

A Study on Compressive Strength of Concrete

1. Aniket Choure
2. Nivedita Dehariya
3. Akanksha Kushram

Abstract – Concrete is a Composite Construction material made Primarily of aggregate, Cement and water fresh concrete. Must have certain features. These are durability, in this study we are talking you about compressive strength of concrete by 150mm and 100mm cube.

Keywords - Aggregates, cement, water, CTM machine, load 140kg/cm²

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I. Introduction and Concept

Compressive strength is the ability of material or structure to carry the loads on its surface without any crack or deflection a material compression tends to reduce the size while in tension size elongates. Compressive strength of Concrete can be defined as the ability of material or structure to carry the loads on it without any crack or deflection. A material under compressive load tends to reduce the size, while in tension, size elongates. The American Society for Testing Materials of construction ASTM C39/C39M provides Standard Test Method for Compressive Strength of cube and Cylindrical Concrete Specimens.

II. Methods

1. Remove specimen from water after curing.
2. Clean the bearing surface of the testing machine.
3. Place the specimen in the machine.
4. Align the specimen centrally on the base plate of the machine.
5. Rotate the movable portion gently by hand so that it touches the top surface of the specimen.
6. Apply the load gradually without shock and continuously at the rate of 140kg/cm/minute till the specimen fails.
7. Record the maximum load and note any unusual features in the type of failure.



This concrete is filled in the mould and tempered properly so as to minimize any air voids available in concrete.

After 24 hours these moulds are opened and test specimens are soaked in water for curing.

The upper surface of these specimen should be made even and smooth. This is done by spreading cement paste on the whole area of the specimen. ■■■■



These cubes are tested by a compression testing machine after 7 days curing or 28 days curing. The Load on the cube should be applied gradually at the rate of 140 kg/cm² per minute till the specimen fails. Load at the failure of a cube divided by area of specimen gives the compressive strength of concrete.

Compressive Strength of Different Grade of Concrete

The following table shows the compressive strength of various concrete grades at different ages.

Grade of Concrete	1 Day (16%)	3 Day (30%)	7 Day (65%)	14 Day (90%)	28 Day (28%)
M 15					
M 20					
M 25					
M 40					
M 45					

Cube Strength of Concrete Compressive strength of concrete can be defined as the ability of material or structure to carry the loads on it without any crack or deflection. A material under compressive load tends to reduce the size, while in tension, size elongates. It is also known as the Cube test of Concrete in the field.

Calculation

Compressive Strength = Load at failure / Cross-sectional Area of element

cube size = 15cm X 15cm X 15cm

Or
10cm X 10cm X 10cm

Area of the specimen = 225 cm²

Characteristic concrete strength 7 days =

Characteristic concrete strength 28 days =

Compressive strength = -----N/mm²

III. Results & Discussion :-

Average Compressive strength of the Concrete cube = -----N/mm² {at 7 days}

Average Compressive strength of the Concrete cube = -----N/mm² {at 28 days}

Advantages

It possesses high compressive strength to withstand a huge amount of load. It has less corrosive and weathering effects due to the environment. The green concrete can be easily handled, remolded or formed into any shape or size. It is durable and fire-resistant and comparatively required little maintenance.

Disadvantage

It has low tensile strength and hence cracks are developed. Fresh concrete shrinks on drying and harden concrete expand on drying. It may cause an efflorescence effect. It has a lack of ductility and may crack suddenly after jerk. It require proper curing till hydration to get required amount of strength.

IV. Conclusion

The conclusion however is that Corn cob ash produced at a regulated and controlled temperature have played an important role in achieving improvement in percentage replacement of OPC in concrete mix of 1:2:4. Based on the 28 days compressive strength results of 18.44N/mm², the designed mix of 30% CCA replacement of OPC in uncompacted 1:2:4 concrete mix would be useful in mass concrete work and other light weight reinforced concrete works.

Acknowledgement

If you get the failure result of a concrete cube test, no need to worry about it! There is a way to find out if the cube really failed or not. Sometimes we may implement the cube test wrongly, or the cube was cast with more slurry; it is called human error.

We are going to discuss the criteria mentioned in the IS code to accept or neglect the concrete cube test results. Before getting into the discussion, you must read the Method of concrete Tests.

Reference

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