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MINERALS ADMIXTURE FOR HIGH PERFOMANE CONCRETE

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Abstract

This paper focuses on the various additives and the study of high performance concrete. We need to increase the strength , durability, workability of concrete structural materials for safety purpose of construction . We mainly studied about mineral admixture for increasing the strength of high performance concrete including the other additives such as steel slag , tailing , chloride ion .Though their two admixtures one is chemical & another is mineral ad mixture used to improve ability of High Performance Concrete(HPC).We are briefly studied here about minerals admixture .The behaviour of chloride ion ,tailing ,steel slag and the effect causing on the high performance concrete by advantage such mineral admixture .Effective role of steel slag in the High Performance Concrete that is the compressive strength and flexural strength (bent strength &facture strength) will be enhance ,due to that reason the steel slag provides to sustainabilityof High performance of concrete. When we mix the iron ore tailing , cement and fly ash in the proper ratio to produce the concrete which contain the high quality of High Performance Concrete.

Index Terms: *HPC, Steel slag, Tailing, Chloride Ion, Strength , Durability.*

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INTRODUCTION

There is mostly use of concrete for construction workin India. The demand of concrete for the construction industry purpose must be such that it should contain the enhance properties in hardened state and also great flow ability .Appropriate detailing of reinforcement in joints of beams and column is most important for the strength and ductility of structures [4].The structural properties such as strength (ability of material to sustain maximum load without rupture) , toughness (it is the property of material which enables it to be withstand, bend or stretch under a high stress before rupture), energy absorption capacity , stiffness (the property of material to resist against deformation),durability (to sustain for a long time),multiple cracks and resistance of corrosion are togetherly comes in the term " high performance ". HPC is a mixture of concrete which have ability to sustain for long time and it possess high strength than other ordinary concrete.Silica fumes (It is decrease high quality of quartz in an electric arc furnace) or ground blast furnace slag (obtain by the process of steel making) , fly ash obtain by burning process of coal) , super plasticizers are all include in this concrete.

Corrosion induced by chloride is the main sustainable problem in structure of concrete .The diffusion of chloride into concrete is done due to corrosion of reinforcement .The proportional mixing of chloride plays a vital role for long time assessment of cement .Resisting and conducting properties are also useful for grate quality concrete which extends durability of concrete for assessing the permeability properties of concrete (RCPT) i.e. rapid chloride permeability test has been usually used [1].Industrial solid waste in nowdays available in a huge quantity which contain tailing as a major component.Raw material Fly ash , Lime, Cement, Yellow sand. In that , main five additives are present that is TB, TH, TS, FN and TNC. This is reagent of pure chemical. Properties of steel slag is play a vital role in HPC,availability of the steel slag increase now a days in India and other Countries, from the steel industryand iron industry etc. The using of steel slag is an important measurefor the security of environment and hence it will be the great significance.with the considerationof the consumption of natural effect to reduce the carbon dioxide.Mineral additives are present in huge quantity hence itshould usein the concrete instant of Portland cement ,which the additives or the raw materials blast-furnace, natural pozzolanas,fly ash ,silica fumes ,risk-hard ash and metakaolin. The of raw material or the additive with the water decreasing admixture containing the high range and due to all ,this judge the economical HPC with the increasing sustainability and decreasing the used of the cement constituent in the mixture proportion which reducethe Carbon Dioxide proportion. Adding the mineral such as a steel slag, which act as a binding substance in high performance of concrete due to this the working ability of the HPC will enhance. At we mix the powder of super fine steel slag into concrete as the creativity of the admixture, the measure properties of the concrete increase rapidly to making HPC. In that the super fine steel slag , play a key role for the enhancing properties of the High Performance of Concrete.

ADDITIVES

Fly Ash

In concrete fly ash is replace by Portland cement and it gives a good performance concrete .It shows higher durability level

than the other traditional concrete have lower permeability and it's easy to use. It prevent alkali-silica reaction which gives the long duration .Fly ash is naturally occurring component or material which is obtained from coal burning process and is almost similar to volcanic ash. It is replace Portland cement by 20%-30% or more. Fly ash increase the strength and durability due to this it carry high load and it survive long time. Fly ash is cheaper nearly 20%-60% than the Portland cement.

Advantages

1 .Fly ash is environmental friendly.
2. It is sustain for long time.
3. It reduces the damaging action.
4. Fly ash is cheaper than Portland cement.
5.It is easy to place without giving to much efforts.

Disadvantage

1.It is likely to be affected by chemical attack .
2.Permeability can be increases by the poor quality of fly ash in construction yet it may be cause damage to the building.
3. Poor quality of fly ash shows the worst impact or effect on concrete.

Super plasticizer

It is a chemical admixture having capacity to reduce the high range of water .The super plasticizer is not consider as a mineral admixture but it exist as admixture in high performance concrete. Super plasticizer can be use to minimize the requirements of water by 15%-20% without any harm to work ability, leading to the thick concrete and high strength .[4]

Ground Blast Furnace

It also called as silica fume. It is obtain from the remaining of iron manufacturing industries the strength , durability and the working ability of concrete by using as a admixture in HPC. Proportion ratio of adding ground blast furnace can be used same but by some studies it conclude that it can replace about 30%-85% of cement weight.

Advantages

1.Ground blast furnace provides great chemical stability to concrete.
2.It may reduces the penetration of chloride .
3. It contain good compaction properties.
4.Less chances to flower out.

Disadvantages

1.In cold weather ground granulated blast furnace will have less strength and may required form work to be placed for a long time.

CONCLUSION

1 To enhance the strength , durability and work ability of High Performance Concrete an appropriate ratio of admixture is the main thing to produce good quality of High Performance Cement.
2.The constituent in the ration that is 65:25:10,iron ore tailing :cement:flyash.
3.Availability of mine tailing in industry as a solid waste in a huge quantity due to this environment is protected by harm.
4. Iron ore tailing is the main raw material that is used in concrete.
5.In that the steel slag will increase the flexural strength as well as compression strength in High Performance Concrete .
6. We can made the HPC by use the admixture of various mineral such as steel slag powder and the blast furnace slag.
7. Using a steel slag in HPC can give a better strength also give the effective application in construction industry.

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