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EFFECT OF COIR AND SISAL FIBERS ON SMA MIXES

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Abstract

Generally a bituminous mixture consists of coarse aggregate, fine aggregate, filler and binder. The technology of asphalt materials and mixtures is discovered and mostly used in Europe and North America. The SMA (stone matrix asphalt) mixture is a gap-graded mix and it consists of predominantly coarser aggregates. In this present study attempt has been made to study the comparison of strength of pavement wearing coat made with SMA mix with naturally and locally available coir fiber and sisal fiber. This research was done to evaluate the viability of coir and sisal fibers as stabilizing agent in the mixture by laboratory tests in which a flow, stability, voids, VMA, VFB, Vv parameters are analyzed, as well as the physical properties of the mixture. For the SMA mix the aggregate gradation was taken as per the MoRTH specification and the binder content was 5.4%, 5.6%. 5.8%, 6%, 6.2% by weight of aggregate and fiber used was 0.3% by weight of aggregate. From the experimental results, using of coir fiber is dominant than the sisal fiber. Marshall stability value for coir fiber is 11.70 Kn is also higher than the sisal fiber and also comparison with the tensile strength and moisture susceptibility values coir fiber results with SMA is higher than the sisal fiber.

Keywords: SMA, Coir fiber, Sisal fiber, Drain down test, Tensile strength ratio, Moisture susceptibility.

Introduction

Stone Matrix Asphalt (SMA) is a gap-graded mixture, have a better stone to stone contact which gives better strength to the mixture. Stone mastic asphalt also called stone matrix asphalt, was developed in Germany in the 1960s with the first SMA pavements being placed as in 1968 near Kiel. It provides a deformation resistant, durable surfacing material, suitable for heavily trafficked roads. SMA has found use in Europe, Australia, the united states, and Canada as a durable asphalt surfacing option for residential streets and highways. Stone Matrix asphalt has a high coarse aggregate content that interlocks to form a stone skeleton that resists permanent deformation. In SMA mix, the stone to stone contact between the aggregates provides efficient network for load distribution. The stone skeleton is filled with a mastic of bitumen and filler to which fibers are added to provide adequate stability of bitumen and to prevent drainage of binder during transport and placement. Typical SMA composition consists of 70-80% coarse aggregate, 8-12% filler, 6-7% binder and 0.3% fiber. Most SMA mixtures