

Properties of Asphalt Binder After Extended Aging in a Pressure Aging Vessel

PROJECT TITLE

Properties of Asphalt Binder After Extended Aging in a Pressure Aging Vessel

STUDY TIMELINE

5/20-Present

INVESTIGATORS

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Asphalt Binder, Delta T_c, Bending Beam Rheometer

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Introduction or Problem Statement

Simulating the aging of asphalt binder in a laboratory setting has been an industry standard for several decades. More recently, a correlation between pavement performance and the difference between the critical stiffness and relaxation rate of an aged binder, a calculation referred to as “ ΔT_c ” has been discovered. This research takes the aging process a step beyond AASHTO requirements, aging the binder for 40 hours, in lieu of the typical 20 hour cycle.



Methodology or Action Taken

The asphalt binder is aged for 40 hours in a chamber maintained at 100°C and 2.1 MPa of pressure. The binder is then tested at a range of temperatures in a bending beam rheometer until passing and failing results are achieved for both the stiffness and the m-value. The critical temperatures for the stiffness ($T_{c,s}$) and the m-value ($T_{c,m}$) are then interpolated from these results. The ΔT_c is then calculated by subtracting the $T_{c,m}$ from the $T_{c,s}$.

Conclusions or Next Steps

Research is still ongoing but has shown promising results for multi-laboratory repeatability. Another round robin is being planned, and low-end modifiers are being tested both in the laboratory and in the field.

Potential Impacts and VTrans Benefits

Should the 40-hour ΔT_c testing prove able to distinguish between beneficial low-end modifiers and inadequate ones, then the State of Vermont may allow their usage once more.

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