

Laboratory study of asphalt concrete durability in Jeddah

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Abstract: Jeddah City road network is showing severe deterioration before the end of its anticipated design life. Raveling and stripping are the main problems observed; the bond between aggregates and asphalt film is broken due to water intrusion. The aggregates are then removed by traffic action. The problem has been aggravated by the high water table. Asphalt concrete mixes used in Jeddah City road network were investigated to evaluate the effect of degree of saturation, percent air voids and medium of attack on fatigue life, modulus of resilience, split tensile strength and permanent deformation. Three media of attack were considered: fresh water, sea water and soap-diluted water. A number of treatments were carried out on asphalt mixes, including filler replacement by Portland cement, aggregate coating by Portland cement, addition of lilamine as an anti-stripping agent and use of emulsified asphalt instead of asphalt cement. Results indicated that modulus of resilience, split tensile strength and fatigue life decreased with increase in degree of saturation. Highest strength parameters were obtained for fresh water and lowest in the case of soapy water. Portland cement coating and replacement of filler by Portland cement were found to be effective in reducing stripping. © 1998 Published by Elsevier Science Ltd. All rights reserved.