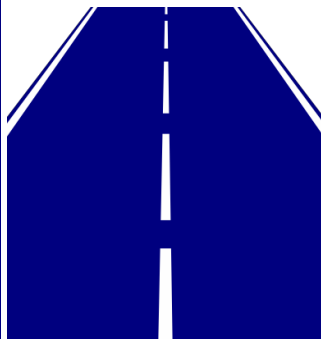


Report Title

*Layer Coefficients for
 New Hampshire
 Department
 of Transportation
 Pavement Design*

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Report Link

https://www.nh.gov/dot/org/projectdevelopment/materials/research/projects/documents/26962n_report.pdf

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Why was it studied?

The layer coefficients (a-values) for asphalt mixtures significantly influence the determination of pavement thickness, translating into the structural contribution of the layers as well as the long term performance of the pavement and construction/maintenance costs. One of the major recent modifications in the AASHTO 1993 design approach has been to update layer coefficients using different mechanistic and performance based measures.

It is critical to determine reliable a-values that are most relevant to the regional conditions and locally used materials. In addition, the asphalt mixtures in use today are substantially different from those characterized during the development of the design guide in the 1960s. With use of asphalt binder modification technologies, allowance for recycled materials such as RAP and ground tire rubber, and newer manufacturing and construction techniques such as cold recycling, there was a need to reevaluate layer coefficients for materials that are currently being used in the construction of pavements.

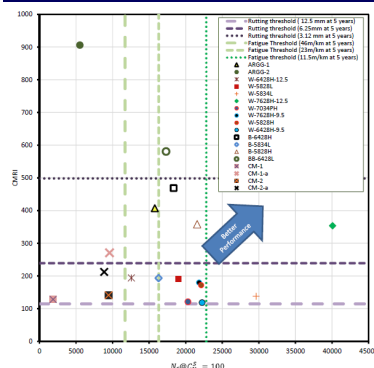
What was done?

A set of 18 asphalt mixtures commonly used in New Hampshire were selected for performance testing and evaluation of the structural contribution in terms of layer coefficients. In order to develop the layer coefficients, comprehensive research was conducted on the performance and properties of the mixtures through different mechanistic-based laboratory testing methods.

Asphalt mixtures from the region were also studied to develop and validate three novel performance index parameters for rutting, fatigue and transverse cracking. The developed parameters were incorporated with the field distress data to develop mechanistically informed layer coefficients for the New Hampshire flexible pavement design approach.



Resilient modulus test



Performance space diagrams

What did we learn?

The newly developed layer coefficients incorporate the lab measured performance indices and reflect the expected performance of asphalt mixtures in the field. Based on the analysis, a set of average and minimum a-values at different levels of reliability have been proposed for future New Hampshire pavement designs. Pavement structures designed with the proposed layer coefficients are expected to have higher reliability in terms of performance and service life.

How can we use it?

The layer coefficients developed in this research study are based on a combination of field performance and performance based laboratory evaluations and can be reliably used in design of pavement structures in New Hampshire. This can result in a more efficient pavement structural design and major savings in construction costs.