2% for F.A ⇒

⇒ 2/100 × 656.90 = 13

Net Qty of water = 185 + 11.0

∴ Mix of C.A = 1104 + 11.0

Name # Zakirullah

Student ID# 16074

Section # A

Subject # Concrete technology

Teacher Name # Usma Ali

Exam # Final

Q1:- (a) **What is Re-Tempering of concrete? In which Case IS Re-Tempering of concrete Done?**

Answer:- **Re-Tempering of Concrete:-**

* The process of remixing of water to concrete in addition to required quantity of water is known as re-tempering of concrete Some times, extra cements is also added while re-tempering.
* Re-tempering is done owing to loss of workability or undue Stiffness of concrete at actual side in case of long tunnels, road construction etc. where batching Plant is few kilometers away.

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2% for F.A ⇒

⇒ 2/100 × 656.9

Net Qty of water = 185

(b) :- What Is the Normal RPM of the Agitator of A Transit Mixer? What is the minimum limitation of Total revolutions of Agitator In A Transit Mixer Set BY Astm Before Concrete Placement?.

Answer:

For agitating, a range from 2 to 6 RPM is sufficient. For mixing the concrete drum must turn faster, with a maximum of 12 to 18 RPM. Adjust the rotation speed to the flow rate of the concrete pumping equipment. So as not to exceed the 300 rotations ACI recommended during the complete loading, transport, and unloading cycle, You should calculate the rpm used during loading & transport so that the available margin required for unloading the mixture can be adjusted to the pump flow.

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$\Rightarrow \frac{2}{100} \times 656.90$

Net Qty of water = 185+

Net Qty of C.A = 1104+

Net Qty of F.A = 656

Then Cement =

Q3 :- What Do you Mean By Endurance level? What is the Endurance level of concrete And Steel ?.

Answer :- The fatigue strength (S) decreases as the number of cycles (N) increases. The minimum value of S below which failure does not occur is known as endurance level. For Steel S = 0.5 x Strength. Concrete does not have a minimum endurance level.

(b) What is The Difference Between Attrition And Erosion of Concrete ?.

Answer :- Sliding and scraping of concrete surface can cause attrition, and in hydraulic structures, action of water can cause erosion of concrete.

(c) What steps I should Be taken to Improve Bond Strength of Reinforcement in concrete ?.

Date:__/__/__

Answer:-

- The Bond Strength increase with increase in compressive Strength of concrete.
- Deformed (ribbed) bars should be used to increase friction between reinforcement & concrete.

Q 4:- What is Creep? What are the Factors Affecting Creep? What Difference is Between Creep And Strain Relation.

Answer:-

Creep:-

The increase in Strain of concrete with in Passage of time under Sustained Stress is known as creep.

⇒ **Factors Affecting Creep:-**

- Stiffer the aggregate lower the creep. more the content of Aggregate per unit volume of concrete, lower the creep.
- Decrease in w/c causes decrease in creep — In other words Strength & creep and inversely proportional.

creep also depends on the type of cement. High alumina cement experience less creep as compared to Ordinary Portland Cement.

⇒ **Difference IS Between Creep And Strain Relation.**

- In Statically indeterminate Structures the creep may relieve (by relaxation) the stress concentration induced by Shrinkage, temperature changes etc.

Q5:- What is the Difference Between Drying Shrinkage And Plastic Shrinkage? Is Drying And Plastic Shrinkage Reversible?

Answer:-

Difference Between Drying Shrinkage And Plastic Shrinkage:-

Drying Shrinkage:-

* Withdrawal of water from hardened Concrete causes drying Shrinkage.
* A Part of drying Shrinkage is reversible through moisture movement (40 to 70 %).

Plastic Shrinkage:-

* Plastic Cracking (Plastic Shrinkage Cracking) is cracking that occurs in the Surface of the fresh Concrete Soon after it is Placed & While it is still Plastic.

Drying And Plastic Shrinkage Reversible.

Drying and Plastic Shrinkage is not reversible.

Q6:-

(a) What Are Risks To Concrete Structure Exposed To Sea water? How Do You Increase Resistance of Concrete to Sea water?

Answer:- **Concrete Structure Exposed To Sea water:-**

* In addition to Sulphates present in Sea water, Chlorides are also present. The Present of Chlorides Prevents expansion of concrete unlike Sulphate attack, but increase Posity of concrete over time, resulting decreas in Strength.

⇒ **Increase Resistance of Concrete To Sea waters:-**

* Expansion of Concrete above high level of water due to Crystallization of Percolated Salt can occur which can be prevents by making concrete impermeable. Concrete Subjected to alternate wetting & drying is severely attacked. While concrete that is constantly wet is least affected.

Day: M T W T F S Date: __/__/__

Page (8)

* Concrete exposed to sea water should have w/c below 0.45, it should have low Permeability, It should be well compacted with good workmanship, especially in the construction joints.

Solution:-

(1) Slump — 50 mm

(2) Required quantity of water from table # 19.4

$W = 185\ kg/m^3$, C.A = 2%

(3) aggregate size = 25mm

(4) Find area Strength of concrete

$f_m = f_{min} + k \cdot s$

f_{min} x + y + 15 ⇒ (my id #16074)

than,

$f_{min} = 9 + 5 + 15 = 29\ C/PA$

$f_{min} = 29\ C/PA$

$f_m = f_{min} + 8.5 \Rightarrow f_{min} = 1.1 \times f_{min} + 5$ for 21 C/PA < f_{min} < 35 C/PA

(5) w/c ratio

The table 19.1 S.# 1 and 2

$$= \frac{41.4 - 34.5}{0.48 - 0.41} \times \frac{37.5 - 34.5}{0.48 - x}$$

$$= \frac{5.9}{0.07} \times \frac{2}{0.48 - x}$$

$$= (0.48 - x)(5.9) = (2)(0.07)$$

$$\Rightarrow (0.48 - x) = \frac{2 \times 0.07}{5.9}$$

$$= 0.48 - x = 0.035$$

$$= 0.48 = 0.035 + x$$

$$= 0.48 - 0.035 = x$$

$$= x = 0.44$$

$$= w/c \text{ ratio} = 0.45$$

$$0.48 - 0.0023 = x$$

$$x = 0.45$$

(6) Qty of Cement $\Rightarrow$ w/c ratio

$$= 185/0.45 = 411.11 \text{ kg/m}^3$$

(7) Qty of C.A from Tab# 19.9

C.A = 0.69

weight of = 0.69 × bath of C.

= 0.69 × 1600 = 1104 kg/m³.

(8) Qty of F.A by volume method

weight of C.A ⇒

$$\Rightarrow 2.65\left(1000 - \left(\frac{411.11}{3.15} + \frac{185}{1} + \frac{1104}{2.65} + 20\right)\right)$$

$$= 2.65\,(1000 - (752.11))$$

C.A = 656.90

for 0/0 of C.A ⇒

$$\frac{1}{100} \times 1104 = 11.04 \text{ kg/m}^3$$

2% for F.A ⇒

$$\Rightarrow \frac{2}{100} \times 656.90 = 13.13 \text{ kg/m}^3.$$

Net Qty of water = 185 + 11.04 − 13.13 = 182.91 kg/m³

Net Qty of C.A = 1104 + 11.04 = 1115.04 kg/m³

Net Qty of F.A = 656.90 + 13.13 = 670.03 kg/m³

Then Cement = 411.11 kg
Water = 182.91 kg
C.A = 1115.04 kg/m³
F.A = 670.03 kg/m³

Day: M T W T F S Date: __/__/__

Q2:- What will be the expected loss in strength of 3000 psi concrete if it curing has not been performed?.

Answer:- it will take ~~the~~ longer than 28 days for the concrete to cure and will produce a weaker and easier to scar structure if it was not cured properly.

When concrete is not cured properly its durability strength and abrasive resistance are affected.

When the surface of concrete is not kept moist within the first 24 hours after the casting the evaporation from the exposed horizontal surface results in plastic shrinkage cracks and a week dusty surface.

(b) **Endurance level of Concrete:-**

The endurance limit for concrete as the stress level below which it can withstand the threshold fatigue life of 2 million loading cycles. they observed

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C.A = 1115
F.A = 676

that the sample which did not fail within 2 million cycles, even sustained 4 million load cycles.

Part (C)

(C):- Strength retrogression:-

* Strength retrogression is defined as a change in the hydration products that are formed when cement is exposed to high temperatures (>110°C/230°F). It can be described as a decline of cement strength at elevated temperatures where decreased strength is observed with increasing time.

* When strength retrogression occurs, not only is there a reduction in the strength of cement, but also an increased in permeability which compromize zonal isolation.

Water - 115
C.A = 1115