Effect of cementation level on performance of rubberized cement-stabilized aggregate mixtures

Farhan, A.H., Dawson, A.R., Thom, N.H.

An investigation and comparison is made of the effect of cement content on the performance of rubberized cement-stabilized aggregate mixtures and on cement-stabilized aggregate mixtures containing no rubber (RCSAMs and CSAMs). These materials are intended to be used as a base course for pavement structures. Three cement contents (3%, 5%, and 7% by dry weight of aggregate) were investigated. Rubberized mixtures were manufactured by replacing 30% of one aggregate fraction that has a similar gradation of crumb rubber. Performance was evaluated under static and dynamic testing. The investigated properties are unconfined compressive strength, indirect tensile strength, indirect tensile static modulus, toughness, dynamic modulus of elasticity, dynamic modulus of rigidity and dynamic Poisson's ratio. Increasing cement content increases strength of both types of mixtures, especially in the CSAMs. It is found that using crumb rubber at low cement content is more feasible than with high cement contents. Stiffnesses increased for both types of mixture as cement content increased but decreased on incorporation of crumb rubber. Energy absorption capacity was inversely related to stiffness. Mesostructural investigation revealed that the cracks were propagated through the rubber particles for all cement contents.