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## A REVIEW PAPER ON POLYMER COATED AGGREGATE USING FLEXIBLE(BITUMEN) PAVEMENT

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### ABSTRACT

Disposal of waste materials including waste plastic bags has become a serious problem and waste plastics are burnt for apparent disposal which cause environmental pollution. Utilization of waste plastic bags in bituminous mixes has proved that these enhance the properties of mix in addition to solving disposal problems. Plastic waste which is cleaned is cut into a size such that it passes through 2-3mm sieve using shredding machine. The aggregate mix is heated and the plastic is effectively coated over the aggregate. This plastic waste coated aggregate is mixed with hot bitumen and the resulted mix is used for road construction. The use of the innovative technology will not only strengthen the road construction but also increase the road life as well as will help to improve the environment. Plastic roads would be a boon for India's hot and extremely humid climate, where temperatures frequently cross 50°C and torrential rains create havoc, leaving most of the roads with big potholes. In my research work I have done a thorough study on the methodology of using plastic waste in bituminous mixes and presented the various tests performed on aggregates and bitumen.

*Keywords: Plastic, Cement, Bitumen etc.*

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### I. INTRODUCTION

some state while manufacturing or processing into finished articles, can be shaped by its flow, is called as 'Plastic'. Plastics are durable and degrade very slowly; the chemical bonds that make plastic so durable make it equally resistant to natural processes of degradation. Plastics waste constitutes a significant portion of the total municipal solid waste (MSW) generated in India. It is estimated that approximately **10 thousand tons per day (TPD)** of plastics waste is generated (i.e 9 % of 1.20 lakh TPD of MSW). Their visibility has been perceived as a serious problem and made plastics a target in the management of solid waste. Plastics are non-biodegradable. They also have very long lifetime and the burning of plastics waste under uncontrolled conditions could also lead to generation of many hazardous air pollutants (HAPs) depending upon the type of polymers and additives used. However, the end-of-life plastics can be recycled into a second life application but after every thermal treatment, degradation of plastics takes place to a certain extent. This process is ecofriendly and can promote value addition to the waste plastic.

In order to contain this problem experiments have been carried out whether this waste plastic can be reused productively. The experimentation at several institutes indicated that the waste plastic, when added to hot aggregate will form a fine coat of plastic over the aggregate and such aggregate, when mixed with the binder is found to give higher strength, higher resistance to water and better performance over a period of time. Waste plastic such as carry bags, disposable cups and laminated pouches like chips, pan masala, aluminum foil and packaging material used for biscuits, chocolates, and milk and grocery items can be used for surfacing roads.

### II. OBJECTIVES

Basic intention is to efficiently utilize the waste plastic in constructive way so that it can be beneficial to society however main objectives of current project work are:

- a) To coat the aggregates with the waste plastic materials
- b) To check the properties of bituminous mix specimen
- c) To check the properties of bituminous mix specimen due to coating of waste plastic materials
- d) To compare the properties of bituminous mix specimen with the properties of coated aggregate

### III. METHODOLOGY

#### Material

##### *Coarse Aggregate*

Coarse aggregate is used for construction of bituminous macadam construction. The coarse aggregate shall consist of crushed rock, crushed gravel or other gravel or other hard material retained on 2.36mm sieve. It shall be clean, hard, durable and cubical shape, free from dust and soft organic and other deleterious substances.

➤ **Metal I**

The coarse aggregate shall consist of crushed gravel having particle size between 10mm-4.75mm mean passing through 10mm IS sieve and retained on 4.75 mm IS sieve.

➤ **Metal II**

The coarse aggregate shall consist of crushed gravel having particle size between 10mm-20mm mean passing through 20mm IS sieve and retained on 10mm IS sieve.

##### *Fine Aggregate*

Fine aggregate shall consist of crushed or naturally occurring mineral material, or a combination of two, passing 2.36 mm sieve and retained on 75 micron sieve. It shall be clean, hard, durable, and free from dust and soft organic matters. It shall consist of fine powder of crushed stone having size of particle less than 75 micron.

##### *Bitumen*

The bitumen shall be viscosity graded and penetration graded paving bitumen complying with Indian Standard Specification for paving bitumen, IS: 73-2006. The grade of bitumen to be used would depend upon the climatic conditions and the traffic. It should have penetration grade in the range of 60/70.

##### *Polymer*

It should consist of polyethylene (PE) polymer having thickness 55 micron shredded polymer passing through 4.75 mm and retained on 2.36 mm IS sieve

### IV. CONCLUSION

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, is called as 'Plastic'. Plastic are durable and degrade very slowly; the chemical bonds that make plastic so durable make it equally resistant to natural processes of degradation. Plastics can be divided into two major categories: thermosets and thermoplastics. A thermoset solidifies or "sets" irreversibly when heated. They are useful for their durability and strength, and are therefore used primarily in automobiles and construction applications. These plastics are polyethylene, polypropylene, polyamide, polyoxymethylene, polytetrafluorethylene, and polyethylenephthalate. A thermoplastic softens when exposed to heat and returns to original condition at room temperature. Thermoplastics can easily be shaped and moulded into products such as milk jugs, floor coverings, credit cards, and carpet fibres. These plastic types are known as phenolic, melamine, unsaturated polyester, epoxy resin, silicone, and polyurethane.

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