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1) (a) What is re-tempering of concrete? In which case is re-tempering of concrete done?
(b) What is normal RMP of the agitator in a transit mixer? What is the minimum [illegible] concrete placement?

a) Retempring of Concrete:

The process of remixing of water to concrete, in addition to required quantity of water as retempering of concrete. Sometime, extra cement is also added while retempering.
Retempering is done owing to loss of workability or undue stiffness of concrete at atual side is case of long tunnels, road construction etc. Where batching plant is few kilomete away.

b For agitating, a range from 2 to 6 rpm is sufficient. For mixing the concrete drum must turn faster, ~~with~~ with a maximum of 12 to 18 rpm.
Transit mixers have capacity ranging from 4-7 m^3. Speed of agitor varies from 2 to 5 rpm. A limit of 300 revolutions has been set by ASTM before placing.

2 b What is the percentage efficieney of membrane curing as compared to water curing?
Membrance curing is 80% effiecient as compared to water curing.

c What is meant by retrogression of strength in concrete? Which method of curing promotes retrogression in concrete strength?
Retrogression of strength in concrete is defined as a change in the hydration products that are formed when cement is exposed to high temperature (>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.
Steam curing a ordinary pressure is the method used to promotes ie trogression in concrete strength.

9 What will be the expected loss in stregh of 3000 psi concrete if it curing has not been perfomed at all?
It will take longer then 28 days for the concrete to cure and will produce a weaker & easier to scar structure if it was not cured properly. When concrete is not cured properly, it durability, strength & abressive resistance are affected. When the surface of the concrete is not kept moist with in the first 24 hours after the casting, the evoporation from the exposed horzontal surface results in plastic shrinkge crack & a weak & dusty surface.

4 What is creep? What are the factors affecting creep? What difference is between creep & stress relaxation?

Creep:

* The in strain of concrete with in passage of time under sutained stress is known as creep.
* All material exhibit the phenomenon of creep, but in concrete its considerably more.
* The deformation of material under design stress is trumed elastic & the susequent incresse in deformation under sustained design stress in creep.
* If a loaded concrete specimen is retrained in such a way that stain over time remains constent, creep will manifest it self in the form of progressive defrease in stress over time. this term as relaxation.
* Creep is not a completely reversible phenomenon.

Factor effecting Creep:

* Stiffer the aggregate lower the creep. More the content of aggregete per unit volume of concrete, lower the creep.
* Decrease in W/C causes decrease in

creep. In other other words strength & creep & inversely proportional.

* creep is smaller when concrete is cured at high temperation because strength in higher than when cured & loaded at higher temperature
* Creep also depends upon the applied stress. The relationship is directly proportional.
* Creep also depends on the type of cement. High alumina cement experiences less creep as compared to ordinary portland cement.

Difference between Stress relaxation & creep:

Creep:

Creep is an increase tendency toward more strain & plastic deformation with no change in stree

Creep is an incresse in plastic strain under constant stress. Creep is usually enpressed in percent of deformation after the part is loaded rather than the unloaded dimenslons.

Creep is, expressed as a percent, equal total deformation minus initial deformation devided by initial deformation, time loo

Stress relexation:

Stress relaxation is a decrease tendency for the material to return to its original shape when unloaded.

Stress relaxion is a decrease in stress under constant strain. It usally express in terms of percent stress ramaining after an aribitary length of time at a given temperature. Stess relaxation is the loss is stress when it is held at a constant strain over a period of time.

3(a) What do you mean by endurance level? What is the edurance level of concrete and steel.

Endurance lvel:

Endurance level is defined as the maximum value of completely reversed bending stress that a material can with stand for a finite number of cycles without a fatigue failure. Endurance also rated to sufference, resilience, constitution, fortitude & hardiness which is the ability of an organism to exert itself & remain active for a long time period of time.

as well as its ability to resist, withstand, recover from, & have immunity to trauma, wounds or fatigue.

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 that the sample which did not fail with in 2 million cycles, even sustained for million loads cycles.

Endurance level of steel:

An endurance or fatigue limit which is defined as the maximum stress below which the steel could persumeably endure and infinite numbers of cycles is dicussed. A simple rule of thumb calculation for the fatigue limit is one-half of the ultimate tensile strengths of 150,000 psi or 150ksi (1,034 MPa). A fatigue limit of 100 ksi appears to be maximum value that can be obtained for steel For a largue numbers of steels, there is a direct correlation between tensile strength & fatigue strength; Higher-tensile-

- stength steel have higher endurance limits. The endurance limit is normally in the range of 0.35 to 0.60 of the tensile strength

(b) What is the difference between attrition & erosion of concrete?

Attrition of Concrete:

An attrition test is a test carried out to measure the resistance of a granular material to wear. The test it self involves agitating the particles, typically by tumbling with in a drum, vibration, or with jets of gase to simulate a fludized bed. After a specifies time, the material is sieved and the sieved material weighed to measure the proportion of material which has been reduced to below a certain size (reffered to as "fines") An example of a material subjected to an attretion test are stones used in road construction, indecating the resistance of the material to being broken down under road traffic.

Erosion of Concrete:

Erosion is the deterioration of a concrete surface as a result of particles in moving water scrubbing the surface. Erossion is one form of wearing of concrete that is observed in contact with flowing water. The water body that results erosion may carry solid particles which leads to serious erosion to concrete.

C What steps were taken to improve bond strength of reinforcement of concrete?

Amswer:

Proper reinforcement placement is critical for many reasons, including concrete bond. Bond length increase with increasing methile cellulose amount. The combined use of salica fume (15% by weight of cement) & methylcellulose (0.4% by weight of cement) as admixtures was found to give concrete that exhibited high bond strength

to steel reinforcing bar, in addition to previously reported high tensile modulus, tensile ductility flexural strength & flexural tougness; the bond strength attend was higher then that attained by using either silica fume or methyl cellulose as admixture.

Q5 What is the difference between dring shrinkage & plasic shrinkage? Is drying and plastic shrinkage revesible?

Plastic Shrinkage:

If the volume reduction occurs before the concrete hardens it is called plastic shrinkage.

Plastic shinkage is caused by the loss of water by evaporation from the surface of newly laid concrete or by suction of dry concrete underneath. At the surface, plastic shrinkage occurs when the rate of evaporation exceeds the rate of bleeding.

Plastic shrinkage cracks appear in

in the first few hours after concrete placement & typically before the finishing operation are complete. It can be prevent by cover concrete with wet burlap or polythylene sheets between finishing operation. Use cooler concrete in hot weather & avoid excessively high concrete temperatures in cold weather. Cure properly as soon as finishing has been completed.

Drying shrinkage:

It is results from the loos of capillary water from the hardened cement mixture, leading to contraction & crack formation with in concrete. According to the previous studies, the addition of plant fibers, such as sisal, to cement mortar increases its drying shrinkage. It is also defined as the contracting of a hardened concrete mixture due to the loss of capillary water. This shrinkage causes an increase in tensile. Cracks formed by restrain to volume changes caused by loss of excess water. The time

at which shrinkage cracks occure depend on the rate of drying.
Yes it is revesible.
A pait of drying shrinkage is revesible through moisture movement (40 to 70%)

Q6 a What are visks to concrete structure exposed to sea water? How do you increase resistance of concrete to sea water?

Answer:

Sulfates attack the concrete and cause expansion but due to the presence chlorides in seawater the swelling of concrete retards. The presences of chlorides prevents expansion of concrete unlike sulphate attack, but in increase porosity of concrete overtime, resulting decrease in strength. Expasion of concrete above high level of water due to crystallization of perlocated salts can occur which can be prevented by making concrete impermeable. Concrete subjected to alternate wetting & driging is severely

attacked, while concrete that is constantly wet is least affected. Concrete exposed to sea water should have W/C below 0.45, it should have low permeability, it should be well compacted with good work man ship, especially in the construction joints.

6 b

Step 1

1 Slump = 50 mm

2 size of aggregate = 25 mm

3 water cement using table 19.4

$w = 180 \ kg/m^2$

A.C = 1.5%.

Now

Averege strength of croncrete =

$f_m = f_{min} + k.s$

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$x = 7$

$y = 2$

$f_{min} = 7 + 2 + 15 = 24$ MPA

21 MP < F_{min} < 35 MPa

$f_m = 24 + 8.5$

$= 32.5$

(4) b/f ratio 19.1

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

$$\frac{(41.4 - 34.5)}{0.48 - 0.41} = \frac{32.5 - 34.5}{0.48 - x}$$

$$\frac{6.9}{0.07} = \frac{-2}{0.48 - x}$$

$$(6.9)(0.48 - x) = -2 \times 0.07$$

$$0.48 - x = \frac{-2.07}{6.9}$$

$$0.48 - x = -0.3$$

$0.48 + 0.3 = x$

$x = 0.51$

5) Quantity of cement

$\frac{W}{w/c}$ = Quantity of cement

$\frac{180}{0.51} = c$

$c = 352.94 \text{ kg/m}^3$

~~weight of C.A =~~

6) C.A = 0.69

weight of C.A = $0.69 \times 1600 \text{ kg/m}^2$

$= 1104 \text{ kg/m}^2$

7 Find the quantity of F.A volume method.

weight of CA = 0.69×1600

$= 1104 \text{ kg m}^3$

8) Find the quantity of F.A by volume method

weight of CA $\left(1000 - \frac{352.94}{3.15} + \frac{185+1104+25}{2.65}\right)$

$= 2.65 \times (1000 - 7$

$= 2.65 \times ($

$=$