# Temperature Effect on Concrete Bridge

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**ABSTRACT:-** Expansion and shrinkage concrete has a very low coefficient of thermal expansion. However, if no provision is make for expansion, very large for us can be created causing shot in character of the social organization not capable of withstanding the force or the repeated cycles of expansion and condensation. However, the term fire proof is in appropriate, for high temperature fires can be not enough to induce chemical changes in concrete, which in the extreme point can cause considerable structural damage to the concrete bridge. Rain forced and pre-stressed concrete are widely used for the construction of major civil engineering structure. Concrete structures undergo decent with time due to environmental and other unfavorable operating status to assess the safety and servicing ability of the detrained concrete structure and to take decision on the possible repair measures, it is necessary to reliably estimate the exiting horizontal surface of stress.

Determination of in-situ stress on the concrete surface is one way to assess the pre- stressing force available in the pre-stressed concrete phallus. Assessing the existing in service is fairly a difficult task and the engineers are often faced with lack of actual design/construction item and environmental service conditions. Research lab studies were conducted to evaluate the reliability of this concrete care drilling technique. Standardization constants evaluated based on experiments are compared with concrete bridge. Due to expansion of road and rail networks and increasing constrains on alignment and clearance requirements, the design and construction involves complex computations and special construction technique. Daily and seasonal variation in temperature occur causing material to shorten with a fail in temperature land length with rise in temperature. These variations have two components, a uniform change over the entire bridge deck and a temperature gradient caused by the difference in temperatures at the top and the bottom of the desk.

**Keyword:** Bridge, Shrinkage, creep of concrete, curing, load on bridge.

## 1. INTRODUCTION

Bridge design requires consideration of the effects produced by temperature range and thermal gradients in bodily structure.

Temperature magnetic pas seals within synonyms /Hyponyms (Ordered by Estimated frequency) of noun Bridge can cause thermal stresses that are comparable in magnitude to stresses induced by lire and dead loading. After the past years, significant evaluation has been made in the study of temperature variation and thermal stresses. The thermal response of a bridge involves a combination of local anesthetic, zephyr temperature, current of air trend cloud concealment, bridge location and orientation with esteem to sun day time solar radiotherapy and loss of heat energy by radiation in a night sky. Mathematical modeling of the temperature variation trouble has been issued by different scholar & researcher.

The method now available for reckoning of thermal stresses in different type of bridges is very diverse but they all deepened on an accurate prediction of temperature variation. The basis of transfer of training is the same for all type of structure, but different methods have been employed to solve the heat transfer equations. Each method has its own set of simplifying assumptions and each has its advantage and disadvantages. The concrete bridge on effect will be treatment used in serviceability analysis of concrete bridge. It the temperature gradient is applied slowly or is sustained for a period of time, the internal stresses induced by temperature are relieved, to some extent by creep.

A time analysis using the Age-adjusted effective modulus method (AEMM) can be used conveniently to determine the variation of cross-sectional behavior with time.

## 2. METHODOLOGY

### 1. CLASSIFICATION OF BRIDGE

Bridges may be classified in many ways,

1) According to function as aqueduct (canal over a river) viaduct (road railway over a valley), pedestrian , highway, railway or pipeline bridge.

2) According to the material of construction of super structure as timber, masonry, iron ,steel,reinforced concrete, pre-stressed concrete, composite or Aluminum Bridge.

3) According to the form or type of super structure as slab beam, truss arch, cable stayed or suspended bridge.

4) According to the inter span relations as simple, continuous or cantilever bridge.

5) According to the method of connections of different parts of super structure, particularly for steel construction as pin-connected riveted or welded bridge.

6) According to the road stage relative to the highest flood stratum of the river below, particularly for a highway span as high level or submersible warship span.

7) According to length of bridge such as culvert (Total length between inner side of dirt walls less than 6m) , nipper bridge ( 6 to 60 time), major bridge (above 60 m)

8) According to degree of redundancy as determinate or indeterminate bridge.

9) According to the anticipated type of service and duration of use as permanent, temporary, military bridge.

## 3. DESIGN PHILOSOPHY

The basic philosophy governing the design of bridge is that a structure should be designed to sustain with a defined probability all actions likely to occur with in its intended life span.

The structure should maintain stability during umpire cemented actions and should have adequate durability during its life span.

The combination of loads and forces to be considered in design and allowable increases in permissible stresses for certain are used.

## 4. STANDARD SPECIFICATION ACTIONS FOR ROAD BRIDGE

The Indian road congress (IRC) has formulated standard specifications and codes of practice for road span with a view to establish a commons procedure for the design and structure of road bridges in India.

The specifications are collectively known as the Bridge code. Prior to the formulation of the IRC bridge code, there was no uniform code for the whole country, Each state had its own regulation about standard cargo and stresses .

A) INDIAN ROADS CONGRESS BRIDGE CODE:-

The Indian roads congress (IRC) bridge code as available now consists of eight section as given below:

1. Section – I- General features of design
2. Section –II - Loads and stresses
3. Section – III- Cement concrete (plain or rain forced)
4. Section – IV - Brick, store and block masonry

5. Section – V- Steel road bridges
6. Section – VI- Composite construction
7. Section – VII- Foundations and substructures
8. Section – VIII - Bearings.

## 5. CONCRETE MIX DESIGN

There are two types of concrete mix

(i) Nominal Mix:

The ratio of cement: sand : coarse aggregate are fixed by volumetric ratio.

such as

1: 2: 4 - M 15

$$1:{}^{1}\!/_{1/2}:3 - M20$$

The quality of material used in not considered we assume that derived strength shall be obtained nominal mix is not used for concrete of higher grade than M20

(ii) DESIGN MIX

The proportion of different materials required is designed, based on the quality of material used for a particular strength of concrete. Target mean strength is kept as

Fm= Fck + 1.645

(iii) Steps of Design Mix

1. Select a water-cement ratio of the desired strength W/C ratio are fixed using charts available
2. Select quantity of water required for 1m$^3$ of concrete
3. Calculate cement content required W/C Ratio = water quantity/cement content Cement required = water quantity /W/C ratio
4. Select a ratio of fine aggregate may be generally 1 :2
5. Using the absolute volume theory
6. The quantity of different material required are mixed concrete is cost in cubes test the samples at 28 days.

## 6. CURING OF CONCRETE

Curing is the process of preventing the loss of moisture form the concrete whilst maintain a satisfactory temperature regime. The prevention of moisture loss from the concrete is particularly important if the water cement ratio is low, if the cement has a high rate of strength development. If the concrete contains granulated blast furnace slag or pulverized fuel ash. The curing regime should also prevent the development of high temperature gradates within the concrete. The rate of strength development at early age of concrete made with super sulfated cement is significantly reduced at loser temperature. Super sulphated cement concrete is seriously affected by adequate curing and the surface has to keep moist for at least seven days.

(A) CURING METHODS

Curing methods may be divided broadly into four categories.

i. Water curing (Moist Curing)

ii. Membrane Curing

iii. Application of Heat

iv. Miscellaneous

(i) Water Curing (Moist Curing)

Exposed surfaces of concrete shall be kept continuously in a damp or wet condition by pounding or by covering with a layer of sucking, canvas, hessian or similar materials and kept constantly wet for at least seven days from date of placing concrete is case of ordinary Portland cement and at least 10 days where mineral admixture or blended cement are used, it is recommended that above minimum periods may be extended to 14 days.

(ii) Membrane Curing

Approved curing compounds may be used in lieu of moist curing with the permission of the Engineer-in-charge. Such compounds shall be applied to all exposed surfaces of the concrete as soon as possible after the concrete has set impermeable membranes such as polyethylene seating covering closely the concrete surface ay also be used to provide the effective barrier against evaporation.

For the concrete containing Portland pozzolana cements, Portland slag cement or mineral admixture, the period of curing may be increased.

## 7. SHRINKAGE OF CONCRETE

Concrete shrinkage is a difficult material behavior to predict because of the many factors affecting this property. Concrete shrinkage is a result of the development of negative pore pressures with in the concrete. Since the development of negative pore pressure can occur in several different ways and at different concrete ages, engineers have characterized concrete shrinkage by five different types.

1. Plastic Shrinkage
2. Autogenously /shrinkage
3. Thermal Shrinkage
4. Carbonation Shrinkage
5. Drying Shrinkage

The sum of these five types of shrinkage equals total shrinkage.

Concrete shrinkage has been found to be related to the magnitude of developed concrete strength as well as the rate at which concrete strength develops.

## 8. CREEP OF CONCRETE

Weirdly and shrinkage of concrete are two physical properties of concrete.

The crawl of concrete, which originates from the calcium silicate hydrates (C-S-H) in the hardened Portland cement spread (which is the binder of mineral aggregates) is fundamentally different from the weirdo or metal and polymers.

Unlike the creep of metals, it occurs at all emphasis spirit level and, with in the service accent range, is linearly dependent of the stress if the pore $H_2O$ mental object is constant

Unlike the creep of polymers and metals, it exhibit multi-months aging, caused by chemical set due to hydration which stiffens the microstructure, and multi-year aging caused by long-term relaxation of self-equilibrated micro-stresses in the Non-porous microstructure of the C-S-H. if concrete is fully dry, it does not creep, but it is next to impossible to dry concrete fully without sever cracking.

They are called the shrinkage (typically causing breed S between 0.00012) or Prominence (<0.00005 in normal concretes, <0.00020 in high strength concrete)

**9. ELASTICITY OF CONCRETE**

The modulus of snap of concrete is function of the modules of elasticity of the aggregates and the cement intercellular substance and their relative proportion.

The modules of elasticity of concrete is relatively constant at depression stress levels but start decreasing at higher stress levels as matrix cracking develops.

The elastic modulus of the hardened paste may be in the order of one O-111 O GPa. The concrete composite is then in the range of 30 to 50 GPa.

The American English Concrete Institute allows the Modules of elasticity to be calculated using the following equation.

**10. IMPLEMENTATION & TESTING**

**(i) TEST OF CONCRETE**

(A) Compressive Strength of Concrete

Compressive strength is calculated by dividing the failure load with the area of application of load, usually after 28 days of curing. The strength of concrete is controlled by the proportioning of cement, coarse and fine aggregates, water and various admixtures. The ratio of the water to cement in the chief factor for determining concrete strength. The lower the water cement ratio, the higher is the compressive strength. The capacity of concrete is reported in pri-pounds per SQ inch in US unit and in MPa-mega Pascal’s in SI units. This is usually called as the characteristic compressive strength of concrete fc/fck. For normal field applications the concrete strength can vary from 10 MPa to 60 MPa.

For certain applications and structures, concrete mixes can be designed to obtain very high compressive strength capacity in the range of 500 MPa. Usually referred as Ultra High Strength Concrete or Powder Reactive Concrete. It is obtained by testing concrete cylinder specimen. However, empirical formulas can be used to convert cube strength to cylinder strength and Vice-versa. As per code definition /the compressive strength of concrete is given in terms of the characteristic compressive strength of 150 mm size cubes tested at 28 days (fck). The characteristic strength is defined as the strength of the concrete below which not more than 5% of the test results are expected to fall.

Average 28 days compressive strength of at least three 150 mm concrete cubes prepared with water proposed to be used shall not be less than 90% of average of strength of three similar concrete cubes prepared with distilled water. For quality control in case of mass concreting, the frequency of testing of compressive strength by cube test is as follows.

Table 1 Compressive Strength

| S.No. | Quantity of concrete (in $m^3$) | Number of samples for testing compressive strength |
|---|---|---|
| 1. | 6 – Jan | 1 |
| 2. | 16 – Jun | 2 |
| 3. | 17-30 | 3 |
| 4. | 31-50 | 4 |

Minimum or specified compressive strength of concrete cubes of various grade of concrete at 28 days of curing is as follows.

(i) DETERMINATION OF COMPRESSIVE STRENGTH OF CONCRETE

(ii) APPRATUS :- TESTING MACHINE:

The testing political auto may be of any reliable type of sufficient capacity for the metal test and capable of applying the commitment at the specified charge per unit of measurement.

(iii) HYRAULIC COMPRESSION TESTING MACHINE

The header control unnerve of the plates. When new, shall not depart from a plane by more than 0.01 mm at any ledge man period, and they shall be maintained with a permissible version demarcation of 0.02mm. The movable portion of the spherical rear ended compression platen shall be held on the spherical seat. But the design shall be such that the mien typeface can be roated freely and tiered through small angles in any instruction.

(iv) AGE AT TEST

Test shall be making at recognized year of the run specimens. The most usual being 7 and 28 days. The ages shall be calculated from the time of the improve of body of water of the prohibitionist ingredients.

(v) NUMBER OF SPECIMENS At least three specimens preferable from different batches shall be made you resting at each selected age.

(vi) CASTING CONCRETE CUBES :-

Placing the Specimen in the examination political car the bearing Earth's surface of the examination political machine shall be wiped clean and any loose sand or other material removed from the surface of the specimen.

Which are to be striking with the densification plates?

In the case of Block, the specimen shall be placed in the machine in such a way that the loading shall be applied to opposition side of meat of the cubes as cast that is not to the cover and bottom.

The axes of specimen shall be carefully aligned with the center of logged of the spherically seated platen.

(B) TENSILE STRENGTH TEST:

The test of determining the tensile strength of concrete is primarily made to estimate the load under which cracking develops.

Cracks in concrete structure are not desirable because these cracks expose the reinforcement to corrosion.

The maximum tensile stress in bottom fiber of the test beam is known as "Modulus of rupture".

(1) APPRATUS :- following apparatus are required

(i) Tamping bar

(ii) Trovels

(iii) Hand Scoop

(iv) 20 tones universal testing machine.

(2) Test Specimen:- A beam mound 15x 15 x 70 cm. If the largest size of aggregate does not exceed 19 mm. the size of the specimen beam, may be accepted as 10 x 10 x 50 cm.

(3) PROCEDURE :- following steps are followed

(i) Fill the concrete in to the mould in layers of approximately 6 cm height. ensuring uniform distribution over entire cross- section.

(ii) COMPACTION :- Compaction may be done by vibrators or by hand. In case of compaction by hand, standard rod is used. Each stroke should penetrate the underlying layer. Compaction of each layer is done by 25 strokes.

(iii) CURING: The specimen beam after casting should be placed in an atmosphere at temperature $27 \pm 2°C$ for 24 hours, the specimen dis removed from the mould and immediately submerged in water. Water is renewal of the 7 days.

(4) TEST PROCEDURE:

(i) The specimen is placed in a testing machine as cast the distance between roller loads should be 20 cm or 13.5 cm.

(ii) The load should be applied carefully without any shock @ 400 kg\min for 15 cm square specimen and @ 180 kg\min for 10 cm square specimen.

(iii) Note down the line of rupture at maximum load, let it be at a distance 'a' form the nearer support in cm Modulus of rupture

$Fb = W.L/(bd^2)$……………………………………………………..(1)

When 'a' is more than 20 cm for 15 cm specimens and more than 13.3 cm for 10 cm specimens .

$Fb = 3W. a/(ba^2)$ …………………………………………………..(2)

When 'a' is less than 20 cm but more than 17.0 cm for f15 cm cubes.

Or less than 13.3 cm but greater than 11.0 cm for 10 cm cubes.

In equations (1) & (2) , W is maximum load in kg. applied to the depth of the beam and L is span of the beam

RESULT:- if 'a' is less than 17 cm for 15 cm specimens, or less than 11 cm for 10 cm specimen, the result of the test are note.

**15. WORKABILITY**

The quantity of water used will get attired at site either due to the presence of free surface moisture in the aggregates or due to the absorption characteristics of dry and porous aggregates the water/cement ratio to be actually adopted at site is required to be adjusted keeping the above mind.

The workability is defined as the ratio of weight of water to the weight of cement.

W/C Ratio = (Weight of water /Weight of Cement)

Weight of Water = W/C Ratio x weight of water

The word "workability" or workable concrete signifies much wider and deeper meaning than other workability. Consistency is general term to indicate the degree of fluidity or the degree of mobility.

(i) FACTOR AFFECTIONG WORKABILITY

Workable concrete is the exhibits very little internal friction between particle and particle or which overcome the frictional resistance offered by the formwork surface or reinforcement contained in concrete with just the amount of compacting efforts fourth coming.

The factors helping concrete to have more lubricating effect to reduce internal friction for helping easy compaction are given below:

i) Water content

ii) Size of aggregate

iii) Surface texture of Aggregate

iv) Use of admixtures

v) Mix Proportions

vi) Shape of Aggregate

vii) Grading of Aggregate

(ii) MEASUREMENT OF WORKABILITY

The following test is commonly employed to measure workability

i) Slump Test

ii) Flow Test

iii) Vee-Bee consist meter Test

iv) Compacting Factor Test

v) Kelly Ball Test

(a) Slump Test:- Slack exam is used to determine the workability of fresh concrete. Slump tryout a per IS: 1199-1959 is followed. The set up used for doing economic crisis examination is slump strobilus and tamping rod. Procedure to determine the workability of fresh concrete by slump test.

i) The internal surface of the clay sculpture is thoroughly cleaned and applied with a light coat of oil. The mould is placed on a smooth, horizontal, rigid and non absorbent surface.

ii) The stamp is then filled in four stratum with freshly mixed concrete, each approximately to one-one-fourth of the tip spinning top of the molding.

iii) Each layer is stamped 25 meter by the rounded close of the tamping rod.

iv) After the top layer is node, the concrete is stuck off the level with a trowel.

v) The cost is removed from the concrete immediately by raising it slowly in the vertical direction.

vi) The departure in level between the height of the mould and that of the highest point of the subsided concrete is measured.

vii) The difference in height in mm is the slump of the concrete.

**RESULTS:-**

The slump measured should be recorded in mm of subsidence of the specimen during the test any slump specimen. Which crash or shear off literally gives incorrect result and if this occurs, the test should be repeated with another sampling. If in the repeat test also the specimen shears the slump should be measured and the fact that the specimen shared, should be recorded.

Compressive intensity the compressive specialty of any material is defined as the resistance to nonstarter under the action of compressive strength is an important parametric quantity to determine the operation of the material during armed service consideration.

Concrete mix can be designed or proportioned to obtain the required applied science and durability properties as required by the design applied scientist.

Some of the other engineering properties of hardened concrete include safe stripe Modules, Tensile Strength, Weirdly co efficient.

PROCEDURE:- Procedure as under following steps.

(i) Clean and dry the internal surface of mould.

(ii) With the help of hand scoop, place the concrete in upper hopper, a up to top surface.

(iii) Out doors the share door of ground ball in order to facilitate the falling of the concrete into lower width groundball B. The concrete sticking to the face of the grounder A, should be pushed downward with the help of a sward rod.

(iv) Open the trap door of the hopper B and entered the concrete to fall into cylinder C.

(v) Remove the surplus concrete from the top of the cylinder with the help of trowel. Wipe and clean the outside surface of the cylinder.

(vi) Weight the cylinder with partially compacted concrete nearest to 10 gm.

(vii) Fill in the cylinder with fresh concrete in layers not exceeding 5cm. in thickness and compact each layer till 100 percent compaction is achieved.

(viii) Wipe off and clean the outside surface of the cylinder and weight the cylinder with fully compacted concrete nearest to 10 gm.

(ix) Compaction factor = (weight of partially compacted concrete/ weight of fully compacted concrete)

RESULT :- This method is adopted for determining the workability of concrete mix in laboratory. It gives, fairly goodness out come for concrete of depression workability.

(A) VEE-BEE CONSITOMETER:-The apparatus used in this method.

METHOD :- Procedure as under following steps.

1. Mix the dry constituent of the concrete thoroughly trough a uniform colour is obtained and then add the required amount of water.
2. Pour the concrete in to the slump conic with the help of the funnel paroxysm to stand. Tcrzetto.
3. Remove the slump mould and rotate the stand so that transparent mantrap touches to the top of the concrete.
4. Show time the vibrator on which piston chamber containers in placed.
5. Due to vibrating action mechanism, the concrete startle re-mould and occupying the cylindrical container continue the cylinder till concrete surface because horizontal.
6. The time required for complete remolding in seconds is the required measure of the workability and it is expressed as number of Vee-Bee seconds.

Table 2 Vee-Bee Consistometer Test

| S.No. | Conditions | Degree | Values of workability |
|---|---|---|---|
| 1. | Concreting of shallows sections with | Very low | 0.75 to 0.80 compacting |
| 2. | Concreting of lightly reinforced sections with vibrations | Low | 0.80 to 0.85 compaction factor |

| | | | |
|---|---|---|---|
| 3. | Concreting of lightly reinforced section without vibrations | Medium | 0.80 to 0.92 compacting factor or 25-75 mm slums |
| 4. | Concreting of heavily reinforced sections without vibrations | High | Above 9.92, compacting factor or 75-125 mm slump for 20 mm aggregate |

RESULT :- This method is suitable for dry concrete having very low workability. Some recommended values of workability of concrete for various placing conditions.

(d) FLOW TEST

This is laboratory test, which gives indirection of the quality of concrete with respect to consistency, cohesiveness and proneness of segregation.

In this test a standard mass of concrete is subjected to joining. The spread of the flow of concrete is measured and this flow is related to workability.

APPRATUS:-

1. Flow Table
2. Tamping Bar
3. Mould

METHOD :-

1. This method is suitable for dry concrete having very low workability. Some recommended values of workability of concrete for various placing conditions.
2. A mould made from smooth metal casting in the form of a frustum of a cone is used with the following internal dimensions. The base is 25 cm in diameter. Upper surface 17 cm high of cone is 12 cm.
3. The table top is cleared of all gritty material and is wetted. The mould is kept on the center of the table, firmly held and is filled in two layers.
4. Each layer is rodded 25 times with tamping rod 1.36 cm in diameter and 61 cm long rounded at the lower tamping end.
5. After the top layer is rodded evenly, the excess of concrete which has over flowed the mould in removed.
6. The mould is lifted vertically upward and the concrete stands on its own without support.
7. The table is then raised and dropped 12.5 mm 15 times in about 15 seconds.
8. The diameter of spread concrete is measured in about 6 directions to the nearest 5mm and the average spread is noted.
9. The flow of concrete is percentage increase in the average diameter of the spread concrete over the base diameter of the mould.

Flow, percent = (Spread diameter in cm – 25 cm/ 25)x 100

RESULTANT :- The value could range anything from o to 150 percent.

This is a good indication of the characteristics of concrete such as tendency for segregation.

(a) KELLY BALL TEST

This is a simple field test consisting of the measurement of indentation made by 15cm diameter metal hemisphere weighing 13.6 kg when fully placed on fresh concrete. The test has been devised by Kelly and hence known as Kelly ball test.

The main benefit of this test is that it can be performed on the concrete placed in site and it is claimed that this test can be performed faster with a greater precision than slump test.

PROCESS:-

1. The minimum depth of concrete must be at least 20 cm and the minimum distance from the center of the ball to nearest edge of the concrete.
2. The surface of the concrete is struck off level avoiding excess working, the ball is lowered gradually on the surface of the concrete.
3. The depth of penetration is read immediately on the stem to nearest 6mm.
4. The test can be performed in about 15 seconds and it gives much more consistent results than slump test.

**11. ELASTICITY OF CONCRETE**

The modulus of snap of concrete is function of the modulus of elasticity of the aggregates and the cement intercellular substance and their relieve proportion.

The modulus of elasticity of concrete is relatively constant at depression stress levels but starts decreasing at higher stress levels as matrix cracking develops.

The clastic modulus of the hardened paste may be in the order of one 0-111 O Gpa and aggregates about quarter 5 to 85 GPa. The concrete composite is then in the range of 30 to 50 GPa.

The American English concrete Institute allows the modulus of elasticity to be calculated using the following equation.

**12. THERMAL PROPEERTIES**

Expansion and shrinkage concrete has a very low co-efficient of thermal expension. However, if no provision is make for expansion, very large forces can be created, causing shot in character of the social organization not capable of with standing the force or the repeated cycles of expansion and condensation. The co-efficient of thermal expansion of Portland cement concrete is 0.000008 to 0.000012 (Per degree Celsius) (8to 12 micro strains/$^0$c) (8-12 1/MK).

Thermal conductivity concrete has moderate thermal conductivity, much lower than metals, but significantly higher than other building material such as wood, and is a poor people non- conductor. A layer of concrete is frequently used for ‘fireproofing’ of steel social organization.

However, the term fireproof is in appropriate, for high temperature fires can be hot enough to induce chemical changes in concrete, which in the extreme point can cause considerable structural damage to the concrete.

**13. STRUCTURAL FAILURE**

Creep and shrinkage of concrete are two physical properties

The weirdly of concrete, which originates from the calcium silicate hydrates (C-S-H) in the hardened Portland cement past times (which is the ring binder of mineral sum), is fundamentally different from changes of stomata water content due to drying or wetting processes cause significant volume changes of concrete in loading free specimen.

They ar called the shrinkage (typically causing air between 0.0002 an 0.0005 and in low strength concretes even 0.001 or swelling (<0.00005 in normal concretes, < 0.00020 in high strength concretes )

The multi-year crawl evolves logarithmically in time (with no final asymptotic value), and over the typical structural life time larger than the initial elastic strain. When a deformation is suddenly imposed and grip constant, weirdo causes relaxation of critically produced elastic stress. After unloading creep recovery takes place, but it is overtone, because of aging . in practice, creep during drying is inseparable from shrinkage.

The rate of creep increases with the rate of change of pore humidity (i.e. structural integrity and failure is an aspect of engineering which tidy sum with the ability of a structure to support a designed load, weight, force , etc ) with out breaking, and includes the bailiwick of past structural failure in ordering to prevent failures in future hence designs. Structural integrity is the ability of an item- either a structural component or a structure consisting of many part to held to gather.

**14. CONCLUSTIONS**

It is well known among engineers that absolute safety is unattainable and inevitably there are risks of collapse associated with any bridge.

The bridge engineer should take every possible precaution to avoid failures, as serious failures of bridges will often result in loss of lives, interruption to vital traffic and costly repairs.

Every Bridge Engineer would do well study the circumstances leading to any bridge failure that may come across.

When fresh is laid at the site then proper set of concrete is required because body structure are exposed to the environment and in these setting if there is no such an arrangement against the environment, then there are many factors that affect the workability of concrete and temperature is one of them.

Temperature, almost in every fact has negative effects on the belongings of concrete and same is the case with the workability of fresh concrete.

When temperature increases, In the same proportion workability of fresh concrete lessening.

The reasonableness that view point behind is "When temperature increases then evaporation rate also increases due to that hydration rate decreases and hence, concrete will gain strength earlier" Due to fast hydration of concrete solidification comes in concrete and that decreases the workability of fresh concrete therefore, in return manipulation of concrete becomes very difficult.

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