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Transparent Concrete using Thermo-Plastic Elastomer

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ABSTRACT

Transparent concrete is the new type of concrete introduced in todays world which carries special property of light transmitting due to presence of Optical Fibres. Which is also known as translucent concrete or light transmitting concrete, it is achieved by replacing coarse aggregates with transparent alternate materials (Optical Fibres).This project aims to use maximum sunlight as much as possible. Also to reduced the construction cost by replacing optical fibre with Thermoplastic Elastomer. Also increasing compress The main purpose of using transparent concrete is to utilize sunlight as a light source following to result in saving or reducing power consomption for the same purpose, is Can also be used for architectural purpose for new designs and attractive partition Wall. The Paper confines with the need of transparent concrete at present to utilize the sunlight and for architecture technologies. The new type of concrete Can satisfy the green energy saving with its own Natural property.

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I. INTRODUCTION

"Light Transmitting concrete also knows as translucent concrete". It is the brightest building material development in recent years. It is one of the newest, most functional and revolutionary element in green construction material. In this paper the manufacturing uses and future scope of transparent concrete is widely given. However, this innovative new material, while still partially in the development stages, is beginning to be used in a variety of applications in architecture, and promises vast opportunities in the future. We had replaced optical fiber with Thermo-plastic Elastomers as this material is more economical than that of optical fiber. Thermoplastic elastomers (TPE), sometimes referred to as thermoplastic rubbers, are a class of copolymers or a physical mix of polymers (usually a plastic and a rubber) which consist of materials with both thermoplastic and elastomeric properties. While most elastomers are thermosets, thermoplastics are in contrast relatively easy to use in manufacturing, for example, by injection molding. Thermoplastic elastomers show advantages typical of both rubbery materials and plastic materials. The benefit of using thermoplastic elastomers is the ability to stretch to moderate elongations and return to its near original shape creating a longer life and better physical range than other materials. Even we had replaced cement with fly ash. fly ash obtained from Dadri thermal power plant, India with a specific gravity of 2.13 was used. The mean particle diameter of fly ash is 12 micron.

II. PROCEDURE OF CASTING CONCRETE

Concrete design mix of different grades was prepared by Trial & Error Method and the mixing of ingredients cement, fine aggregate, coarse aggregate and optical fiber was done as per the design.

- Preparation of mould
- Cutting thermo-plastic elastomers
- Fixing the Fibers in mould
- Concreting
- Removing the mould Cutting and Polishing

III. METHODOLOGY OF PROJECT

3.1Making of Mould

- Size of Mould 150*150*150 mm.
- The holes are created in mould to place the Thermo-plastic Elastomers

Casting Of Concrete (7% thermo-plastic elastomers, & replacement of cement by 5% to 30% fly ash):

- Before placing thermo-plastic elastomers the mould is firstly oiled from inside.
- Then the thermo-plastic elastomers are placed through the hole as per design such that they are parallel to each other.
- As per design the concrete is mixed.
- Then the mixed concrete is poured into prepared mould carefully.
- After pouring concrete into mould, poured mould is placed on the table vibrator for compaction of concrete.

3 Testing of Blocks

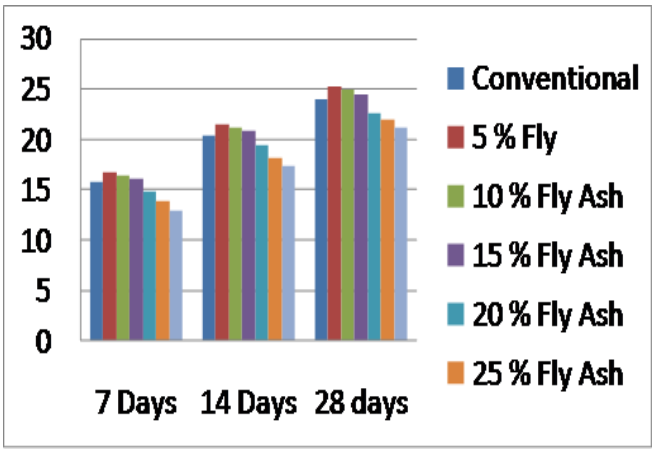
Compression test is taken for every block for 7 days, 14 days, 28 days.

Testing of Blocks

Development of Cracks

IV. EXPERIMENTAL ANALYSIS

Compression Strngth result of Conventional conctete and Fly ash



By studying overall graph of conventional concrete with adding of fly ash we found highest strength for replacing cement with 5 % fly ash, 10 % fly ash and 15 % fly ash. After replacing more than 15 % of fly ash strength goes on slightly decreasing. The above graph shows that adding of 20 % of fly ash gives lesser strength than that of conventional concrete.

To get more economically and by strength 10 % to 15 % of fly ash can be replaced.

V. COMPRESSION STRNGTH RESULT OF CONVENTIONAL CONCRETE AND FLY ASH

REPLACEMENT OF FLY ASH BY %	STRENGTH IN KN		
	7 DAYS	14 DAYS	28 DAYS
CONVENTIONAL	15.84	20.40	24.00
5% FLY ASH	16.69	21.50	25.30
10% FLY ASH	16.44	21.18	24.92

15% FLY ASH	16.13	20.78	24.42
20% FLY ASH	15.87	20.44	24.05
25% FLY ASH	15.51	19.97	23.50
30% FLY ASH	14.61	18.82	22.15

VI. CONCLUSION

- The compressive strength is decreasing after replacing 20% of cement with fly ash.
- Fly ash gives effective strength and economy till replacing 15 % of cement with fly ash
- The translucent concrete has good light guiding property and the ratio of optical fiber volume to concrete is proportion to transmission.
- The translucent concrete not loses the strength parameter when compared to regular concrete and also it has very vital property for the aesthetical point of view.
- It can be used for the best architectural appearance of the building. Also used where the light cannot reach with appropriate intensity.
- This new kind of building material can integrate the concept of green energy saving with the usage self-sensing properties of functional materials.

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