EVALUATION OF GLASS FIBER REINFORCED STRESS ABSORBING MEMBRANE INTERLAYERS

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Reflective cracking, the propagation of cracks present in the existing old pavement to the new overlay, is one of the major distresses prevailing in asphalt overlays. Different remediation techniques and products have been developed and adopted using the years. One such technique, common on low volume roads, is the incorporation of a Stress Absorbing Membrane Interlayer (SAMI) between the cracked pavement and the overlay.

In the present study, a newly developed product consisting of a surface treatment with glass fibers is evaluated for the effectiveness as SAMIs. The product consists of glass fibers randomly dispersed into an asphalt emulsion that is sprayed onto the cracked surface, after which aggregates are laid and compacted. An asphalt overlay is then placed on top of the glass-fiber reinforced SAMI. The study is carried out in two stages. In the first stage, an experimental section consisting of an overlay with SAMI and a control section consisting of only an overlay were constructed at the Pennsylvania Transportation Institute's (PTI) Test Track and subjected to bus and accelerated trafficking using the MMLS3. The development of cracks was monitored over time both visually and by using a Portable Seismic Property Analyzer (PSPA) to record the fall in the AC overlay modulus, an indicator of damage and crack growth. In the second stage, laboratory tests are carried out on emulsions with and without glass fibers. The Direct Tension Test (DTT), Bending Beam Rheometer (BBR), and Dynamic Shear Rheometer (DSR) tests are conducted out to quantify the influence of fibers on the tensile strength and flexural strength of the emulsion, properties which are important both for thermal and reflective cracking. Additionally, strength and torsion tests are conducted. Strength tests on field cores will also be tested. Results from the tests conducted on binder and mixture are analyzed to study their correlation to observed field performance.

References:

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