

PROJECT REPORT ON
“PERFORMANCE OF STONE MATRIX ASPHALT (SMA)
USING WASTE PLASTIC AS MODIFIER”

Project Associates

Mr. Abhishek Kumar
(4NM08CV002)

Ms. Divya Rashmi Castelino
(4NM08CV010)

Ms. Rachana Bhagwath K R
(4NM08CV042)

Ms. Shetty Ranjita Rajeeva
(4NM08CV057)

Mr. Vaishnav Jayachandran
(4NM08CV068)

Under the guidance of

Dr. A U Ravishankar
HOD and Professor
NITK, Surathkal

Dr. I R Mithanthaya
Professor
NMAMIT, Nitte

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ABSTRACT

Stone Matrix Asphalt (SMA) is a gap graded mix which consists of two parts namely, a high concentration coarse aggregate skeleton which provides the mixture with **stone to stone** contact and a high binder content which adds durability. Due to the high binder content, there will be a drain down of binder during the manufacture, transportation and laying of the mix. To prevent this drain down and to improve the mix characteristics, it has been modified by adding waste plastics to the aggregates (dry process).

The main purpose of the current project is to provide a highly rut resistant bituminous course for heavy traffic loads to resist tensile cracking, fatigue and potholing. Apart from this the study of stability, flow value and percentage drain down characteristics of Stone Matrix Asphalt (SMA) mixes is also observed by adding adequate proportions of waste plastic to the mix.

The initial step involves fixing the adequate gradation which is done on the basis of bulk density and selecting the highest among those i.e., Chinese and Indian gradation. After this various tests are conducted such as Marshall Stability Test for different proportions of bitumen and plastic content, Drain Down test and Rutting Test for Optimum Bitumen Content (OBC) and Optimum Plastic Content (OPC) respectively.

For the Chinese bitumen mix, OBC was found to be 6.0%, 5.75% and 5.70% with addition of 6%,8% and 10% plastic content respectively. For the Indian (MoRT&H) bitumen mix for 4%, 6%and 8% plastic content, OBC was 5.90%, 5.80% and 5.33%respectively. The Marshall Stability value for the Chinese mix with 8% plastic content was found to be 18kN which is much higher as compared to other mix proportions where as for Indian mix, 6% plastic content was found to be 16kN which is higher as compared to other mix proportions. By adding waste plastic to the SMA Mix, drain down value decreases and satisfy the condition i.e., less than 0.3 percent for both the gradations. It was also observed that rutting depth was found to be 43% higher for Indian gradation as compared to that of Chinese gradation.