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Department : Civil Engineering.

Section : (A)

Paper : concrete technology.

Question of #

Which step is taken to prevent flash setting of cement? Also, write steps to prevent false setting of concrete.

Ans:

Steps to prevent blast setting:-

Flash setting is the immediate stiffening of cement paste in a few minutes after mixing with water. It is accompanied by large amount of heat generation upon reaction with water.

Gypsum is added in cement to prevent flash setting of cement.

And blast setting is a rapid development of rigidity of cement paste without generating of much heat. This rigidity can be overcome and plasticity can be regained by further mixing without addition of water.

(2) In this way cement restore its plasticity in set in a normal manner without any loss of strength. It may be due to hydration of gypsum as a result of containing hot cylnker or due to activation of C_{3S} by aeration in high humidity.



(2)

Question# 02
Draw a graph showing the strength development of pure compounds of cement.

Ans: The following graph shows the strength development of pure compound of cement.

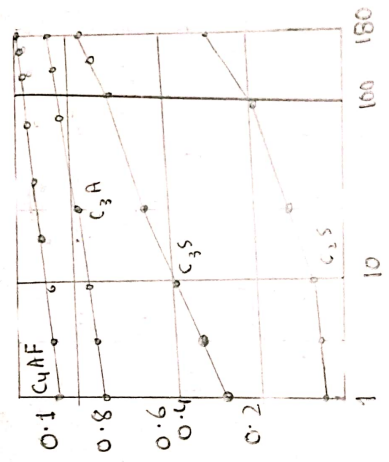


Fig: Strength development.

(4)

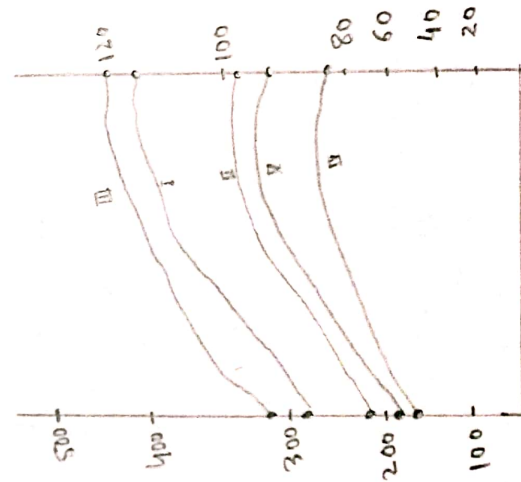
Q3: why type III (three) cement is rapid hardening and type IV low Heat Producing? Draw a graph showing the development of heat of hydration of different cement types

Ans:-

Type III cement is rapid hardening because the component of type III is more finely ground with roller and grinders and addition of more C_3A as compared to type IV. while the low heat producing of type IV is due to the low content of C_3A and C_3S .

The product of type IV are less finely ground therefore the content react slowly and produce low heat of hydration.

development of heat of hydration of different cement types.



(5)

Q4: What is the effect of compaction on entrapped air of concrete? What will be the effect on strength if concrete is not compacted sufficiently.

Ans: ⇒ Effect of compaction on entrapped air of

concrete:

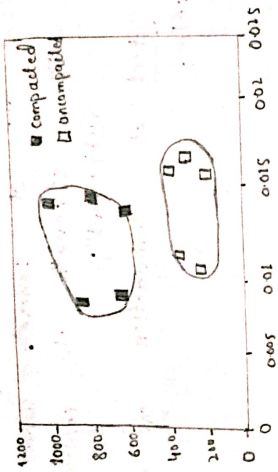
compaction is the process which expels entrapped air from freshly placed concrete and packs the aggregate particles together so as to increase the density of concrete. It increases significantly the ultimate strength of concrete and enhances the bond with reinforcement.

Due to compaction of concrete segregation occurs. It creates the problem of segregation in which the denser aggregates settle to the bottom while the lighter cement paste tends to move forwards.

⇒ Effect of non compaction:

The effect

of on strength if concrete is not compacted is that there will be no segregation -



Question Q5: Why we add only 5% of gypsum to cement?

Ans: Gypsum is a naturally occurring mineral mined from deposits formed by ancient seabeds as a raw material. Gypsum is called a retarding agent of cement which mainly used for regulating the setting time of cement and is an indispensable component.

Gypsum, 2 to 3% is added to cement in powder form to slow down the setting of cement. We add 5% of gypsum to slow down the setting of cement. About 3 to 5% gypsum is added to cement to slow down the setting

Q6) What is the effect of following on the bond strength of concrete?

i) Shape of Aggregate :-

The shape and texture of aggregate affect the property of fresh concrete more than hardened concrete. The aggregate have smooth surface and improve workability and the rougher surface generates a stronger bond between the paste and aggregate creating a higher strength.

ii) Size of aggregate :-

Several factors including chemical, roughness and reinforcement with concrete. Therefore minimum aggregate size is critical for bond strength when smaller size aggregates are used.

iii) Texture of aggregate :-

The texture also affect the properties of fresh concrete. A smooth surface can improve workability thus a rougher surface aggregate create a strong bond between the paste and aggregate.

(8)

Bleeding:-

Bleeding in concrete may be considered as the physical movement of water towards the top surface. It is not always favorable as it increases finishing time, decrease strength where resistance and bond strength and causes poor bonds between successive lifts.

Question 07#

What is the effect of following on workability of aggregate?

i) Porosity and absorption:- Porosity

and absorption will effect water/cement ratio and hence workability of concrete as well as bond between it and cement paste.

ii) Air entraining agent:- Air entraining agent effect compressive strength of concrete and its workability.

(4)
iii) Coarse aggregate to fine aggregate ratio:

Finer particle require more water for a longer surface, hence aggregate with finer particles needs more water make it workable. On the other hand, bigger particles have less surface area, demand less water for wetting surface and require less amount of paste for lubricating.

iv) Grading of aggregate:-

Graded aggregates tends to fill up voids and easily workable. Smaller amount of water can make it workable.

Question # 08

What is the effect of fineness of cement on the following?

i) strength of concrete:-

fineness causes an increased rate of hydration, high strength and high heat generation. Blending can be reduced by increasing fineness - increasing rate and high strength can be reduced by increasing fineness -

(10)
ii) Rate of heat evolution during hydration:-

The fineness of cement has an important bearing on the rate of hydration and hence on the rate of gain of strength and also on the rate of evolution of heat.

iii) Total heat of hydration:-

The size of cement particles directly affects the hydration setting and hardening strength and heat of hydration. The finer the cement particles are, the longer the total surface area.

iv) workability of concrete:-

The workability of non air entrained concrete is increased by increasing the cement. The 28 days compressive strength of concrete with air with out air entrained air, increases with an increase in cement fineness.



(11)

Question #09
What step can be taken during transportation and placement of concrete to prevent segregation?

Ans: Segregation of concrete can be prevented by correctly proportioning mix and using the recommended water. Cement ration so as to prevent using excess water. Care should be taken while handling placing, transporting, compacting and also at finishing stages -

