VISHNU INSTITUTE OF TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

CONCRETO (A NATIONAL LEVEL CUBE TEST COMPETITION)

Name of the Team : KARUNAKAR & TEAM

Team Size : 3

Name of the Institute : SAGI RAMAKRISHNAMRAJU ENGINEERING COLLEGE

Team Member 1

Name : KASA LAVANYA

Mobile Number : 6302723142

Registered Number : 20B91A01A3

Email id : kasalavanya046@gmail.com

Team Member 2

Name :GUNNAM JNANASRI

Mobile Number :7659049669

Registered Number :20B91A0180

Email id :jnanasrigunnam17@gmail.com

Team Member 3

Name :LINGAMSETTI KARUNAKAR

Mobile Number :7997801820

Registered Number :20B91A01D4

Email id :lingamsettikarunakark@gmail.com

Faculty Mentor

Name : M.SUNEEL

Mobile Number : Suneel.m@srkrec.ac.in

Email id : 9963401312

MIX DESIGN [As per IS: 10262-2019]

For cube Testing.

characteristic compressive strength (f_{ck}) - 30 N/mm²

Maximum size of coarse aggregate - 20mm

Degree of Workability - 125mm, slump

Type of Exposure - sever

Degree of Quality control - Good

proposed mixing of coarse aggregate

20mm - 70%.

18.5mm - 30%.

Material Data

cement used - opc 53 grade

specific gravity of fine aggregate - 2.65 } From IS 383-2016

specific gravity of coarse aggregate - 2.72 }

zone of sand - II

step-1:- Target Mean strength

$$f'_{ck} = f_{ck} + 1.65 \times S \quad (or) \quad f'_{ck} = f_{ck} + x$$

From Table-1 of IS: 10262-2019

For M30 grade; $S = 5.0 N/mm^2$

$$f'_{ck} = 30 + 1.65 \times 5$$

$$\boxed{f'_{ck} = 38.25 N/mm^2}$$

$$f'_{ck} = 30 + x$$

x - Factor based on grade of concrete as per table-1

X - 6.5 N/mm²

$f'_{ck} = 30 + X$

$f'_{ck} = 30 + 6.5$

$\boxed{f'_{ck} = 36.5 \text{ N/mm}^2}$

We taking the higher value, $f'_{ck} = 38.25 \text{ N/mm}^2$.

$\therefore \boxed{f'_{ck} = 38.25 \text{ N/mm}^2}$

Step-2:- Selection of water cement ratio

Exposure severe

IS : 456-2000 ; Table -3 & 5 Pg - 20

Maximum water cement ratio - 0.45

Minimum cement content - 320 kg/m³

Based on trial Mixes water cement ratio adopted - 0.45<0.5 {curve 3, from IS:10262-2019

Step-3:- Selection of water content

Maximum water cement - 186 kg/m³ {Table 4 of IS 10262-2019 for 20mm

Estimated water content - 186+(186x3x0.03) {Cl 5.3 of IS 10262-2019

= 202.74 kg/m³

As superplasticizer is used, the water content may be reduced.

The water content may be reduction of 20% is considered while using superplasticizer at the rate of 0.8% by weight of cement.

water content = 202.74 kg/m³

Superplasticizer reduction @ 20% = 202.74 x 0.80 = 162.192 kg/m³

Step-4:- Calculation of cement content

Minimum cement content - 320 kg/m³

Water - cement ratio - 0.45 - W/c

cement content = $\frac{162.192}{0.45}$ = 360.426 kg/m³

Required cement content = 360.426 × 1.1

= 396.468 kg/m³

water content = 162.192 kg/m³

So, water - cementitious ratio = $\frac{162.192}{396.468}$ = 0.409

≅ 0.41

Fly ash @20% of total cementitious material content

= 396.468 × 0.20

= 79.2936

≅ 79.294 kg/m³

cement (OPC) = 396.468 - 79.294

= 317.174 kg/m³

∴ 396.468 > 320 kg/m³

∴ Hence, ok

step-5:- proportion of volume of coarse aggregates and fine aggregates

Volume of coarse aggregate - 0.62 { Zone-II from IS:10262-2019 for 20mm size

For W/c as 0.5 = 0.62 m³

W/c 0.5 - 0.45 = 0.05

∴ volume of coarse aggregate is increased by 0.01

correction in volume of coarse aggregate = 0.62 + 0.01
= 0.63

Due to pumping it is reduced by 10%

correction in Aggregate = $0.63 \times 0.9 = 0.567 m^3$

volume of fine aggregate = $(1 - 0.567) = 0.433 m^3$

step-6 :- Mix calculations

a) volume of concrete = $1 m^3$

b) volume of entrapped air in wet concrete = $0.01 m^3$ {from Table-3 of IS:10262 -2019

c) volume of cement = $\frac{\text{Mass of cement}}{\text{Specific gravity of cement}} \times \frac{1}{1000}$

$= \frac{317.175}{3.15} \times \frac{1}{1000}$

$= 0.1006904 7 m^3$

d) volume of water = $\frac{\text{Mass of water}}{\text{specific gravity of water}} \times \frac{1}{1000}$

$= \frac{162.192}{1} \times \frac{1}{1000}$

$= 0.162192 m^3$

e) volume of fly ash = $\frac{\text{Mass of fly ash}}{\text{specific gravity of fly ash}} \times \frac{1}{1000}$

$= \frac{79.294}{2.2} \times \frac{1}{1000}$

$= 0.0360427 m^3$

f) Volume of admixtures (superplastizier) @0.8% by mass of cementitious material

$$= \frac{\text{Mass of chemical admixtures}}{\text{specific gravity of admixture}} \times \frac{1}{1000}$$

$$= \frac{2.537}{1.145} \times \frac{1}{1000}$$

$$= 0.0022157 m^3$$

g) volume of all aggregates $= ((a-b)-(c+d+e+f))$

$$= ((1-0.01)-(0.1006947+0.162192 + 0.0360427+0.0022157))$$

$$= 0.6888913 m^3$$

h) Mass of coarse aggregate = volume of all aggregates x volume of coarse aggregates x specific gravity of coarse aggregate x 1000

$$= 0.6888913 \times 0.567 \times 2.72 \times 1000$$

$$= 1062.3861 kg/m^3$$

i) Mass of fine aggregates = volume of all aggregates x volume of coa fine aggregate x specific gravity of fine aggregate x 1000

$$= 0.6888913 \times 0.433 \times 2.65 \times 1000$$

$$= 790.431 kg/m^3$$

step-7:- Mix proportion: 1 : 0.511 : 2.49 : 3.349 : 0.25

cement : water : sand : coarse agg : fly ash

Cement - 317.175 kg/m³

Fly Ash - 79.294 kg/m³

fine aggregate - 790.431 kg/m³ (sand)

coarse aggregate - 1062.3861 kg/m³

20 mm - 743.670 kg/m³

12.5mm - 318.715 kg/m³

Actual water - 162.192 lit/m³

SP - 2.537 kg/m³

step-8:- Quantity Estimation for 3 cubes 150 x 150 x 150(mm³)

volume of 3 cubes = 1.25[3x0.15x0.15x0.15] = 0.01266 m³.

Cement - 4.01424 kgs

Fly Ash - 1.0035 kgs

fine aggregate - 10.006 kgs

coarse aggregates - 13.4498 kgs

20 mm - 9.414 kgs

12.5mm - 4.034 kgs

Actual water - 2.0531 lit

SP - 0.0321 kgs

∴ Mix Design is submitted on the purpose of CONCRETO (A National level cube Test competition)

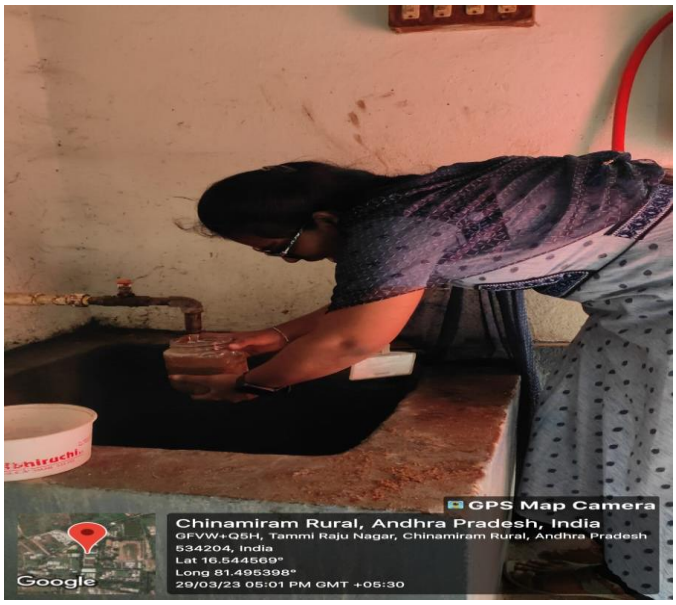
H5AB

Dept. of Civil Engg.
Chaitanya Engg. College
CHINA AMIRAM
BHIMAVARAM-534 204.

Department of Civil Engg

SIEVING OF COARSE AGGREGATES

SIEVING OF FINE AGGREGATES (SAND)



SPECIFIC GRAVITY OF FINE AGGREGATES

SIEVING OF FLY ASH

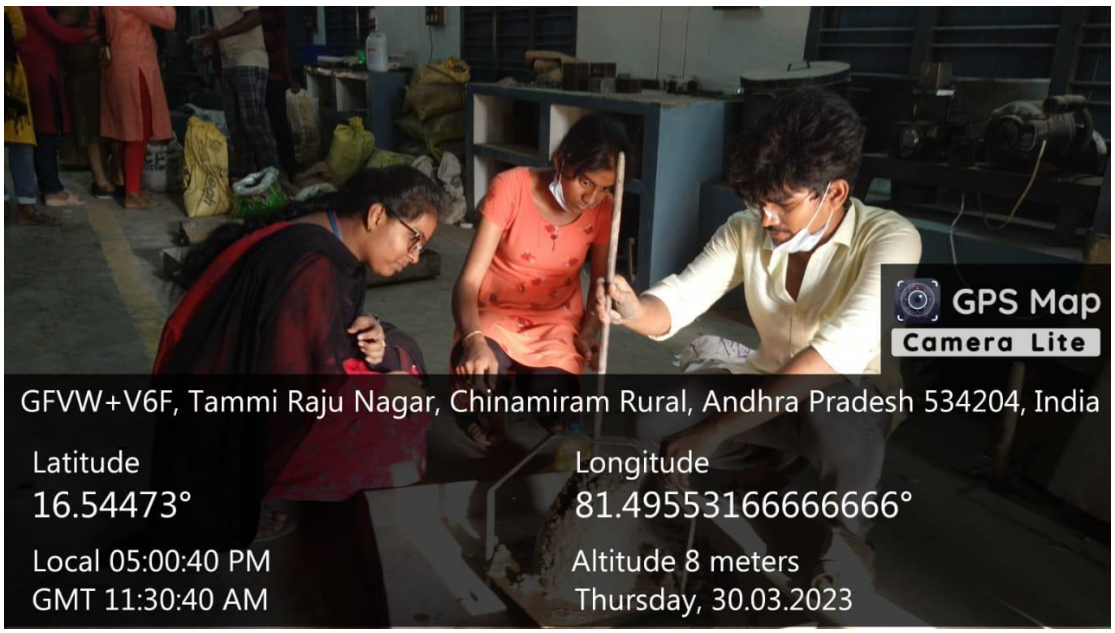
SPECIFIC GRAVITY OF COARSE AGGREGATES

WEIGHING OF AGGREGATES

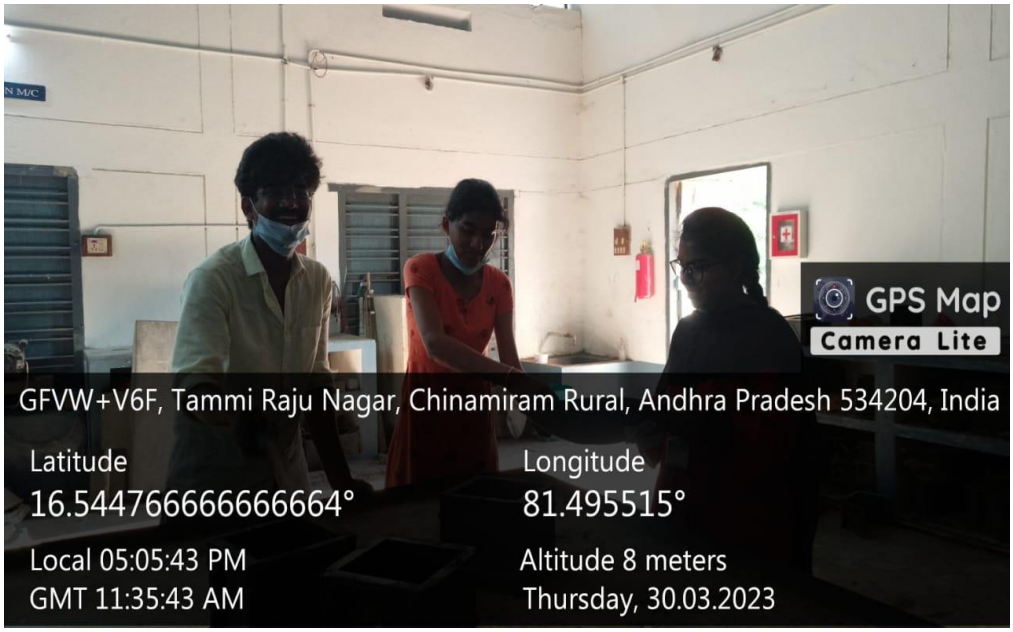
WEIGHING OF CEMENT

CLEANING & TIGHTING THE MOULDS


COARSE
AGGREGATES
FINE
AGGREGATES
12.5mm
20mm
GPS Map Camera
Chinamiram Rural, Andhra Pradesh, India
GFVW+V6F, Tammi Raju Nagar, Chinamiram Rural, Andhra Pradesh
534204, India
Lat 16.544582°
Long 81.49544°
30/03/23 02:02 PM GMT +05:30
Google


GPS Map
Camera Lite
GFVW+V6F, Tammi Raju Nagar, Chinamiram Rural, Andhra Pradesh 534204, India
Latitude
16.54473°
Longitude
81.49553166666666°
Local 05:00:40 PM
GMT 11:30:40 AM
Altitude 8 meters
Thursday, 30.03.2023

SLUMP TEST



CASTING OF CUBES

REMOVING CONCRETE CUBES OUT OF MOULDS

WEIGHING THE CONCRETE CUBES

Materials Used as replacement of cement, Fine Aggregate and coarse Aggregate

→ Fly Ash is used @ 20% as replacement of cement, for fine Aggregate and coarse Aggregate we donot take any replacement.

properties of fly ash :-

→ Flyash possesses almost little or no cementitious properties but becomes reactive in presence of lime.

→ Specific gravity of flyash is 2.2.

→ Flyash is pozzolanic and develops self hardening characteristics.

properties of cement :-

→ stiffens and hardens early.

→ possesses good plasticity.

→ Easily workable

→ Good moisture resistant.

properties of sand :-

→ Texture : sharp, angular, coarse and durable grains.

→ It should chemically inert.

→ It free from any organic matter.

properties of coarse aggregates:-

→ shape:- Rounded, irregular, elongated (long) and flaky (flat).

→ specific gravity of coarse aggregate is 2.72.

Admixtures used:-

We used chemical admixtures i.e; SP430

→ It is a chloride free, superplasticising admixture based on selected sulphonated napthalene polymers.

VIDEO LINKS:

https://photos.app.goo.gl/mzgQAEWy6qEVHoXa7

https://photos.app.goo.gl/iS7GaHuouUUga4QA6

https://photos.app.goo.gl/jZK6xH86pm6YAxoM8

https://photos.app.goo.gl/fQYGDN3YYDdhMe5Q6

https://photos.app.goo.gl/WU2D5XgCL6fyj2jX6