

# Study on Green Concrete using Industrial Waste Product for Rigid Pavement Construction

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## ABSTRACT

In this experiment Fly ash is used as 10% replacement by weight of cement and Eco Sand as the partial replacement of Fine Aggregate from 0%, 6%, 12%, 18% and 24%.

The grade of the concrete here is M-30 grade and tested for compressive, split tensile and flexure strength at 7 days, 14 days and 28 days of age prepared and the different strength parameters i.e. compressive strength, tensile & flexure strength. Compressive strength of the concrete by replacing 0% to 18% sand by eco sand and 10% cement by fly ash the strength increases 26.3, 29.22 and 36.28 at 7, 14 and 28 days respectively after adding of eco sand strength decreases in M-30 Grade concrete as compared to the conventional concrete.

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## INTRODUCTION

Concrete is the most widely used construction material in the world it is a mixture of cement, sand, coarse aggregate and water. Cement is binding material in the cement concrete and its role is to provide strength to concrete. Cement fills up voids existing in the fine aggregate and makes the concrete impermeable. Provides strength to concrete on setting and hardening and binds the aggregate into a solid mass by virtue of its setting and hardening properties when mixed with water. Fine aggregate consists of small angular or rounded grains of silica. It is commonly used as the fine aggregate in cement concrete.

### Fly Ash

Fly ash remains in one of the deposits produced in the burning of coal, Fly cinder is for the most part caught shape the fireplaces of coal-terminated power plants and is one of two kinds of slag that together are known as coal powder; the other, base fly, remains, is expelled from the base of

coal heater. Contingent on the source and cosmetics of the coal being scorched, the parts of guileful cinder shift extensively, however all fly fiery debris incorporates considerable measures of silicon dioxide and calcium oxide.

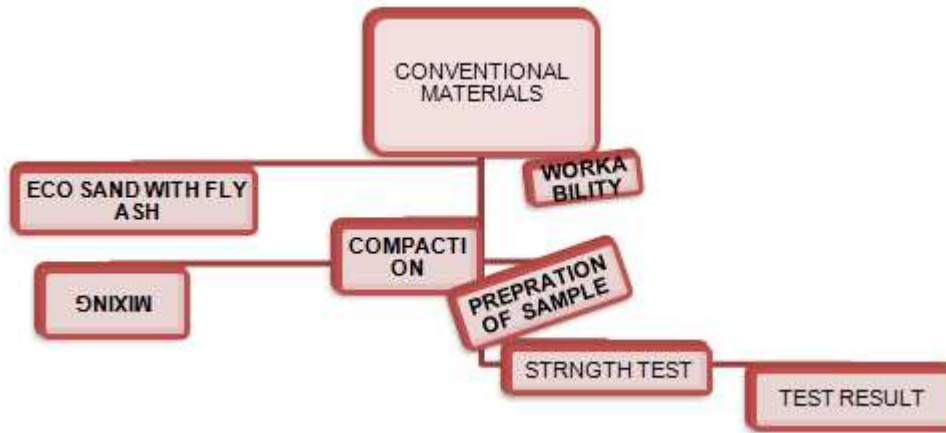
### Eco sand

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 aggregate replacement in concrete. It acts as an inert material and being very small particle 530 nm range, it can fill pores and add physical durability to concrete.

## OBJECTIVES

- To find out properties of concrete by adding 10% fly ash with 0% to 24% eco sand as a partial replacement of cement and fine aggregate.

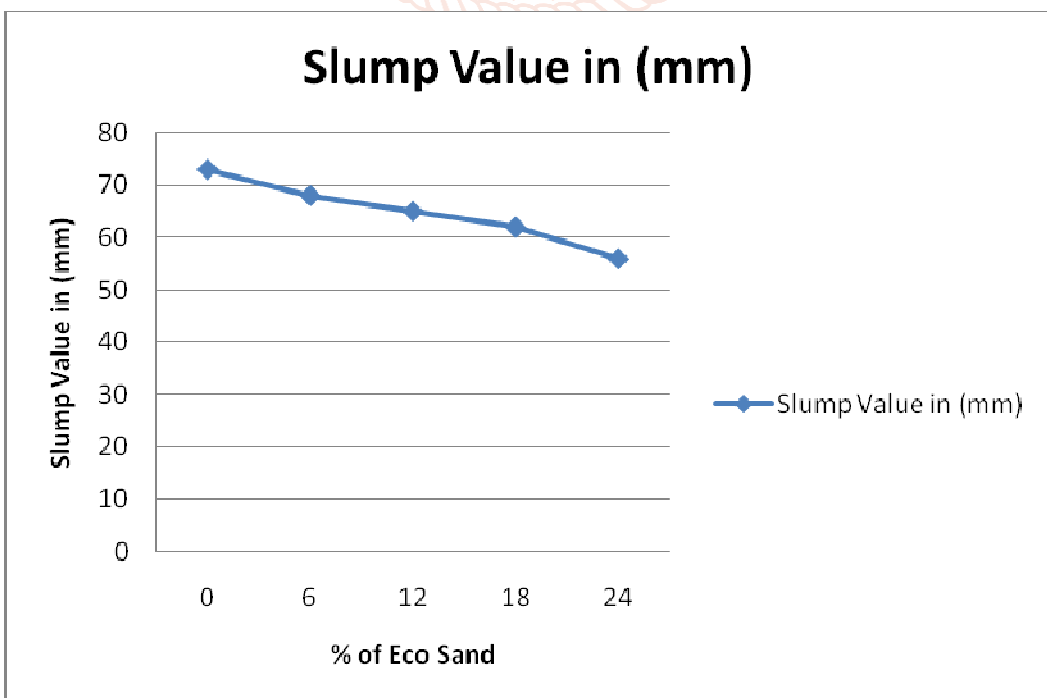
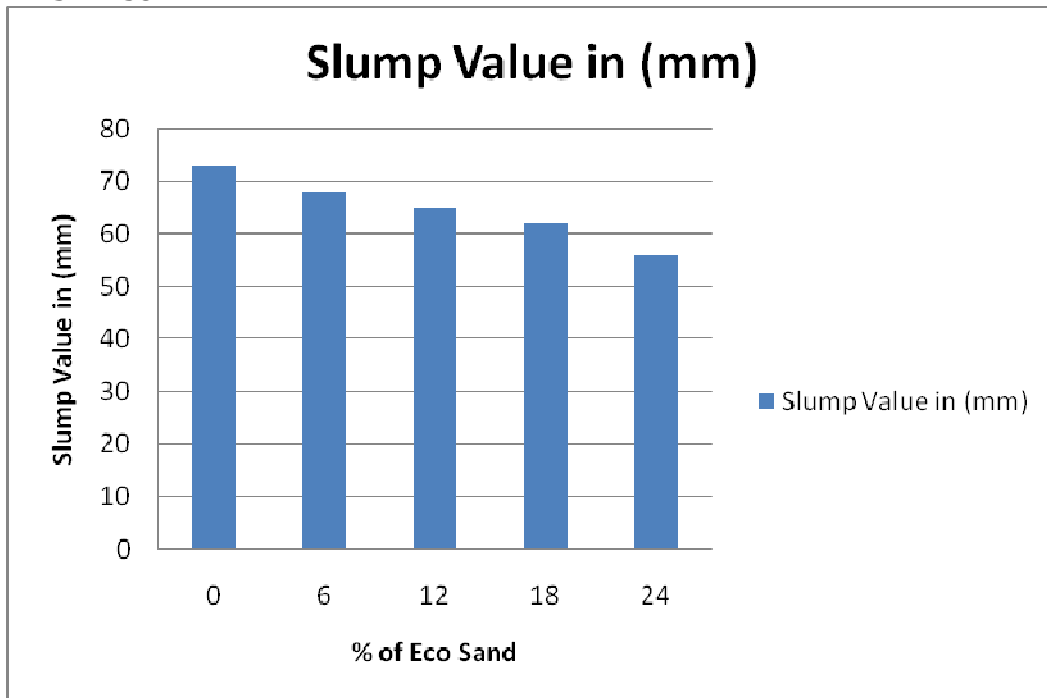
**METHODOLOGY**



**Fig.4.1. Flow chart of methodology**

**RESULTS**

**WORKABILITY TEST RESULT**



**Figure 5.1 Slumps of M-30 with 10% fly ash**

**COMPRESSIVE STRENGTH TEST**

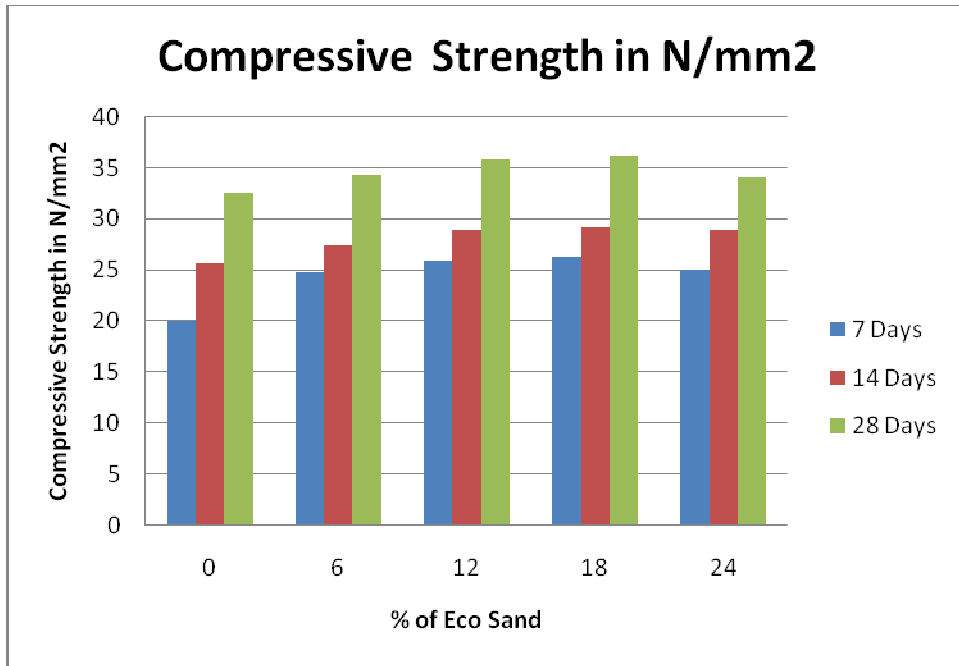
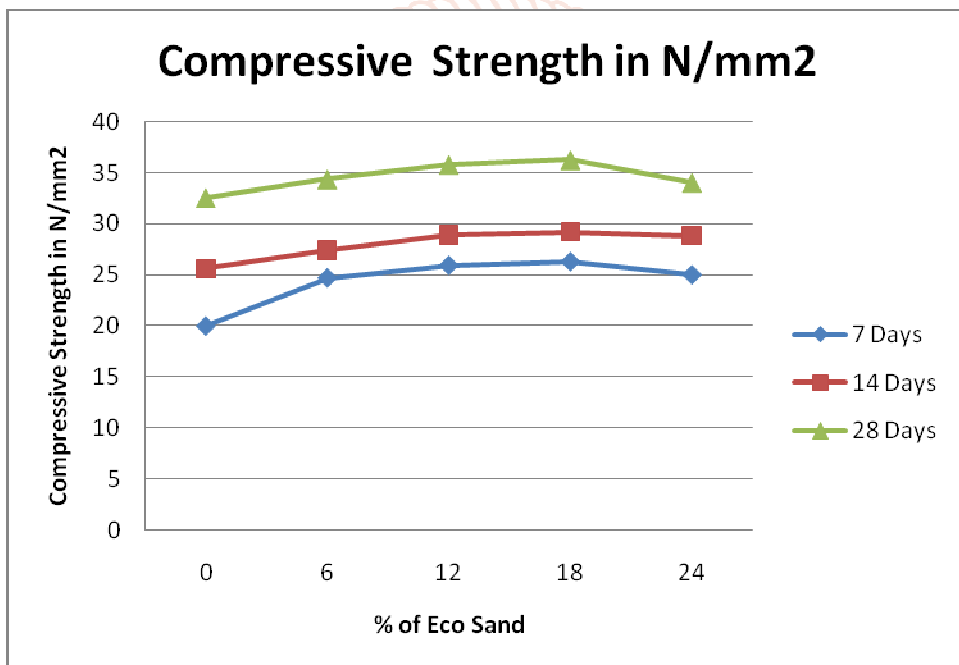
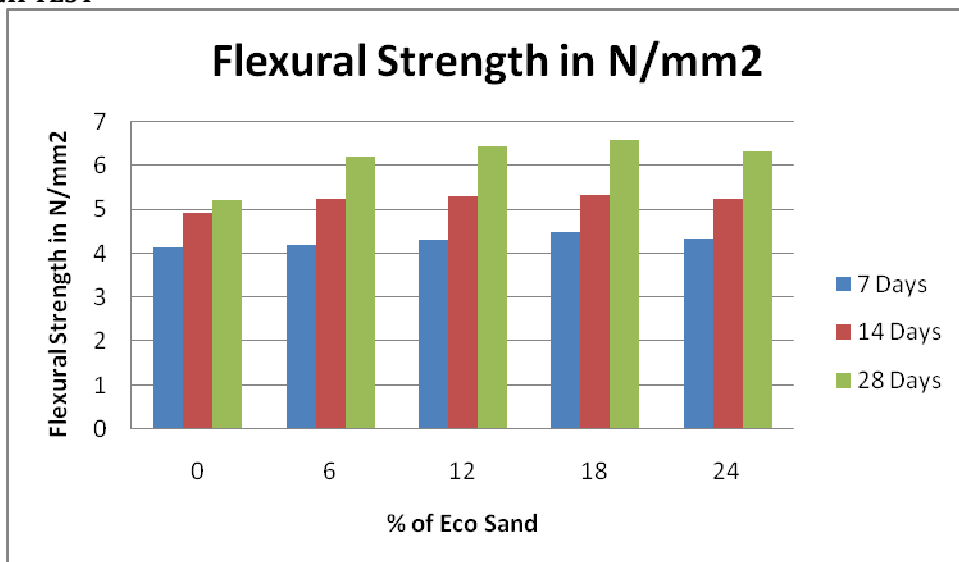


Figure 5.2 Compressive Strength of Different Mix of M-30 Concrete (with Fly ash 10% & Cement 90%)



**FLEXURE STRENGTH TEST**



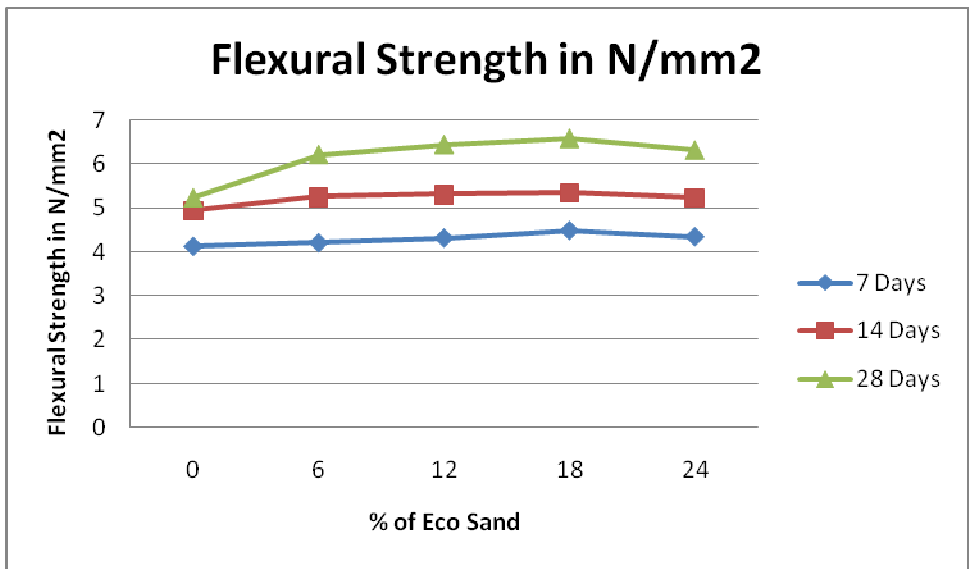


Figure 5.3 Flexure Strength of Different Mix of M-30 Concrete (with Fly ash 10% & Cement 90%)

**SPLIT TENSILE STRENGTH TEST**

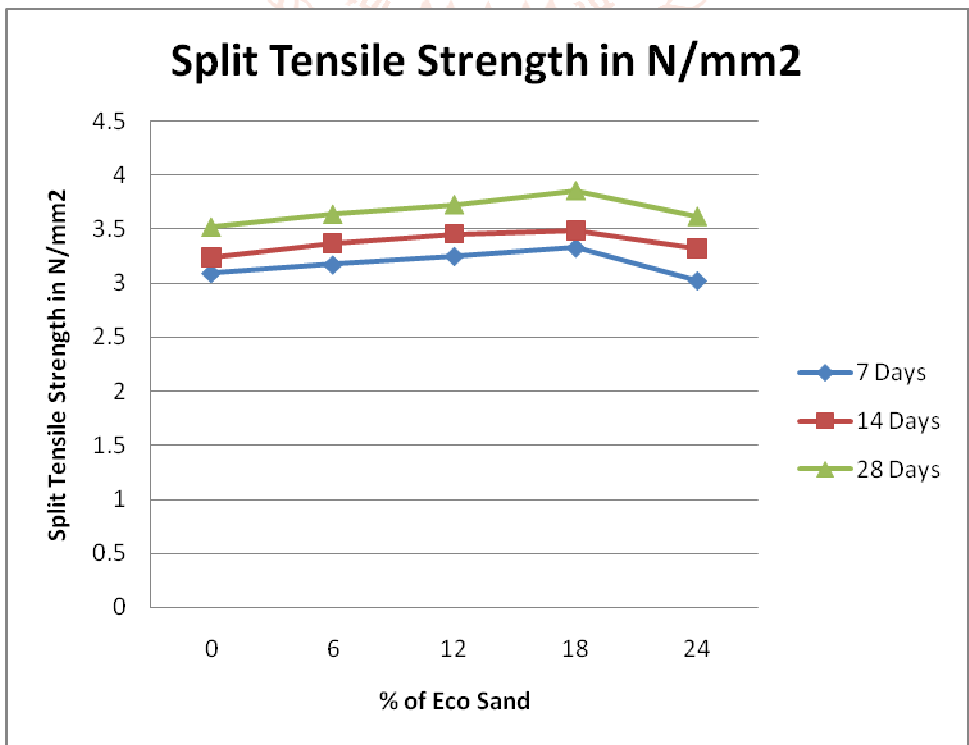
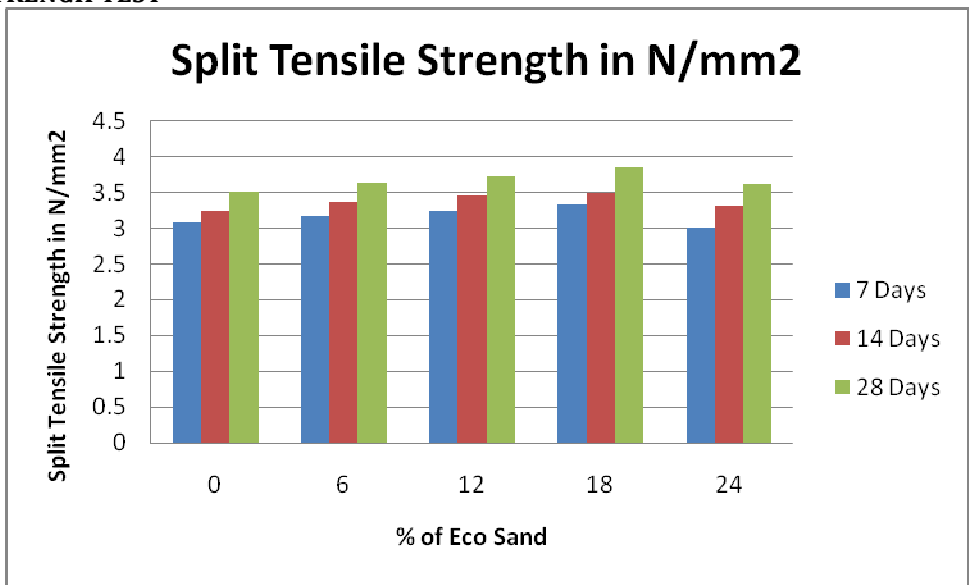


Figure 5.4 Split Tensile Strength of Different Mix of M-30 Concrete (With Fly ash 10% & Cement 90%)

## CONCLUSIONS

1. The strength of the concrete by replacing 0% to 18% sand by eco sand and 10% cement by fly ash after adding of eco sand strength was decreases in M-30 concrete. As compared to the conventional concrete.
2. The use of eco sand in concrete is beneficial in different manner such as environmental aspects, non-availability of good quality of fine aggregate or rarely availability, strength quality etc.

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