International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056
Volume: 03 Issue: 03 | Mar-2016 www.irjet.net p-ISSN: 2395-0072

COMPREHENSIVE COMPORTMENT OF RECYCLED AGGREGATE CONCRETE AT EXALT TEMPERATURES

G.SWATHI[1] P.RAVI KISHORE[2]

[1]POST GRADUATE, DEPARTMENT OF CIVIL ENGINEERING, ADITYA ENGINEERING COLLEGE
[2]ASSISTANT PROFESSOR, DEPARTMENT OF CIVIL ENGINEERING, ADITYA ENGINEERING COLLEGE

Abstract: *In the presence day Recycling and Reusing of the material is gaining its importance. This paper's aim is to give you an idea about the performance of recycled aggregate concrete at exalts temperatures through experimental and analytical studies. Design mix for M40 grade is done by using various factors like W/C ratio, Air content, Cement content, Fine aggregate, Coarse aggregate. Preliminary investigations like Specific gravity, Sieve analysis, Aggregate Crushing and Impact values etc. are done to find the properties of the materials used in casting. Test specimen are casted such way to generate M40 concrete. Now, RAC is replaced by the normal aggregate in different percentages like 25%, 50%. One set of cubes are casted for each replacement and their strengths are determined. Another set of cubes are casted as above and they are exposed to elevated temperatures ranging from 200°C to 800°C, at an interval of 200°C for 1 hour for every replacement and the compressive strengths are determined. Now, the compressive strengths of each replacement are compared to 0% replacement at every interval and the percentage reductions in strengths compared to 0% are analyzed.*

1.INTRODUCTION

For thousands of years, the improvement of the quality of life has been the indicator of any developed society. This indicator has always been associated to the presence of elements and infrastructures, which facilitate the development of daily activities without taking into account of impact. Days of yore has taught us how to recovery, use of rejected and squander elements. Copious civilizations have reused building materials of earlier civilizations of their own destroyed architecture to construct novel buildings. The remains of ruined Romanesque churches supplied the stone for various farmhouses. Regarding this issue our major concern is to reduce natural energy, materials and minerals and increasing usage of waste and recycled material.The use of recycled aggregates from construction and demolition wastes is showing forthcoming application in construction as alternative to chief (natural) aggregates. It reduces the space required for the landfill disposal and conserves natural resources.

1.1 Experimental investigations:

The Document presents, an endeavor makes comparison of mechanical properties of recycled aggregate concrete with the natural aggregate concrete. Demolished concrete is being used to produce the recycled aggregates because of the availability of RAC in huge quantities. The concrete debris were collected from different sources with the age ranging from 28 days to 96 days and broken into the pieces of approximately 20 mm and 10 mm size with the help of hammer. The foreign matters were sorted out from the pieces. Further, those pieces were crushed and mechanically sieved through sieve of 4.75 mm to remove the finer particles.

1.2 Modal Analysis: From The investigations the background enhanced the methods for eradicating the fire resistance of concrete structures specified to BS 8110. In particular, BRE has examined and revised the original research and underpinned the tabulated data from the test results.In Additional the research provides the provision is found from many cases conformist, as they are based on the assumption that structural elements are completely stressed at the limit state of fire resistances and takes into account the spalling characteristics of concrete. The concrete helps to prevent a fire from spreading throughout a building, the concrete as an exterior wall or roof helps to prevent a fire from jumping from structure to structure.The

concrete walls and roofs help provide protection to human life and the occupants' possessions within a building, at period of wild fires. Concrete helps to contain a fire whereas sprinklers rely on a water source. even if no water supply is available,

Table-1:specific gravity of coarse aggregate

TRIAL	WT. OF PYCNOMETER (A)IN GMS	WT. OF PYCNOMETER +1/3AGGREGATE(W2) IN GMS	WT. OF PYCNOMETER +1/3 AGGREGATE+ 2/3 WATER(W3) IN GMS	WT. OF PYCNOMETER+ WATER(W4) IN GMS	SPECIFIC GRAVITY
TRAIL 1	625	1058	1792	1520	2.68
TRAIL 2	624	1060	1796	1526	2.62
TRAIL 3	625	1056	1791	1524	2.62

Table 2 Explains the values of F. M OF FINE AGGREGATE

SIEVE SIZE	WT. RETAINED	% WT. RETAINED	CUMILATIVE % WT RETAINED
80	0	0	0
40	0	0	0
20	0	0	0
10	0	0	0
4.75	0.023	2.3	2.3
2.36	0.021	2.1	4.4
1.18	0.08	8	12.4
600	0.134	1.34	25.84
300	0.707	70.7	96.5
150	0.17	17	98.3
			239.74
		F.M=239.74/100=2.394	

Table-3: RESULTS OF IMPACT VALUE TEST

TRIALS	ORIGINAL WT. W1(GMS)	WT. RETAINED W2(GMS)	CRUSHING VALUE=(W1-W2)/W1*100
TRAIL 1	312	221	70%
TRAIL 2	320	224.5	71%
TRAIL 3	305	218.5	71%

Table-4: Results of crushing test

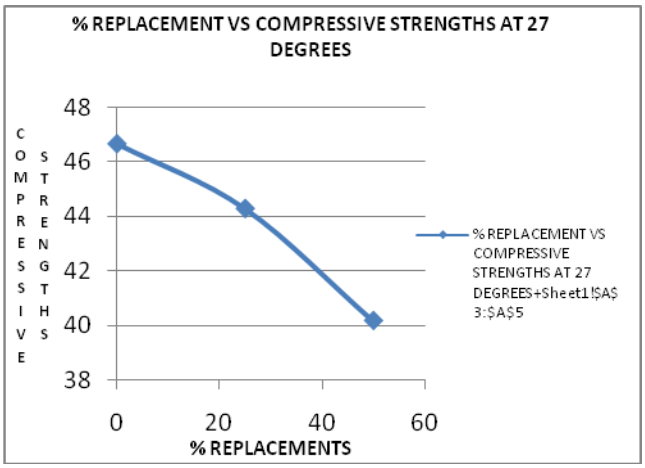
TRAIL	ORIGINAL WT. W1(GMS)	WT. RETAINED W2(GMS)
TRAIL 1	3250	2438.5
TRAIL 2	3250	2495.5
TRAIL 3	3250	2512.5

MIX	% REPLACEMENT	SLUMP(MM)	COMPRESSIVE STRENGTH IN N/mm2	
			7days	28 days
M40	0	29	33.89	46.67
	25	28	28	44.29
	50	29	26.67	40.17
	75	28	28.89	42.402
	100	28	31.53	34.665

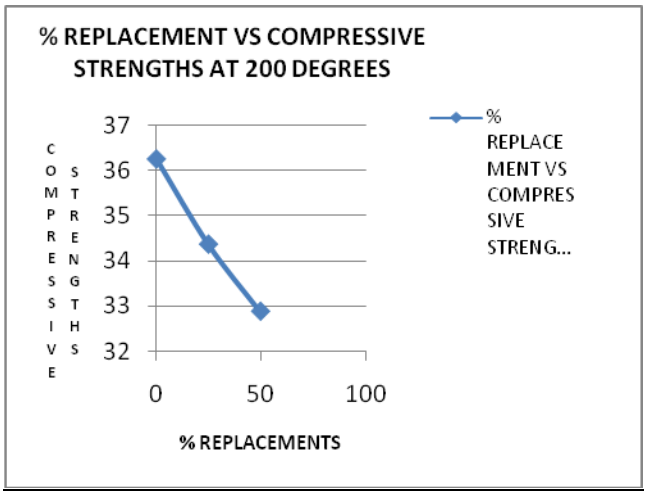
% Replacement	COMPRESSIVE STRENGTHS AT ELEVATED TEMPERATURES IN DEGREES				
	27	200	400	600	800
0	46.67	36.26	37.11	35.88	32.36
25	44.29	34.37	36.03	34.7	31.44
50	40.17	32.88	35.11	32.02	30.03

2.ANALYSIS AND DISCUSSIONS

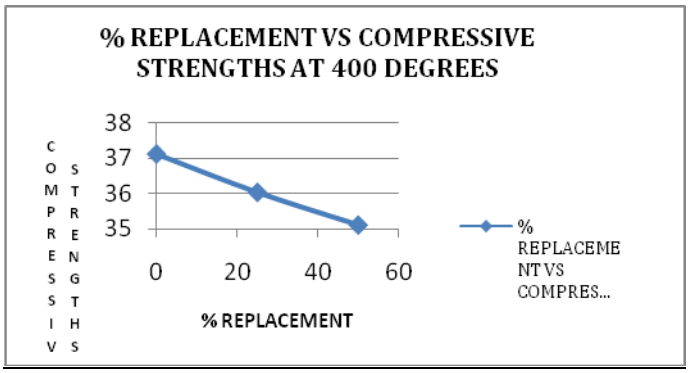
Graph:1



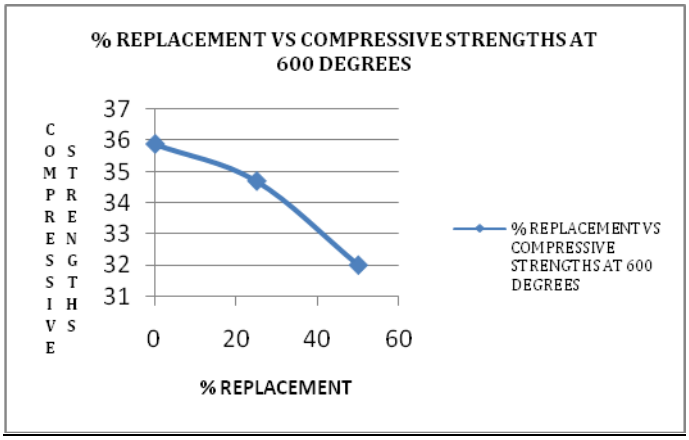
Graph:2 **At a temperature of 200^{0}C**



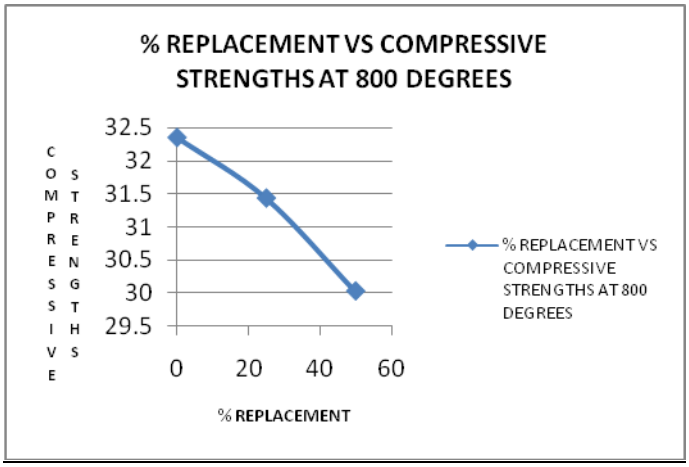
Graph:3 At a temperature of 400^{0}C



Graph: 4 At a temperature of 600^{0}C



Graph:5 At a temperature of 800^{0}C



3. CONCLUSIONS

Compressive Strengths Vs Replacements

[1]From the results it is perceived that there is decrease in strength as the percentage replacement increases.

[2]At 200^{0}C it is perceived that there is increase in the replacement percentage, the strength decreases

[3]At 400^{0}C it is perceived that there is decrease in strength as the percentage replacement increases.

[4]At 600^{0}C it is perceived that there is increase in the replacement percentage, the strength decreases.

[5]At 800^{0}C it is perceived that there is decrease in strength as the percentage replacement increases.

[6]From the results it is perceived that as the compressive strength decreases, the percentage replacement increases for each temperature

Compressive Strengths Vs Temperatures

For 25% replacement

[1]The percentage decreases of strength with respest to strength at 27^0c to strength for 25% replacement at 200^0c is 26.35%.
[2]The percentage decreases of strength with respest to strength at 27^0c to strength for 25% replacement at 400^0c is 22.70%.
[3]The percentage decreases of strength with respest to strength at 27^0c to strength for 25% replacement at 600^0c is 25.64%.
[4]The percentage decreases of strength with respest to strength at 27^0c to strength for 25% replacement at 800^0c is 32.60%.

For 50% Replacement

[1]For 50% replacement it is observed that the strength was decreased comparitiveiy more than the strength values of 25% replacement.
[2]A decreases of 29.54% is observed for 50% replacement at 200^0c with respect to strength at 27^0c
[3]A decreases of 24.76% is observed for 50% replacement at 400^0c with respect to strength at 27^0c
[4]A decreases of 31.39% is observed for 50% replacement at 600^0c with respect to strength at 27^0c
[5]A decreases of 35.65% is observed for 50% replacement at 800^0c with respect to strength at 27^0c

REFERENCES

[1]Sami W. Tabsh, Akmal, "Influence of recycled concrete aggregates on strength properties of concrete".
[2]Khaldoun Rahal, "The coarse aggregate which are recycled and their Mechanical properties of concrete.
[3]L. Lam, H. Fok, "Influence, of moisture states of natural and recycled aggregates on the slump and compressive strength of concrete" .
[4]A. Marí, M. Barra, "Influence of amount of recycled coarse aggregates and production process on properties of recycled aggregate concrete".
[5]Etxeberria M, A.R. Mari, "Recycled aggregate concrete as structural material".