

PRELIMINARY EVALUATION OF THE EFFECTS OF LIME ON STONE MASTIC ASPHALT MIXTURES WORKABILITY

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ABSTRACT

The main aim of the present research activity is to study the effect of lime in the prevention of binder drain down of SMA (Stone Mastic Asphalt) mixtures during the working process. Mixtures with high binder content are usually mixed with different types of fibers (cellulose fibers, glass fibers etc.), working as an additive able to prevent the binder drainage during production, transport and laying of mixtures. Hydrated lime is known to be more than just a moisture damage additive: it is to be considered an active filler able to create strong interactions between the aggregate and the bitumen. On the other hand, from a general point of view, filler markedly affect behavior of asphalt binder in HMA mixtures; typically, an increase in filler increase the optimum asphalt content, increase the density and increase the stability. Conversely, an excessive amount of filler in the mix could negatively increase the stiffness of the mix and the aggregate surface area thus reducing the asphalt film thickness. Hydrated Lime modifies the surface properties of the aggregate, allowing for the development of surface roughness more favorable to bitumen adhesion. This study address for evaluation of the effects of fiber replacement with lime for production of SMA mixtures; assessment will be mostly based on results of drainage tests. An optimization of the amount of lime to be added to the mix has been performed in order to reduce the binder drainage until values typically provided by the use of cellulose fibers. Moreover, volumetric and mechanical properties have been evaluated in order study the effect of lime on performances of optimized mixtures. Results appear to be promising regarding the possibility to replace cellulose fibers with hydrated lime.