

Partially Replacement of Coarse Aggregate with Soda Lime Bottles and Polyethylene Terephthalate

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Abstract

Waste glass and undecomposed plastic is a major component of solid waste stream on the planet in order to make concrete industry sustainable the use of waste material is the best alternative of natural resource it can be found in many forms such as windows, bulb glass and plastic bottle etc. It present a small proportion of glass and plastic has been recycled and reused. The use of glass and plastic is increasing day-by-day. Although the steps are taken to reduce its consumption. Glass is 100% recycle material with high performance and unique aesthetic properties which may its suitable for wide spread uses. The management and recycle plastic waste is rapidly growing as it is a viable resource for Aggregate replaced by waste glass and plastic as 5%, 10%, 15%, 20% variation of M₃₀ grade concrete. The concrete cubes tested for compression at 3days, 7days, and 28days. Split tensile strength of concrete for 3days, 7days, and 28days and flexural strength of concrete for 28days the test results shows that replacement of 5% by weight has significant effect on the compressive strength of concrete compare to conventional concrete.

Keywords - Soda-lime glass, Polyethylene-terephthalate.

I. INTRODUCTION

Concrete is the most widely used man made construction material in the world and it is second only to water as the most utilized substance in the planet in developing countries such as India, were diversified projects for industrialization in conjunction with rapid urbanization are vigorously embarked upon to improve the standard of living, the major problem is environmental pollution by the increasing generation of domestic and industrial waste. Disposal of waste has become a major problem in metropolitan areas in India, spatially the disposal of waste glass and plastic bottles generated from domestic and industries. Quantities of waste glass and plastic bottles have been on the rise in the recent years due to an increase in industrialization and the rapid improvement in the standard of living. Unfortunately, the majority of waste glass and plastic bottles and not being recycled

but rather abandoned and is therefore, the cause of certain serious problems such as waste of natural resources and environmental problems the increasing awareness of glass and plastic recycling speeds up inspection on

II. MATERIAL AND METHODOLOGY:

In order to study the effect of waste glass and plastic as partial replacement of coarse aggregate on the strength of concrete, fine aggregate, coarse aggregate of 60 cubes, 45 cylinders and 5 beams has casted in the laboratory .

The material used for the experimental work is :-

- Cement
- Fine aggregate
- Coarse aggregate
- Water
- Replace aggregate (Soda-lime glass Polyethylene terephthalate 0%, 5%,10%, 15%,20%)

A. Experimental Work

The method of mix design is followed from IS10262-2009 of M₃₀ grade concrete .trail mixes where carried out for both fresh and hardened properties optimum mix finalised was with 5%,10%,15%,20% of soda lime glass and polyethylene terephthalate replacement for coarse aggregate were used separately in different trail mixes. Based on fresh properties of concrete like workability and slump in accordance with IS10262-2009 guide lines were found with different percentages has obtained it observe that increase in percentage reduces the slump and reduces the strength of the concrete

S.no	Material	Quantities (kg/m ³)
1	Cement	441
2	Fine aggregate	748.8
3	Coarse aggregate	1057.59
4	Soda lime glass	Depends upon % of replacement
5	Polyethylene terephthalate	Depends upon % of replacement
6	water	220.48

Fresh Concrete Properties

The slump cone test is conducted to know the different properties of concrete

S.no	Type of mix	Slump cone test (mm)
1	Normal mix	88
2	Variation- 1	84
3	Variation -2	81
4	Variation-3	82
5	Variation-4	80

III. METHODOLOGY

In the present work, experimental investigation was carried out to know how effectively we can replace cement from concrete. A brief description of the methodology followed in the present investigation is discussed below.

The first phase involved collection and studying the physical properties of cement fine aggregate coarse aggregate soda-lime glass and polyethylene terephthalate. Coarse aggregate passing 10mm as sieve and retained on IS 12.5mm sieve was considered for experimental program

IV. CONCLUSIONS

By testing the sample of normal mix, variation 1, variation 2 variation 3, variation 4. It is concluded that variation 1 is attaining more strength when compared to other variations.

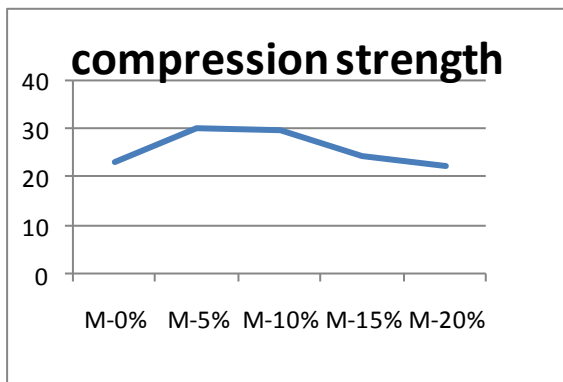
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slumpcone test



Compression Strength (N/Mm²) For 28 Days:-



Tensile Strength (N/Mm²) For 28 Days:-

