EXPERIMENTAL INVESTIGATION ON THE USE OF SUGRCANE BAGASSE ASH IN CONSTRUCTION OF LOW VOLUME TRAFFIC ROAD

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Abstract-*This study investigates the Utilization of industrial and agricultural waste products in the industry, which has been the focus of research for economic, environmental and technical reasons. Sugarcane bagasse is fibrous waste product of the sugar refining industry and Sugarcane bagasse has high concentration of silica in it approximately 72%. Which is very fruitful for increasing the strength of pavement. Huge quantity of ash which is a waste product available at very negligible rate. It causes chronic lung condition pulmonary fibrosis more specifically referred to as Bagasse. The aim of this research is to make economical construction of pavement &to maintain environmental balance & avoid problem of Ash disposal.*

Key Words: **Waste sugarcane bagasse ash, Bitumen, Coarse aggregate, Fine aggregate**

1. INTRODUCTION

The road transport industry is that the backbone of strong economies and dynamic societies. The road transport industry is indeed instrumental in interconnecting all businesses to all major world markets, driving trade, creating employment, ensuring a far better distribution of wealth and uniting mankind. It plays an important role within the daily economic and social lifetime of industrialized and developing countries alike. A crucial a part of the important part of the road transport industry's story is sustainable progress. Due to the above mentioned advantages, the road transport has become very fashionable and its share is consistently increasing. It is therefore legitimate and indispensable to safeguard an industry that is vital to economic process, social development, prosperity and ultimately peace and which plays an important role in life of everyone in industrialized and developing countries alike by meeting the demand for the sustainable mobility of both people and goods.

The massive constructions release enormous amount of pollutants to the atmosphere and studies reveal that the pollutants from the development industry are more harmful than the pollutants from the other segment. But on the opposite hand, there is an outsized production of agricultural wastes like as rice husk ash, wheat straw ash, hazel nutshell, fly ash, cork and sugarcane bagasse ash. Agriculture industry is that the largest industry in India as quite 70% of Indian population is depend thereon. Sugarcane is essentially produced within the states of Punjab, Haryana, Uttar Pradesh and Tamil Nadu. The state of Uttar Pradesh is named the "Sugar Bowl" of India. An outsized number of sugarcane processing industries are located in these areas. But an outsized quantity of wastes called as bagasse is produced from these sugarcane processing industries. These roads are often constructed in those areas where there is availability of sugarcane bagasse. In Uttar Pradesh and Haryana, there is an outsized cultivation of sugarcane and thus the sugarcane bagasse are often easily procured to be utilise in the development of low volume traffic roads . Sugarcane bagasse consists of roughly 50% of cellulose, 25% of hemicelluloses and 25% of lignin. The utilization of sugarcane bagasse as bio fuel or burning in open fields has posed an excellent environmental threat of polluting air, water, etc. During rains these wastes begin producing highly offensive gases, thereby again causing nuisance. The smoke produced also causes invisibility. It can therefore be advantageous to use it within the construction of pavements to mitigate the disposal problem also on minimize the utilization of natural aggregate (sand) and binding material (cement, bitumen), so as to construct the low volume economic road pavements.

1.1 OBJECTIVES AND SCOPE OF STUDY

The specific study of this research study are listed below

- To gauge the performance of conventional bitumen modified with shredded waste sugarcane ash.
- To analyse the value impact on the utilisation of modified bitumen over the convention one
- To review the workability of a fresh sample of this concrete.
- To evaluate the stability, flow value and volumetric properties of bituminous mix with and without additional of shredded Waste sugar cane ash .

1.2 LABORATORY TESTS RESULTS

The research discusses the laboratory results for modified bitumen using shredded waste plastic bags, waste sugar cane ash and Marshall Stability test for hot bituminous mixture prepared using the modified binder. The tests were tabulated, necessary graphs drawn and test comparison carried out. The tests determining suitability of aggregates were also summarized in here.

Property of aggregate	Type of Test	Standard	Value	Limitation
Crushing Strength	Aggregate Crushing Value	IS:2386(Part 4)	20.60%	30%
Hardness	Los Angeles Abrasion test	IS:2386(Part 5)	17.10%	35%
Toughness	Aggregate Impact Value	IS:2386(Part 4)	10.10%	30%
Durability	Soundness test	IS:2386(Part 5)	2%	12%
Shape Factor	Flakiness index	IS:2386(Part 1)	9.70%	
Specific Gravity & Porosity	Specific gravity	IS:2386(Part 3)	2.737	
Adhesion of Bitumen	Water absorption	IS 6241-1971	0.691	2%

2. METHODOLOGY

The study was conducted supported laboratory tests as a main procedure to get data sets and results. The modified bitumen was subjected to a series of standard laboratory tests to determine its physical properties and the results were tabulated. The test that were carried out included: -

- Penetration test
- Ductility test
- Softening point test
- Specific gravity test

% Wgt of WSCA	% Wgt of Bitumen	Penetration Value (mm)	Softening point Value (°C)	Ductility Value	Specific gravity value
0	0	87	53	100	1.01
1	99	78	53	89	1.02
2	98	67	55	68	1.04
2.5	97.5	62	56.6	55	1.05
3	97	58	57.3	34	1.07
4	96	45	58.2	28	1.08
5	95	30	59.8	20	1.09
6	94	Very Stiff			

Table : Bitumen Modified with WSCA

3. CONCLUSIONS

Following conclusions are drawn based supported this study:

- ★ Sugarcane bagasse ash modified bitumen performed better in comparison to ordinary bitumen up to 30% for baggase ash replacement and 10% of sand replacement in ordinary bitumen.
- ★ Increase of strength in pavement is especially thanks to presence of high amount of silica in sugarcane bagasse ash.
- ★ Unlike Rigid pavements, baggase ash modifiedbitumen pavement does not exhibit very deterioratory effect thanks to thermal expansion and contraction, and are free from the cracking phenomenon.
- ★ Baggase ash pavement does not need in-situ curingthen often be opened to traffic soon after completion of construction.

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