

TRANSPARENT CONCRETE AS A GREEN MATERIAL FOR BUILDING

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ABSTRACT: *In this paper represents transparent concrete as the smart and green building material with increased strength good aesthetic appearance and also having the light transmitting property. Light Transmitting concrete, also known 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. The function of this invention is to change the traditional image of concrete and add a modern architectural touch. While its main purpose is to use sunlight as a source of light in order to reduce lighting energy consumption, LTC can be used for a diverse range of applications, including floors, pavements, load-bearing walls, furniture, facades, interior wall cladding, dividing walls, and partition walls. There are two basic materials that are used to produce LTC: concrete and light-transmitting material. Fine concrete consists of cement, fine aggregate, small chips and water, while plastic optical fiber is added to create LTC. . In LTC, the optical fibre occupies 1% and 2% of the concrete's volume. The distance between the rows of fibers is 5 mm.*

1. INTRODUCTION

In order to reduce the energy consumption by structures and also the upcoming building construction in future. Many researchers and scientists were attracted towards the development of new construction material which will consume very less amount of energy. Transparent concrete is the concrete is one such new developed material. Concrete is the basic thing or material required for all types of construction. This type of transparent concrete is an innovative concrete it has the ability to letting light pass through it. This innovative concrete is made transparent by reinforcing the optical plastic fibres in it. This is because of optical plastic fibers can transmit sunlight without any light, heat or any other photochemical reaction. In this optical plastic fiber can transmit the light from one end of the fiber to another.

2. OBJECTIVE

- To cast a special type of concrete with light transmitting properties .
- To study their light emitting characteristics and to develop a functioning material which is not only energy saving but gives out artistic finish.
- It has very good architectural properties for giving good aesthetical view to the building.
- Energy saving can be done by using translucent concrete in the building.
- Thus this project aims in making concrete, attractive energy efficient and eco friendly green building material.

3. MATERIALS

- **OPTICAL FIBER:** Flexible transparent fibre made up of glass or plastic material and transmitting light between two ends. The thickness of the fibre is 0.75mm.
- **CEMENT:** In this project we used portland cement of 53 grade
- **FINE AGGREGATE:** Normal concreting sands are suitable for litracon
- **COARSE AGGREGATE:** Coarse aggregate having a size of 10mm were used. Specific gravity is 2.14 with its impact strength of 13.3%
- **WATER:** Ordinary drinking water can be used for making the concrete.

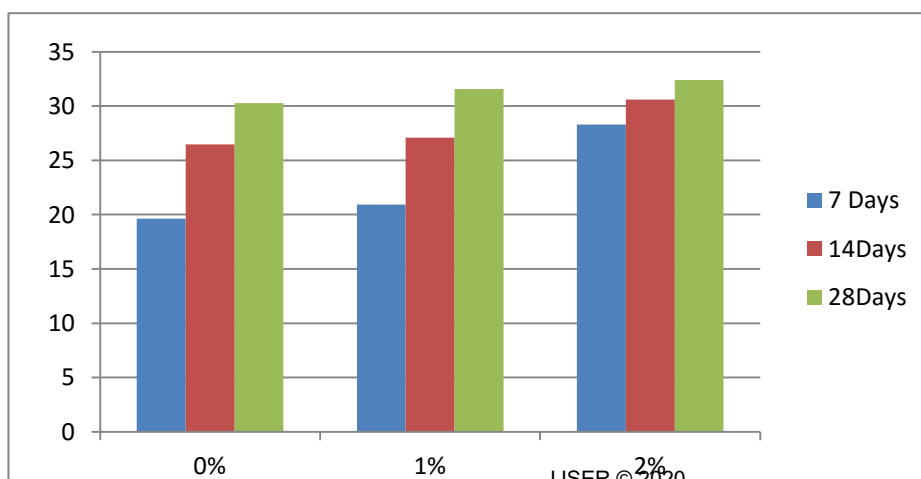


4. MANUFACTURING OF LTC

Seven cubes of size 15cmx15cmx15cm were made. One of the cube used for as the conventional concrete and others are used for transparent concrete. The optical plastic fibers are adding with different percentage in the concrete specimens like cubes. The optical fibers in transparent concrete were distributed in vertical direction equally at a distance of 5cm. they constituted as 1% and 2% of total volume of the concrete cubes. For transparent concrete Cube, iron mould with wooden base of size 15cmx15cmx15cm were prepared each cubes contains the holes for taking the optical fibers in vertical direction. Before filling these cubes with concrete they were coated with oil, so that, the concrete cubes would not adhere to the moulds. The compressive strength of the cubes was found out using Universal Testing Machine.



POF (%)	Compression strength (N/mm ²)		
	7 Days	14 Days	28 Days
0	19.62	26.48	30.28
1	20.92	27.10	31.56
2	28.30	30.60	32.40

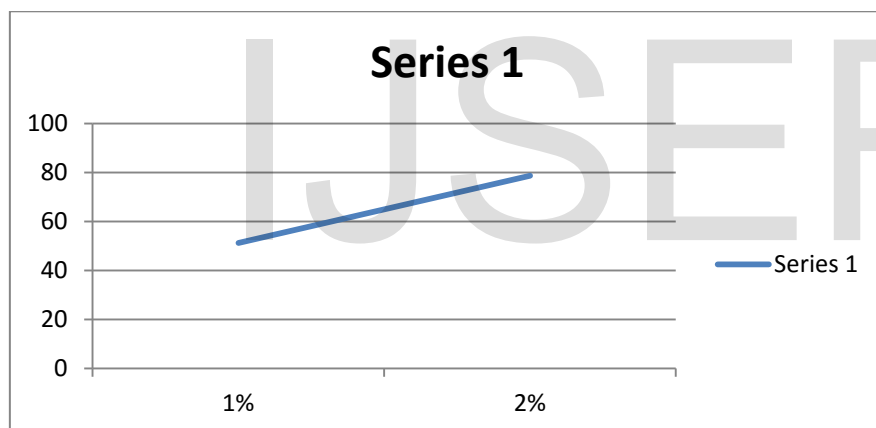


LIGHT TRANSMITTING TEST

MATERIALS USED:

- Sensor box
- 40W lamp
- Light detecting resistor(LDR)
- 10V battery
- 100 ohm resistor
- Amplifier
- Light transmitting concrete(LTC)

POF (%)	Amount of light passing through (lux)
1%	51.25
2%	78.67



6. CONCLUSION

This study investigates the compressive behaviour of LTC. The properties of POF used are also investigated. The maximum amount of light passing through the cubes was 78.67 LUX using fibres of 0.75mm diameter spaces 5mm apart for a percentage of 2% of fibres. Translucent concrete is one of the most interesting new takes on the historically stiff and uninspiring building material. The possibilities of transparent concrete are innumerable; the more it is used, the more new uses will be discovered. As with any new material, it is expensive and still has some issues to be resolved. In the few years, as engineers further explore these exciting new materials, it is sure to be employed in a variety of interesting ways that will change the opacity of architecture. The average value of transmission of light through the light transmitting concrete (LTC) blocks will minimise the daily electricity consumption needed for the lighting inside building.

7. REFERENCES

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