LIGHT WEIGHT CONCRETE

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INTRODUCTION

- Light weight concrete is a special concrete which weighs lighter than conventional concrete.
- Density of this concrete is considerably low (300 kg/m3 to 1850 kg/m3) when compared to normal concrete.
- It is basically a concrete which uses light weight aggregates.

- There are three types of LWC :
- Lightweight Aggregate Concrete: By utilizing permeable lightweight aggregate of low specific gravity.
- Cellular, aerated, gas or foamed concrete: By utilizing big voids inside the mortar weight.
- No-fines Concrete: By removing fine total from the blend so that a big amount of interstitial voids is there.

PRINCIPLE OF LWC

The basic principle behind the making of lightweight concrete is by inducing the air in concrete. To do this there are several methods that can be adopted. Such as : Conventional aggregates in the concrete can be replaced by cellular porous aggregates.

ADVANTAGES

- Reduction in dead loads making savings in foundations and reinforcement.
- Improved thermal properties.
- Improved fire resistance.
- Savings in transporting and handling precast units on site.
- Reduction in formwork and propping.
- Rapid and relatively simple construction.

- Reduction in concrete density.
- Greater fire resistance than ordinary cement.
- Good sound absorption.
- Saving in all over cost of construction.

DISADVANTAGES

- Difficult to place and finish because of the porosity and angularity of the aggregate.
- Very sensitive to water content.
- Mixing time is longer than conventional concrete.
- Porous and shows poor resistance

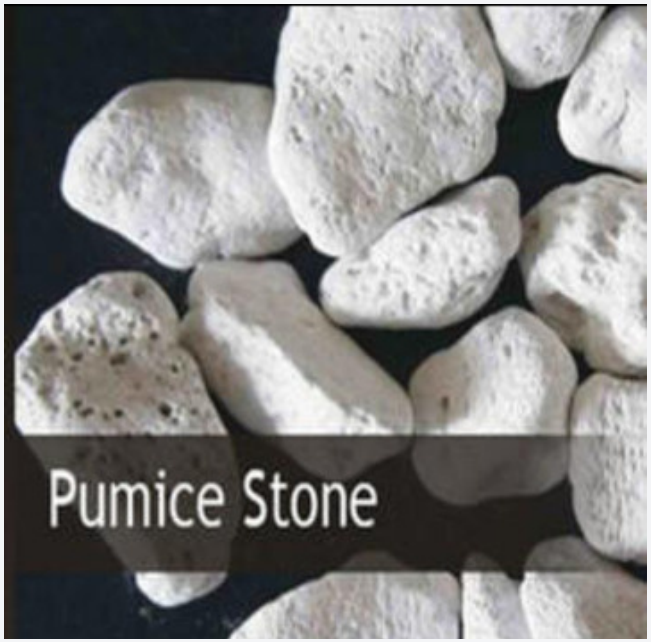
APPLICATIONS

- Since the strength of LWC is low, it is used in the construction of roof slabs, small houses with load bearing walls etc.
- It is also used in the construction of stairs, windows, garden walls, etc.
- In large building construction this is used in the construction of partition walls.
- These are moulded in the form of slabs and used as thermal insulators inside the building.

LIGHT WEIGHT AGGREGATE CONCRETE

- Basically two types of light weight aggregates
- NATURAL AGGREGATES
- ARTIFICIAL AGGREGATES
- Natural light weight aggregates are less preferred over artificial aggregates.

- Important natural aggregates : Pumice & Scoria.



Pumice

Scoria

- Important artificial aggregates : Shale ,Slate,Perlite,Vermiculite etc.

Shale

Slate

Perlite

Vermiculite

PROPERTIES OF LWC

1. For the same strength, the modulus of elasticity of light weight concrete is lower by 25 to 50% than normal concrete. Hence its deflections are greater.
2. Its resistance to freezing and thawing is greater than normal weight Concrete due to the greater porosity of light weight aggregate, provided the aggregate is not saturated before mixing.
3. Its fire resistance is greater as light weight aggregate have a lesser tendency to spall. Thus concrete suffers a lesser loss of strength due to rise in temperature.

4. It is easy to cut to fix desired attachments.
5. For the same compressive strength its shear strength is lower by 15 to 25% and bond strength is lower by 20 to 50%.
6. The tensile strain capacity of light weight aggregate is greater than normal weight aggregate. Thus the tensile strain capacity of light weight aggregate concrete is about 50% greater than normal weight concrete.
7. For the same strength the creep of light weight aggregate concrete is about the same as that of normal weight concrete.

METHODOLOGY

- BATCHING
- WEIGH BATCHING
- MEASUREMENT OF WATER
- PREPARATION OF CONCRETE BEAMS
- COMPACTING
- CURING
- TESTING

MIX DESIGN OF LWC

- Difficult to decide water-cement ratio ,due to variable water absorption by aggregates.
- Generally done by trial mixing.
- Pre - saturation of aggregates is done to avoid excessive absorption of water by aggregates.

- Concrete with saturated aggregates will have higher density , which is bad in freezing & thawing action.
- In rare cases , aggregates are coated with bitumen to overcome the water absorption problem.

CONCLUSION

Lightweight aggregate concretes can be used for structural applications, with strengths equivalent to normal weight concrete. The benefits of using lightweight aggregate concrete include: Reduction in dead loads making savings in foundations and reinforcement. Improved thermal properties of concrete.


Thank
you