

Influence of polymer and aged binder on the physical and rheological properties

ABSTRACT

This research paper presents laboratory investigation on the physical and rheological properties of asphalt binder modified with Ethylene-vinyl acetate (EVA) and Aged binder in different duration. Six different concentrations (0%, 1%, 2%, 3%, 4%, and 5% by weight of base asphalt) of Ethylene-vinyl acetate (EVA) was selected to blend with 80/100 penetration grade asphalt binder. six aging duration (0 min, 45 min, 85 min, 125 min, 165 min and 205 min) by using 80/100 penetration grade asphalt binder with rolling thin film oven were selected to prepare the aged binders. The EVA modified asphalt binders as well as Aged binders was subjected to short term aging process by means of Rolling Thin Film Oven Test (RTFOT) in order to investigate the influence of the addition of EVA and aged binder in the asphalt binder properties after aging. Bituminous binder properties were investigated by both physical and rheological methods. In general, the physical test results demonstrated prominent increment in softening point; viscosity and decrement in penetration for both EVA modified asphalt binders and aged binders as compared to non-modified and non-aged binder. This study adopts a time sweep (TS) test method to study the fatigue phenomenon under control strain mode using a dynamic shear rheometer (DSR). Fatigue life of asphalt binder is defined using the traditional approach based on number of cycles required to cause failure and reduction in stiffness. Temperature sweep test by using a dynamic shear rheometer (DSR) is used to predict the asphalt grade after aging and after adding Ethylene-vinyl acetate (EVA).

Keyword: Asphalt; Aging; Ethylene-vinyl acetate; DSR; Rheological property; Physical properties; RTFO aged binder