

MID TERM EXAM.NAME:: HAMAD - UR - RAHMANID:: 7669Subject:: Concrete Technology.Teacher:: Eng1. Humaira ArshadDate:: 20/08/2020.Semester:: Senior.

Q1):- Discuss in brief types of admixtures used in concrete::

Ans:: Various types of admixtures are used in concrete to enhance the performance of concrete. Concrete admixture is defined as the material other than the aggregate, water and cement added to the concrete.

### \* Types of Concrete Admixtures::

Following are the types of concrete Admixtures.

- 1). Accelerating Admixtures.
- 2). Retarding Admixtures.
- 3). Water Reducing Admixtures.
- 4). Air Entraining Concrete Admixtures.
- 5). Pozzolanic Admixtures.

## 1) Accelerating Admixture:-

Accelerating Admixtures can be used to increase either the rate of stiffening or setting of the concrete or the rate of hardening and early strength gain to allow earlier formwork striking and demoulding. Most Accelerators achieve one rather than both of these functions.

## 2) Retarding Admixtures:-

Retarding Admixtures are used to slow the rate of setting of concrete. By slowing the initial setting time, the concrete mixture can stay in its fresh mix state longer before it gets to its hardened form.

### 3) Water Reducing Admixtures:-

Water reducers, retarders, and superplasticizers are admixtures for concrete, which are added in order to reduce the water content in a mixture or to slow the setting rate of the concrete while retaining the flowing properties of a concrete mixture.

### 4) Air-Entraining Admixture:-

It is an admixture that causes the development of a system of microscopic air bubbles in cement paste during mixing, usually to increase its resistance to freezing and thawing and to improve workability.

## 5) :: Pozzolanic Admixtures ::

Typically pozzolans are used as cement replacements rather than cement additions. Adding pozzolans to an existing concrete mix without removing an equivalent amount of cement increases the paste content and decreases the water / cement ratio.

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QNo: 2):- Define Workability of concrete and factors affecting on workability.

Ans: Workability of Concrete:

The ease with which a concrete can be compacted 100% having regard to the mode of compaction and place of deposition.

Factors Effecting Workability:

- 1). Water Content
- 2). Mix Proportion.
- 3). Size of Aggregates
- 4). Shape of Aggregates.
- 5). Surface Texture of Aggregates.
- 6). Grading of Aggregate.
- 7). Use of Admixture.

## 1) Water Content:

If the water is high than the required amount of water content in a mix. Then it will have greater workability. It will leads to bleeding of concrete. And the water will escape through the joints of formwork. There will be w/c Ratio.

## 2) Mix Proportion:

The ingredients of concrete can be proportioned by weight or volume. The goal is to provide the desired strength and workability at minimum expense.

A low water to cement (w/c) ratio is needed to achieve strong concrete.

### 3) Size of Aggregates:

Larger Aggregates sizes have relatively smaller surface areas (for the cement to coat), and since less water means less cement; it is often said that one should use the largest practical <sup>aggregate</sup> size and the stiffest practical mix.

### 4) Shape of Aggregates:

Angular Aggregates, increased flakiness or elongation, and it reduces workability. And on the other hand Round Smooth aggregates, require less water for lubrication and gives greater workability with a given w/c ratio.

### 5) Surface Texture of Aggregates:

We know that porous aggregate require more water as compared non-porous aggregates for achieving same degree of workability.



## 6). Grading of Aggregates:

- 1). It is one of the important of all of the above.
- 2). It has maximum influence on workability.
- 3). We shall use well graded aggregates.
- 4). There should be least amount of voids in a given volume.
- 5). We should prevent segregation.
- 6). Cohesive Mix.

## 7). Use of Admixture:

Use of Air entraining agent increase mobility workability, decrease bleeding / segregation.

Using of Fine pozzolanic materials give better lubricating effect and increase workability.

A Good concrete is one which has workability in the fresh state and develop adequate strength.

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Q No: 3) :: What are the properties of fresh concrete.

Ans: Properties of Fresh Concrete:

Concrete remains in its fresh state from the time it is mixed until it sets. During this time, the concrete is handled, transported, placed and finally compacted. Properties of fresh concrete are very important because it influence the quality of hardened concrete.

Following are the some of the properties of fresh concrete.

- 1). Consistency.
- 2). Workability.
- 3). Settlement and Bleeding.
- 4). Plastic Shrinkage.
- 5). Loss of Consistency.

## 21. Consistency:

It is one of the important property of fresh concrete. It is the measure of stiffness or sloppiness or fluidity of the mix. For effective handling, placing and compacting the concrete, consistency must be the same for each batch. Slump test is commonly used to measure consistency of concrete.

## 21: Workability:

It is the relative ease by which concrete can be placed, compacted and finished without separation or segregation of the individual materials. Mixes with the same consistency can have different workability. If smaller the stone in aggregate more workable the concrete.

### 3). Settlement And Bleeding:

Cement and aggregate particles have densities about three times 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 concrete. This upward movement of mixing water is known as bleeding. Water that separates from rest of the concrete is called Bleed water.

### 4). Plastic Shrinkage:

As the water is removed from the compacted concrete before it sets, the volume of the concrete is reduced by the amount of water removed. This volume reduction is called Plastic Shrinkage.



## 5) Slump loss:

From the time of mixing, fresh concrete gradually loses consistency. It will give rise to the problem only if the concrete is too stiff to handle, place and compact properly.

It will cause due to following reasons.

- 1). If loss of water by evaporation.
- 2). Hydration of Cement (Generating more heat).
- 3). If there will be Absorption of water by surfaces in contact with concrete.
- 4). If the Aggregate will be dry it will absorb water from the mix.