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EXAMINATION OF CERAMIC WASTE'S BREAKDOWN AND USE IN OLID DANGERS EXPERIMENTALLY INVESTIGATED

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Abstract

Ceramic wall tiles are used as building material in the field of construction. Manufacturing of ceramic tiles require different raw material like clay, potash, dolomite, feldspar, talc and different chemicals like sodium silicate, sodium tripoly, phosphate (STPP) in ceramic production. The temperature in the kiln varies from 200.c to 1200. c. this variation of manufacturing; therefore, there is a pozzolanic reactivity in such material. In ceramic industry about 5-10% production goes as waste in various processes while manufacturing (this waste percentage goes down if the technology is installed in new units).

1.INTRODUCTION

Recent decades have seen a marked upsurge in industrial and economic growth, contributing to an improved quality of life and well-being for citizens. However, we should not lose sight of the fact that every production system creates by-products and waste products which can affect the environment. These effects may occur at any point in the product's life-cycle, whether during the initial phase of obtaining raw materials, during the transformation and production phase, during product distribution or when the end user must dispose of products which are no longer required.

APPARATUS REQUIRED:

1.Soil

2.Ceramic waste

3.Aggregate, Cement, Sand

4. Compression Test Machine

5. Liquid Limit Test

2.PHYSICAL PROPERTIES OF CERAMICS:

Typical properties of ceramics

- High hardness
- High elastic modulus
- Low ductility
- High dimensional stability
- Good wear resistance
- High resistance to corrosion and chemical attack
- High weather resistance
- High melting point
- High working temperature
- Low thermal expansion
- Low to medium thermal conductivity

3.VARIOUS TEST:

Fig: - Liquid Limit Test

Fig: - Liquid Limit Test

RESULTS :-

Observation table:

S.NO	OBSERVATION	SAMPLE NUMBER
1.	No. of blows	20
2.	No. of container	2
3.	Wt. of container	19.5g
4.	Wt. of container + wet soil	63g
5.	Wt. of water	21g
6.	Wt. of oven dry soil	55.5g
7.	Water content	13.51%

Calculation:

w=(w/wd-1) *100

= (63/55.5-1) *100

=13.51%

4.OBJECTIVE:

1• To compare the compressive strength of conventional concrete with PCA concrete.

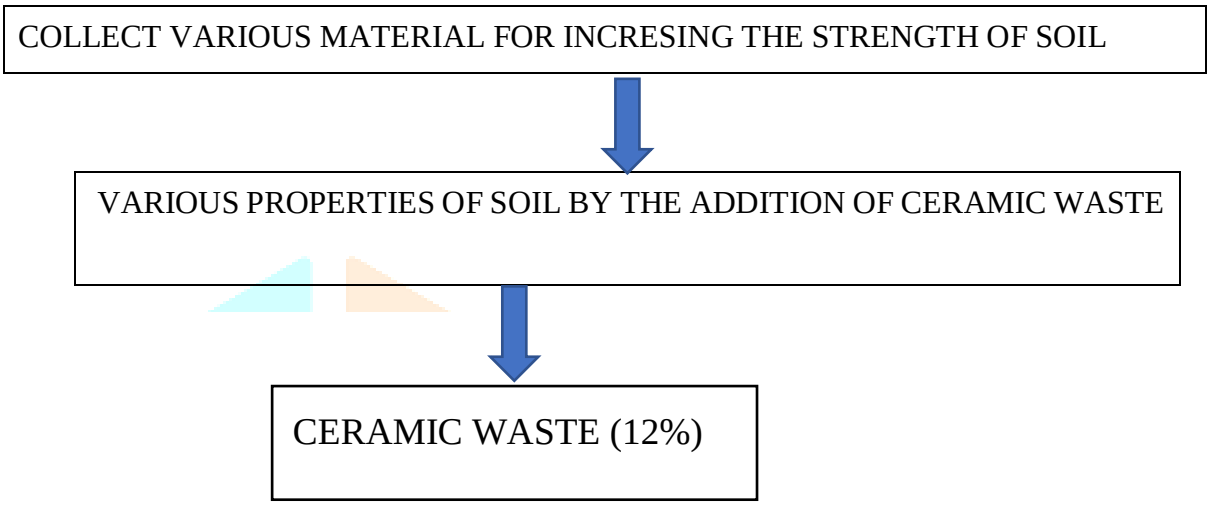
2 ・To compare the split tensile test of convention concrete.

3• To compare the flexure strength of convention concrete with PCA concrete.

4• To determine optimum quality of plastic that can be used in concrete.

5• To study the behaviour of fresh concrete with plastic coarse aggregate and compare its properties to those of conventional concrete.

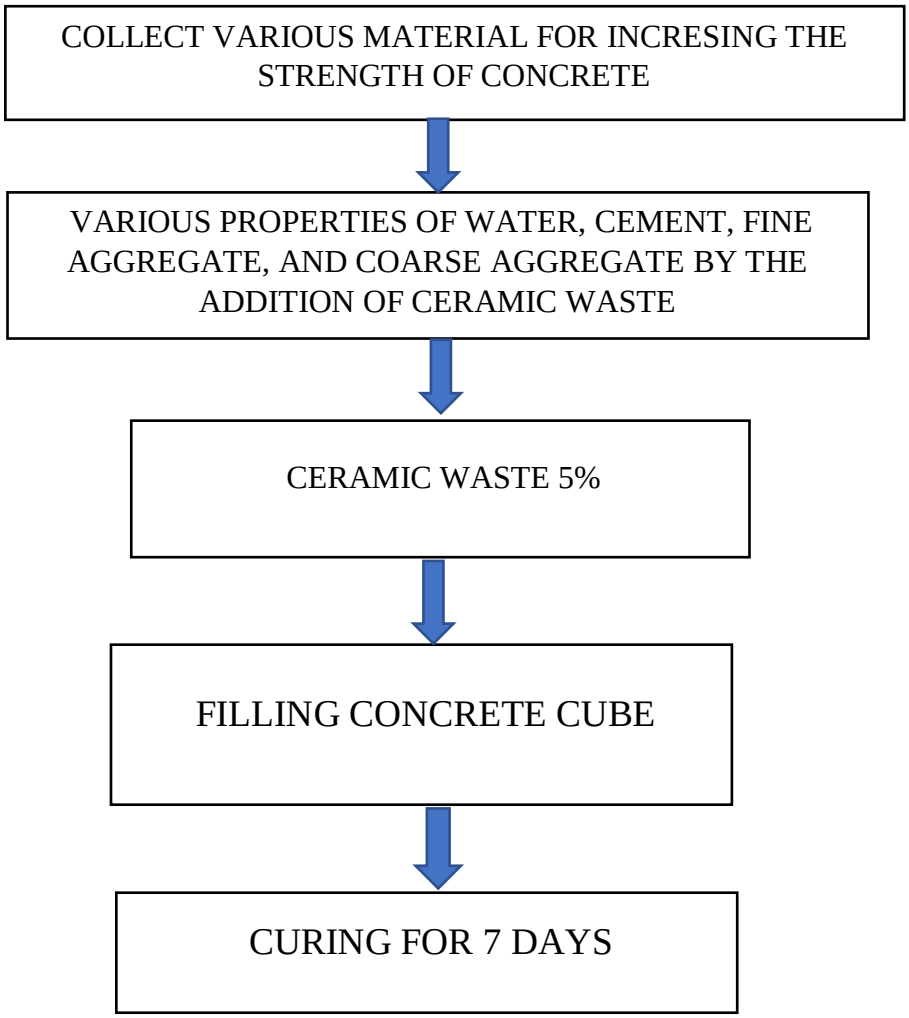
5.METHODOLOGY:



STEPS:

1. Collecting the ceramic waste from clay pot.
2. Add the ceramic waste to the soil.
3. Test a soil in the laboratory.
4. Then it will improve the soil quality.

CONCRETEMETHODOLOGY:



6.LITERATURE REVIEW:

S.NO	AUTHOR	DATE	TITLE	CONCLUSION	
1.	Hassan M. Maqbool	15 April 2022	Utilisation of ceramic waste aggregate and its effect on Eco-friendly concrete	In this work, sustainability, strength, workability, durability, other properties and the engineering applicability of a new category, which involved RWCA, were examined and reviewed through physical experimentations and numerical simulations.	
2.	Eman M. EI-Sayed Hesham Ahamad	November–December 2020	Journey from ceramic waste to highly efficient toxic dye adsorption from aqueous solutions via one-pot synthesis of $CaSO_4$ rod-shape with silica	As a result of the synthesized CRCS low cost, eco-friendly, technical feasibility, environmental benefits and high adsorption capacity with mild operating conditions, it can be utilized as an efficient adsorbent for CV removal from wastewater.	
3.	Y Tabak	January 2012	Ceramic tile waste as a waste management solution for concrete	Although our research objectives did not include an economic feasibility study, there is no doubt that the use of industrial wastes as cost-free raw materials will represent substantial savings for civil construction.	
4.	Amit Kumar D. Rava	June 2013	Effective Replacement of Cement for Establishing Sustainable Concrete	The Compressive Strength of M20 grade Concrete increases when the replacement of Cement with Ceramic Powder up to 30% replaces by weight of Cement and further replacement of Cement with Ceramic Powder decreases the Compressive Strength.	

7.RESULT AND DISCUSSION

Partial Replacement of Cement by Ceramic powder

Mix design calculation for 2 cubes:

Cement=2.124kg

Water=0.96

Fine aggregate=2.82kg

Coarse aggregate=5.51kg

Compressive Strength of Mix Grade M20:

7days

Sample 1

Compressive load = 540 KN

Compressive Strength = 540*1000/150*150 = 24 N/mm2

Sample 2

Compressive load = 550KN

Compressive Strength = 550*1000/150*150 =24.44 N/mm2

Compressive strength

S.No.	7 days strength in N/mm2
1.	24
2.	24.44

5% Replacement of cement by Ceramic powder

Mix Design calculation of M30 for 2 cubes:

Cement = 2.124kg

Water =0.96

Fine aggregate = 2.82kg

Coarse aggregate = 5.51kg

By replacing 5% of cement by ceramic waste

5% of 2.124 =0.1062kg

Therefore,

Final Mix for 5% replacement: Cement = 2.124 – 0.1062 = 2.0178kg

Water =0.96

Fine aggregate = 2.82kg

Coarse aggregate = 5.51kg

Ceramic waste = 0.1062kg

7 days

Sample 1

Compressive load = 558KN

Compressive strength = 558*1000/150*150 =24.80 N/mm2

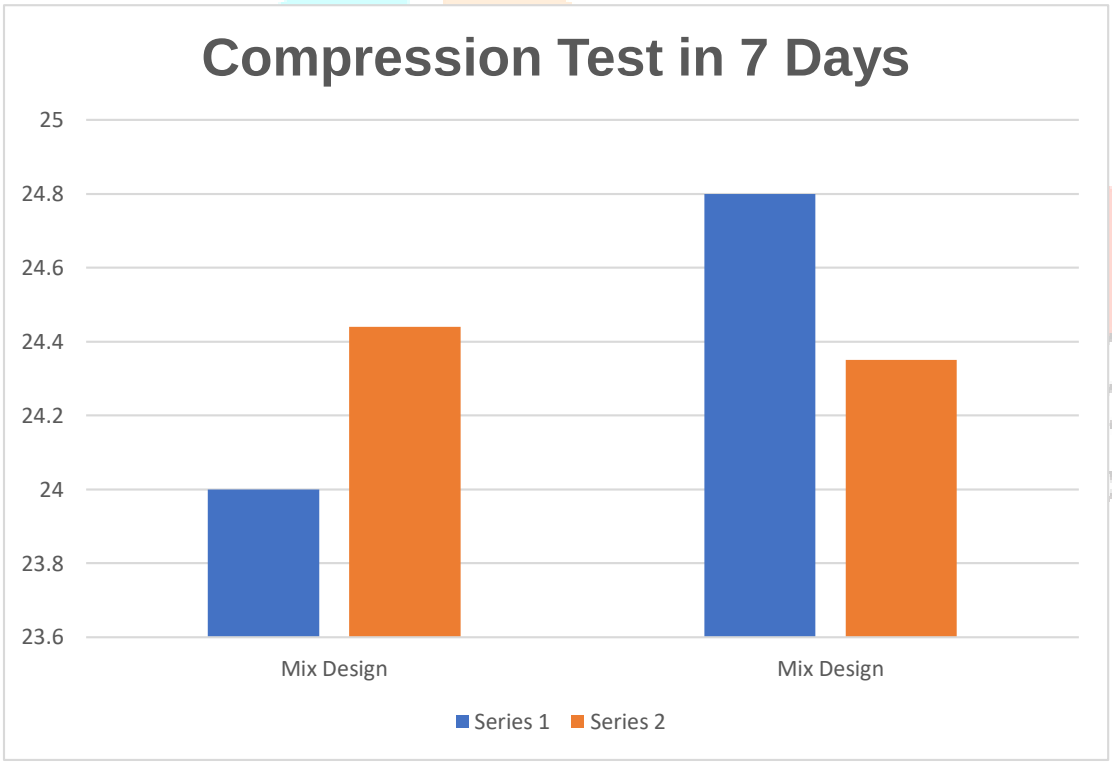
Sample 2

Compressive load =548KN

Compressive strength =548*1000/150*150 = 24.35 N/mm2

Compressive test of 5% replacement cubes:

S. No	7 days strength in N/mm2
1.	24.80
2.	24.35



RESULTS:

From the work carried out, the effect of ceramic waste on the properties such as workability, compressive strength, splitting tensile strength, flexural strength, impact resistance and modulus of elasticity of concrete of CSC is discussed.

8.SUMARRY AND CONCLUSION

CONCLUSIONS

This study was carried to obtain the results, test conducted on the tile powder modified cement concrete mix, in order to ascertain the influence of tile powder on the characteristics strength of concrete.

1. The most optimal dosage for the partial alternative of cement by ceramic tile powder is 5%.

2. The compressive strength of concrete decreases, when the addition of dosage is more than 5%. The result show if 20% replacement of cement by ceramic tile powder will affect the strength of concrete.

FUTURE SCOPE:

1. Ceramic tile industry produces large amount of waste during mining and processing stages.
2. Ceramic tiles are also wasted during construction stage of new building.
3. This waste is dumped on open land which creates lot of environments as well as health problem.
4. Therefore, it is necessary to utilize this waste material as a construction material in concrete production.
5. Ceramic waste has special properties, which can contribute positively in other areas of recycling.

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