



JECRC Foundation



JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE

JAIPUR ENGINEERING COLLEGE AND RESEARCH CENTRE DEPARTMENT OF CIVIL ENGINEERING

Class – III Semester /II Year

Subject –Building Materials And Construction

Chapter – 2(Lime)

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VISION

To become a renowned center of outcome based learning, and work towards academic, professional, cultural and social enrichment of the lives of individuals and communities.

MISSION

Focus on evaluation of learning outcomes and motivate students to inculcate research Aptitude by project based learning. Identify, based on informed perception of Indian, Regional and global needs, areas of focus and provide platform to gain knowledge and solutions. Offer opportunities for interaction between academia and industry. Develop human potential to its fullest extent so that intellectually capable and imaginatively gifted leaders can emerge in a range of professions.

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VISION

To become a role model in the field of Civil engineering for the sustainable development of the society.

MISSION

To provide outcome base education

To create a learning environment conducive for achieving academic excellence

To prepare civil engineers for the society with high ethical values.

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- Introduction
- Classification
- Properties
- Test of Lime
- Uses of Lime

INTRODUCTION

- Lime is an important cementing material used in engineering construction.
- A Cementing material may be defined as that material which has capacity of holding structural unit to-gether with sufficient strength.
- Among this group are included lime, natural cements, gypsum, Portland cement as well as various other synthetic products.

LIME



TYPES OF LIME

Classification: based on its composition

Lime is available in the market in three main types

- i) Quicklime
- ii) Hydraulic lime
- iii) Poor lime



QUICKLIME

Quicklime: also called Fat lime, Rich lime, Pure lime. In it CaO is greater than (93%) by weight, remaining being MgO and very little clay. Quick lime is Amorphous (shapeless) white material. It has very high affinity for water and carbon dioxide. It Will Absorb the moisture quickly from atmosphere and converting itself to a carbonate of calcium, This lime possess pure white lime color ,hence is generally used for finishing work like plastering and white washing,

HYDRAULIC LIME

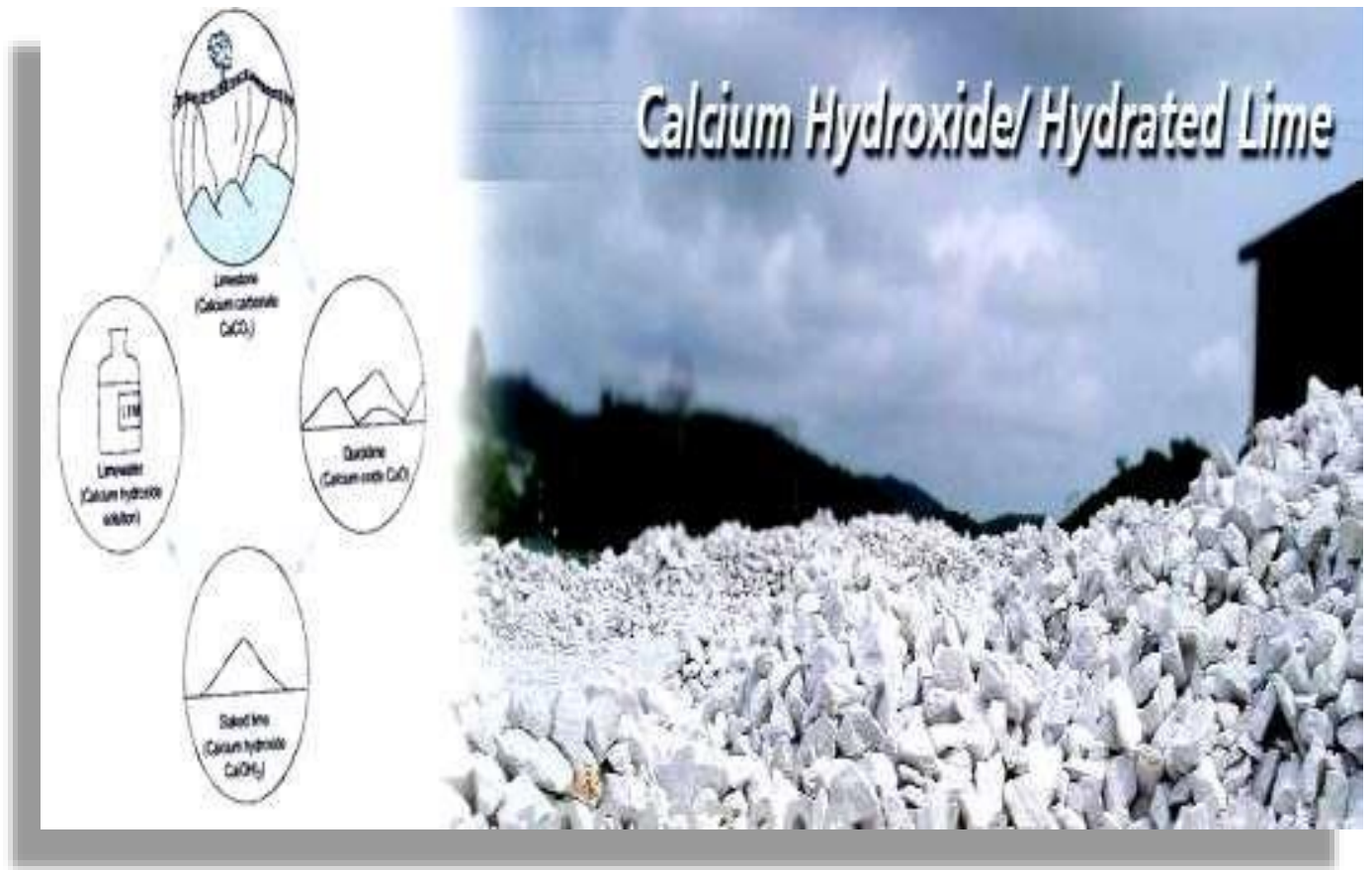
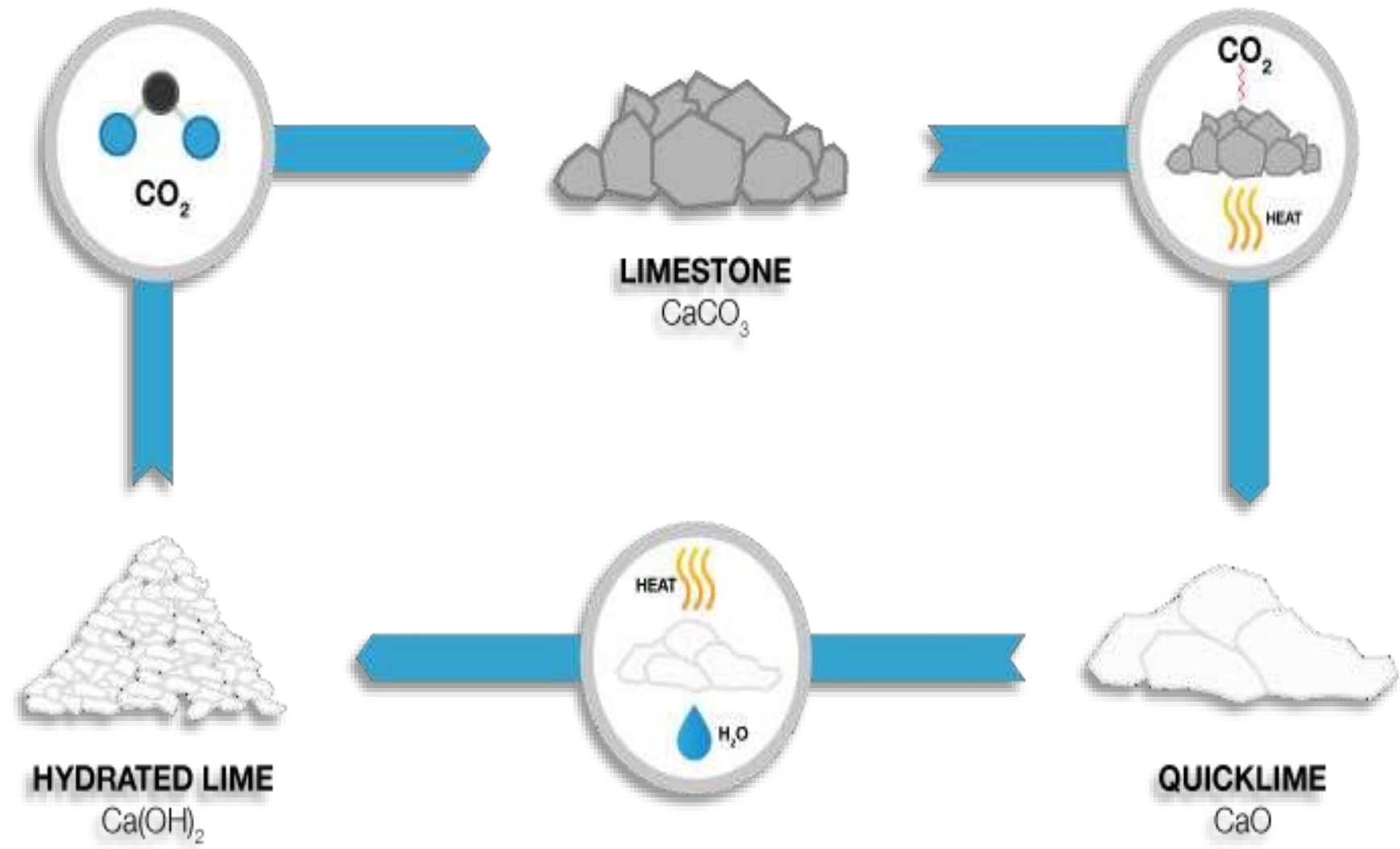
Hydraulic Lime: It is different in chemical composition from fat lime in that it contains a definite amount of clay in addition to CaO, clay content in hydraulic lime may range from 10 to 30% by weight.

This clay plus lime composition gives the hydraulic lime a property of hydraulicity.

This color of this lime is not perfectly white hence it is not used for finishing work

POOR LIME

- It is the lime which is produced from relatively impurities lime stone having high % of impurities on it (Clay Content Greater than 30%)
- This lime does not slake ,set or hardens very slowly posses poor binding property ,hence is generally used for inferior work like brick walls
- This lime posses muddy whit color.



HYDRAULIC LIME



HYDRAULIC LIME

Hydraulicity: The capacity to set and harden even under water and in the absence of air as between very thick walls”

The hydraulic lime is further classified into three sub types on the basis of hydraulicity of the lime.

Subdivision based on hydraulicity:

Class A – Eminently Hydraulic: clay content 21-30%, sets under water in 24 hours

Class B – Moderately Hydraulic: clay content 11-20%, sets in water in about a week

Class C – Feebly Hydraulic: clay content 5-10%, sets under water within a month or more

Class D – rich in magnesium, suitable only for finishing coats, do not possess hydraulicity

Class-A :

Eminently Hydraulic Lime

Can be used for structural works such as arches domes etc.

Class-B :

Semi-Hydraulic Lime

Can be used for constructing masonry

Class-C :

Fat Lime

Can be used for Finishing Coat in Plastering , white washing, etc. or used for masonry mortar with addition of pozzolanic material

Class-D :

magnesium / dolomite Lime

Can be used for Finishing Coat in Plastering and white washing.

Class-E :

Kankar Lime

Produce by burning Lime Nodules (found in soil like black cotton soils contain silica) , it can be use for masonry mortar

Class-F :

Siliceous dolomite Lime

It is used generally for undercoat and finishing coat of plaster

PROPERTIES OF LIME

Following are the more important properties that determine the quantity of lime as a building material,

- Hardens very slowly
- High degree of plasticity
- Soluble in water
- Colour is perfectly white
- Sets slowly in presence of air
- Slakes vigorously.
- Increase in percentage of clay makes slaking difficult & increases the hydraulic property.
- With 30% of clay, hydraulic lime resembles natural cement.
- Can set underwater & in thick walls with no free circulation of air.
- Colour is not perfect white.
- Forms a thin paste with water & does not dissolve in it



TESTS FOR LIME

Building lime required to satisfy a number of tests before it is approved for use in construction work.

1. Chemical Composition: Lime is tested To determine ratio of different components such as CaO , MgO , SiO_2 , AlO_2 and iron oxides.

The limits of component should be as per IS:712-1973

2. Fineness: To determine the fineness of grain size by sieve analysis The residue Is weighed after the test and should not exceeds the specified limits.

SOUNDNESS TEST

3. Soundness: It is defined as The capacity of lime to resist expansion on setting

- It is tested with the help of Le Chatelier apparatus.
- Lime is mixed with sand and water and filled in mould of the apparatus.
- The distance between the indicator points is noted and after one hour placed in a steam boiler for three hours.
- After the boiling action, the distance between the indicators is noted once again.
- Difference between the two readings gives a measure of soundness which should be within prescribed limit.

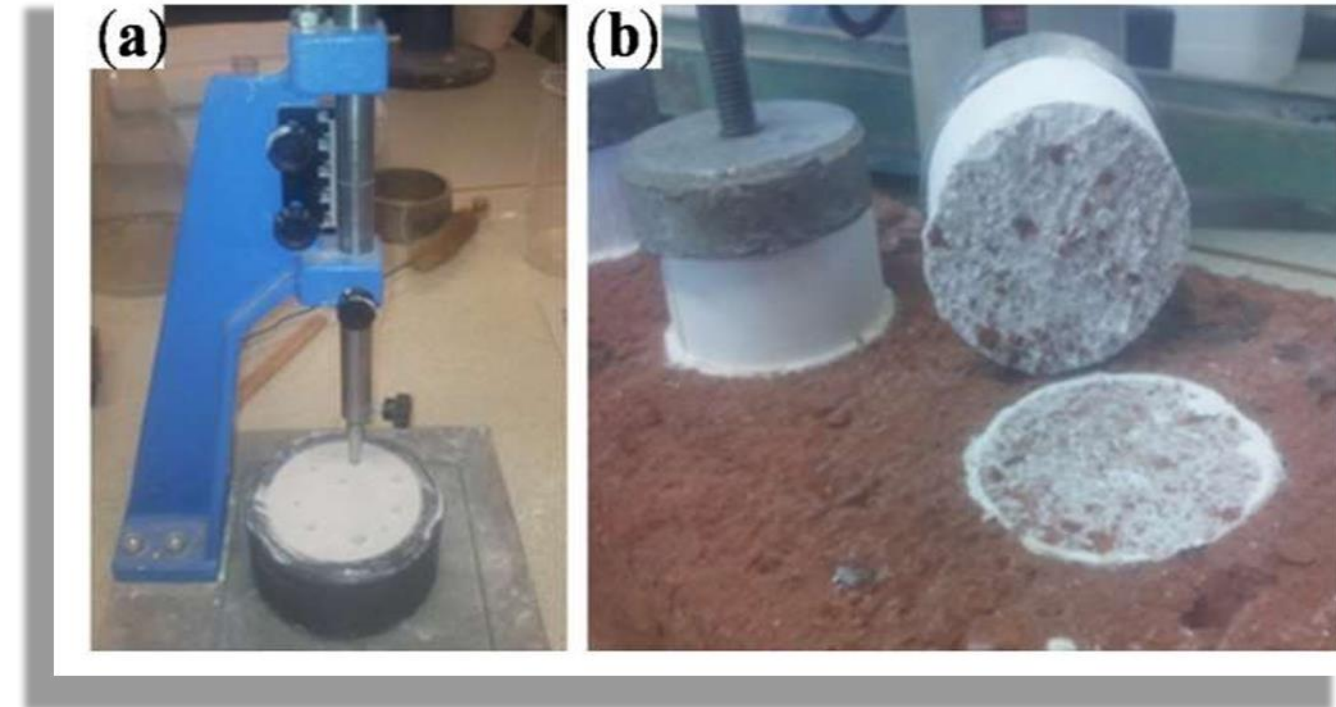
SOUNDNESS TEST



SETTING TIME TEST

Setting Time: The time that elapses between the preparing of lime paste of standard consistency and setting of the same paste after it has been filled in a standard mould (Vicat Mould) to a minimum specified depth.

- Initial setting time: The time that elapses from the gauging to the penetration of the Vicat needle in the paste up to a specified depth – 35mm
- Final setting time: The time that elapses from the gauging to a time when Vicat needle can no more penetrate the paste (because it is already set) and makes only a mark on the surface.



STRENGTH TEST

Strength: Tested by preparing specimens of standard sand-lime mortar,
compressive strength – average of 12 specimens, tested on standard testing machine on
specimens taken after 14 days and 28 days

transverse strength – average of 6 specimens, tested on standard transverse strength testing
machine

The setting time and strength tests are recommended for hydraulic limes only.

USES OF LIME

- Chemical raw material in the purification of water & for sewage treatment.
- Flux in the metallurgical industry
- Matrix for concrete & mortar.
- Refractory material for lining open-hearth furnaces.
- Production of glass
- Making mortar for masonry work
- Plastering of walls & ceilings
- Production of artificial stone, lime – sand brick, foam – silicate products, etc.
- Soil stabilization & improving soil for agricultural purposes.
- White washing & as a base coat for distemper.
- When mixed with Portland cement, can be used in place with costly cement mortar.

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*Thank
you!*

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