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Department # BE Civil

Section # A

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Subject # Concrete Technology

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

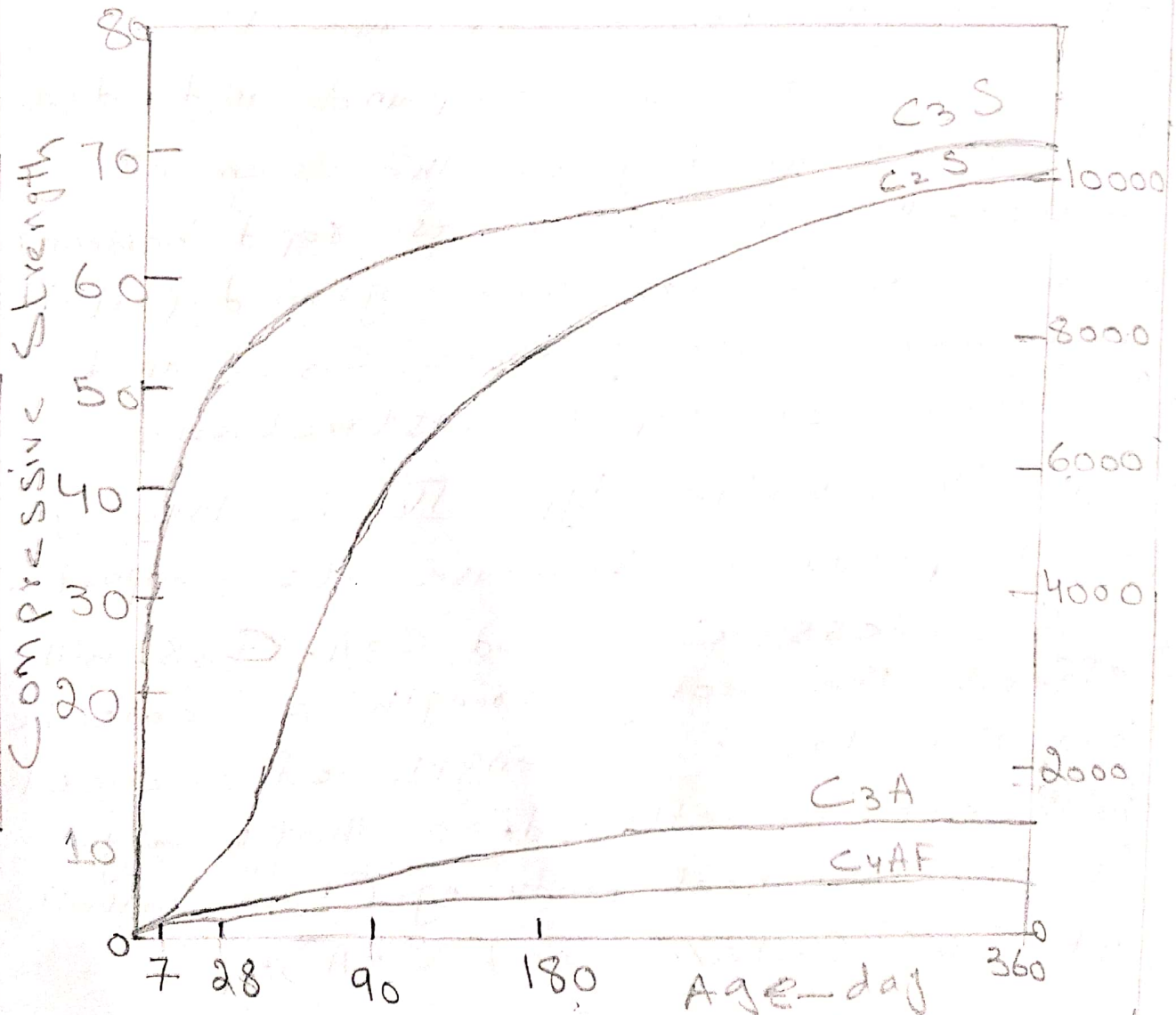
Ans Gypsum is added in cement to prevent flash setting.

* Step to prevent false setting of concrete :-

It is just the temporary rigidity attain by concrete. When we transport the concrete from one place to another the mixer in which it is transported are usually the drums are being rotated by its own

axis so that the concrete is constantly mixed which prevent the false setting, so false sett can be prevent by continuous mixing and re-working.

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

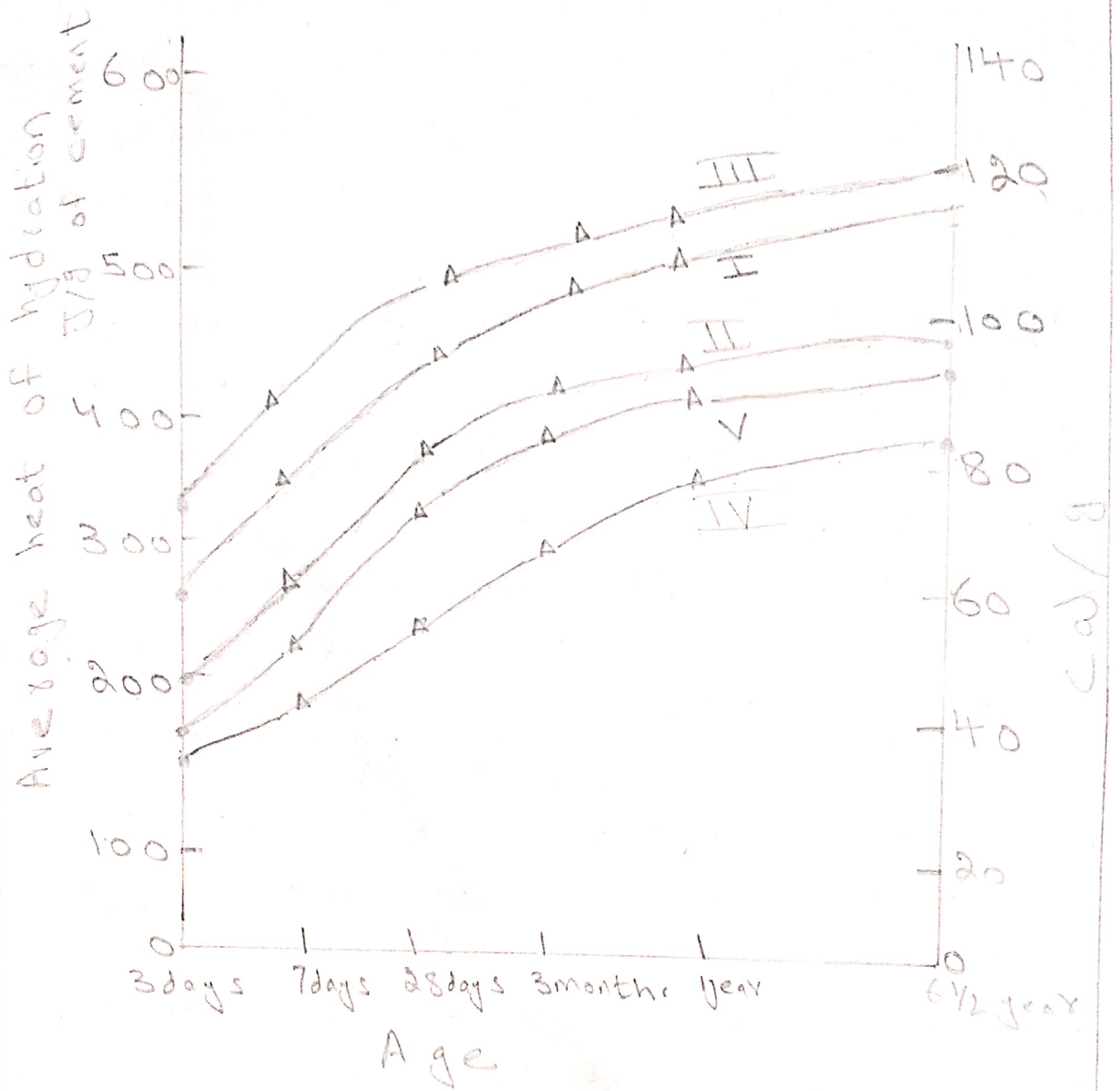


Development of strength of pure compound

Q3 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 Type III cement is rapid hardening because this type develops strength more rapidly than OPC. The rate of strength gain occur due to increase of C_3S compound and due to finer grinding of the cement clinker, that is known as rapid hardening cement which has more ground particle and have slightly more C_3S and is used for rapid construction.

* Type IV :- while type IV is low heat producing because its composition contain less C_3S and C_3A . C_3S will affect the early strength of concrete but the later strength of concrete will not be effected, so that's why it is low heat producing. (Low content of C_3S ($<50\%$) and C_3A).



Development of heat of hydration of different cement types (graph)

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? Explain with graph?

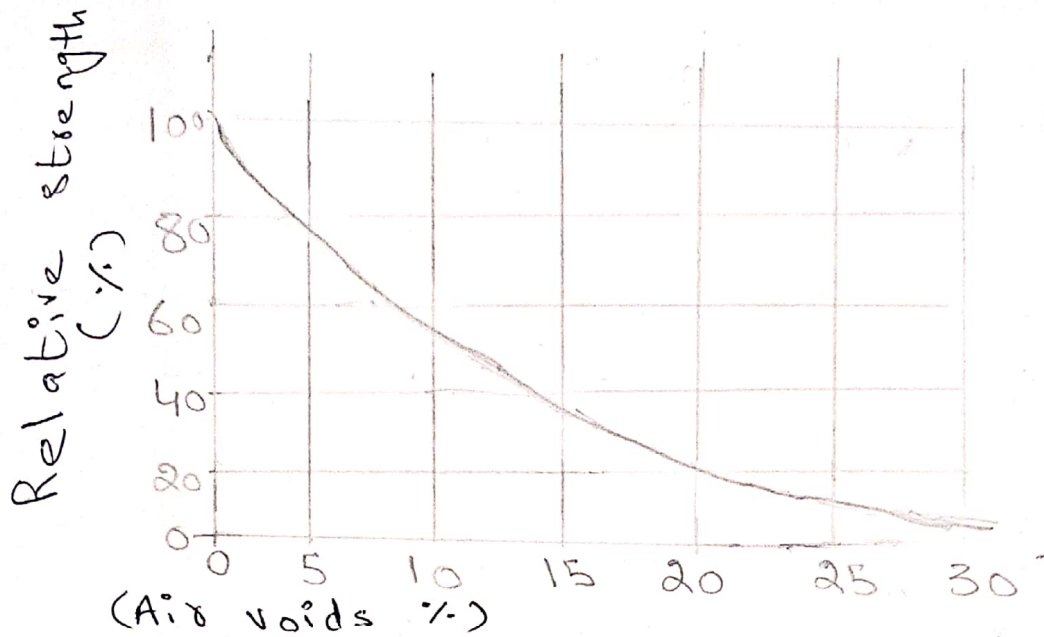
Ans The effect of compaction on entrapped air of concrete is that it increases the ultimate strength of concrete and enhances the bond with reinforcement. It also increases the absorption resistance & general durability of concrete. It is estimated that 50% of air entrainment is lost after compaction for $\frac{1}{2}$ min.

* Effect of strength if concrete is not compacted sufficiently :-

If the concrete is not compacted a series of defects may appear and concrete will suffer from significant loss of strength.

* Now defining through graph. See the figure, ~~from~~ ~~figure~~ the effect of compaction on compressive strength is dramatic. e.g. the strength of concrete containing 10% of entrapped air may be as little as 50% that of the concrete

when fully compacted.



Lost of strength through incomplete compaction.

Q5 Why is the percentage of gypsum added to cement limited only to 5%?

Ans Gypsum is added only in the range of 3% - 5% to cement for delaying the setting time of cement. If it should added in excess it should delay the setting time more than usual time. Adding gypsum in excess it accelerates the setting time because gypsum generates

its own clotting agent resulting in quick setting of time. It also result in weaker strength and inevitable expansion. It also cause False set.

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

- ① Shape of aggregate: - The large surface area of more angular aggregate provide a greater bond compare to rounded aggregate.
- ② Size of aggregate: - With increase in maximum aggregate size, in concrete the compressive strength & tensile decrease. Maximum aggregate size is harmful for bond strength.
- ③ Texture of aggregate: - It can be either smooth or rough. A smooth surface can improve workability yet rough surface make strong bond because of more paste required.
- ④ Bleeding: - It increase finishing time, produce laitance at the surface decrease strength water resistance and cause poor bonds.

Q7 What is the effect of following on workability of ~~aggr~~ concrete

Ans

① Porosity and absorption:-

Porosity and absorption of aggregate will affect the water/cement ratio, workability of concrete, bond b/w them and durability of concrete.

② Air entraining agent:-

Provide resistance to damage by freeze/thaw cycle. Improve flow & reduce segregation in fresh concrete. It decrease strength.

③ Coarse aggregate to fine aggregate ratio:-

It effect the porosity of RCC & relationship between the tensile strength and compressive strength.

④ Grading of aggregates:- It is determining the average grain size of the aggregates before that are used in construction that is applied to both coarse and fine aggregate.

Q8 What is effect of fineness of cement on the following.

Ans (1) Strength of concrete :- The strength of concrete depends on the fineness of cement, more the fine element more will be the strength used in mixture of concrete. Increase the fineness of cement reduce the amount of bleeding in concrete.

(2) Rate of heat evolution during hydration :-

Finer cement offers a greater surface area for hydration & hence faster the development strength.

(3) Total heat of hydration :- when water & cement react heat is generated, it is most influenced by the proportion of C_3S and C_2S . The size of cement particle directly affects the hydration setting & hardening strength & heat of hydration.

(4) Workability of concrete :- It is the property of freshly mixed concrete which determines the ease and homogeneity with which it can be

mixed or placed, increase in water cement ratio increase the workability of concrete.

Q9 what step can be taken during transportation and placement of concrete to prevent segregation of concrete.

Ans ~~A step~~ Following step should be taken during Transportation ^{placement} of concrete to prevent segregation of concrete:-

- ① Transport the concrete mix correctly. choose the shortest route for transportation of concrete mix.
- ② It should be remixed properly.
- ③ Avoid Jolts & Jerks during transporting concrete by mixer/millers ~~of~~ ~~teq~~
- ④ Do not allow concrete to flow.
- ⑤ Use the vibrator correctly while placing the concrete.
- ⑥ vibrate the concrete for just the right time - not too long, not too less.