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A Study on Waste Plastic Used In Road Construction

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Abstract: A large amount of non-renewable resources is consumed by the construction industry throughout the world. This paper describes the various aspects of utilization of papercrete and plastic waste in construction of roads paper crete will offer a way to turn trash paper into inexpensive road that are quite strong, well-insulated and easily built.

Keywords*:* Plastic road, Waste recycle plastic, Aggregate, Bitumen.

I. INTRODUCTION

The major threat to the environment is the disposal of waste plastic. In a highway, the potholes and corrugation is the major problem. Plastic pavement will be better solution to the above stated problem. The durability of plastic is high and it degrades very slowly and also plastic has high resistance to degradation.

Plastic is non degradable waste, causes green house effect and global warming. Plastic waste is a huge threat to the environment. With more than 35 Tons of a plastic waste generated by every Indian state, each day India is confronted with the big question of how to get rid of this non-biodegradable menace.

II. PROBLEM STATEMENT

The following is a problem statement for the waste plastic use in road construction:

- Can break down into micro plastic and can find their way into the soil and bodies of water.
- UNEPs body of work demonstrates that the problem of plastic pollution doesn't exist in a vacuume.

III. OBJECTIVE

The following are the objectives of the reduce the plastic ferm environment and in hence communication rural and urban areas:

- To reduce pollution due to plastic& reduce disposal problem of plastic.
- To required strength of bitumen mixture by waste plastic.

IV. LITERATURE SURVEY

1. Use of plastic waste in bituminous pavement, 2017: ISSN:0974_4290,R.Manju; Sathaya; Sheema K.
In this paper studied that the waste plastic and its disposal is a major threat to the environment which result in pollution and warming. The utilization of a plastic waste in bituminous mixes enhances its properties and also its strength.

2. Use of waste plastic and rubber in bituminous pavement 2021 ISSN: 2321_0613 Nikhil N, Saketh Shetty

To deal with the problem here an attempt is made to study the use of waste as an alternative to conventional materials along with partial replacement of bitumen with plastic and used rubber by the wet mix process. In the highway infrastructure, a large number of originate materials and technologies have been invented to determine their suitability for the design, construction and maintenance of this pavement.

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A. Proposed work

- A. basics process

1. Collection process

The collection process involve such as shredding, washing, and shredding etc.

2. Shredding process

In this process after collecting the plastics wastes it will be cut into small pieces and then mixed all the product together.

3. Cleaning process

Plastic waste can be get cleaned and dried.

- B. field path

1. Dry process

The aggregate is heated at about 170 C in hot mix plant then the hot bitumen 80/100 grade 160 C is added after transfer the mixture to road. Plastics squander like sacks, bottles and so on are cut into a size somewhere in the range of 2.36 mm and 4.75mm utilizing destroying machine.

- The total blend is warmed to 170 C and afterward it is moved to blending chamber.
- Comparably the bitumen is to be warmed upto a limit of 160 C.
- At the blending chamber, the destroyed plastics squander is added over the hot total.
- The plastic waste covered accumulated is blended in with hot bitumen.

1. Wet process
1. Mechanical stirrer is to be used.
2. This process is required a lot of investment.
3. Not commonly used.
4. Proper cooling is to be used.

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RESULTS

As per IS : 2386 (P-IV) – 1997 interpretation the mean value of AIV is between 10 to 12% hence the aggregate are strong enough.

A. Crushing Value Test:

The aggregate crushing value of the given sample = 5.065%. Also many more tests which are necessary should be conducted either it may be bitumen or aggregate tests for bitumen.

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B. Penetration test:

Penetration is the measurement of hardness or softness of bitumen by measuring the depth in tenths of the millimeter to which a standard loaded needle will penetrate vertically in 5 seconds.

C. Flash and Fire Point

1) Results

Flash point of bitumen = 280 C

Fire point of bitumen = 320 C

S.R. No.	Description	Sample 1	Sample 2
1	Total wt. of dry sample taken(W1) gm	300	350
2	Wt. of portion passing 2.36mm sieve(W2)gm	36.55	38.5
3	Aggregate Impact Value (A.I.V.)= (W2/W1)*100	12.16%	11.0%
	Mean	11.58%	

V. ADVANTAGES

1) Reduce the need of bitumen by around 10%.
2) Develop a technology which is eco-friendly .
3) Improvements in fatigue life of roads.
4) Increase the strength and better performance of the road .
5) The gases released during traffic condition are absorbed by smoke absorbent.
6) Use higher percentage of plastic waste.

VI. CONCLUSION

As the use of plastics waste materials is increasing day by day And plastic material will not be recycled so we can use it as road pavement. The use of plastic materials will not strengthen but also improve the life span of pavement road as plastics is a non-biodegradable which is harmful to the environment, therefore use of waste plastic in road construction is an actual way of disposal of waste plastics it has been concluded that the modified bitumen is cheaper than conventional bitumen .

REFERENCES

[1] Justo, C.E.G. and Veeraragavan, A.(2002) Utilization of waste plastic bags in Bituminous Mix for Improved Performance of Roads. Benguluru University, Bengaluru.
[2] Swami, V., et al.(2012) Use of Waste Plastic in Construction of Bituminuous Roads. International Journal of Engg. Science and Technology (IJEST), 4, 2351-2355.
[3] Johnson – "Use of waste plastic materials for road constructions in Ghana", case studies in construction materials, Volume 6,pp-1-7,(2017).
[4] Sunil- Use of plastic in road construction material towards solid waste minimization, "International Journal of Recent trends in Engineering and Research (IJRTER)", Volume 03,Issue 01,pp-146-148 (2017).
[5] S. S. Verma – Roads from plastic waste – The Indian Concrete Journal – November 2008
[6] 40 Tonnes of plastic waste each day, Times of India, Chennai Edition.
[7] Vinoth.N – Use of plastic wastes in road construction- Central Institutes of Plastic Engineering And Technology.