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Section "B"

Subject : Concrete Technology

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QNo#2: Discuss in brief various types of admixtures used in concrete?

Ans:

ADMIXTURES:

Admixture are those Ingredient in concrete other then cement, water, and aggregates that are added to the mixture Immediately before or during mixing as to obtain the required properties. After concrete Admixture used. When properties cannot be made by varying the composition of basic material. To produce desired effects more economically. unlikely to make a poor concreter better.

Types:

1. Air-entraining Admixtures.
2. Plasticizeres
3. Retarding Admixtures.
4. Accelerating Admixtures.
5. Corrosion Inhibiting Admixtures.
6. Water-proofing Admixtures.
7. Grouting Admixtures.
8. Mineral Admixtures.

Types of mineral Admixture:

Fly Ash, Blast-Furnance slag
Silca fumes, Rice Husk.

* Air - Entraining Admixtures:

Air - Entraining Admixtures are used to introduce and stabilize microscopic air bubbles in concrete.
These are generally used to improve workibility, ease of placing, increase duribility, better resistance to frost action and reduction in bleeding.
The common Air-Entraning agents are natural Wood resins, neutralized vinsol resins, Polylen Polyethlene oxide polymers and sulfonated compounds.
These bubbles are introduce by an air entraining agent, a types of chamical that includes detergents.

* PLASTISIZERS Admixure:

Plastisizers or water reducers and superplastisizers or high rong water reducers, are chemical Admixtures that can be added to concrete mixtures to improve its workability. in order to produce stronger concrete, less water is added. which make the concrete mixture workable and difficult to mix, necessitating the useed of plasticizers.

* Retarding Admixtures:

Retarding Admixtures are used to slow down the speed of the rection between cement and water by affecting the growth of the hydration products or reducing the rate of water penetration to the cement particals. The used of a retarder will increase the setting time and may delay strength development of the concrete.

The typical material used as reterders are:

Lignin, Borax, Sugars, Tartaric Acid Sugars, and Salts.

*Accelerating Admixture:

The admixture that causes an increse in the rate of hydration of the hydraulic cement and thus shortens the time of setting, increases the rate of Strangth development. Accelerating Admixtures are used to quicker setting times of concrete. It prondeeles higher early strangth development in freshly cast concrete. Calcium Chloride is a common accelerating the time of set and the rate of strangth gain.

Corrosion Inhibiting Admixtures:

The function of this type of Admixture is to enhance the long term durability of reinforced concrete. Corrosion-Inhibiting Admixtures can significantly reduced maintenance costs of reinforced concrete structures through a typical service life of 30 to 40 years.

Grouting Admixtures:

It is a power Admixture which can be used for making neat cementitious grouts. It comprises a water reducing / plasticising agent.

Advantages.

* Higher Strength.
* Higher fluidity.
* lower permeability.
* Reduced bleeding.

Mineral Admixture:

Mineral Admixture are "inorganic" material that also have pozzolanic properties. These very fine-grained materials are added to the concrete mixture to improve the properties of concrete, or even as a replacement for portland cement and aggregates.

* FLYASH :

Fly ash is a by-product of the combustion of powdered coal in the thermal power plants. Concrete using fly ash is generally reported show reduced segregation and bleeding.

* BLAST Furnace slag :

Blast furnace slag is a by-Product of iron manufacture. Concrete containing slag as a mineral admixtures generally offers better chemical resistance due to improved water tightness.

* SILICA FUMES :

Silica fumes is an industrial by-product consisting of ultrafine particle-It is recovered form electric furnace by means of dust Collectors from the west gas emitted during the production of ferro-silicon metal. It can be used as an water reducing admixture.

Q No:2 : Define Workability of Concrete and factors affecting on Workability.?

Ans:- Workability of Concrete:

" The ease with wich a Concrete Can be Compacted 100% having regard to the mode of Compaction and place of deposition "

Every Job requirement Particular Workability
Right workability → durability → Economy
Workability → Perameter → A mix designer must Satisfy → in mix design → with proper understanding of type of work
Distance of transport - loss of slump.
Method of placing.

: Fectors affecting workability:

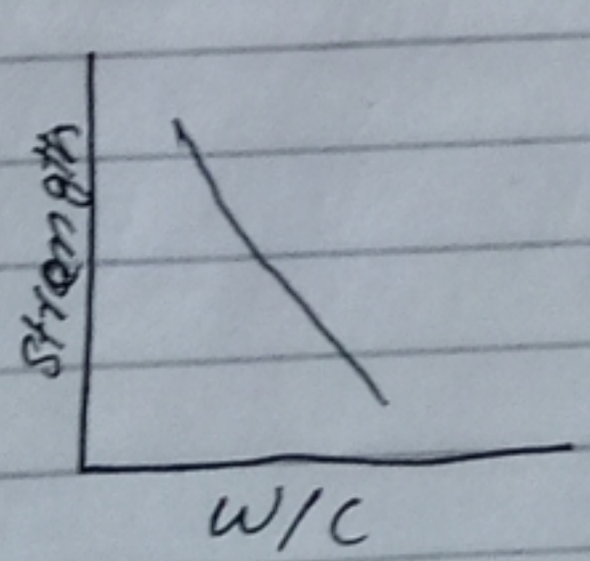
→ Water Content
→ Mix Proportion
→ Siz of aggregates
→ Shape of aggregates
→ Surface texture of Aggregates.
→ Gracling of aggregates
→ use of Admixture.

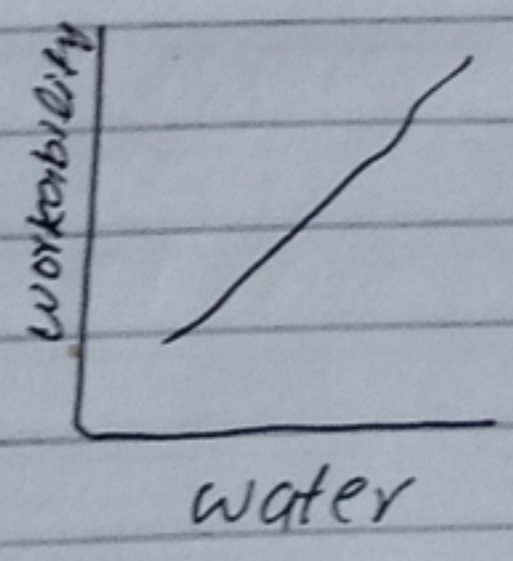
Water Content:

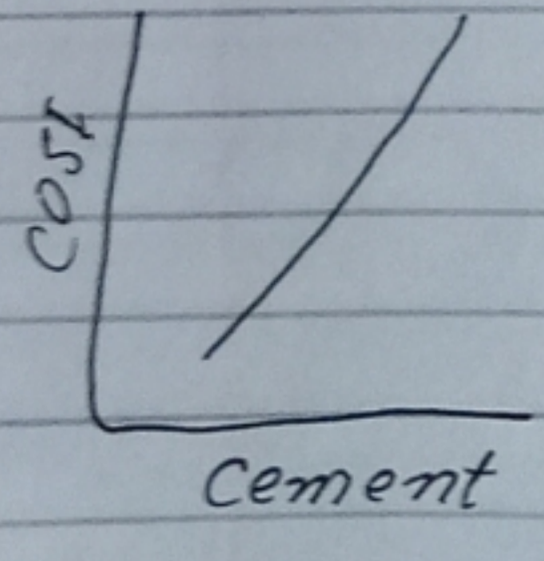
Higher water Content → Higher fluidity → greater workability, increase in water → bleeding → escape of water through joints of formwork.

Mix proportion:

The ingredients of concrete can be proportioned by weight or volume. the goal is to provide desired strength and workability at minimum expense. As mentioned previously, a low water-to-cement ratio is needed to achive strong concrete. It would seem therefore that by merely keeping the cement content high one could use enough water for good workability and still have a low W/C ratio. The probem is that cement is the most costly of the basic ingredients. The dilemma is easily seen in the schematic graphs of Figure 3







Size of aggregates:

Since larger agregate sizes have relatively Smaller Surface areas (for the Cement Paste to Coat) and since less Water means less Cement, It is offter Said that one Should use the largest practical aggregate size and the Stiffest practical mix. (most building elements are Constructed with a maximum aggregate size of 3/4 1 in, larger sizes being prohibited by the Closeness of the Closeness of the renforcing bars.

Shape of aggregates:

Angular aggregates: Increased flakness or elongation, reduces workbility.

Round smooth aggregates: require less water for lubrication and gives Greater workability with a given W/C ratio.

Surface tenture of aggragates.

Porous aggregates: need more water as Compared to non absorbent aggregates for achieving same degree of workility.

Seconclary important factor:

Greading of aggregtes:
important factor →
→ maximum influence on workability
→ well graded aggretes.
→ least amount of voicls a given volume
→ less voicls
→ mix is Cohisive
→ Prevent segregation

*use of admixture:

use of air entraining agent: increase mobility decrease bleeding / segregetion. Fine pozzolanic materials give better lubricating effect and increase workability. A good concrete is one which has workability in the fresh state and developes adequate strength. Maximum strength of concrete can only be obtained, if the concrete has adequate degree of workability in relation to the method of compaction to be used. Concrete which is to be compacted by mechanical vibrator will need 15% less water and 15% less cement as compared to the one which has to be compacted by hand.

Q NO #03 What is the property of fresh concrete? Explain in Brief.

ANS:

PROPERTIES OF FRESH CONCRETE

Concrete Remain in it fresh state from the time it is mixed until it sets. During this time the concrete is handled, transported, Placed and Compacted. properties of concrete in its fresh state are very important because the influence the quality of the hardened Concrete. The fresh concrete has the following procedures.

* Consistancy
* Workability
* Settlement & Bleeding
* Plastic Shrinkage
* Loss of Consistancy

(1) CONSISTANCY :→

Consistancy of a Concrete mix is a measure of the stiffness OR sloppines OR fluidity of the mix. for effective handling, placing and Compacting the Concrete Consistency

must be same for each batch. It is therefore necessary to measure Consistency of Concrete. at Reguler intervals. slump test is commonly used to measure Consistency of concrete.

(2) WORKABILITY:→

The workability of a Concrete mix is the Relative ease with which Concrete can be placed, Compacted and finished without Separation OR Segregation of the individual materials. workability is not the same thing as Consistency. Mixes with the same consistency can have different workabilities. if they are made with the different sizes of stone. The smaller the stone the more workable the concrete. It is Not possible to Measure the workabilities but the slump test, together with an assessment of properties like stone Content. Cohesiveness and plasticity, gives a useful indication.

(3) SETTLEMENT AND BLEEDING.

Cement and aggregate particales have densities about three time then that

of water. In fresh concrete They consequently tend to settle and displace mixing water which migrates upward and may collect on the top surface of the concrete. This upward movement of mixing water is known as bleeding water that separates from the rest of the concrete is called bleed water.

(4) PLASTIC SHRINKAGE :→

If water is Removed from the compacted concrete before it sets. the volume of the Concrete is reduced by the amount of water remaved. This volume reduction IS Called Plastic shrinkage. water may be Removed from the plastic concrete by evaporation OR by absorbed by dry surfaces such as Soil OR old concrete OR by the dry wooden form work.

(5) SLUMP LOSS :→

From the time of Mixing fresh Concrete gradually losses consistancy This Gives rise to the problem

only if the concrete becomes too stiff to handle, place and compact properly.

Slump loss in concrete is caused due to the following Reasons

* Hydration of cement (Generation more heat)
* Loss of water by evaporation
* Absorption of water by dry aggregates.
* Absorption of water by surfaces in contact with the concrete.