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Section A

SUBJECT CONCRETE TECHNOLOGY

DEPARTMENT CIVIL ENGINEERING

SUBMITTED TO SIR USAMA

Question 1

1. What is re-tempering of concrete? In which case is re-tempering of concrete is done?
2. What is the normal rpm of the agitator of a transit mixer set by astm before concrete placement?

Re-tempering of concrete:

When water is added to a stiffened concrete or partially set fresh concrete set fresh concrete in order to bring it back to the desired consistency or workability, then it is called retempering of concrete. The one and only reason for retempering of concrete is to make it usable. The reason behind the workiblity loss is the delay between mixing of concrete ingredents and placing of concrete on actual site.

In which case retempering of concrete is done:

Re-tempering is generally prohibited. In view of the lack of knowledge regarding the effect of retempering the restriction has probable been necessary.

( b ) part of question 1:

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

Concrete mixers are design for a certain volume of concrete per batch. The mixing time of one to two minutes. Modern concrete batching is specified by the manufacture. Modern concrete batching have a mixing of thirty seconds.

Question 2

1. What will be the expected loss in strength of 3000psi concrete if it curing has not been performed at all?
2. What is the percentage efficiency of membrane curing as compared to water curing?
3. What is meant by retrogression of strength in concrete? Which method of curing promotes retrogression in concrete strength?

Answer

It will take a 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 effected.

part( b )

The result include that using the membrane curing componds an efficiency of 80 to 90% can be achieved as compared to conventional water curing.

part ( c )

The curing at high temperature can be cause retrogression in the strength which is refer to high strength in the early age due to the heating but lods in the strength of last age.

Question 3

1. What do you mean by endurance level? What is the endurance level of concrete and steel?
2. What is the difference between attrition and erosion of concrete?
3. What steps should be taken to improve bond strength of reinforcement in concrete?

Answer

Endurance level:

Endurance level is defined as the maximum value of completely reversed bending stress that a material can withstand for a finite number of cycles without a fatigue failure. Endurance also related to sufferance, resilience, construction, fortitude, and hardness which is the ability of an organism to exert itself and remain active for a long period of time, as well as its ability to resist, withstand, recover from, and have immunity to trauma. Wounds, or fatigue.

( b )

Attrition:

Sliding and scaping of concrete surface can cause attrition.

Erosion:

In hydraulic structures action of water can cause erosion of concrete.

( c )

Steps to improve strength:

Strength of bond depends upon the friction between steel and concrete. The bond strength increase with increase in compressive strength of concrete. Deformed bars’s should be used to increase friction between reinforcement and concrete.

Question 4

What is creep? What are the factors affecting creep? What differences is between creep and strain relaxation?

Creep: deformation of structure under sustain load. Basically, long term pressure or stress on concrete can make it change shape. This deformation usually occurs in the direction the force is being applied. Like a concrete column getting more compressed,or a beam bending. Creep does not necessarily cause concrete to fail or break apart. When a load is applied to concrete, it experience an instantaneous elastic strain which develops into creeps strain if the load is sustain.

Factor affecting creep:

Influence of aggregate:

Aggregate undergoes very little creep. It is really the paste which is responsible for the creep. However, the aggregate influences the creep of a concrete through a restraining effect on the magnitude of creep. An increase from 65 to 75 percent of volumetric content of the aggregate will decrease the creep by 10 percent.

Influence of mix properties:

The amount of paste content and its quality is one the most important factor influencing creep. A poorer paste structure undergoes higher creep. Broadly speaking, all other factors which are affecting the water cement ratio are also affecting the creep.

Influence of age:

Age at which a concrete member is loaded will have a predominant effect on the magnitude of creep. This can be easily understood from the fact that the quality of gel improves with time. Such gel creeps less, wheres a young gel under load being not so stronger creeps more

Differences between creep and strain relaxation: two terms are sometimes used interchangeably, although they are really different. Creep is an increase in plastic strain under constant stress. Strain relaxation is a decrease in stress under constant strain. Creep is an increased tendency towards more strain and plastic deformation with no change in stress.

Question 5

What is the difference between dying shrinkage and plastic shrinkage? Is drying and plastic shrinkage reversible?

Answer

Drying shrinkage:

Drying shrinkage is defined as the counting of a hardened concrete mixture due to the loss of capillary water. This shrinkage causes an increase in tensile stress, which may lead to cracking internal wraping, and external deflection, before the concrete is subjected to any kind of loading. All Portland cement concrete undergoes drying shrinkage.

Plastic shrinkage:

When concrete tensile strength is exceeded by an applied stress, a crack forms in the concrete. Concrete has a relatively low tensile strength compared to its compressive strength and experience a varity of volumetric changes depending on environmental condition, curing condition, and applied stresses.

Is drying and plastic shrinkage reversible:

In drying shrinkage, the excessive water which has not taken part in hydration process would migrated from interior of concrete core to the concrete surface. As a result of evaporation of the water moisture, the volume of concrete shrinks. The reduction in volume owing to moisture loss is termed shrinkage.

Question 6

1. What are risks to concrete structure exposed to seawater? How do you increase resistance of concrete to sea water?
2. Concrete is required for the internal columns of a building. The specified 28 days strength is (x+y+15) mpa (where x and y are the last two digits of your roll no) the following equation may be used to find average compressive strength.the slump required is 50mm and a miximum size of 25mm is required. The fine aggregate has a fineness modulus of 2.60.preliminary tests indicate that fa and ca have a specific gravity of 2.56 and 2.7 with 1 percent absorption in c.a and 2% free moisture in f.a the bulk density of c.a is 1600kgm find the required quantities of ingredents.

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