ABSTRACT

Understanding bond between bituminous binder and aggregate is an important consideration for bituminous mixes. The cohesion within the binder and the adhesion between the binder and the aggregate interface, affect the mix performance in terms of load transfer, propagation of crack, moisture sensitivity etc. In the present work, bond strength between aggregate and bituminous binder with varying bitumen film thickness has been studied at a fixed temperature (23 ± 1^{o}C) and fixed displacement rate (1 mm per minute). Surface of aggregate samples are polished to an average roughness (R_a) level of 7 micron. Two different types of samples are developed for testing purpose. For the first type, polished surface of one aggregate is entirely covered with thin film of bitumen and then another aggregate is placed with its polished surface over the bitumen film. For the second type, similar procedure is adopted except the bitumen film is applied in a discontinuous manner as circular patches. Vertical pulling load is then applied to this assembly. Load displacement data is recorded for various samples for different bitumen film thicknesses. The variation of peak stress, energy and displacement at failure are plotted with respect to the bitumen film thickness. The conditions for cohesion and adhesion failures are studied. It is envisaged that such studies would evolve as a useful input for the micro-mechanical modeling of bituminous mix.

KEYWORDS: Bitumen, Aggregates, Bitumen film thickness, Adhesion, Cohesion