Mix Design M-50 Grade

The mix design M-50 grade (Using Admixture –Sikament) provided here is for reference purpose only. Actual site conditions vary and thus this should be adjusted as per the location and other factors.

Parameters for mix design M50

Grade Designation = M-50

Type of cement = O.P.C-43 grade

Brand of cement = Vikram (Grasim)

Admixture = Sika [Sikament 170 (H)]

Fine Aggregate = Zone-II

Sp. Gravity

Cement = 3.15

Fine Aggregate = 2.61

Coarse Aggregate (20mm) = 2.65

Coarse Aggregate (10mm) = 2.66

Minimum Cement (As per contract) =400 kg / m^3

Maximum water cement ratio (As per contract) = 0.45

Mix Calculation: -

1. Target Mean Strength = 50 + (5 X 1.65) = 58.25 Mpa

2. *Selection of water cement ratio:-*

Assume water cement ratio = 0.35

3. *Calculation of water: -*

Approximate water content for 20mm max. Size of aggregate = 180 kg /m^3 (As per Table No. 5 , IS : 10262). As plasticizer is proposed we can reduce water content by 20%.

Now water content = 180 X 0.8 = 144 kg /m^3

4. *Calculation of cement content:-*

Water cement ratio = 0.35

Water content per cum of concrete = 144 kg

Cement content = 144/0.35 = 411.4 kg / m^3

Say cement content = 412 kg / m^3 (As per contract Minimum cement content 400 kg / m^3) Hence O.K.

5. Calculation for C.A. & F.A.: [Formula's can be seen in earlier posts]-

Volume of concrete = 1 m^3

Volume of cement = 412 / (3.15 X 1000) = 0.1308 m^3

Volume of water = 144 / (1 X 1000) = 0.1440 m^3

Volume of Admixture = 4.994 / (1.145 X 1000) = 0.0043 m^3

Total weight of other materials except coarse aggregate = 0.1308 + 0.1440 +0.0043 = 0.2791 m^3

Volume of coarse and fine aggregate = 1 – 0.2791 = 0.7209 m^3

Volume of F.A. = 0.7209 X 0.33 = 0.2379 m^3 (Assuming 33% by volume of total aggregate)

Volume of C.A. = 0.7209 – 0.2379 = 0.4830 m^3

Therefore weight of F.A. = 0.2379 X 2.61 X 1000 = 620.919 kg/ m^3

Say weight of F.A. = 621 kg/ m^3

Therefore weight of C.A. = 0.4830 X 2.655 X 1000 = 1282.365 kg/ m^3

Say weight of C.A. = 1284 kg/ m^3

Considering 20 mm: 10mm = 0.55: 0.45

20mm = 706 kg .

10mm = 578 kg .

Hence Mix details per m^3

Increasing cement, water, admixture by 2.5% for this trial

Cement = 412 X 1.025 = 422 kg

Water = 144 X 1.025 = 147.6 kg

Fine aggregate = 621 kg

Coarse aggregate 20 mm = 706 kg

Coarse aggregate 10 mm = 578 kg

Admixture = 1.2 % by weight of cement = 5.064 kg.

Water: cement: F.A.: C.A. = 0.35: 1: 1.472: 3.043

Observation: -

A. Mix was cohesive and homogeneous.

B. Slump = 120 mm

C. No. of cube casted = 9 Nos.

7 days average compressive strength = 52.07 MPa.

28 days average compressive strength = 62.52 MPa which is greater than 58.25MPa

Hence the mix accepted.

We are thankful to Er Gurjeet Singh for this valuable information.