

A STUDY ON UTILISATION OF SUGRCANE BAGASSE ASH IN BITUMEN

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Abstract - This paper summarizes the continued researches about the experimental investigation on the utilization of bagasse ash within the construction of low volume traffic roads. The most focus of this research was to enhance the transport industry so on end in to result in greater economy and mobility of product and services by developing economic roads and also to utilize the varied agro-wastes within the housing industry to end in in suitable waste management for environmental susceptibility and eco-conservation. During this case sugarcane bagasse ash (an agro-waste) is being utilized for the development of low volume traffic roads (village roads, city street roads and other arterial roads).

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 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.

1.2 MIXTURE PROPORTION AND SAMPLE PREPARATION

The aim of the addition of bagasse ash in bitumen is to extend strength of bitumen as bagasse ash inherits ample amount of silica in it. Bagasse ash is added into the molten bitumen within the proportion of 10%, 20%, 30% and 40% respectively. During testing we found that best result is attained at the addition 40% of ash in bitumen which is really improves the property of bitumen.

Table -1: Chemical composition of Sugarcane Bagasse Ash

Mineral	Percentage
SiO ₂	73
Al ₂ O ₃	6.7
Fe ₂ O ₃	6.3
CaO	2.8
MgO	3.2
P ₂ O ₅	4.0
Na ₂ O	1.1

2. METHODOLOGY

The study was conducted supported laboratory tests as a main procedure to get data sets and results. The laboratory tests were divided into several stages beginning with sieving of WSCA to get rid of any unburned materials and any material retained in sieve 2.36 mm respectively, testing of conventional bitumen, modified bitumen and aggregate preparation. Sieving analysis was administered to separate aggregate into different sizes. Marshall Stability test method was used to determine the strength of the mix, determine the optimum bitumen content and other parameters.

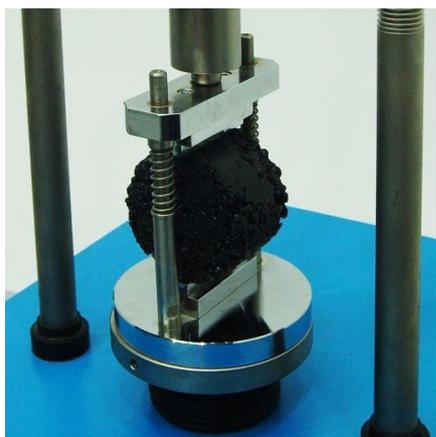
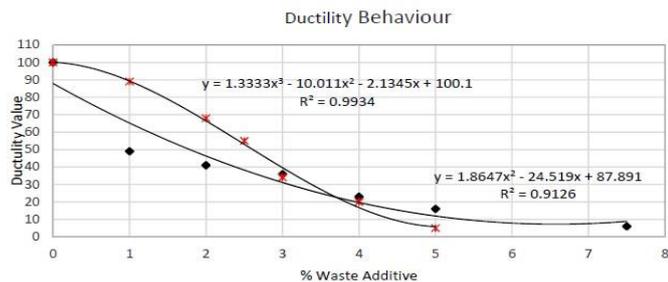


Fig. Marshall Stability test

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 bagasse 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, bagasse ash modified bitumen pavement does not exhibit very deterioratory effect thanks to thermal expansion and contraction, and are free from the cracking phenomenon.
- ★ Bagasse ash pavement does not need in-situ curing then often be opened to traffic soon after completion of construction.

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