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Cellular light weight concrete

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Abstract—**cellular light weight concrete (CLWC) is not a new Invention in concrete world. It has been known since ancient times. Cellular light weight concrete is a versatile material which is made up of cement, fly ash,MSandand foam basically it is new material which is currently using in India for walling purpose. Cellular light weight concrete gives better sound insulation, durable, lightweight, uniform size and safe, reducepermeability. The usage of cellular light weight concrete blocks gives a prospective solution to building construction industry along with environmental preservation. Cellular concrete is popular because of its light weight which reduces self-weight of a structure. Cellular light weight. Concrete blocks are casted with the proportion of Mix1, Mix2,Mix3 and Mix 4.To check properties of these cellular light weight concrete blocks test like compressive strength, flexural strength and split tensile strength is done in the laboratory**

Key words-fly ash, foam, cement, compressive strength

I. INRTRODUCTION

Light weight concrete has been widely used in different structural applications and its consumption grows every year of a global basis. The reason for these that using light weight concrete has many advantages. These include reduction in the dead load of the building, which minimizes the dimensions of structural members. The production of lighter and smaller pre-cast elements with inexpensive casting,handling and transportation operations. The provision of more space due to the reduction in size of the structural member a reduction in the risk of earth quake damage and increased thermal insulation an fire resistant.

In India among the multiple construction applications, masonry structures from the largest proportion of the uses of conventional burnt clay bricks, fly ash bricks,hollow concrete block, which have many draw back(like heavy weight,non - uniform shape and size, low thermal insulation and fire resistance etc..) that can be improved using light weight concrete. The utilization light weight concrete, provides improved thermal insulations and fire resistance, their by its considered an effective approach U-values9its the measures of heat loss through a structural elements) of structures.

In upcoming years there has been an increasing worldwide demand for the construction of building road and air field which has mitigate the raw material in concrete like aggregate . In some ruler areas , the quantizes of aggregate that have already been used means that local material are no longer available and the deficit has to be made up by importing materials from other place. Therefore a new direction toward s cellular light weight concrete in building and civil engineering construction is used .the origin of the CLWC is different to assess, It would not be an exaggeration to say that its roots are from the ancient period. With the increase in the demand of CLWC and the unavailability of the aggregates, technology for producing lightweight aggregates has been developed.

II. OBJECTIVES OF THE INVESTIGATION

To study the properties of fly ash and foam used in concrete, in which coarse aggregates are partially replaced by fly ash and addition to the foam in to concrete.

1. To provide sufficient strength.
2. To provide low density (for better insulation)
3. For low dying shrinkage.(to avoid cracking /rift)

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III. EXPERIMENTAL PROCEDURE

Material used
Ordinary Portland land cement (OPC)-53grade
Fine aggregate (m-sand)size-4.75 mm
Foam - polyethylene
Fly ash
Water

IV. MATERIAL PROPERTIES

Specific gravity of cement= 3.15
Specific gravity of fine aggregate = 2.50
Specific gravity of fly ash = 1.6-2.6
Specific gravity of foam(polyethylene) = 0.59
Bulk density of fly ash = 0.9-1.3
Fineness of fine aggregate = 2.90

V. EXPERIMENTAL PLAN

In this work Mix1, Mix2, Mix3 and Mix4 of the coarse aggregate is replaced by fly ash and foam for M20 Grade concrete.

Cube specimen of size 150 mm X 150 mm X 150 mm
Cylinder specimen of size 150mm dia X 300 mm
Prism specimen of size 100mm X 100mm X 500 mm

Were casted for different proportion with glass powder and compared with the properties of concrete prepared without glass powder. Compressive Test was performed on the concrete after 7, 14 and 28 days.

VI. MIX DESIGN

The mix design for M20 grade concrete was made using IS456 :2000, IS 1026 : 2007 and IS 516 : 1959

VII. MIX PROPORTIONS

The mix proportion was obtained for various mix of fly ash, foam and Msand such as replaced for course aggregate in this the water content was maintained constant.

TABLE I

DETAIL OF MIX PROPORTION

MATERIAL	MIX1	MIX2	MIX3	MIX4
CEMENT	30%	30%	30%	30%
FLY ASH	21%	23%	25%	27%
FOAM	3%	3%	3%	3%
WATER	25%	25%	25%	25%
MSAND	21%	19%	17%	15%

VII. TEST OF SPECIMEN

All the casted specimen were demolded after 24 hours and were placed in curing tank for a period of 7, 14 and 28 days

the specimen were tested in the compression test machine of 2000 KN capacity.
Three numbers of specimen in each Cube, cylinder and prism were tested and average value was calculated. The result were compared with that of control mix
The test setup and the failure pattern of specimens for compression test in shown in figure 1.

Fig.1

IX. COMPRESSION STRENGTH

The overall Result of compressive strength for cube, cylinder and prism is respectively.

COMPRESSIVE TEST RESULT FOR CUBE

S.NO	MIX	CUBE 7DAYS (N/MM^2)	CUBE 14DAYS (N/MM^2)	CUBE 28DAYS (N/MM^2)
1	1	7.30	14.57	19.45
2	2	7.12	14.30	19.60
3	3	8.50	13.85	20.35
4	4	8.27	13.95	20.55

FLEXURAL TEST RESULT FOR CYLINDER

S.NO	MIX	CYLINDER 7 DAYS (N/MM^2)	CYLINDER 14DAYS (N/MM^2)	CYLINDER 28DAYS (N/MM^2)
1	1	0.91	1.12	1.65
2	2	1.09	1.24	1.68

3	3	1.17	1.41	1.71
4	4	0.97	1.17	1.78

SPILT TENSILE TEST RESULT FOR PRISM

S.NO	Mix	PRISM 7 DAYS (N/MM^2)	PRISM 14DAYS (N/MM^2)	PRISM 28DAYS (N/MM^2)
1	1	0.6	1.35	1.85
2	2	0.72	1.50	1.88
3	3	0.94	1.65	1.91
4	4	1.15	1.82	1.95

The graph shown in figure 2 ,figure 3, and figure 4 illustrates the variation of the compressive strength of specimen of cubes, cylinder and prism with different mix of light weight concrete.

THE GRAPH FOR COMPRESSIVE STRENGTH

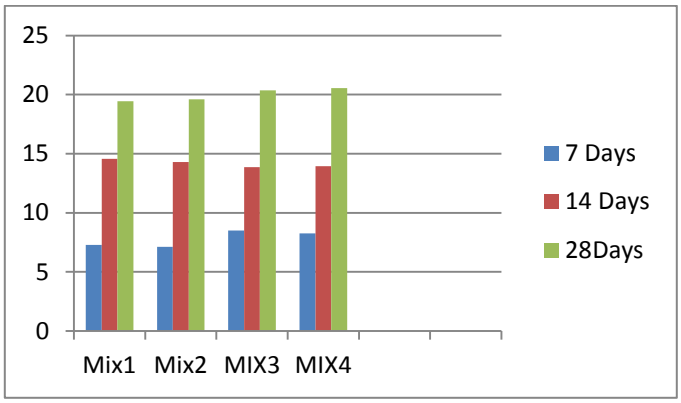

Fig.2

THE GRAPH FOR FLEXURAL STRENGTH

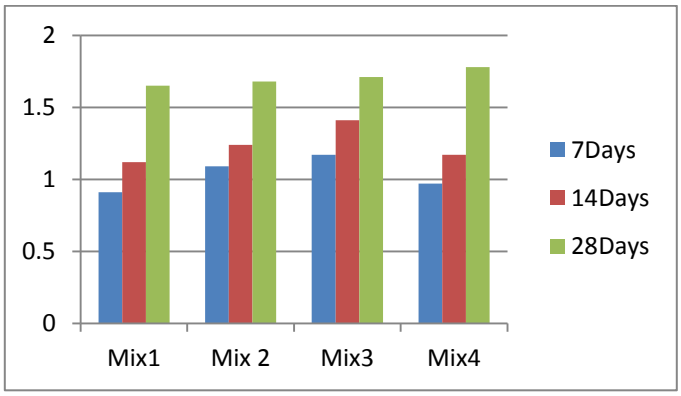

Fig.3

THE GRAPH FOR SPILIT TENSILE STRENGTH

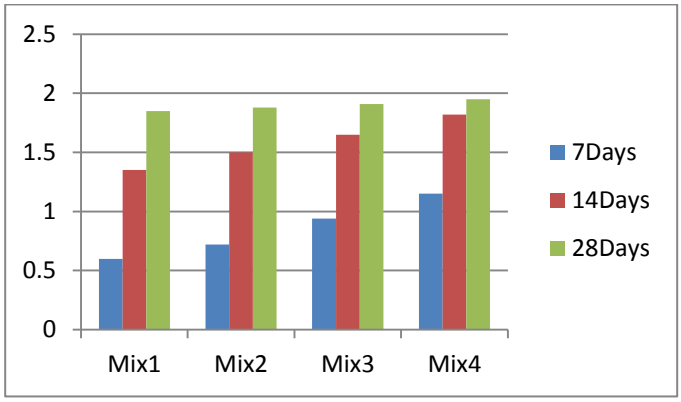

Fig.4

X DISCUSSION FOR TEST RESULT

The influence of waste fly ash and foam on the properties of concrete such as compressive strength, split tensile strength and flexural strength test slump and percentage water absorption were studied.
Properties of fly ash light weight concrete are good enough to be used in non-load bearing building construction where load is transferred beam to column and then to foundation therefore structure load will not to be following on to wall in that case much needed strength in wall is not required.

XI CONCLUSION

The influence of replacement of aggregateby fly ash and foam has been studied. Based onthe experimental work conducted, the following conclusions aredrawn.

Cellular light acceptable for framed structure for framed structure. This concrete structure can be suitable for earthquake areas.

XII REFERENCE

[1] Hemanth k. sarje ,Amol s.autade **,study of performance of lightweight concrete**"department of civil engineering fabtech technical campus of engineering and research ,Maharashtra ,india

[2] Mr.ashishs.moon,dr.valssonVarghese,mrs.s.waghmare, **foam concrete can used for sustainable construction as building material** department of civil engineering CSIR-NEERI ,NAGPUR.

[3] P.S.bhandari,dr.k.m.tajne **cellular light weight concrete using fly ash**priyadharshini college of engineering ,Nagpur,ssmaharastra,