Scientific Journal of Impact Factor (SJIF): 5.71

e-ISSN (O): 2348-4470
p-ISSN (P): 2348-6406

International Journal of Advance Engineering and Research Development

Volume 6, Issue 03, March -2019

EFFECTIVE USE OF MANGALORE TILES WASTE AS A PARTIAL REPLACEMENT TO COURSE AGGREGATE IN CONCRETE

Bhushan B. Pachpute[1], Bhagyashri G. Bhade[2]

[1]*Under Graduate Student, Civil Engineering Department H.S.B.P.V.T.'s Parikrama College of Engineering, Kashti*
[2]*Assistant Professor, Civil Engineering Department H.S.B.P.V.T.'s Parikrama College of Engineering, Kashti*

Abstract —*This Paper Aims to Study Experimentally, the Effect of Partial Replacement of Course Aggregate by Mangalore Tiles and Check the Compressive Strength of Concrete by Using M_{15} Grade of Concrete. Replacing Mangalore Tiles by Varying Percentage (i.e. 10%, 20%, 30%) to the Course aggregate and checking the Compressive Strength after 7days and 28days of Curing. And Optimum Percentage of Replacement of course aggregate is found out.*

Keywords- *Mangalore Tiles, Compressive Strength.*

I. INTRODUCTION

The Construction Industry is one which Grows very Fastly and Rapidly. And this Growth have some Bad Impact on Environment and Human Health. That's why we required an eco friendly and Economical Material. Mangalore Tiles are Non Degradable Waste Material and by using this into concrete the Aggregate Cost is Reduces, Strength increases and there will be effective Utilization of Waste Materials. Aggregate are Used in Higher Proportion while Preparing the Concrete and by replacing the Aggregate with the Mangalore Tiles the Cost of Producing the Concrete will be minimized. In this Experiment we have tested sum of 18 Cubes for 7days and 28days of Curing with the Varying Percentages of Mangalore Tiles and Compare the Results with Conventional Concrete.

II. MANGALORE TILE WASTE

Mangalore was the Birth Place of Tiles and the Tiles Used all Over India Hence were Known as Mangalore Tiles. It was First Introduce in India by German Missionary and these are Fired Clay Tiles. The Tiles Produced by the factory were in Great Demand Throughout the Indian Subcontinent and East Africa Abundant Deposit of Clay. Hence Broken Tiles are available in Plenty and Free of Cost and it Becomes Easy for the Collection of our Project.

III. EXPERIMENTAL DETAILS

Material-

Cement:

The Cement Used Should Be Ordinary Portland Cement Of 53 Grade. The Various Test Are Conducted On Cement Like Fines By Sieve Analysis And Initial And Final Setting Time By Vicat Apparatus. For Design Purpose The Specific Gravity Of Cement Should Be Taken Standard.

Course Aggregate:

The aggregate having Size Greater Than 4.36 mm Are Known As Course Aggregate. the Aggregate Used Should Free From Dust And Organic Materials. And Obtain From Natural Hard Stone There Are Various Test Are Conducted On Course Aggregate Like Specific Gravity, Silt Content, And Water Absorption Etc For Design Purpose.

Fine Aggregate:

The Aggregate Having Size Less Than 4.36 Mm Are Known As Fine Aggregate. The Fine Aggregate Used In The Concrete Also Free From Dust And Organic Materials. And Obtain From River Or From Broken Crushed Stones. There Are Various Test Are Conducted On Fine Aggregate Like Specific Gravity, Silt Content, Sieve Analysis, And Water Absorption Etc For Design Purpose.

Mangalore Tiles:

The Mangalore Tiles Used In Concrete Should Sieve From 20mm Is Sieve And Retain On 16mm Is Sieve. The Pieces Of Mangalore Tiles Should Be Free From Dust And Silt. The Angular Mangalore Tile Pieces Should Be Preferred In Manufacturing Of Concrete.

Mix Design-

The Mix Design Should Be Prepared By Using Indian Standard Guide Line. The Various Test Result Of Material Should Be Used In Designing The Concrete For M15 Grade Of Concrete (1:2:4) The Design Should Be Prepared And Checked By Using Standard Guideline Of Bureau Of Indian Standard. And Design Is Based On Proper Water Cement Ratio Which Make Smooth And Workable Concrete.

Test Procedure-

After Preparing The Design The Concrete Should Be Prepared. The Mixture Of Cement Sand And Aggregate With Mangalore Tiles Are First Mix In Dry State And Then Water Is Added Into It And Mix Thoroughly. The Mould Of Size 15cmx15cmx15cm Should Be Open And Clean Their Should Be Not Any Dirt And Other Particles. The Nut Bold Should Be Greased And Mould Plate Should Be Oiled Then The Mould Are Locked And Packed By Nut Bolts. The Prepare Concrete Are Placed In The Mould And Tamped By Tamping Rod Smoothly After The Mould Fill Completely The Surface Should Be Finished And Mould Should Be Put On Vibrator. After Vibrating Mould Should Be Placed On Flat Surface For Drying The Concrete. After 24 Hrs The Mould Should Be Opened And Concrete Cube Are Taken Out From That Mould And Placed In The Water For Curing. After 7days And 28days Of Curing The Concrete Blocks Are Removed From The Water And Tested In Compression Testing Machine And Results Are Noted.

IV. RESULTS

Following are the result of compressive test carried on % of varying of Mangalore

normal concrete (N/mm²)

Sr. No.	Days	C/S Area(mm²)	Load (KN)	Comp. Strength (N/mm^2)	Avg. Comp. strength (N/mm²)
1	7	22500	350	15.55	15.56
2	7	22500	359	16.17	
3	7	22500	337	14.97	

normal concrete (N/mm²)

Sr. No.	Days	C/S Area(mm²)	Load (KN)	Comp. Strength (N/mm²)	Avg. Comp. strength (N/mm²)
1	28	22500	420	18.66	19.92
2	28	22500	450	20	
3	28	22500	475	21.11	

Mangalore tiles waste concrete of proportion (10-90)
10%Manglore tiles & 90% coarse aggregate (N/mm²)

Sr. No.	Days	C/S Area(mm²)	Load (KN)	Comp. Strength (N/mm²)	Avg. Comp. strength (N/mm²)
1	7	22500	333.3	14.81	15.199
2	7	22500	353.1	15.69	
3	7	22500	339.7	15.97	

Mangalore tiles waste concrete of proportion (20-80)
20% Mangalore tiles & 80 % coarse aggregate (N/mm²)

Sr. No.	Days	C/S Area(mm²)	Load (KN)	Comp. Strength (N/mm²)	Avg. Comp. strength (N/mm²)
1	7	22500	377.4	16.44	16.10
2	7	22500	441.8	19.63	
3	7	22500	268.1	11.91	

Mangalore tiles waste concrete of proportion (30-70)
30% Mangalore tiles & 70% coarse aggregate (N/mm²)

Sr. No.	Days	C/S Area(mm²)	Load (KN)	Comp. Strength (N/mm²)	Avg. Comp. strength (N/mm²)
1	7	22500	488.9	21.72	20.8
2	7	22500	427.3	18.99	
3	7	22500	493.5	21.93	

Mangalore tiles waste concrete of proportion (10-90)
10%Manglore tiles & 90% coarse aggregate (N/mm²)

Sr. No.	Days	C/S Area(mm²)	Load (KN)	Comp.Strength (N/mm²)	Avg. Comp. strength (N/mm²)
1	28	22500	350	688.5	29.57
2	28	22500	359	666.9	
3	28	22500	337	641.2	

Mangalore tiles waste concrete of proportion (20-80)
20% Mangalore tiles & coarse aggregate (N/mm²)

Sr. No.	Days	C/S Area(mm²)	Load (KN)	Comp. Strength (N/mm²)	Avg. Comp. strength (N/mm²)
1	28	22500	699.1	31.07	28.66
2	28	22500	591.7	26.29	
3	28	22500	644.6	28.64	

Mangalore tiles waste concrete of proportion (30-70)
30% Mangalore tiles & 70% coarse aggregate (N/mm²)

Sr. No.	Days	C/S Area(mm²)	Load (KN)	Comp. Strength (N/mm²)	Avg. Comp. strength (N/mm²)
1	28	22500	548.4	24.37	25.63
2	28	22500	678.5	30.15	
3	28	22500	503.3	22.36	

V. CONCLUSION

1) It Has Been Observed That After Replacing 10% Of Mangalore Tiles The Compressive Strength After 28days Is Increasing By 10N/MM.
2) By Using 20% Of Mangalore Tiles The Strength Increasing By 9N/MM.
3) By Using 30%Of Mangalore Tiles The Strength Increase By 6N/MM.
4) It Has Been Seen That 10% Replacement Is Effective For Conventional Concrete.
5) By Replacing Mangalore Tiles To The Aggregate The Cost Of Concrete Is Reduce.
6) By Using Waste Tile Pieces The Waste Material Is Effectively Utilized.
7) By Using Mangalore Tiles In The Concrete The Disposal Cost Of Waste Tiles Are Avoided.
8) This Is An Effective Method Of Increasing Strength By Reducing Cost.

REFERENCES

[1] Kotresh K.M and Anup.D.P, "Cost Effective Concrete by Using Mangalore Tile Wastages and Iron Ore Slag", IJIRSET, Vol. 4, Issue 4, April 2015.
[2] Geetha S D , Kavyashree M P, "Utilization of Bone Aggregate And Mangalore Tiles Waste As A Partial Replacement To Natural Sand And Course Aggregate In Concrete", IJSART - Volume 4 Issue 12 –DECEMBER 2018.
[3] Unmesh Tayade, Priyanka Tupe , "Design of Low Cost Roofing Tiles using Agricultural Waste", , IRJET, Volume: 06 Issue: 02 | Feb 2019.

[4] Naveen Kumar MS and Nikhil B, "Experimental studies on clay tile powder as partial replacement of cement for sustainable concrete" IJETT – Volume 36 Number 1- June 2016.
[5] Wadhah M.Tawfeeq , "Maryam AlSaidi Using Crushed Tiles as Coarse Aggregate in Concrete Mix" IJRCMCE, Vol. 3, Issue 2 (2016) ISSN 2349-1442 EISSN 2349-1450.
[6] Dr. B. Krishna Rao, Manthena. Sri Lakshmi, "Use of Tile Dust as Partial Replacemnt for Cement in Concrete" IJERT,Vol. 2 Issue 12, December – 2013.
[7] SIVAN BALASUBRAMANIAM.T.R "Mangalore Tile Waste As Coarse Aggregate In Concrete" IJR, Volume 05 Issue 12 April 2018.
[8] Maya T.M, Nivin Philip "Mechanical Properties of Concrete Containing Roof Tile Aggregate Subjected to Elevated Temperature", (IJIRAE), Volume 1 Issue 8 (September 2014)
[9] Batriti Monhun R. Marwein , M. Sneha, "A REVIEW PAPER ON UTILISATION OF CERAMIC WASTE IN CONCRETE" International Journal of Scientific & Engineering Research, Volume 7, Issue 4, April-2016.
[10] Ponnapati. Manogn, M. Sri Lakshmi "TILE POWDER AS PARTIAL REPLACEMENT OF CEMENT IN CONCRETE", IRJET, Volume: 02 Issue: 04 | July-2015.

