ISSN:2348-2079

Volume-6 Issue-2

International Journal of Intellectual Advancements and Research in Engineering Computations

Experimental investigation of rice husk ash brick using M-Sand and F2R cement with perma plast AC

Mathiyalagan.S[1],Mohanram.T[1],Naveenkumar.K[1],Sathyaprabhu.M[1]

Gowtham.S.K[2]

Students of Final year B.E Civil Engineering [1]

Assistant Professor[2]

Nandha Engineering College

Perundurai

sathyaprabhuknp@gmail.com [1], gowthamsk619@gamil.com [2]

***Abstract*— In this study of investigation of rice husk ash, it can be used in preparation of rice husk ash brick. Engineering properties like compressive strength ,water absorption ,size and shape have been studied. .F2R cement is special used for increasing the workability for M-sand. M-sand is used to satisfy the carsity of river sand. Since rice husk ash has more absorption of water, to minimize the water absorption Perma plaster AC is used .From the studies it is observed that optimum proportion for RHA + M-sand + F2R cement was observed as minimum 30% of RHA .when compared to all other possible proportions after 28 days curing period the rice hush ash brick achieve nominal strength compare to clay brick.**

Key words F2R cement, M-sand ,Perma Plast AC , RHA

I. INTRODUCTION

Shelter is a basic human need and owning a house becomes a life long struggle as majority of Indians find housing costs prohibitively expensive. This problem becomes even more accurate when considering the low income families who accounts for about 60-70% of Indian population. This brings out the need to reduce the cost of the housing and make it affordable for the booming population. Burnt clay bricks are being used extensively and the most important building material in construction industry. In India the building industry consumes about 20000 million bricks and 27% of the total natural energy consumption for their production.

Avoid dumping and land filing RHA can be used in replacement of cement.in our project RHA is used as part of brick combination , combination RHA ,M-sand,F2Rcement with admixture of Perma Plast AC (which reduce the water absorption).similar ratio of combination of brick have been moulded and test to find properties and to find the strength of the brick.

1.1 DEFINITION OF RHA

India is the second highest rice producing country in the world after China. Rice Husk Ash (RHA) is generated by burning rice husk in boilers. Disposal of such a big amount is hazardous for the rice producing nations. For every thousand kilogram of paddy around 220kg of rice husk is produced and on burning this 220kg of rice husk around 55kg of rice husk ash is generated which is 25% of rice husk (Koteswara Rao. D, 2011)

1.2 DEFINITION FOR M-SAND

Manufactured sand (M-sand) is a substitute of river sand for concrete construction. Manufactured sand is produced from hard granite stone by crushing. The size of manufactured sand

(M-sand) is less than 4.75mm. The use of M-sand is more availability and in case of less transportation cost. It can be readily available at the nearby place, reducing the cost of transportation from far-off river sand bed.

1.3 DEFINITION FOR F2R CEMENT

ACC F2R cement is a new product from the F2R family developed to address specific consumer needs and faviour workability of M-sand

II. ABBREVATION

RHA - Rice Hush Ash

F2R cement - Foundation to Roof

Perma Plast AC - Acclerator

III. MATERIALS

a) F2R cement b)Fine aggregate (M-sand) c) Perma Plast ACd) RHA e) Water

a)F2R cement

Portland slag cement of grade 53 was used as per IS 455-1989 code and result have been observed and tabled

Table 1

Properties of F2R cement	
Initial setting time	33 Minutes
Final setting time	570 Minutes
Specific gravity	2.94
Finess	3.5
Consistency	26.4

b)Fine aggregate (M-sand)

As per IS 383-1970 code properties and nature of M-sand have been tested

Table 2

Properties of M-sand	
Specific gravity	2.45
Finess	6%
Moisture content	NIL

c) Perma Plast AC

As per IS 9103-2007 code admixture is used reduce water absorption

d) RHA

As per IS code RHA is examined and result have been tabulated

Table 3

Properties of RHA	
Specific gravity	2.21
Bilk density	0.781 g/cc

e) Water The water used for mixing should be potable drinking water having ph 6 TO 8.

IV.EXPERIMENTAL RESULT

The test are considered for Compressive strength ,soundness ,shape and size, water absorption, hardness are given below.

4.1 Compressive test

Table 4

Material	Percentage %	Weight (gm)	Test for 7 days
RHA	30	831	45 kN
M sand	60	1662	
F2R cement	10	277	
RHA	40	864	40 kN
M sand	50	1080	
F2R cement	10	216	
RHA	50	920	30kN
M sand	40	736	
F2R cement	10	184	
RHA	60	1026	25 kN
M sand	30	513	
F2R cement	10	184	
RHA	40	900	35 kN
M sand	40	900	
F2R cement	5	112.5	
Lime	15	337.5	

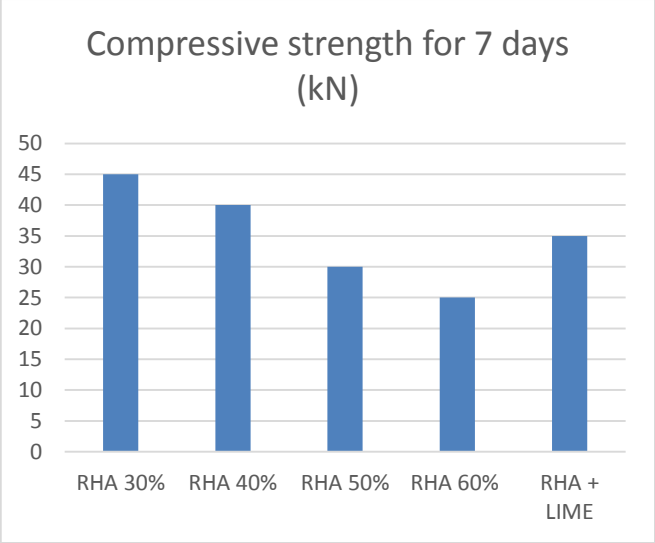

Fig 1. Compressive test for 7 days

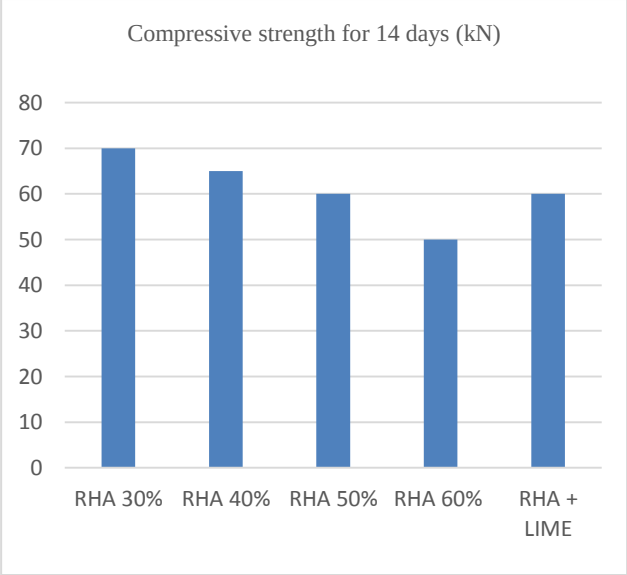

Fig 2 . Compressive strength for 14 days

Table 5

Material	Percentage %	Weight (gm)	Test for 14 days
RHA	30	831	70 kN
M sand	60	1662	
F2R cement	10	277	
RHA	40	864	65 Kn
M sand	50	1080	
F2R cement	10	216	
RHA	50	920	60 kN
M sand	40	736	
F2R cement	10	184	
RHA	60	1026	50 kN
M sand	30	513	
F2R cement	10	184	
RHA	40	900	60 kN
M sand	40	900	
F2R cement	5	112.5	
Lime	15	337.5	

Table 6

Material	Percentage %	Weight (gm)	Test for 28 days
RHA	30	831	105 kN
M sand	60	1662	
F2R cement	10	277	
RHA	40	864	90 kN
M sand	50	1080	
F2R cement	10	216	
RHA	50	920	75 kN
M sand	40	736	
F2R cement	10	184	
RHA	60	1026	60 kN
M sand	30	513	
F2R cement	10	184	
RHA	40	900	70kN
M sand	40	900	
F2R cement	5	112.5	
Lime	15	337.5	

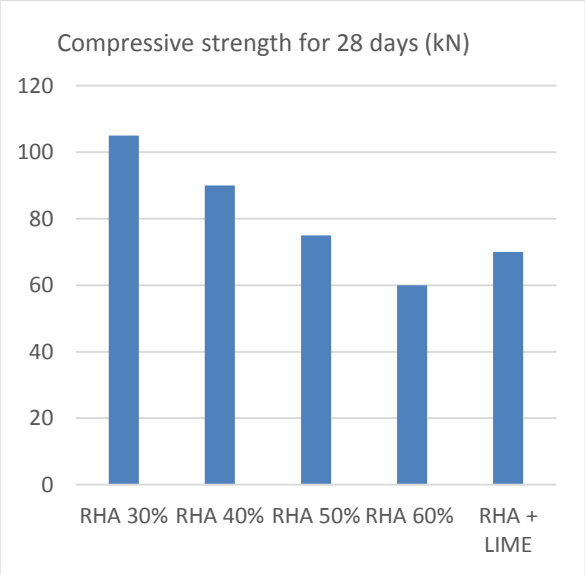

Fig 3 .compressive strength for 28 days

4.2 Water absorption and Soundness

Table 7

Material	Percentage %	Water Absorption %	Soundness
RHA	30	13.35	Clear and ring sound
M sand	60		
F2R cement	10		
RHA	40	14.58	
M sand	50		
F2R cement	10		
RHA	50	15.76	
M sand	40		
F2R cement	10		
RHA	60	16.90	
M sand	30		
F2R cement	10		
RHA	40	14.67	
M sand	40		
F2R cement	5		
Lime	15		

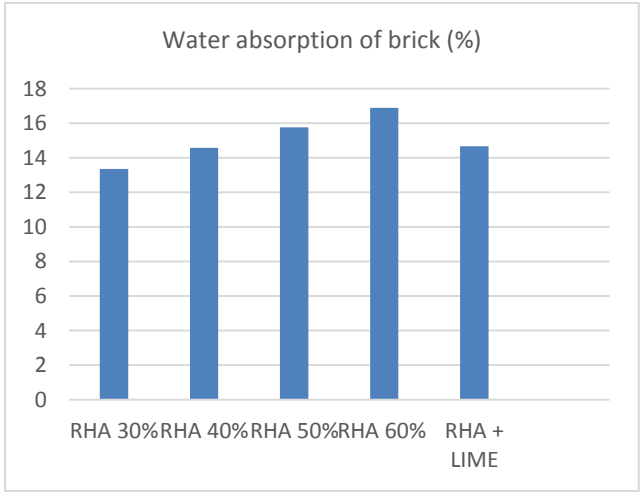

Fig 4 . Water absorption of bricks

4.3 Structure and Size and Shape

Table 8

Material	Percentage %	Structure	Shape an size
RHA	30	Homogenous	Rectangle size with sharp edge 23x11x7
M sand	60		
F2R cement	10		
RHA	40		
M sand	50		
F2R cement	10		
RHA	50		
M sand	40		
F2R cement	10		
RHA	60		
M sand	30		
F2R cement	10		
RHA	40	Small lumps	
M sand	40		
F2R cement	5		
Lime	15		

V. Conclusion

As per study and result RHA 30% is cost Efficient and achieve the strength .the cost of the brick less compare to the ordinary clay brick and fly ash brick

RHA brick is very useful brick as a good interior materials of building construction because of its light weight as compare to any other conventional brick

Due to less weight and cost efficient is satisfies the middle people .It will reduce dumping and land filling

By the addition of RHA upto 30% to M-sand the strength gradually decreased and beyond the addition of 30% of RHA the compressive strength decrease rapidly

As the percentage of RHA increased the water absorption of RHA ash brick also increased

As per percentage of lime increased water absorption of RHA decreased

By use Perma Plaster AC the water absorption of the brick decreased.

VI.Reference

1. N.Vamsi Mohan, Prof.P.V.V.Satyanarayana, Dr.K.Srinivasa Rao / International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622 www.ijera.com Vol. 2, Issue 5, September- October 2012, pp.1906-1910 1906 | P a g e Performance Of Rice Husk Ash Bricks

2. N.Banumathidas, N.Kalidas, "Newtrends in Bricks and Blocks, the role of Fal-G", July 1992, the Indian concrete journal.

3. Rozainee, M., Ngo, S.P. and Salema, A.A. (2008) Effect of Fluidising Velocity on the Combustion of Rice Husk in a Bench-Scale Fluidised Bed Combustor for the Production of Amorphous Rice Husk Ash. Bioresource Technology, 99, 703-713.

4. Mohan, N.V.P., Satyanarayana, V.V. and Rao , K .S .(2012) performance of Rice Hush Ash Bricks. International Journal of Engineering Research and Application (IJERA),2,1906-1910.

5. Alam, M.K., Islam, M.R., Saha, S., Islam, M.N. and Islam, S.M.A. (2013) Quality Study of Hand Made Brick-DK Using Neutron Radiography Technique. Bangladesh Journal of the Scientific and Industrial Research, 48, 237-246.

6. Kumar ,A.,Mohanta,K.,Kumar, D .and parkash,O.(2012) Properties and Industrial Applications of Rice Husk. International Journal of Emerging Technology and Advancing Technology