

Evaluation of Stripping Potential Tests for Bituminous Concrete

PROJECT TITLE

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STUDY TIMELINE

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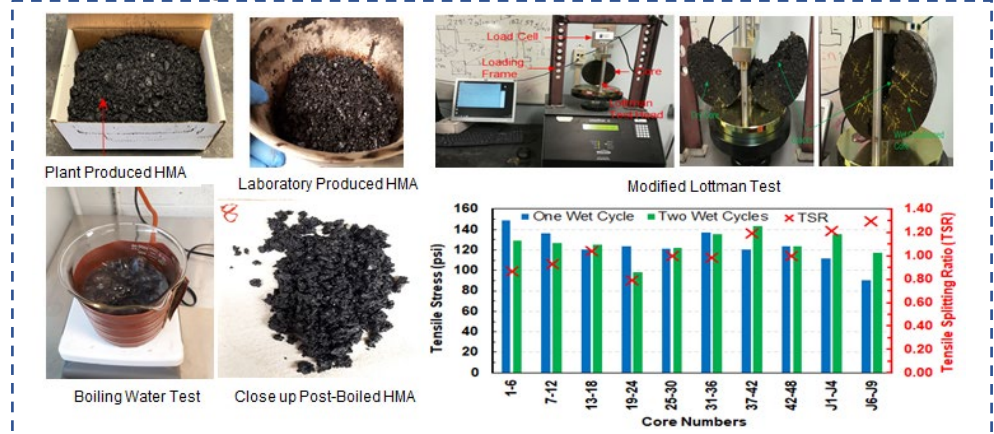
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More information about the VTrans Research Program, including additional Fact Sheets, can be found at: <http://vtrans.vermont.gov/planning/research>

Introduction or Problem Statement

Pavement stripping due to loss in adhesion/binding between asphalt binder and aggregate in presence of moisture is a common and challenging pavement distress in wet climates such as Vermont. Current VTrans practice is to require either AASHTO T283 (modified Lottman test) or Hamburg Wheel Tracking (HWT) testing during mix design approval. However, the correlation of the result of these tests and field performance is not satisfactory. The goal of this study is to assess the modifications of ASTM D3625 (boiling water test) and AASHTO T283 to determine the moisture susceptibility of Hot Mixed Asphalt (HMA) concrete containing Reclaimed Asphalt Pavement (RAP), different aggregates, and Anti-stripping Agents (ASA).



Methodology or Action Taken

Boiling water and modified Lottman tests were conducted on the HMA mixtures and cores retrieved from the field and produced in the laboratory. Particularly, the sensitivity of ASTM D3625 to additional 10% RAP, presence of stripping potential and non-potential aggregates, and ASA was evaluated. In addition, the effect of additional cycle of Lottman conditioning on the Tensile Strength Ratio (TSR) of the asphalt cores was also investigated.

Conclusions or Next Steps

Boiling water test showed RAP content in the mixture could be increased by 10% (i.e. up to 30 %) without any additional moisture damage. The quantification of ASTM D3625 is unreliable due to insignificant loss of asphalt binder during boiling. The TSR of the field cores were above acceptance range. However, the joint cores exhibited lower compaction level resulting in the lower tensile strength. An additional cycle of lottman conditioning was not enough to induce extra moisture damage in the field retrieved cores.

Potential Impacts and VTrans Benefits

The study will help VTrans to develop a robust and reliable moisture susceptibility test standard that can accurately predict the moisture susceptibility of asphalt pavement subject to Vermont condition (i.e. wet condition), which could potentially reduce pavement maintenance cost for VTrans.