

Name = SHOAIB KHAN

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I'D = 16358

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Department = BS (civil)

Teacher = Usama Ali.

Q.1:- Which step is taken to prevent flash setting of cement? Also write steps to prevent ~~flash~~ false setting of cement.

Ans:- Steps to prevent Flash Setting of Cement

To prevent flash setting of cement, gypsum is added to cement clinker while grinding.

Prevention of False setting of concrete

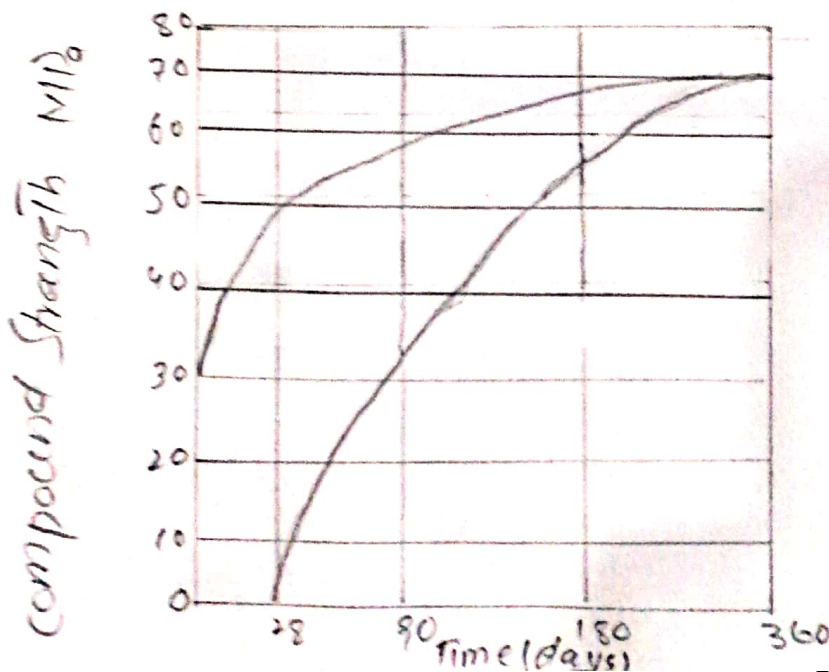
Premature stiffening of cement occurs within a few minutes of adding water to it, then it is called false setting.

False setting can be removed by remixing the cement (concrete) paste without adding water.

✱ ——— ✱ ——— ✱ ——— ✱ ——— ✱ ——— ✱ ——— ✱ ——— ✱

Q.2:- Draw a graph showing the strength development of pure compounds of cement.

Ans:- Strength Development of pure compounds of cements.



Q.3:- Why Type III cement is rapid hardening and Type IV low heat producing? Draw a graph showing heat of hydration of different type of cement.

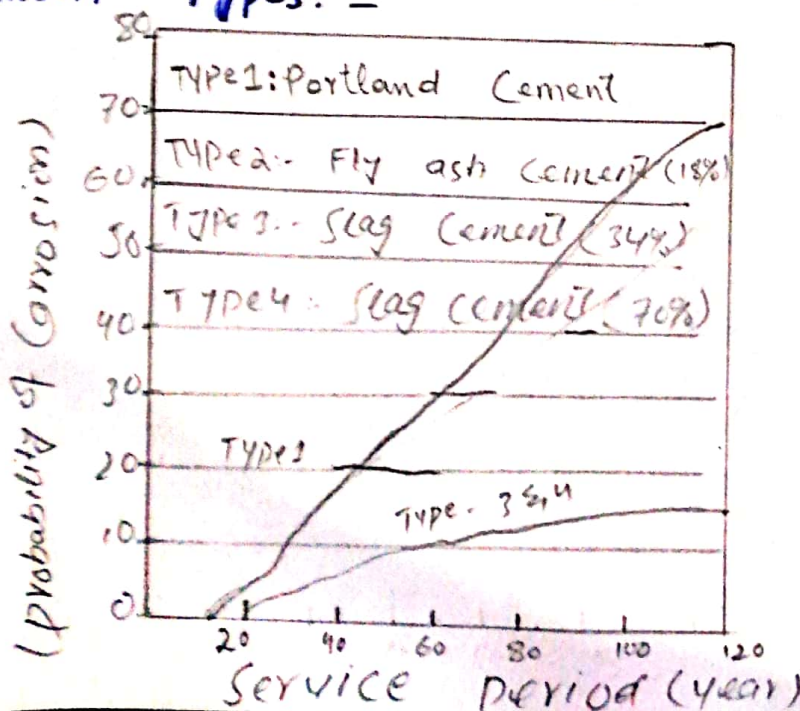
Ans:- **Rapid Hardening cement (Type III)**

This type of cement develops strength more rapidly and is so called high early strength cement. The rapid hardening of this cement is due to a higher C_3S content even sometime upto 70% and also because of fine grinding of the cement clinkers.

Low Heat Producing cement (Type IV)

This type of cement contains less amount of C_3S and C_3A which results in slow development of strength and producing less heat, which make this cement of low heat. Portland blast furnace cement and Portland pozzolana cement can be specified to be of low heat variety.

Graph of Heat of Hydration of Different cement Types:-

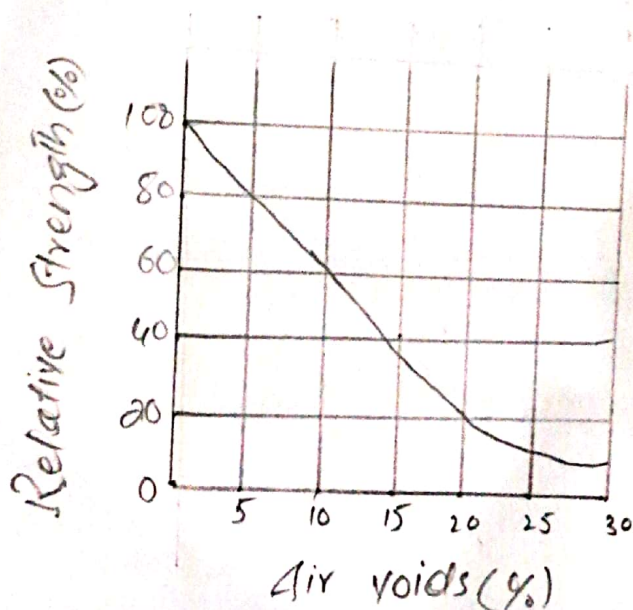


Q:4: What is the effect of compaction on entrapped air of concrete? What will be the effect on strength if concrete is not compacted sufficiently? Explain with graph.

Ans: **Effect of compaction on entrapped Air of concrete.**

Compaction expels entrapped air from fresh placed concrete and packs the aggregate particles together so as to increase the density of concrete. It also increases the strength of concrete. It also improves durability of concrete.

Effect on strength of concrete if not compacted sufficiently.
In case concrete is not compacted sufficiently, it will have entrapped air which will greatly reduce its strength.



Q.5:- why is the percentage of gypsum added to cement limited only to 5%?

Ans:- Percentage of Gypsum::

It is very important to add 3% - 5% gypsum exactly to cement, because it acts as a set retarder. It prevents the portland cement from flash set.

Adding additional amount of gypsum will cause "False set". The gypsum act as a binder, causing the sensation of setting.

·x· ————— ·x· ————— ·x· ————— ·x· ————— ·x· ————— ·x· ————— ·x·

Q.6:- what is the effect of following on the bond strength of concrete? (Use not more than two lines to answer each part).

- i): shape of aggregate (ii) size of aggregate
- iii): Texture of aggregate (iv) Bleeding.

Ans:(i) Effect of shape of aggregate on bond strength of concrete.

→ Angular Aggregate:

Increased flatness or elongation reduces workability, which result into stronger bond.

→ Round Smooth Aggregate:

Require less water for lubrication and gives greater workability which results into weaker bond.

ii) Effect of size of Aggregate on the bond strength of concrete.

The smaller the size of aggregate the less will be workability and

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And higher will be the bond of strength and vice versa.

(iii) Effect of Texture of aggregates on the Bond strength of concrete.

Porous aggregates need more water as compared to non-absorbant aggregate for achieving same workability and bond strength. Hence porous aggregate should be avoided.

(iv) Effect of Bleeding on the bond strength of concrete.

Bleeding has a bad effect on the bond strength of concrete because it decrease the bond strength.

Q:7:- What is of the following on workability of concrete?

- i) Porosity \approx Absorption (ii) Air entraining agent
- iii) Coarse Aggregate to fine aggregate ratio
- iv) Grading of Aggregate.

Ans!: Effect of Porosity \approx Absorption on workability of concrete.

If there more porosity the concrete will be more workable and vice versa.

Absorption will effect the workability in the following way, Since concrete contains aggregates which disturbs the water to cement ratio because aggregate itself also absorb water. If the aggregate absorbs water and equivalent water of this absorption is not added as per the required water to cement ratio, the workability will reduce.

The case will be opposite if aggregates contain excess water.

ii) Effect of air entraining Agent on workability of concrete.

Air entraining agents form small bubbles of air in the concrete. These bubbles reduce the friction that occurs during the concrete pumping stage. As a result workability improves.

iii) Effect of coarse Aggregate to Fine Aggregate on workability.

Fine Aggregates require more water for a large surface, hence aggregate with finer particles need more water to make it workable. On the other hand, coarse aggregates have less surface area, demand less water for wetting surface and making workable. Gravel and crushed stone are generally ~~preferred~~ preferred.

iv) Effect of Grading of Aggregate on workability of concrete.

If there is ~~more~~ grading of aggregates have the maximum effect on workability of concrete. Well graded aggregate have all sizes in required proportions. This helps in reducing the voids in a given volume of aggregates which help in improving the workability.

Q:8:- what is the effect of fineness of cement on the following? (Use not more than two lines sentences to answer each part).

- i) Strength of concrete (ii) Rate of heat evolution during hydration.
iii) Total heat of hydration (iv) workability of concrete.

Ans: i) ~~Strength~~ ^{Effect} of Fineness of Cement On Strength of concrete.

Strength of concrete increase with an increase in cement fineness. Strength of concrete is directly proportional to the fineness of cement.

2) Rate of Heat evolution.

Rate of Heat evolution during hydration decreases due to replacing cement with fly ash of different fineness.

3): Total Heat of Hydration.

Greater the heat of Hydration will be if the cement particles are more finer.

4): Workability of concrete.

Fineness of cement leads to make the ~~fast~~ concrete past more workability.

Q: 9:

The concrete mix should be properly designed with optimum quantity of water to make a cohesive mix. Such concrete will not exhibit any tendency for segregation.

Field quality must be maintained while handling, transporting, placing, compacting and finishing.

Admixture, such as pozzolanic material or air. Entraining agent should be used to avoid segregation.