A STUDY ON PROPERTIES OF FOAMED CONCRETE WITH FLY ASH AND MARBLE SLUDGE POWDER

G.Mithra (1)

Assistant professor

Sri Ranganathar institute of engineering and technology

Coimbatore

S.Rajeshkumar (2)

Assistant professor

Sri Ranganathar institute of engineering and technology

Coimbatore

ABSTRACT

Foam concrete is a type of lightweight concrete.It is non-load bearing structural element which has lower strength than conventional concrete. This study is comparative experimental on foam concrete by using fly ash and marble sludge powder under compression and split tensile loading.This paper which based on the foam concrete properties and preparation process analyses the test results of foamed concrete.The cube compressive strength and cylinder split tensile strength of conventional concrete and foam concrete were determined in the laboratory. The M20grade of concrete mix and fly ash and MSP at volume fraction of various proportions and adding Foaming agent were used in the research.

Keywords: Foam concrete, Foaming agent, compression test, tensile strength test, etc.

1. INTRODUCTION

Generally conventional concrete having a density of 2400kg/m^3.while light weight concrete having a density ranges of 300kg/m^3-1800kg/m^3.light weight concrete is widely used in construction. This study focuses on usage of quarry dust in Foam concrete. In this study, quarry dust as a replacement material to fine aggregate by various proportions. In this experimental study, the effect of quarry dust in light weight concrete sample with various proportions of replacement 0%, 25%, 50%, 75% and 100%. Foam concrete density ranges from 800kg/m^3 to 1400kg/m^3.All samples were caster and cured. The samples were used to determine the compressive strength at the age of 7 and 28 days.The results were compared with conventional and foamed concrete.

2. METHODOLOGY

Methodology refers to the systematic procedures applied to a field of study. Tests will be done to find if the cubes that are cast match the desired density after the curing process. If the desired density is achieved, then compressive test will be done on the foam concrete cubes so as to adjudicate their load carrying capacity.

Fig 3.1 Chart for methodology

3. EXPERIMENTAL STUDY

In present study experimental investigation conducted on fly ash and marble sludge powder replacement with fine aggregate at the various proportions. Experiment were conducted to corrosion study on foam concrete and to fine the physical properties of materials and strength of the concrete mix.

Table 1.1 physical properties of cement

S.No	Properties	Test result
1	Fineness of cement	2.2%
2	Specific gravity of cement	3.15
3	Initial setting time	35 min
4	Final setting time	10hrs
5	Water absorption	2%

Table 1.2 properties of fly ash

S.No	Properties	Test result
1	Fineness of fly ash	3.2
2	Specific gravity of fly ash	1.2
3	Water absorption	0.27%

1.3 properties of Marbles sludge powder

4. MIXING OF CONCRETE

For present experimental study, M-20 grade of concrete was prepared. Concrete was mixed in 1:1 proportions and w/c ratio was kept 0.5. Sand was replaced marble dust and fly ash. These materials added as 25%, 50%, 75%, and 100% which was used in mixing concrete.

Table 1.4 Mix Ratio for conventional concrete

Cement (kg/m^3)	F.A (kg/m^3)	C.A (kg/m^3)	W/P ratio (kg/m^3)
510.93	608.82	1220.47	153.28
1	1.19	2.38	0.3

COMPRESSIVE STRENGTH OF CONCRETE

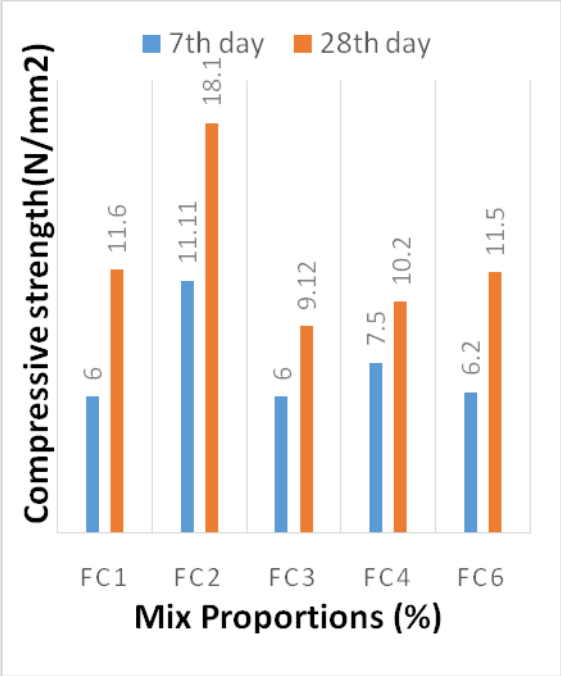
Trial Mix Proportions of Materials

MIX	F.A (%)	MSP (%)	Fine aggregate (%)
FC1	100	-	-
FC2	-	100	-
FC3	75	25	-
FC4	25	75	-
FC5	50	50	-

Table 1.5 compressive strength result

MIX	COMPRESSIVE STRENGTH(N/mm^2)	
	7^{th} day	28^{th} day
FC1	6	11.6
FC2	7	12.5
FC3	11.11	18.15
FC4	6	9.12
FC5	7.5	10.72

Fig 1.1 compressive strength



5. CONCLUSION

This study revealed that FC can be prepared by using the foaming agent.In present study experimental investigation conducted on optimum marble dust and fly ash replacement with sand. The following conclusions from the results of this work.

1) Sand has more water content then marble dust and fly ash. So for preparing concrete mix these materials require more water to add.

2) Initial setting time of cement was found 45-50 minute

3) In compressive strength test on harden concrete cube, it was found as amount of marble dust and fly ash increased compressive strength decrease but it has enough compressive strength as require for construction. Up to 75% fly ash and 25% marble dust can replaced with sand.

6. REFERENCES

[1] Prof. Veena G. Pathan, Prof. Md. GulfamPathan*Feasibility and Need of use of Waste Marble Powder in Concrete Production*

[2] Prof. P.A. Shirulea, AtaurRahman ,Rakesh D. Gupta, *partial replacement of cement with marble dust powder* International Journal of Advanced Engineering Research and Studies, E-ISSN2249–8974

[3] Vaidevi C, *Study on marble dust as partial replacement of cement in concrete*, Indian journal of engineering, 2013, 4(9), 14-16.]

[4] R.C. Valore Jr., Cellular concretes Part 2 physical properties, ACI J. Proc. 50 (6)
(1954).

[5] K. Ramamurthy, E.K. Nambiar, G.I.S. Ranjani, A classification of studies on properties of foam concrete, Cem. Concr. Compos. 31 (6) (2009) 388–396.

[6] F.A. Oluokun, Fly ash concrete mix design and the water –cementratio law, ACI Mater. J. 91 (4) (1994) 362– 371.

[7] A. Bilodeau, V. Sivasundaram, K.E. Painter, V.M. Malhotra, Durability of concrete incorporating high volumes of fly ash from sources in the USA, ACI Mater. J. 91 (1) (1994) 3– 12.

[8] M.K. Gopalan, Nucleation and pozzolanicfactors in strength development of Class F fly ash concrete, ACI Mater. J. 90 (2) (1993) 117– 121.

[9] V. Sivasundaram, G.G. Carette, V.M. Malhotra, Mechanical properties, creep, and resistance to diffusion of chloride ions of concretes incorporating high volumes of ASTM Class F fly ashes from seven
different sources, ACI Mater. J. 88 (4) (1991) 384–389