UNIT– III CONCRETE MIX DESIGN AND TESTING OF CONCRETE

B. Testing of concrete, determination of compressive strength of concrete cubes and cylinder at different ages, interpretation and co-relation of test results.

DETERMINATION OF COMPRESSIVE STRENGTH OF CUBES AND CYLINDERS

APPARATUS: Compression Testing Machine, Balance, Scale

PROCEDURE:

1. Remove the specimen from water of the curing tank at recognised date (usually 7 days and 28 days). Test the specimen immediately on removal from the water while they are still in the wet condition.

2. Wipe off the surface water and grit from the specimen and remove any projecting fins.

3. Measure the dimensions of the specimen to the nearest 0.20mm and their weight to nearest 0.10gm.

4. Wipe clean the bearing faces of the upper and lower bearing platens of the testing machine and remove any loose sand or other material from the surfaces of the specimen, which are to be in contact with the compression platens.

5. Place the test specimen on the lower bearing block of the testing machine.
□In case of cubes, the test specimen should be placed in the machine in such a manner that the load is applied to opposite sides of the cubes as cast and not to the top and bottom.

6. Carefully align the axis of the specimen with the centre of thrust of the spherically seated platens.

7. Lower the upper spherical block slowly to bear on the specimen and rotate the block gently by hand, so that uniform seating is obtained. No packing is used between the faces of the test specimen and the steel platen of the testing machine.

8. Apply the load continuously and without shock at the rate of approximately 140Kg/cm^2/minute. Do not make any adjustment in the controls of the testing machine while the specimen is yielding rapidly immediately before failure.

9. Increase the load until the specimen yields or fails and record the maximum load carried by the specimen during test in tonne and converted to N.
Observe the movement of the pointer on dial of the testing machine during loading when the pointer stops advancing consider the specimen in failure.

10. Calculate the compressive strength of the specimen by dividing the maximum load carried by the specimen during test by the cross sectional area.

11. Compute average of the compressive strength of three cubes/cylinders at each selected age.

12. Note the type of failure and the appearance of the concrete.

TYPICAL CASTING STRENGTH GAIN FOR M_{25} CONCRETE OVERTIME:

Day 1 ____ 16% __ 4MPa
Day 3 ____ 40% __ 10MPa
Day 7 ____ 65% __ 16.25MPa
Day 14 ___ 90% __ 22.5MPa
Day 28 ____ 99% __ 25MPa

Compressive Strength		*Ratio of strengths cylinder/ cube*	*Difference of strength (cube-cylinders)*
Cube MPa	*Cylinder MPa*		*MPa*
9.0	7.0	0.77	2
16.0	12.0	0.77	4
20.0	16.0	0.76	4
25.0	20.0	0.81	5
28.0	25.0	0.87	3
30.0	27.0	0.91	3
30.0	28.0	3.91	2
36.0	32.0	3.89	4
37.0	35.0	0.94	2
43.0	37.0	0.87	6
45.0	42.0	0.92	3
49.0	45.0	0.91	4
54.0	51.0	0.96	3