



Features of Plastic Mix:

- Resistance towards water stagnation i.e. no potholes are formed.
- Strength of plastic road is twice than normal roads.
- Less bleeding during summer.
- Burning of plastics waste could be avoided.
- It doesn't involve any extra machinery.
- It doesn't increase cost of road construction.
- It also reduces the cost of bitumen.
- It is Economical.
- Flexible Pavement
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LAYING OF BITUMENOUS MIX:

I. MIX DESIGN BY MARSHALL METHOD:

- a) Optimum Waste Plastic Content
- b) Comparison of Two Mixes
- c) Volumetric properties of BC Mixes.

I. MIX DESIGN BY MARSHALL METHOD

:-MARSHALL TEST:-

Laboratory studies were carried out at the Centre for Transportation Engineering of Bangalore University on the possible use of the processed plastic bags as an additive in bituminous concrete mixes. The material used in this study was supplied by M/s KK Poly Flex (P) Ltd., Bangalore. The processed plastic was used as an additive with heated bitumen in different proportions (ranging from zero to 12 % by weight of bitumen) and mixed well by hand, to obtain the modified bitumen. The properties of the modified bitumen were compared with ordinary bitumen. It was observed that the penetration and ductility values of the modified bitumen decreased with the increase in proportion of the plastic additive, up to 12 % by weight. The softening point of the modified bitumen increased with the addition of plastic additive, up to 8.0 % by weight. Auto Marshall Compactor Auto Marshall tester 11

OPTIMUM WASTE PLASTIC CONTENT:

Varying percentages of waste plastic by weight of bitumen was added into the heated aggregates Marshall specimen with varying waste plastic content was tested for bulk density and stability. Maximum value of stability was considered as criteria for optimum waste plastic content. Studies were carried out on Bituminous mixes using 60/70 grade bitumen having average Marshall Stability Value (MSV) of 1300 kg at optimum bitumen content of 5.0 % by weight of the mix. Further studies on mixes were carried out using the modified binder obtained by the addition of varying proportions of processed plastic bags (percentage by weight of bitumen) with the conventional 80 /100 grade bitumen. The optimum modified binder content fulfilling the Marshall Mix design criteria was found to be 5.0 % by weight of the mix, consisting of 8.0 % by weight of processed plastic added to the bitumen. The average MSV of the mix using the modified binder was found to be as high as 1750 kg at this optimum binder content, resulting in about three fold increase in stability of the BC mix, which contains 4.6 % bitumen plus 8 % processed plastic by weight of bitumen, i.e., 0.4 % processed plastic by weight of the mix.

In order to evaluate the ability of the mix prepared with the above-modified bitumen to withstand adverse soaking condition under water, Marshall Stability tests were conducted after soaking in water at 60 Co for 24 hours. The average MSV of the BC mix with modified binder (using 8 % processed plastic by weight of bitumen, as above) was found to increase by about 2.6 times of the mix with ordinary bitumen. Further laboratory studies carried out on the BC mixes using this modified binder also indicated noteworthy increase in fatigue life under repeated application of loads.

Dry process is recommended for isolated works.

It is recommended that the percentage of shredded waste plastic will be 8% by CRRI, while the same is specified as 10% by Dr. Vasudevan. However we can adopt 8% as the optimum plastic content for blending the bitumen in the construction of plastic roads. The details of the process are given below. Bitumen of grades 60/70 or 80/100 can be used as binder as in case of conventional method.



Reference:

- You Tube– <https://youtu.be/coWg1414kXA>
<https://youtu.be/ZBWiU8jQcMM>

- Articles Read –

-Articles of Dr. Vasudevan.

-Use of Plastic and waste rubber tyres inflexible pavement.

-Use of plastic in construction of bituminous road (International Journal of Engineering Science and Technology)

-Research Paper on Plastic Roads Use of Waste Plastic in Road Construction Ahmed Trimbakwala Department of Civil Engineering, K. K. Wagh Polytechnic, Nashik