

Experimental Study of Application of Steel Slag as Aggregate in Road Construction

Authors : Meftah M. Elsaraiti, Samir Milad Elsariti

Abstract : Steel slag is a by-product of the steel production and utilizing it potentially as new or substitute materials in road construction is advantageous regarding cost reduction and flattening improvement or properties pavement. Ease of use, low cost, and resource availability are some of few advantages of reuse and recycling of steel slag. This study assesses the use of Steel Slag Aggregates (SSA) as an alternative to natural road building aggregates. This paper discusses the basic characteristics of steel slag based on extensive laboratory tests, and to determine the possibilities of using steel slag in road construction. Samples were taken from the furnaces directly at different times and dates. Moreover, random samples were also taken from the slag field from various areas at different far distances from each other. A necessary analysis was performed through the use of (XRF). Three different percentages of SSA (0, 50 and 100%) were added as an alternative to natural aggregate in hot mix asphalt (HMA) production. The proposed design of the mix was made according to the Marshall mix design. The results of the experiments revealed that the percentages of iron oxide ranged from (9 to 26%) and that the addition of SSA has a significant improvement on HMA properties. It was observed that the Marshall stability obtained in the mix of 100% slag ranged from 600 to 800 N as a minimum, and the flow of Marshall obtained from 2.4 to 3.23 mm and the specification requires from 2 to 4 mm. The results may be showed possibilities to use steel slag as new or substitute materials in road construction in Libya.

Keywords : by-product material, properties, road construction, steel slag

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