

Study on Mechanical Properties of Polyurethane Foam Concrete



Gomasa Ramesh

Abstract: Foamed concrete is a special type of concrete and it can be used widely in construction of reinforced concrete structures. This study is very helpful for understanding about foamed concrete and mechanical properties of foamed concrete. Lot of researches are going on concrete material and finally we got foamed concrete. It has lot of advantages compared to conventional concrete. Fluidity and Flowability is very good in the foam concrete. It can be used for low cost of construction of structures. It has high properties and advantages compared to conventional concrete. Manufacturing and Production of poly urethane is very simple and easy. because of their low density it can be used for low-cost construction works. Weight of the concrete is also less compared to other conventional concrete.

Keywords: Poly urethane, Foam concrete, Polyurethane Aggregates, Mechanical Properties, Mix Design, Manufacturing.

I. INTRODUCTION

Foamed concrete is one of important type of concrete used in construction of civil engineering structures. the main reason for the use of this type of concrete is having high fluidity compared to other conventional concrete. This type of concrete is having high settlement compared to conventional concrete. There are lot of advantages are there for using this type of concrete in construction works compared to others. Many researches are going day by day. In this paper mainly focuses on importance of foamed concrete and its mechanical properties. In this type of concrete cement paste and mortar are used about twenty percentage of its volume. The strength of concrete is also good compared to conventional concrete. It is a light weight aerated concrete.



II. LITERATURE REVIEW

Mohd Sari 2007 et al.

In this paper author explains about foamed concrete and its applications very clearly. Application and properties are very good compared to conventional concrete. In this paper author explains mechanical properties of foamed concrete. In this author also explains about important factors and applications of foamed concrete.

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Jones 2016 et al.

In this author explains that stability of foamed concrete and instability of foamed concrete. In this author also explains importance of foamed concrete for sustainable material and construction. Many countries are using foamed concrete because their excellent properties.

Vivek 2019 et al.

In this paper author explains that importance of foamed concrete and uses. Author also explains that cellular and micro structure of foamed concrete. Author specially explained about its special properties such as physical and mechanical. It is also engineered concrete and extensively used for construction of engineering works.

MATERIALS USED

1. Cement
2. Fly ash
3. Natural sand
4. Foam
5. Water
6. Admixture

ADVANTAGES

1. Light weight concrete
2. Low density
3. High strength
4. High Dry density
5. High compressive strength
6. Volume stability
7. Impermeability
8. Freezing & thawing
9. High workability
10. High thermal insulation
11. Good seismic behavior
12. Lower weight
13. Shock absorbing capacity
14. Replace traditional material
15. Speed up work by using precast panel

III. METHODOLOGY

There are different types of methods are available for producing this type of concrete. In this mainly two methods are used. They are as follows;

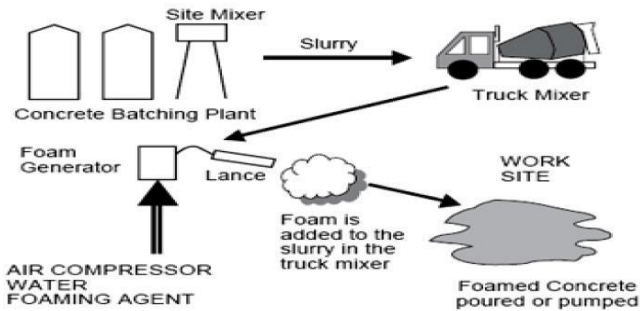
1. Pre foaming method
2. Mixed foaming method

In this first method, cement slurry or cement paste mixed with the stable foam. This type of mixed foam is called pre foaming method.

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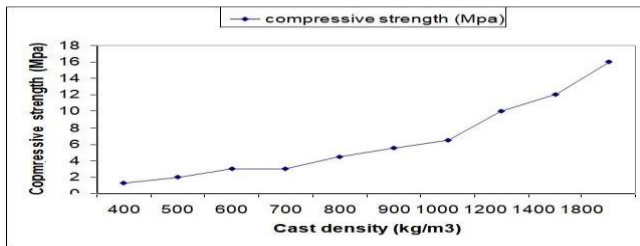
In the second method, foaming is added to the prepare mixture at during the mix process. This type of foaming is called mixed foaming method.

Due to more strength, it can be used for many structural applications. Foamed concrete is different than conventional concrete due to its properties and duration and curing time etc.



Manufacturing Process

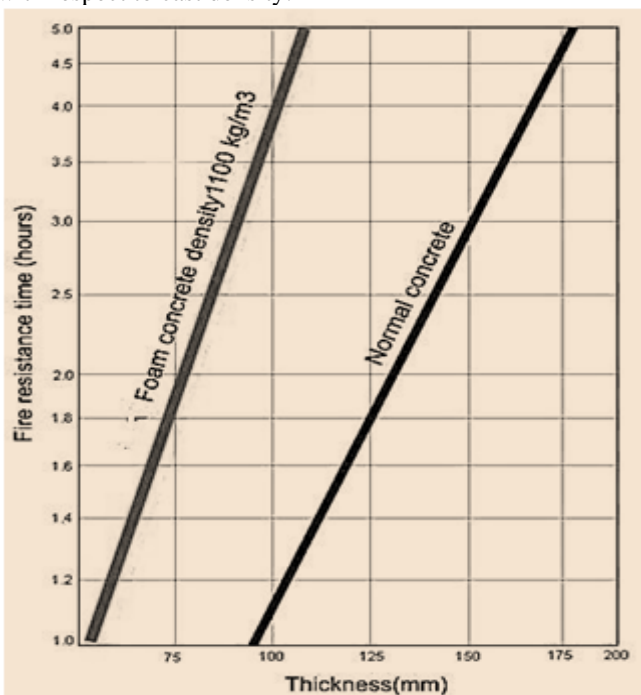
1. Firstly, cement and water and fly ash and admixtures are mixed to form a foam slurry.
2. Foaming agent is used to create a foam.
3. Next prepared slurry is mixed with the foam to make aerated foam concrete.



4. After completion, which can be transported into the required site place.

IV. RESULTS

The results shows that compressive strength of the concrete is increases that with respect to the cast density. With the help of graph know the compressive strength of concrete with respect to cast density.



In this above graph we can understand about fire resistance time of foam concrete and normal conventional concrete with respect to the thickness.

V. APPLICATIONS



Fig. Roof top thermal insulation and water proofing



Fig. Load bearing wall with pre cast panel

VI. CONCLUSION

The major conclusion of this paper is;

1. It is a good construction material
2. Strength is good
3. Thermal properties and insulation properties are good
4. Lower density
5. Weight is less
6. Saving cost of structure
7. Good alternative material for construction
8. High Fluidity
9. High Flowability

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