



# SITAM



**SATYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT**

ACCREDITED BY NAAC, RECOGNISED UNDER 2(F) AND 12 (B) OF UGC  
APPROVED BY AICTE, NEW DELHI,  
(PERMANENTLY AFFILIATED TO JNTU-GV, RECOGNISED BY SBTE, GOVERNMENT OF A.P.)

JNTUK CODE: B6

COLLEGE CODE: SGVP

REPORT NO.: SITAM/GTE/006

DATE: 26.09.2022

Project	Construction of Apartment [stilt floor + Ground Floor + 4 Upper floors]
Location	Sy.No. 125Part, Pot No. 25, D.No. 6-20-8/1, Eastpoint Colony, Ward No. 17, Chinawaltair, Visakhapatnam.
Tests Conducted for	M/s. Dhanunjaya Builders, Visakhapatnam.
Reference	Your sample submitted Dt 22-09-2022
Description	Testing of undisturbed soil samples (02) (Two only)

## TEST RESULTS

Date of Testing: 24.09.2022

The following are the results of tests conducted on two undistributed soil samples pertaining to the work cited above.

S.No	Engineering Property	Sample I Result	Sample II Result
1	<u>Grain size distribution</u>		
	a) Gravel (%)	10.0	9.0
	b) Sand (%)	76.0	72.0
	c) Fines (%)	14.0	12.0
2	<u>Plasticity Characteristics</u>		
	a) Liquid Limit (%)	NP	NP
	b) Plastic Limit (%)	NP	NP
	c) Plasticity Index (%)	NP	NP
3	IS Classification	SM of SDR	SM of SDR
4	In-situ Density (%)	2.19	2.15
5	N.M.C. (%)	9.6	9.4
6	Differential Free Swell	0.0	0.0
7	<u>Shear Parameters</u>		
	a) Cohesion ( $t/m^2$ )	0.16	0.14
	b) Angle of Shearing Resistance	32°	30°
8	Depth of Foundation (m)	1.8	1.6
9	Width of Foundation (m)	1.5	1.8
10	Safe Bearing Capacity ( $t/m^2$ )	23.4	23.8

Safe Bearing Capacity (SBC) is evaluated as per IS 6403-1981 considering the footing to be square. Transition mode of shear failure conditions are assumed to prevail in foundation soil.

A factor of safety of 2.5 against shear failure is taken in calculation of SBC value.

B.H.S. Saravali 26-9-25  
Signature of Lab Incharge

Signature of HOD

Signature of Principal

NEAR RTO OFFICE, GAJULAREGA, VIZIANAGARAM - 535003, ANDHRA PRADESH, INDIA

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# SITAM



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JNTUK CODE: B6

REPORT NO.: SITAM/SM/007

DATE: 26.09.2022

Project	Construction of Apartment [stilt floor + Ground Floor + 4 Upper floors]
Location	Sy.No. 125Part, Pot No. 25, D.No. 6-20-8/1, Eastpoint Colony, Ward No. 17, Chinawaltair, Visakhapatnam.
Tests Conducted for	M/s. Dhanunjaya Builders, Visakhapatnam.
Reference	Your sample submitted Dt 22-09-2022
Description	Testing of reinforcement steel (SIMHADRI Fe500D) 8mm and 10mm dia.
No. of specimens tested	06 (Six only)

## TEST RESULTS

Date of Testing: 24.09.2022

The following are the results of tests conducted on reinforcement steel samples, pertaining to the work cited above.

	Property	8mm	10mm	Requirements as per IS: 1786-2008
1	Weight/Meter (Kg/m)	0.419	0.628	0.363 to 0.395 for 8mm 0.567 to 0.617 for 10mm
2	Yield Stress (YS) (N/mm <sup>2</sup> )	580	602	500 N/mm <sup>2</sup> (minimum)
3	Tensile Strength (TS) (N/mm <sup>2</sup> )	689	688	500 (minimum)
4	TS/YS Ratio	1.19	1.14	≥ 1.10, but TS not less than 565.0 N/mm <sup>2</sup>
5	Elongation (%)	25.0	22.0	16 % (minimum)
6	Bend Test	satisfactory	satisfactory	No visible cracks, tested as per IS 1599
7	Re bend Test	satisfactory	satisfactory	No visible cracks, tested as per IS 1599

The tested samples are satisfying the requirements as per IS 1786-2008 table -3 for Fe 500D

K. Gayatri Kishan  
26/09/22  
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JNTUK CODE: **B6**

REPORT NO.: SITAM/EE/008

DATE: 27.09.2022

Project	Construction of Apartment [stilt floor + Ground Floor + 4 Upper floors]
Location	Sy.No. 125Part, Pot No. 25, D.No. 6-20-8/1, Eastpoint Colony, Ward No. 17, Chinawaltair, Visakhapatnam.
Tests Conducted for	M/s. Dhanunjaya Builders, Visakhapatnam.
Reference	Your sample submitted Dt 22-09-2022
Description	Testing of ground water sample collected from site

## TEST RESULTS

Date of Testing: 26.09.2022

The following are the results of tests conducted on ground water sample for drinking purpose, pertaining to the work cited above.


SI No.	Particulars	Constituents Determined	Requirements as Per IS:10500
1	pH Value	7.65	6.50-8.50
2	Electrical Conductivity ( $\mu$ . Mhos/cm)	1097	***
3	Odour	Agreeable	Agreeable
4	Taste	Not Agreeable	Agreeable
<b>Chemical Parameters</b>			
5	Dissolved Solids (mg/l), Max.	756	500
6	Total Hardness as CaCO <sub>3</sub> (mg/l), Max.	496	300
7	Alkalinity to Methyl Orange as CaCO <sub>3</sub> (mg/l), Max.	432	200
8	Alkalinity to Phenolphthalein as CaCO <sub>3</sub> (mg/l)	Nil	Not Specified
9	Turbidity NTU, Max.	Nil	1
10	Iron as Fe (mg/l), Max.	0.12	0.3

With reference to the above results, the ground water under consideration is suitable for drinking upon treatment like filtration.

  
Signature of Lab Incharge

  
Signature of HOD



  
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Signature of Principal

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# SITAM



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REPORT NO.:SITAM/CT/009

DATE: 24.10.2022

Testing done for: M/s. Dhanunjaya Builders, Visakhapatnam

Reference: Your sample submitted Dt 22-09-2022

Name of work: Construction of Apartment [stilt floor + Ground Floor + 4 Upper floors]

Location: Sy.No. 125Part, Pot No. 25, D.No. 6-20-8/1, Eastpoint Colony, Ward No. 17, Chinawaltair, Visakhapatnam.

## REPORT ON CONCRETE MIX DESIGN M25

### STIPULATION FOR PROPORTIONING

a) Grade of designation	M25
b) Type of cement	OPC 43
c) Maximum nominal size of aggregate	20mm
d) Exposure condition	Mild
e) Minimum cement content	300 kg/m <sup>3</sup>
f) Maximum water cement ratio	0.55
g) Workability	100mm
h) Method of concrete placing	Manual
i) Degree of supervision	Good
j) Type of coarse aggregate	Crushed angular aggregate
k) Chemical admixture type	Fosroc SP 430
l) Sand	River Sand
m) Water	Surface water/ Ground Water Available at Site

*G. et al* 24/10/2022  
Signature of Lab Incharge

*Dany*  
Signature of HOD

*D.V.Ram*  
Dr.D.V.Ram  
Principal  
Signature of Principal

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**Design stipulations for M25**


i)	Characteristic compressive strength required in the field at 28 days	25 N/mm <sup>2</sup>
ii)	Max. size of aggregate	20mm
iii)	Type of coarse aggregate	Crushed Angular
iv)	Type of fine aggregate	River Sand
v)	Workability(Slump	100 mm
vi)	Degree of quality control	Good
vii)	Type of exposure	Mild
viii)	Type or brand of cement	OPC 43
ix)	Type of Admixture	Fosroc SP 430

**(1) Specific Gravity**

i)	Cement	2.82
ii)	Coarse aggregate	2.67
iii)	Fine aggregate	2.60
iv)	Admixture Fosroc SP 430	1.20

  
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**SPOC, IQAC**  
SITAM, GAJULAREGA  
VIZIANAGARAM, A.P., INDIA

### Water Absorption

Coarse aggregate		
i)	20mm	0.50%
ii)	10mm	0.60%
Fine aggregate	-	1.80%

### **Coarse Aggregate.**

Table-I

Sieve size	% passing	
	20mm Fraction-1	10mm Fraction-2
40mm	00	100
20mm	95.9	100
10mm	0	82.1
4.75mm	0	20.9

To satisfy the required grading of combined aggregates, the 20mm size and 10mm size coarse aggregates are mixed in the following proportions.

Fraction -1 (20mm) : 52 %

Fraction -2 (10mm) : 48 %

The grading achieved of the blended aggregate is given is as under:-



Sieve size	% passing observed	Required as per T-7  IS-383-2016
40mm	100	100
20mm	98	90-100
10mm	39	25-55
4.75mm	10	0-10

(ii) Fine Aggregate: Sieve analysis of fine aggregate is given in table-2.

Table-2

Sieve size	% passing	Limits for zone –II
10.0mm	100	100
4.75mm	98.8	90-100
2.36mm	80.8	75-100
1.18mm	60.4	55-90
0.60mm	35.4	35-59
0.30mm	19.6	8-30
0.15mm	2.4	0-10

**Fine aggregate belongs to Zone-II as per Table- 9 of IS 383-2016.**



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## Concrete Mix Design of M25 Concrete

### A-0 — Determination of Target Strength

Himsworth constant for 5% risk factor is 1.65. In this case standard deviation is taken from IS:456 against M 25 is 4.0.

$$\begin{aligned}f_{\text{target}} &= f_{\text{ck}} + 1.65 \times S \\&= 25 + 1.65 \times 4.0 = 31.60 \text{ N/mm}^2\end{aligned}$$

Where,

S = standard deviation in  $\text{N/mm}^2 = 4$  (as per table -1 of IS 10262- 2009)

For a tolerance factor of 1.65 and a standard deviation value of 4.0 the target mean strength of concrete comes out to be equal to  $31.60 \text{ N/mm}^2$ .

### A-1 SELECTION OF WATER CEMENT RATIO

From table 5 of IS 456 on page no. 20, Maximum water-cement ratio=0.50

Based on experience, adopt water-cement ratio as 0.43, for the target mean strength and required workability

$0.43 < 0.50$ , hence O.K.

### A-2 SELECTION OF WATER CONTENT

From Table 2 of IS 10262- 2009,

Maximum water content = 186 Kg (for Nominal maximum size of aggregate — 20 mm)

Table for Correction in water content

Parameters	Values as per Standard reference condition	Values as per Present Problem	Departure	Correction in Water Content
Slump	25-50 mm	25-50 mm	Nil	
Shape of	Angular	Gravel with Crushed		-20



Aggregate		stone		
Admixture	Fosroc SP430	Based on Experience		-10.50
			Total	-30.50

So, estimated water content =  $186 - 30.50 = 155.50 \text{ litre /m}^3$

### A-3 CALCULATION OF CEMENT CONTENT

Water-cement ratio = 0.43

Corrected water content =  $155.50 \text{ litre /m}^3$

Cement content =  $\frac{155.5}{0.43} = 361.63$  say 362 Kg/m<sup>3</sup>

Minimum cement Content for moderate exposure condition =  $300 \text{ kg/m}^3$

$362 \text{ kg/m}^3 > 300 \text{ kg/m}^3$ , hence, OK.

This value is to be checked for durability requirement from IS: 456.

In the present example against mild exposure and for the case of reinforced concrete the minimum cement content is  $300 \text{ kg/m}^3$  which is less than  $362 \text{ kg/m}^3$ . Hence cement content adopted =  $362 \text{ kg/m}^3$ .

As per clause 8.2.4.2 of IS: 456

Maximum cement content =  $450 \text{ kg/m}^3$ .

### A-4 PROPORTIONS OF VOLUME OF COARSE AGGREGATE AND FINE AGGREGATE CONTENT

From Table 3 of IS 10262:2009,

the volume of coarse aggregate per unit volume of total aggregate corresponding to 20mm size aggregate and fine aggregate (Zone II) for the water-cement ratio of 0.43

The volume of coarse aggregate per unit volume of total aggregate is 0.634

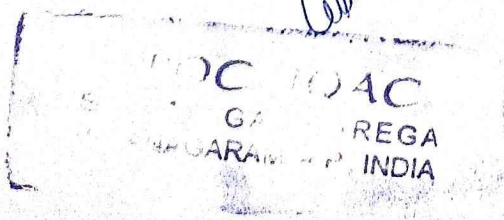
Volume of fine aggregate is taken as 0.366

### A-5 MIX CALCULATIONS

The mix calculations per unit volume of concrete shall be as follows:



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a) Volume of concrete = 1 m<sup>3</sup>

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

$$= (362/2.82) \times (1/1000)$$

$$= 0.1284 \text{ m}^3$$

c) Volume of water =  $\frac{\text{Mass of water}}{\text{The specific gravity of water}} \times 1$   
1000

$$= (155.5/1) \times (1/1000)$$

$$= 0.1555 \text{ m}^3$$

d) Volume of Chemical Admixture =  $\frac{\text{Mass of Chemical Admixture}}{\text{Specific gravity of admixture}} \times 1$   
Super Plasticizer @ 1.0% By 1000

Mass of cementations material)

$$= (3.45/1.20) \times (1/1000)$$

$$= 0.0029$$

e) Volume of all in aggregate = [ a- (b + c + d) ]

$$= 0.7132 \text{ m}^3$$

f) Mass of coarse aggregate = 1207 Kg

g) Mass of fine aggregate = 679 Kg

#### **A-6 (1) MIX PROPORTIONS FOR TRIAL NUMBER 1**

Water-cement ratio = 0.43

Quantity of cement = 362 Kg/m<sup>3</sup>

Quantity of Water taken = 155.5 Kg/m<sup>3</sup>

Quantity of Fine aggregate = 679 Kg/m<sup>3</sup>

Quantity of Coarse aggregate = 1207 Kg/m<sup>3</sup>

Quantity of Admixture @ 1.0% = 3.45 Kg/m<sup>3</sup>



## A-6 (2) MIX PROPORTIONS FOR TRIAL NUMBER 2

Water-cement ratio	= 0.45
Quantity of cement	= 353 Kg/m <sup>3</sup>
Quantity of Water taken	= 159 Kg/m <sup>3</sup>
Quantity of Fine aggregate	= 679 Kg/m <sup>3</sup>
Quantity of Coarse aggregate	= 1207 Kg/m <sup>3</sup>
Quantity of Admixture @ 1.0%	= 3.38 Kg/m <sup>3</sup>

## A-6 (3) MIX PROPORTIONS FOR TRIAL NUMBER 3

Water-cement ratio	= 0.46
Quantity of cement	= 352 Kg/m <sup>3</sup>
Quantity of Water taken	= 162 Kg/m <sup>3</sup>
Quantity of Fine aggregate	= 684 Kg/m <sup>3</sup>
Quantity of Coarse aggregate	= 1216 Kg/m <sup>3</sup>
Quantity of Admixture @ 1.0%	= 3.10 Kg/m <sup>3</sup>

The concrete cubes (150mm x 150mm) were cast with these mixes and the following results were obtained.

RECOMMENDATIONS. The 28 days compressive strength of trial mix no.3 fulfills the design criteria as per IS 10262:2009. Hence recommended being adopted for M-25 grade Cement concrete. Quantities of Material for one cubic meter of concrete-

**Water=162 Kg**

**Cement =352 Kg**

**Sand =679 Kg**

**Coarse aggregate =1207 Kg**


**Fraction-1 (20mm) = 603.50 Kg**

**Fraction-2 (10mm) = 579 Kg**

**Quantity of Admixture @ 1.0% = 3.10 Kg**



  
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SPOC, IQAC  
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VIZIANAGARAM, A.P., INDIA

The above concrete mix design holds good for the samples provided that the parameters taken for the mix design remain the same as taken and aggregates fall within close to their individual grading as mentioned above. The design was on saturated surface dry condition of aggregate when computing the requirement of mixing water, allowance must be made for free surface moisture content or for water absorption dry aggregate Necessary adjustment shall be made in the mass of aggregate. In actual execution, if there is a change in the grading of different materials, the proportions of mixing materials can be changed to achieve the required grading. Quantity of aggregates and water may please be adjusted according to the free moisture present in the aggregates at the time of mix preparations.

Mix No.	Water	Cement	W/C Ratio	Slump (mm)	28-days Compressive Strength. N/mm <sup>2</sup> .
1	155.5	362	0.43	45	31.11
2	159	353	0.45	51	32.89
3	162	352	0.46	55	33.33





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JNTUK CODE: B6

REPORT NO.:SITAM/CT/010

DATE: 24.10.2022

Testing done for: M/s. Dhanunjaya Builders, Visakhapatnam

Reference: Your sample submitted Dt 22-09-2022

Name of work: Construction of Apartment [stilt floor + Ground Floor + 4 Upper floors]

Location: Sy.No. 125Part, Pot No. 25, D.No. 6-20-8/1, Eastpoint Colony, Ward No. 17,  
Chinawaltair, Visakhapatnam.

## REPORT ON CONCRETE MIX DESIGN M20

### STIPULATION FOR PROPORTIONING

Grade of designation	M20
Type of cement	OPC 43
Maximum nominal size of aggregate	20mm
Exposure condition	Mild
Minimum cement content	300 kg/ m <sup>3</sup>
Maximum water cement ratio	0.55
Workability	100mm
Method of concrete placing	Manual
Degree of supervision	Good
Type of coarse aggregate Aggregate	Crushed angular
Chemical admixture type	Fosroc SP 430
Sand	River Sand
Water	Surface water/ Ground Water Available at Site

*G. ete kl*  
Signature of Lab Incharge 24/10/2022

*[Signature]*  
Signature of HOD

*[Signature]*  
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Principal  
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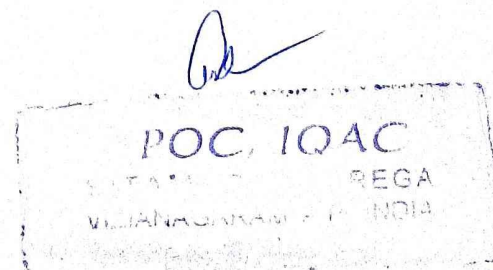
**Design stipulations for M20**

i)	Characteristic compressive strength required in the field at 28 days	20 N/mm <sup>2</sup>
ii)	Max. size of aggregate	20mm
iii)	Type of coarse aggregate	Crushed Angular
iv)	Type of fine aggregate	River Sand
v)	Workability(Slump	100 mm
vi)	Degree of quality control	Good
vii)	Type of exposure	Mild
viii)	Type or brand of cement	OPC 43
ix)	Type of Admixture	Fosroc SP 430

**(1) Specific Gravity**

i)	Cement	2.82
ii)	Coarse aggregate	2.67
iii)	Fine aggregate	2.60
iv)	Admixture Fosroc SP 430	1.20

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### Water Absorption

Coarse aggregate		
i)	20mm	0.50%
ii)	10mm	0.60%
Fine aggregate	-	1.80%

### **Coarse Aggregate.**

Table-I

Sieve size	% passing	
	20mm Fraction-1	10mm Fraction-2
40mm	00	100
20mm	95.9	100
10mm	0	82.1
4.75mm	0	20.9

To satisfy the required grading of combined aggregates, the 20mm size and 10mm size coarse aggregates are mixed in the following proportions.

Fraction -1 (20mm) : 52 %

Fraction -2 (10mm) : 48 %

The grading achieved of the blended aggregate is given is as under:-

Sieve size	% passing observed	Required as per T-7  IS-383-2016
40mm	100	100
20mm	98	90-100
10mm	39	25-55
4.75mm	10	0-10

(ii) Fine Aggregate: Sieve analysis of fine aggregate is given in table-2.

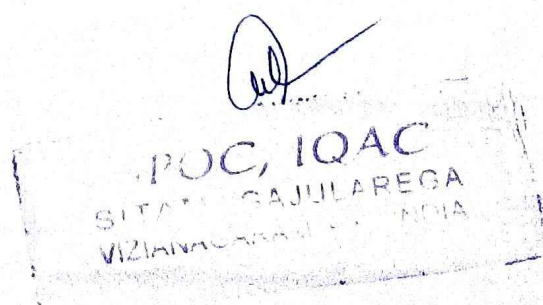
Table-2

Sieve size	% passing	Limits for zone –II
10.0mm	100	100
4.75mm	98.8	90-100
2.36mm	80.8	75-100
1.18mm	60.4	55-90
0.60mm	35.4	35-59
0.30mm	19.6	8-30
0.15mm	2.4	0-10

**Fine aggregate belongs to Zone-II as per Table- 9 of IS 383-2016.**



  
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## Concrete Mix Design of M20 Concrete

### A-0 — Determination of Target Strength

Hinsworth constant for 5% risk factor is 1.65. In this case standard deviation is taken from IS:456 against M 20 is 4.0.

$$\begin{aligned}f_{\text{target}} &= f_{\text{ck}} + 1.65 \times S \\&= 20 + 1.65 \times 4.0 = 26.60 \text{ N/mm}^2\end{aligned}$$

Where,

S = standard deviation in  $\text{N/mm}^2 = 4$  (as per table -1 of IS 10262- 2009)

For a tolerance factor of 1.65 and a standard deviation value of 4.0 the target mean strength of concrete comes out to be equal to  $26.60 \text{ N/mm}^2$ .

### A-1 SELECTION OF WATER CEMENT RATIO

From table 5 of IS 456 on page no. 20, Maximum water-cement ratio=0.50

Based on experience, adopt water-cement ratio as 0.43, for the target mean strength and required workability

$0.43 < 0.50$ , hence O.K.

### A-2 SELECTION OF WATER CONTENT

From Table 2 of IS 10262- 2009,

Maximum water content = 186 Kg (for Nominal maximum size of aggregate — 20 mm)

**Table for Correction in water content**

Parameters	Values as per Standard reference condition	Values as per Present Problem	Departure	Correction in Water Content
Slump	100 mm	100 mm	Nil	
Shape of	Angular	Gravel with Crushed		-20



Aggregate		stone		
Admixture	Fosroc SP430	Based on Experience		-10.50
			Total	-30.50

So, estimated water content =  $186 - 30.50 = 155.50 \text{ litre /m}^3$

### A-3 CALCULATION OF CEMENT CONTENT

Water-cement ratio = 0.43

Corrected water content =  $145.50 \text{ litre /m}^3$

Cement content =  $\frac{145.5}{0.43} = 290 \text{ Kg/m}^3$

Minimum cement Content for moderate exposure condition =  $300 \text{ kg/m}^3$

$290 \text{ kg/m}^3 > 300 \text{ kg/m}^3$ , hence, OK.

This value is to be checked for durability requirement from IS: 456.

### A-4 PROPORTIONS OF VOLUME OF COARSE AGGREGATE AND FINE AGGREGATE CONTENT

From Table 3 of IS 10262:2009,

the volume of coarse aggregate per unit volume of total aggregate corresponding to 20mm size aggregate and fine aggregate (Zone II) for the water-cement ratio of 0.43

The volume of coarse aggregate per unit volume of total aggregate is 0.634

Volume of fine aggregate is taken as 0.366

### A-5 MIX CALCULATIONS

The mix calculations per unit volume of concrete shall be as follows:

a) Volume of concrete =  $1 \text{ m}^3$

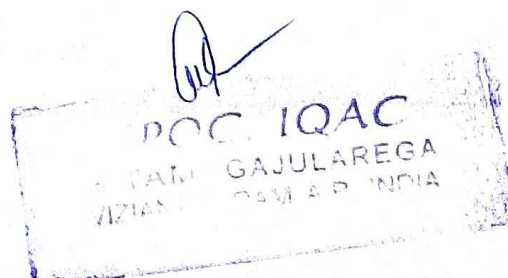
b) Volume of cement =  $\frac{\text{Mass of cement}}{\text{Specific gravity of cement} \times 1000}$

=  $(290/2.82) \times (1/1000)$

=  $0.1028 \text{ m}^3$



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Gajularega, Vizianagaram



$$\text{c) Volume of water} = \frac{\text{Mass of water} \times 1}{\text{The specific gravity of water} \times 1000}$$

$$= (145.5/1) \times (1/1000)$$

$$= 0.1455 \text{ m}^3$$

$$\text{d) Volume of Chemical Admixture} = \frac{\text{Mass of Chemical Admixture} \times 1}{\text{Super Plasticizer @ 1.0\% By Specific gravity of admixture} \times 1000}$$

Mass of cementations material)

$$= (3.45/1.20) \times (1/1000)$$

$$= 0.0029$$

$$\text{e) Volume of all in aggregate} = [ a - (b + c + d) ]$$

$$= 0.7488 \text{ m}^3$$

$$\text{f) Mass of coarse aggregate} = 1429 \text{ Kg}$$

$$\text{g) Mass of fine aggregate} = 696 \text{ Kg}$$

#### **A-6 (1) MIX PROPORTIONS FOR TRIAL NUMBER 1**

$$\text{Water-cement ratio} = 0.43$$

$$\text{Quantity of cement} = 290 \text{ Kg/m}^3$$

$$\text{Quantity of Water taken} = 145.5 \text{ Kg/m}^3$$

$$\text{Quantity of Fine aggregate} = 696 \text{ Kg/m}^3$$

$$\text{Quantity of Coarse aggregate} = 1430 \text{ Kg/m}^3$$

$$\text{Quantity of Admixture @ 1.0\%} = 2.9 \text{ Kg/m}^3$$

#### **A-6 (2) MIX PROPORTIONS FOR TRIAL NUMBER 2**

$$\text{Water-cement ratio} = 0.45$$

$$\text{Quantity of cement} = 310 \text{ Kg/m}^3$$

$$\text{Quantity of Water taken} = 153 \text{ Kg/m}^3$$

Quantity of Fine aggregate = 702 Kg/m<sup>3</sup>  
Quantity of Coarse aggregate = 1450 Kg/m<sup>3</sup>  
Quantity of Admixture @ 1.0% = 3.1 Kg/m<sup>3</sup>

### A-6 (3) MIX PROPORTIONS FOR TRIAL NUMBER 3

Water-cement ratio = 0.46

Quantity of cement = 320 Kg/m<sup>3</sup>  
Quantity of Water taken = 155 Kg/m<sup>3</sup>  
Quantity of Fine aggregate = 710 Kg/m<sup>3</sup>  
Quantity of Coarse aggregate = 1460 Kg/m<sup>3</sup>  
Quantity of Admixture @ 1.0% = 3.20 Kg/m<sup>3</sup>

The concrete cubes (150mm x 150mm) were cast with these mixes and the following results were obtained.

RECOMMENDATIONS. The 28 days compressive strength of trial mix no.3 fulfills the design criteria as per IS 10262:2009. Hence recommended being adopted for M-20 grade Cement concrete. Quantities of Material for one cubic meter of concrete-

**Water=155 Kg**

**Cement =320 Kg**

**Sand =710 Kg**

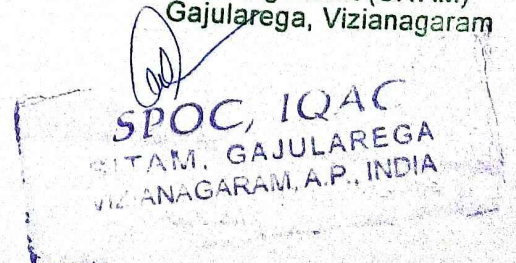
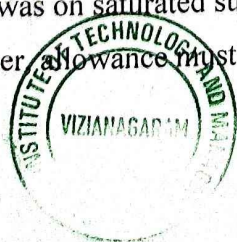
**Coarse aggregate =1460 Kg**

**Fraction-1 (20mm) = 876 Kg**

**Fraction-2 (10mm) = 584 Kg**

**Quantity of Admixture @ 1.0% = 3.20 Kg**

The above concrete mix design holds good for the samples provided that the parameters taken for the mix design remain the same as taken and aggregates fall within close to their individual grading as mentioned above. The design was on saturated surface dry condition of aggregate when computing the requirement of mixing water allowance must be made for free surface moisture content of aggregate.





water absorption dry aggregate Necessary adjustment shall be made in the mass of aggregate. In actual execution, if there is a change in the grading of different materials, the proportions of mixing materials can be changed to achieve the required grading. Quantity of aggregates and water may please be adjusted according to the free moisture present in the aggregates at the time of mix preparations.

Mix No.	Water	Cement	W/C Ratio	Slump (mm)	28-days Compressive Strength. N/mm <sup>2</sup> .
1	145.5	290	0.43	96	24.05
2	153	310	0.45	103	25.69
3	155	320	0.46	104	28.32

**SRI BOTCHA GURUNaidu MEMORIAL EDUCATIONAL SOCIETY - (from 1-Apr-2022  
VIZIANAGARAM**

**SBI FORT BR-31744546678 Book**

1-Dec-2022 to 5-Dec-2022

Date	Particulars	Vch Type	Vch No.	Debit	Credit
1-12-2022	Cr Opening Balance			5,49,320.25	
1-12-2022	Cr University Fee UPI/CR/233587804867	Receipt		5,000.00	
	Dr (as per details)	Payment			99,010.00
	TCS Food Expenses 1,440.00 Dr				
	Aqua Water Life Technology 60,000.00 Dr				
	M Srinu 20,000.00 Dr				
	Repairs & Maintenance-CAR 9,500.00 Dr				
	Events and Celebrations Expenses 1,720.00 Dr				
	Hostel Maintenance Expenses 6,350.00 Dr				
	T/W CAT EXAMINATION FOOD EXPENSES, RO UPGRADATION, SALARY ADVANCE TO M SRINU, GRINDER REPAIR. VEHICLE REPAIR AND PURCHASE OF A4 CERTIFICATES & MEDALS				
	Dr Advertisement Expenses	Payment			20,853.00
	T/W ADVERTISEMENT BILL PAID TO ANDHRA JYOTHI AND NATIONAL NEWS EXPRESS				
	Cr TUITION FEE	Receipt		69,000.00	
	TRANSFER FROM BORA NEELIMA				
	Cr Dhanunjaya Builders	Receipt		98,000.00	
	UPI/CR/233591238217				
	Cr TUITION FEE	Receipt		31,100.00	
	DUK2419264				
	Cr University Fee	Receipt		5,500.00	
	DUK2409073				
2-12-2022	Cr Examination Fee A/c [Sitam]	Receipt		300.00	
	DUK2390601				
	Dr Furniture and Fixtures @10% Soc & ENGG	Payment			50,000.00
	T/W PURCHASE OF IRON RACKS FROM MASETTY & CO.				
	Dr (as per details)	Payment			15,800.00
	Repairs & Maintainance Electrical - Main A/c 9,800.00 Dr				
	Staff Welfare Expenses 6,000.00 Dr				
	T/W LED STREET LIGHTS PURCHASED AND TEA AND BISCUITS EXPENSES AT ION DIGITAL FOR THE MONTHS OF OCT AND NOV				
	Dr Bank Charges A/c	Payment			791.78
	SBICMPNEW CHARGES				
	Carried Over			7,58,220.25	1,86,454.78

continued ...

*(Signature)*



*(Signature)*  
Dr. D.V. RAMAMURTHY  
Principal  
Satva Institute of Technology and Management

Date	Particulars	Vch Type	Vch No.	Debit	Credit
	Brought Forward			9,23,862.25	1,86,454.78
3-12-2022	Cr University Fee DUK2506955	Receipt		4,000.00	
	Cr TUITION FEE DUK2494489	Receipt		11,400.00	
	Cr TUITION FEE DUK2501796	Receipt		12,550.00	
	Cr TUITION FEE DUK2506426	Receipt		11,400.00	
	Cr Examination Fee A/c [Sitam] DUK2507412	Receipt		900.00	
	Cr University Fee DUK2513784	Receipt		4,000.00	
	Cr TUITION FEE DUK2475586	Receipt		11,400.00	
	Cr Examination Fee A/c [Sitam] DUK2466779	Receipt		900.00	
	Cr Examination Fee A/c [Sitam] DUK2465637	Receipt		700.00	
	Cr TUITION FEE DUK2454537	Receipt		15,000.00	
	Cr Hostel Fee-Exempted DUK2466662	Receipt		10,000.00	
	Cr Examination Fee A/c [Sitam] DUK2464858	Receipt		500.00	
	Cr University Fee DUK2445488	Receipt		4,000.00	
	Cr Examination Fee A/c [Sitam] DUK2465099	Receipt		500.00	
	Cr Examination Fee A/c [Sitam] DUK2465918	Receipt		900.00	
	Cr TUITION FEE DUK2445029	Receipt		12,000.00	
	Cr TUITION FEE DUK2492780	Receipt		11,400.00	
4-12-2022	Cr Examination Fee A/c [Sitam] DUK2525944	Receipt		900.00	
	Cr TUITION FEE DUK2541581	Receipt		11,400.00	
	Cr TUITION FEE DUK2527717	Receipt		11,400.00	

Carried Over

10,59,112.25 1,86,454.78

*Carried Over*

*DUK 2527717*

continued ...





# SITAM



SATYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT

COLLEGE CODE: SGVP

ACCREDITED BY NAAC, RECOGNISED UNDER 2(F) AND 12 (B) OF UGC  
APPROVED BY AICTE, NEW DELHI,  
(PERMANENTLY AFFILIATED TO JNTU GV, RECOGNISED BY SBTE, GOVERNMENT OF A.P.)

JNTUK CODE: B6

REPORT NO.: SITAM/GTE/011

DATE: 11.03.2023

Project	Construction of Apartment [stilt + Ground Floor + 3 Upper floors]
Location	8-162/6/A, Ganababu Nagar, Ramapadu, Arilova, Visakhapatnam, Visakhapatnam, Andhra Pradesh.
Tests Conducted for	M/s A One Constructions, Visakhapatnam.
Reference	Your sample submitted Dt 27-02-2023
Description	Testing of undisturbed soil samples (02) (Two only)

## TEST RESULTS

Date of Testing: 02.03.2023

The following are the results of tests conducted on two undistributed soil samples pertaining to the work cited above.

S.No	Engineering Property	Sample I Result	Sample II Result
1	<u>Grain size distribution</u>		
	a) Gravel (%)	10.0	11.0
	b) Sand (%)	78.0	75.0
	c) Fines (%)	12.0	14.0
2	<u>Plasticity Characteristics</u>		
	a) Liquid Limit (%)	NP	NP
	b) Plastic Limit (%)	NP	NP
	c) Plasticity Index (%)	NP	NP
3	IS Classification	SM of SDR	SM of SDR
4	In-situ Density (%)	2.13	2.18
5	N.M.C. (%)	10.2	10.6
6	Differential Free Swell	0.0	0.0
7	<u>Shear Parameters</u>		
	a) Cohesion ( $t/m^2$ )	0.14	0.15
	b) Angle of Shearing Resistance	31°	32°
8	Depth of Foundation (m)	1.8	1.6
9	Width of Foundation (m)	1.5	1.8
10	Safe Bearing Capacity ( $t/m^2$ )	23.5	23.9

Safe Bearing Capacity (SBC) is evaluated as per IS 6403-1981 considering the footing to be square. Transition mode of shear failure conditions are assumed to prevail in foundation soil. A factor of safety of 2.5 against shear failure is taken in calculation of SBC value.

*B.H.S. Sai Prakash*  
Signature of Lab Incharge

*[Signature]*  
Signature of HOD

*[Signature]*  
Signature of Principal  
D.V. RAMAMURTHY

NEAR RTO OFFICE, GAJULAREGA, VIZIANAGARAM - 535003, ANDHRA PRADESH, INDIA

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COLLEGE CODE: **SGVP**

JNTUK CODE: **B6**

REPORT NO.: SITAM/SM/012

DATE: 11.03.2023

Project	Construction of Apartment [stilt + Ground Floor + 3 Upper floors]
Location	8-162/6/A, Ganababu Nagar, Ramapadu, Arilova, Visakhapatnam, Visakhapatnam, Andhra Pradesh.
Tests Conducted for	M/s A One Constructions, Visakhapatnam.
Reference	Your sample submitted Dt 27-02-2023
Description	Testing of reinforcement steel (SIMHADRI Fe500D)8mm and 10mm dia.
No. of specimens tested	06 (Six only)

## TEST RESULTS

Date of Testing: 29.02.2023

The following are the results of tests conducted on reinforcement steel samples, pertaining to the work cited above.

	Property	8mm	10mm	Requirements as per IS: 1786-2008
1	Weight/Meter (Kg/m)	0.386	0.612	0.363 to 0.395 for 8mm 0.567 to 0.617 for 10mm
2	Yield Stress (YS) (N/mm <sup>2</sup> )	593	604	500 N/mm <sup>2</sup> (minimum)
3	Tensile Strength (TS) (N/mm <sup>2</sup> )	696	698	500 (minimum)
4	TS/YS Ratio	1.17	1.15	≥ 1.10, but TS not less than 565.0 N/mm <sup>2</sup>
5	Elongation (%)	22.0	25.0	16 % (minimum)
6	Bend Test	satisfactory	satisfactory	No visible cracks, tested as per IS 1599
7	Re bend Test	satisfactory	satisfactory	No visible cracks, tested as per IS 1599

The tested samples are satisfying the requirements as per IS 1786-2008 table -3 for Fe 500D

*K. Gayatri Kiran*  
Signature of Lab Incharge

*[Signature]*  
Signature of HOD

*[Signature]*  
Signature of Principal  
Dr. D. V. RAMAMURTHY  
Principal  
Satya Institute Technology and Management  
Vizianagaram

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JNTUK CODE: B6

REPORT NO.: SITAM/EE/013

DATE: 16.03.2023

Project	Construction of Apartment [stilt + Ground Floor + 3 Upper floors]
Location	8-162/6/A, Ganababu Nagar, Ramapadu, Arilova, Visakhapatnam, Visakhapatnam, Andhra Pradesh.
Tests Conducted for	M/s A One Constructions, Visakhapatnam.
Reference	Your sample submitted Dt 11-03-2023
Description	Testing of ground water sample collected from site

## TEST RESULTS

Date of Testing: 13.03.2023


The following are the results of tests conducted on ground water sample for drinking purpose, pertaining to the work cited above.

SI No.	Particulars	Constituents Determined	Requirements as Per IS:10500
1	P <sup>H</sup> Value	6.98	6.50-8.50
2	Electrical Conductivity ( $\mu$ . Mhos/cm)	1086	***
3	Odour	Agreeable	Agreeable
4	Taste	Not Agreeable	Agreeable
<b>Chemical Parameters</b>			
5	Dissolved Solids (mg/l), Max.	312	500
6	Total Hardness as CaCO <sub>3</sub> (mg/l), Max.	216	300
7	Alkalinity to Methyl Orange as CaCO <sub>3</sub> (mg/l), Max.	153	200
8	Alkalinity to Phenolphthalein as CaCO <sub>3</sub> (mg/l)	Nil	Not Specified
9	Turbidity NTU, Max.	Nil	1
10	Iron as Fe (mg/l), Max.	0.8	0.3

With reference to the above results, the ground water under consideration is suitable for drinking upon treatment like filtration.

  
Signature of Lab Incharge

  
Signature of HOD

  
Signature of Principal  
Dr. D. V. RAMAMURTHY  
Principal  
Satya Institute Technology and Management  
Vizianagaram

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JNTUK CODE: B6

COLLEGE CODE: SGVP

REPORT NO.: SITAM/CT/013

DATE: 16.03.2023

Project	Construction of Apartment [stilt + Ground Floor + 3 Upper floors]
Location	8-162/6/A, Ganababu Nagar, Ramapadu, Arilova, Visakhapatnam, Visakhapatnam, Andhra Pradesh.
Tests Conducted for	M/s A One Constructions, Visakhapatnam.
Reference	Your sample submitted Dt 11-02-2023
Description	Mix Design for M20 Concrete

## Concrete Mix Design of M20 Concrete

### Design stipulations for M20

i)	Characteristic compressive strength required in the field at 28 days	20 N/mm <sup>2</sup>
ii)	Max. size of aggregate	20mm
iii)	Type of coarse aggregate	Crushed Angular
iv)	Type of fine aggregate	River Sand
v)	Workability(Slump	100 mm
vi)	Degree of quality control	Good
vii)	Type of exposure	Mild
viii)	Type or brand of cement	OPC 43
ix)	Type of Admixture	Fosroc SP 430

Signature of Lab Incharge

Signature of HOD

Signature of Principal

Dr. D.V. RAMAMURTHY  
Principal  
Satya Institute Technology and Management  
Vizianagaram

NEAR RTO OFFICE, GAJULAREGA, VIZIANAGARAM - 535003, ANDHRA PRADESH, INDIA

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### (1) Specific Gravity

i)	Cement	2.82
ii)	Coarse aggregate	2.67
iii)	Fine aggregate	2.60
iv)	Admixture Fosroc SP 430	1.20

### Water Absorption

Coarse aggregate		
i)	20mm	0.50%
ii)	10mm	0.60%
Fine aggregate	-	1.80%

### Coarse Aggregate.

Table-I

Sieve size	% passing	
	20mm Fraction-1	10mm Fraction-2
40mm	100	100
20mm	95.9	100
10mm	0	82.1
4.75mm	0	20.9

To satisfy the required grading of combined aggregates, the 20mm size and 10mm size coarse aggregates are mixed in the following proportions.

Fraction -1 (20mm) : 52 %

Fraction -2 (10mm) : 48 %

The grading achieved of the blended aggregate is given is as under:-

Sieve size	% passing observed	Required as per T-7 IS-383-2016
40mm	100	100
20mm	98	90-100
10mm	39	25-55
4.75mm	10	0-10

(ii) Fine Aggregate: Sieve analysis of fine aggregate is given in table-2.

Table-2

Sieve size	% passing	Limits for zone -II
10.0mm	100	100
4.75mm	98.8	90-100
2.36mm	80.8	75-100
1.18mm	60.4	55-90
0.60mm	35.4	35-59
0.30mm	19.6	8-30
0.15mm	2.4	0-10

Fine aggregate belongs to Zone-II as per Table- 9 of IS 383-2016.

## Concrete Mix Design of M20 Concrete

### **A-0 — Determination of Target Strength**

Himsworth constant for 5% risk factor is 1.65. In this case standard deviation is taken from IS:456 against M 20 is 4.0.

$$\begin{aligned}
 f_{\text{target}} &= f_{\text{ck}} + 1.65 \times S \\
 &= 20 + 1.65 \times 4.0 = 26.60 \text{ N/mm}^2
 \end{aligned}$$



Where,

$S = \text{standard deviation in N/mm}^2 = 4$  (as per table -1 of IS 10262- 2009)

For a tolerance factor of 1.65 and a standard deviation value of 4.0 the target mean strength of concrete comes out to be equal to  $26.60 \text{ N/mm}^2$ .

### A-1 SELECTION OF WATER CEMENT RATIO

From table 5 of IS 456 on page no. 20, Maximum water-cement ratio=0.50

Based on experience, adopt water-cement ratio as 0.43, for the target mean strength and required workability

$0.43 < 0.50$ , hence O.K.

### A-2 SELECTION OF WATER CONTENT

From Table 2 of IS 10262- 2009,

Maximum water content = 186 Kg (for Nominal maximum size of aggregate — 20 mm)

**Table for Correction in water content**

Parameters	Values as per Standard reference condition	Values as per Present Problem	Departure	Correction in Water Content
Slump	100 mm	100 mm	Nil	
Shape of Aggregate	Angular	Gravel with Crushed stone		-20
Admixture	Fosroc SP430	Based on Experience		-10.50
			Total	-30.50

So, estimated water content =  $186 - 30.50 = 155.50 \text{ litre /m}^3$

### A-3 CALCULATION OF CEMENT CONTENT

Water-cement ratio = 0.43

Corrected water content =  $145.50 \text{ litre /m}^3$

Cement content =  $\frac{145.5}{0.43} = 290 \text{ Kg/m}^3$

Minimum cement Content for moderate exposure condition =  $300 \text{ kg/m}^3$   
 $290 \text{ kg/m}^3 > 300 \text{ kg/m}^3$ , hence, OK.

This value is to be checked for durability requirement from IS: 456.

#### A-4 PROPORTIONS OF VOLUME OF COARSE AGGREGATE AND FINE AGGREGATE CONTENT

From Table 3 of IS 10262:2009,

the volume of coarse aggregate per unit volume of total aggregate corresponding to 20mm size aggregate and fine aggregate (Zone II) for the water-cement ratio of 0.43

The volume of coarse aggregate per unit volume of total aggregate is 0.634

Volume of fine aggregate is taken as 0.366

#### A-5 MIX CALCULATIONS

The mix calculations per unit volume of concrete shall be as follows:

a) Volume of concrete =  $1 \text{ m}^3$

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

$$= (290/2.82) \times (1/1000)$$

$$= 0.1028 \text{ m}^3$$

c) Volume of water =  $\frac{\text{Mass of water}}{\text{The specific gravity of water}} \times \frac{1}{1000}$

$$= (145.5/1) \times (1/1000)$$

$$= 0.1455 \text{ m}^3$$

d) Volume of Chemical Admixture =  $\frac{\text{Mass of Chemical Admixture}}{\text{Specific gravity of admixture}} \times \frac{1}{1000}$   
Super Plasticizer @ 1.0% By

Mass of cementations material)

$$= (3.45/1.20) \times (1/1000)$$

$$= 0.0029$$

e) Volume of all in aggregate =  $[ a - (b + c + d) ]$

$$= 0.7488 \text{ m}^3$$

f) Mass of coarse aggregate = 1429 Kg

g) Mass of fine aggregate = 696 Kg

#### **A-6 (1) MIX PROPORTIONS FOR TRIAL NUMBER 1**

Water-cement ratio = 0.43

Quantity of cement = 290 Kg/m<sup>3</sup>

Quantity of Water taken = 145.5 Kg/m<sup>3</sup>

Quantity of Fine aggregate = 696 Kg/m<sup>3</sup>

Quantity of Coarse aggregate = 1430 Kg/m<sup>3</sup>

Quantity of Admixture @ 1.0% = 2.9 Kg/m<sup>3</sup>

#### **A-6 (2) MIX PROPORTIONS FOR TRIAL NUMBER 2**

Water-cement ratio = 0.45

Quantity of cement = 310 Kg/m<sup>3</sup>

Quantity of Water taken = 153 Kg/m<sup>3</sup>

Quantity of Fine aggregate = 702 Kg/m<sup>3</sup>

Quantity of Coarse aggregate = 1450 Kg/m<sup>3</sup>

Quantity of Admixture @ 1.0% = 3.1 Kg/m<sup>3</sup>

#### **A-6 (3) MIX PROPORTIONS FOR TRIAL NUMBER 3**

Water-cement ratio = 0.46

Quantity of cement = 320 Kg/m<sup>3</sup>

Quantity of Water taken = 155 Kg/m<sup>3</sup>

Quantity of Fine aggregate = 710 Kg/m<sup>3</sup>

Quantity of Coarse aggregate = 1460 Kg/m<sup>3</sup>

Quantity of Admixture @ 1.0% = 3.20 Kg/m<sup>3</sup>

The concrete cubes (150mm x 150mm) were cast with these mixes and the following results were obtained.



Mix No.	Water	Cement	W/C Ratio	Slump (mm)	28-days Compressive Strength. N/mm <sup>2</sup> .
1	145.5	290	0.43	96	26.05
2	153	310	0.45	103	29.69
3	155	320	0.46	104	25.32

RECOMMENDATIONS. The 28 days compressive strength of trial mix no.2 fulfills the design criteria as per IS 10262:2009. Hence recommended being adopted for M-20 grade Cement concrete. Quantities of Material for one cubic meter of concrete-

**Water =153 Kg/m<sup>3</sup>**

**Cement =310 Kg**

**Sand =702 Kg**


**Coarse aggregate =1450 Kg**

**Fraction-1 (20mm) = 870 Kg**

**Fraction-2 (10mm) = 580 Kg**


**Quantity of Admixture @ 1.0% = 3.10 Kg**

The above concrete mix design holds good for the samples provided that the parameters taken for the mix design remain the same as taken and aggregates fall within close to their individual grading as mentioned above. The design was on saturated surface dry condition of aggregate when computing the requirement of mixing water, allowance must be made for free surface moisture content or for water absorption dry aggregate Necessary adjustment shall be made in the mass of aggregate. In actual execution, if there is a change in the grading of different materials, the proportions of mixing materials can be changed to achieve the required grading. Quantity of aggregates and water may please be adjusted according to the free moisture present in the aggregates at the time of mix preparations.

  
Signature of Lab Incharge

  
Signature of HOD



  
Signature of Principal  
**D.P.D.V. RAMAMURTHY**  
Principal  
Satya Institute Technology and Management  
Vizianagaram



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JNTUK CODE: 86

REPORT NO.: SITAM/CT/015

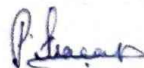
DATE: 16.03.2023

Project	Construction of Apartment [stilt + Ground Floor + 3 Upper floors]
Location	8-162/6/A, Ganababu Nagar, Ramapadu, Arilova, Visakhapatnam, Visakhapatnam, Andhra Pradesh.
Tests Conducted for	M/s A One Constructions, Visakhapatnam.
Reference	Your sample submitted Dt 11-02-2023
Description	Mix Design for M25 Concrete

## Concrete Mix Design of M25 Concrete

### Design stipulations for M20

i)	Characteristic compressive strength required in the field at 28 days	25 N/mm <sup>2</sup>
ii)	Max. size of aggregate	20mm
iii)	Type of coarse aggregate	Crushed
iv)	Type of fine aggregate	Crushed
v)	Workability(Slump)	25- 50 mm
vi)	Degree of quality control	Good
vii)	Type of exposure	Moderate
viii)	Type or brand of cement	A.C.C. ( PPC )
ix)	Type of Admixture	Sikka

  
Signature of Lab Incharge

  
Signature of HOD

  
Signature of Principal  
Dr.D.V.RAMAMURTHY  
Principal  
Satya Institute Technology and Management  
Vizianagaram

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### (1) Specific Gravity

i)	Cement	2.82
ii)	Coarse aggregate	2.67
iii)	Fine aggregate	2.60
iv)	Admixture Sikka	1.20
Coarse Aggregate		
i)	20mm	0.50%
ii)	10mm	0.60%
Fine aggregate		1.80%

### Water Absorption

Coarse aggregate		
i)	20mm	0.50%
ii)	10mm	0.60%
Fine aggregate		1.80%

### Coarse Aggregate.

Table-I

Sieve size	% passing	
	20mm Fraction-1	10mm Fraction-2
40mm	100	100
20mm	95.9	100
10mm	0	82.1
4.75mm	0	20.9

To satisfy the required grading of combined aggregates, the 20mm size and 10mm size coarse aggregates are mixed in the following proportions.

Fraction -1 (20mm) : 52 %

Fraction -2 (10mm) : 48 %

The grading achieved of the blended aggregate is given is as under:-



Sieve size	% passing observed	Required as per T-7 IS-383-2016
40mm	100	100
20mm	98	90-100
10mm	39	25-55
4.75mm	10	0-10

(ii) Fine Aggregate: Sieve analysis of fine aggregate is given in table-2.  
Table-2

Sieve size	% passing	Limits for zone -II
10.0mm	100	100
4.75mm	98.8	90-100
2.36mm	80.8	75-100
1.18mm	60.4	55-90
0.60mm	35.4	35-59
0.30mm	19.6	8-30
0.15mm	2.4	0-10

**Fine aggregate belongs to Zone-II as per Table- 9 of IS 383-2016.**

### Procedure for Concrete Mix Design of M25 Concrete

#### **A-0 — Determination of Target Strength**

Himsworth constant for 5% risk factor is 1.65. In this case standard deviation is taken from IS:456 against M 25 is 4.0.

$$f_{\text{target}} = f_{\text{ck}} + 1.65 \times S$$

$$= 25 + 1.65 \times 4.0 = 31.60 \text{ N/mm}^2$$

Where,

S = standard deviation in  $\text{N/mm}^2 = 4$  (as per table -1 of IS 10262- 2009)

For a tolerance factor of 1.65 and a standard deviation value of 4.0 the target mean strength

of concrete comes out to be equal to  $31.60 \text{ N/mm}^2$ .

### A-1 SELECTION OF WATER CEMENT RATIO

From table 5 of IS 456 on page no. 20, Maximum water-cement ratio=0.50

Based on experience, adopt water-cement ratio as 0.43, for the target mean strength and required workability  
 $0.43 < 0.50$ , hence O.K.

### A-2 SELECTION OF WATER CONTENT

From Table 2 of IS 10262- 2009,

Maximum water content = 186 Kg (for Nominal maximum size of aggregate — 20 mm)

#### Table for Correction in water content

Parameters	Values as per Standard reference condition	Values as per Present Problem	Departure	Correction in Water Content
Slump	25-50 mm	25-50 mm	Nil	
Shape of Aggregate	Angular	Gravel with Crushed stone		-20
Admixture	Sikka	Based on Experience		-10.50
			Total	-30.50

So, estimated water content =  $186 - 30.50 = 155.50 \text{ litre /m}^3$

### A-3 CALCULATION OF CEMENT CONTENT

Water-cement ratio = 0.43

Corrected water content =  $155.50 \text{ litre /m}^3$

Cement content =  $\frac{155.5}{0.43} = 361.63$  say  $362 \text{ Kg/m}^3$

Minimum cement Content for moderate exposure condition =  $300 \text{ kg/m}^3$

$362 \text{ kg/m}^3 > 300 \text{ kg/m}^3$ , hence, OK.

This value is to be checked for durability requirement from IS: 456.

In the present example against mild exposure and for the case of reinforced concrete the minimum cement content is  $300 \text{ kg/m}^3$  which is less than  $362 \text{ kg/m}^3$ . Hence cement content adopted =  $362 \text{ kg/m}^3$ .

As per clause 8.2.4.2 of IS: 456

Maximum cement content =  $450 \text{ kg/m}^3$ .



#### A-4 PROPORTIONS OF VOLUME OF COARSE AGGREGATE AND FINE AGGREGATE CONTENT

From Table 3 of IS 10262:2009,

the volume of coarse aggregate per unit volume of total aggregate corresponding to 20mm size aggregate and fine aggregate (Zone II) for the water-cement ratio of 0.43

The volume of coarse aggregate per unit volume of total aggregate is 0.634

Volume of fine aggregate is taken as 0.366

#### A-5 MIX CALCULATIONS

The mix calculations per unit volume of concrete shall be as follows:

a) Volume of concrete = 1 m<sup>3</sup>

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

Specific gravity of cement 1000

= (362/2.82) x (1/1000)

= 0.1284 m<sup>3</sup>

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

The specific gravity of water 1000

= (155.5/1) x (1/1000)

= 0.1555 m<sup>3</sup>

d) Volume of Chemical Admixture =  $\frac{\text{Mass of Chemical Admixture}}{\text{Specific gravity of admixture} \times 1000} \times 1$   
Super Plasticizer @ 1.0% By

Mass of cementations material)

= (3.45/1.20) x (1/1000)

= 0.0029

e) Volume of all in aggregate = [ a - (b + c + d) ]

= 0.7132 m<sup>3</sup>

f) Mass of coarse aggregate = 1207 Kg

g) Mass of fine aggregate = 679 Kg



**A-6 (1) MIX PROPORTIONS FOR TRIAL NUMBER 1**

Water-cement ratio = 0.43

Quantity of cement = 362 Kg/m<sup>3</sup>  
Quantity of Water taken = 155.5 Kg/m<sup>3</sup>  
Quantity of Fine aggregate = 679 Kg/m<sup>3</sup>  
Quantity of Coarse aggregate = 1207 Kg/m<sup>3</sup>  
Quantity of Admixture @ 1.0% = 3.45 Kg/m<sup>3</sup>

**A-6 (2) MIX PROPORTIONS FOR TRIAL NUMBER 2**

Water-cement ratio = 0.45

Quantity of cement = 353 Kg/m<sup>3</sup>  
Quantity of Water taken = 159 Kg/m<sup>3</sup>  
Quantity of Fine aggregate = 679 Kg/m<sup>3</sup>  
Quantity of Coarse aggregate = 1207 Kg/m<sup>3</sup>  
Quantity of Admixture @ 1.0% = 3.38 Kg/m<sup>3</sup>

**A-6 (3) MIX PROPORTIONS FOR TRIAL NUMBER 3**

Water-cement ratio = 0.46

Quantity of cement = 352 Kg/m<sup>3</sup>  
Quantity of Water taken = 162 Kg/m<sup>3</sup>  
Quantity of Fine aggregate = 684 Kg/m<sup>3</sup>  
Quantity of Coarse aggregate = 1216 Kg/m<sup>3</sup>  
Quantity of Admixture @ 1.0% = 3.10 Kg/m<sup>3</sup>

The concrete cubes (150mm x 150mm) were cast with these mixes and the following results were obtained.

Mix No.	Water	Cement	W/C Ratio	Slump (mm)	28-days Compressive Strength. N/mm <sup>2</sup> .
1	155.5	362	0.43	45	32.11
2	159	353	0.45	51	35.89
3	162	352	0.46	55	39.33

RECOMMENDATIONS. The 28 days compressive strength of trial mix no.3 fulfills the design criteria as per IS 10262:2009. Hence recommended being adopted for M-25 grade Cement concrete.

Quantities of Material for one cubic meter of concrete-

Water=162 Kg

Cement=352 Kg

Sand=679 Kg

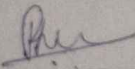
Coarse aggregate=1207 Kg

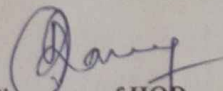
Fraction-1 (20mm) = 603.50 Kg

Fraction-2 (10mm) = 579 Kg

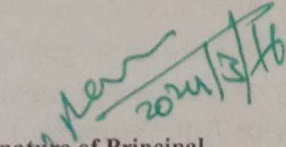
Quantity of Admixture @ 1.0% = 3.10 Kg

The above concrete mix design holds good for the samples provided that the parameters taken for the mix design remain the same as taken and aggregates fall within close to their individual grading as mentioned above. The design was on saturated surface dry condition of aggregate when computing the requirement of mixing water, allowance must be made for free surface moisture content or for water absorption dry aggregate. Necessary adjustment shall be made in the mass of aggregate. In actual execution, if there is a change in the grading of different materials, the proportions of mixing materials can be changed to achieve the required grading. Quantity of aggregates and water may please be adjusted according to the free moisture present in the aggregates at the time of mix preparations.

  
Signature of Lab Incharge

  
Signature of HOD



  
Signature of Principal  
**Dr. D. V. RAMAMURTHY**  
Principal  
Satya Institute Technology and Management  
Vizianagaram

**SRI BOTCHA GURUNAI DU MEMORIAL EDUCATIONAL SOCIETY - (from 1-Apr-2022**  
**VIZIANAGARAM**

**SBI FORT BR-31744546678 Book**

1-Mar-2023 to 20-Mar-2023

Page 1

Date	Particulars	Vch Type	Vch No.	Debit	Credit
1-3-2023	Cr <b>Opening Balance</b>			<b>1,05,876.53</b>	
6-3-2023	Cr <b>TUITION FEE</b> UPI/CR/306590288286	Receipt		37,800.00	
9-3-2023	Cr <b>TUITION FEE</b> UPI/CR/306848258019	Receipt		25,000.00	
11-3-2023	Cr <b>Hostel Fee-Exempted</b> UPI/CR/307027967463	Receipt		9,500.00	
	Cr <b>TUITION FEE</b> UPI/CR/307059065546	Receipt		30,000.00	
	Cr <b>University Fee</b> UPI/CR/307020591826	Receipt		5,000.00	
	Cr <b>TUITION FEE</b> UPI/CR/307056791209	Receipt		15,000.00	
	Cr <b>University Fee</b> UPI/CR/307031472689	Receipt		3,600.00	
	Cr <b>TUITION FEE</b> UPI/CR/307013415828	Receipt		35,000.00	
	Cr <b>TUITION FEE</b> UPI/CR/307075106002	Receipt		24,000.00	
	Cr <b>TUITION FEE</b> UPI/CR/307013457944	Receipt		20,000.00	
	Cr <b>Hostel Fee-Exempted</b> UPI/CR/307060305233	Receipt		10,000.00	
	Cr <b>A One Constructions</b> Cheque/DD 11-3-2023 40,000.00 Dr UPI/CR/307060547898	Receipt		40,000.00	
	Cr <b>TUITION FEE</b>	Receipt		45,000.00	
15-3-2023	Cr <b>TUITION FEE</b>	Receipt		28,000.00	
	Cr <b>TUITION FEE</b> UPI/CR/307439469873	Receipt		18,000.00	
	Cr <b>TUITION FEE</b>	Receipt		65,000.00	
	Cr <b>TUITION FEE</b> UPI/CR/307458559027	Receipt		17,542.00	
16-3-2023	Cr <b>TUITION FEE</b> UPI/CR/307523644323	Receipt		11,400.00	
	Cr <b>A One Constructions</b> Cheque/DD 16-3-2023 70,000.00 Dr UPI/CR/307541963120	Receipt		70,000.00	
	Carried Over				6,15,718.53

continued ...



Date	Particulars	Vch Type	Vch No.	Debit	Credit
	Brought Forward			6,15,718.53	
17-3-2023	Cr TUITION FEE UPI/CR/307662427138	Receipt		20,000.00	
	Cr TUITION FEE UPI/CR/307693256803	Receipt		20,000.00	
	Cr TUITION FEE UPI/CR/307696424935	Receipt		42,000.00	
20-3-2023	Cr Hostel Fee-Exempted UPI/CR/307916857636	Receipt		10,000.00	
				7,07,718.53	
Dr	Closing Balance				7,07,718.53
				<b>7,07,718.53</b>	<b>7,07,718.53</b>