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ID NO : 16317

Section : A

Subject : Concrete Technology

Q1:- What re-tempering of concrete in case is re-tempering of concrete done? (b) what is the normal RPM of the agitator of a transit mixer? what is the minimum limitation of total revolution of agitator in a transit mixer set by ASTM before concrete placement?

Ans: When water is added to a stiffened concrete or partially set fresh concrete in order to bring it back to the desired consistency or workability, then it is called "retempering of concrete".

(b) 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.

are usually required to produce the specified uniformity. No more than 100 revolutions at mixing speed should be used. All revolutions after 100 should be at a rate of rotation.

Agitating Speed:

Agitating speed is usually about 2 to 6 revolutions per minute and mixing speed is generally about 6 to 18 revolutions per minute. Mixing for long period of time at high speed, about 1 or more hours, can result in concrete strength loss of entrained and accelerated slump loss, temperature rise.

Concrete, mixed in a transit mixer should be delivered and discharge within $1\frac{1}{2}$ hours or before the drum has revolved 300 times after the induction of water to cement and the cement to the aggregate. Mixer and agitator should always be operated within the limit of the volume and the speed of rotation designated by the equipment manufacturer.

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Q2: what will be the expected loss in strength of 3000psi concrete if its curing has not been performed?

Ans:- 40% strength loss of 3000psi concrete if its curing has not been performed.

(b) what is the percentage efficiency of membrane curing as compared to water curing?

Ans:- Using membrane curing compounds, an efficiency of 80-90% can be achieved as compared to conventional water curing.

(c) What is meant by retrogression of strength in concrete? which method promotes retrogression in concrete strength?

Ans:- Strength retrogression is defined as the change in the hydration product that formed when cement is exposed to high temperature ($>110^{\circ}\text{C}$ / 230°F) it can be described as a decline of cement strength at elevated temperature where.

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decreased strength is observed with increasing time.

Real-time Monitoring with Concrete Sensors:

Lumicon concrete sensor provide real time insight into concrete temperature, maturity, and concrete strength along with full visibility into temperature differential and relative humidity.

Q3: What do you mean by endurance level? what is the endurance level of concrete?

Ans: Endurance can be defined as the ability to continue to endure a stress, hardship or level of suffering. In the context of sport endurance is the ability to sustain a specific activity.

Endurance limit expressed as a percentage of modulus of rupture of plain concrete the endurance limit (ELI) is defined.

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as the maximum flexural fatigue stress at which beam could withstand 2 million cycles of nonreversed fatigue loading, expressed as a percentage of modulus of rupture of Plain Concrete.

b) what is the difference b/w attrition and erosion of concrete?

Ans: Both abrasion and attrition refer to the wearing down of an object... However, attrition refers to the breaking off of particles (erosion) which occurs as the result of object hitting against each other. Abrasion leads to surface-level destruction over time, whereas attrition results in more change at a faster rate.

c) what step should be taken to improve bond strength of reinforcement in concrete?

Ans:- The use of methylcellulose (0.4% to 0.8% by weight of cement) as an admixture in cement paste or concrete was found to increase

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the shear bond strength with steel reinforcing bar, steel fiber or carbon fiber to value attained by using latex (20% by weight of cement) as admixture even though latex was used in a much larger quantity than methylcellulose. The bond strength increased with increasing methylcellulose amount.

Q4: what is creep? what are the factors effecting creep? what difference blw creep and stress relaxation?

Ans: Creep is a type of metal deformation that occurs at stresses below the yield strength of a metal, generally at elevated temperatures.

Ans: Creep can be defined as the elastic and long term deformation of concrete under a continuous load. Generally, a long term pressure change the shape of concrete structure and the deformation occurs along the

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the direction of the applied load. When the continuous load is removed, the strain is decreased immediately.

OR

The increase in strain of concrete within passage of time under sustained stress is known as Creep.

: Factors effecting Creep:

→ Stiffer the aggregate lower the creep. More the content of aggregate per unit volume of concrete lower the creep.

→ Decrease in w/c cause decrease in creep. In other word strength and creep are inversely proportional.

Creep is smaller when concrete is cured at high temp because strength is higher than when cured and loaded at high temp.

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Creep also depend upon the applied stress. the relation is directly proportional.

→ Creep also depend on the type of cement experience less creep as compared to ordinary portland cement.

Difference between creep And stress relaxation :-

Two terms are sometimes used interchangeably, although they are really different. Creep is an increase in plastic strain under constant stress. Stress relaxation is a decrease in stress under constant strain. ∴ Creep is an increased tendency toward more strain and plastic deformation with no change in stress.

Q5: What is the difference b/w drying shrinkage and plastic shrinkage? is drying and plastic shrinkage reversible?

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Plastic Shrinkage

Drying Shrinkage

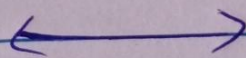
→ if the volume reduction occurs before the concrete has hardened it is called Plastic Shrinkage

→ it's an initial stage as soon as you start placing concrete, due to hydration of cement the concrete starts gaining strength by losing moisture content.

The volume reduction that occurs primarily due to moisture loss after the concrete has hardened is known as drying shrinkage.

it's a long term process. Here the loss of moisture content is very less because 90% moisture will get dry during the time of plastic shrinkage only.

IS Shrinkage in concrete a totally reversible process in this way dry and plastic shrinkage are reversible.



1) Slump requirement \rightarrow 50mm.

2) Find maximum aggregate size \rightarrow 25mm

3) Find require quantity of water from table 19.4.

$$w = 180 \text{ kg/m}^3, \text{ A.C} = 1.5\%$$

4) Find Average strength of concrete.

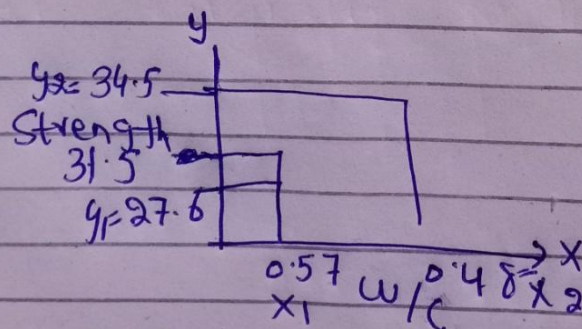
$$f_m = f_{min} + k \cdot S \quad \text{for } f_{min} < 28 \text{ MPa}$$

$$f_m = 23 \text{ MPa} + 7 = 30$$

$$f_m = 23 \text{ MPa} + 8.5 = 31.5.$$

5) w/c Ratio

Use table 19.1



$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{y - y_1}{x_2 - x_1}$$

$$\frac{34.5 - 27.6}{0.48 - 0.57} = \frac{31.5 - 27.6}{0.48 - x}$$

$$\frac{6.4}{0.08} \neq \frac{3.9}{0.48x}$$

$$(6.4)(0.48x) = (3.9)(0.08x)$$

$$3.072 = 0.312x$$

$$x = \frac{3.072}{0.312}$$

$$x = 9.84615$$

Find the quantity of cement

$$w/w_c = \text{Quantity of cement}$$

$$\frac{180}{9.84615} = 18.28$$

Find the quantity of coarse aggregate

19.9 table

$$C.A = 0.69$$

$$\text{Weight of CA} = 0.64 \times \text{Bulk density}$$

$$= 0.64 \times 1600 \text{ kg/m}^3$$

$$= 1024 \text{ kg/m}^3$$