

# Experimental Study of Lightweight Concrete Using Perlite

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**Abstract-** Light weight aggregate has a ability to reduce the selfweight of the building and workability easy . it also allows to minimize the risk of damages during the period of any natural disasters like storms, earthquakes, etc also it can be used in the flooring in the parking lots for letting the water to pass through it .and helps the trees to absorb the surface water and also used as best insulation for the building of furnace oven etc by fully replacing the coarse aggregate with perlite which is a type of expanded perlite aggregate from volcanic ash to reduce the dead load .

**Keywords-** Light weight concrete, perlite aggregate, self weight, pervious concrete, water pass workability ,insulation

## I. INTRODUCTION

lightweight aggregates and certain admixtures which make the composite lighter. The density of the floating concrete ranges from 600 kg/m<sup>3</sup> to 1000 kg/m<sup>3</sup>. Since its density is less than that of water (1000 kg/m<sup>3</sup>) the concrete in its hardened state can float in water. Floating concrete is a special type of concrete whose density is about 1/3rd compared to the conventional concrete. To replace other less durable materials perlite, Pumic stone in the applications where the material is desired to float. Also its lightweight property is suitable for use in non load bearing walls, thermal and sound insulation. Lightweight concretes can either be light weight aggregate concrete, foamed concrete or autoclaved aeriated concrete. In this project we are using lightweight aggregate concrete i.e. produced using amorphous volcanic glass called Perlite. The perlite aggregate has a wide range of uses generally due to its properties of extremely low bulk density, high brightness, high absorption, low thermal and acoustical conductivity and non-flammability. Owing to its thermal or acoustic insulation, light weight and fire resistance, perlite aggregate is generally used in construction application, especially as concrete and mortar

### Uses and Needs of Lightweight Perlite pervious concrete

It reduces the self weight of the building  
Can act a good insulation for furnace and oven

Good sound insulation  
Act as storm water drains in parking lots

## Materials

**Cement:** (OPC) Cement used is ordinary port land cement . It is used to bind the materials in the concrete. The grade of cement is 53 grade.

### Types of cement:

- Ordinary Portland cement
- Portland pozzolana cement
- Rapid Hardening cement
- Sulphate Resisting cement
- Portland slag cement
- Air entraining cement

The following are the some of the properties of the .....cement:

- Fineness
- Setting time
- Soundness
- Compressive strength

### SILICA FUME

• Silica fume is a by product of producing silicon metal or ferrosilicon alloys.

### Perlite

It is volcanic glass that is heated to 1,600 degrees F. (871 C.) whereupon it pops much like popcorn and expands to 13 times its former size, resulting in an incredibly lightweight material

### WATER:

Water is one of the most critical but probably the cheapest constituents of concrete. Water in concrete should be as low as possible, however, minimum amount of water is

essential for hydration of cement. Lower water cement ratio increases the strength and generally improves the durability of concrete. It is therefore desirable to keep water cement ration as low as possible but adequate to get workable concrete and achieve adequate hydration of cement

## II. OBJECTIVES OF THE PROJECT

The main objectives of the study are

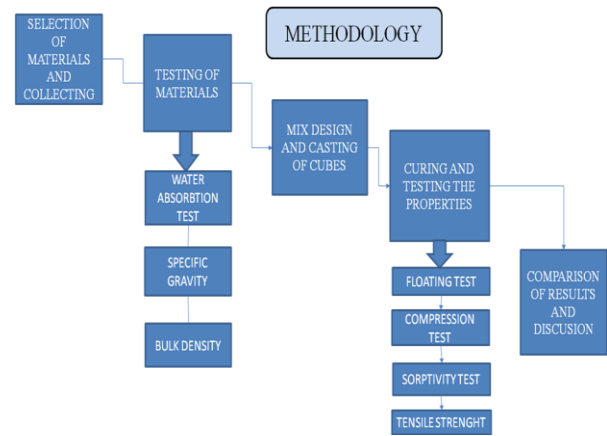
- To determine the compressive strength and split tensile strength of light weight concrete having density below 1800kg/m<sup>3</sup>
- To determine whether light weight concrete can be used as a structural concrete.
- To characterize the materials required for developing floating concrete.
- To develop LIGHT WEIGHT concrete based on trials.
- To reduce usage of coarse aggregate in concrete by replacement of Light weight materials
- To reduce the self weight of the concrete.
- To characterize the materials required for developing floating concrete.
- Explore the optimal design of light weight aggregate concrete, considering its compressive strength and density.
- The objective is achieved by casting five different trial batches of 2-in cube lightweight concrete specimens and compressive strength is determined at 28-days.

The mix calculation per unit volume of concrete shall be as follows :

$$\text{Volume of concrete} = 1 \text{ m}^3$$

$$\begin{aligned} \text{Volume of cement} &= (\text{mass of cement} / (\text{specific gravity of} \\ &\text{cement} * 1000)) \\ &= (350 / (3.6 * 1000)) = 0.097 \text{ m}^3 \end{aligned}$$

$$\begin{aligned} \text{Volume of water} &= (\text{mass of water} / (\text{specific gravity of} \\ &\text{water} * 1000)) \\ &= (197 / (1 * 1000)) = 0.197 \text{ m}^3 \end{aligned}$$



Read already published work in the same field.

Gogging on the topic of your research work.

## III. WRITE DOWN YOUR STUDIES AND FINDINGS

Now it is the time to articulate the research work with ideas gathered in above steps by adopting any of below suitable approaches:

### A. Bits and Pieces together

In this approach combine all your researched information in form of a journal or research paper. In this researcher can take the reference of already accomplished work as a starting building block of its paper.

### Jump Start

This approach works the best in guidance of fellow researchers. In this the authors continuously receives or asks inputs from their fellows. It enriches the information pool of your paper with expert comments or up gradations. And the researcher feels confident about their work and takes a jump to start the paper writing.

## IV. GET PEERREVIEWED

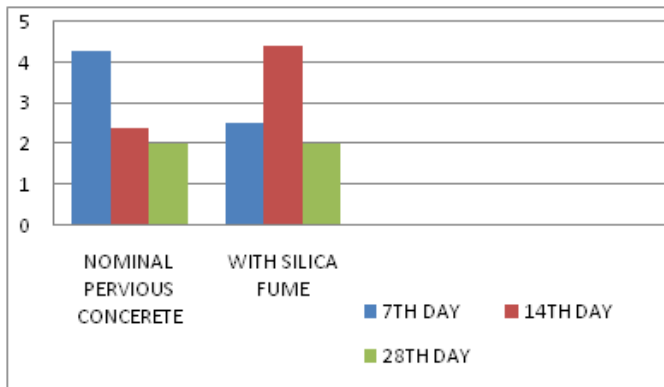
Here comes the most crucial step for your research publication. Ensure the drafted journal is critically reviewed by your peers or any subject matter experts. Always try to get maximum review comments even if you are well confident about your paper.

## V. IMPROVEMENT AS PERREVIEWER COMMENTS

Analyze and understand all the provided review comments thoroughly. Now make the required amendments in your paper. If you are not confident about any review

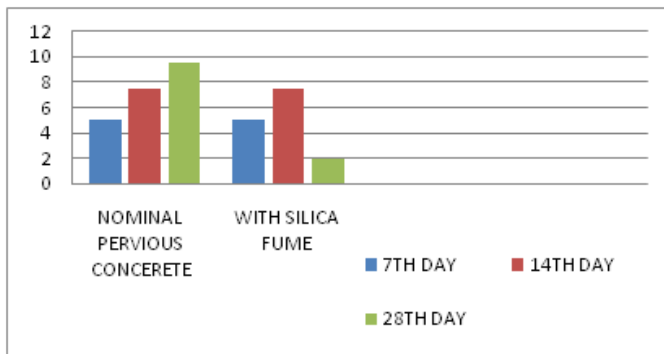
comment, then don't forget to get clarity about that comment. And in some Cases there could be chances where your paper receives number of critical remarks. In that cases don't get disheartened and try to improvise the maximum.

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**VI. CONCLUSION**

A conclusion section is not required. Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions.



**VII. APPENDIX**

Appendixes, if needed, appear before the acknowledgment.

**VIII. ACKNOWLEDGMENT**

The preferred spelling of the word — acknowledgment | in American English is without an—el after the—g. | Use the singular heading even if you have many acknowledgments.

**REFERENCES**

[1] X. Y. Jing, F. Wu, Z. Li, R. Hu and D. Zhang, "Multi-Label Dictionary Learning for Image Annotation," in