

⇒ Name :- AriZ ullah

⇒ ID :- 16073

⇒ Dpt :- BE (C)

⇒ Section :- A

⇒ Paper :- Concrete Technology

⇒ Submitted :- Sir Osama Aziz (sb)



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

Ans:- Flash Setting:

It 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 of C₃A with water. It is also added to gypsum in the

prevent flash set.

⇒ Steps to prevent flash setting.

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

⇒ False setting:

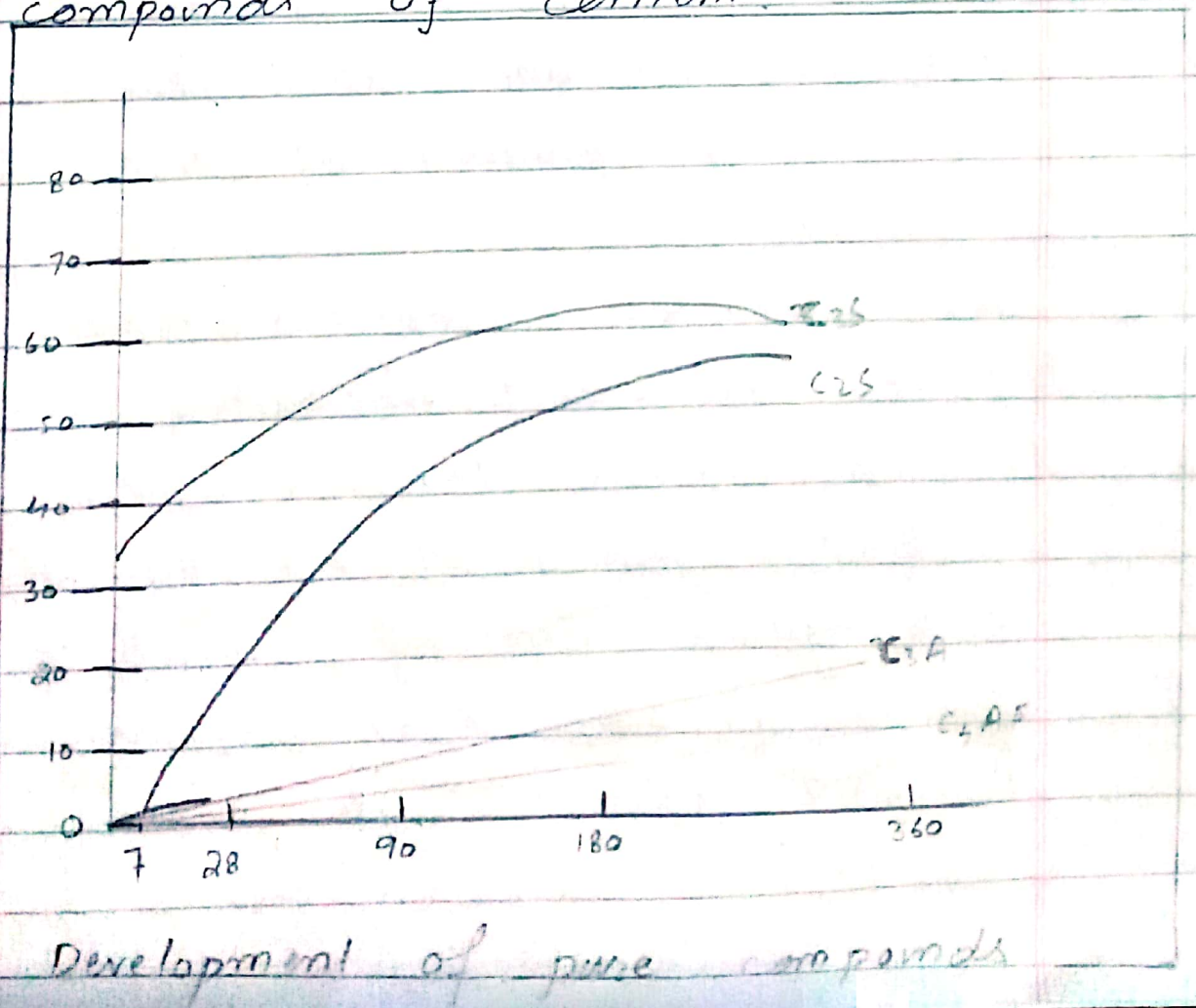
It is a rapid development of rigidity of cement paste without generated of much heat. This type of rigidity can be overcome and plasticity can be regained by further mixing without addition of water.

In this way Cement paste loses its plasticity & sets in a normal manner without any loss of strength. It may be due to dehydration of gypsum as a result of contacting hot clinkers or due to activation of C3S by aeration in high humidity.



Q no: 02: Draw a graph showing the strength development of pure compounds of cement?

Ans:

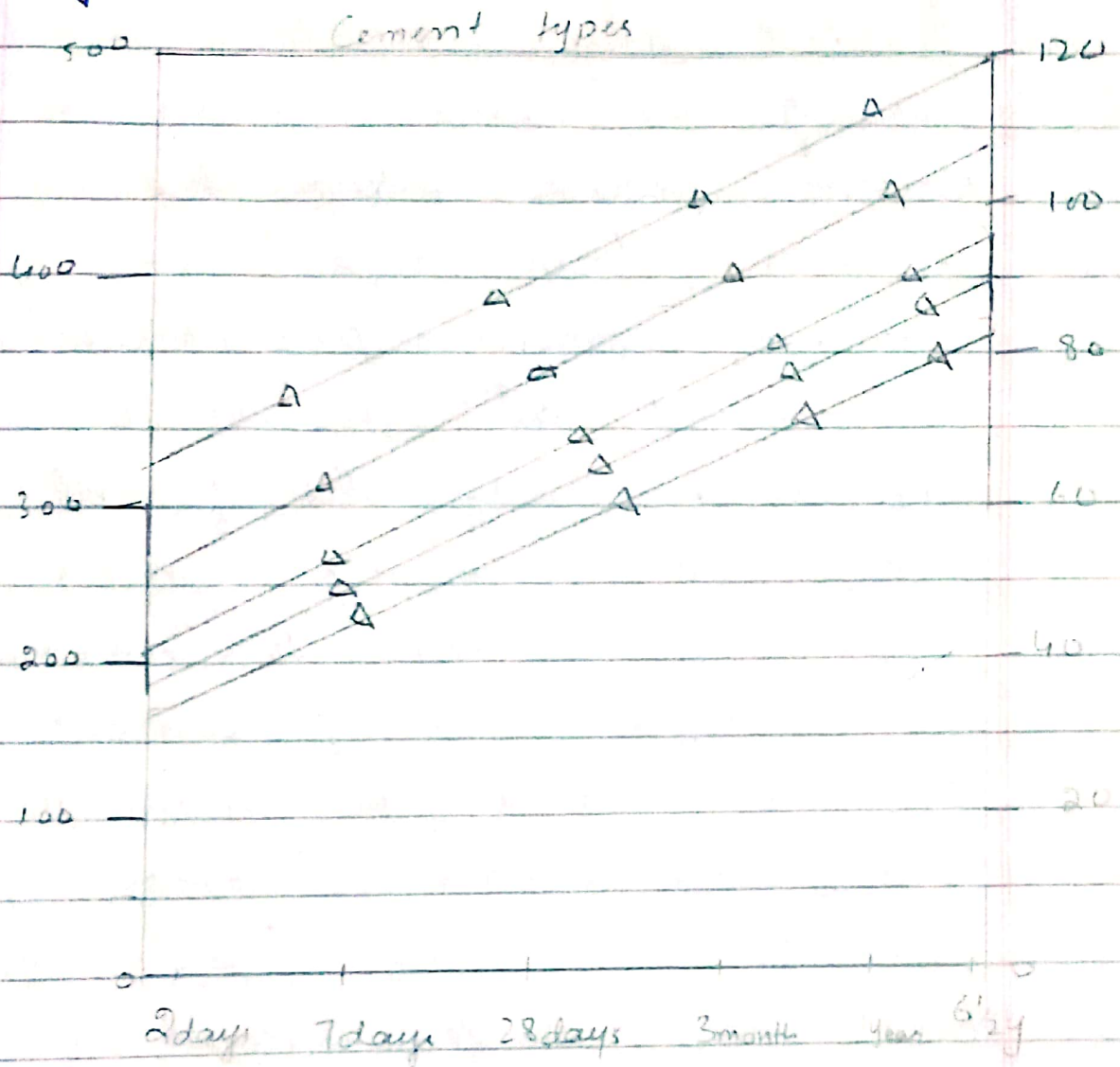


Qno:3: Why type III cement is Rapid Hardening and Type IV Low Heat producing? Draw a graph showing the development of heat of hydration of different cement types?

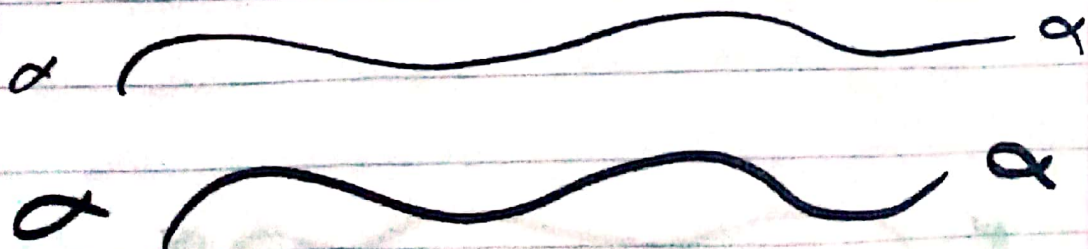
Ans: The Type III cement is Rapid hardening cement because the initial strength is higher, but they equalize at 2-3 months. Setting time for this type is similar for that of ordinary Portland cement. The rate of strength gain occurs due to increase of C_3S compound and also due to finer grinding of the cement.

The type IV cement is low heat producing because it is a special tailored which generates low heat of hydration. This special type of cement, with same as that of normal Portland cement, with the

amount of water required for hydration is low.



⇒ Development of heat of hydration of different cement types.



Q No 5: Why is the percentage of gypsum added to cement limited only to 5%?

Ans: During the cement manufacturing process when the clinkers form and then cool a small percentage or amount of gypsum is introduced during the final stage in grinding process. Gypsum is added to control the setting time of cement. If not added the cement will set immediately after mixing of water leaving no time for concrete mixing or placing. If we exceed the percentage of gypsum then the setting time of cement will also exceed. Which we can't want so adding of 5% gypsum to cement is a fixed ratio.

Q No: 6 What is the effect of following on the bond strength of concrete?
Ans:- Bond strength of concrete:

The force that resists to separation of mortar and concrete from reinforcing steel (or other materials with which it is in contact) such as adhesion, friction due to shrinkage and longitudinal shear in the concrete engaged by bar deformation.

1. Shape of aggregate:-

The shape and texture of aggregate affect the property of fresh concrete more than hardened concrete.

The aggregate have smooth surface are improve workability and a rougher surfaces generates a stronger between the paste and the aggregate creating a higher strength.

2. Size of aggregate:

These are several factors including the chemical adhesion, roughness and reinforcement with concrete. Therefore maximum aggregate size is critical for bond strength when smaller size aggregate are used.

3. Texture of aggregate:

The texture of aggregate also effect the properties of fresh concrete. A smooth surface can improve workability thus a rougher surface aggregate creat a strong bond b/w the paste and aggregate.

4. Bleeding:

Bleeding is responsible for causing permeability in concrete. In the process the accumulation of water creates a water voids and reduces bond between the aggregate and cement.

Q. No: 7. What is the effect of following on workability of aggregate?

Ans: Workability of aggregate:

Grading of aggregates have the maximum effect on the workability of concrete. This helps in reducing the voids in a given volume of aggregate. The less volume of voids makes the cement paste available for aggregate surfaces to provide better lubrication to the aggregates.

1) Porosity and absorption

Porosity also significantly effects Fatigue behaviours. The lower fraction of porosity can cause pore size, pore shape and pore spacing are all important factors. The absorption rate of a specific aggregate can modify plasticity hardness and even the appearance of the resulting concrete.

2. Air entraining agent

The presence of entrained air caused a slight reduction in the water requirement, the flexural strength and the dynamic modulus of elasticity of concrete and increased the durability from 5 to 50 times, depending upon the quantity of entrained air and the aggregate.

3. Coarse aggregate to fine aggregate ratio

The effect of coarse to fine aggregate ratio on the fresh and hardened properties of Roller-Compacted concrete Pavement. The test result demonstrate that increasing the C/F ratio from 0.6 to 1.8 increased the vebe time threefold while increasing the cement content from 9% to 12% decreased the vebe time by 12%.

4. Grading of aggregate

of grading

of aggregate is varied, it also changes cement paste content (cost money) workability of the mix, density and porosity. It is an important factor and has a maximum influence on workability. Well graded aggregates result in the least amounts of voids in a given volume.

Q. No: 08: What is the effect of fineness of cement in the following?

Ans. Fineness of cement:

The fineness of cement affects hydration rate and in turn, the strength. Fineness causes an increased rate of hydration, high strength, and high heat generation. Bleeding can be reduced by increasing fineness.

1. Strength of concrete:

For a given workability an increase in the proportion

of cement in a mix has little effect on the water demand and results in a reduction in the water/cement ratio. Therefore for a given workability an increase in the cement content results in an increase in strength of concrete.

Q. 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 strength and also on the rate of evolution of heat. Finer cement offers a greater surface area for hydration and hence offers faster the development of strength.

3. Total heat of hydration:

The reaction between water and cement heat will be produced that's called heat of hydration. If producing heat of hydration is more than it will create causes for developing cracks. Cement is play role as binder in concrete and for increasing strength up to certain limit.

4. Workability of concrete:-

Factors

affecting the workability of concrete are materials such as water content, cement concrete sand and aggregate properties such as size, shape, grading, mix design ratio and use of admixtures. Strength of concrete decreases with increases in workability of normal concrete affecting the durability

of concrete.

~

~

Qno 3: What steps can be taken during transportation and placement of concrete to prevent segregation of concrete?

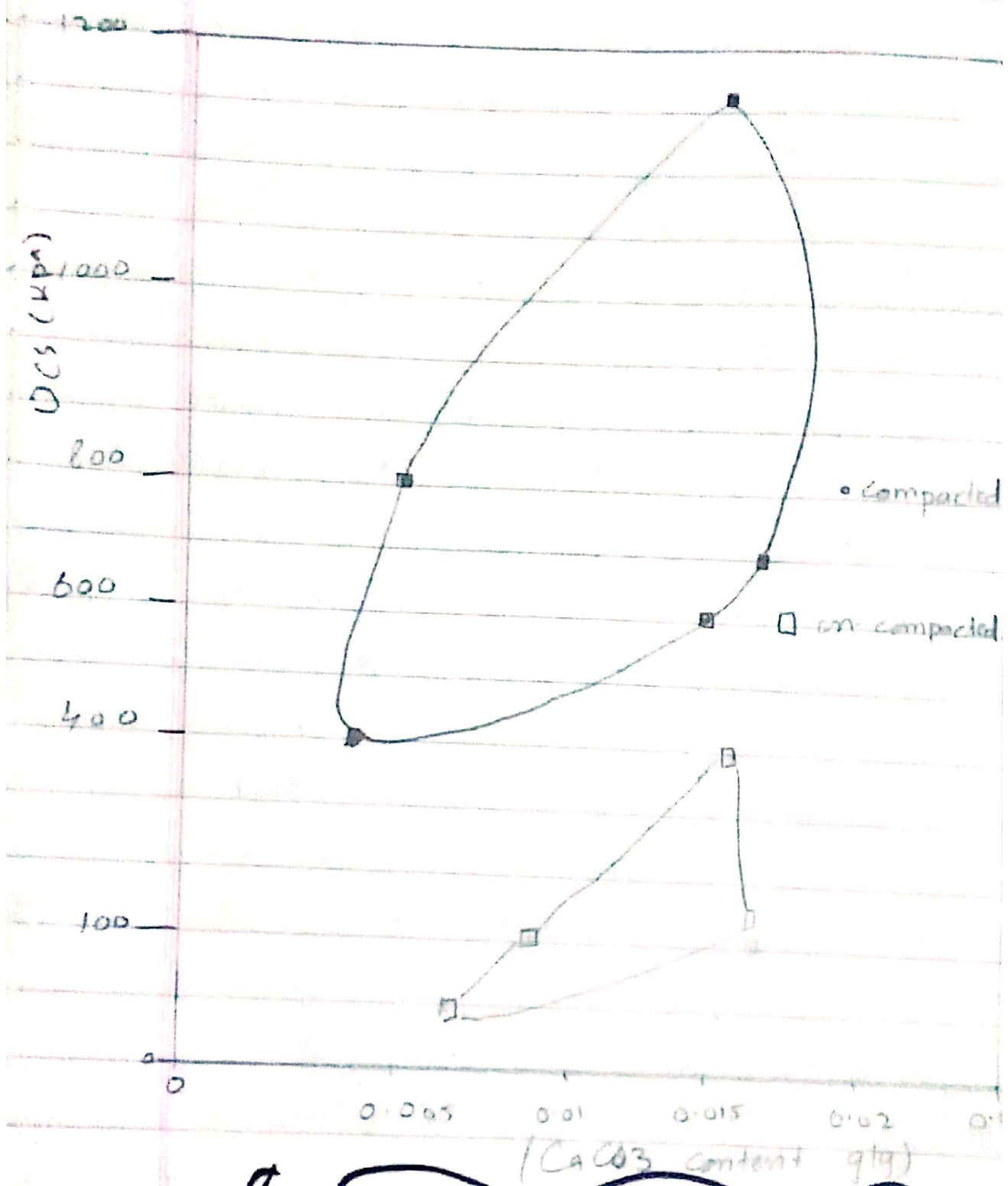
Ans:- Segregation of concrete can be prevented by correctly proportioning the mix and using the recommended water-cement ratio so as to prevent using excess water. Care should be taken while handling, placing, transporting, compacting and also at finishing stages.

~

Qy: What is the effect of compaction on entrapped of concrete? What will be the effect on strength of concrete is not compacted sufficiently? Explain with graph?

Ans: Compaction significantly increases the ultimate strength of concrete and enhances the bond with reinforcement. It also increases the abrasion resistance and general durability of the concrete, decreases the permeability and helps to minimise its shrinkage and creep characteristics.

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.



o
o

The End