Influence of Mw of LDPE and vinyl acetate content of EVA on the rheology of polymer modified asphalt

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Abstract: Asphalt binder was modified by low-density polyethylene (LDPE) and ethyl vinyl acetate (EVA) polymers to investigate the structure-property relationships of polymer-modified asphalt (PMA). The PMA was prepared in a high-shear blender at 160 Â°C. The optimum blending time (OBT) for each polymer was determined following a separate investigation. OBT was influenced by Mw, MWD, and polymer structure. The influence of Mw of LDPE and vinyl acetate (VA) content of EVA on PMAs was studied by rheological tools. Polymer modification improved the rheological properties of base asphalt. EVA-PMAs were found to be less temperature sensitive than LDPE-modified asphalts. LDPE modification increased flow activation energy (Ea) but EVA modification decreased Ea. Both VA content and Mw of LDPE have influenced the storage stability of PMAs. The low-temperature properties of PMAs and short ageing tests were not influenced by polymer type. On the other hand, the high-temperature properties of PMAs were strongly influenced by Mw of LDPE and VA content of EVA. Overall, EVA with low VA content showed the best temperature resistance to high-temperature deformations, the highest upper service temperature as well as the best storage stability. Â© Springer-Verlag 2005.