

Physical and Rheological Properties of Asphalt Modified with Cellulose Date Palm Fibers

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Abstract : Fibers are extensively used in civil engineering applications for many years. In this study, empty fruit bunch of date palm trees were used to produce cellulose fiber that were used as additives in the asphalt binder. Two sizes (coarse and fine) of cellulose fibers were pre-blended in PG64-22 binder with various contents of 1.5%, 3%, 4.5%, 6%, and 7.5% by weight of asphalt binder. The physical and rheological properties of fiber modified asphalt binders were tested by using conventional tests such as penetration, softening point and viscosity; and SHRP test such as dynamic shear rheometer. The results indicated that the fiber modified asphalt binders were higher in softening point, viscosity, and complex shear modulus, and lower in penetration compared to pure asphalt. The fiber modified binders showed an improvement in rheological properties since it was possible to raise the control binder (pure asphalt) PG from 64 to 70 by adding 6% (by weight) of either fine or coarse fibers. Such improvement in stiffness of fiber modified binder is expected to improve pavement resistance to rutting.

Keywords : cellulose date palm fiber, fiber modified asphalt, physical properties, rheological properties

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