

EXPERIMENTAL INVESTIGATION ON PARTIAL REPLACEMENT OF CEMENT WITH DOLOMITE POWDER

Mrs.N.Shifu Jahan.M.E., Mrs.V.Anandhi.

Mrs.N.Shifu Jahan.M.E., Assistant professor, Anna University, Tamilnadu,India

ABSTRACT

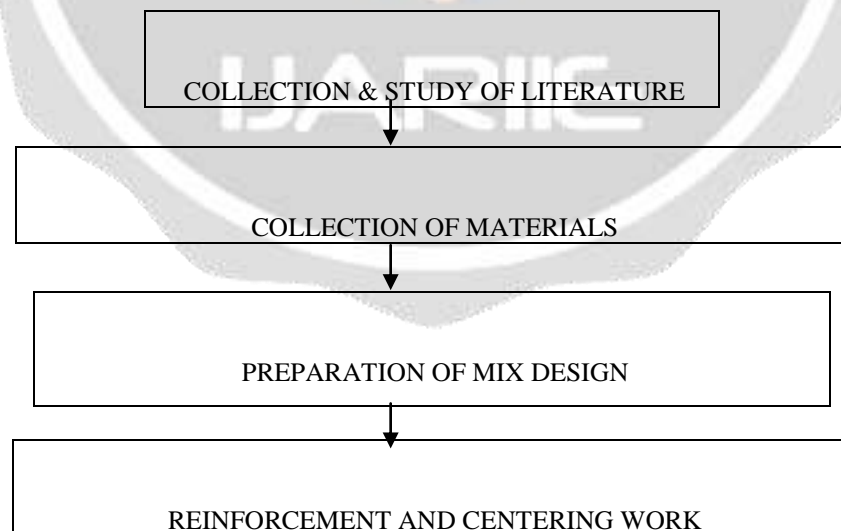
Experimental investigation on this project is to reduce the emission of carbon di oxide. Dolomite is a material which is having a advantage of less emission of carbon dioxide. It has some similar properties like cement. Partial replacement of cement in some percentage like 0% ,10%,25%,50% with the water cement ratio 0.45 by using the grade of concrete M30. Test results after the compression test, split tensile test, Flexural strength test with conventional concrete and with this percentage of dolomite .strength of this admixture mix will be more when compared to that of conventional concrete.

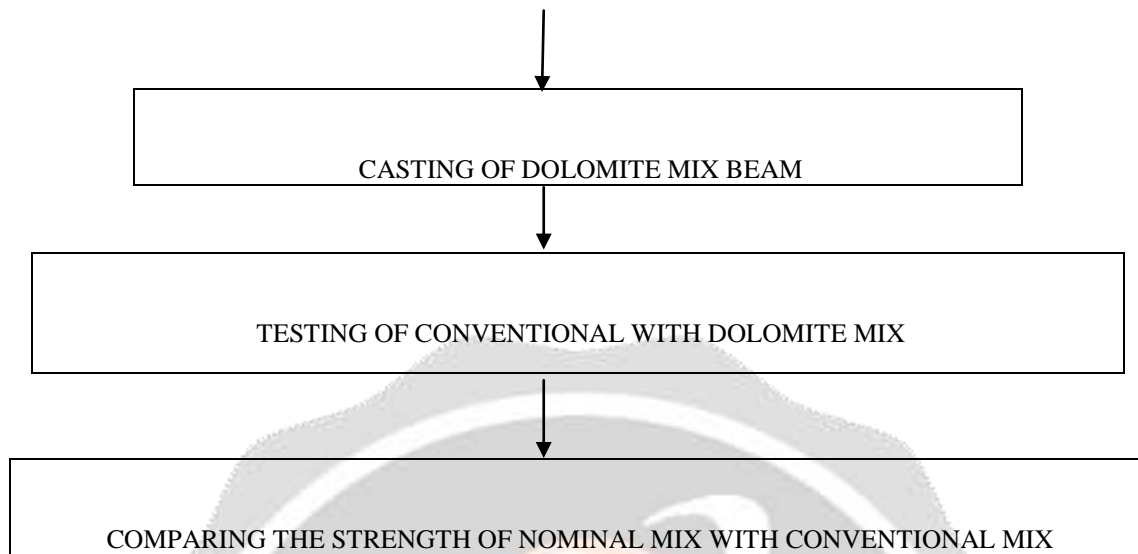
Keywords: *Co₂ emission, dolomite powder, compression strength, flexural strength, split tensile test.*

1. INTRODUCTION

Here dolomite stone is a Carbonate material which is composed of calcium magnesium Carbonate ($\text{CaMg}(\text{Co}_3)_2$) It is a rock forming mineral which is widely used for its wettability and dispersibility. The reason behind the partial replacement of cement is to reduce the emission of Carbon-Di-Oxide from the concrete. The only reason for the carbon emission is because of cement is to be heated during the manufacturing of the cement in order for Clinker to form. However dolomite is a material which is obtain in nature so the emission of heat will be Less in concrete.

2.METHODOLOGY OF THE PROJECT





2.1 PHYSICAL TEST

Physical Properties Of Cement Properties	Results
Fineness	7%
Specific Gravity	3.16
Initial Setting	150 Min.
Final Setting	270 Min.

Properties	Fine Aggregate
Specific gravity	2.70
Bulk density	1632.9 kg/m ³

Properties	Coarse Aggregate
Specific gravity	2.67
Bulk density	1558.5 kg/m ³

Mix	Dolomite powder	Cement	Compressive Strength (7days)(N/mm ²)	Compressive Strength (21 days) (N/mm ²)	Compressive Strength (28 Days) (N/mm ²)
Mix 1	0%	90%	18.02	22.32	27.38
Mix 2	15%	85%	22.41	35.62	41.61
Mix 3	25%	75%	24.21	31.61	36.47
Mix 4	50%	50%	28.28	39.32	49.28

3.TEST ON CONCRETE

- COMPRESSIVE STRENGTH TEST ON CONCRETE
- SPLIT TENSILE TEST ON CONCRETE
- FLEXURAL STRENGTH TEST ON CONCRETE

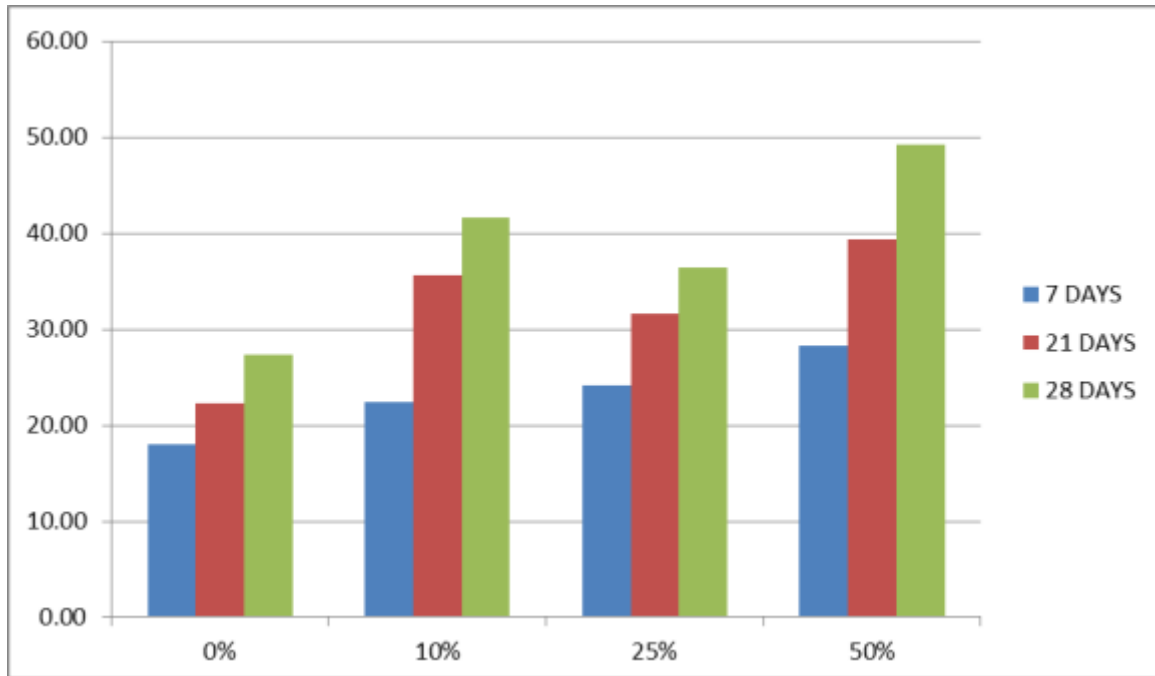
3.1 COMPRESSIVE STRENGTH TEST ON CUBE

Tabulation For Compressive Strength Of Concrete

Mean Value For 7 Days compressive strength - 23.23 N/mm²

Mean value For 21 days compressive strength - 32.85 N/mm²

Mean value For 28 days compressive strength - 37.685 N/mm²



Graph.3.1 COMPRESSIVE STRENGTH OF CONCRETE

3.2 SPLIT TENSILE STRENGTH TEST ON CONCRETE

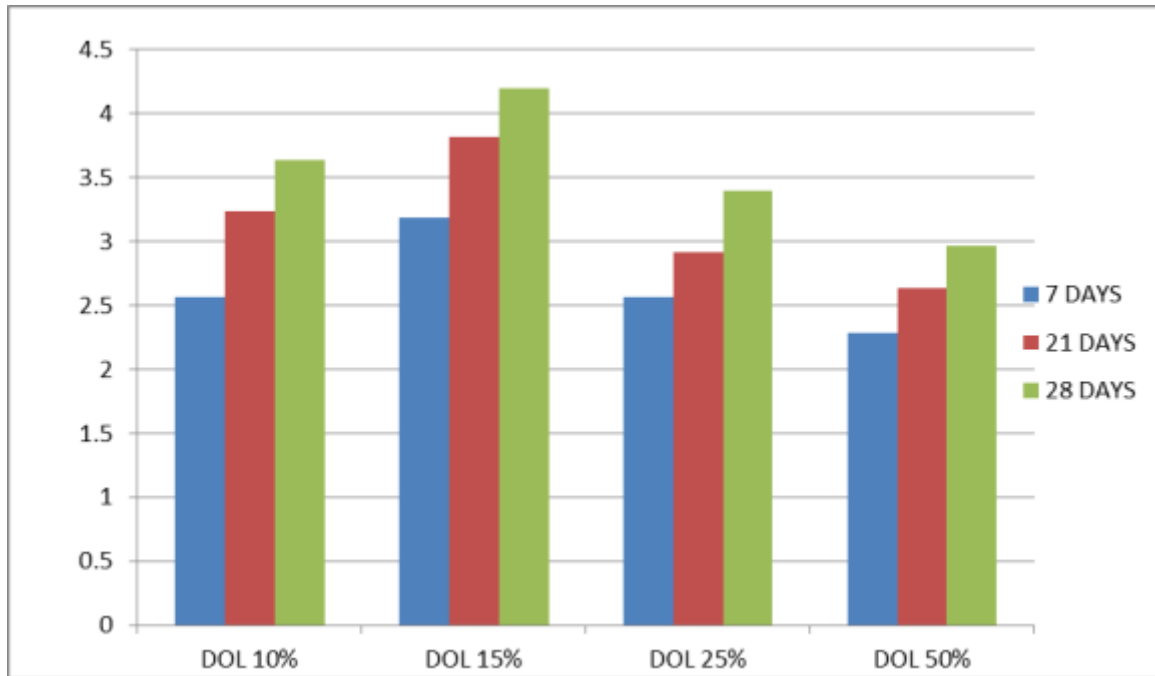
Tabulation For Split Tensile Strength Of Concrete

MIX TYPE	SPLIT TENSILE STRENGTH (7DAYS) N/mm ²	SPLIT TENSILE STRENGTH (21 DAYS) N/mm ²	SPLIT TENSILE STRENGTH (28DAYS) N/mm ²
Conventional Concrete	2.24	3.12	3.53
Dol Powder 10%	2.56	3.23	3.63
Dol Powder 15%	3.18	3.81	4.20
Dol Powder 25%	2.56	2.91	3.39
Dol Powder 50%	2.28	2.63	2.96

Mean value for 7 days split tensile strength - 2.81 n/mm²

Mean value for 21 days split tensile strength - 3.12 n/mm²

Mean value for 28 days split tensile strength - 4.02 n/mm²



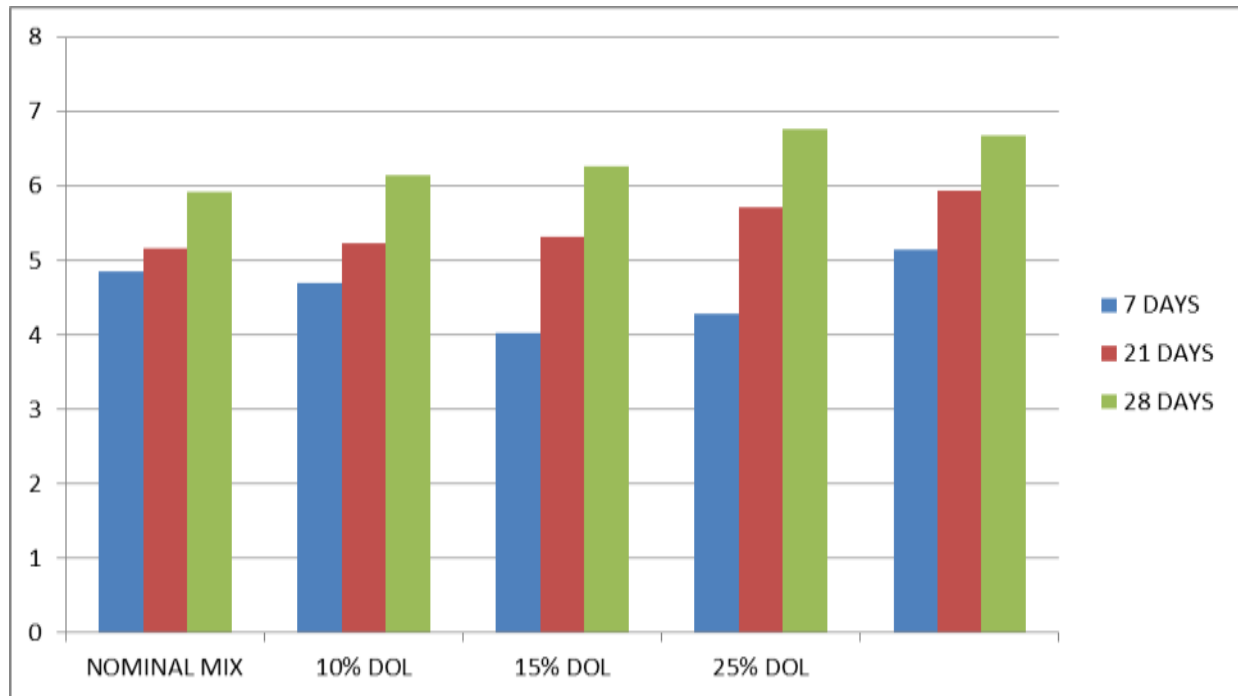
Graph.3.2 SPLIT TENSILE STRENGTH ON CONCRET

3.3 FLEXURAL STRENGTH ON CONCRETE

Tabulation On Flexural Strength On Concrete

MIX TYPE	FLEXURE STRENGTH (7DAYS) N/mm ²	FLEXURE STRENGTH (21 DAYS) N/mm ²	FLEXURE STRENGTH (28DAYS) N/mm ²
Conventional Concrete	4.86	5.16	5.92
Dol Powder 10%	4.7	5.23	6.14
Dol Powder 15%	4.03	5.31	6.26
Dol Powder 25%	4.29	5.71	6.74
Dol Powder 50%	5.14	5.93	6.68

Table.3.3 Flexural Strength On Concrete



Graph.3.3 Flexural Strength On Concrete

4. CONCLUSION

The compressive strength for M30 grade concrete is 27 and it is increased by replacement of and dolomite 10%, 25% & 50%. Thus, the use of these eco-friendly materials has changed waste into wealth.

Replacement of dolomite powder and m-sand is found to improve the strength of concrete.

- The target mean of M30 grade concrete is 31.6 N/mm^2 . The optimal replacement percentage of cement with dolomite powder 10% is 23.23 N/mm^2 and when the compressive strength for 21 days is 32.85 N/mm^2 , 37.685 N/mm^2 for 28 days.
- The optimal replacement percentage of cement with dolomite powder when the Split tensile strength is 2.81 N/mm^2 for 7 days, 3.12 N/mm^2 for 21 days, 4.02 N/mm^2 for 28 days.
- The optimal replacement percentage of cement with dolomite powder when the Flexure strength value is 4.81 N/mm^2 for 7 days, 5.12 N/mm^2 for 21 days, 6.02 N/mm^2 for 28 days

REFERENCES

- L.Ranjith Kumar, J.Kiran, P.Rangarajan, " Properties of Concrete Incorporating Dolomite Powder " IOSR Journal of Mechanical and Civil Engineering, Volume 14, Issue 2 Ver. II (Mar. - Apr. 2017), PP 78-80.
- Marija Jelčić Rukavina, Ivan Gabrijel, Dubravka Bjegović. "Modifications of dolomite-based self-compacting concrete properties using mineral additives" Technical Gazette 22, 1(2015), 233-240
- Olesia Mikhailovaa, Grigory Yakovlevb, Irina Maevac, Sergey Senkovd. "Effect of Dolomite Limestone Powder on The Compressive Strength of Concrete" Department of Geotechnics and Building Materials, Faculty of Civil.
- Preethi G, Prince Arulraj G. "Effect of Replacement of Cement with Dolomite Powder on the Mechanical Properties of Concrete" 1ME-Student, Dept of Civil Engineering, S.N.S College of Technology, Coimbatore, Tamil Nadu, India. 2 Professor & Dean, Dept of Civil Engineering, S.N.S College of Technology, Coimbatore, Tamil Nadu, India. 1083-2013.

- Ragulraj, Vennila A, Venkatasubramani R, Sreevidya V “A Study on Self-Compacting Concrete by Replacing Fine Aggregate and Cement by Foundry Sand and Dolomite Powder”. International Journal of ChemTech.

