3.5 TYPES OF MIXES

Compressive Strength Grading and Classes

Grade of Concrete is the classification of concrete according to its compressive strength.

Indian Standards:

There are different grades of concrete are given as M10, M15, M20, M25, M30, M35 and M40.

The letter **"M"** denotes Mix design with proportion of materials like Cement: Fine Aggregate: Coarse Aggregate.

Nominal Grades

Grade of Concrete	Mix Ratio	Compressive Strength in N/mm2 or MPa
M5	1 : 5 : 10	5 MPa
M7.5	1 : 4 : 8	7.5 MPa
M10	1 : 3 : 6	10 MPa
M15	1 : 2 : 4	15 MPa
M20	1 : 1.5 : 3	20 MPa

2. Standard Grades

M25	1 : 1 : 2	25 MPa
M30	Design Mix	30 MPa
M35	Design Mix	35 MPa
M40	Design Mix	40 MPa
M45	Design Mix	45 MPa

3. High Strength Grades

M50	Design Mix	50 MPa
M55	Design Mix	55 MPa
M60	Design Mix	60 MPa
M65	Design Mix	65 MPa
M70	Design Mix	70 MPa
M80	Design Mix	80 MPa
M90	Design Mix	90 MPa
M100	Design Mix	100 MPa
M150	Design Mix	150 MPa
M200	Design Mix	200 MPa

The Numbers represent the predetermined cube strength of 15cm cube after curing of 28 days in N/mm^2.

M10 = 10N/mm^2 compressive strength after 28 days.
M15 = 15N/mm^2 compressive strength after 28 days.
M20 = 20N/mm^2 compressive strength after 28 days.

1. NOMINAL MIX

Mixes of fixed proportions, IS: 456-2000 permits nominal mixes for concretes of strength M20 or lower

Advantages of Nominal mix

In the past , the specifications for concrete prescribed the proportions of cement, fine and coarse aggregates. these mixes of fixed Cement-aggregate ratio which ensures adequate strength are termed nominal mixes. These offer simplicity and under normal circumstances, have a margin of strength above that specified. However, due to the variability of mix ingredients the nominal

2. DESIGN MIX

Designed on the basis of requirements of the concrete in fresh and hardened states. Design mix is permitted by IS 10262-1982 and IS 456:2000 for concrete of strength greater than M25 is design mix.

Advantages of Design mix

a. Properties of all materials are used.

b. Cement content is low and hence the mix design is economical.

TRIAL MIXES

Prepared to verify whether the Design Mix would perform as per the assumptions. If appreciable variation exists, the available alternatives are:

1. Directly employ the trial mix proportions at the site

2. Modify the trial mix proportions on the basis of intuition and employ the revised proportions at the site

3. Prepare further trial mixes incorporating changes in the proportions based on the feedback generated from the previous mix.