

HOT BITUMINOUS MIXTURES : DESIGN FOR PERFORMANCE

By

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ABSTRACT

Modern design of bituminous mixtures involves not only compliance with structural requirements but also compliance with performance requirements during service. Ensuring satisfactory in service performance and therefore durability is not easy because durability is not a measurable property of a material but rather an attribute which can only be defined as a function which relates the level of performance to the service life. This function is obtained by controlling performance related properties and appropriate environmental variables associated with the exposure conditions for which the design is being prepared. Researchers in the field of bituminous materials agree that performance can be assessed by one or more of the following properties: permeability, porosity, adhesion of binder to mineral aggregate and long term deformation (creep).

Hot bituminous mixes have to be handled placed and compacted at high temperature. Some mixes can not be satisfactorily compacted at lower temperatures and therefore the "in place" resultant mix has low density, high porosity and high permeability. Assessment of the workability of a bituminous mix during the laboratory design stage should be a requirement of any method of design not only to avoid difficult mixes in terms of handling and compacting but also to allow the optimization of design by the use of appropriate selected components.

This paper presents a discussion of the Leeds Design Method (LDM) which is applicable to hot bituminous mixtures, i.e., hot rolled asphalt, dense bitumen macadam and asphaltic concrete. It presents results comparing the optimum binder content obtained by the LDM and by the conventional BS method. It also shows the advantages of using a workability parameter during the design stage for optimization purposes.