

Strength of Translucent Concrete

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Abstract— Since from Roman times concrete is main material for construction and infrastructures but its combinations are differencing day to day, at present situations many types of concretes are funded out by number of researchers. Now I like to give a brief description regarding the TRANSPARENT CONCRETE. It is a combination of fibre-optics and fine concrete. Mainly transparent concrete consists of only fine aggregate. Materials used in transparent concrete are sand, water, cement and optical fibres. Transparent concrete is also known as translucent concrete or light transmitting concrete. Replacement of translucent concrete in construction results in art design. Transparent fibre has a nature of fire resistance. Transparent concrete blocks are suitable for pavements, floors and load-bearing walls. Mainly partition walls, where sunlight is more available. Present our research work carried to find the transparent percentage compared to strength.

Key words: Concrete, Fibres, Load Bearing, Partition, Roman, Strength, Transparent, Translucent

I. INTRODUCTION

Making a concrete in present world is not a big deal, while utilization of concrete is changing day to day, hence the generation new type with modern features are required. Concrete is a solid medium which doesn't pass light through it is old scenario but present we are observing a concrete can also pass light through it by adding some other materials for it including the traditional materials.

A. Strength of Light Transmitting

Light emitting of a concrete sample has different from material to material, for the experimental analysis we are here tried Optical fibres, Glass and Plastic fibres. Strength of concrete is varying in each case, it also varying by the quantity of material using.

B. Strength of Concrete

Generally concrete strength varies with material combination and curing time; present case has extra case like transmitting medium. Strength of the concrete vary with the type of transmitting mediums shear with concrete

II. EXPERIMENTAL INVESTIGATION

A. Material Properties

- Cement: Ordinary Portland Cement 53grade
- Fine Aggregate: Maximum size 2.45mm
- Course Aggregate: Maximum size 7.5mm
- Super Plasticizer: Polycarboxylic ether
- Curing: Water bath curing at 27oc
- Translucent members: Ordinary soda Glass, Optical fibre glass, Plastic fibres (decorating fibres) and Plastic.
- Water: Clean drinking water is used for mixing and curing



Fig. 1: a. Optical fibre glass, b. Plastic fibres (decorating fibres)

B. Trail Mix Design

In the mix, maximum size of the course aggregate is considered as 7.5mm due to easy workable for all types of concretes for filling small gaps producing by fibres.

To obtain strength variation of different translucent members we consider same mix for all.

Final Mix: 1:1:2

Water/cement: 0.36

III. PROPERTIES OF CONCRETE

A. Fresh Concrete

Workability tests like slump and Vee-Bee consistometer test is conducted to find the workability and water content required also quantity of super plasticizer. By addition of super plasticizer workability and also strength increases.



Fig. 2: a. Placing of plastic fibres in the mould b. Concreting to fibres in mould

B. Mechanical Properties of Harder Concrete

For the comparison of different translucent concretes here we considered only Compression test is conducted to find compressive strength. Cubes of 7.06x7.06x7.06 cm³ are taken for compression test after 14 and 28 days curing.



Fig. 3: testing the plastic fibre translucent concrete cube in CTM



Fig. 4: failure of cube at maximum compression load



Fig. 5: testing of glass translucent cube



Fig. 6: Casting Cube of plastic as translucent medium

IV. RESULTS AND DISCUSSIONS

Compressive strength of concrete for 14 and 28 days curing:

- 1) Compressive strength of translucent concrete made by glass as translucent medium

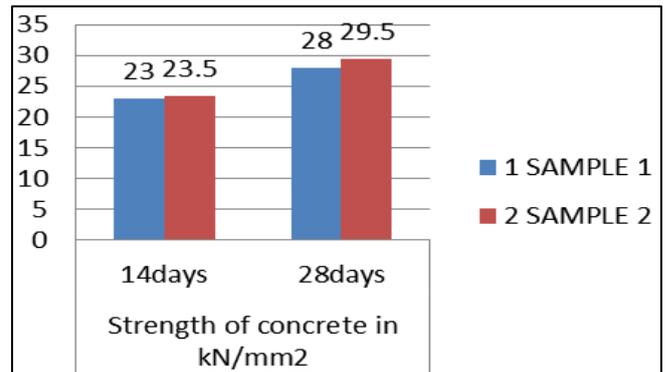


Fig. 7: Strength of Glass Translucent concrete at 14 and 28 days curing

- 2) Compressive strength of translucent concrete made by optical fibre glass as translucent medium

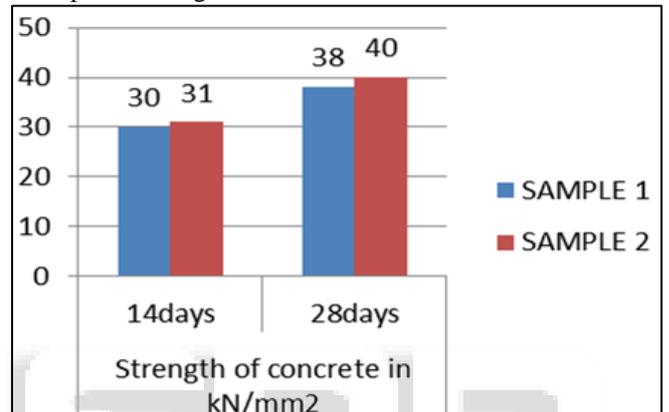


Fig. 8: Strength of optical fibre glass translucent concrete at 14 and 28 days curing

- 3) Compressive strength of translucent concrete made by Plastic fibres as translucent medium

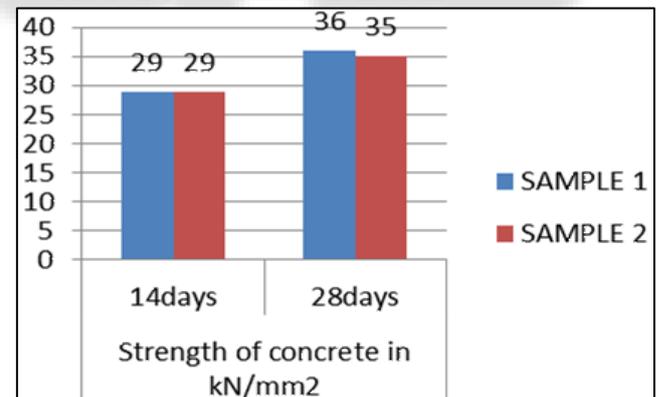


Fig. 9: Strength of Plastic fibres translucent concrete at 14 and 28 days curing

- 4) Compressive strength of translucent concrete made by Plastic strips as translucent medium

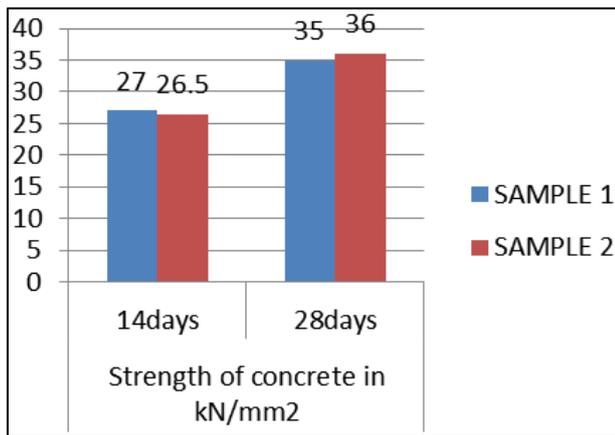


Fig. 10: Strength of Plastic strips translucent concrete at 14 and 28 days curing

5) Comparison all the four translucent concretes

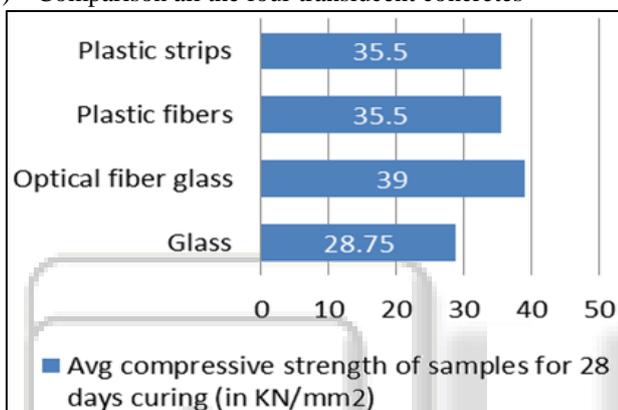


Fig. 11: Strength of four translucent concretes with average compressive strength of samples at 28 days curing

V. CONCLUSION

- In this experiment we observed that Strength of Optical fiber glass Translucent concrete is height than others.
- Strength of Plastic fibres and Plastic strips strengths most equal.
- Strength of Glass translucent concrete shows lesser strength which can be formed due the width of plates provided is looking as too high, so need to take small widths as possible is observed.
- Translucent medium considering is free from dust and bends.
- Economical criterion plastic is adoptable. In the case of high translucent glass medium needed.

REFERENCES

[1] B R Harika & Ajay Kumar Reddy "Low Cost Translucent Concrete" IJMTMR Issn: 2348-4845.
 [2] NEHA R. NAGDIVE & SHEKAR D. Bhole "To evaluate properties of translucent concrete / mortar & their panels"
 [3] Allen E and Iano J (2009), "Concrete Construction", Fundamentals of Building Construction: Materials and Methods, Fifth Edition, Hoboken, New Jersey, John Wiley & Sons Inc. , Ch. 13, pp. 515-551.

[4] How to see through walls: Transparent concrete is encouraging architects to rethink how they design buildings. The Economist. Sept. 20, 2001. Available:
 [5] <http://www.economist.com/node/779421>.
 [6] Jeff Hecht, Understanding Fiber Optics, 4th ed., Prentice-Hall, Upper Saddle River, NJ, USA 2002.
 [7] (ISBN 0-13-027828-9). National Instruments' Developer Zone, Light collection and propagation, <http://zone.ni.com/devzone/cda/ph/p/id/129#toc2>. Retrieved 2007-03-19.
 [8] http://www.materialproject.org/wiki/Translucent_concr_etc.
 [9] ACI committee 211, 1991, BS EN:480-1, 2006.
 [10] IS: 516-1959, IS: 3535 1st REVISION.