

# Image

ID No : 16317

Section : A

Subject : concrete technology.

Q1: Which step is taken to prevent flash setting of cement? Also write steps to prevent false setting of concrete?

: Prevent flash setting of cement:

Calcium sulfate sources, such as gypsum are intentionally added to Portland cement to regulate early hydration reaction to prevent flash setting, improve strength development and reduce drying shrinkage. Sulfate and aluminate are also present in supplementary cementitious material and admixtures.

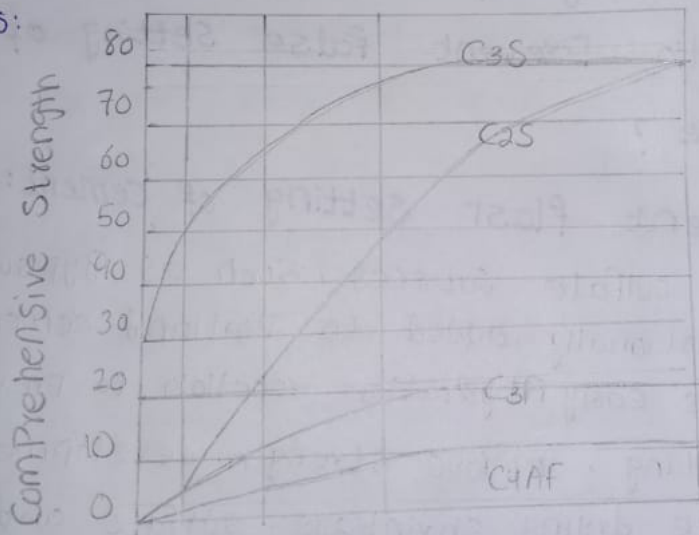
: Prevent false setting of concrete:

The hydration completes in a day. Hydration

lead to immediate stiffening of the paste, known as flash setting. To prevent this from happening, gypsum is added to cement clinker during grinding.

Q2: Draw a graph showing the strength development of pure compound of cement?

Ans:



Q3: Why type III cement is rapid hardening and type IV low heat produce  
Draw a graph showing the development

of heat of hydration of different types.

Ans: Rapid Hardening Portland cement

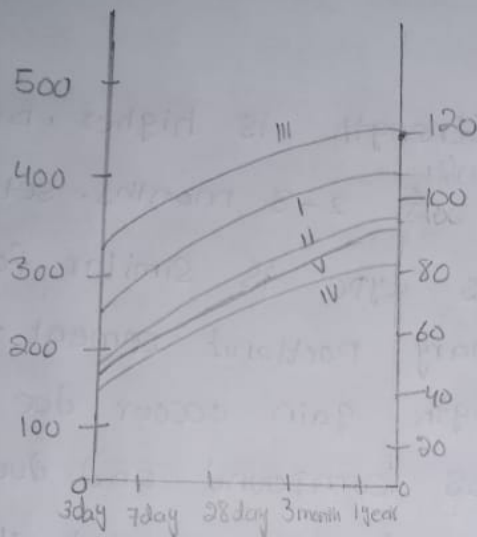
type III:

The initial strength is higher, but they equalize at 2-3 months. setting time for this type is similar for that of ordinary Portland cement. The rate of strength gain occur due to increase of  $C_3S$  compound and due to finer grinding of the cement clinker.

: Type IV low heat Produce:

low heat Portland cement, usually type 4, develops less heat of hydration during setting and curing. This is helpful in mass concrete placement since large volume of concrete retain and develop high temperature during hydration

without a mechanism for releasing the heat.



Development of heat of hydration of different cement types.



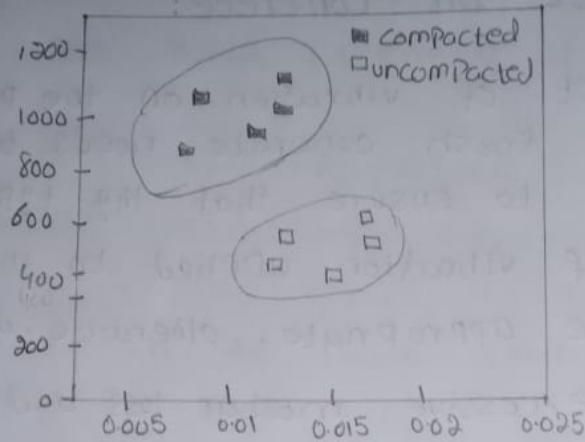
Q4:- what is the effect of compaction on entrapped air of concrete? what will the effect on strength if concrete is not compacted sufficiently with graphs?

## : Effect on concrete:

The effect of vibration on the properties of fresh concrete needs to be understood to ensure that the type and amount of vibration applied to the concrete are appropriate. otherwise, defects such as excessive mortar loss and other forms of segregation can be caused.

## : Effect on strength if concrete is not compacted:

Compaction of concrete is an important component in the process of laying a concrete slab. if compaction is not carried out as required a series of defects may become apparent and the concrete slab will suffer from significant loss of strength.



Q5: why is the Percentage of gypsum add to cement limited only to 5%?

Ans: Generally gypsum is added in the range of 3-5% cement for delaying the setting time of cement. That is why gypsum is also known as retarding agent of cement. after adding gypsum in excess it accelerate the setting time because gypsum generate its own clotting agent resulting in quick setting of cement. it also result in weaker strength and inevitable expansion.

Q6: what is the effect of following on the bond strength of concrete?

: Shape of aggregate:

Particle shape principally affect the w/cm by its effect on water demand and amount of Paste required for workability of given mixture.

: Effect of size of aggregate:

Strengths than the larger sized coarse aggregate. Cook observed that the difference in compressive strength due to aggregate size is increasingly larger with a decreasing water ratio and to cement ratio and increasing test age. The smaller sized coarse aggregate also increases the flexural strength of the concrete.

: Effect of texture of aggregate:

The surface texture of aggregate can be either smooth or rough. A smooth

Surface can improve workability, yet a rougher surface generate a stronger bond b/w the paste and the aggregate creating a higher strength.

### : Effect of Bleeding of aggregate:

Bleeding in concrete may be considered as the physical migration of water toward the top surface. it is not always favorable as it increases finishing time, produce laitance at the surface, decrease strength, wear resistance and bond strength and cause poor bond between successive lifts.

Q7: what is the effect of following on workability of aggregate?

Ans : Effect of Porosity and absorption on workability of aggregate:

The Porosity of an aggregate may also affect workability of concrete. if the



aggregate can also absorb a great deal of water, less will be available to provide workability.

: Effect of Air Entrainment:

: on concrete strength:

Air entrainment affect compressive strength of concrete and it workability it increases the workability of concrete without much increase in water-cement ratio.

: Effect of coarse to fine aggregate on workability of concrete:

The workability of fresh concrete is higher for gap graded coarse aggregate concrete than for well graded coarse aggregate concrete. for the gap aggregate the bigger the particle size removed the higher the workability.

## : Effect of grading of Aggregate on workability of concrete:

well-graded aggregate tend to fill up voids and easily get workability less amount of water can make it workable. if grading is better, there will be fewer voids and excess Paste will be available to gave better-effect.

Q8: what is the effect of the following of fineness of cement?

## : Effect of fineness of Cement on Strength of concrete:

The fineness of cement affect by hydration rate, and in turn, the strength increasing fineness causes an increased rate of hydration, high strength and high<sup>2</sup>

heat generation. Bleeding can be reduced by increasing fineness.

: Effect of fineness of cement on rate of heat evolution during hydration:

Partially replacing cement with fly ash of different fineness, decreased the cumulative heat evolution. The reduction in heat evolved increased with an increase in fly ash content.

: Effect of fineness of cement on 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 larger the total surface area is and the bigger the area contacting with water.

## : Effect of fineness of cement on workability of concrete:

When fineness of cement increases beyond a certain particle size the particle of cement itself starts acting as lubricant in the concrete.

Q9:- What step can be taken during transportation and placement of concrete to prevent segregation of concrete?

### : Prevention of segregation:

Segregation of concrete can be prevented by correctly proportioning the mix and using the recommended water-cement ratio as to prevent using excess water. Care should be taken while handling, placing, transporting, compacting and also at finishing stages properly using air entraining agent, admixture, pozzolanic material also prevent segregation.