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IMPROVEMENT OF RECENTLY CONSTRUCTED PAVEMENT

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Abstract - *Bottle, containers and packing strips etc. Is increasing day by day. As a result amount of waste plastic also increases. This leads to various environmental problems. Therefore it is necessary to utilize waste effectively with technical development in each field. Many by-products are being produced using the plastic wastes. Plastic waste, consisting of carry bags, cups and other utilized plastic can be used as a coating over aggregate and this coated stone can be used for road construction. The mix polymer coated aggregate and tyre modified bitumen have shown higher strength. Use of this mix for road construction helps to use plastic waste effectively. Now a day's waste plastic is used in bituminous road construction. This technology is not a new concept but rather not practiced widely.*

Key Words: **Asphalt binder, flexible pavement, Trafficable Loading**

1. INTRODUCTION

In general there are two types of road rigid pavement roads and flexible pavement roads. For rigid roads material used is concrete and for flexible roads bitumen is used. In India mostly the flexible pavement roads are available. And for economical road construction new techniques, new material is used. The significant variation in daily and seasonal temperature demand improved road characteristics. Any improvement in the property of the binder is needed. Bitumen is a useful binder for road construction. Different grades of bitumen like 30/40, 60/70 and 80/ 100 are available on the basis of their penetration values. The steady increase in high traffic intensity in terms of commercial vehicles, and the significant variation in daily and seasonal temperature demand improved road characteristics. Any improvement in the property of the binder is the needed.

Today the availability of the waste plastics is enormous, as the plastic materials have become part and parcel of daily life. They either get mixed with Municipal Solid Waste and/or thrown over land area. If not recycled, their present disposal is either by land filling or by incineration. Both the processes have certain impact on the environment. Under this circumstance, an alternate use for the waste plastics is also the needed. Plastic waste when mixed with hot bitumen, plastics melt to form an oily coat over the aggregate and the mixture is laid on the road surface like a normal tar road.

In the construction of flexible pavements, bitumen plays the role of binding the aggregate together by coating over the aggregate. It also helps to improve the strength of the road. But its resistance towards water is poor. Anti-stripping agents are being used. A common method to improve the quality of bitumen is by modifying the rheological properties of bitumen by blending with organic synthetic polymers like rubber and plastics. Studies on this subject are going on both at national and international level. This Concept of Utilization of Waste Plastic in Bituminous Mixes for Road Construction has been done since 2000 in India, They can return to the earth as beneficial additives in bitumen roads.

1.1 AIM & OBJECTIVE

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:

- To coat the aggregates with the waste plastic materials.
- To check the properties of bituminous mix specimen.
- To check the properties of bituminous mix specimen due to coating of waste plastic materials. To compare the properties of bituminous mix specimen with the properties of coated aggregates.

1.2 SCOPE OF STUDY

- Disposal of waste plastic is a major problem. It is non-biodegradable.
- It mainly consists of low-density polyethylene.

Fig No. 1(Disposal Waste Plastic)

- To find its utility in bituminous mixes for road construction.
- Burning of these waste plastic bags causes environmental pollution.
- Laboratory performance studies were conducted on bituminous mixes.
- Studies proved that waste plastic enhances the property of the mix.

- Studies proved that waste plastic enhances the property of the mix.
- Improvement in properties of bituminous mix provides the solution for disposal in a useful way.

2. METHODOLOGY

a) Wet Process

1. Waste plastic bags collect first.
2. Collected plastic waste sorted as required thickness.
3. Normally polyethylene 60 micron or below is used for the further process.
4. Generally less micron plastic is easily mixable in the 5. Bitumen at higher temperature (160-170oc)
5. Collected plastic was cut into fine pieces as far as Possible
6. Then sieve it through 4.75mm sieve and retain on 2.36mm sieve was collected.
7. First bitumen heated at about 160-170 c temp. Which Is melting temperature.
8. Then piece were added into this.
9. At constant temperature mixture was stirred manually for about 20-30min.
10. Polymer bitumen mixture of different composition out diff. test i e. Penetration test, ductility test, flash point test & fire point test.

b) Dry Process

1. An alternate method was innovated to find an effective way of using higher percentage of plastic waste
2. In the flexible pavement. The aggregate coated with plastic was used as the raw material. The plastic used were
3. The disposed carry bags, films, and cup etc. with a maximum thickness of 60 microns. Plastic waste can be used
4. As a coating over aggregate and this coated stone can be used for road construction. The bitumen was not blended with plastic waste.

Table -1: Comparison of Bituminous Roads and Waste Plastic Bituminous Roads

Sr. No	Properties	Plastic	Ordinary Road
1	Marshall Stability Value	More	Less
2	Binding Property	Better	Good
3	Softening Point	Less	More
4	Penetration Value	More	Less
5	Tensile Strength	High	Less
6	Rutting	Less	More
7	Stripping	No	More
8	Seepage Of Water	No	Yes
9	Durability Of The Road	Better	Good
10	Cost Of Pavement	Less	Normal
11	Maintenance Cost	Almost Nil	More
12	Environment Friendly	Yes	No

3. GRAPH

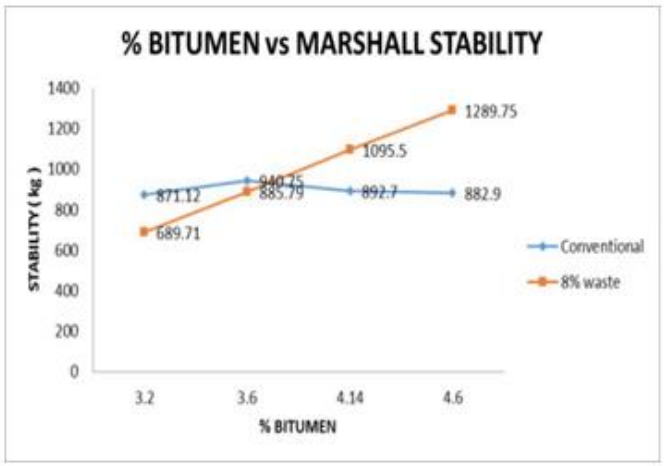

Fig No. 2 Graph of % Bitumen Vs Marshall Stability

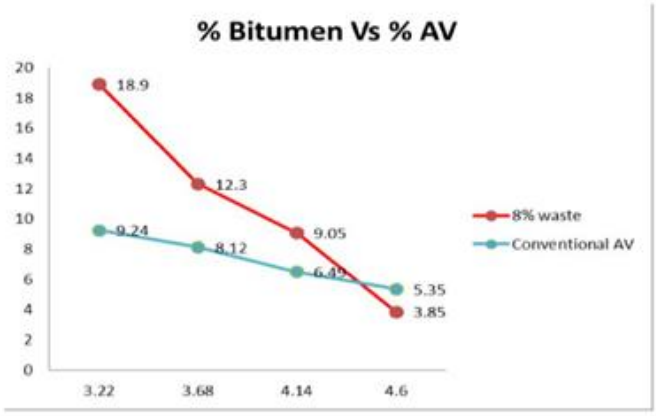

Fig No. 3 Graph of % Bitumen Vs % AV

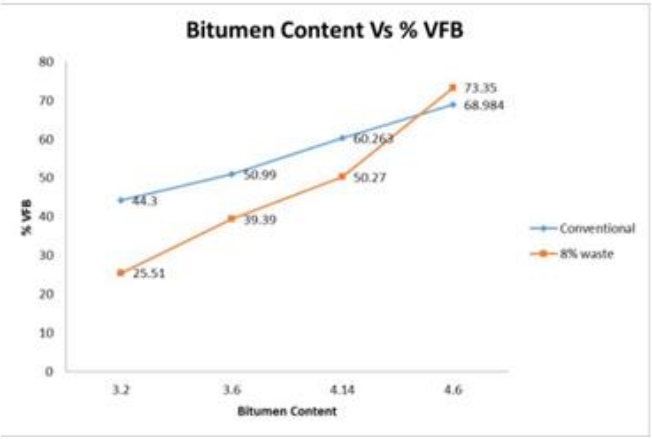

Fig No. 4 Graph Of % Bitumen Vs Vfb

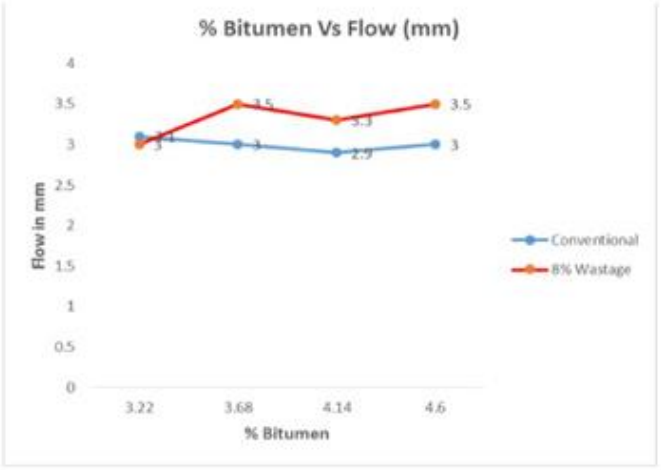

Fig No. 5 Graph of % Bitumen Vs Flow

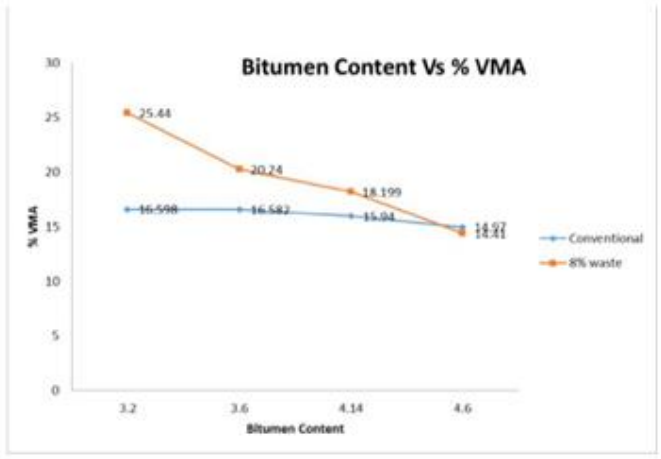

Fig No. 6 Graph of % Bitumen Vs VMA

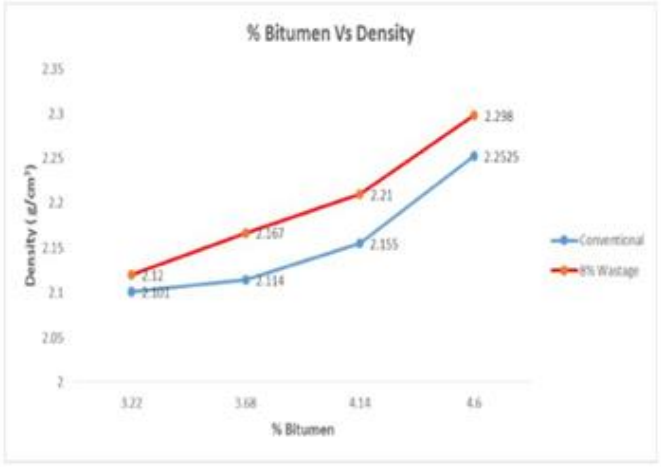

Fig No. 7 Graph of % Bitumen Vs Flow

4. Current Scenario in India

After using them mostly used plastics products are bags, cups, films and foams, made up of polyethylene, polypropylene or polystyrene. India consumption of Plastics will grow 15 million tones by 2015* and is set to be the third largest consumer of plastics in the world. In our country we use so many plastic in our daily use.

The data we look above was a comparison of consumption of plastic in World and in India.

India generates 5.6 million metric tons of plastic waste annually, with Delhi generating the most of at municipality at 689.5 metric tons every day, according to a report from the Central Pollution Control Board (CPCB). CPCB submitted the report to the Indian Supreme Court, which said, "We are sitting on a plastic time bomb."

Fig -8: Construction Pavement

Sample paragraph Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, sc, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

After the text edit has been completed, the paper is ready for the template. Duplicate the template file by using the Save As command, and use the naming convention prescribed by your conference for the name of your paper. In this newly created file, highlight all of the contents and import your prepared text file. You are now ready to style your paper.

5. CONCLUSIONS

The pavement design of the road was found to be sufficient as the forecast traffic axle loadings for a design period of 15 years was less than class T4 used to design the pavement structure. The material characteristics recommended in design were sufficient for the design traffic loading. Therefore the design has no aspect in development and propagation of the cracks. The base and sub-base layers have adequate strength but the values of moduli are in some sections higher than recommended for a flexible pavement, leading to semi-rigid pavement overlying flexible subgrade.

Therefore the subgrade does not provide sufficient support to the pavement due to the high base and sub-base strength. The variation of strength for pavement layers; the average elastic moduli for both base and sub-base exceed the

specified tolerances for scatter, and the collapse of some pavement cores during soaking process point to inadequate/non-uniform mixing and insufficient curing of the pavement layers. Therefore, pavement cracks were caused by combination of factors, namely: sub -grade does not provide sufficient support to the pavement due to high base and sub-base strengths; and the variation of strength for pavement layers and the collapse of some cores during soaking process point to cases of inadequate/non- uniform mixing and insufficient curing of the pavement layers.

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