

# EXPERIMENTAL STUDY ON LIGHT TRANSLUCENT CONCRETE

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**ABSTRACT** : Concrete is historically a solid, giant constructing material. It wishes to makeover. Small homes are changed through excessive upward thrust homes and skyscraper. This arises one of the important Problem in deriving herbal mild in constructing, because of obstruction of close by structures. To triumph over this problem, synthetic resets are used to light up constructing, however synthetic mild boom of warmth stage within side the homes. To examine the effectiveness of the clever obvious concrete, the prevailing observe pursuits at generating the concrete specimens through combining glass rods and optical fibers with special percent and evaluating it with the everyday concrete. Two assessments are finished compressive take a look at and mild transmission take a look at and price comparisons also are done. Key Words- Glass Rods, Lax, Optical fiber, Transparent Concrete.

## I. INTRODUCTION

Concrete is a composite fabric composed of coarse granular fabric (the combination or filler) embedded in a tough matrix of fabric (the cement or binder) that fills the gap among the combination debris and glues them together. We also can don't forget concrete as a composite fabric that is composed basically of a binding medium inside which might be embedded debris or fragments of aggregates. The handiest illustration of concrete is Concrete= Filler + Binder. According to the kind of binder used, there are numerous distinct types of concrete. For instance, Portland cementconcrete, asphalt concrete, and epoxy concrete. In concrete construction, the Portland cement concrete is applied the most. The strength, sturdiness and different traits of concrete depend on the homes of its ingredients, on the percentage of mix, the technique of compaction and different controls for the duration of placing, compaction and curing. The advances in concrete era have paved the manner to make the great use of regionally to be had substances via way of means of sensible proportioning and

right workmanship with a view to produce the concrete for pleasurable the carry out 1.2.1 Properties of fresh concrete

1. Workability: The ease with which concrete can be compacted fully without segregation and bleeding and depends on the quantity of water, grading of aggregates and percentage of fine materials in the mix. 2. Segregation: It is the separation of coarse particles for the mix, which results in non-homogeneity of the concrete mix 3. Bleeding: The appearance of water along with cement particles on the surface of freshly laid concrete after compaction and finishing. 4. Consistency: It is an indication of workability of the concrete which describes how stiff and soft enough construction works. 5. Mobility: It is that property by which the concrete can flow very easily into the formwork around the steel and creating strong bonding between the constitutions of concrete. 6. Compatibility: It is that property of concrete by virtue of which are the concrete can be compacted very easily.

### 1.2.2 Properties of Hardened Concrete

1. Strength: The concrete should be strong enough to withstand its own weight and all other stresses imposed on it with required factor of safety.

2. Durability: It is that property of concrete by virtue of which it is capable of resisting its own disintegration and decay which may be caused due to use of unsound cement, less durable aggregates, improper compaction, change in temperature etc. 3. Creep of Concrete: Sometimes stress in concrete cause gradual increase in strain with time. This continuous deformation due to stress in the concrete is known as creep of concrete. 4. Impermeability: It is that property of concrete by virtue of which the concrete offers resistance to the flow of water into it. It increases the durability of the concrete. 5. Shrinkage of Concrete: This may cause due to the losses of moisture by the evaporation. This may also cause due to increase In cement and water ratio. 1.3 Light Translucent Concrete The present day

creation cloth is mild transmitting concrete. It is likewise referred to as translucent concrete. Light translucent concrete is a unique kind of concrete that lets in mild to byskip thru it. Strength of this concrete is sort of identical as of traditional concrete. It can transmit mild thru partitions up to 20 meters thick, because the glass works with none lack of mild up to 20 meters. It is popularly utilized in inexperienced homes to store electricity. In today's advanced global power intake may be very excessive. The brightness of indoor surroundings is absolutely maintained via way of means of synthetic lighting, which has fed on a big quantity of resources. Translucent concrete is available in as a blessing answer for less difficult day lighting. Translucent concrete objectives at decreasing the running power via way of means of exploiting sizable quantity of power withinside the shape of sunlight. Translucent concrete is a concrete primarily based totally constructing cloth having mild transmissive belongings. Light transmissive belongings is specifically because of uniform diribution of excessive numerical optical fibers all through its body. ` 1.3.1 Translucent Concrete Translucent Concrete is a mixture of fiber optics or glass rods and concrete. It may be produced as prefabricated constructing blocks and panels. Due to the small length of the fibers, they combination into concrete turning into a issue of the cloth like small portions of aggregate. Because in their parallel function of fiber, the mild-data at the brighter aspect of a wall seems unchanged at the darker aspect. The sharp show of shadows will fall at the opposing aspect of the wall. Moreover, the colour of the mild additionally stays the same. Thousands of optical fibers shape a matrix and run parallel to every different among the 2 essential surfaces of every block. These fibers mingle withinside the concrete due to their insignificant length, and that they emerge as a structural issue as a form of modest aggregate. Therefore, the floor of the blocks stays homogeneous concrete. Translucent concrete is utilized in best structure as a facade cloth and for cladding of indoors walls. Light-transmitting concrete has additionally been implemented to numerous layout products. When a stable wall is imbued with the cappotential to transmit mild, it way that a domestic can use fewer lighting of their residence at some stage in daytime so it's miles strength saving. With the monetary boom and technological know-how and era development, many huge-scale civil engineering systems inclusive of tall homes, underground homes and landmark homes and so forth are constructed across the world. Those homes are primarily based totally on synthetic lightings. Most of the huge homes are constructed near every different, like sky scrapers. When many homes are stacked near every different, there isn't always an awful lot herbal daylight passing via and the

significance of herbal daylight is properly known. Translucent concrete is available in as a blessing answer for less complicated day lighting. By arranging many optical fibers into concrete, it transmit mild so efficiently that there may be certainly no lack of mild performed via the fibers. The optical fibers have right mild guiding belongings and sensing advantages, inclusive of small dimensions, dispensed dimension and anti- corrosion characteristics, optical fibers were extensively followed withinside the communicate and sensing fields. 1.3.2 Need of Light Translucent Concrete This concrete could be very critical for sustainable improvement and inexperienced constructing factor of view, because it permits, use of herbal mild greater effectively with out compromising a good deal on power parameter. For inexperienced homes, consistent with IGBC (Indian Green Building Council), 50% of day mild is obligatory which bills for three credit in a inexperienced constructing. Light translucent concrete can also

additionally permit enough mild withinside the constructing, thereby making it simpler to attain better score for homes. Due to boom in land cost, requirement of extended usable space, engineers are being forced to move for excessive upward push homes and skyscrapers. In those structures, people's optical pastime necessities are met with the assist of synthetic reasserts of strength only. Complete dependence on synthetic reasserts has negative effect on our surroundings and fitness of people. As the manufacturing of synthetic reasserts of strength, pollutes our surroundings through liberating dangerous through merchandise into the surroundings. Light translucent concrete is a unique kind of concrete that permits mild to byskip thru it. It is made from cement, sand, coarse combination and optical fibers, positioned in change layers. Light translucent concrete permits herbal daylight or any seen mild to byskip thru it, thus, growing the mild content material withinside the constructing to decorate people's optical pastime. Passing of mild thru optical fiber is primarily based totally at the precept of overall inner mirrored image of mild within side the center of the plastic optical fiber. When mild falls on one stop of the optical fiber, it receives definitely internally meditated withinside the fiber and receives transmitted to the alternative stop of fiber. Very restrained studies has been executed on numerous residences of mild translucent concrete concerning its suitability as production material. The important goal of this experimental application is to look at its mild translucent and power traits through various the spacing among glass rods and urban grade which can also additionally produce unique results on performance.

## II.OBJECTIVE

1. To Study the compressive strength of Light Translucent Concrete specimens for 7, 28 days of curing.
2. To Study the workability requirement of light translucent concrete cubes.
3. To compare strength characteristics of Light Translucent Concrete and comparing with Normal conventional Concrete.
4. To obtain percentage of Light transmission of Translucent Concrete for different spacing's (2.5cm, 3.0cm, 3.75cm).
5. To obtain the optimum spacing size (geometry) with high light transmission and optimum strength.
6. To compare light transmittance property of transluce



**Fig-Cube Casting**

## III.SCOPE OF THE STUDY

1. The work can be carried out with different light transmitting materials.
2. The use of fly ash, GGBS in LTC can be done to achieve high strength with good workability.
3. The light transmittance concrete mould with different spacing's can be fabricated and used.
4. The LTC panels, beams can also be fabricated.

## IV.METHODOLOGY

Based on objectives of present study, following methodology has been set for present project 1. Mix design of M 20 grade concrete as per IS 10262:2009 code. 2.IS 456:2000 Plain and Reinforced concrete code of practice. Methodology Process: Compressive Strength

### Material Selection

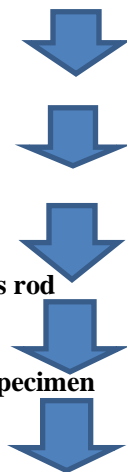
### Basic test of material

### Preparation of mould

### Placing of mix and glass rod

### Casting and curing of specimen

### Test on specimen



**Fig-Compressive strength test**

## V. RESULT AND DISCUSSION

In this project we have conducted following test are follow.

- 1 .**Slump cone test:** - It states in the procedure that when the cone is removed, it should be lifted up vertically, without any rotational movement at all. The concrete slump test is known as "Standard Test Method.

Trials	Slump (cm)
1	20
2	25
3	20
4	25
5	30
6	35

**Table No: 5.1 Slump cone test readings**

Discussions - Slump will reduced with increase in spacing for higher spacing water reducing admixture must be used for maintain proper slump

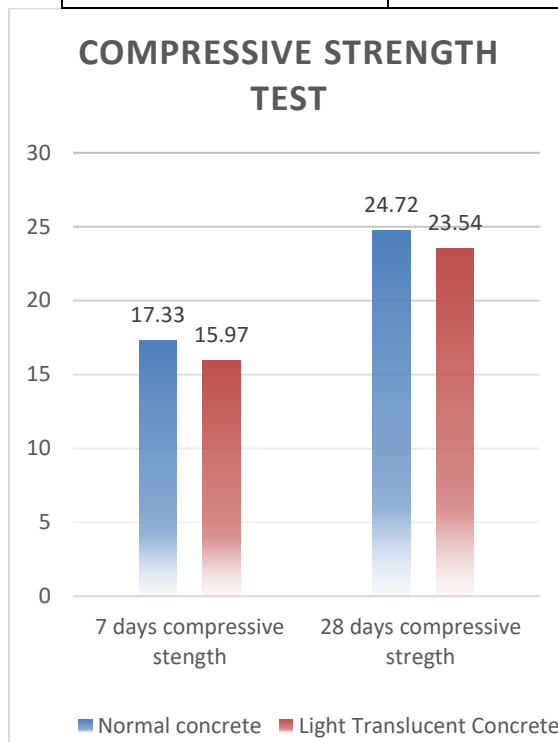
**2. Compaction factor test:** Compaction factor test is the workability test for concrete conducted in laboratory. The compaction factor is the ratio of weights of partially compacted to fully compacted concrete. It was developed by Road Research Laboratory in United Kingdom and is used to determine the workability of concrete. T

**3. Compressive strength test:** Cubes specimens of dimensions 150mm x 150mm x 150mm mm were casted for M20 grade of concrete. After curing, these cubes were tested on Compression Testing machine as per I.S. 516-1959. The failure load was noted. In each category two cubes were tested and their average value is reported.

**4. Compressive strength of LTC cubes** were tested for 7- and 28-days curing period. The strength of LTC cubes are compared with normal conventional concrete as shown in below table. Table No 3:Compressive strength test

	Failure load(KN)		Area (mm <sup>2</sup> )	Average Compressive strength (N/mm <sup>2</sup> )	
	7 Days	28 Days		7 Days	28 Days
NCC	630	555	22500	17.33	24.72
LTC	390	490	22500	15.97	23.54

Trials	Compaction factor
1	0.65
2	0.70
3	0.80
4	0.82
5	0.75
6	0.84



## VI. CONCLUSION

1. The compressive strength of LTC with spacing (3cm) (16 holes) found comparatively higher
2. The compressive strength of light transmittance concrete with spacing (3cm) should almost equal strength with that of NCC.
3. The optimum spacing's with high strength and light transmittance was found to be 3 cm (i.e 16 holes).

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