EFFECT OF MOISTURE ON THE ADHESION OF AGGREGATE–BINDER SYSTEMS

P.D.C. Nageswaran, A. Varveri & A. Scarpas
Delft University of Technology, Delft, Zuid Holland, The Netherlands
S. Mohan
Dura Vermeer, Rotterdam, Zuid Holland, The Netherlands

ABSTRACT
The introduction of new materials, polyurethane, epoxy, etc., either as a supplement or replacement to bitumen in pavement construction necessitates a better understanding of their adhesive properties with aggregates. This paper aims to study the changes in adhesion of aggregate-binder systems, before and after moisture conditioning. An easily implementable test procedure for the assessment of adhesive bond strength was developed. In total three aggregates (porphyry, diorite and sandstone) with four binders (Pen 70/100, SBS polymer modified bitumen, polyurethane-based binder and epoxy-based binder) and two adhesion promoters were tested. The direct tension test was found to be effective in quantifying adhesion. Overall, the test results demonstrated the detrimental effect of moisture on bond strength, especially when tested at low temperatures. The polyurethane- and epoxy-based binders were found to be highly moisture susceptible. Also, the effectiveness of the adhesion promoter was observed to depend on its compatibility with the binder.