

9.DETERMINATION OF FLEXURAL STRENGTH OF CONCRETE.

(IS : 516 – 1959)

Object: Determination of the flexural strength of concrete specimen.

Apparatus:

- a) Standard moulds of size 15 X 15 X 70 cms for preparing the specimen.
- b) Tamping bar.
- c) Testing Machine.

Procedure:

Test specimens stored in water at a temperature of 25⁰C to 30⁰C for 48 hours before testing shall be tested immediately on removal from the water, whilst they are still in a wet condition. The dimensions of each specimen shall be noted before testing. No preparation of the surface is required.

Placing the specimen in the testing machine: The bearing surfaces of the supporting and loading rollers shall be wiped clean, and any loose sand or other material removed from the surfaces of the specimen where they are to make contact with the rollers. The specimen shall then be placed in the machine in such a manner that the load shall be applied to the upper most surface as cast in the mould, along two lines spaced 20 or 13.30 cms apart. The axis of the specimen shall be carefully aligned with the axis of the loading device. No packing shall be used between the bearing surface of the specimen and the rollers. The load shall be applied with shock and increasing continuously at a rate such that the extreme fiber stress increases at approximately 7 kgs/cm²/mm for the 10 cm specimens, the load shall be increased until the specimen falls, and the maximum load applied to the specimen during the test shall be recorded. The appearance of the fractured faces of the concrete and any unusual features in the type of failure shall be noted.

Calculation:

The flexural strength of the specimen shall be expressed as the modulus of rupture 'fb' which if 'a' equals the distance between the line of fracture and the nearer support measured on the centerline of the tensile side of the specimen, in cm, shall be calculated to the nearest 0.5 kg/cm² as follows.

$$fb = (p \times l) / (b \times d^2)$$

When 'a' is greater than 20.0 cm . for 15.0 cm specimen or greater than 13.30 cm for a 10.0 cm specimen, or

$$fb = (3p \times a) / (b \times d^2)$$

When 'a' is less than 20.0 cms. but greater than 17.0 cms for 15.00 cms specimen, or less than 13.30 cms but greater than 11.0 cms for a 10.0 cms specimen, where b = measured width in cms of the specimen, d = measured depth in cms of the specimen at the point of failure, l = length in cm. of the span on which the specimen was supported, and p = maximum load in kg. applied to the specimen.

If 'a' is less than 17.0 cm. for a 15 cm specimen or less than 11.0 cm for a 10.0 cm specimen, the result of the test shall be discarded.