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ID16528 ANS EFECT OF FIRE .

PAPER Concreat technology

SUBMMITED to iqtidar sir

[Q NO 1] A

Spaling of concrele the spalling of concrete is the breaking and splitting of the concrete surface layers .

1 HEATING RATE The peobabiity of explosive spalling occur in creasing with the in creasing of the heating rate

2.EXPOSEURE OF DEMENT OF THE FIRE the more faces of steuctual elements are exposed to fire the probability of the spaling to occur increased

FOR EXAM,PLE sabs have better resistance then the beams this because thire is only one face of the stabs are exposed to fire on like beams 3 face expsed to fire

3AGE OF CONCRETE STRUCTURE.Most of the research papers in dicate that the probability of the concrete spaliling decrease whith the increasing of the seructure age this is because when the concrete structure oge increase the moisture comtemt is decreasing as a result of date signifcamt decrease well happened in the generated pore pressure and the intimal tansion stresses

4 AGGRE GATES TYPE The perobability of spalling decrease when low themal expansion aggregates are used

5 AGGREGATE SIZE most of research paper and the results on the experiments indicates that greater size of their oggregate more likely explosive concrete spaling is to accure

6 COVER TO REINTOR CEMENT it is founded that it the concrete cover with the thickness less then 15mm has high probability .for the spalling of the concretes cover .

2. SULPHAT ATTACK

1 Sulphate attack on concerte is a chemical breakdown mechanism where sulphate ions attack components of the cement paste

2 The compound responsible for sulphate attack on concrete are water soluble sulphate conytianing salts such as alkali earth [calcium magnesium ] and alkali [sodium potassium ] sulphates that are capable at of chemically reacting with components of concerte

FORMS OF SULPHATE ATTACK ON COCRETE

Sulphate attack on cocerte might show it self in different from depending on

The atmospheric environment which the concerete is exposed to

WHATE happens when sulphate get into concrete

When sulphates enters into concrete .

1 it combines with the concrete poste and begins destroying the paste that the concrete together as sulphate aries new compounds are formed otten called ettringite .

2 These new crystals accupy space and as they continue to form they cause the paste to crack further damaging the concrete

1.FORST ACTION …..

Is a magor souse of deterioration case of concreter a cold climates it takes ploce due to freezing are water within the concrete pores and cavites during extremely cold wether .

water on freezing expands and exerts pressure on the walls of the pores this cyclic freezing of water in the pres are responsible for the dedelopment of cracke of various nature in the concrete .

TO MINIMIZE FROST ACTION FOLLOWING MEASURES SHOULD LAKEN.

1 In could water the water cement ration should be kept as low as possible this wall not a low any extra water to remain within the concrete poces hence prost tormation well not takes placed .

2 Use good doinge and covering methods for removing any suface water from staying on the concrete during the cuing process

3 SULPHATE ATTACK

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FORMS OF SULPHATE ATTACK ON CONCREATE sulphate attack on concrete might show it self in defferent from depending on .

The chemical from of the sulphate ……

The atmospheric environment which the concrete is exposed

WHAT HAPPYENS WHEN SULPHATES GET INTO CONCRETE…

When suphates enters into concrete it combines with the concrete paste and begins destroying the paste that holds the concrete together as sulphate aies new compounds are formed atten callet ettringite these new crystals occupy space and as they continue to from they

couse the paste to cracke further damaging the concrete .

ALKILI AGGREGATE REACTION

Sodium and potassium hydroxides of cement capable of reaction with silica since amorphous silice is common component of many coarse aggregeates such on alkali aggregate reaction may create harmful effect on cement concrete thjis is because the gei like silicates structures produced by the abow reaction are quite weak and unstable and result in greater expansion .

These may be the couse of frequent cracking in some concrete for avoiding this reaction either the percentage of alkalies [ k2 o and na 20] has to be keept very low in the portiand cement or a graeat care has to

be taken for selecting aggregates free of silica .

QUESTION NO 2…..A…………..

RETARDING ADMIXTURES …

Retarding admixture are used to slow down the speed of the rection between cement and water by affecting the growth of the hydration products or reducing the rate of water penetration to the cement particles the use of a retarder will increase the setting time and may dely strength development of the concrete to allow the placing of a larg pour of concrete our several hours

To exiend the time between mixing and placing to prevent setting of the concrete in the truck in case of delay .

The primary ingredients used in air entraining admixtures are salts of vinsol resin synthetic detergents and salts of petroleum acids in cold weather water in concrete convertes in to ice as ice occupies more valume than liquid water so it exerts stress on surrounding concrete as a result concrete might crack but air bubbles in side the concrete provide space for the enhanced valume of ice and prevents cracks in the concrete .

PLASTISIZERS …….

Plastisizers are water reducers and superplasticizer or high range water reducers are chemical admixtures then that cane be added to concrete mixtures to improve its warkability .

TYPES…

1 Air – entraining Admixtures

2 Plasticizers

3 Rectarding Admixtures

4 Accelerating Admixture

5 Corrosion inhibiting Admixture

6 Water proofing Admixeture

7 Grouting Admixture

8 Mineral Admixtures

1 AIR –ENTRAINING ADMIXTURE

Air entraining admixtures are used to introduce and stabilize microscopic air bubbles in concrete

These are generally used to improve workability ease of placing in creased durability better resistance to frost action and reduction in bleeding

The common air entrain agents are natural wood resins neutralized vinsol resins polyethylene oxide poly mers and sulfonated compounds these bubbles are imtroduced by an air entraining agent tape of chemical that includes detergents .

GROUTHING ADMIXSTURE

it is apowerd admixture which can be used for making neat cementit ious grouts it comprises water reducing plasticizing agent

ADVANTAGES

1 higher strength

2 higher fluidity

3 lower permeability

4 reduced bleeding

CORROSION INHIBITING ADMIXTURES

The function of this type of admixture is to enhance the long term durability of reinforced concrete corrosion inhibiting admixture can sirnificantly reduce maintenaince cost of reinforced concrete structure life of 30 to 40 years

PLASTISZERS

Plasticizer or water reducers and superplasticizer or high rang water reducer are chemical admixture that can be added to concrete mixture toimprove mixture to improve its workability .plasticizer are commonly manufactured from pop lignosulfonates which is a by product from the paper industry

In ancient times the romans used animal fat milk and blood to improve workability of concrete mixer .

Q[2] [B]…………

ANS COMPACTION Factor test ..

Caculation of compaction fatore vaue

The compation factor is defined as the ratio of the weight of partial compacted concrete to the weight of fully compacted concrete it show compacted normaly to be stated to the nearest second decimal place

Compaction Factore value =[w1 –w]/[w2-w]

compaction Factor test

The Compacting Factor [CF ]= weirht of partially compacted concrete

 weight of fully compacted concrete

Workability slump [mm] c,F

Very low 0-25 0.78

 25-50 0.85

low 25-100 0.92

Medium 100-175 0.95

High

USES

Roads –pavement

Foudation Concrete

Reinforced Concrete

Reinforced Concrete [High Reinforcement]

SLUMP Test

Apparatus

1 slump cone inverted cone 300 mm [12in] of height . The base is 200mm [8in]] in diameyter and it has a smaller opening at the top of 100mm .

2 scale for and measurement

3 Temping rod [steel] 16mm diameter 60cm lenth.

PROCEDURE

1 THE BASE IS placed on a smmoth surface and the container is filled with concrete in three layers whose workability is to be test .

2 Each layer is temped 25 times with a standard 16mm [5/8in] diameter steel rod rounded at the end

3 After the top layer has been tamped the concrete is struk off level with trowel and tamping rod

4The the mould is removed by liftiung it slowly and carefully in a vertical direction .

Thisd allows the concrete to subsides this subsidence is referred as slump concrete .

Flow table Test

The flow table is wetted .The cone is placed on the follow table and filled with fesh concrete into layer each layer 25times tamp with tamping rod ,

The cone is lifted allowing the concrete to follow

The flow table is then lifted up several centimeters and then dropped causing the concrete flow alittle bit further

After this the diameter and of the concrete is measured in 6 different direction and take the average .

FIOW Table

FLOW present = Diameter of flow [cm] – 25 multiply 100

25

present of flow 0-20 per 20-60 per 60-100 per 100-120per 120-150per

Consistency … Dry …. stiff …. plastic …..Wet …… Sloppy.

KELLY Ball Test

DEFINITION….

Another method used in the field and laboratory to measure the consistency of concrete is ball penetration test which is also known as the Kelly ball test

Proceure…

IT is perfomed by measuring the penetration .IN inches of a 6- in . diameter steel cylinder with hemi spherically shaped bottom .weighing 30 lbs .

Advantages

1 one of avantage of the ball penetration test can be performed on the concrete in a wheelbarrow, or other suitable continer .

2 Another advantage of this method is its simplicity and the rapidity with which the consistency of the concrete can be determined .

3 IT is also note dependent on a procedure of filling and roding a continer like the slump test .

VEE BEE TEST

Difiniton ..1. IT is based on measuring the time [called VEBE TIME ] needed to transfer the shape of a concrete miux from a cone to a cylinder these shapes are standar dized by the apparatus of this tes . by vibrating and compacting the mix. The more VEBE time needed the less work able the mix is .this method is vary useful for stiff mixe.

Procedure …slump test as the scribed earlier is perfomed placing the slump cone in side the sheet metal cylindrical pot of the consiste meter

The electrical vibrator is then switched on and simultaneously a stop watch started .

The vibration is continued till such time as the conical shape of the concrete disappears and the concrete assume a cylindrical shape.

This cane be judge by observing the glass disc from the top disappearance of transparency .

Immediately when the concrete fully assume a cylindrical shape . The stop watch is switched off.

SQ [2] [B]

 SS