

# USE OF PLASTIC WASTE IN BITUMEN ROAD CONSTRUCTION.

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## ABSTRACT

In this paper the study of some of plastic waste materials which we can reuse by certain processing and use in road construction..the materials as a result we are equipped with useful and valuable information about these materials. The discussed materials have many advantages over conventional/traditional materials and methods.. This project will conduct a study on recycling plastic waste and blending it with bitumen to lay roads in India and compare with the environmental and economic conditions Some of these materials are relatively cheaper and provide more strength as compared to traditional road materials. This project 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 this paper we are going to study about the comparison of bitumen roads with plastic bitumen roads. As the population and development activities is growing rapidly the quantum of plastic waste in municipal solid waste is increasing, which leading to widespread littering on the landscape. Once the used plastic material is generally thrown out and they do not undergo bio decomposition. Therefore the waste is either landfilled or incinerated. Both the actions are not eco-friendly as it pollutes the land and the air. There are many ways to stop the plastic pollution. The lots of small individual actions can have a big impact on the planet. Currently, majority of Indian roads are paved with asphalt(Hot & Warm) consists of aggregate and bitumen mixed together at specific temperature, developed techniques to use plastic waste for construction purpose of roads and flexible pavements has reviewed. This waste modified bitumen mix show better binding property, stability, density and more resistant to water

## METHODOLOGY

For this research on large no of plastic collected. These waste plastic cut to the crushing plant in various sizes (2.36 mm to micron).The waste plastic use not only in bitumen but also aggregate in percentages of 7,8,9,10,11,12 by using wet process. The different test conduct on aggregate (Impact, Crushing, Abrasion, specific Gravity & Water Absorption Test) as well as on bitumen (Penetration, Ductility, Softening, Viscosity & Marshall Stability Test).

The debate on the use and abuse of plastics on environmental protection can go on, without yielding results until practical steps are initiated at the basic level by everyone who is in a position to do something about it. So different test were conducted on aggregates with plastic and bitumen. The tests conducted for

the normal aggregates, plastic coated aggregates & bitumen coated aggregates are given in the below description.

There are a large number of ways to manage the waste plastic. It can be in the form of Food wrappers, plastic bottles, plastic bottle caps, plastic grocery bags, plastic straws, and stirrers are the next most common items . Various processes like de-dusting and washing are used to clean the waste plastic. Then, these well – sieved and cleaned plastic aggregate is mixed well with stone aggregate and bitumen at temperature of about 160°C-170°C for the proper mixing of bituminous mix. The waste plastic are thermodynamically set, thus they are not melted in bitumen at the time of mixing altogether in a mix plant. Large quantities of waste plastic are collected from road sides, dumpsites and waste – buyers. The collected plastic are sorted as per the required sizes for the mixing purposes. A shredder is a mechanical device used to cut objects into smaller pieces. A plastic shredder machine is a machine that cuts the plastics into smaller pieces in order to make waste management easier. As shown in fig.

### SHREDDING PROCESS

Will be shredded or cut into small piece(2.36 to 4.56 mm). The different types of plastic wastes are mixed together



### CO-PROCESSING OF PLASTIC WASTE MANAGEMENT

Plastic Waste Management

**1)Conventional Technology**

Recycling

Incineration

Land filling

**2)New Technology**

Plasma Pyrolysis Technology

Liquid Fuel

Polymer Blended Bitumen Roads

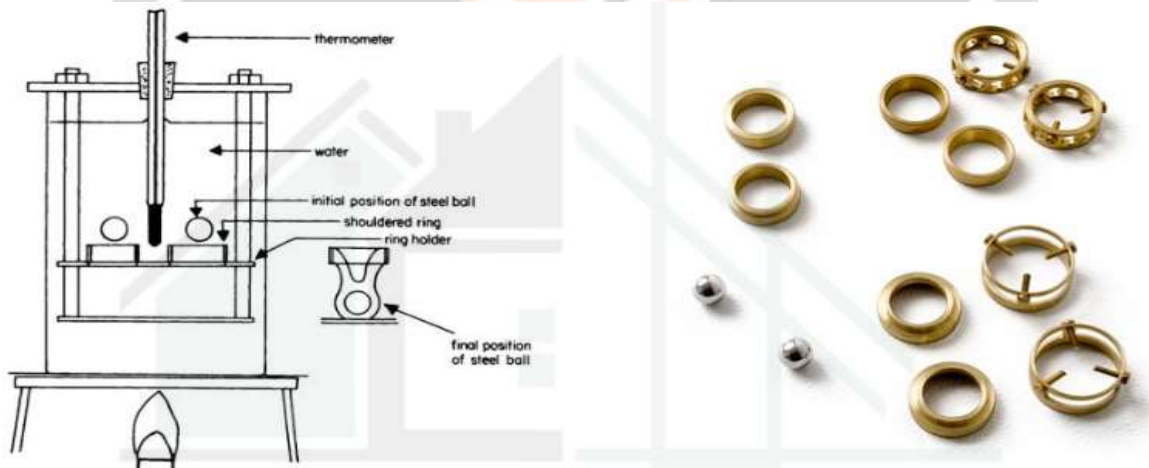
Co-processing in Cement Kiln

**TEST ON BITUMEN****TEST ON SOFTENING POINT Objective:**

To determine the softening point of a given sample of bituminous material by using Ring and Ball apparatus.

**IRC Recommendation:**

The temperature at the instant when each of the ball and sample touches the bottom plate of support is



recorded as softening point value. The mean of duplicate determinations is noted. It is essential that the mean value of the softening point (temperature) does not differ from individual observation by more than the following limits:

Softening Point Repeatability Reproducibility Below 30

°C 2 °C 4 °C

30 °C to 80 °C 1 °C 2 °C

Above 80 °C 2 °C 4 °C

#### 4. CONCLUSION

- ▶ Plastic will increase the melting point of the bitumen.
- ▶ This innovative technology not only strengthened the road construction but also increased the road life.
- ▶ Plastic roads would be boon for India's hot & extremely humid climate, where temperature frequently cross 50°C .
- ▶ In general excess binder content causes bleeding problems especially at high temperature, whereas any deficient amount of binder may cause cracking, loss of aggregates, pot holes problems etc. In India due to manual mixing, it is very difficult to control the temperature and optimum amount of bitumen in the mix. In this regard polymer (waste plastic) modified binder could be a better solution due to its low ductility, high softening point and enhanced elastic properties.

#### 5. REFERENCES

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