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EXPERIMENTAL STUDY ON BAGASSE ASH AND ITS STRENGTH ON M25 & M30 GRADE CONCRETE

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Abstract - *The utilization of industrial and agricultural waste produced by industrial processes has been the focus of waste reduction research for economical, environmental, and technical reasons. Sugar-cane bagasse is a fibrous waste-product of the sugar refining industry, along with ethanol vapor. This waste product (Sugar-cane Bagasse ash) is already causing serious environmental pollution, which calls for urgent ways of handling the waste. Bagasse ash mainly contains aluminum ion and silica. In this paper, Bagasse ash has been chemically and physically characterized, and partially replaced by weight of cement in concrete. Fresh concrete tests like compaction factor test and slump cone test were undertaken was well as hardened concrete tests like compressive strength, Tensile strength & NDT was obtained. A few studies have been carried out on the ashes obtained directly from the industries to study pozzolanic activity and their suitability as binders, partially replacing cement. Therefore, it is possible to use sugarcane bagasse ash as cement replacement material to improve quality and reduce the cost of construction materials.*

***Key Words*: Bagasse Ash (BA), Quarry Dust (QD)**

1. INTRODUCTION

Concrete is the most popular building material in the world. However, the production of cement has diminished the limestone reserves in the world and requires a great consumption of energy. River sand has been the most popular choice for the fine aggregate component of concrete in the past, but overuse of the material has led to environmental concerns, the depleting of securable river sand deposits and a concomitant price increase in the material. Therefore, it is desirable to obtain cheap, environmentally friendly substitutes for cement and river sand that are preferably by products.

This paper is generated from a research project designed to determine whether benefits could be obtained by the use of Bagasse ash and Quarry dust materials together and to quantify benefits of concrete. Positive results will lead to the possibility of using the two by products in large quantities, while reducing the dependency on chemical admixtures.

2. BAGASSE ASH

Researchers all over the world today are focusing on ways of utilizing either industrial or agricultural waste, as a source of raw materials for industry. This waste, utilization would not only be economical, but may also result in foreign exchange earnings and environmental pollution control. Currently, there has been an attempt to utilize the large amount of bagasse ash, the residue from an in-line sugar industry and the bagasse-biomass fuel in electric generation industry. When this waste is burned under controlled conditions, it also gives ash having amorphous silica, which has pozzolanic properties.

A few studies have been carried out on the ashes obtained directly from the industries to study pozzolanic activity and their suitability as binders, partially replacing cement.

2.1 Composition of Bagasse ash

The sugarcane bagasse consists of approximately 50% of cellulose, 25% of hemicelluloses and 25% of lignin. Each ton of sugarcane generates approximately 26% of bagasse (at a moisture content of 50%) and 0.62% of residual ash. The residue after combustion presents a chemical composition dominates by silicon dioxide (SiO_2). In spite of being a material of hard degradation and that presents few nutrients, the ash is used on the farms as a fertilizer in the sugarcane harvests and bagasse ash was collected during the cleaning operation of a boiler operating system.

2.2 Quarry Dust in Concrete

Quarry sand when mixed with concrete results in increasing the compressive strength and flexural strength. Durability of the structure is increased to about 10% of that of the conventional concrete and decreases the cost.

Table -1: Chemical Composition Ashes

Property	Quarry rock dust
Specific gravity	2.54-2.60
Bulk relative density (kg/m3)	1720-1810
Absorption (%)	1.20-1.50
Moisture content (%)	Nil
Sieve analysis	Zone II
Fine particles less than 0.075mm	12-15