Presentation On

ADMIXTURES

Presented By:-Karunesh Raj Verma

What is Admixture

Admixtures are the materials other than the basic ingredients of concrete – cement, water and aggregates-added to the concrete mix immediately before or during mixing to modify the specific properties of concrete in the plastic or hardened state.

Functions of Admixtures

1. To retard setting and hardening of concrete.
2. To improve the workability.
3. To make the cellular concrete and also homogeneous.
4. To give the perfect bonding between steel and concrete.
5. To make the impermeability.
6. To reduce the segregation and also bleeding.

Classification Of Admixtures

There are two types of Admixture:-

1. Chemical Admixture
2. Mineral Admixture

Chemical Admixtures

1. Retarder – Gypsum
2. Accelerators-NaCl,NaOH
3. Air-entraining-Natural Wood Resin
4. Plasticizers-Lingosulpahonates
5. Super Plasticizers-
6. Grouting Admixture-Clays,Gels

Retarder

1.RETARDERS

WHAT IS RETARDER?

- Retarder is an admixture that slowsdown chemical process of hydration

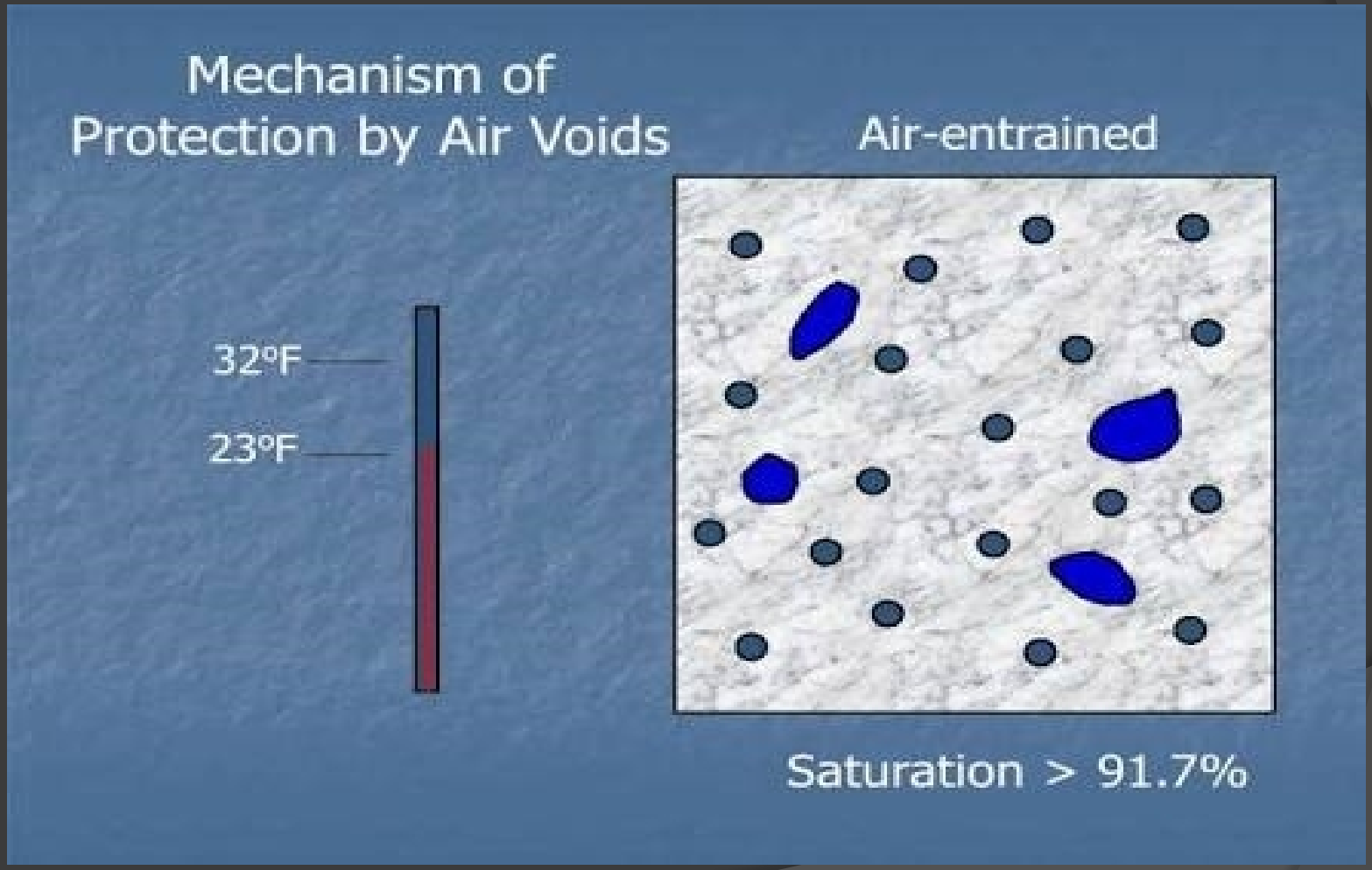
USES OF RETARDERS

- Overcome accelerating effect of temperature in hot weather concreting
- Grouting oil wells[if depth>6 km]
- To obtain exposed aggregate look in concrete

Accelerators

Accelerator are the chemical Admixtures added to speed up the initial setting of concrete.

Air-Entraining Admixtures



Plasticizers

Plasticizers are the chemical compound which give the high workability with less quantity of water.

Super Plasticizers

Super plasticizers

- These are the modern type of water reducing admixtures, basically a chemical or a mixture of chemicals that impart higher workability to concrete.
- Three different purposes or a combination of these
  - ✓ to increase workability without changing the mix proportion.
  - ✓ to reduce the mix water and W/C ratio in order to increase the strength and improve the durability.
  - ✓ to reduce both water and cement in order to reduce creep shrinkage and thermal strains caused by heat of cement hydration.

Mineral Admixtures

1. Fly-ash Admixture- SiO_2,Al_2O_3
2. Blast Furnace Admixture
3. Rice-husk ash
4. Silica Furnace

Mineral Admixtures

1. Flyash Admixture

Blast Furnace Slag

BLAST FURNACE SLAG

- Blast-furnace slag is a nonmetallic product consisting essentially of silicates and aluminates of calcium and other bases.
- The molten slag is rapidly chilled by quenching in water to form a glassy sand like granulated material.
- The granulated material when further ground to less than 45 micron will have specific surface of about 400 to 600 m2/ kg (Blaine).

Rice Husk Ash

Silica Fumes

SILICA FUME

It is a product resulting from reduction of high purity quartz with coal in an electric arc furnace in the manufacture of silicon or ferrosilicon alloy.

- Micro silica is initially produced as an ultrafine undensified powder
- At least 85% SiO_2 content
- Mean particle size between 0.1 and 0.2 micron
- Minimum specific surface area is 15,000 m^2/kg
- Spherical particle shape

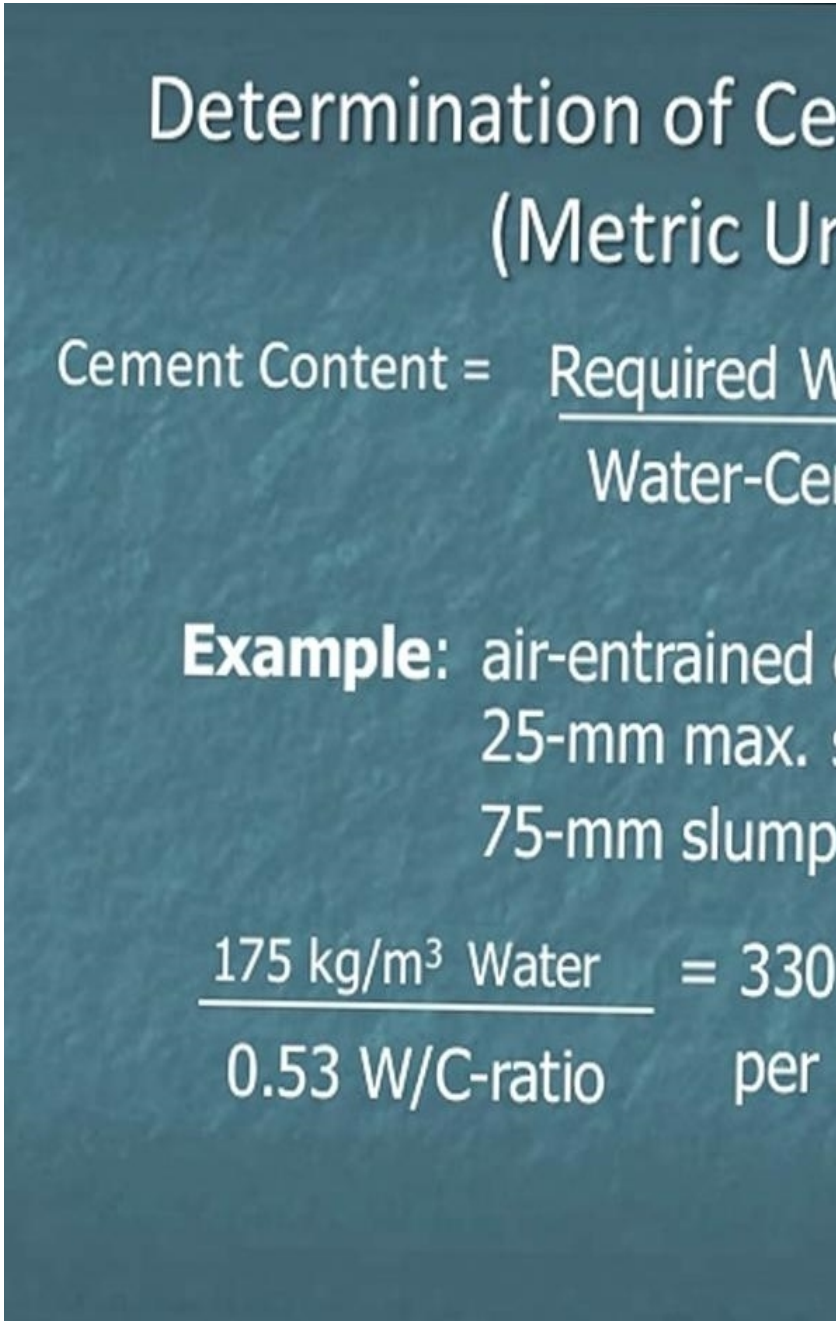
Concrete technology

Water cement ratio

Water cement ratio

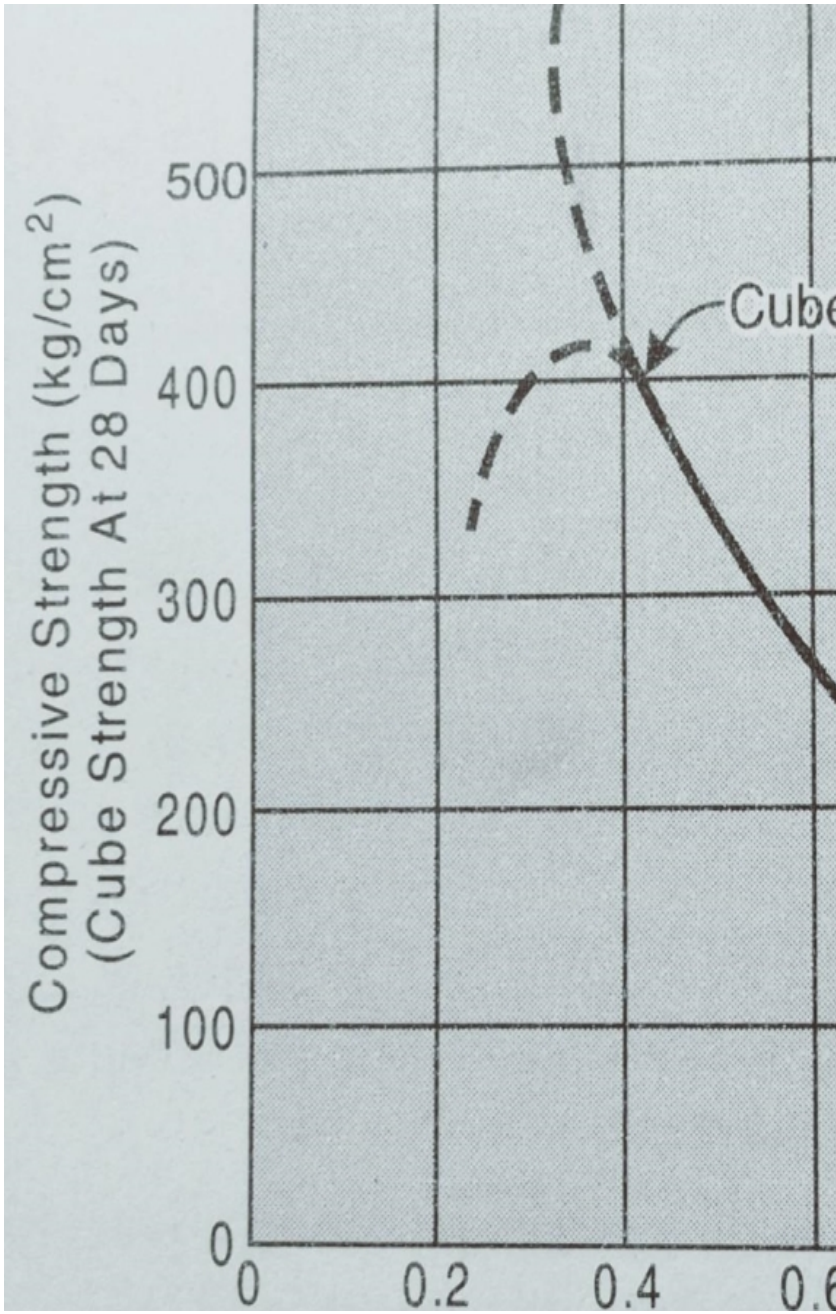
It is the ratio of weight of water in concrete mix to weght of cement added.

*water cement ratio varies from 0.35 to. 6 as per requirement.



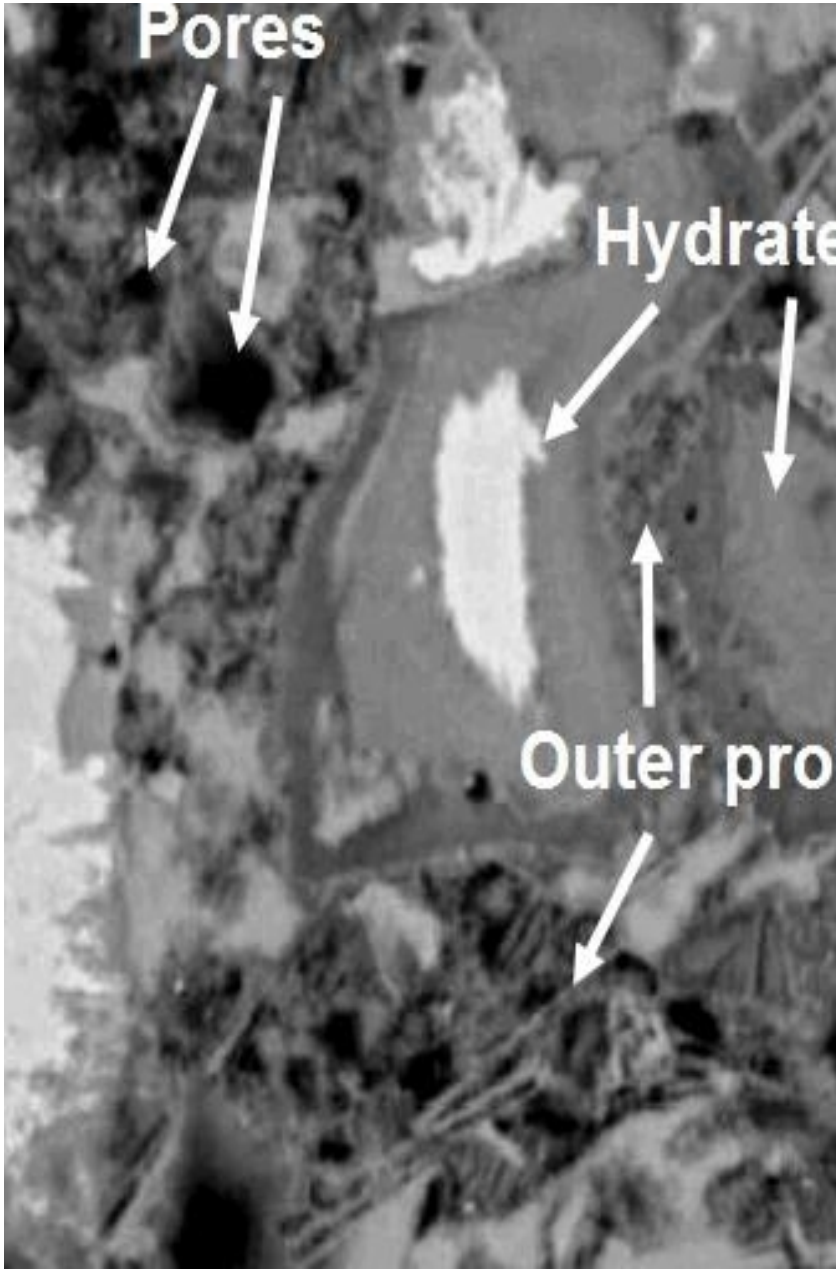
Relationship between water cement ratio and compressive strength

The water place the important role on strength of the concrete increases with the heat of hydration of cement so to achieve the maximum strength exact quantity of water cement ratio must be added into the concrete as drwan on the graph it is clearly shows if the quantity of water in concrete is less then proper heat of hydration will not take place so the strength of concrete is less.



Hydration of cement

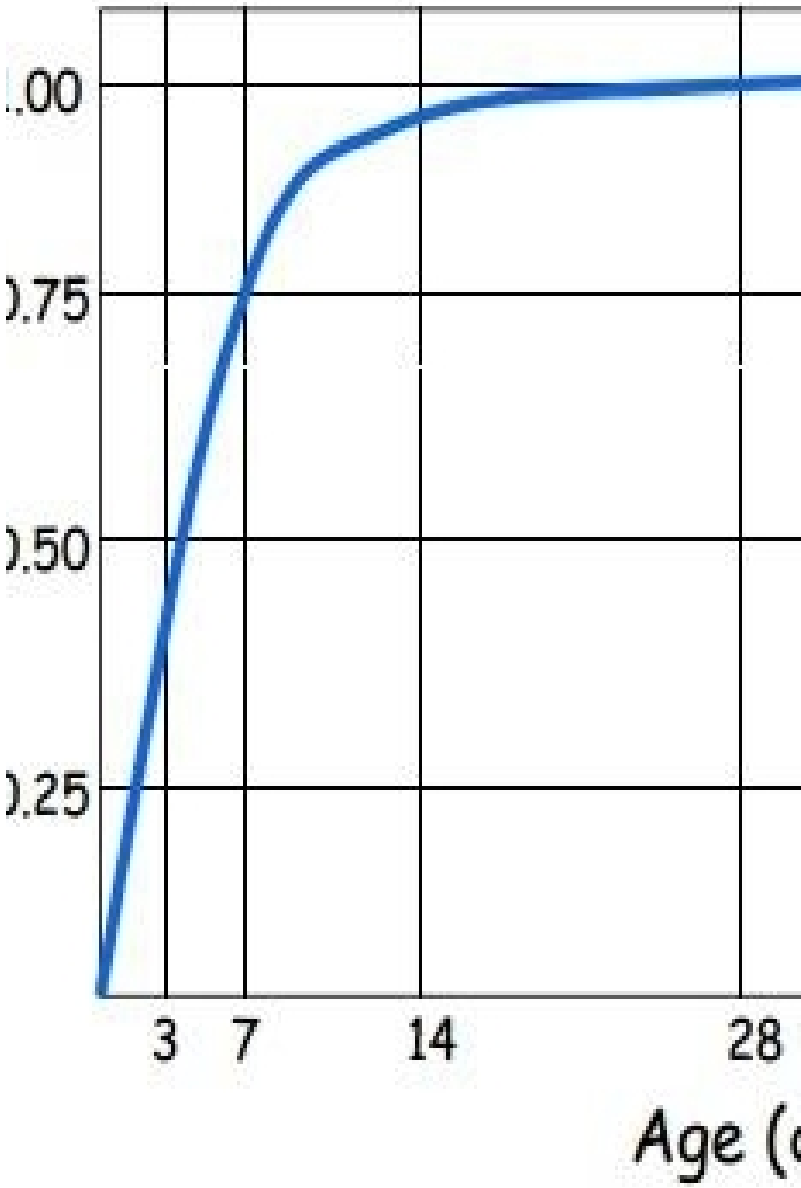
A cement of average composition requires approximately 25% of water by mass for chemical reaction and chemical reaction between cement at water is known as hydration of cement.



Strength of concrete with age

It is clear that the strength of concrete goes on increasing with age but development of strength at first 28 days is about 75% of the ultimate strength after one year.

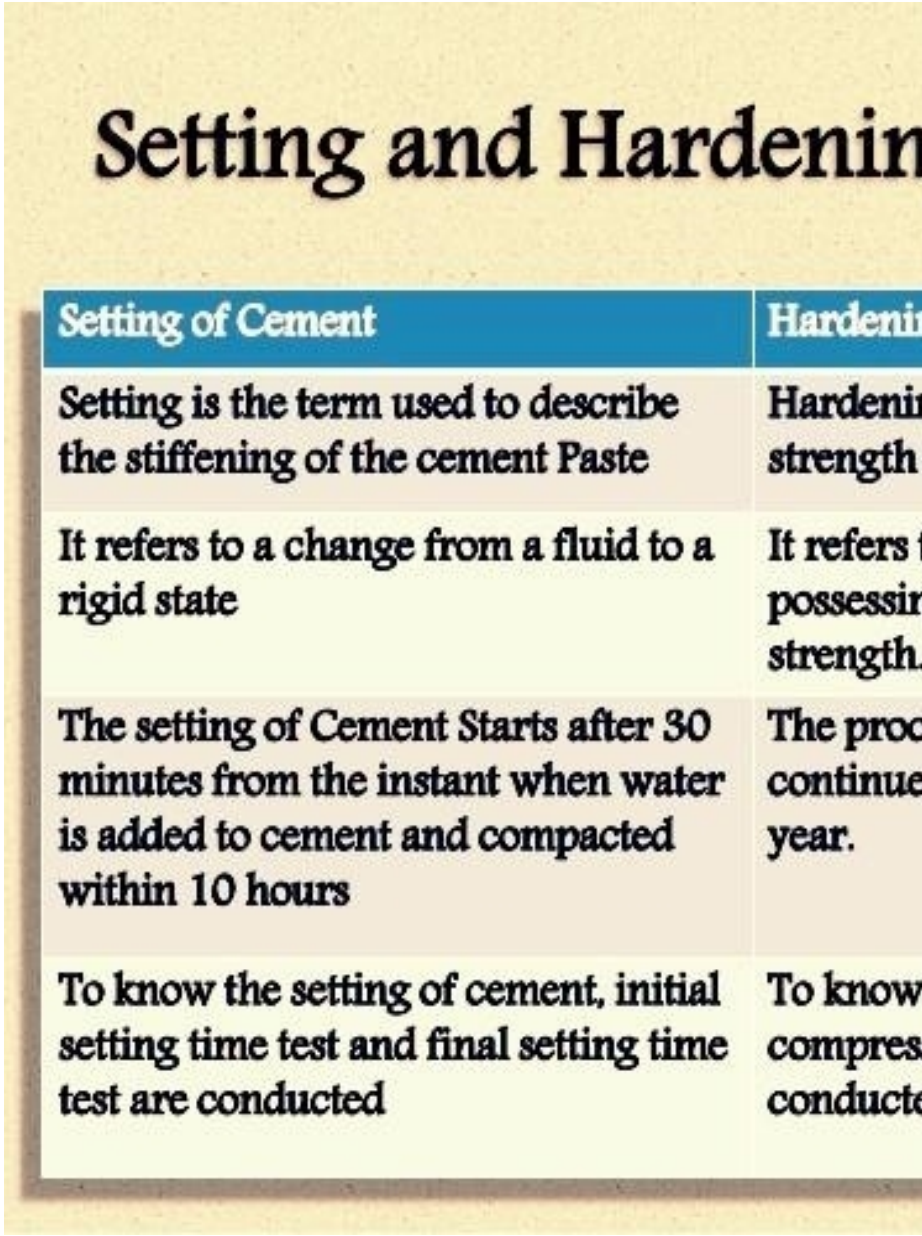
Therefore. the 28 days of strength of concrete is taken as standard strength of comparing the concrete mix strength.All the designs based upon 28 days.



Setting and hardening of cement

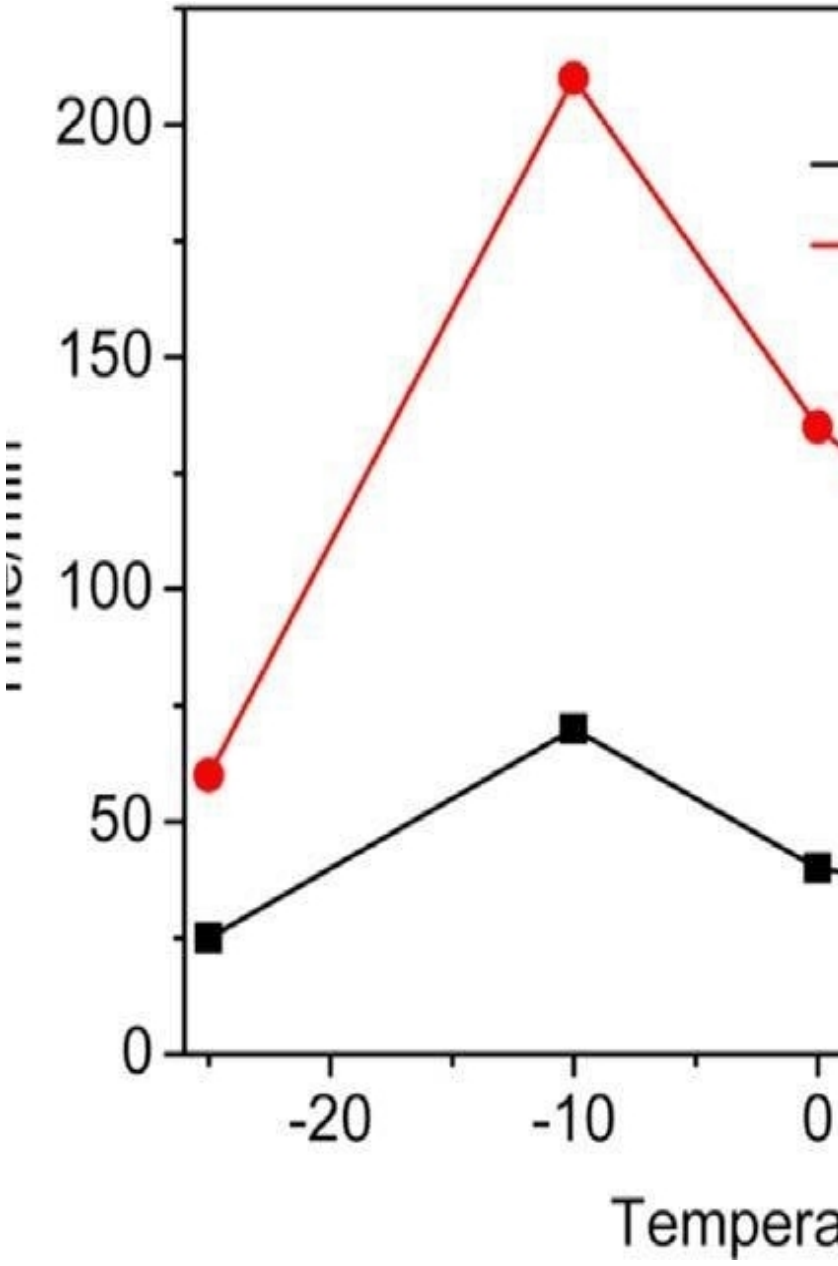
The term `setting'is used to describe ofthe setting of the cement refers to changes of cement paste from to rigid state.

The term Hardening refers to the gain of strength of set cement paste.



Effect of temperature on setting time

The setting time of concrete decreases with rise in temperature but above 30°c. A reverse effect could be observe At low temperature setting time is retarded

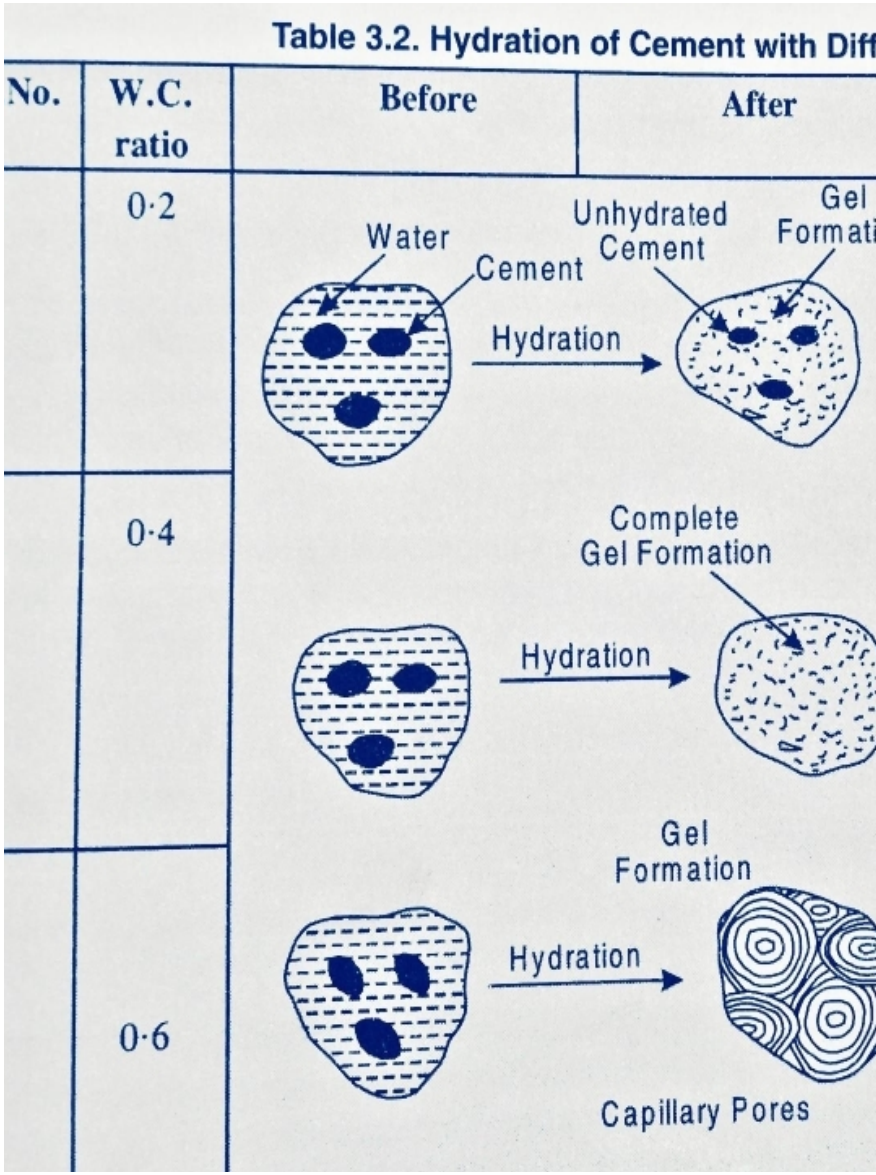


Effect of various water - cement ratio on the strength of concrete

case-1 Hydration of cement with insufficient water cement ratio.

#case-2 Hydration of cement with just sufficient water cement ratio.

#case-3 Hydration of cement with water more than required water cement ratio.



Water cement ratio law (Duff Abrahm's Rule)

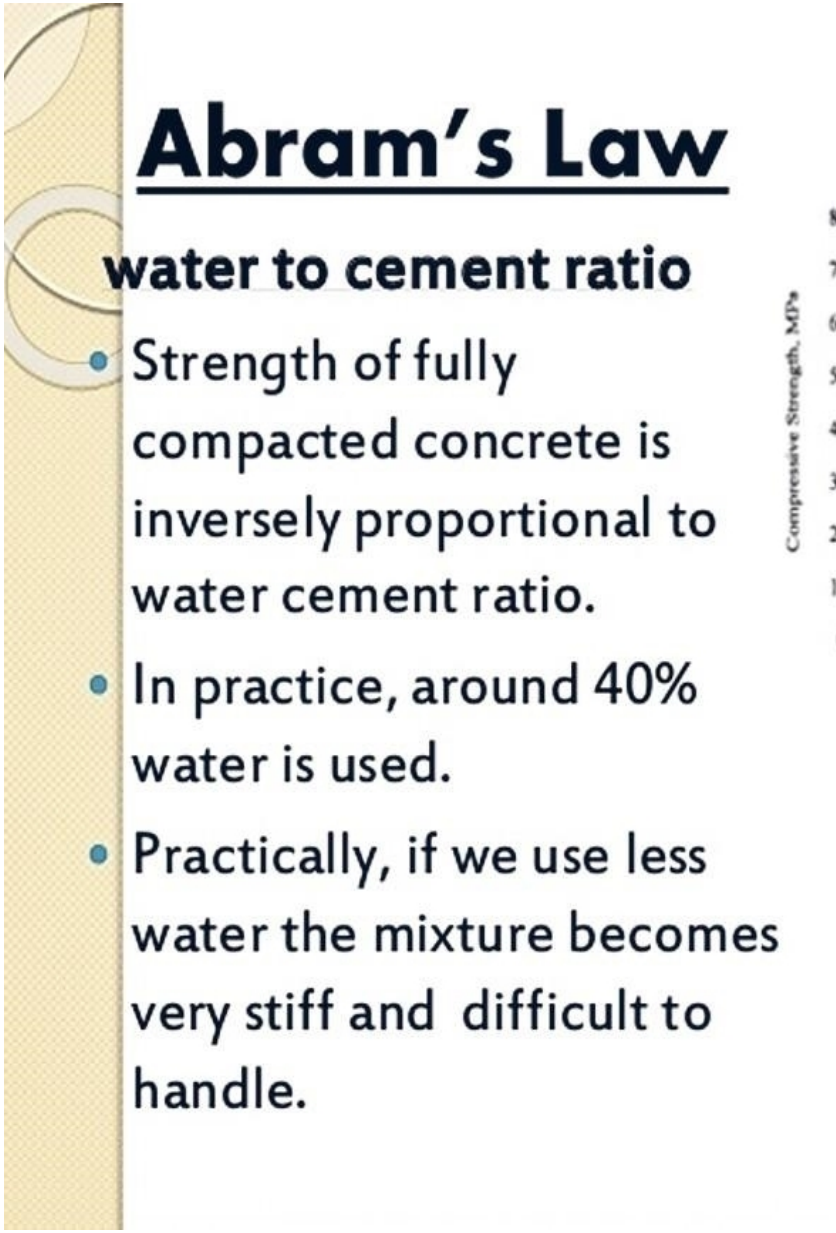
The law states 'with' given ingredient of concrete and testing condition the quantity of water used for mixing alone determines the strength of concrete as long as the mixture is of workable plasticity.

S = 948/7^x

Where, s = Compressive strength of concrete

in kg/cm^2 after 28 days of curin.

X = WATER-CEMENT-RATIO by volume



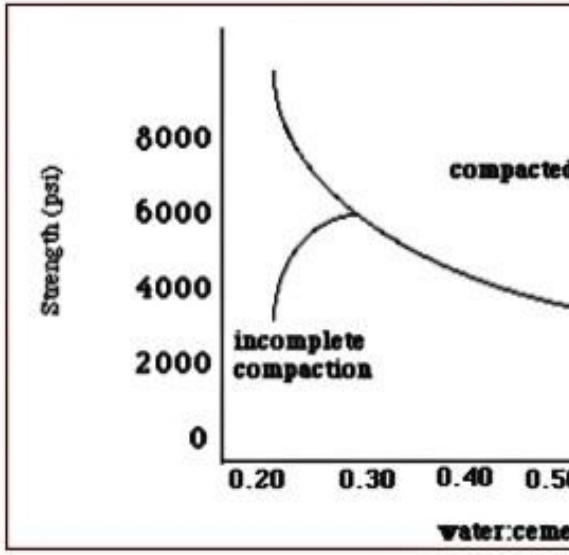
Limitation of water cement ratio law

1. The concrete specimens are cured under standard temperature
2. The concrete specimens should be of same size.
3. The internal moisture condition of the concrete specimen should be kept uniform.

4. Water/Cement Rat

- The most important indicator of **stre**
- Lower w/c ratio is, the higher the fin
- Concept was developed by ***Duff Ab***

1920's



Effect of water - cement ratio on the strength of concrete

Appartus- slump cone apparatus, two bucket, two trowels, graduated cylinder, foot rule, tamping rod(15mm dia., 600mm long), universal testing machine, cube moulds of 150mm size and non porous plate.

Procedure

1. Wait the sand and gravel in the ratio of 1:25. The materials required at 20 kg of gravel and 8 kg of sand for making 150 mm cubes.
2. Mix the ingredients and dry until a uniform distribution is attained.
3. Prepare cement slurry.
4. Add certain amount of slurry in the aggregate and mix it to the uniform colour.

5. Test the mix for slump and increase the amount of slurry until required slump pf 40mm is obtained.

6. Weight the bucket and find the quantity of cement slurry used.

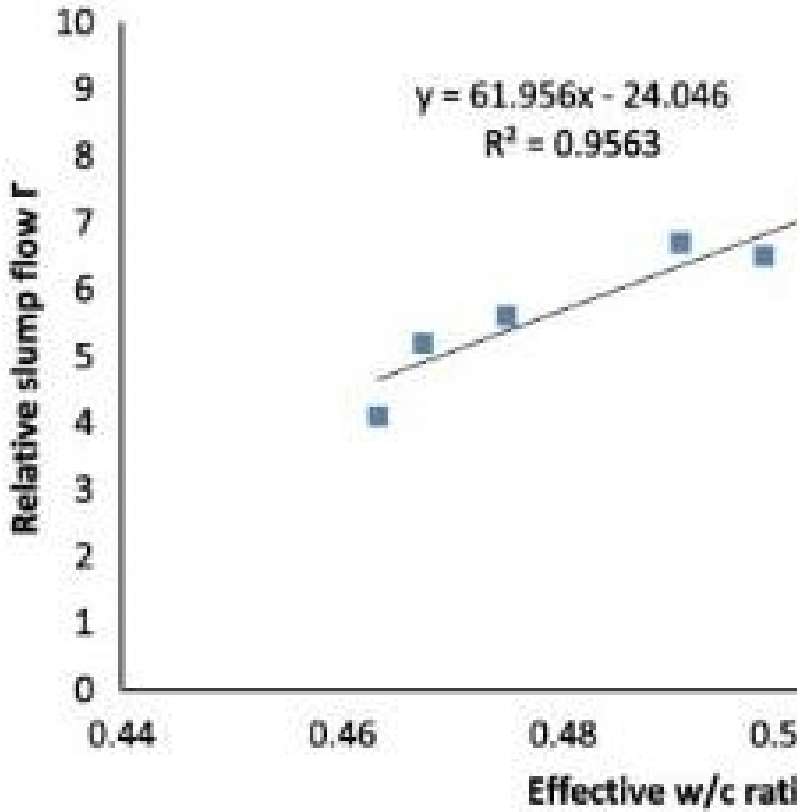
7. Prepare 150mm cubes three in member as described the Compressive test.

8. Test the cubes in compression after 28 days.

9. Calculate tge average Compressive strength.

Conclusions

It will be observed that if we increase the water cement ratio the slump value increases and his the workability is also increases.



THANK YOU

For watching

Presentation On

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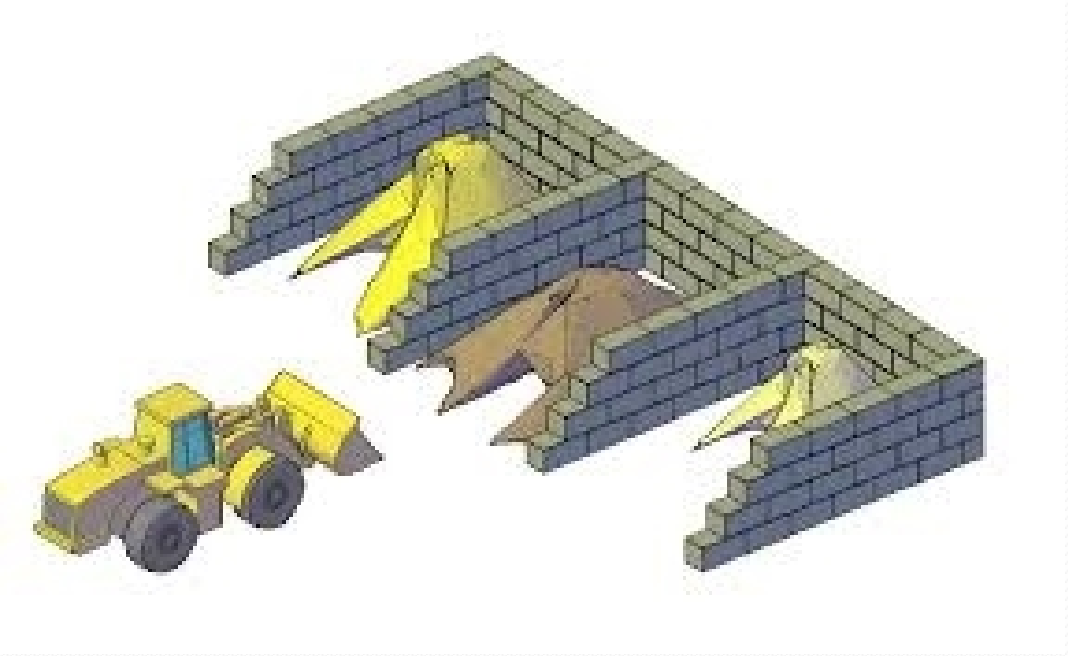
Various steps In Concrete Operation:-

1. Storing Of Ingredients
2. Batching Of Ingredients
3. Mixing
4. Transportation
5. Placing
6. Compaction
7. Finishing
8. Curing
9. Joints In Concrete

1-Storing Of Ingredients

In this process we store Ingredients like-
Cement,Aggregate,Water



2-Batching

Batching Is done by two types:-

1. Volume Batching
2. Weight Batching

3-Mixing

- Mixing Is Done By Two Method:-

1. HAND MIXING 2. Machine Mixing

- In Hand Mixing,It is done by Hand .
- In Machine Mixing,It is done by Machine.
- Types Of Machine Mixing:-

1. Batch Mixer:-

   1-Tilting 2- Non Tilting

- Continuous
- Pan Mixing
- Truck Mixing

4- Transportation

There are Eight types of Transportation

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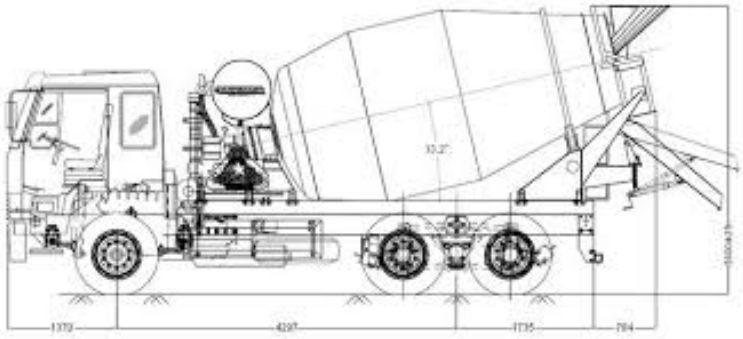

5- Placement

The process of depositing the concrete mix in its required position is called Placement of concrete.

6- Compaction

There are two types of Compaction:-

1- Hand Compaction

i. Screed Vibrator

2- Machine Compaction

i. Internal Vibrator(Needle)

ii. Form Vibrator(External)

iii. Screed Vibrator

7- Finishing of Concrete Surface

- Trowelling
- Screeding
- Floting

8- Curing

The process of keeping finished Concrete surface moist to enable it to gain strength is called Curing.

CONCRETE TECHNOLO
INGREDIENTS OF CONC

PHYSCIAL PROPERTIES OF CEMENT

1. FINENESS.
2. SETTING TIME
3. COMPRESSIVE STRENGTH
4. SOUNDNESS OF CEMENT
5. HEAT OF HYDRATION

HEAT OF HYDRATION AND SOUNDNESS OF

1. HEAT OF HYDRATION :-The heat of hydration is defined as the quanti
calories per gram of hydrate cement liberated on complete hydration at a gi

2. SOUNDNESS OF CEMENT:- It is very important that the cement after se
under go any appreciable change of volume . Certain cement have been fo
a large expansion after setting causing loss of durability .

The phenomenon by virtue of which cement does not under go large chan
when treated with water is known as soundness.

COMPRESSIVE STRENGTH

3. COMPRESSIVE STRENGTH: COMPRESSIVE STRENGTH is o
important property .

cement mortar cubes(1:3) having an area of 5000 mmsquare are pr
tested in compressive testing machine .For ordinary Portland cemer
compressive strength at 3 a nd 7 days curing shall not be less than
(160kg/m2) and 22mpa (220kg/m2) respectively .

SETTING TIME

The time at which the cement paste loses to plas
the addtion of water is known as initial setting tim

The time corresponding to the pasre become a h
is known as final setting time .

FINENESS

The strenth development of in concrete is the result of th
water will cement particals .Thus,large the surface area a
raection faster is the rate of hydration .

The repid development of a strength required a greater d
fineness .Therefore, the degree of grinding of cement is
fineness.

TYPES OF CEMENTS

1. Ordinary portland cement
2. Repid hardening portland cement
3. Low heat portland cement
4. White cement
5. colour portland cement

6. Portland pozzolana cement
7. Oil well cement
8. Quick setting cement
9. Masonary cement
10. Expansive cement

AGGREGATES

The aggregats are the filler materials
make the concete economical and co
the strength with sand cement paste i
aggregates

REQUIREMENT OF GOOD AGGREGATE

1. It should be durable .
2. It should be fire resistance
3. It should be prevent chemical effect
4. It should be easily available.
5. It density should be high.

6. Easy to workable
7. Perfect bonding with sand and cement
8. It should low water absorbation
9. It should be rough.

CLASSIFICATION OF AGGREGATES

1. Classification according to geological :

A. NATURAL AGGREGATES:- It is that type of which are available in nature (base of river).

B. ARTIFICIAL AGGREGATES:- It is obtained b made process.

CLASSIFICATION ACCORDING TO SIZE AGGREGATES

1. Fine aggregates
2. Coarse aggregaytes
3. All in aggregaytes

CLASSIFICATION ACCORDING TO SHA AGGREGATES

1. Rounded shape
2. Irregular shape
3. Angular shape
4. Flaky aggregate

GRADING OF AGGREGATES

The grading of aggregate means partical s
distribution of an aggregate determine by s
analysis is known as grading of aggregates

SIZE OF SIEVE OF AGGREG

80 mm	40mm
20mm	10mm
4.75mm	2.36mm
1.18mm	900mic.
600mic.	300mic.
150mic.	75mic
pan	

FINENESS MODULUS

It is a numerical i9ndex number which give the id
the coarse and fine of the aggregate. It is find ou
of the quimuletic percentage retain on INDIAN S
sieve divided by 100.

Flakiness index = wt. of flaky partical /total sample * 100

Elonganation index = wt. of elongated part wt. of sample * 100

WATER

Water is an important in gradient of concrete beca
hydration of cement depending upon the water .

Which effect the workability of strength and duraab
concrete.

The water which is to be use for mixing the concre
harmful materials.

The common impurties in water organic and in org
impurties sulphet suspended partical .

The PH value of water for constructions work shal

EFFECT OF IMPURTIES/IMPURE WATER CONCRETE

1. It effects sterngth of concrete.
2. It effects durability of concrete.
3. It effects the bonding power of concrete.
4. It effects the initial/final setting time.

CHARACTERISTICS OF AGGREGATES (PROPERTIES OF AGGREGATES)

1. Strength of aggregates.
2. Aggregates size.
3. Aggregates shape .
4. Aggregates surface texture.
5. Specific gravity of aggregates.

6. Bulk density
7. Water absorption and surface moisture
8. Bulking of sand
9. Bulking factor
10. Soundness of aggregates.

GRADES OF CONCRETE AS PER IS :

GROUP	GRADE DESIGNATION	SPECIFIC CHARATE COMPRES STRENGT 150MM CU DAYS IN N

ORDINARY CONCRETE	M10	10
	M15	15
	M20	20

STANDARD CONCRETE	M25	25
	M30	30
	M35	35
	M40	40
	M45	45
	M50	50
	M55	55

HIGH STRENGTH CONCRETE	M60	60
	M65	65
	M70	70
	M75	75
	M80	80

SUBMITTED BY.

DIPAK KUMAR GUPTA.

SIR

ROLL NO. -160280700009

BRANCH - CIVIL

SUB

RAME

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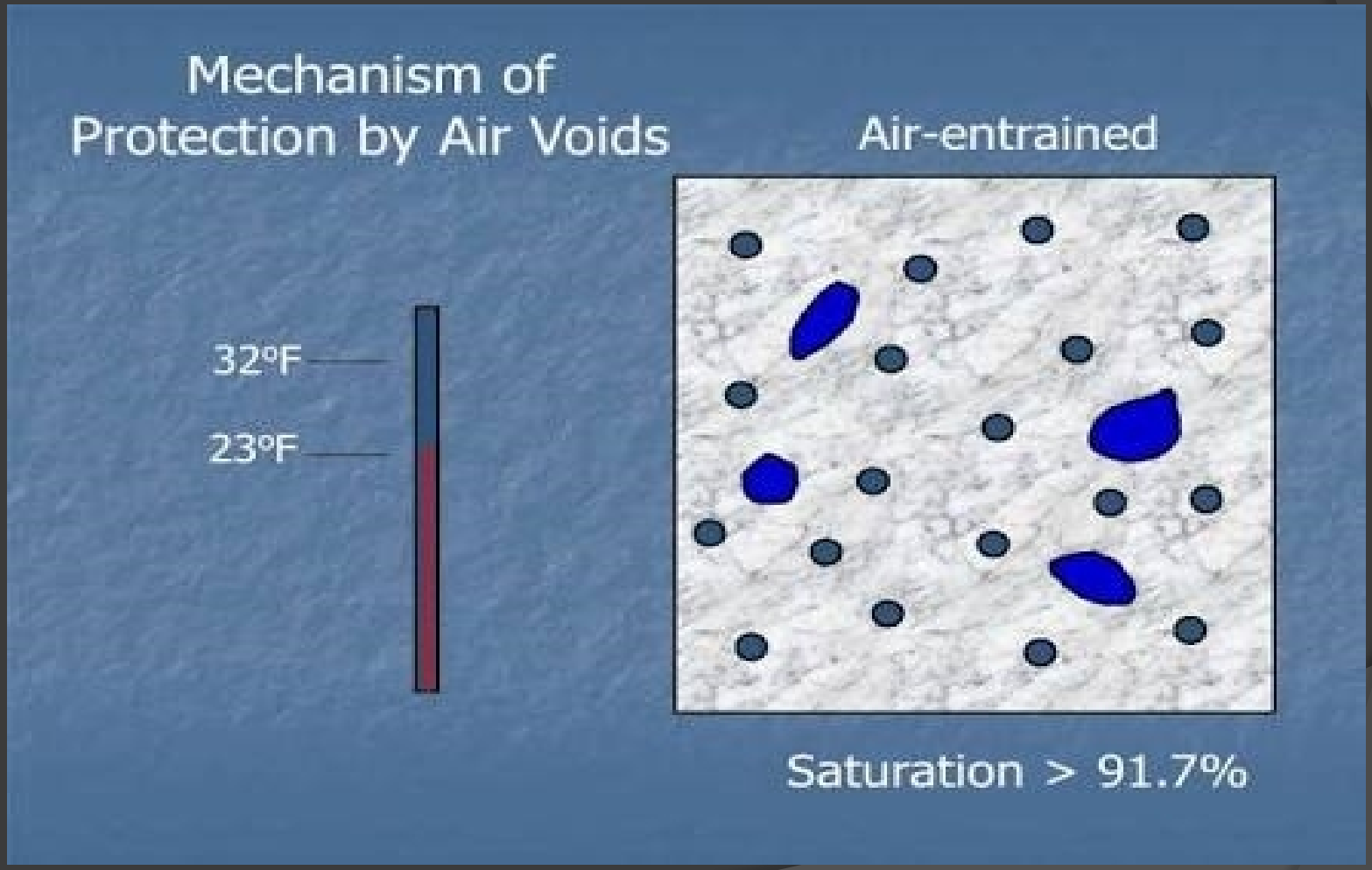

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- Mean particle size between 0.1 and 0.2 micron
- Minimum specific surface area is 15,000 m^2/kg
- Spherical particle shape

Concrete technology
Non destructive test

Presented by Shashi Kuma

Roll n 160280717019

- Non destructive testing is helpful in determine the strength and durability characteristics of existing structure without distribution or destroying.

Application of non destructive testing

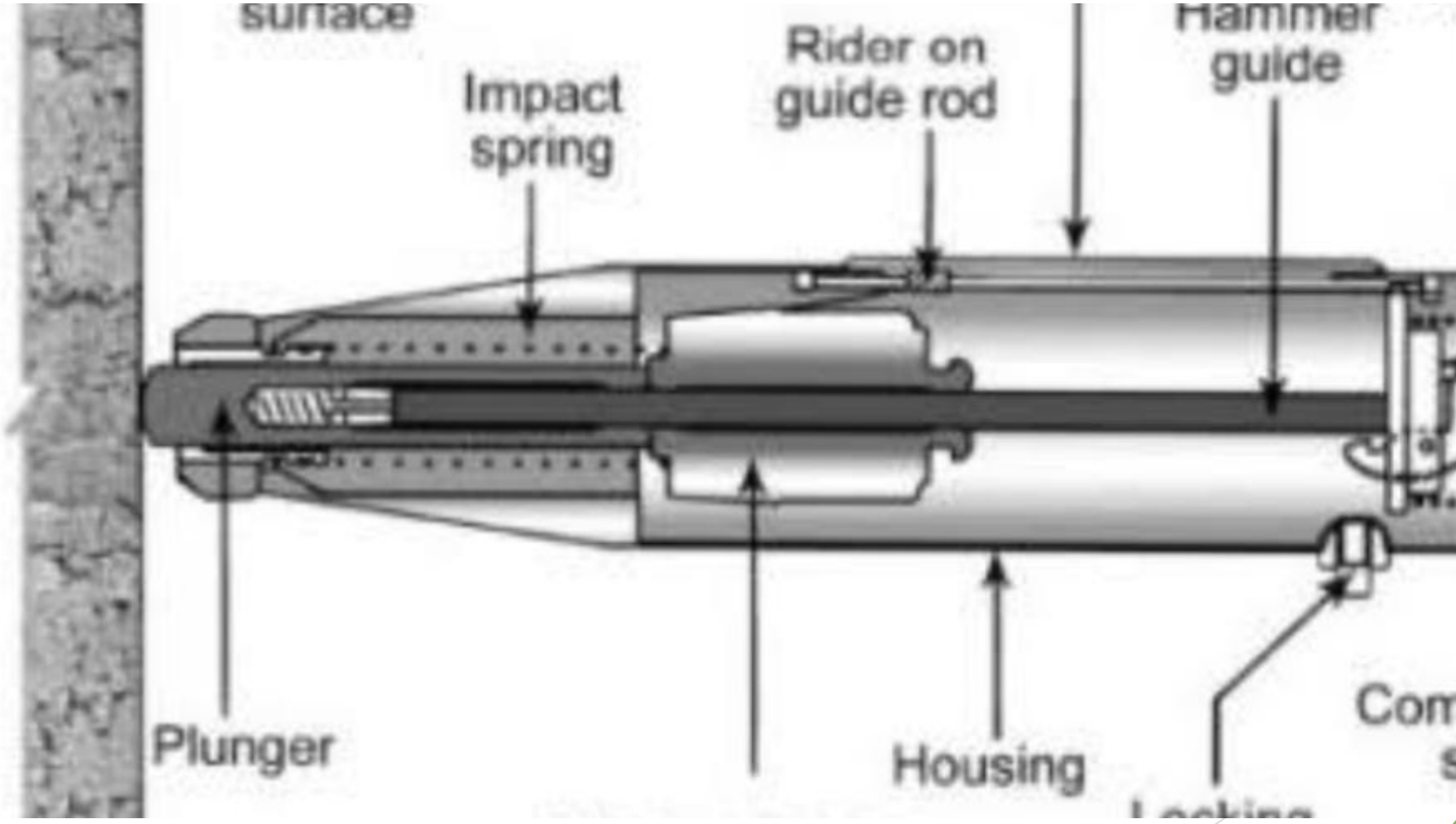
1. Strength of concrete.
2. Durability of concrete.
3. Homogeneity and uniformity of concrete.
4. Moisture content in concrete.
5. Thickness of concrete member.
6. Clear or normal cover to reinforcement.
7. Growth pattern of crack.

Non destructive testing methods

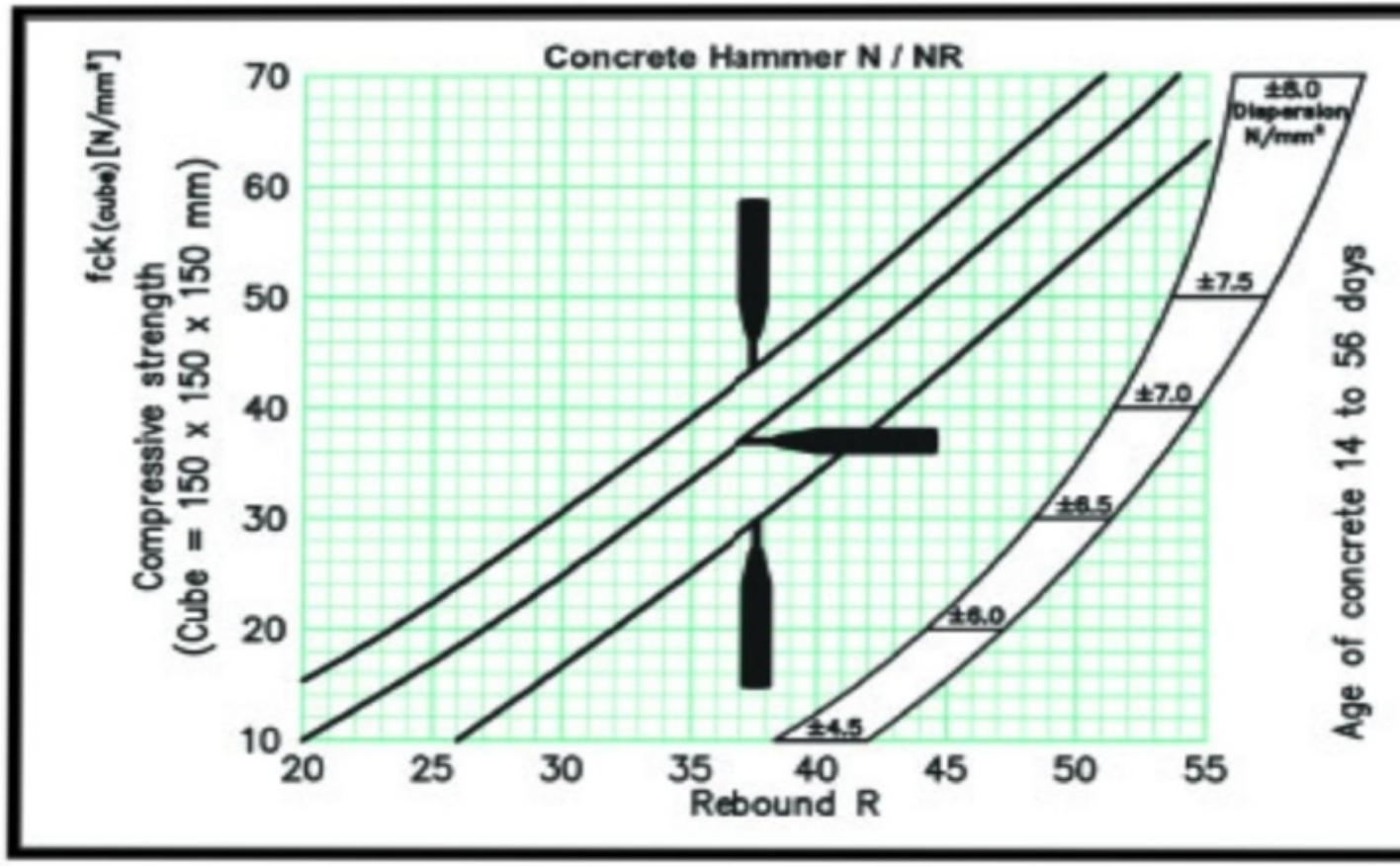
1. Surface hardness test.
2. Rebound hammer test.
3. Dynamic or vibration test.
4. Radioactive and nuclear method.
5. Electrical method.
6. Ultrasonic pulse velocity test.
7. Magnetic method.

The test hammer will hit the concrete at a defined energy its rebond is depend upon the hardness of the concrete it is measu
equipments by Reference chart.

The rebound value can be used to the determine compressive strength.



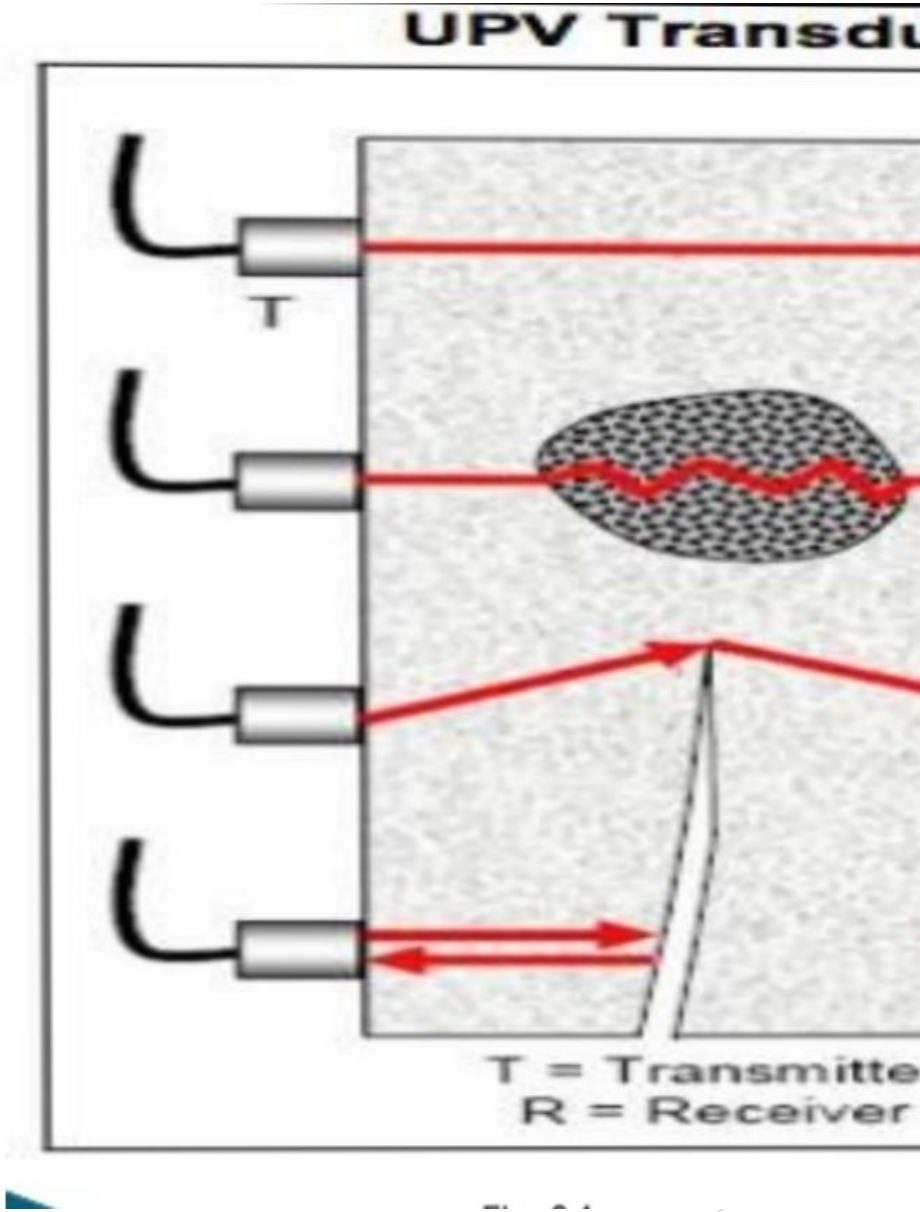
Reference chart of rebound hammer.



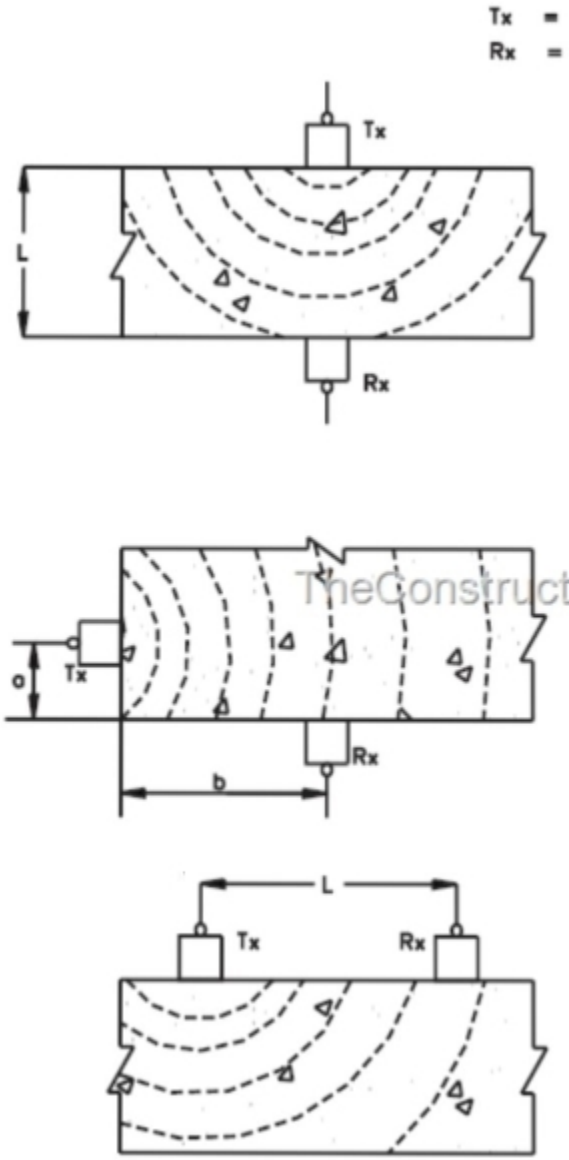
Ultrasonic pulse velocity test

An ultrasonic pulse velocity test is non destructive test to check the quality of concrete and also determine the initial structure of concrete.

It is measured the time travel of an ultrasonic pulse passing through the concrete structure.

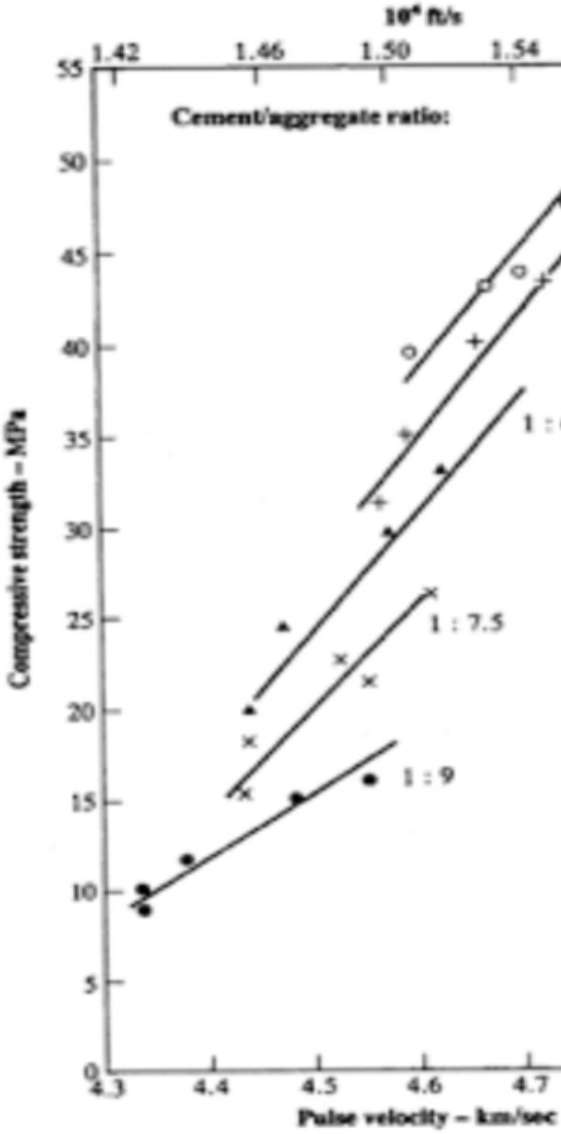


Methods of measuring pulse velocity through concrete.



Application of ultrasonic pulse velocity test.

1. Uniformity of concrete.
2. Strength of concrete.
3. Durability of concrete.
4. Presence of cracks and voids.
5. Modulus of elasticity.
6. Setting characteristics of concrete.
7. Quality of concrete.



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In this process we store Ingredients like-
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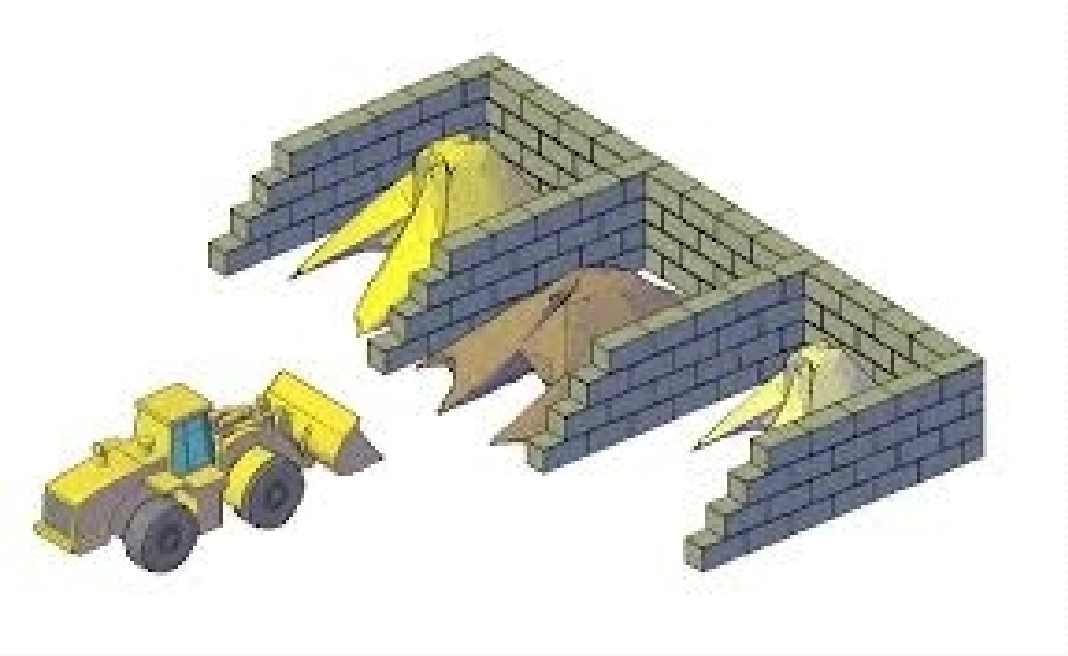

2-Batching

Batching Is done by two types:-

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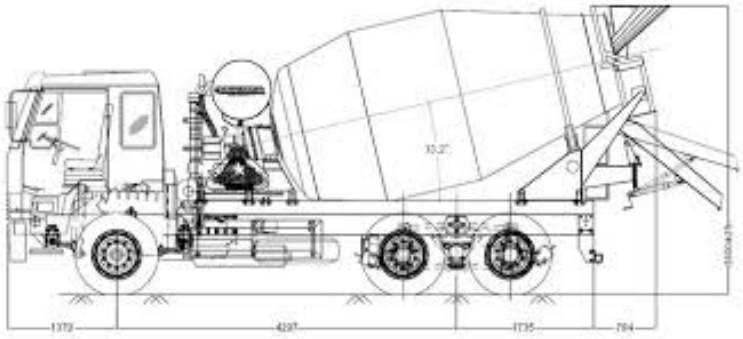

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iii. Screed Vibrator

7- Finishing of Concrete Surface

- Trowelling
- Screeding
- Floting

8- Curing

The process of keeping finished Concrete surface moist to enable it to gain strength is called Curing.

Concrete technology
Introduction

PPT by Shashi

160280717019

Concrete is a mixture of Cement, fine aggregate coarse aggregate and water

Ingredient of concrete

1. Cement
1. Aggregate
2. Water

Cement

Cement is a very fine particles which make the concrete provide binding property.

Aggregate


REQUIREMENT OF GOOD AGGREGATE
It must be clean i.e. it should be free from lumps, organ
It should be strong.
It should be durable.
It should not react with cement after mixing.
It should have rough surface.
It should not absorb water more than 5%.
It should not be soft and porous.
It should be chemically inert.
It should be of limiting porosity.
It should preferably be cubical or spherical in shape.

Water

. Requirements of water used in

Water used for mixing and curing shall be cl

from injurious amounts of **Oils, Acids, Alka**

Organic materials

Potable water is generally considered **satis**

mixing concrete

Mixing and curing with **sea water** shall not b

The **pH** value shall **not be less than 6**

Properties of concrete

Plastic stage

1. Good workability.
2. Freedom from segregation.
3. Freedom from bleeding.
4. Prevention from harshness.

Hardened stage

1. Strength.
2. Durability.
3. Impermeability.
4. Dimensional changes.

Requirements of good concrete

1. The aggregate must be clean hard durable and rough surface.
2. It should have good workability.
3. Water cement ratio should be accurate.
4. It should be fire resistance.
5. It should be minimum shrinkage.
6. The Water used must be free from organic impurities and free from harmful material.
7. It should from homogeneus mixture.
8. it should be impermeable.
9. It should be easy to transportation it should be easy to molded any shape
10. It should be economical.

Grade of concrete

		strength of da
Ordinary Concrete	M10 M15 M20	
Standard Concrete	M25 M30 M35 M40 M45 M50 M55	
High Strength Concrete	M60 M65	

Advantage and disadvantage of concrete

Advantage of concrete

1. Concrete is economical, it run long time.
2. Concrete possesses high compressive strength.
3. It is fire resistance.
4. It is durable and required very little maintenance.
5. It is almost impossible to moisture.
6. It provide good architectural appearance to the structure.
7. It is not liable to decay or rot.
8. It is used as a sound and thermal insulation purpose

Disadvantage of concrete

1. Concrete has very low tensile strength and hence crack easily.
2. Dead weight of concrete is very high is required strong shuttering.
3. Concrete expands and shrinkage with change in temperature.
4. It required more time of curing to develop Strength.
5. Concrete fully not impervious in nature.

Concrete operation

1. Storage of material
2. Batching
3. Mixing
4. Transportation
5. Placing
6. Compaction
7. Finishing
8. Curing
9. Joints

Application:

- Bridges
- Slabs in buildings
- Water Tank
- Concrete Pile
- Thin Shell Structures
- Offshore Platform
- Nuclear Power Plant
- Repair and Rehabilitations

Concrete mixing plant

Concrete mixer

Truck mixer

Concrete pump

Crane

Vibrator