

# Experimental Investigation on Properties of Concrete as Partial Replacement of Fine Aggregate with Eco Sand and Cement with SCBA

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## ABSTRACT

The introduction of Eco sand as fine aggregates replacement materials in concrete looks to achieve success recently. The use of Eco sand as a substitute for fine aggregates in concrete mix is one option that can Eco sand disposal problem. Use of Eco sand in concrete makes it economical, and also solves the problem of its disposal. Experimental investigations were performed to study the strength properties of M-25 grade of concrete mix, with partially replaced sand with Eco sand (ES).

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## INTRODUCTION

Concrete is a complex material which is composed primarily of cement, fine aggregates and coarse aggregates mixed with portable water that hardens with time. The aggregates are mostly crushed rocks or coarse gravels like lime stones, together with fine aggregates i.e., sand. Portland cement is usually used for production of concrete and other materials which have cementitious properties such as fly ash and slag cement all are function as a binder for the aggregates. The cement in concrete reacts with water and forms a hardened mass. In addition the additive which are mineral admixture such as fly ash, slag, are added to cement manufacturing process to improve the properties. During the increased demand for river sand causes dramatic issues in producing a conventional concrete.

## ECO SAND

Eco sand is a by-product of cement manufacturing process and it poses a serious land fill problem.

Hence, as a solution to the above mentioned issue, it can be used as an aggregate in concrete depending on its property. The Eco sand does not absorb moisture and it can be made as a fine aggregates replacement in concrete. It acts as an inert materials and being very small particle 530 nm range, it can fill pores and add physical durability to concrete.

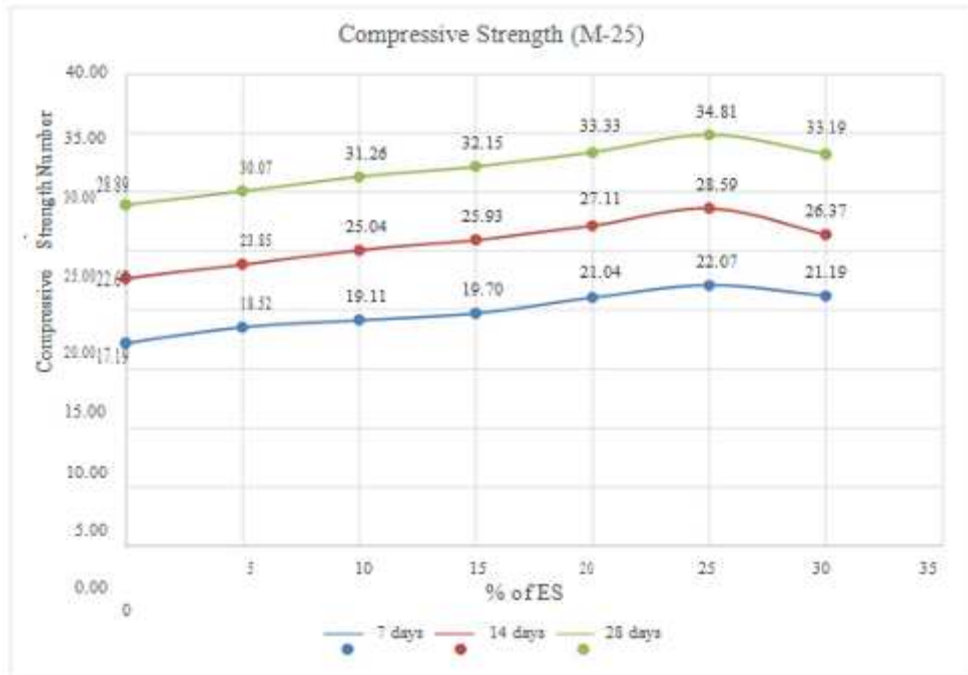
## Sugarcane Bagasse Ash (SCBA)

Bagasse is fibrous waste produced after the extraction of sugar juice from cane mills. Bagasse ash is residue derived from incineration of bagasse in sugar producing factories. The bagasse mass frequently faces problem of disposal in sugar factories particularly in equatorial countries. In numerous equatorial countries, there is ample quantity of Bagasse affluent in amorphous silica indicating its pozzolanic properties.

**Objectives**

- To study the concrete properties by using partially replaced Eco sand as natural sand with 10% SCBA.

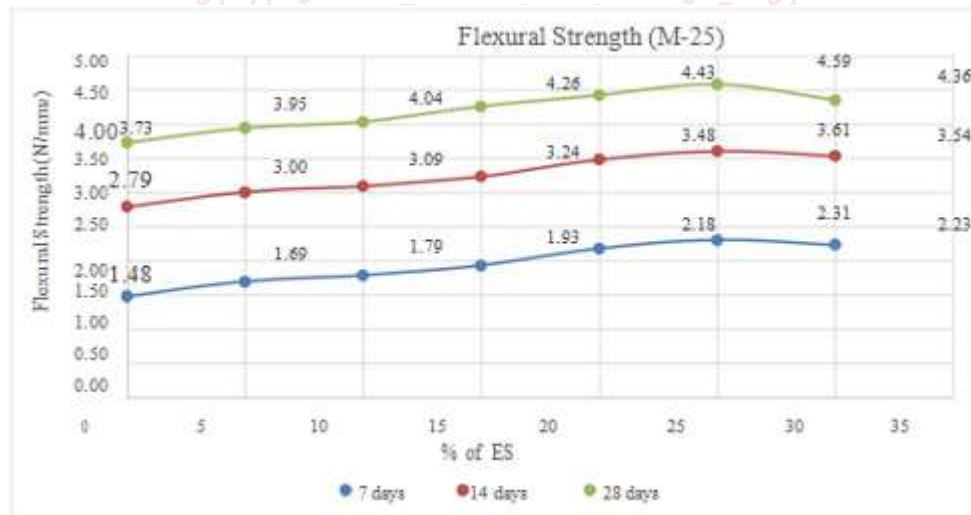
**COMPRESSIVE STRENGTH TEST**



**Figure 5.1: Compressive Strength of cubes for 7, 14 and 28 days (M-25)**

**FLEXURAL STRENGTH TEST**

Flexural Strength test is carried out on specimen Beam of Concrete blended with various percent replacements to fine aggregate by Eco sand (varying percentages) with 10% SCBA and conventional Concrete at 7, 14 and 28 days.



**Figure 5.2: Flexural Strength of Beams for 7, 14 and 28 days (M-25)**

**Conclusion-**

- At 25% Eco sand replacement to fine aggregate increases compressive strength than conventional concrete in 28 days about 20.49% in M-25 grade concrete.
- When the fine aggregate is replaced with 25% ES With 10%SCBA gives the optimum compressive strength.

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