

Evaluation of Fracture Resistance and Moisture Damage of Hot Mix Asphalt Using Plastic Coated Aggregates

Authors : Malleshappa Japagal, Srinivas Chitragar

Abstract : The use of waste plastic in pavement is becoming important alternative worldwide for disposal of plastic as well as to improve the stability of pavement and to meet out environmental issues. However, there are still concerns on fatigue and fracture resistance of Hot Mix Asphalt with the addition of plastic waste, (HMA-Plastic mixes) and moisture damage potential. The present study was undertaken to evaluate fracture resistance of HMA-Plastic mixes using semi-circular bending (SCB) test and moisture damage potential by Indirect Tensile strength (ITS) test using retained tensile strength (TSR). In this study, a dense graded asphalt mix with 19 mm nominal maximum aggregate size was designed in the laboratory using Marshall Mix design method. Aggregates were coated with different percentages of waste plastic (0%, 2%, 3% and 4%) by weight of aggregate and performance evaluation of fracture resistance and Moisture damage was carried out. The following parameters were estimated for the mixes: J-Integral or J_c , strain energy at failure, peak load at failure, and deformation at failure. It was found that the strain energy and peak load of all the mixes decrease with an increase in notch depth, indicating that increased percentage of plastic waste gave better fracture resistance. The moisture damage potential was evaluated by Tensile strength ratio (TSR). The experimental results shown increased TRS value up to 3% addition of waste plastic in HMA mix which gives better performance hence the use of waste plastic in road construction is favorable.

Keywords : hot mix asphalt, semi circular bending, marshall mix design, tensile strength ratio

Conference Title : ICTHE 2017 : International Conference on Transportation and Highway Engineering

Conference Location : Melbourne, Australia

Conference Dates : February 02-03, 2017