METHOD FOR PREPARING STONE MATRIX ASPHALT SAMPLE

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Abstract

The present invention relates to a method for preparing a stone matrix asphalt sample, comprising the steps of; initially sampling two aggregates, grading the aggregates, drying, weighing and compacting the aggregates, heating the aggregates in an oven at specific temperature, weighing a binder and heating it separately, separating out the aggregates, adding the separated aggregates in a mixing bowl and heating the aggregates under specific conditions, poring the binder, and mixing manually to obtain a mixture, washing a mould, and fixing a filter paper and pouring the mixture into the mould to obtain a specimen.

Keywords:specimen, aggregates, binder, stabilizer, grading, asphalt sample.

1. Introduction

Stone matrix asphalt is also known as stone mastic asphalt, generally a stone-on-stone like bony arrangement of gap graded aggregates, such as coarse and fine aggregates, attached together by matrix. The SMA mixtures are generally prepared by mixing fine, coarse aggregates and filler according to the gradation chart given by the standard code when using along with or without a stabilizer. The jute fiber is easily available and cost-effective in nature as compared with other fibers, as it is used as stabilizer high strength in fiber direction, greater tensile and impact strength. Conventionally, the stone matrix asphalt mixture is prepared by prilling an asphalt modifier, and then evenly mixing coarse aggregate, fine aggregate and a mineral powder at about 160-190 degree Celsius temperature. Later the asphalt and a proper amount of asphalt modifier are evenly stirred to obtain the stone matrix asphalt mixture. For the stabilization of tone matrix asphalt composed of mineral fibers, cellulose fibers or polymers are generally required to prevent drain down of the mixture. In order to enhance the stabilization of the stone matrix asphalt a naturally and locally available fiber called jute fiber is added into the asphalt so as to enhance the quality of stone matrix asphalt sample than that of bituminous concrete in respect of creep characteristics.

2. Experiment

The method for preparation of stone matrix asphalt sample using stabilizer havinghigh strength in fiber direction, greater tensile, flexural and impact strength[1]. The method for the preparation of stone matrix asphalt sample, comprising the steps of; a) initially the specific amount of two aggregates are sampled, grinded the weighed aggregates according to IRC-SP-79 and later dried the same, weighed and compact the aggregates in a mould to specific height value of 63.5 + 1.3 mm[1], b) the obtained aggregates are heated in an oven under certain conditions[2], c) the predefined amount of a binder is weighed and later the binder is heated at 168-190 degree Celsius, d) the aggregates are separated out, heated into the mixing bowl at about 150-160 degree Celsius temperature for 1 hour, and then the heated binder is poured in the bowl and manually mixed to obtain a mixture, e) the mould having 101.6 mm diameter and 76.2 mm height is washed, then a filter paper is fixed in another portion of the mould and the mixture is poured into the mould to obtain a specimen[3][4], f) the whole assembly of the mould is placed on a compaction pedestral, hammered 75 blows for no fiber and 50 blows for fiber with the[5] help of 2500 g compacting hammer having falling height of 80 mm and later the reversed side of the specimen is treated by changing the direction of the mould[2], g) the mould is transferred to a smooth flat surface and later the specimen is cooled at room temperature for 24 hours[6][7], h) the obtained specimen is measured and a paraffin wax is applied on the same, weighed the obtained specimen in water and later the same is store[8]d for calculating the stability and flow measurements values[6], and i) later, the obtained specimen is placed in hot water at 60 degree Celsius for 30 minutes to perform marshell test[2].

Sample No.	Bitumen Content	Temp. in ° C	Weight before paraffin coating in (g)	Weight after paraffin coating in (g)	Weight in water in (g)	Height in (mm)	Radius in (mm)	Weight of Bitumen (g)	Flow in (mm)	Load taken in (kN)
C-4-1	4.00%	160	1198	1207	760	60	50	48	2.34	328
C-4-2	4.00%	160	1195	1206	758	60	50	48	2.39	316
C-4-3	4.00%	160	1190	1201	755	59	50	48	2.3	325

C-5-1	5.00%	160	1196	1208	758	59	50	60	2.89	439
C-5-2	5.00%	160	1203	1212	763	60	50	60	2.95	451
C-5-3	5.00%	160	1192	1202	754	60	50	60	3.02	458
C-5.5-1	5.50%	160	1190	1203	753	60	50	66	3.51	529
C-5.5-2	5.50%	160	1195	1205	759	60	50	66	3.43	545
C-5.5-3	5.50%	160	1193	1202	754	60	50	66	3.44	540
C-6-1	6.00%	160	1190	1201	758	60	50	72	4.06	472
C-6-2	6.00%	160	1198	1207	763	61	50	72	3.98	483
C-6-3	6.00%	160	1205	1216	770	61	50	72	3.95	468
C-6.5-1	6.50%	160	1190	1200	753	59	50	78	4.51	410
C-6.5-2	6.50%	160	1206	1218	769	61	50	78	4.43	422
C-6.5-3	6.50%	160	1189	1198	756	59	50	78	4.4	396

3. Result and Conclusion

The method is develop to prepare stone matrix asphalt sample using jute fiber as a stabilizer. There is considered decrease is observed in Flow value (23.8%) in different SMA samples when jute fiber is basically used as the stabilizer. It is observed that mentioned parameters satisfy range for SMA as per IRC. The SMA sample prepared with normal aggregates along with jute fiber as the stabilizer gives best output result as compared to all other samples.

Reference

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