An Overview of Use of Waste Plastic in Road Construction

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Abstract – Disposal of waste plastic is major problem in India .waste plastic both commercial and industrial can be problem of disposal of waste plastic .Therefore it is necessary to utilize waste effectively with technical development day by in each field .Many of products are produced by using plastic waste . plastic waste consisting carry bags cups and other utilized plastic can be utilized plastics can be used as a coating over aggregate and this coated stone can be used for road construction.This economic method helps the pavements to resist higher temperature by reducing the making of cracks and reducing the rainwater infilteration which otherwise leads to development of potholes.

Plastic roads would be boon for our country and near future we will have strong , durable, and ecofriendly roads which will relieve the earth from all type of plastic-waste this process is ecofriendly and economical too.

Keywords: Disposal, Plastic Waste, Ecofriendly

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1. INTRODUCTION

Plastic is everywhere in today's lifestyle .Today in every industry plastics are used main component like agriculture to packaging, automobile, building construction, automobile, communication has mainly application of plastics .Plastic waste can be used in road construction and the field test withstood the stress and proved that plastic wastes used after proper processions an additive would increase the life of the roads and also solve environmental problems. Natural materials being exhaustible in nature, its quantity being gradually decreased .Also the cost of extracting good quality material is increasing.So for this technique looking for second alternative is using waste plastic in road construction .In developing countries application of waste plastics are mainly used in road construction. The use of these materials in road construction is based on economic, technical, ecological criteria.

The possible use of these materials should be developed for construction of low volume roads in different country. The important specification should made and attempts are to be made to maximize the use of solid wastes in different layers of the road pavement.

2. LITERATURE REVIEW

1. **Dr. R. Vasudevan (2007)** hasResaerh paper concludes that polymer bitumen blend is a better binding property as compared to plain bitumen. Blend increases the sifting point of bitumen and decreases the penetration value. When it is used in road construction it increases the higher temperature of the road .the coating of plastic decreases the property of porosity, absorption of moisture and improve soundness. Use of waste plastic in road help in many ways like diposal of waste , better road and presentation of pollution and so on.

2. **Anzar Hamid Mir (2015) "Plastic waste in pavement construction** He introduce that viscos elastic nature of binder have complex modulus phases of angles of binders , need to be measured at different temperature, loading rates which are resembling to weather and climatic condition

3. **Amit P. Gowanda (2013) "Economics And Viability Of Plastic Road"** evaluated flexural fatigue life of asphalt concrete modified by 3% crumb rubber as part of aggregated and reported that fatigue life and creep properties of the polymer modified

mixes increased significantly as compared to unmodified asphalt mixes

4. **Verma S.S (2008**) studied that plastic will increase the melting point of bitumen. This technology not only strengthens the road but also increase the life of the road.

5. **Dr S. Vasudevan and S. Rajasekaran (2006)** Examines the polymer bitumen is blend is better binder as compared to plain bitumen. Blend has increased the softing point of bitumen but decreased the penetration value with a suitable ductility.

NEED OF STUDY

- Disposal of waste plastic is major problem.
- It is non-biodegradable.
- It is main property of low density polyethylene.
- Its main purpose is to find utility in road construction.
- By burning of these waste causes environmental pollution.
- Waste plastic increases the Property of mix.
- To reduce the disposal waste problem of waste.

MATERIALS

Aggragte: aggregateare materials which are used in surface coarse and can be divided into two type fine aggregate and coarse aggregate. Coarse aggregate generally defined as the aggregate which are retained on 2.36mm save size. Fine aggregate are those pass through 2.36mm sieve size and retained on 0.075mm sieve

BITUMEN: Bitumen is a black, highly viscous and very sticky liquid or semi-solid, found in some natural deposits. It is also the by-productof fractional distillation of crude petroleum.

PLASTIC WASTE: The plastic waste used was waste plastic bottles, bags, wrappers

MANUFACTURING PROCESS

Waste plastic bags were collected from roads, garbage trucks, dumpsites and compost plants, rag pickers, Waste-buyers at Rest 5-6 per kg.Household plastic was also collected for the work, like empty Milk bags, used plastic bags etc. The collected Plastic waste was sorted as per the required thickness. Generally, polyethylene of 60 micron or below is used for the further process. Less micron plastic is easily mixable in the bitumen at higher temperature (160°c-170°c).It is clean by de-dusting or washing if required. Collected Plastic was cut into fine pieces as far as possible. The plastic pieces were sieved through 4.75mm sieve and retaining at 2.36mm sieve was collected. Firstly, Bitumen was heated up to the

Temperature about 160°c-170°c which is its melting temp. Pieces were added slowly to the hot bitumen of Temperature around 160-170°c.The mixture was stirred manually for about 20-30 minutes. In that time Period temperature was kept constant about 160-170°c. Polymer-bitumen mixtures of different Compositions were prepared and used for carrying out tests i.e. Penetration test, Ductility test, Flash point test& Fire point test, Stripping test, Ring and ball test and Marshall Stability value test.

Advantage

- Better resistance towards rain water and water stagnation.
- No stripping and pot holes.
- Increase binding and better bonding of mix.
- No leaching of plastic.
- No effect of us radiation like us
- The strength of road is increased by 10%
- Waste without causing disposal problem.

Disadvantage

1. Cleaning process :-

- Toxics present in the co-mingled plastic waste would start leaching.

2. During the road laying process :-

- In the presence of chlorine will definitely release noxious HCL gas.

3. After the road laying:-

- It is opined that the first rain will trigger leaching. As the plastics will merely form a sticky layer

CONCLSION

The purpose of studying the waste plastic in road construction understands that coating of plastic reduces the porosity, absorption of moisture, and improves soundness.

- Plastic will increase the melting point of the bitumen.
- This innovative technology not only increase the strength of road but also increase the life of road.
- Using waste plastic in flexible pavements shows good results when compared with conventional flexible.
- Helps to improve the environment
- The addition of waste plastic can increases the properties of bitumen.
- The waste plastic thus can be put to use and ultimately improve the quality and performance of road.
- It is hoped that in near future we will have strong, durable and ecofriendly roads which will
- Relieve the earth from all types of plastic waste.

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