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EFFECTS OF DIFFERENT TEMPERATURE ON CONCRETE BY ADDING GLASS FIBER, STEEL FIBER AND POLYPROPYLENE FIBER WITH RIVER SAND

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ABSTRACT*--The paper introduces an examination concerning the productivity of temperature-delicate self compacting concrete. Inspecting on self-compected solid, steelfibe, glassfiber, Polypropylenefiber to this end addıng strands(steelfiber,glassfiber,Polypropylene),using riversand content1.2% for blend of solidmaterial When the shapetests were7,14,28 days old. They have been warmed to high temperatures. Every example were warmed to various temperatures for each solid blend (0°C,100C,200°C) Then Tests for weight reduction and compressive quality were performed.The Observations of surface breaks were made after presentation to high temperatures A critical loss of solidarity for all cements after 200°C was watched, Especially for concrete containing Polypropylene fiber,glassfiber,steelfiber The strands decreased the danger of dangerous spalling and forestalled it Based on the consequences of the investigation, the yield of fine total cement can be induced*

Keywords*-- Steel fiber, Glass fiber, Polypropylene Fiber, river sand ,M20,M25,M30 grade concreate*

I. INTRODUCTION

Self-Compacting Concrete is also known as Self-Consolidating Concrete. This concrete can compact under its own weight without using any mechanical vibrators. Analyse the compressive strength of concrete with mix of Glass fibre, Polypropylene fibre and Steel fibre and apply different temperature.Self-compacting concrete (SCC) is also known as self-consolidating concrete. **Self-compacting concrete** (SCC) is a special type of **concrete** which can be placed and consolidated under its own weight without any vibration effort due to its excellent deformability, and which at the same time is cohesive enough to be handled without segregation or bleeding SCC is also much less labor intensive than to standard concrete mixes. SCC is usually similar to standard concrete in terms of its setting and curing time (gaining' strength), and strength SCC gains its fluid properties by usually high proportion of fine aggregates such as sand and also additive of admixtures to settle the concrete. In this chapter discussed about the need for SCC, applications of SCC, properties and objective for the fresh concrete and the hardened concrete. The main purpose of the project is the Self-Compacting Concrete mix with Glass fiber, polypropylene fiber and Steel fiber comparing with each other with different grade (M20,M25,M30).

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II. MATERIALS USED:-

Cement:-

Cement is the fine grey powder that acts as a binding material which is used for the construction. The cement that was used during experiment was Ordinary Portland Cement (Fig. No. 3. 1) 43 grades confirming to IS 8112 impurities were removed before the process. Generally, Portland cement is used for pervious concrete. 53 Grade cements was used in our project. A cement is a binder, a substance used in construction that sets, hardens to other materials, binding them together. Cement is seldom used solely but is used to bind sand and gravel (aggregate) together. Cement is used with fine aggregate to produce mortar for masonry, or with sand and gravel aggregates to produce concrete. Portland cement gets its strength from chemical reactions between the cement and water. The process is known as hydration. This is a complex process that is best understood by first understanding the chemical composition of cement.4

Chemical Compounds of portable Cement

The raw material used in the manufactures of Portland cement comprises four principal compounds. These compounds are usually regarded as the major constituents of cement and tabulated with their abbreviated symbols (Table No: 3.1).

NAME OF COMPOUND	OXIDE	ABBREVIATIONS
Tricalcium Silicate Dicalcium Silicate Tricalcium AluminateTetra Calcium Aluminoferrite	3CaO.SiO2 2CaO.SiO2 3CaO.Al2O3 4CaO.Al2O3.Fe2O	C3S C2S C3A C4AF

River sand

River Sand for Construction Sand is used as fine aggregate in mortars and concrete. Natural river sand is the most preferred choice as a fine aggregate material. River sand is a product of natural weathering of rocks over a period of millions of years. Itis mined from the river beds. Sand is used to provide bulk, strength, and other properties to construction materials like asphalt and concrete. It is also used as a decorative material in landscaping. It is used most commonly in the masonry trade to bind stone, brick or concrete blocks during building construction.

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Advantage of river sand

- It is well graded in the required proportion.
- It does not contain organic and soluble compound that affects the setting time and properties of cement, thus the required strength of concrete can be maintained.
- It does not have the presence of impurities such as clay, dust and silt coating, increase water requirement as in the case of river sand which impair bond between cement paste and aggregate. Thus, increase quality and durability of concrete.

Coarse Aggregate

The aggregates that are used for this research work are taken from the locally available natural rocks that are get retained on 4.75micron sieve after being crushed. These granite passes the requirement provided by Indian Standard 383 1970. The aggregates should consist the 20mm size to mix the SCC. The aggregates size was analysed by sieving process. Aggregates are inert granular materials such as sand, gravel, or crushed stone that, along with water and Portland cement, are an essential ingredient in concrete. For a good concrete mix, aggregates need to be clean, hard, strong particles free of absorbed chemicals or coatings of clay and other fine materials that could cause the deterioration of concrete. Aggregates, which account for 60 to 75 percent of the total volume of concrete, are divided into two distinct categories--fine and coarse in general, for pervious concrete fine aggregates are hardly used or very less, as it might reduce the permeability the green The concept will be diluted, in this case for this study also fine aggregates were used for the preparation of pervious concrete. Natural gravel and sand are usually dug or dredged from a pit, river, lake, or seabed. Crushed aggregate is produced by crushing quarry rock, boulders, cobbles, or large-size gravel. The coarse aggregates were well traded to 20mm size in order to ensure that more than 60% of the aggregates are of same size this will ensure the permeability consistent (Fig. No: 3. 4). Although some variation in aggregate properties is expected, characteristics that are considered include:

- Grading
- Durability
- Particle Shape and Surface Texture
- Abrasion and Skid Resistance
- Unit Weight and Voids

Glass Fibre

Glass fibre is a really cool polymer. It can be used to make a very wide - ranging style pf products. You may never have heard of glass fibre, but there's no doubt that you encounter or use a product that is made from it nearly every single day of your life! That is. provided you live a modern existence and not in the wilderness of course

3.1.6.1 Properties of Glass Fibre:

- High tensile strength: Glass has greater tensile strength than steel wire of the same diameter at a lower weight.
- Dimensional stability: Consist of a low elongation load, typically 3% or less.
- High heat resistance: Glass fabrics retain 50% of room temperature tensile strength at 700ºF 25% at 900ºF, a softening point of 1,555ºF and a melting point of 2,075ºF.
- Fire resistance: made up inorganic materials making the product non-combustible.
- Good thermal conductivity: Glass fibres are great thermal insulators because of their high ratio of surface area to weight.
- Good Chemical resistance: Highly resistance to the attack by most chemical.
- Outstanding electrical properties: Has a high dielectric strength and low dielectric constant.
- Durability: No prone to sunlight, fungi or bacteria**.**
- Economical: A cost efficient choice compared to similar product.

3.1.6.2Properties of steel fiber:

Steel fiber is a metal reinforcement. Steel fiber for reinforcing concrete is defined as short, discrete lengths of steel fibers with an aspect ratio (ratio of length to diameter) from about 20 to 100, with different cross-sections, and that are sufficiently small to be randomly dispersed in an unhardened concrete mixture using the usual mixing procedures. A certain amount of steel fiber in concrete can cause qualitative changes in concrete's physical property, greatly increasing resistance to cracking, impact, fatigue, and bending, tenacity, durability, and other properties . Basically, steel fiber can be categorized into five groups, depending on the manufacturing process and its shape and/or section: cold-drawn wire, cut sheet, melt-extracted, mill cut, and modified cold-drawn wire. In 2003 Wen and Chung first fabricated cement paste with self-sensing properties using steel fibers with a length of 6 mm and diameter of 8 mm . Hong employed steel fibers with a length of 32 mm and diameter of 0.64 mm to develop self-sensing concrete .Hou and Lynch also developed an engineered cementitious composite with sensing properties by incorporating steel fibers .Teomete and Kocyigit used steel fiber with a length of 6 mm to fabricate self-sensing concrete with tensile strain-sensing properties.

3*.1.6.3Properties of polypropylene:*

Thermal conductivity:

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Lowest thermal conductivity of any natural or synthetic fibre (6.0 compared to 7.3 for wool, 11.2 for viscose and 17.5 for cotton). Polypropylene fibres retain more heat for a longer period of time, have excellent insulative properties in apparel, and combined with its hydrophobic nature keeps wearer dry and warm. Warmer than wool.

Anti-Static Behaviour:

The generation of static electricity on textiles is a complex and, to some extent, a subjective problem. Practical experience shows that polypropylene does not exhibit a static behavior in most normal circumstance and if a problem does occur it can easily be controlled by the use of normal textile anti-static treatments during processing. Anti-static agents can also be incorporated in the polymer to reduce static build up.

Tests on Fresh Concrete

1 L-Box Test

The apparatus consists of rectangular section box in the shape of an 'L', with a vertical and horizontal section. separated by a movable gate, in front of which vertical length of reinforcement bar are fitted The vertical section is filled with concrete, and then the gate lifted to let the concrete flow into the horizontal section. When the flow has stopped, the height of the concrete at the end of the horizontal section is expressed as a proportion of that remaining. in the vertical section. It indicates the slope of the concrete when at rest. This is an indication passing ability, or the degree to which the passage of concrete through the bars is restricted. The horizontal section of the box can be marked at 200mm and 400mm from the gate and the times taken to reach these points measured. These are known as the T20 and T40 times and are an indication for the filling ability The section of bar con be of different diameters and are spaced at different intervals, in accordance with normal reinforcement considerations, 3x the maximum aggregate size might be appropriate. The bar can principally be set at any spacing to impose a more or less severe test of the passing ability of the concrete.

2 U-Box Test

U box test was developed by the Technology Research Centre of the Taisei Corporation in Japan. Sometime the apparatus is called a "box shaped" test. U Box test is used to measure the filing ability of self-compacting concrete. The apparatus consists of a vessel that is divided by a middle wall into two compartments an opening with a sliding gate is fitted between the two sections. Reinforcing nominal diameter of 134 mm are installed at the gate with centre to centre spacing of 50 mm. this create a clear spacing of 35 mm between bars. The left-hand section is filled with about 20 litres of concrete then the gate is lifted and the concrete flows upwards into the other section. The height of the concrete in both sections is measured.

3 V-Funnel Test

The equipment for V funnel test on self-compacting concrete consists of a v shaped funnel. V-funnel test is used to determine the filling ability (flow ability) of the concrete with a maximum aggregate size of 20mim. The funnel is filled with about 12 litters of concrete and the time taken for it to flow through the apparatus measured. After this the funnel can be concrete and left for 5 minutes to settle. If the concrete shows segregation then the flow time will increase significantly.

4 J-Ring

J - Ring The J-ring test can be used to determine the passing ability of self - consolidating concrete. It is applicable for laboratory use in testing different concrete mixtures for passing ability or can be used in the field as a quality control test.

Test on Hardened Concrete:

1 Compressive Strength

Compressive strength is used to determine the strength of the concrete cube, compressive strength of concrete depends on many factors such as water-cement ratio. cement strength quality of concrete material, quality control during production of concrete etc. These specimens are tested by compression testing machine after 7 days curing or 28 days curing. Load at the failure divided by area of specimen gives the compressive strength of concrete.

III. MIX PROPERTIES

3.3.2.1 M20 Mix:

M20 grade is used with a mix ratio of (1:1.8:2.27) idea is to the increase the compressive strength. The quantity of the materials is mention in the Table No: 3. 3 and Table No: 3.

Maximum water - cement ratio = 0. 5 Based on experience, adopt water - cement ratio as 0. 5. For calculating cement, sand and coarse aggregate,

Calculation for the quantity of materials required
Volume of cement = (cement ratio / 6.07) * 1.54*1440kg
Volume of sand = (sand ratio / 6.07) * 1.54* 1600kg
Volume of coarse aggregate (C.A ratio / 6.07) * 1450kg
Were:
1440kg/m^3 – unit weight of cement.
1600kg/m^3 = unit weight of fine aggregate.
1450kg/m^3 = unit weight of coarse aggregate.

Table No. 3.3 Mix Properties M20 for the effects of River-Sand (Each Cube)

S. No	% of GF/PF/SF	Cement (Kg)	River-Sand (kg)	C.A (kg)	W/C ratio	SP (ml)
1	1.2	1.23	2.45	4.86	0.5	12.3

Table No. 3.3 Mix Properties M25 for the effects of River-Sand (Each Cube)

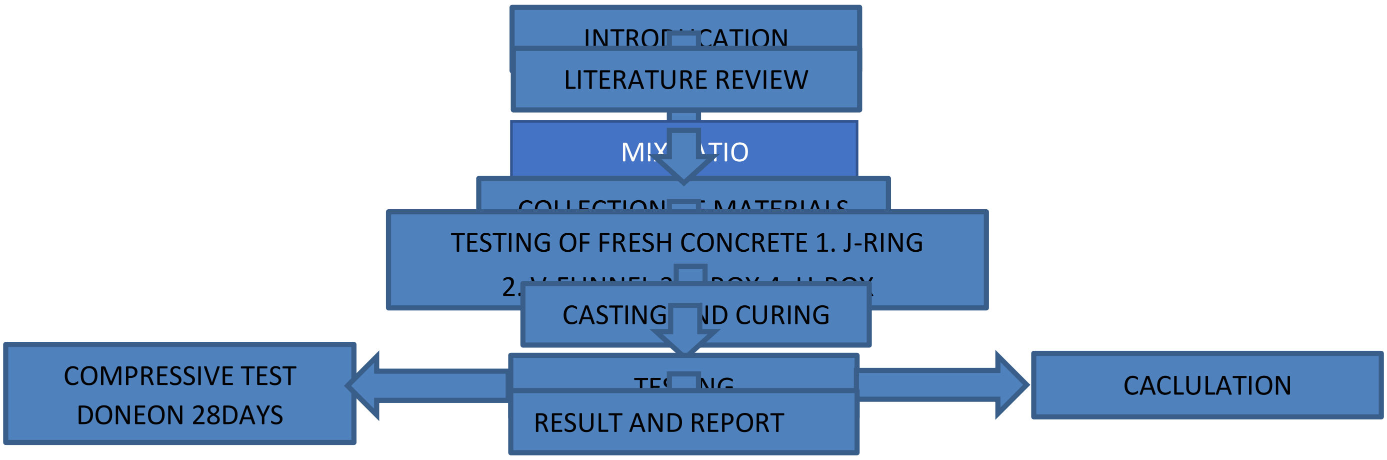
S. No	% of GF/PF/SF	Cement (Kg)	River-Sand (kg)	C.A (kg)	W/C ratio	SP (ml)
1	1.2	1.36	2.41	4.78	0.5	13.6

Table No. 3.3 Mix Properties M30 for the effects of River-Sand (Each Cube)

S. No	% of GF/PF/SF	Cement (Kg)	River-Sand (kg)	C.A (kg)	W/C ratio	SP (ml)
1	1.2	1.4	2.32	4.75	0.5	14

Were:
GF = Glass Fibre,

SF = Steel Fibre,
PF = Polypropylene Fibre,
River Sand,
C.A = Coarse Aggregate,
W/C = Water Ratio,



The project work was started by collecting all the materials required i. e. cement, fine aggregates, fine aggregates, sand, chemical admixture (TECH - MIX550) and glass fibers. Once the materials were collected, sieving was done for aggregates, using mechanical sieving by which we collected 20mm graded aggregates. Sand sieving was done manually and the sand passing through 4. 75mm sieve was collected. 6cubes were casted with River Sand after doing the slump cone test, flow table No: test and J - Ring test. After 24hours they were kept for curing. 3cubes for 7th day of compressive test and 3cubes for 28 * day of compressive test. Do similar for the manufacture sand. The compressive strength test was done using universal testing machine for 7 "and 28" day respectively after drying the cubes under the sun for 5 hours. The test results for all the cubes with respect to their day of curing was recorded.

sieve analysis for fine aggregate

Weight of fine aggregate taken (Wf): 1Kgs					
Sl No.	Sieve size	Weight retained (in kg)	% of retained	Cumulative %age retained	%age passed (100-C_1)
C_1	C_2	C_3	C_4	C_5	C_6
1	4.75 mm	0.010	1.0%	1.0	99
2	2.36 mm	0.070	7.0%	8.0	92
3	1.18mm	0.200	20.0%	28.0	72
4	600 microns	0.170	17.0%	45.0	55
5	300 microns	0.440	44.0%	89.0	11
6	150 microns	0.100	10.0%	99.0	1
7	Pan	0.010	1.0%	100	0
Sum of cumulative %age retained (excluding pan)				370	-

sieve analysis for coarse aggregate

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Weight of coarse aggregate taken (Wf): 5Kgs					
Sl No.	Sieve size	Weight retained (in g)	% of retained	Cumulative %age retained	%age passed ($100-C_1$)
C_1	C_2	C_3	C_4	C_5	C_6
1	20 mm	0	0	0	100
2	16mm	15	0.3	0.3	99.7
3	12.5mm	435	8.7	9	91
4	10 mm	1675	33.5	42.5	57.5
5	4.75 mm	2625	52.5	95	5
6	Pan	250	2.0	100	0
Sum of cumulative %age retained (excluding pan)				246.8	-
Fineness modules + 5				7.468	-
Grade to which the coarse aggregate belongs					-

MIX DESIGN

Mix Design for M20 (Is Method)

I. STIPULATIONS FOR PROPORTIONING

A) GRADE OF DESIGNATION -M20
B) TYPE OF CEMENT - OPC 53 GRADE
C) MAXIMUM NOMINAL SIZE OF AGGREGATE - 20 mm
D) MINIMUM CEMENT CONTENT - 300 kg/m^3
E) MAXIMUM CEMENT CONTENT - 450 kg/m^3
F) WORKABLITY - 50 mm
G) EXPOSURE CONDITION - severe
H) METHOD OF CONCRETE PLACIING - Hand

II. TEST DATA FOR MATERIALS

CEMENT USED - OPC 53 grade
SPECIFIC GRAVITY OF CEMENT - 3.15
SPECIFIC GRAVITY
COARSE AGGREGATE -2.74
FINE AGGREGATE -2.74
WATER ABSORPTION
COARSE AGGREGATE -0.5%
FINE AGGREGATE -1.0%

III. TARGET STRENGTH FOR PROPORTIONING

f'ck =fck + 1.65 *s*

where,

f'ck = target average compressive strength at 28 days,
fck = characteristic compressive strength at 28 days, and
s = standard deviation.

From Table I, standard deviation, *s* =4 N/mm^2
Therefore, target strength =20 + 1.65 x 4 = 26.6 N/mm^2

IV. SELECTION OF WATER-CEMENT RATIO

From Table 5 of IS 456, maximum water-cement ratio = 0.45.
Based on experience, adopt water-cement ratio as 0.50.
0.45 < 0.5, hence O.K.

V. SELECTION OF WATER CONTENT

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From Table 2, maximum water content =186 litre (for 25 to 50 mm slump range)
For 12.5 mm aggregate
Estimated water content for 50 mm slump = 186 litre

Vl. CALCULATION OF CEMENT CONTENT

Water-cement ratio = 0.45

Cement content=

= 358 kg/m^3

From Table 5 of IS 456, minimum cement
content for 'severe' exposure condition = 300 kg/m3
358 kg/m^3 > 300 kg/m^3, hence, O.K.

A·7 PROPORTION OF VOLUME OF COARSE AGGREGATE AND FINE AGGREGATE CONTENT

From Table 3. volume of coarse aggregate corresponding to 20 mm size aggregate and fine aggregate (Zone III)

for water-cement ratio of 0.45 = 0.5
Therefore, volume of coarse aggregate = 0.5
Balancing: 0.5-0.63 =
Volume of fine aggregate content = (1 - 0.63) =0.37

A-8 MIX CALCULATIONS

Volume of concrete = 1 m^2
Volume of cement = x
=
= 0.113 m^2
Volume of water = x
=
= 0.197 m^2
Volume of chemical admixture = x
(superplasticizer) @ 1.0% by mass =
Of cementitious material =0.6813 m^2

Volume of chemical admixture = [a – (b+c+d)]
= 1-(0.113+0.197+0.1)
= 0.69 m^2
Mass of coarse aggregate = e x volume of coarse aggregate x S.G of Coarse aggregate
= 0.69 X 0.63 X 2.74 X 1000
= 1173.69 kg
Mass of fine aggregate = e x volume of fine aggregate x S.G of fine aggregate
= 0.69 X 0.37 X 2.74 X 1000
= 676.545 kg

IX. MIX PROPORTIONS FOR M-20

Cement - 358 kg/m^3
Water - 197 kg/m^3
Fine aggregate - 676.54 kg/m^3
Coarse aggregate - 1176.54 kg/m^3
Water cement ratio - 0.45

MIX DESIGN

Mix Design for M25 (Is Method)

I. STIPULATIONS FOR PROPORTIONING

A) GRADE OF DESIGNATION	-M25
B) TYPE OF CEMENT	- OPC 53 GRADE
C) MAXIMUM NOMINAL SIZE OF AGGREGATE	- 20 mm
D) MINIMUM CEMENT CONTENT	- 300 kg/m^3
E) MAXIMUM CEMENT CONTENT	- 450 kg/m^3
F) WORKABLITY	- 50 mm
G) EXPOSURE CONDITION	- severe
H) METHOD OF CONCRETE PLACIING	- Hand

II. TEST DATA FOR MATERIALS

CEMENT USED	- OPC 53 grade
SPECIFIC GRAVITY OF CEMENT	- 3.15
SPECIFIC GRAVITY	
COARSE AGGREGATE	-2.74
FINE AGGREGATE	-2.74
WATER ABSORPTION	
COARSE AGGREGATE	-0.5%
FINE AGGREGATE	-1.0%

III. TARGET STRENGTH FOR PROPORTIONING

f'ck =fck + 1.65 *s*

where,

f'ck = target average compressive strength at 28 days,
fck = characteristic compressive strength at 28 days, and
s = standard deviation.

From Table I, standard deviation, *s* =4 N/mm^2
Therefore, target strength =25 + 1.65 x 4 = 31.6 N/mm^2

IV. SELECTION OF WATER-CEMENT RATIO

From Table 5 of IS 456, maximum water-cement ratio = 0.45.
Based on experience, adopt water-cement ratio as 0.50.
0.45 < 0.5, hence O.K.

V. SELECTION OF WATER CONTENT

From Table 2, maximum water content =186 litre (for 25 to 50 mm slump range)
For 12.5 mm aggregate
Estimated water content for 50 mm slump = 186 litre

Vl. CALCULATION OF CEMENT CONTENT

Water-cement ratio = 0.45

Cement content=

= 394 kg/m^3

From Table 5 of IS 456, minimum cement
content for 'severe' exposure condition = 300 kg/m3
394 kg/m^3 > 300 kg/m^3, hence, O.K.

A·7 PROPORTION OF VOLUME OF COARSE AGGREGATE AND FINE AGGREGATE CONTENT

From Table 3. volume of coarse aggregate corresponding to 20 mm size aggregate and fine aggregate (Zone III)

for water-cement ratio of 0.45 = 0.5
Therefore, volume of coarse aggregate = 0.5
Balancing: 0.5-0.63 =
Volume of fine aggregate content = (1 - 0.63) =0.37

A-8 MIX CALCULATIONS

Volume of concrete = 1 m^2
Volume of cement = x
=
= 0.125 m^2
Volume of water = x
=
= 0.197 m^2
Volume of chemical admixture = x
(superplasticizer) @ 1.0% by mass =
Of cementitious material =0.6813 m^2

Volume of chemical admixture = [a – (b+c+d)]
= 1-(0.125+0.197+0.1)
= 0.67 m^2
Mass of coarse aggregate = e x volume of coarse aggregate x S.G of Coarse aggregate
= 0.67X 0.64 X 2.74 X 1000
= 1157.76 kg
Mass of fine aggregate = e x volume of fine aggregate x S.G of fine aggregate
= 0.67 X 0.37 X 2.74 X 1000
= 639.18 kg

IX. MIX PROPORTIONS FOR M-25

Cement - 394 kg/m^3
Water - 197 kg/m^3
Fine aggregate - 639.18 kg/m^3
Coarse aggregate - 1157.76 kg/m^3
Water cement ratio - 0.45

MIX DESIGN

Mix Design for M30 (Is Method)

I. STIPULATIONS FOR PROPORTIONING

A) GRADE OF DESIGNATION -M30
B) TYPE OF CEMENT - OPC 53 GRADE
C) MAXIMUM NOMINAL SIZE OF AGGREGATE - 20 mm

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D) MINIMUM CEMENT CONTENT - 300 kg/m^3
E) MAXIMUM CEMENT CONTENT - 450 kg/m^3
F) WORKABLITY - 50 mm
G) EXPOSURE CONDITION - severe
H) METHOD OF CONCRETE PLACIING - Hand

II. TEST DATA FOR MATERIALS

CEMENT USED - OPC 53 grade
SPECIFIC GRAVITY OF CEMENT - 3.15
SPECIFIC GRAVITY
COARSE AGGREGATE -2.74
FINE AGGREGATE -2.74
WATER ABSORPTION
COARSE AGGREGATE -0.5%
FINE AGGREGATE -1.0%

III. TARGET STRENGTH FOR PROPORTIONING

f'ck =fck + 1.65 *s*

where,

f'ck = target average compressive strength at 28 days,
fck = characteristic compressive strength at 28 days, and
s = standard deviation.

From Table I, standard deviation, *s* =4 N/mm^2
Therefore, target strength =30 + 1.65 x 4 = 38.25 N/mm^2

IV. SELECTION OF WATER-CEMENT RATIO

From Table 5 of IS 456, maximum water-cement ratio = 0.45.
Based on experience, adopt water-cement ratio as 0.50.
0.45 < 0.5, hence O.K.

V. SELECTION OF WATER CONTENT

From Table 2, maximum water content =186 litre (for 25 to 50 mm slump range)
For 12.5 mm aggregate
Estimated water content for 50 mm slump = 186 litre

Vl. CALCULATION OF CEMENT CONTENT

Water-cement ratio = 0.45

Cement content=

= 447 kg/m^3

From Table 5 of IS 456, minimum cement
content for 'severe' exposure condition = 300 kg/m3
447 kg/m^3 > 300 kg/m^3, hence, O.K.

A·7 PROPORTION OF VOLUME OF COARSE AGGREGATE AND FINE AGGREGATE CONTENT

From Table 3. volume of coarse aggregate corresponding to 20 mm size aggregate and fine aggregate (Zone III)

for water-cement ratio of 0.45 = 0.5

Therefore, volume of coarse aggregate = 0.5
Balancing: 0.5-0.63 =
Volume of fine aggregate content = (1 - 0.63) =0.37

A-8 MIX CALCULATIONS

Volume of concrete = 1 m^2
Volume of cement = x
=
= 0.138 m^2
Volume of water = x
=
= 0.197 m^2
Volume of chemical admixture = x
(superplasticizer) @ 1.0% by mass =
Of cementitious material =0.6813 m^2
Volume of chemical admixture = [a – (b+c+d)]
= 1-(0.138+0.+0.1)
= 0.665 m^2
Mass of coarse aggregate = e x volume of coarse aggregate x S.G of Coarse aggregate
= 0.665 X 0.65 X 2.74 X 1000
= 1167.075 kg
Mass of fine aggregate = e x volume of fine aggregate x S.G of fine aggregate
= 0.665 X 0.35 X 2.74 X 1000
= 616.78 kg

IX. MIX PROPORTIONS FOR M-30

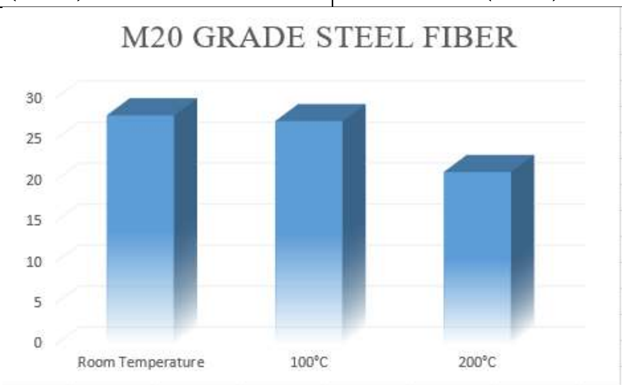
Cement - 437 kg/m^3
Water - 197 kg/m^3
Fine aggregate - 616.78 kg/m^3
Coarse aggregate - 1167.075 kg/m^3
Water cement ratio - 0.45

RESULTS:

Compressive strength for M20(steel fiber,polypropylene fiber and glass fiber) 28 days

M20 STEEL FIBER

RG NO	ROOM TEMPERATURE	100	200
1	594(26.4)	458(20.355)	377(16.755)
2	606(26.933)	622(27.644)	551(24.488)
3	684(30.04)	490(28.77)	568(25.244)



M20 GLASS FIBER

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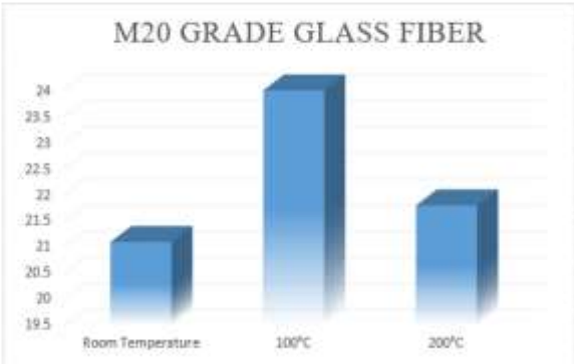
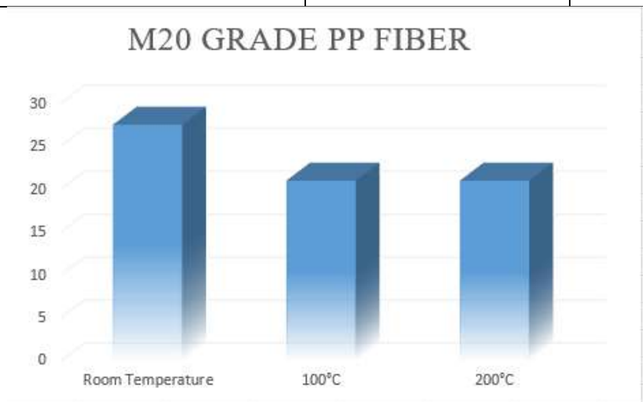
RG NO	ROOM TEMPERATURE	100	200
1	335(14.888)	529(23.511)	495(22)
2	566(25.155)	546(24.266)	533(23.688)
3	532(23.644)	572(25.422)	450(20)



M20 POLYPROPYLENE

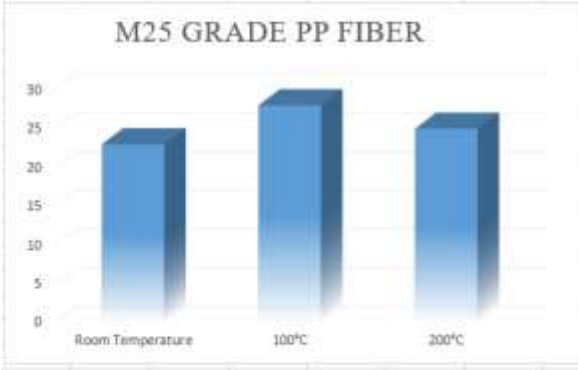
RG NO	ROOM TEMPERATURE	100	200
1	771(34.26)	468(20.8)	430(19.11)
2	464(20.62)	531(23.6)	465(20.66)
3	647(28.75)	420(18.6)	453(20.13)



Compressive strength for M25(steel fiber,polypropylene fiber and glass fiber) 28 days

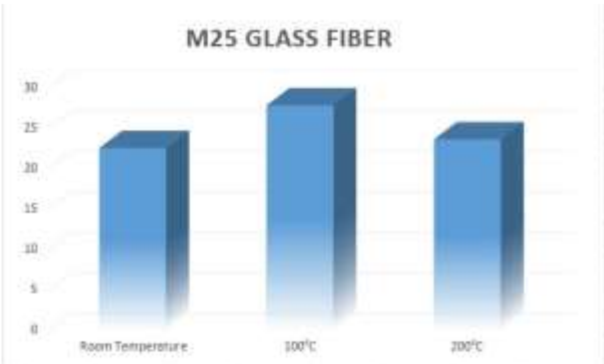
M25 POLYPROPYLENE

SR NO	ROOM TEMPERATURE	100	200
1	530(23.55)	690(30.66)	700(31.11)
2	453(20.13)	549(24.4)	563(25.02)
3	575(25.55)	720(32)	470(20.88)



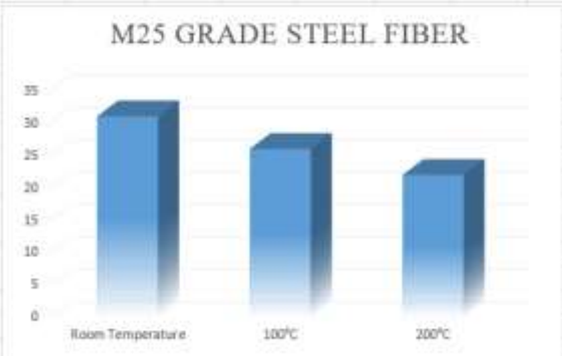
M25 GLASS FIBER

SR NO	ROOM TEMPERATURE	100	200
1	630(28)	679(30.17)	593(26.35)
2	571(25.37)	611(27.15)	435(19.33)
3	320(14.22)	590(26.22)	571(25.37)



M25 STEEL FIBER

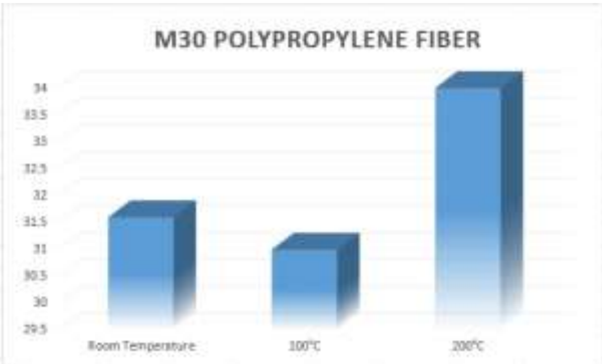
SR NO	ROOM TEMPERATURE	100	200
1	811(36.04)	645(28.66)	435(19.33)
2	635(28.22)	625(27.77)	489(21.73)
3	693(30.8)	540(24)	570(25.33)



Compressive strength for M30(steel fiber,polypropylene fiber and glass fiber) 28 days

M30 POLYPROPYLENE

RG NO	ROOM TEMPERATURE	100	200
1	738(32.8)	659(29.28)	805(35.77)
2	690(30.66)	711(31.6)	756(33.6)
3	709(31.51)	725(32.22)	780(34.66)



M30 GLASS FIBER

RG NO	ROOM TEMPERATURE	100	200
1	530(23.55)	617(27.42)	783(34.8)
2	427(18.97)	584(25.95)	831(36.93)
3	510(22.66)	590(26.22)	653(29.02)

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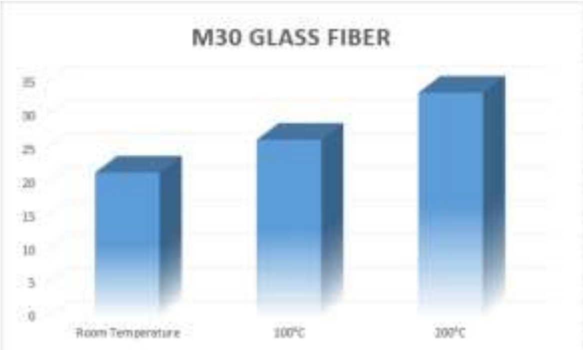
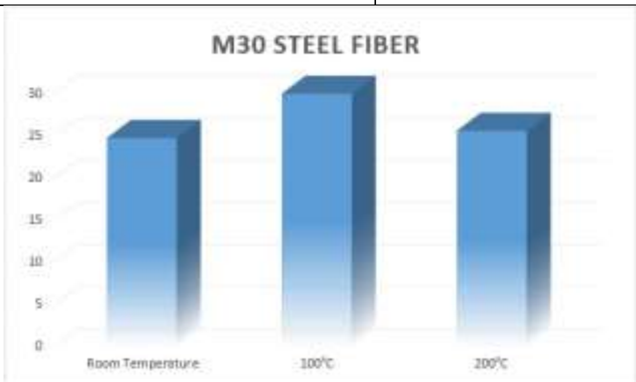


M30 STEEL FIBER

RG NO	ROOM TEMPERATURE	100	200
1	506(22.48)	739(32.84)	580(25.77)
2	611(27.15)	678(30.13)	539(23.95)
3	554(24.62)	630(28)	610(27.11)



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