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Investigation on Bitumen with PVC as an Additive Material for Road Construction

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ABSTRACT: The deep strength asphalt, bitumen, crushed rock, chalk rock, and compacted sand are the materials used to make modern roads. Earth sand, loam, gravel, and bituminous spray seal are the materials used to make the majority of rural roads. PVC disposable items have long been a major source of dioxin contamination in incinerators and fires. The necessity of the hour is to find a suitable use for disposed of PVC trash. On the other hand, as a result of growing traffic, it is necessary to expand the roads' capacity to support more weight. Reusing PVC waste is made possible by the use of PVC coated gravel, asphalt, or mixed bitumen in pavement construction. The various characteristics of PVC-modified bitumen, including penetration and softening point, were examined in this study. Key word: Aggregate, bitumen, PVC.

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I. INTRODUCTION

Global population growth and industrialization lead to the development and manufacturing of new non-biodegradable plastic wastes, such as PVC trash. Recent research has demonstrated that plastic garbage can persist on Earth for 4500 years without deterioration and unaltered. Finding a practical recycling method is necessary to lessen pollution caused by plastic trash. Using waste plastic components to create a flexible pavement mixture is one such method. The purpose of our project is to evaluate the strength characteristics of unaltered asphalt with asphalt modified with PVC and filled with brick powder. Plastic boxes, covers, and other items made of leftover food waste are among the PVC waste materials used in this project. Various percentages were used to create the mixes.

II. SCOPE

- To get rid of potholes.
- To reduce pollution, greenhouse gas emissions, and global warming. The roadways' life span can be extended.
- Inherently eco-friendly.
- Stones are covered with plastic to improve aggregates' surface qualities.
- The coatings are simple to apply, and the necessary temperature is the same as for laying roads. The percentage of waste to bitumen should range from 6 to 8 percent, depending on the rainfall patterns in locations with high and low levels of precipitation.

III. METHODOLOGY

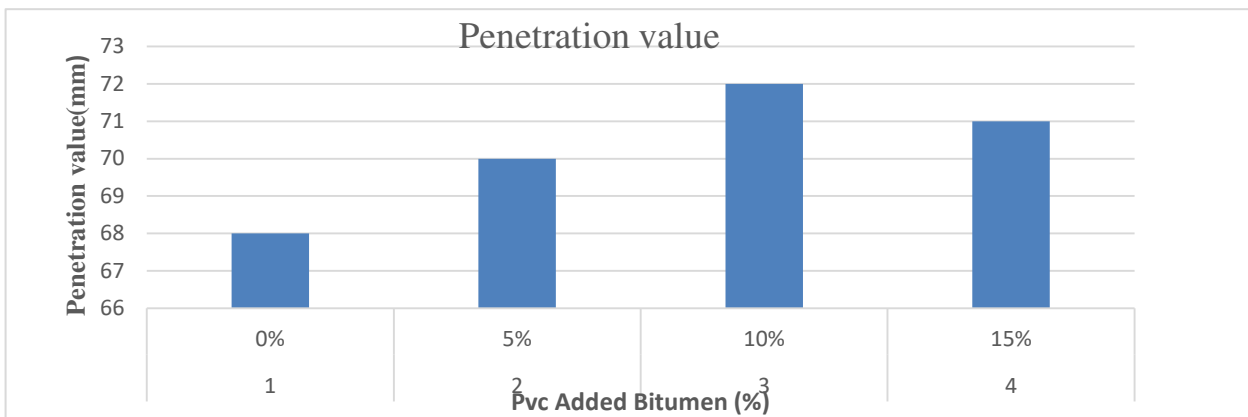
- Collecting the waste material like PVC pipes, water bottles, cover and cleaning process will be go head.
- Waste materials are cut into small pipes and bitumen will be heated at 120°.
- Add PVC waste in hot bitumen which vary percentage from 0%,5%,10%,15 % and test will be carry out bitumen test.
- To analysis the result of bitumen test and report will submitted.



IV. EXPERIMENTAL RESULTS

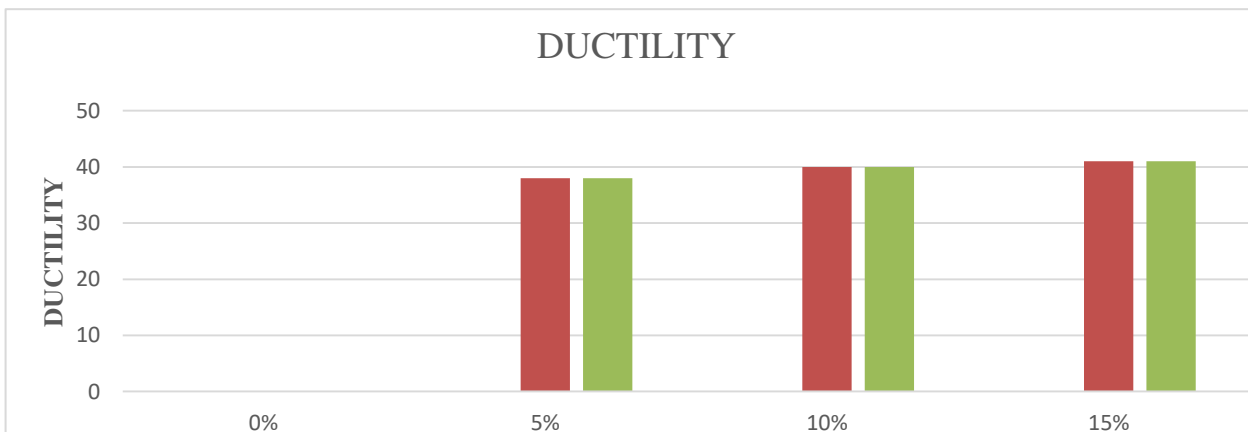
BITUMEN TEST
PENETRATION TEST

S.No	PVC Added Bitumen (%)	Penetration value(mm)
1	0%	68
2	5%	70
3	10%	72
4	15%	71



DUCTILITY TEST

S.No	PVC Added	Initial	Final	Ductility
1	0%	0	0	0
2	5%	0	38	38
3	10%	0	40	40
4	15%	0	41	41

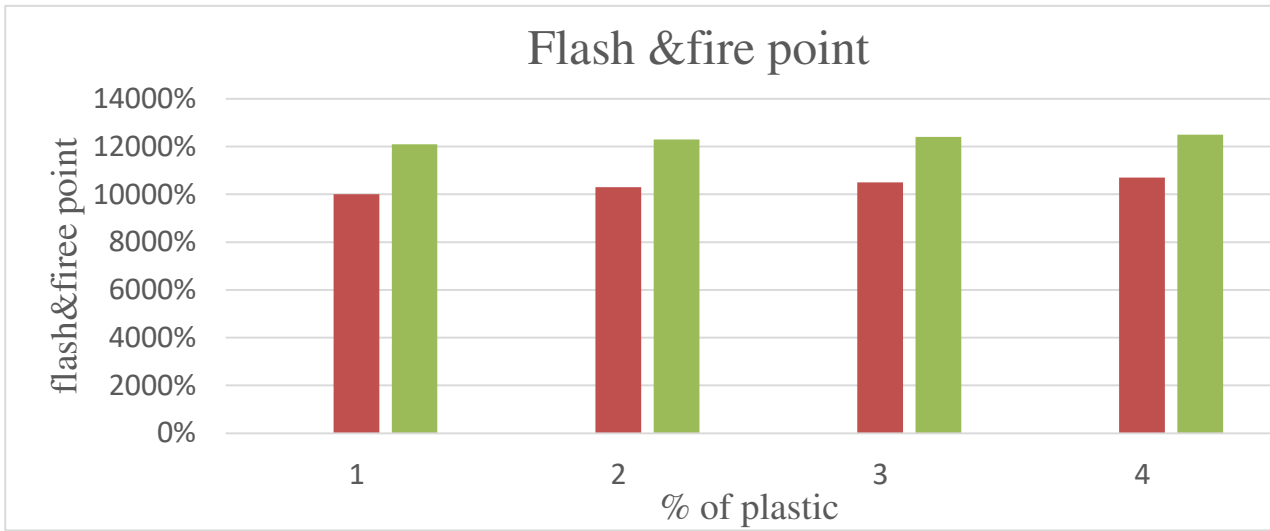




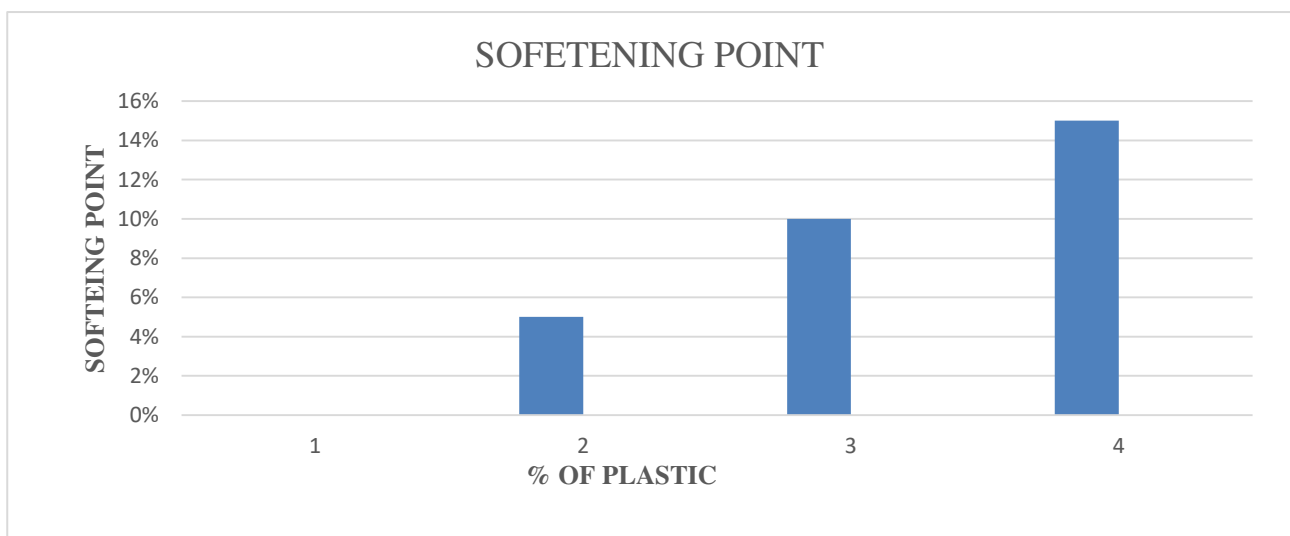
FLASH AND FIRE POINT TEST

S.No.	% Of Plastic	Flash Point	Fire Point
1	0%	100°C	121°C
2	5%	103°C	123°C
3	10%	105°C	124°C
4	15%	107°C	125°C

SOFTENING POINT



S.No	% Of Plastic	Softening Point
1	0%	46.7°C
2	5%	48.2°C
3	10%	51.8°C
4	15%	53.4°C



V. CONCLUSION

Based on the experimental findings of this study, the following

- It is possible to improve the adhesion characteristics and high strength mixtures of bitumen by modifying it with scrap PVC that is available from household and other waste.
- In hot climates where low penetration grade bitumen is utilized, the recommended amount of PVC modifier up to 10% by the weight of bitumen component can be used for road building.
- While the study's results are positive, more research is needed to determine whether the bitumen mixtures incorporating waste PVC can benefit from the application of current mix design techniques.

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