



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

# IJRSET

International Journal of Innovative Research in  
**SCIENCE | ENGINEERING | TECHNOLOGY**

# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 10, Issue 8, August 2021

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

**Impact Factor: 7.569**

9940 572 462

6381 907 438

[ijirset@gmail.com](mailto:ijirset@gmail.com)

[www.ijirset.com](http://www.ijirset.com)

# Plastic Roads: A Recent Advancement in Plastic Waste Management

Md Wasaid Alam<sup>1</sup>, Usman Farooque<sup>2</sup>, Mohsin Khan Agwan<sup>3</sup>

B.Tech. Scholar, Department of Civil Engineering, Arya College of Engineering and Research Centre, Jaipur, India<sup>1</sup>

B.Tech. Scholar, Department of Civil Engineering, Arya College of Engineering and Research Centre, Jaipur, India<sup>2</sup>

Assistant Professor, Department of Civil Engineering, Arya College of Engineering and Research Centre, Jaipur, India<sup>3</sup>

**ABSTRACT:** in this review paper we study about some of the waste plastic material which we can reuse by certain processing and can be used in road construction. As a result, the materials we are equipped with have useful and carried valuable information about these materials. These materials have many advantages over traditional material as well as methods. But the idea of road construction by using Waste plastics is relatively new. It shows positive result in laboratory to small amount of plastic material (i.e 5-10%) where incorporated in bituminous mixes (asphalt), resulting in improved pavement stability, strength and durability.

However, this is quite limited in international field experience. But in this review, we found few examples of road construction in India, Netherlands, U.K, Ethiopia, Ghana and south Africa. While road construction using plastic waste materials have shown good long term as well as pavement performance to safe but the first road constructed using this technology are only few years old ( i.e about 10 years) So,we don't have long term outcome clear yet. This review not discuss the clear evidence of maintenance of road by using this technology.

**KEYWORDS:** Plastic Road, Waste, Stability, Traffic, Non-biodegradable materials.

## I. INTRODUCTION

Plastic is the most widely used material in present day. It is light in weight, flexible, moisture resistant and inexpensive. It can remain on earth for about 5000 year with showing any signs of degradation. we have to some steps of ground level in order to control the hazard of plastic waste. Studies have shows that plastic waste after perfect process can be used in the construction of bituminous, flexible & Rigid pavement. Such pavement shows enhance properties & increased life spans, thus making the road and solving the environmental protection problem at the present time..



Today the availability of flexible pavement, bitumen plays the main role of binding the aggregate together by coating over the aggregate. Plastic waste is spacious, as the plastic waste has become part and parcel of today life. Bitumen is useful binder road construction. Different grade of bitumen available 30/40, 60/70, & 80/100. The steady increased in high traffic terms of commercial, residential vehicle. It creates fixture of water hygiene problems plastic waste hazard

to the environment plastic can be reused productivity in construction of road. The safe disposal of waste plastic is an environmental problem Non-biodegradable materials it does not decays over time and if dumped in landfills, finds its way previous in the environment though water & air erosion, can choke the drains and drainage channels.

## II. LITERATURE REVIEW

**Huda Shafiq & Anzar Hamid** to find out use of plastic in road construction. In this paper discussed the different test i.e los Angeles test, Crushing test, Impact test & Shape test. In this study plastic mixed 0 to 10 percentage with respect to bitumen. In this case results shows the percentage of plastic & softening point given by: when plastic mixed in percentage with bitumen in series of 0, 2, 4, 6, 8 & 10 then softening point found out 43, 48, 57, 61, 63 & 66.

**Shweta N. Rokdey, p.c. Naktode & M.R. Nikhar** work on plastic road construction. In this paper use percentage of plastic coating over aggregate & find out compressive strength and bending strength. In this paper test conducted then reliable results, means strength of the road increased. When percentage of plastic coating over aggregate in percentage 10, 20, 30, & 40 the compressive strength found the 250, 270, 290 & 320.

**Brajesh Mishra & Ravi Shankar Mishra** to study on use of plastic material in flexible pavement. To ready the sample of waste plastic expressed as percentage by weight of optimum bitumen content. In this study plastic mixed plastic mixed 0, 6, 8, 10, 12, 14 & 16 in percentage. And test conducted Marshall stability, flow value, theoretical max density & volume of air voids. When plastic in percentage 0, 6, 8, 10, 12 & 14 then bulk density found 23.6, 23.35, 23.38, 23.54, 23.44, 23.35 & 23.24.

**Mr. P.B. Rahmane, Prof. A.K Gupta & Prof.D.B. Desai** investigate on effective utilization of waste plastic in construction of flexible pavement for improving their performance. In this paper shows the need for the study: Disposal of waste is a major problem, it is Non-biodegradable, burning of these waste plastic bags causes environment pollution & it mainly consists of low density polyethylene, to find its utility in bituminous mixes for road construction & bituminous mix provide the solution for Disposal in an useful way. In this study to discussed about different type of waste plastic & its origin. Mainly two type of plastic used first low density polyethylene plastic & High density polyethylene plastic. It is hoped that in near future we will have strong, durable & eco-friendly roads will relieve the earth from all type of plastic waste.

**Uniyal, Kulvendra singh & Vimal Uniya** works on potential use of waste plastic in flexible road pavement. In this paper take the some special materials or equipment, length of rotar-200mm, length of blade-200mm, No of blade-1 No & motor-3HP, 900RPM. To prepared q model with plastic waste & find out the los Angeles value in percentage. In this case plastic mixed in percentage 4, 6, 8 & 10 and found out los Angeles value, aggregate impact value & aggregate crushing value and also find out the softening point & ductility. When mixed the plastic waste in percentage 4, 6, 8 & 10 the found the value in percentage 19.46, 19.33, 18.57 & 18.22.

**Nripendra Singh, Shashivendra Dilawat & Dr. Esar Ahmad** studies have revealed that waste plastic have great essential for use in bitumen construction as its add in small doses 8% by weight of bitumen. First collection the waste plastic & for size reduction use shredding machine. In this paper discusses two methods dry process and wet process. In this research plastic mixed 5-9 percentage (i.e 5, 6, 7, 8 & 9). In this case when plastic mixed 5, 6, 7, 8 & 9 then Marshall stability (KN) found out 13.90, 15.37, 15.86, 16.29 & 11.03.

## III. CONCLUSION

- The generation of waste plastics is increasing day by day.
- The plastics show adhesion property in their molten state.
- Plastics will increase the melting point of the bitumen.
- Hence, the use of waste plastics for pavement is one of the best method for easy disposal of waste plastics.
- Moreover, plastic is not recyclable and using them in road construction will help in disposal of these Plastic Waste in an eco-friendly.

- The use of the innovative technology will not only strengthen the road construction but also make it economic as well as increase life span of road.
- Plastic will increase the melting point of the bitumen.
- This innovative technology not only strengthened the road pavement but also increase the road durability.
- The major polymers namely polyethylene, polyethylene, polystyrene, show adhesion properties in their molten state.

---

#### IV. ACKNOWLEDGEMENT

This is the place to admit that while there appears only author on the cover, this work just as any other, is a product of the interaction with and support during our thesis work, among them, first I express my gratitude to my guides Mr. Mohasin Khan agwn for their affection throughout guidance, advice and encouragement. Thanks to all my family members for their affection, care and encouragement. Special thanks to my college for giving me the invaluable knowledge. Above all I am thankful to almighty God for everything and all researchers whose research papers in this field have been referred for our study.

---

#### REFERENCES

1. Rajasekaran, S., Vasudevan, R. and Paulraj, S. (2013) Reuse of Waste Plastics Coated Aggregates-Bitumen Mix Composite for Road Application—Green Method. American Journal of Engineering and Research, 2, 1-13.
2. Justo, C.E.G. and Veeraragavan, A. (2002) Utilization of Waste Plastic Bags in Bituminous Mix for Improved Performance of Roads. Banglore University, Bengaluru.
3. Bindu C , Dr.K.S.Beena, "Waste plastics as a stabilising additive in Stone Mastic Asphalt", International Journal of Engineering and Technology, Vol.2(6)pp.379-387,2010.
4. Atlantic Publishers and Distributors, New Delhi (2004) pp.100-111.
5. Manual on Municipal Solid Waste Management, Table 1 (2000).
6. Zoorob SE, Suparma LB. Laboratory design and investigation of the Zoorob SE, Suparma LB. Laboratory design and investigation of the recycled plastics aggregates replacement (plastiphalt). Cement Concrete Composites 2000; 22:233–42.
7. Vasudevan .R, utilization of waste plastics for flexible pavement, Indian High Ways (Indian Road Congress), Vol.34, No.7. (July 2006).
8. S.S.Verma,(2008),Roads from plastic waste, The Indian Concrete Journal ,pp.43-47
9. Kajal , N K S Pundhir , Sangita and A Chandra(2007), Use of waste plastics and copper slag for low cost bituminous roads, Journal Of Scientific and Industrial Research,Vol.66.pp.938-994
10. <http://www.scribd.com/doc/51055725/use-of-plastic-waste-in-road-construction>
11. <http://nbmcw.com/articles/roads/930-use-of-waste-plastic-in-construction-of-flexible-pavement.html>
12. ISI, "Indian Standards Specifications for Roads Tar", IS:215, Indian standard Institution.
13. Ministry of Road Transport and High Ways, Manual for construction and supervision of Bituminous works, New Delhi, November 2001.
14. Flynn F. (1993) " Recycled Plastic finds home in Asphalt Binder" Journal Roads and Bridges.
15. IRC:111-2009, Specifications for Dense Graded Bituminous Mixes.
16. IRC:SP:98-2013, Guidelines for the use of Waste Plastic in Hot Bituminous Mixes in Wearing Courses.
17. Sridhar, R Bose , S Kumar, G and Sharma G, (2004) "Performance Characteristics of Bituminous Mixes Modified by Waste Plastic Bags" Highway Research Bulletin , No 71, IRC pp 1-10.
18. Afroz Sultana S K, K.S.B. Prasad "Utilization of Waste Plastic as a Strength Modifier in Surface Course of Flexible and Rigid Pavements" International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622, Vol. 2, Issue 4, July-August 2012, pp.1185-1191



**Impact Factor:  
7.569**



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  [ijirset@gmail.com](mailto:ijirset@gmail.com)



[www.ijirset.com](http://www.ijirset.com)

Scan to save the contact details