

Research Paper on the Waste Plastics pavement Road

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Abstract— As we know that today waste of plastics is increased too much in our universe. It generally consists of waste plastics materials such as carry bags disposal and pet bottles etc which are collected from a dump or a garbage. but before construction of a waste plastics road we have to clean dried well. When we melt these waste plastics in a hot bitumen it melts an oily and after that we coated segregate and the mixture which is form then laid on the road surface in the form of tar. Plastics road are completely differ from other road which are a very hard surface and have a long life. they have a better resistance and do not absorb water and have better flexibility which results in less rutting and no need to repair .The surface of the road is smooth and have lower maintance as compared to other. Traffic is also increasing day by day in which of our road in fracture is about used over 60% of total good and 85% of passenger. By increasing the strength and durability of roads it is free from economic pollution and safe .The main objective of these research paper is to cost reduce and have to increase strength property and durability.

Keywords: Waste plastics Aggregate, Bitumen Road Construction

I. INTRODUCTION

Plastics is today found in everywhere in todays life but when it is disposal it may create a great problem. Plastics waste may be produced as almost 9% to 12% in an municipal solid waste It is a non-biodegradable products and produce stagnation of water and hygiene problems .Utilization of waste plastics in the construction of flexible road it is been used in year 2000 in india. Road using plastics have been constructed in various state in india such as goa maharashtra, tamilnadu etc. To construction of a flexible pavement bitumen plays a role of binding the aggregate together by coated over aggregate.it improves the strength and life of road.

Use of plastics in road construction is becoming more and more due to the improved properties of construction materials In India, 52,000 tons of plastics waste are produced per year. Plastics waste mainly contain such as carry bags, disposal cups and pet bottles which are collected from a garbage dumps .Plastics is a type of material which can become a problem to the environment after it use. These plastics waste materials crushes into small size i.e 2mm to 4mm and then coated over a hot aggregate at 160 and then the mixture is laid on the road surface like a normal tar. Plastics road have more strength property as compared to other road .In hot and extremely humid climate durable and extremely plastics road have a great advantages. These types of road should not be stripping when come to contact with water. In these types of road the maintance property is totally nill and the life period is long as compared to the other road .They have a withstood loads due to the heavy traffic on the road .Plastics road will not withstand future damage but it also

solve the problem of disposing the problem of non-recycled plastics waste. A single lane tar road can consume about one ton of plastics waste in our environment.

Hazard of human health causes by improper disposal of plastics waste. There was a problem to human and animal health.

A. Waste

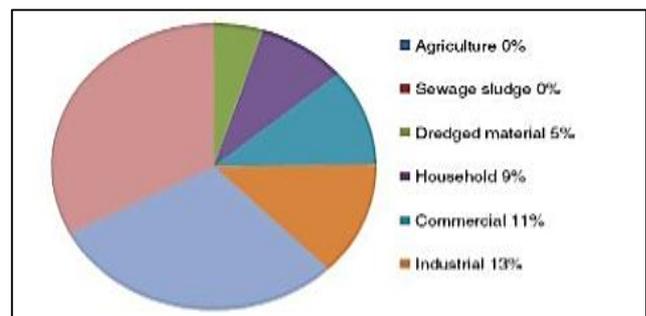


Fig. 1: Composition of waste production

<https://www.google.co.in/search?q=waste+production+pie+chart>

Waste is a type of material which cannot be use further .To overcome these various materials which can have high binding properly have to be used in replacement of bitumen.

B. Objective

- 1) To reduce the plastics from environment and enhance the communication rural and urban areas.
- 2) Using the plastics in roads without compromising its strength.
- 3) To perceive the role of plastics waste in road making
- 4) to perceive what are the difficulties faced by companies by using plastics waste for road construction.
- 5) To know how the procedure of road construction using plastics wastage.
- 6) To identify the advantages and disadvantage of road construction using plastics over road construction.
- 7) To understand the impact on environment with the use of plastics.
- 8) To understand barriers in practical and infeasible challenges.
- 9) To analysis the impact of the initiative pre and post implementation.
- 10) To set up economics model and implementation of observation model.
- 11) To identify the ideal proportion of wastage of plastics to be added in the bituminous mix for getting a proper strength.
- 12) To prepare a statistic model for most appropriate utilization of plastics waste.

C. Material Used:

1) Bitumen

When we mix bituminous with aggregate it acts as a binding agent. Generally in India we see that bitumen used in road construction of flexible pavement is of grade 60/70 or 80/100 penetration grade.

2) Aggregate

Aggregate which we can use are classified into two types according to their size

- 1) Fine aggregate:- The type of aggregate which can pass through the 2.36mm sieve and be retained on 0.075mm sieve. It may include such as crushed stone, clay, silt, etc.
- 2) Course aggregate:- The type of aggregate which can be retained on 2.36mm sieve. It may be a natural stone gravel which cannot be crushed.

D. Plastics Waste Modifiers

Modifiers are specially used to raise the properties of bituminous concrete mixes by reducing the air voids which are present between aggregate and also bind them together so that there is no bleeding of bitumen can occur.

E. Experimental Setup

These types of roads are made from recycled plastics, and the first step in construction is to collect and have to manage the plastic materials. Most common types of plastics are polypropylene, polyethylene, and low density and high density polyethylene. Then we have to place the waste plastic materials after placing the materials is cleaned, dried, and shredded. The shredded plastics are mixed and melted at around 170°C. Then add the hot bitumen and mix it with melted plastics. After mixing the mixture is laid on the asphalt concrete.



Fig. 1.1: Melting waste plastics products

In the above fig I clean the plastics and after that I melt at 170°C according to the procedure I have mixed bitumen and the plastics and made a mixture out of it by using that mixture we have applied to make the road and we have repeated this procedure again and again until we covered the whole area.



Fig. 1.2: Plastics road at its early stage

In the beginning, the road softens but after many days, the road seems to be hardened and looks like the actual bitumen road.



Fig. 1.3: Plastics road in the final stage

After 4 weeks, the road was working fine and there were no defects or any kind of potholes. So we conclude that waste plastic use is beneficial and more stable than the road we are making by bitumen. During this research, we can easily compare between the road which we make by bitumen and waste plastics.

II. METHODOLOGY

A. Basics Process

1) Collection Process

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

2) Shredding Process

In this process, after collecting the plastic waste, it will be cut into small pieces and then mixed all the products together.

3) Cleaning Process

Plastic waste can be cleaned and dried.

B. Field path

1) Dry process

The aggregate is heated at about 170°C in a hot mix plant. Then the hot bitumen (80/100 grade) at 160°C is added after transferring the mixture to the road.

2) Wet Process

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

C. *Advantages and Disadvantages:*

1) *Advantages*

- 1) Plastic waste helps increase the strength of the road, and better resistance towards rain water and cold weather.
- 2) 2 Less maintainance and have fast construction
- 3) 3 Better quality and have a long life span
- 4) 4 It will increase the plasticity of road
- 5) 5 Reduce 10% of bitumen requirement.
- 6) 6. Plasticity of road be increased.
- 7) 7. Environment should have been clean.
- 8) 8 Reduce the cost of about 5000/km of single road lane.
- 9) 9 Stop erosion of soil and safe ecosystem
- 10) 10 Uses of higher percentage of plastics waste.

2) *Disadvantages*

- 1) Better resistance towards rainwater.
- 2) Plastics is not strong and does not operate at higher temperature.
- 3) Plastics is lesser stronger than metals

III. CONCLUSION

As the use of plastics waste materials is increasing day by day. And plastics materials will not be recycled so we can use it as a road pavement .The use of plastics 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 plastics 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. The use of the innovative technology will not only strengthen road construction but also make it egoistic .Plastics roads will be most likely to be for a country like India where the temperature is about 50^oC.

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