Ruby Mica Dust as a Replacing Material in Design Mix Concrete

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Abstract – In this time fine aggregate plays an important role in the preparation of both concrete and mortar in construction work. Generally we are widely using industrial waste ruby mica has an alternative for natural sand. In this project we used the industrial waste ruby mica dusts which were produced by quarrying and fleshing of ruby mica for the manufacturing of insulating material. The purpose of this study is to investigate the possibility of using industrial waste material ruby mica as fine aggregate fully with different grades of concrete composite. Ruby The suitability of industrial waste ruby mica as a fine aggregate for concrete has been assessed by comparing its basic properties with that of conventional concrete. Compressive strength, flexural strength and split tensile strength of the concrete mixes used in this experiment has been obtained after 7 days, 14 days and 28 days. The results of the experimental work shows that replacement of Fine aggregate with industrial waste material ruby mica dust will increased up to 100% of compressive strength, up to 70% of split tensile strength and flexural strength of concrete in manufacturing of hollow concrete brick. These results were shown in the utilization of industrial waste material in construction industries and reduce the cost for the manufacturing of Hollow concrete brick.

Key Words: Industrial Waste Ruby Mica, Phyllosilicate Minerals, Pozzolanic Properties, Compressive strength, Flexural Strength, Tensile Strength, Hollow concrete block.

1.INTRODUCTION

In India, Ruby mica is widely distributed and occurs in igneous, metamorphic and sedimentary regime in Jharkhand. Large crystals mica used for various applications are typically mined from granitic pegmatite under the ground. Typically ruby mica found at Koderma district in Jharkhand It had the largest deposits of mica in the world. The industries were established in Koderma district for the purification of impurities in ruby mica. Mica is stable element when exposed to electricity, light, moisture and extreme temperature. Ruby Mica powder has been used for various purposes. Ruby Mica Powder is a naturally occurring group of silicate minerals. In the preparation of Concrete, It is widely used in construction material in the civil construction work because of its structure strength, stability and durability. In this research paper the ingredients of Concrete are cement, fine aggregate (sand), coarse aggregate and water. Cement Paste is used as a binding material for binding aggregates, while coarse aggregate is responsible for the performance and durability of concrete and fine aggregates fills the voids of concrete mix. Gases were evolved during construction and after construction the setting of concrete contain hydration are produced harmful gases in the environment and hence there is requirement of reducing harmful effect of gases and it can be done by introducing other material in concrete such as industrial waste material Ruby mica dust. The main objective of this research paper to investigate the experimental results of replacing fine aggregate (sand) with industrial waste ruby mica in concrete mix design of M20 and M25 grade of concrete. All the investigation is based on comparative test results of normal concrete and desired proportional concrete by help of Indian standard method. The desired proportion of the percentage of the industrial waste ruby mica as 0%, 25%, 50% and 100% with the ordinary Portland cement of grade 43 (Shree cement manufactured in Bihar unit)

1.1 Research Significance

In this study Industrial waste material Ruby Mica collect from the Koderma Mica mines source was used for the investigation. Concrete mixtures were prepared using fine aggregate and different replacing level of industrial waste Ruby Mica.

1.2 Objective of Investigation

In this project our main objective is to study the influence of replacement of sand with industrial waste Ruby mica. The compressive strength, flexural strength and tensile strength of M20 an M25 grade of concrete are obtained. Similarly compressive strength, flexural strength & tensile strength were obtain for 0%,25%,50%,75% and 100% replacement of fine aggregate with industrial waste Ruby mica by weight. The water cement ratio for M20 and M25 grade of concrete were taken 0.50 and 0.42 thought the investigation of this project work.

- To study the physical properties of Industrial waste material ruby mica.
- To characterize the particle size of industrial Ruby mica.
- Industrial waste Ruby mica as replacement material for fine aggregate.
- To study the effect of Industrial waste material inclusion on the properties of concrete.

2. EXPERIMENTAL MATERIALS

2.1 Cement

Cement used in used of 43 grade for this work and IS 4031 -1968 was adopted in this study; the test conducted on cement is given below.
Fineness of Cement IS: 4031(Part 1)-1996.
Specific Gravity IS: 4031 (Part 11)-1988
Consistency IS: 4031 (Part 4)-1988
Initial & Final setting time IS: 4031 -1988
Compressive strength IS: 4031 (Part 6)-1988.

Table-1 Properties of Cement:

S.N	Properties	Results	Standard Results
1.	Normal Consistency	6mm	<8 mm
2.	Soundness	Expansion 3 mm	<10 mm
3.	Initial Setting Time & Final Setting Time	85 minutes 11 Hours	>300Min & <600 Min
4.	Specific Gravity	3.15	3.15- 3.25
5.	Fineness Modulus	2.94% retain on 90 micron I.S sieve	<10%
6.	Compressive Strength(N/mm^2)	N/mm^2	
	3 Days	19.85	>16 N/mm^2
	7 Days	23.45	>22 N/mm^2
	28 Days	35.98	>33 N/mm^2

2.2 Fine Aggregate

Natural sand which is used for testing with the fine aggregate and gives satisfied results. the all properties of fine aggregate which is easily available nearest river and charges are applicable so it was costly used for this work, fine aggregate conform to zone (I) as per the IS 383:1970. The sieve analysis of aggregates -IS 383:1970 for graded aggregates.

Fineness modulus-IS: 383-1970
Specific gravity-IS: 2386 (Part 3)-1988
Bulk Density- IS: 2386 (Part 3)-1988
Impact test- IS: 2386(Part 4)-1963.

Table-2 Properties of Fine Aggregate:

S.N	Experimental Method	Results Value
1	Fines modulus %	2.458%
2.	Specific gravity	2.650
3.	Bulk density(Loose)(Gm/cm^3)	1.464
4.	Bulk Density(Compact)(Gm/cm^3)	1.627
5.	Water Absorption (%)	1.00

2.3 Coarse Aggregate

The coarse aggregate used in the work was crushed granite of pass through 20 mm seive and retain on 10 mm, aggregate are locally available and easily test conducted on aggregate is shown.

The sieve analysis of aggregates -IS 383:1970 for graded aggregates.

Fineness modulus-IS: 383-1970
Specific gravity-IS: 2386 (Part 3)-1988
Bulk Density- IS: 2386 (Part 3)-1988
Impact test- IS: 2386(Part 4)-1963

Table-3 Properties of Coarse Aggregate:

S.N	Experimental Method	Result Value
1.	Fines modulus %	6.587
2.	Specific gravity	2.68
3.	Bulk Density(Loose)(gm/cm^3)	1.753
4.	Bulk Density (Compact)(gm/cm^3)	1.862
5.	Water Absorption (%)	0.60
6.	Elongation Index (%)	10.23
7.	Flakiness Index (%)	11.28

2.4 Industrial Waste Ruby Mica

Ruby mica is widely present in Koderma district of Jharkhand .In the process of refining Ruby mica in mills there large amount of ruby mica dust collected. These ruby mica dusts were waste product in industries but powder form of ruby mica are utilized as fine aggregates in this research paper. Due to this basic nature and chemical composition of Ruby Mica were help to use in concrete for the manufacture of hollow concrete brick.

Table-4. Experimental Results Value:

S.N	Experimental Method	Result Value
I	Fines Modulus %	3.58%
II	Specific Gravity	2.640
III	Bulk Density(Loose)(Gm/cm^3)	1.621
6.	Bulk Density (Compact)(Gm/cm^3)	1.785
7.	Water Absorption (%)	0.80

Table-5 Physical Properties of Ruby Mica:

S.N	Physical Properties	Result Value
1.	Physical State	Non toxic
2.	Appearance	Fine
3.	Particle Size	<45 micron
4.	Colour	Grey
5.	Odour	Odourless
6.	Hardness	2.5

2.5 Water

In Concrete Mix design water is an important ingredient of concrete which is actually participate in the chemical reaction with cement. Hence it improve the strength to cement concrete, the quantity and quality of water are required to very carefully. Portable water is free from various injurious amounts of oils, acids, alkalis, salts and other organic materials. The pH value of water should be equal to 7.0.It confirming the requirement of IS: 456:2000 were used for the preparation of concrete and curing the specimen.

3. EXPERIMENTAL METHODOLOGY

3.1 Workability

The workability is one of the most important physical parameter of concrete which affect the strength and durability, and also affect the appearance of the finished structure has been. It is observed that degree of workability is medium as per BIS (IS: 456-2000) for normal concrete. The workability of concrete depends on the water cement ratio and water absorption capacity of constitute of material used.

3.1.1. Slump Cone Test

The test are perform according to IS 1199-1959 is followed, compaction factor value decreace as increace the percentage of Industrial waste material Ruby Mica consist of lot of water so concrete becom less stiff (less workable) table show the result.The higher the slum value ,the greater its ability to work easier in construction site. As the percentage of industrial waste Ruby Mica is increase then Workability is reducing. The reason for this is the water absorption of Industrial waste Ruby Mica.

3.2. Compressive Strength Test:

Compressive strength test in laboratory method for concrete cube has because found the desirable characteristics properties of design mix concrete are related to its compressive strength. Compressive strength test is done as per IS516-1959.The compressive strength test was made using Compressive Testing Machine (CTM) of 2000 KN capacity. The compressive strength of M20 and M25 grade of concrete cube was tested using sample of 150mm x 150mm x 150mm cube specimen. The strength of concrete cubes was tested at an age of 7 days, 14 days and 28 days after curing at 27^0 C. And the results obtained. Where replacement of Cement with Wheat husk ash fine aggregate with crushed stone dust in %age, in concrete 7 days test has been conducted to check the gain in initial strength of concrete and after 14 days and 28 days curing it test gives the final strength of concrete.

3.3. Flexural Strength Test:-

In this research paper flexural strength test is done as per IS: 516- 1959. Beams are tested for flexure in Universal testing machine of capacity 500KN and the results obtained. Flexural strength is measure for M20 and M25 grade of concrete. This is a measure of an unreinforced concrete beam or slab to resist failure in bending. It is measured in the dimension of specimen of 100 mm x 100 mm x 500 mm. Flexural strength is about 10% to 20% of compressive strength depending upon the type, size and volume of coarse aggregates that are used. The best results of material are obtained by laboratory tests for design mix concrete. In this research paper flexural strength is determined by third point loading. The flexural strength Test is done graphs which show the 7 days, 14 days and 28days strength of the concrete mix. The flexural strength required following formula.

3.4. Split Tensile Strength Test:-

Testing for split tensile strength of concrete is done as specimen prepared in this experimental research paper. The concrete mix is prepared for M20 and M25 grade of concrete and sand is replaced by Industrial waste material Ruby Mica of certain percentage. Split tensile strength is done as per IS: 5816 -1999.The test on compression testing machine of capacity 2000 KN as shown in fig 4.5, and shown in graph 4.5.1.The dimension of cylinder D= 150 mm and H=300 mm. The cylinder is placed horizontally under compression testing machine and the load is applied till failure of the cylinder. The Split Tensile Test is done in graphs which show the 7 days 14 days and 28days strength of the concrete mix, Graph also says, there is increase in strength as compared to conventional concrete.

4. CONCRETE MIX DESIGN

In this experiment Indian standard method of proportioning concrete is used. Concrete include cement, sand, fine aggregate, coarse aggregate and water. Fine aggregate is replaced with ruby mica powder by 0%, 25%, 50% ,75% and 100% by desired proportion of M20 (W/C=0.50) and M25 (W/C=0.43) grade of concrete mix design. For analysis of the experimental results of normal concrete and other variation concrete mix design with totally 270 specimen were casting and curing at 27^0C for compressive strength, Flexural strength and Tensile strength. The specimen are taken and tested were required at 7 days, 14days and 28 days for their comparative results with normal concrete and desired proportion mix design.

The target mean strength of M20 and M25 grade of concrete is 26.60 N/mm^2 and 31.60 N/mm^2.

Table-6 Design Mix proportion for (1m³ in kg/m³) M20 grade concrete to mild exposure condition.

Grade of Concrete	Material Used in Concrete Mix Design				
	Cement	F.A	C.A	Water	W/C
M20	383.0	803.0	1026.0	191.6	0.50
Ratio prop….	1.00	2.09	2.67	0.50	0.50

Table-7 Design Mix proportion for (1m³ in kg/m³) M25 grade concrete to mild exposure condition.

Grade of Concrete	Material Used in Concrete Mix Design				
	Cement	F.A	C.A	Water	W/C
M25	435.5	781.0	998.0	191.6	0.43
Ratio prop….	1.00	1.79	2.29	0.43	0.43

5. EXPERIMENTAL RESULTS

5.1 WORKABILITY

In the graph, It is observed that degree of workability is a medium as per BIS(IS:456-2000) for the normal concrete.it is observed that percentage of industrial waste Ruby Mica increase from 0%, 25%, 50%, 75% and 100%,The mix proportion becomes stiffer, and workability results in low slump value. Low slump value may have great impact on the workability of concrete in this research paper.

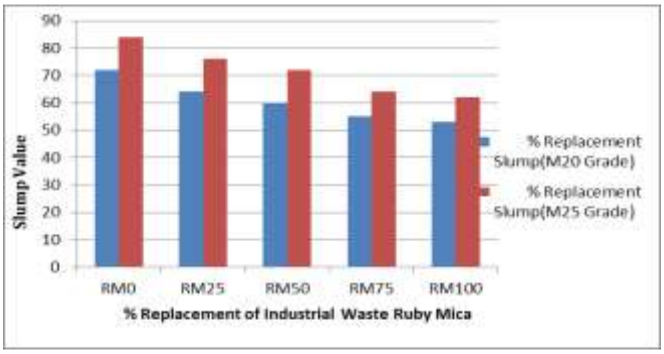
Table-8 Design Mix proportion for M20 grade concrete (Workability) to mild exposure condition.

% Replace	Cement	F.A	R.M	C.A	Water	Slump
RM_0	383	803.0	000.0	1026	191.6	72
RM_{25}	383	602.0	201.0	1026	191.6	64
RM_{50}	383	401.5	401.5	1026	191.6	60
RM_{75}	383	201.0	602.0	1026	191.6	55
RM_{100}	383	000.0	803.0	1026	191.6	53

Table-9 Design Mix proportion for M25 grade concrete (Workability) to mild exposure condition.

% Repl.	Cement	F.A	R.M	C.A	Water	Slump
RM_0	435.5	781.0	000.0	998	191.6	84
RM_{25}	435.5	586.0	195.0	998	191.6	76
RM_{50}	435.5	390.5	390.5	998	191.6	72
RM_{75}	435.5	195.0	586.0	998	191.6	64
RM_{100}	435.5	000.0	781.0	998	191.6	62

Graph1. (Bar Chart) % Replacement Material Industrial Waste Ruby Mica Vs. Slump Value (mm) of M20 & M25 Grade of Concrete.



5.2 COMPRESSIVE STRENGTH

Compressive strength test of concrete is done as per IS 516:1959.The test is conducted on compression testing machine of capacity 2000 KN. The experimental result of concrete was studied for M20 and M25 grade of cubes casted and cured for 7days, 14 days and 28 days. Compressive strength of concrete is tested on cubes at different percentage of Industrial waste Ruby Mica content in concrete.

Table-10 Analysis of test results (Compressive strength N/mm²) of concrete M20 grade.

% Repla.	Compressive Strength of M20 Grade Concrete (N/mm²)			% increase or decrease in Strength over Normal Concrete, M20		
	7th days	14th days	28th days	7th days	14th days	28th days
RM_0	12.62	17.8	23.5	----	----	----
RM_{25}	13.69	18.6	24.3	+8.47	+4.49	+3.40
RM_{50}	13.72	18.7	24.8	+0.21	+0.53	+2.05
RM_{75}	14.80	19.4	25.6	+7.80	+3.74	+3.22
RM_{100}	15.42	20.2	26.3	+4.12	+4.12	+2.73

Graph-2. (Bar Chart) % replacement of Industrial Waste Ruby Mica Vs. Compressive Strength (N/mm²) of M20 Grade of Concrete.

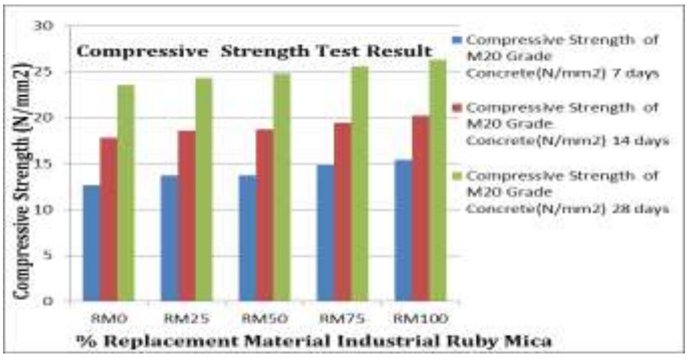
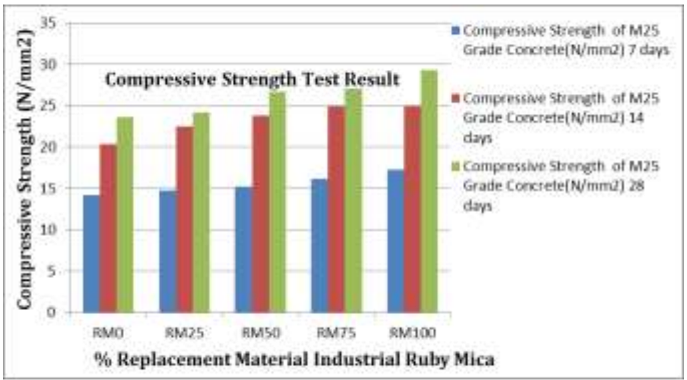


Table-11 Analysis of test results (Compressive Strength N/mm²) of concrete M25 grade.

% Replacement	Compressive strength of M25 grade concrete(N/mm²)			% increase or decrease in strength over Normal Concrete, M25		
	7th days	14th days	28th days	7th days	14th days	28th days
RM_0	14.18	20.4	23.6	---	--	--
RM_{25}	14.78	22.5	24.2	+4.23	+9.29	+2.54
RM_{50}	15.26	23.8	26.7	+3.24	+5.77	+10.3
RM_{75}	16.20	24.9	27.1	+6.15	+4.62	+1.49
RM_{100}	17.25	25.0	29.3	+6.48	+0.40	+8.11

Graph-3.(Bar Chart) % Replacement Material Industrial Waste Ruby Mica Vs. Compressive Strength (N/mm²) of M25 Grade of Concrete.



5.3 FLEXURAL STRENGTH

In Flexural Strength, there are minimum 3 specimen has required for per test after curing at Room Temperature. The size of Specimen is 100 mm x 100 mm x 500 mm. Flexural strength test is done as per IS: 516-1959.Prism is tested for flexural in universal testing machine of capacity 500 KN.

Table-12 Analysis of test results (Flexural strength N/mm²) of concrete M20 grade.

% Replacement	Flexural strength of M20 Grade Concrete(N/mm²)			% increase or decrease in strength over Normal Concrete, M20		
	7th days	14th days	28th days	7th days	14th days	28thdays
RM_0	1.80	3.03	3.52	--	--	--
RM_{25}	2.20	3.07	3.55	+2.20	+1.31	+0.85
RM_{50}	2.23	3.10	3.59	+1.36	+0.97	+1.12
RM_{75}	2.45	3.12	3.64	+2.58	+0.64	+2.78
RM_{100}	2.65	3.19	3.68	+3.24	+2.24	+1.09

Graph-4. (Bar Chart) % Replacement Material Industrial Waste Ruby Mica Vs. Flexural Strength (N/mm²) of M20 Grad of Concrete.

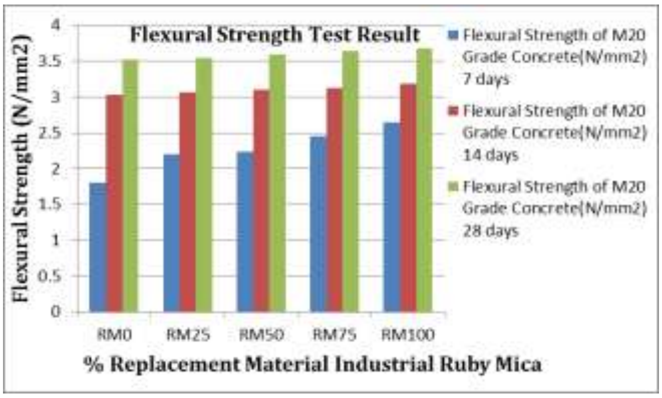
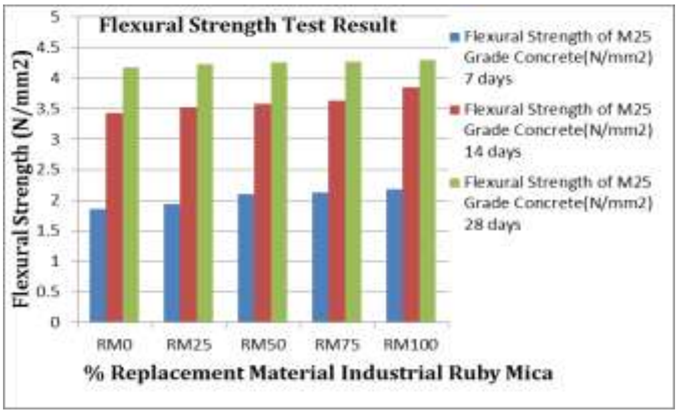


Table-13 Analysis of test results (Flexural strength N/mm²) of concrete M25 grade.

% Replacement	Flexural strength of M25 Grade Concrete(N/mm²)			% increase or decrease in Strength over Normal Concrete, M25		
	7th days	14th days	28th days	7th days	14th days	28th days
RM_0	1.86	3.43	4.17	---	--	--
RM_{25}	1.94	3.52	4.23	+4.30	+2.62	+1.43
RM_{50}	2.10	3.58	4.25	+8.24	+1.70	+0.47
RM_{75}	2.13	3.63	4.26	+1.42	+1.39	+0.23
RM_{100}	2.18	3.84	4.29	+2.34	+5.78	+0.70

Graph-5. (Bar Chart) % Replacement Material Industrial Waste Ruby Mica Vs. Flexural Strength (N/mm²) of M25 Grade of Concrete.



5.4 TENSILE STRENGTH

In Tensile Strength, the testing machine of capacity 2000kN. There are minimum 3 specimen has required for per test after curing at Room Temperature. The size of Specimen was diameter 150 mm and length 300mm. testing for Tensile strength of concrete is done as specimen details of this work. In Tensile strength were conducted for M20 and M25 Grade of concrete with different Proportion of Industrial material Ruby Mica used.

Table-14 Analysis of test results (Tensile strength N/mm²) of concrete M20 grade.

% Replacement	Tensile strength of M20 Grade Concrete(N/mm²)			% increase or decrease in strength over Normal Concrete, M20		
	7th days	14th days	28th days	7th days	14thd ays	28th days
RM_0	1.58	2.28	2.41	---	--	--
RM_{25}	1.62	2.29	2.46	+2.53	+0.43	+2.07
RM_{50}	1.65	2.32	2.52	+1.85	+1.31	+2.43
RM_{75}	1.68	2.36	2.63	+1.81	+1.72	+4.36
RM_{100}	1.92	2.38	2.74	+4.28	+2.00	+4.18

Graph-6. (Bar Chart) % Replacement Material Industrial Waste Ruby Mica Vs. Tensile Strength (N/mm²) of M20 Grade of Concrete.

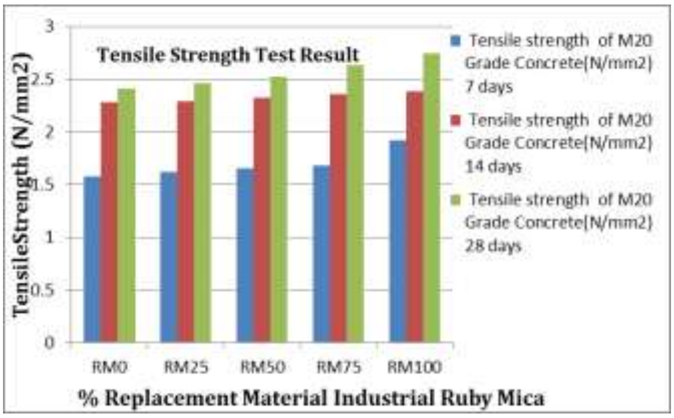


Table-15 Analysis of test results (Tensile strength N/mm²) of concrete M25 grade.

% Replacement	Tensile strength of M25 Grade Concrete(N/mm²)			% increase or decrease in strength over Normal Concrete, M25		
	7th days	14th days	28th days	7th days	14th days	28th days
RM_0	1.90	2.59	2.80	---	--	--
RM_{25}	1.98	2.62	2.84	+4.21	+1.15	+1.42
RM_{50}	2.10	2.66	2.86	+6.06	+1.52	+0.70
RM_{75}	2.18	2.74	2.92	+3.80	+3.00	+2.09
RM_{100}	2.20	2.88	2.98	+0.92	+5.10	+2.05

Graph-7. (Bar Chart) % Replacement Material Industrial Waste Ruby Mica Vs. Tensile Strength (N/mm²) of M25 Grade of Concrete.

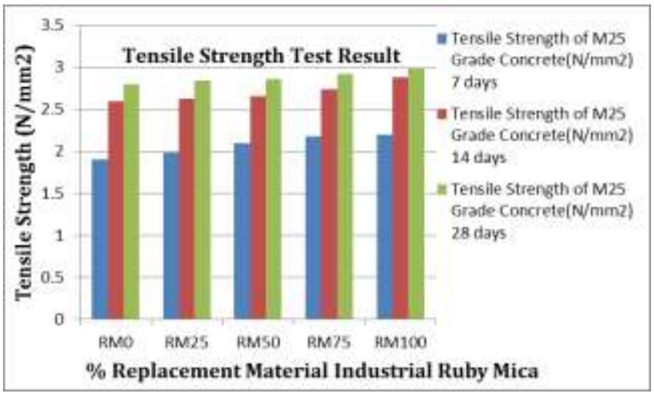


Table-16 Abstract of the test result at 7 days of Concrete M20 grade.

% Replacement	Compressive strength (N/mm²)	Flexural strength (N/mm²)	Tensile strength (N/mm²)	Fracture strength (N/mm²) f cr = 0.7 √f ck
RM_0	12.62	1.80	1.58	2.48
RM_{25}	13.69	2.20	1.62	2.59
RM_{50}	13.72	2.23	1.65	2.60
RM_{75}	14.80	2.45	1.68	2.69
RM_{100}	15.42	2.65	1.92	2.74

Table-17 Abstract of the test result at 7 days of Concrete M25 grade.

% Replacement	Compressive strength (N/mm²)	Flexural strength (N/mm²)	Tensile strength (N/mm²)	Fracture strength (N/mm²) f cr = 0.7 √f ck
RM_0	14.18	1.86	1.90	2.63
RM_{25}	14.78	1.94	1.98	2.69
RM_{50}	15.26	2.10	2.10	2.73
RM_{75}	16.20	2.13	2.18	2.81
RM_{100}	17.25	2.18	2.20	2.90

Table-18 Abstract of the test result at 14 days of Concrete M20 grade.

% Replacement	Compressive strength (N/mm²)	Flexural strength (N/mm²)	Tensile strength (N/mm²)	Fracture strength (N/mm²) f cr = 0.7 √f ck
RM_0	17.8	3.03	2.28	2.95
RM_{25}	18.6	3.07	2.29	3.01
RM_{50}	18.7	3.10	2.32	3.02
RM_{75}	19.4	3.12	2.36	3.08
RM_{100}	20.2	3.19	2.38	3.14

Table-19 Abstract of the test result at 14 days of Concrete M25 grade.

% Replace ment	Compressi ve strength (N/mm^2)	Flexural strength (N/mm^2)	Tensile strength (N/mm^2)	Fracture strength (N/mm^2) f cr = 0.7 √f ck
RM_0	20.4	3.43	2.59	3.16
RM_{25}	22.5	3.52	2.62	3.32
RM_{50}	23.8	3.58	2.66	3.41
RM_{75}	24.9	3.63	2.74	3.49
RM_{100}	25.0	3.84	2.88	3.50

Table-20 Abstract of the test result at 28 days of Concrete M20 grade.

% Replacem ent	Compressive strength (N/mm^2)	Flexural strength (N/mm^2)	Tensile strength (N/mm^2)	Fracture strength (N/mm^2) f cr = 0.7 √f ck
RM_0	23.5	3.52	2.41	3.39
RM_{25}	24.3	3.55	2.46	3.45
RM_{50}	24.8	3.59	2.52	3.48
RM_{75}	25.6	3.64	2.63	3.54
RM_{100}	26.3	3.68	2.74	3.58

Table-21 Abstract of the test result at 28 days of Concrete M25 grade.

% Replace ment	Compress ive strength (N/mm^2)	Flexural strength (N/mm^2)	Tensile strengt h (N/mm^2)	Fracture strength (N/mm^2) f cr = 0.7 √f ck
RM_0	23.6	4.17	2.80	3.40
RM_{25}	24.2	4.23	2.84	3.44
RM_{50}	26.7	4.25	2.86	3.61
RM_{75}	27.1	4.26	2.92	3.64
RM_{100}	29.3	4.29	2.98	3.78

6. CONCLUSIONS

The usages of Industrial Waste Ruby Mica in concrete improve its quality in terms of strength. The conclusion based on experiment conducted and observation from the present study below.

1. In this experiment arbitrary method is easy method for the mix design of M20 and M25 grade of concrete. This type of concrete is used where large mass of industrial waste ruby mica are easily available for construction of structure and it is used as a replacement material for river sand in concrete.
2. Industrial waste material ruby mica is fully utilized in concrete structure which prevents various hazardous effects in nature.
3. The compressive strength of concrete increase up to 50% replacement of fine aggregate by Industrial waste Ruby Mica and further increase of percentage of industrial waste ruby mica help to fully strength to concrete in compressive strength.
4. The Flexural strength of concrete increase up to 75% replacement of fine aggregate by Industrial waste Ruby Mica and further increase of percentage of industrial waste ruby mica help to fully strength to concrete in Flexural strength.
5. The Tensile strength of concrete increase up to 75% replacement of fine aggregate by Industrial waste Ruby Mica and further increase of percentage of industrial waste ruby mica help to fully strength to concrete in Tensile strength.
6. It is concluded that Industrial waste Ruby mica can be used as a replacement of fine aggregate and 100% replacement of fine aggregate gives excellent Results in strength, as compare to the normal concrete.
7. Use of these industrial waste material leads to sustainable development in construction industries.
8. Estimate cost of construction can be reducing by local available material.
9. The utilization of industrial waste ruby mica in concrete will prevent natural resource of river sand.
10. It is cheaper than utilization of river sand because it is available from quarry and fleshing of industries ruby mica.
11. To save the environmental, Industrial waste ruby Mica may be used as better substitute as a replacement of fine aggregate in concrete.

REFERENCES

[1] Sumit A.Balwaik, S.P Raut et al (2011),” Utilization of waste paper pulp by partial replacement of cement in concrete’” International Journal of Engineering Research and Application(IJERA),ISSN:2248-9622, Vol.1 Issue 2,July-August 2011,pp.300-309.

[2] Dhanaraj Mohan Patil, et al(2013),”An Experimental investigation of waste Glass powder as partial replacement of cement in concrete,” International Journal of Advance Technology in Civil Engineering (IJATC) ISSN:2231-5721,Vol.2 Issue No.1,2013,pp.112-117.

[3] Mr.R.Balamurugan, et al (2014),”Experimental investigation of partial replacement of cement by industrial waste material,” International Journal of Engineering Research and Application (IJERA), ISSN:2248-9622,Volume-4,Issue-4(Version 1),April 2014,pp.430-435.

[4] T.Omoniyi, S.Duna, A.Mohammed et al (2014),” The Compressive Strength Characteristics of Cow dung ash blended cement Concrete,” International Journal of Scientific & Engineering Research (IJSER),ISSN:2229-5518,Vol.5 Issue No.7,July 2014,pp.772-776.

[5] P. Padma Rao, A. Pradhan Kumar, B.Bhaskar Singh et al (2014),” A study on use of Rice husk ash in concrete,” International Journal of Education and Applied Research

(IJEAR), ISSN:2249-4944,Vol.4 Issue spl-2, Jan-June-2014,pp.75-81.

[6] Jitender Kumar Dhaka et al (2015)," Utilization of fly ash and cow dung ash as partial replacement of cement in concrete," International Journal of Civil and Structural Engineering (IJCSE), ISSN:0976-4399,Vol.6 Issue No.1,August 2015,pp.34-39.

[7] Inderveer singh Gurjar et al 2015," A Study on use of cow dung ash and Rice husk ash in concrete," International Journal of Research in Engineering and Technology, ISSN: 2321-7308,Vol.4 Issue No.11,Nov-2015,pp.306-310.

[8] D.Gowrisankar et al (2016)," The Partial replacement of sand with quarry dust & cement with Lime powder," International Journal of Engineering Science and Computing, ISSN: 2321-3361, Vol.6 Issue No. 03, March 2016, pp.2660-2664.

[9] Sandeep Dalal, Parveen Berwal et al (2016),"Study the Strength charecteristics of concrete using waste material", International Journal of Engineering Applied and Management Science Paradigms,ISSN:2320-6608,Vol.39,Issue 01,September-2016,pp.47-53.

[10] Sruthy B, Anisha G Krishnan ,Gibi Miriyam Mathew and Sruthi G Raj et al (2017),"An experimental investigation on strength of concrete made with Cow dung ash and glass fibre,"International Journal of Engineering Research & Technology(IJEAT), ISSN:2278-0181,Vol.6, Issue03, March-2017, pp.492-495.