Abstract

In this paper, long-term aged base asphalt and SBS modified asphalt binders were rejuvenated and modified simultaneously using a compound rejuvenator containing 77% aromatic oil and 23% SBS polymer. Aromatic oil was used for rejuvenation purpose due to its softening effect while SBS polymer was used for modification purpose because of its potential to form a polymer network. Conventional bitumen tests, dynamic shear rheological (DSR) test and bending beam rheological (BBR) test were conducted to evaluate the rejuvenation and modification effects. Test results indicated that use of the compound rejuvenator enhanced the softening point and ductility for both aged base asphalt and SBS modified asphalt binders. The polymer modification effect of compound rejuvenator was well distinguished by the plateau region of phase angle master curves. Aromatic oil had a strong softening effect on aged asphalt binder which improved the performance at low temperatures, but weakened the performance at high temperatures. The incorporation of SBS polymer was a good supplement to balance the overall performance of rejuvenated asphalt binders. The compound rejuvenator can be greatly effective for hot recycling of reclaimed asphalt mixture by means of the simultaneous rejuvenation and modification.