

A Review on the Effect of Various Additives on Mechanical Properties of Stone Mastic Asphalt (SMA)

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ABSTRACT

One type of asphalt mixture that has been very popular in recent years is the Stone Mastic Asphalt (SMA), which introduced in the mid-1960s. The use of this type of mixture has been associated with some problems such as rutting, abrasion, and weakness against heavy traffic loads. In this research, the effect of various additives such as organic, mineral, polymeric, and non-polymeric materials on the behavior of SMA mixtures has been investigated. According to the results, the effects of these additives such as Sisal plant fiber, Diyarbakir basalt wastes, and steel slag improved the rutting and fatigue resistance, as well as moisture sensitivity of SMA. In addition, the bitumen drain down will be reduced. For example, by adding 6% of ethylene-vinyl acetate to bitumen, the flow number increased by almost 43% and the addition of nano Fe_2O_3 to asphalt mixtures improved the rutting resistance by 33%. Also, using recycled and waste materials as replacement of aggregates and utilizing available and inexpensive additives can reduce the construction costs. It should be noted that this can decline environmental issues caused by the construction and implementation of conventional asphalt mixtures.

Keywords: Stone Mastic Asphalt (SMA), Additives, Pavement Distress, Rutting Resistance, Drain Down