CONCRETE USING DOLOMITE POWDER AND PARITAL REPLACEMENTOF FINE AGGREGATE WITH STONE DUST

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Abstract : *All the ingredients in concrete, cement is among the most crucial. Cement is responsible for the majority of concrete's qualities. Argillaceous and calcareous materials are heated to a high temperature in the manufacturing of cement. The atmosphere is exposed to significant CO2 emissions during this procedure. Cement production in India is the second largest globally. According to estimates, 0.8 tons of CO2 are released during the manufacture of one ton of cement. Both the price of concrete and the amount of CO2 emitted will decrease with decreased cement consumption. One substitute material for cement is dolomite powder, which is made by powdering the mineral dolostone, which forms sedimentary rocks.. Dolomite powder can lower the price of concrete while also potentially increasing its strength. Dolomite powder is used in place of cement in this. The replacement percentages by weight of cement that were tested were 0%, 5%, 10%, 15%, 20%, and 25%. The reference specimens' compressive, split tensile, and flexural strengths were compared to those of the concrete containing dolomite powder. The findings show that adding dolomite powder instead of cement increases the concrete's flexural, split tensile, and compressive strengths.*

The production of stone dust in the stone crushing zone seems to provide a challenge for efficient disposal. Sand is a typical fine aggregate used as an affine aggregate in construction projects. The major goal of this investigation is to find a sand substitute. Both waste recovery and the reduction of solid waste will benefit from the 50% replacement of regular sand with stone powder. The goal of the study is to use powdered sand to compare the performance of concrete.

1. INTRODUCTION

1.1 GENERAL

One of the materials that is utilized the most in the globe is concrete. It is made up of water, coarse aggregate, fine aggregate, and binding substance (cement). Worldwide, there are numerous sources of carbon dioxide gas emissions, including the transportation sector, the burning of fossil fuels, and the cement making industry. The primary cause is the atmosphere's accumulation of greenhouse gases, such as carbon dioxide, which leads to global warming. Although cement is used as a binding agent to hold fine and aggregate together in concrete, the production of cement releases carbon dioxide into the atmosphere.It is concluded that manufacture of 1 ton cement produce 1 ton carbon dioxide gas. About 7 percent of carbon dioxide gas is evolved from cement industries to the atmosphere, i.e. fifty percent carbon dioxide gas of all industrial emission.A variety of hazardous gases, including nitrogen oxide, sulfur dioxide, carbon dioxide, and dust, are produced during the cement manufacturing process. Dust from the cement industry is released into the atmosphere, contributing to environmental degradation. Cement dust has a negative impact on human health, the ecosystem, and vegetation.

1.2 OBJECTIVE:

1) To mix inexpensive concrete with almost the same benefits as nominal mix.
2) To determine the ideal percentage of dolomite powder addition to cement.
3) In addition, the ideal proportion of dolomite powder should be combined with stone dust to make up the fine aggregate.
4) To make affordable concrete by mixing in stone dust and dolomite powder without compromising strength.
5) To research how stone dust and dolomite affect concrete.
6) To contrast the outcomes with a typical concrete mixture.

1.3 SCOPE OF STUDY:

1）A reduction in the self-weight of concrete relative to the nominal mix.
2) Increased tensile and compressive strength.
3. It is possible to make up for a shortage of fine aggregate. Stone dust and dolomite powder can be disposed of effectively.

2. LITERATURE REVIEW

[1]. Kamal M.M, et al (2012) assessed the dolomite powder-containing self-compacting concrete mixes' binding strength. To significantly strengthen the binding, fly ash or silica fume were added to the dolomite powder. A push-out test was performed and seven mixes were proportioned. It was determined how the binding strength varied for various mixtures. Normal bond strength was used to assess the steel concrete bond sufficiency. The outcome demonstrated that when dolomite powder was substituted for Portland cement, the binding strength rose.

[2]. DeepaBalakrishnan S and Paulose K.C (2013) conducted research on the workability and strength properties of self-compacting concrete that contains dolomite powder and fly ash. They replaced 12.5 percent, 18.75 percent, 25 percent, and 37.5 percent of the cement (by mass) with fly ash and 6.25 percent, 12.5 percent, and 25 percent of the cement with dolomite powder to create high volume fly ash self-compacting concrete.

Results of tests including the slump flow test, J-ring test, V-funnel test, and L-box test, which measure the acceptability of self-compacting concrete, were given. Other mechanical properties of the mixes were subsequently examined, including split tensile strength, flexural strength, cylinder compressive strength, cube compressive strength at 7, 28, and 90 days, and split tensile strength at 28 days. When compared to the reference mixture, concrete performed better both in the fresh and hardened states at all levels of cement replacement.

[3]. Muthukumaran, V. Rajagopalan (2017) claimed that replacing m-sand and dolomite powder has been shown to increase concrete's strength. 31.6 N/mm2 is the desired mean for concrete of M25 grade. When the compressive strength is 36.55 N/mm2, the ideal replacement percentages for cement and sand are 10% for dolomite powder and 10% for m-sand, respectively.The greatest proportion of cement that can be replaced with 10% dolomite powder and 10% m sand results in a split tensile strength of 2.96 N/mm2.When the flexural strength is 3.84N/mm2, the maximum replacement percentage of cement is 10% with dolomite powder and 10% with msand.

[4]. AthulyaSugathan (2017) discussed the following

a. It was determined that adding dolomite powder to cubes up to 15% of the weight of cement increased their compressive strength; however, adding more dolomite powder caused their compressive strength to diminish.

b. Adding dolomite powder to cylinders increases their split tensile strength by up to 15% when compared to the weight of cement; however, adding more dolomite powder causes the split tensile strength to drop.

c. We have proposed a straightforward method to reduce building expenses by using readily or inexpensively accessible dolomite powder. nAs civil engineers, our primary goal is to prevent environmental pollution, and we have ventured into this field.

[5]. Bhavin K, (2013) described the specifics of the study done on cement, dolomite, and various amounts of polypropylene fiber-filled paver blocks.They found that adding 0.3% and 0.4% of polypropylene fibers increased the paver block's flexural strength and resistance to abrasion.

[6]. Salim Barbhuiya (2011) conducted a study to examine the potential applications of dolomite powder in the synthesis of SCC. The results of the tests showed that fly ash and dolomite powder might be used to create SCC.

[7]. Eldhose M Manjummekudy et al., investigated the impact of using eco sand, or extracted dolomite, in place of some fine aggregate. The findings showed that using eco sand to replace 25% of the fine aggregate had the highest compressive strength and that compact packing reduces voids.

[8]. Huseyin Temiz et al. examined dolomite's performance in concrete. This study discovered that the inclusion of dolomite resulted in an increase in setting time. When compared to cement concrete manufactured with regular Portland cement, there was reduced heat of hydration. Dolomite was added to mortar cubes, increasing their compressive strength.

[9]. K.Chinnaraju et al. examined dolomite's performance in concrete. This study discovered that the inclusion of dolomite resulted in an increase in setting time. When compared to cement concrete manufactured with regular Portland cement, there was reduced heat of hydration. Dolomite was added to mortar cubes, increasing their compressive strength.

[10]. Olesia Mikhailova et al., carried out studies on powdered dolomite. According to the findings, the inclusion of 25% dolomite powder improved the early strength and dense structure of the concrete without having an adverse influence on later ages.

3. MATERIALS AND MIX DESIGN

3.1 PROPERTIES OFMATERIALS:

3.1. CEMENT:

Ordinary Portland Cement (OPC) 53 grade was utilized in the current investigation. The brand OPC was Chettinad.

Table 3.1 Cement Sp. gravity

S.No.	OBSERVATIONS	Wt. in grams
1.	Weight of the specific gravity bottle(W1)	49.0
2.	Weight of bottle + 1/3rdfilled with cement(W2)	109.0
3.	Weight of bottle + 1/3rdfilled cement + kerosene(W3)	160.0
4.	Weight of bottle + kerosene (W4)	126.0
5.	Weight of bottle + Water(W5)	142.0

Specific gravity = (W2 - W1) / (W2 – W1) – ((W3 –W4) * 0.79) Specific gravity of cement = 3.080

3.3. FINE AGGREGATE:

There was river sand available locally, in accordance with IS: 383-1970. To get rid of harmful stuff, the sand was screened on location..

3.3.1.SPECIFIC GRAVITY OF FINE AGGREGATE:

The specific gravity of the sample was determined by first measuring the weight of the empty bottle (W1), then filling the bottle with fine aggregate up to two thirds of its height and measuring the weight of the filled bottle (W2).

The remaining height of the bottle was filled with water and weighed as W3. The fine aggregate and water were removed, leaving the bottle fully filled with water and weighed as W4 (bottle + water). The following formula was used to get the fine aggregate's specific gravity

Table 3.2 fine aggregate sp. gravity

S.No.	OBSERVATIONS	Wt. in Grams.
1.	Weight of the specific gravity bottle(W1)	633.30
2.	Weight of the bottle + 1/3rd filled sand(W2)	1606.50
3.	Weight of bottle + 1/3rd filled sand + water (W3)	2064.90
4.	Weight of bottle + water (W4)	1528.0

Specific gravity = (W2 - W1) / [(W2 – W1) – (W3–W4)] Specific gravity of fine aggregate =2.610

3.3. COARSEAGGREGATE:

As coarse aggregate, locally accessible crushed quarry stones that met IS: 383-1970 requirements were employed.

a. SPECIFIC GRAVITY OF COARSE AGGREGATE:

Table 3.3 Sp. gravity of Coarse aggregate

S.No.	OBSERVATIONS	Wt. in Grams.
1.	Weight of coarse aggregate sample	1000
2.	Weight of vessel + sample + water W1	3372
3.	Weight of vessel + water W2	2754
4.	Weight of saturated and surface dry sample W3	990
5.	Weight of oven dry coarse aggregate sample W4	982

Specific gravity = W4/[W3-(W1-W2)]
Specific gravity of coarse aggregate = 2.65

3.4. DOLOMITE POWDER

To a certain extent, dolomite powder—which is made by powdering the sedimentary rock-forming mineral dolostone—can be used in place of cement in concrete. Cement and dolomite powder share several similarities. Dolomite powder can lower the price of concrete while also potentially increasing its strength. Dolomite powder is being used in this project as a partial substitute for cement. By weight of cement, the replacement percentages that were attempted were 0%, 5%, 10%, 15%, 20%, and 25%.

The reference specimens and the concrete containing dolomite powder were tested for compressive strength.

Fig 3.1 Dolomite powder

Table 3.4. Chemical Composition Of Dolomite Powder:

Compound	Weight Percentage
CaO	74.26
MgO	21.42
Na_2O	1.26
Al_2O_3	1.09
Zn	0.06
TiO_2	0.06
MnO	0.04
SO_3	0.85
Fe_2O_3	0.22
CuO_2	0.04
LOSS OF IGNITION	0.32

3.5. STONE DUST:

When rock is combined to create crushed stone or crushed sand, a fine substance known as stone dust is created. The particles that comprise this dust are those that clear 75 µm sieves. It is unknown how the amount of dust in the aggregate affects the characteristics of both fresh and cured concrete. To determine the impacts of different dust content fractions on the characteristics of both fresh and hardened concrete, an experimental investigation was conducted. It might be utilized in concrete in place of some of the natural river sand. By adding stone dust to concrete, you may preserve the natural river sand for future generations while also enhancing the quality of your concrete. Compressive strength and workability were assessed at various fine aggregate replacement levels.

Fig 3.2 Stone Dust

3.5.1. Chemical Composition Of Stone Dust

Table 3.5 Chemical Composition Of Stone Dust

S.No.	Constituents	Percentage by Weight
1.	SiO_2	87
2.	Al_2O_3	2.5
3.	Fe_2O_3	2.0
4.	MgO	0.24
5.	CaO	3.75

3.5.2. Specific Gravity Of Stone Dust

The test was conducted using pycnometer. The procedure is similar that is followed to find out specific gravity of fine aggregate and coarse aggregate.

Table 3.6 specific gravity of stone dust

S.No.	Observations	Wt. In Grams
1.	Weight of empty pycnometer	650
2.	weight of pycnometer + oven dried aggregate	870
3.	weight of pycnometer + oven dried aggregate + water	1420
4.	weight of pycnometer + water	1430

Specific gravity = $(W2 - W1) / [(W2 – W1) – (W3 – W4)]$

Specific gravity of stone Dust = 2.50

3.5.3. Water Absorption Of Stone Dust

The water absorption of sawdust is calculated using the formula

Percentage of absorption = $[A–B/B] \times 100$

Where,

A= saturated weight of stone dust in kg = 1.94 kg

B= oven dried weight of stone dust in kg = 1.32 kg

% of absorption = [1.94-1.32/1.32] × 100 = 35%

3.6. CONCRETE MIX DESIGN PROPORTIONING

The proportioning of the concrete mix is carried out in accordance with IS code 10262 (2009) requirements.

The next action is part of the mix design.

Step 1: Proportioning Requirements:

Table 3.7 Stipulations for proportioning

S. No	Grade designation	M 25
i.	Type of cement	OPC 53 grade conforming to IS 8112
ii.	Maximum nominal size of aggregate	20mm
iii.	Minimum cement content	240 kg/m^3
iv.	Maximum water-cement ratio	0.5
v.	Workability	50-100mm slump
vi.	Exposure condition	Moderate
vii.	Method of concrete placing	Pumping
viii.	Degree of supervision	Good
ix.	Type of aggregate	Crushed angular aggregate
x.	Maximum cement content	450 kg/m^3
xi.	Chemical admixture type	No admixture

3.6.1. Test details of materials:

Table 3.8 Test data of materials

i.	Cement used	ade conforming toIS8112
ii.	Specific gravity of cement	3.08
ii.	Chemical admixture	No admixture is used

v. Specific gravity of:

Coarse aggregate 2.65

Fine aggregate 2.61

Step – 2 Target strength for proportioning:F'ck= fck+ 1.65 × S

WhereF'ck= target average compressivestrength at 28 days, fck= characteristic compressive strength at 28 days, and

S = standard deviation. From Table I, standard deviation, s = 4 N/mm^2

Therefore, target strength

= 25 + 1.65 x 5 = 31.6 N/mm

Step – 3 Selection of water-cement ratio:

From Table 5 of IS 456, maximum water- cement ratio = 0.5 so adopting water-cementratio as 0.44

Step – 4 Selection of water content:

From Table 2 of IS 10262, maximum water content =186 litre (for 25 to50 mm slump range) for 20 mm aggregate

Estimated water content for 100 mm slump =186 + (6/100) x 186 = 197 litre

Step – 5 Calculation of cement content:

Water-Cement ratio = 0.44Cement content =197/0.44Cement = 447.7 kg/m^3

The cement content is in between the minimum and maximum value.

240 < 447.7 < 450 Hence ok

Step – 6 Determination of coarse and fine aggregate:

From Table 3, volume of fine aggregate (Zone II) and coarse aggregate (equivalent to 20 mm size aggregate) for a water-to-cement ratio of 0.40-0.50. Since the current water-to-cement ratio is 0.44, more coarse aggregate must be used in order to reduce the amount of fine aggregate. Given that the ratio of cement to water is 0.10. There is a 0.02 percent increase in the volume of coarse aggregate (at a rate of -/+ 0.01 for every ± 0.05 variation in the water-cement ratio). These figures should be lowered by 10% for pumpable concrete.

Therefore, volume of coarse aggregate = 0.608

Volume of fineaggregate content = 1- 0.608 = 0.392

Step – 8 Mix calculations:

i.Volume of concrete: 1m^3

ii.Volume of cement: [mass of cement/specific gravity of cement x 1000]

[447.7/3.08 x 1000] = 0.14m^3

iii.Volume of water: [mass of water/specific gravity of water x 1000]

(197/1) x (1/1000) = 0.197m^3

iv.Volume of all in aggregate: [a- (b + c)]

[1 - (0.14 + 0.19)] = 0.663m^3

Mass of coarse agg. = d x Vol. of coarse agg. xSp. gravity of Coarse agg. x 1000

=0.663 x 0.608 x 2.65 x 1000 = 1068.2kg

Mass of fine aggregate: d x volume of fine aggregate x

Specific gravity of fine aggregate x 10000.663 x 0.392 x 2.61 x 1000 = 678.3kg

Step – 9 Mix proportion:

Table 3.9 Mix proportion

Cement	447.7 kg/m^3
Fine aggregate	678.3 kg/m^3
Coarse aggregate	1068.2 kg/m^3
Water-Cement ratio	0.44
Mix proportion	1:1.5:2.3

4. EXPERIMENTAL METHODOLOGY

4.1. GENERAL: The materials needed for the study are gathered from various sources following the concrete mix design. In this study, nominal mix concrete is first made, and examples are then made. Next, the fine aggregate is substituted with stone dust at a weight percentage of 50% for the fine aggregate, and dolomite powder is added to the cement at different weight percentages of 5%, 10%, and 20%. Finding the correct percentage of dolomite powder comes after preparation. Currently, by using the ideal ratio of dolomite powder to cement.Concrete cubes and cylinders are subjected to tests such as split tensile strength and compressive strength. The outcomes are contrasted with a typical mixture.

4.2. CALCULATION OF QUANTITY OF MATERIALS:

For the study, concrete cubes and cylinders with varying mix proportions must be cast, with human hair used in place of fine aggregate and stone dust used as cement.

4.2.1. QUANTITY OF MATERIALS REQUIRED FOR ONE CUBE &CYLINDER:

a.Nominal mix:

Table 4.1 Quantities of Nominal mix

MATERIAL	CUBE	CYLINDER
Volume	0.15 x 0.15 x 0.15 = 0.003375m^3	3.14 x 0.075×0.075 x 0.3 = 0.0053m^3
Mass of cement	0.003375 x 447.7 = 1.51kg	0.0053 x 447.7 = 2.37kg
Mass of fine aggregate	0.003375 x 678.3 = 2.28kg	0.0053 x 678.3 = 3.59kg
Mass of coarse aggregate	0.003375 x 1068.2 = 3.60kg	0.0053 x 1068.2 = 5.66kg
Water required	0.66lit	1.042lit

4.3. 0% replacement of fine aggregate with StoneDust:

50% of the weight of the fine aggregate in the concrete is replaced with stone dust.

Table 4.2 Quantities of 50% stonedust replacement

MATERIAL	CUBE	CYLINDER
Volume	0.15 x 0.15 x 0.15 = 0.003375m^3	3.14×0.075 x 0.075 x 0.3 = 0.0053m^3
Mass of cement	0.003375 x 447.7 = 1.51kg	0.0053x 447.7 = 2.37kg
Mass of fine aggregate	0.003375 x 678.3 = 1.14kg	0.0053x 678.3 = 1.795kg
Mass of coarse aggregate	0.003375 x 1068.2 = 3.60kg	0.0053 x 1068.2 = 5.66kg
Mass of stone dust	1.14 kg	1.795kg
Water required	0.66lit	1.042lit

4.4. 50% replacement of fine aggregate with stone dust along with 5% addition of dolomite powder with Cement:

In addition to adding 5% dolomite powder to the cement, 50% of the weight of the fine aggregate in the concrete is replaced by stone dust.

Table 4.3 Quantities of 50% stone dust + 5% dolomite powder addition.

MATERIAL	CUBE	CYLINDER
Volume	0.15 x 0.15 x 0.15 = 0.003375m^3	3.14×0.075×0.07× 0.3 = 0.0053 m^3
Mass of cement	0.003375 x 447.7-0.0715	0.0053 x 447.7

	= 1.43kg	= 2.2515g
Mass of fine aggregate	0.003375 x 678.3 = 1.14 kg	0.0053 x 678.3 = 1.795kg
Mass of coarse aggregate	0.003375 x 1068.2 = 3.60kg	0.0053 x 1068.2 = 5.66kg
Mass of stone dust	1.14 kg	1.795kg
Mass ofdolomite powder	0.0715kg	0.1185kg
Water required	0.63lit	1.042lit

4.5. 50% replacement of fine aggregate with stone dust along with 10%additionof dolomite powder with Cement:

10% dolomite powder is added to the cement, and 50% of the weight of the fine aggregate in the concrete is replaced by stone dust.

Table 4.4 Quantities of 50% stone dust + 10% dolomite powder addition.

MATERIAL	CUBE	CYLINDER
Volume	0.15 x 0.15 x 0.15 = 0.003375m^3	0.0053m^3
Mass of cement	0.003375 x 447.7 -0.151=1.359	2.133kg
Mass of fine aggregate	0.003375 x 678.3 = 1.14 kg	1.795kg
Mass of coarse aggregate	0.003375 x 1068.2 = 3.60kg	5.66kg
Mass of stone dust	1.14 kg	1.795 kg
Mass of dolomite powder	0.151kg	0.237kg
Water required	0.63lit	1.042lit

4.6. 50% replacement of fine aggregate with stone dust along with 20% addition Of dolomite powder with Cement:

In addition to adding 20% dolomite powder to the cement, 50% of the weight of the fine aggregate in the concrete is replaced by stone dust..

Table 4.5 Quantities of 50% stone dust + 20% dolomite powder addition.

MATERIAL	CUBE	CYLINDER
Volume	$0.003375m^3$	$0.053\ m^3$
Mass of cement	1.208kg	1.896kg
Mass of fine aggregate	1.14 kg	1.795kg
Mass of coarse aggregate	3.60kg	5.66kg
Mass of stone dust	1.14 kg	1.795kg
Mass of dolomite powder	0.302kg	0.475 kg
Water required	0.63lit	1.042lit

5. RESEARCH AND ANALYSIS

5.1. GENERAL:

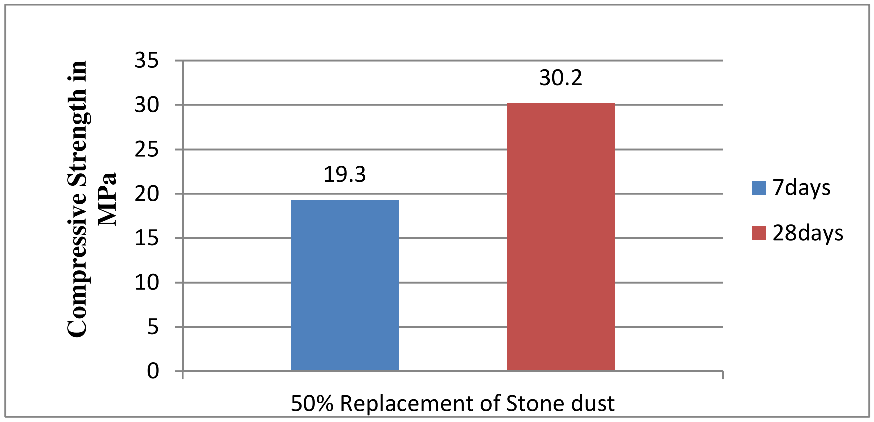
Compressive and split tensile strengths have been assessed through experimental research. The tests are administered using the protocol that was described in the preceding chapter.

5.2. COMPRESSIVE STRENGTH:

Concrete cubes are put through a compression test after seven and twenty-eight days of curing. First, cubes are used for the test, with stone dust replacing 50% of the fine aggregate.

Table – 5.1 Compressive strength results (only fine aggregate isreplaced)

S.No.	50% OF FINE Agg. REPLACED WITH STONE DUST	COMPRESSIVE STRENGTH (N/mm2)			
		7DAYS		28DAYS	
		3Cubes	Avg. Value	3Cubes	Avg. Value
1	50%	19.25	19.30	30.2	30.27
		19.13		30.2	
		19.53		30.4	

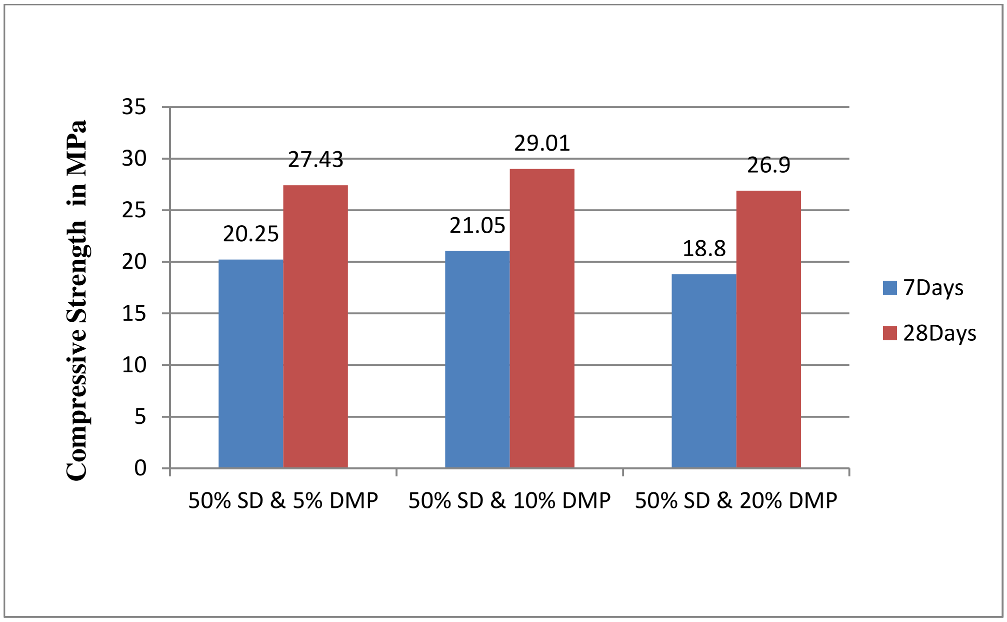


Graph – 5.1 compressive strength results (only fine aggregate is replaced)

Dolomite powder is added to cement in different proportions of 5%, 10%, and 20% by weight of cement, while 50% stone dust is kept as a partial replacement for fine aggregate. Cubes are subjected to the compression test after seven and twenty-eight days of cure.

Table – 5.2 Compressive Strength Results (fine aggregate is replaced and Dolomite powder is added to Cement.)

S.No.	% OF FINE Agg. REPLACED WITH STONE DUST	% OF DOLOMITE POWDER ADDED TO CEMENT.	COMPRESSIVE STRENGTH (N/mm2)			
			7days		28Days	
			3Cubes	Avg. Value	3Cubes	Avg. Value
1	50%	5%	20.3	20.25	26.9	27.43
			20.12		27.46	
			20.25		26.9	
2	50%	10%	20.95	21.05	29.65	29.01
			21.08		28.42	
			20.65		28.96	
3	50%	20%	18.6	18.8	25.5	26.9
			18.2		25.9	
			18.9		27	



Graph- 5.2 Compressive strength (fine agg. is replaced and dolomitepowder)

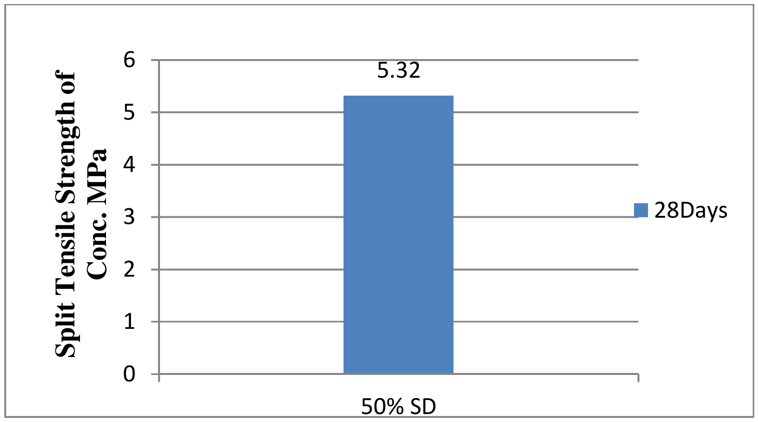
It was discovered by comparing the strengths of various cubes obtained after 7 and 28 days of curing that an appropriate strength was reached at 50% substitution of fine aggregate with stone dust. However, the ideal proportion of dolomite powder to cement is 10%, and this is after the strength has been reduced.

5.3. SPLIT TENSILE STRNGTH:

Concrete cylinders of 150 mm in diameter and 300 mm in height are used for the split tensile strength test. First, after 28 days of curing, the test is run on cylinders with 50% of the weight of the fine aggregate replaced by stone dust

Table – 5.3 Split tensile strength results (only fine aggregate is replaced)

S.NO.	50% OF F.Agg. REPLACED WITH STONE DUST	SPLIT TENSILE STRENGTH (N/mm2)	
		28DAYS	
		3Cylinders	Avg. Value
1	50%	5.3	5.32
		5.25	
		5.4	



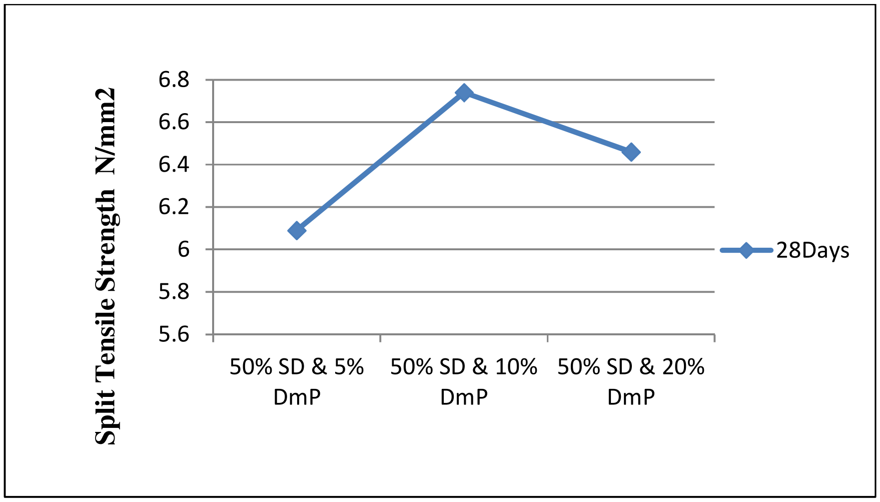
Graph- 5.3 Split Tensile Strength of Conc. For 50% Stone Dust and 50% Fine Agg.

With 50% of the fine aggregate still being made up of stone dust, dolomite powder is now added to the cement in different proportions—5%, 10%, and 20% by weight of cement. Cylinders undergo testing following a 28-day curing period.

Table – 5.4 Tensile strength results (stone dust and cement are replaced)

S.No.	% OF FINE Agg. REPLACED WITH STONE DUST	% OF DOLOMITE POWDER ADDED TO CEMENT.	COMPRESSIVE STRENGTH (N/mm2)	
			28days	
			3Cylinders	Avg. Value
1	50%	5%	6.09	6.09
			6.06	
			6.12	
2	50%	10%	6.44	6.46
			6.35	
			6.6	
3	50%	20%	6.75	6.74
			6.9	
			6.58	

The above results showed that the tensile strength of concrete increased with human hair content



Graph- 5.4 Split Tensile Strength of Conc.at 28days For 50% Stone Dust at Fine Agg. and different % of Dolomite Powder

It was discovered by comparing the strengths of various cubes obtained after 7 and 28 days of curing that an appropriate strength was reached at 50% substitution of fine aggregate with stone dust. However, later on, the strength was improved by mixing in dolomite powder with the cement.

6. CONCLUSION

i. In this study, we talked about using stone dust in place of some fine aggregate to create affordable concrete with high compressive and tensile strength.

ii. It was discovered by comparing the compressive strengths of various mix proportions that, at 50% substitution of fine aggregate with stone dust, more than the nominal mix concrete was attained.

iii. In addition, we anticipated that the strength would grow above the previous strength upon the addition of dolomite powder. However, the concrete's reduced strength might have been caused by the physical characteristics of the dolomite powder.

iv. Based on the results of the split tensile and compression tests, we determined that 10% of the weight cement should contain the ideal amount of dolomite powder**.**

REFERENCES

1. **Kamal, Mounir, et al.** 'Steel - Concrete Bond Potentials in Self-Compacting Concrete Mixes Incorporating Dolomite Powder'. Advances in Concrete Construction, vol. 1, 12 2013, https://doi.org/10.12989/acc2013.1.4.273.
2. **S. Deepa Balakrishnan., and K. C. Paulose**, "Workability and strength characteristics of self-compacting concrete containing fly ash and dolomite powder", American Journal of Engineering Research (AJER), Volume. 2, 2013, pp. 43-47.
3. **Muthukumaran, A., and V. Rajagopalan**. 'Experimental Study on Partial Replacement of Sand with M-Sand and Cement with Dolomite Powder in Cement Concrete'. International Journal of Civil Engineering and Technology, vol. 8, 06 2017, pp. 1054–1060.
4. **Athulya Sugathan**, "Experimental Investigation on partial Replacement of Cement with dolomite powder" IJIRSET, Vol. 6, Issue 7, July 2017.
5. **K. Bhavin, Kashiyani, Jayeshkumar pitroda, and K. Bhavnaben Shah**, "Effect Of Polypropylene Fibers on Abrasion Resistance and Flexural Strength for Interlocking Paver Block", International Journal of Engineering Trends and Technology(IJETT), Volume. 4, 2013, pp. 1837-1843.
6. **Barbhuiya, Salim**. 'Effects of Fly Ash and Dolomite Powder on the Properties of Self-Compacting Concrete'. *Construction and Building Materials*, vol. 25, no. 8, 2011, pp. 3301–3305, https://doi.org/10.1016/j.conbuildmat.2011.03.018.
7. **Eldhose M Majummekudy, Anju K Govind, Shibi Varghese**, "comparative study on the effect of concrete using eco sand, weathered crystalline rocks sand and GBS as fine aggregate replacement", International journal of engineering research and technology, volume 3, Issue 10, October 2014, pp1-6.
8. **Huseyin Temiz, Fatith Kantarci, M Emin Inceer**, "influence of blast furnace slag on behavior of dolomite used as a raw material of MgO type expansive agent", ELSEVIER, volume 94, Issue 42, 2015, pp28-35
9. **Chinnaraju K, V R Ramkumar, K Lineesh, S Nithya, V Sathish**, " Study on Concrete using Steel Slag as Coarse Aggregate Replacement and Eco Sand as Fine Aggregate Replacement", IJREAT, Volume-1, Issue 3, June 2013, pp1-6.
10. **Olesia Mikhailova.et.al** "Effect of Dolomite Limestone Powder on The Compressive Strength of Concrete" 11th International Conference on Modern Building Materials, Structures and Techniques, MBMST 201, Science Direct Procedia Engineering 57 (2013) 775 – 780
11. **Amir ShafiBatt and Anshul Garg** "Partially replacement of dolomite powder with ordinary portland cement and foundry sand as fine aggregate" Journal of Civil and

Environmental Engineering Received date: March 21, 2017; Accepted date: April 11,2017; Published.

12. **G.J.Thilak, A. Nisha Devi, A.Thangadurai** " Experimental study on the effect of limestone (dolomite) as fine aggregate with steel fibre on the properties of concrete " International Journal of Innovative Research in Technology March 2017 IJIRT Volume 3 Issue 10 ISSN: 2349-6002.

13. **J.Aswani, M. Indira, T.M. Jeyashree.** "A Study on Effect of Crystalline Dolomite Silica as a Partial Replacement of Cement" International Journal on Engineering Technology and Sciences – IJETS™. ISSN(P): 2349-3968, ISSN (O): 2349-3976 Volume III, Issue III, March- 2016.

14. **K. Sathishkumar, K.Anitha** "Experimental investigation on partial replacement of cements by dolomite and fine aggregate by copper slag" International Journal of Pure andApplied Mathematics. Volume 116 No. 14 2017, 25-30