

Use of Plastic Waste in Road Construction

Jeeya Ram, Manish kumawat, Adnan Ansari
Department of Civil Engineering, G.E.C. Banswara (Raj.)
Email: jeeyaram1996@gmail.com

Abstract : *This certain processing and use in road construction. The materials as a result we are required with useful and valuable information about plastic materials. Plastic materials have many advantages over conventional/traditional materials and methods. This paper will conduct a study on recycling plastic waste and use it with bitumen to lay roads in our country and compare with the environmental and economic conditions Some of these materials are relatively cheaper and easily available and provide more strength as compared to traditional road materials. My paper will come up with useful information and creating awareness amongst the learner in the industry regarding waste material. So that one can have a step towards further detailed information about these materials and thus be able to implement on field which will definitely improve the level of construction in India.*

Keywords

Plastic Waste, Bitumen, Aggregates, Plastic Roads

Introduction

Plastic waste is everywhere in today's lifestyle. Generally It is used for packaging, protecting, serving, and even disposing of all kinds of consumer goods. With the industrial revolution, mass production of goods started and plastic seemed to be a cheaper and effective raw material. Today, every vital sector of the economy starting from agriculture to packaging, automobile, building construction, been virtually revolutionized by the applications of communication or InfoTech has plastics. Plastic in different form is found, which is toxic in nature. It is commonly collected both urban and rural areas. It creates Stagnation of water and associated hygiene problems. Plastic waste hazard to the environment .Plastic waste can be reused productively in the construction of road.

The passage of tyres up to and down from the crossing. Both options help protect wetland haul roads from rutting by distributing the load across the surface. But the use of plastic-waste has been a concern for scientists and engineers for a quite long time.

Review of literature

The director of the Central Road Research Institute (CRRI) said that bitumen mixed with plastic or rubber improves the quality and life of roads. The deputy director of the CRRI said that polymers mixed with bitumen increased the construction cost up to six per cent, but increased the longevity of roads manifold. The performance studies carried out on the roads constructed in Tamil Nadu indicated satisfactory performance with good skid resistance, good texture value, stronger and less amount of progressive unevenness over a period of time. The experimentation carried out by CRRI also indicated better Stability value, indicating higher strength, less flow and more air voids.

Definition

A material that contains one or more organic polymers of large molecular weight, solid in its finished state and at some state while manufacturing or processing into finished articles, can be shaped by its flow

Types of plastics

1. Thermosets.
2. Elastomers.
3. Thermoplastics

Why use of plastics

Polymers provide following properties.

1. Durable & corrosion resistant.
2. Good insulation for cold, heat & sound saving energy and reducing noise pollution.
3. It is economical and has a longer life.
4. Maintenance free.
5. Hygienic & problems.
6. Ease of processing/ installation.
7. Light weight.

Specification of Plastic waste

Plastic waste use

1. Films (carrybags, cups) up to 60 μ thickness. (PE, PP, PS).
2. Hard foams any thickness.
3. Soft foams (PE&PP) any thickness.
4. Laminated plastic up to 60 μ thickness.

Process

Plastic waste is ground and made into powder; 3 to 4 % plastic is mixed with the bitumen. Plastic that increases the melting point of the bitumen and makes the road hard its edibility during winters resulting in its long life. There is a Use of shredded plastic waste acts as a strong "binding agent" as tar making the asphalt last long. By combination plastic with bitumen the ability of the bitumen to withstand at high temperature increases. The plastic waste is melted and then mixed with bitumen in a particular ratio. Normally, blending takes place when temperature is about 45.5°C but when plastic is mixed, it remains stable even at 55°C. The experimental tests at the laboratory level proved that the bituminous concrete mixes prepared using the treated bitumen binder. Another important observation was that when the bituminous mixes prepared using the treated binder could withstand adverse soaking conditions under water for longer duration.

Advantages and disadvantages

Advantages

1. It increases strength of road
2. Provides Better resistance to water & water stagnation.

3. Absence of stripping & potholes.
4. High binding & good bonding of the mix.
5. Better soundness property.
6. Maintenance cost of road will be negligible.
7. No effect of UV radiation on road

Disadvantages

- 1) Cleaning process -Toxic present in the co-mingled plastic waste start leaching.
- 2) During the road laying process-the presence of chlorine will definitely release noxious gas.

How much Plastic? How many Roads?

Each 5-member family's use of 5 gm plastic bags a week, all-India = 52,000 tons a year. Assume 50% of this is available for roads.1.5 tons plastic goes into average 1 km road. So resurfacing just 35,000 km of roads a year will absorb all this littered waste. This is just 3.5 % of India's 1 million km surfaced roads. (1.1 million km more roads are un-surfaced).

Conclusion

The overall conclusion of this paper is that Plastics waste will increase the melting point of the bitumen. The use of the new advance technology not only increases strength of the road but also increased the road life as well as it will help to improve the environment surrounding and also creating a source of income. Plastic roads would be a benefit for India's hot and extremely humid climate, where temperatures frequently cross 50°C and heavy rains create destruction, leaving most of the roads with big potholes. It is hoped that in near coming generation we will have strong, durable and eco-friendly roads which will relieve the earth from all type of plastic-waste.

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