Abstract

This study reports the long-term crack healing effect of five healing agents (HAs) applied on fractured semi-circular bending test samples of AC-13 asphalt mixtures. A multiple fracture-rehealing test was adopted to simulate the effect of crack opening and closing on treated asphalt pavements. Test results showed that healing was most rapid in the initial stage (0–4 days), it slowed down in the intermediate stage (4–60 days) and formed a plateau in the tertiary stage (60–120 days). Healing in the initial 4 days had the highest contribution to the ultimate healing. Maltene based HAs had a better healing effect than traditional asphalt emulsions. More than 80% of the peak strength and 70% of the fracture energy could be recovered after long-time healing. The ultimate healing was dependent on the type of the HA, healing time and aging of mixture but it was less sensitive to the frequency of the initial multiple fracture-rehealing cycles. Gain in peak strength preceded the recovery of fracture energy. The time needed to attain the optimum healing was dependent on the type of the HA and not the aging of the mixture. Generally, carefully selected HAs have the potential to heal cracks in asphalt pavements.