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Study of Optimum Utilization of Polyethylene Terephthalate (PET) Resin in Flexible Pavement

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Abstract: ***Good transportation is the important infrastructure for our nation development. Road is the greatest mode of transportation in India. And it is essential to achieve economy in the construction of roads. Along with the economy, quality is also an important factor to be considered. On the other hand the domestic wastage and industrial wastage disposal is a big problem. Especially the plastic which creates many environmental problems cannot be decomposable in nature. It is generally recycled and reused. The present investigation is to utilize the plastic waste in the form of reinforcement in road construction in order to increase its performance. There are many ways to achieve economy and quality in roads. it is used in flexible pavement for stabilization, to reduce the thickness of pavement. It includes ecofriendly road construction, waste management, development of innovative material for construction of flexible pavement.***

This topic provides the summary of the study on the utilization of polyethylene terephthalate (PET) resin in road construction. Data from researcher show that, PET can improve some properties of modified asphalt mixture having considered the economic and environmental prudent angles, utilization of PET as an additive to asphalt mixture is suitable to use for flexible road pavement.

I. INTRODUCTION

Roads are very important national investment and require maintenance to keep them in a satisfactory condition and ensure safe passage at an appropriate speed and with low road user cost. Road is a way of communication using a stabilized base other than rails or air strips open to public traffic, primarily the road is used for vehicles running on their own wheel loads. The road should be constructed for development and progress of our country. Road also constructed for connecting different capital of states, large industrial & tourist centers, different states & cities with each other for the purpose of transporting peoples, goods, tools, equipment, machinery etc. A road is well designed, well-constructed and well maintained is essential for agricultural, commercial, industrial and cultural progress i.e. for overall development of country. In the road foundation or pavement, various types of defects are occurs like un-stability, pot holes etc. due to improper proportion of materials, inadequate thickness of pavement & separation or settlement of any layer or any reason then this defect can be overcome by using various Geo-synthetic materials in road pavement to improves such defects this is our actually study as mentioned above. Geo-synthetics can be defined as the manmade or natural fiber, which is used in construction. They are made up of natural fibers or synthetic fibers, which are weaved or bonded with partial melting, needle punching or the addition of chemical agents Generally, the Geo-synthetics are made of Polymer based - Polypropylene, PVC, Polyester, Polyethylene, Polyamide, PET High-Strength Woven Polyester Geo-textiles. Many plastics common to everyday life are found in geo-synthetics. The most common geo-synthetics are polyolefin and polyester, rubber, fiberglass, and natural materials are used. The function of Geo-synthetics is used as a separator, filter, drainage, and reinforcement, protection, as a liquid and gas barrier. It can be also used in construction of road, retaining wall, railway embankment, earthen dam etc. Polyethylene terephthalate is commonly known as PET or beverages plastic bottle. The PET the most common thermoplastic polymer resin of the polyester family is used in fibers for textile, containers, thermoforming for manufacturing, and in combination with glass fiber for engineering resins. The majority of the world's PET production is for synthetic fibers in excess of 60%, with bottle production accounting for about 30% of global demand. In the context of textile applications, PET is referred to by its common name, polyester, whereas the acronym PET is generally used in relation to packaging. Polyester makes up about 18% of world polymer production and is the fourth most. Plastics are regularly utilized substances which play an essential part in practically every part of our lives. The increasing of plastic waste throughout the world need appropriate end-of-life management. Most amount of plastics can be found in containers and packaging (i.e. bottles, cup, etc.) and also can be found in disposable good (e.g. medical device) and durables (e.g. furniture, building materials, tires, etc.). Compared to other materials, plastics always be selected because of their properties such as easy processing, low density, good chemical resistance, good mechanical properties, good electrical insulating properties, low cost and good thermal properties. There are two main field directions of plastic application for post-production and post-consumer which are used as material recycling of waste polymer and used as alternative fuel in power plants.

This research showcases an environmental friendly way of utilizing this waste for road construction.

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Table 1. Propetirs Of Bitumen And Pet Resin

Sr.no.	Properties	Bitumen	Pet resin
1.	Density	1.01 to 1.06	1.38
2.	Youngs modulus	2000 mpa	2800 mpa
3.	Specific gravity	0.97 to 1.02	More than 1.1
4.	Melting point	120°C	More than 250°C
5.	Boiling point	More than 538°C	More than 350°C
6.	solubility	None in water	None in water

Figures

Figure 1.Polyethylene terephthalate

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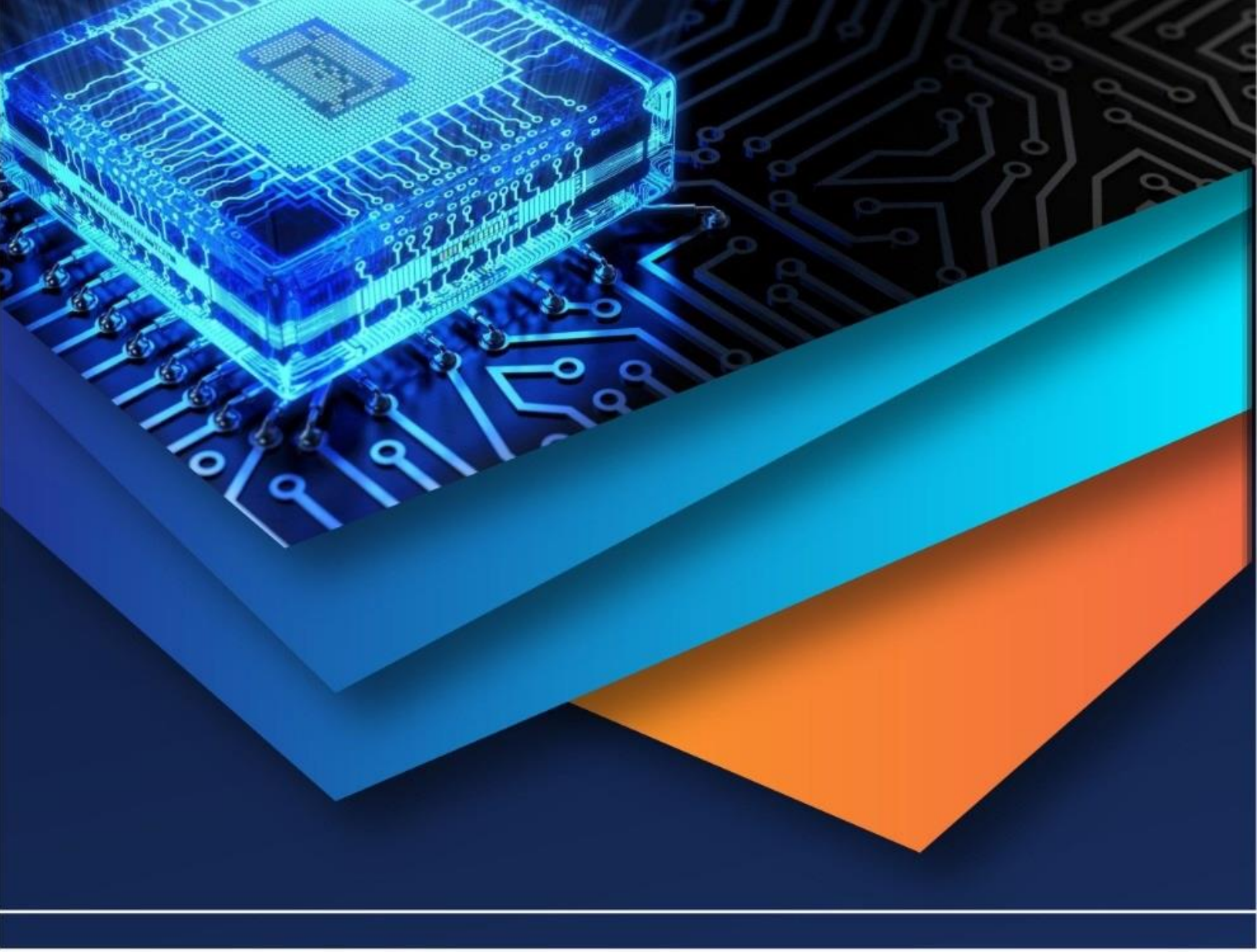

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