduate Enrollment	916
Number of Faculty	417
Placement Rate	95%

Michigan Tech is located in Houghton, MI on the south shore of Lake Superior. This rural area is known for natural beauty, pleasant summers, abundant snowfall, and numerous all-season outdoor activities. In addition, the University maintains its own downhill and cross-country ski facilities and golf course. There are numerous cultural activities and opportunities on campus and in the community. Michigan Tech has also been rated as one of the safest college campuses in the United States, and the local community provides excellent resources conducive to an outstanding quality of life.

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Research Findings

This investigation will identify asphalt mixture properties and tests that in combination can predict RAP percentage from asphalt mixtures. This investigation will be an initial step in producing a testing standard which can be used within Michigan and throughout the nation in determining field RAP percentage using asphalt mixture characterization tests. Finally a model will be developed for RAP percentage prediction and identification which doesn't involve asphalt extraction.

Anticipated Implementation

The results of this research are anticipated to be used by state and local transportation officials as a quality assurance measure to verify the appropriate amounts of RAP material placement within asphalt pavements. A detailed procedure will be produced, detailing the methods for used to validate the presence of RAP. The results of this project will be disseminated to the public through a journal article and poster highlighting the successes of the research.

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