

Impact of Using Pyrolytic Carbon Black as Asphalt Modifier on Wearing Course of Flexible Pavement

Authors : Samiya Siddique, Taslima Akter Elma, Shahrina Mahzabin, Tamanna Jerin, Mohammed Russedul Islam

Abstract : In the maneuver and designing of highway engineering, pavement performance is a principal concern. Quality of construction and materials, traffic volume, climate, etc. are the factors that affect the performance of asphalt concrete. Modified asphalt requires to attain greater strength and stability even at inimical circumstances. In this point of view, pyrolytic carbon black (PCB), which is a by-product of waste tire pyrolysis, holds incomparable properties that individualizes it from other conventional fillers by making it an imminent modifier of bitumen. Optimum asphalt content of 60/70 penetration grade asphalt is determined 5% through the Marshall Stability and Flow test for the wearing course of flexible pavement. 5, 10, and 15 percentages of PCB are then used with neat asphalt for modification. Deviations of physical and rheological properties are investigated on both PCB modified and neat asphalt by going through several laboratory tests such as penetration, softening point, and ductility tests. The obtained results reveal that the performance of paving asphalt can be upgraded by modifying it with PCB. With the increasing percentage of PCB, ductility is gradually decreased, and also penetration grade is gradually reduced from 60/70 to 30/40. Furthermore, asphalt mixtures modified with PCB demonstrate higher stability and lower flow values. The research discloses that the apposite percentage of PCB used in asphalt concrete plays a significant role in the advancement of pavement performances and reutilizing of waste tires.

Keywords : asphalt modification, pavement performances, pyrolytic carbon black, marshall stability, wearing course

Conference Title : ICTPD 2020 : International Conference on Transportation Planning and Design

Conference Location : Bangkok, Thailand

Conference Dates : February 03-04, 2020