



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(Brick)

Presented by – Teekam Singh (Assistant Professor)

VISION AND MISSION OF INSTITUTE

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.

VISION AND MISSION OF DEPARTMENT

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.

CONTENTS

- Introduction
- Types of bricks
- Properties
- Uses of Bricks
- Test of Bricks

INTRODUCTION

- The artificial material of construction in the form of clay bricks of uniform size of shape are known as bricks.
- Traditional brick:- 23cm X 11.4 cm X 7.6 cm 2)
Modular Brick :- 19 cm X 9 cm X 9 cm



TYPES OF BRICKS

Various types of bricks used in masonry are :-

- Common Burnt Clay/Mud Bricks.
- Sand Lime Bricks (Calcium Silicate Bricks)
- Engineering Bricks
- Fly ash Bricks
- Fire Clay Bricks
- Autoclaved aerated concrete (AAC) Bricks.



PROPERTIES OF BRICK

The following are the required properties of good bricks:

- (i) A good brick should be able to resist the effects of weathering agencies like temperature, rain, etc.
- (ii) Colour: Colour should be uniform and bright.
- (iii) Shape: Bricks should have plane faces. They should have sharp and true right angled corners and uniform in shape.
- (iv) Size: Bricks should be of standard sizes as prescribed by codes.
- (v) Texture: They should possess fine, dense and uniform texture. They should not possess fissures, cavities, loose grit and unburnt lime.
- (vi) Soundness: When struck with hammer or with another brick, it should produce metallic ringing sound.
- (vii) Hardness: The bricks should be sufficiently hard finger nail scratching should not produce any impression on the brick.
- (viii) Strength: Crushing strength of brick should not be less than 3.5 N/mm^2 . A field test for strength is that when dropped from a height of 0.9 m to 1.0 m on a hard ground, the brick should not break into pieces.

PROPERTIES OF BRICK(CONT.--)

(ix) Water Absorption: After immersing the brick in water for 24 hours, water absorption should not be more than 20% by weight for class-I, bricks and 22 % by weight for second class bricks.

(x) Efflorescence: Bricks should not show white patches when soaked in water for 24 hours and then allowed to dry in shade. White patches are due to the presence of sulphates of calcium, magnesium and potassium. They keep the masonry permanently in damp and wet conditions.

(xi) Thermal Conductivity: Bricks should have low thermal conductivity, so that buildings built with them are cool in summer and warm in winter.

(xii) Sound Insulation: Heavier bricks are poor insulators of sound while light weight and hollow bricks provide good sound insulation.

(xiii) Fire Resistance: Fire resistance of bricks is usually good. In fact bricks are used to encase steel columns to protect them from fire.

USES OF BRICKS

As a Structural Unit Since the clay bricks or burnt bricks are strong, hard, durable, resistive to abrasion and fire, therefore, they are used as a structural material in different structures:-

1. Buildings, 2. Bridges, 3. Foundations, 4. Arches, 5. Pavement & Footpath, 6. Roads, 7. Drains, 8, Tunnels, 9. Boundary Walls etc. □ As an Aesthetic Unit/Surface Finish Bricks of different colors, sizes and orientations are used to get different surface designs. As an aesthetic material bricks are used in Landscaping, as Facing Brick, as a Fire Resistant Material. □ Bricks in the metallurgy and glass industries are often used for lining furnaces. □ Bricks are used to prepare brick jail. □ Manufacture of surkhi (powder bricks). □ Construction of brick retaining wall.

TESTS OF BRICKS

- Compressive Strength
- Water absorption
- Efflorescence
- Dimensional tolerance

COMPRESSIVE STRENGTH

- Five bricks are taken at random and their dimensions are measured □ Immersed in water of 25°C to 29°C for 24 hrs.
- Surplus moisture is allowed to drain and the frog, if any, is filled with mortar 1:3.
- It is kept under a jute bag for another 24hrs after which it is immersed in clean water for 3 days.
- At the time of testing, these bricks are removed from water, wiped dry and placed with the flat surface between plywood sheets each of 3mm thickness.
- This specimen is kept under UTM and load is applied.
- The compressive strength should note down.



WATER ABSORPTION

Five bricks taken for test. They are allowed to dry in an oven at 110 C to 115 C till they attain a constant weight usually takes place in 48 hrs.

Then they are cooled at room temperature, which generally takes 4 to 6hrs without a fan and weight W_1 is measured.

Then they kept in clear water at 29C for 24 hrs and wiped dry with a damp cloth and weight W_2 is measured.

Then average percentage of water absorbed as percentage of dry weight is reported.



EFFLORESCENCE

Five samples are taken and the bricks are placed vertically in a dish 30cmX20cm approximately in size with 2.5 cm immersed in distilled water. The water is allowed to be absorbed by the brick and evaporated through it.

NIL – there is no perceptible deposit of salt.

Slight – Not more than 10% of the area of brick is covered with salt

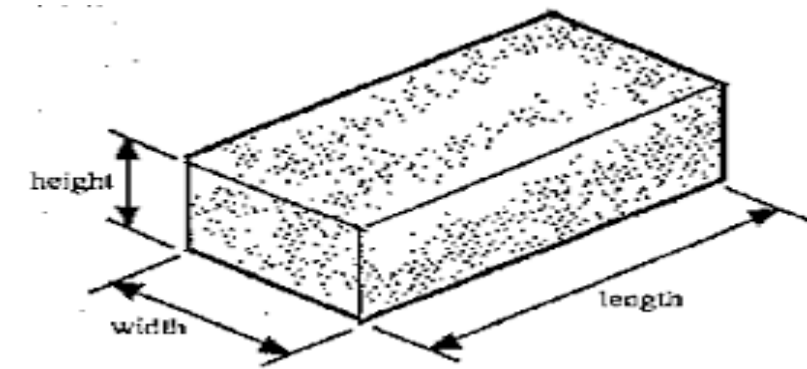
Moderate – heavy deposit covering upto 50% of the area of the brick

Heavy – Heavy deposit covering more than 50% of the area of the brick.



DIMENSIONAL TOLERANCE

- Bricks are selected at random to check measurement of length, width, height.
- Variations in dimensions are allowed only within narrow limits, $\pm 3\%$ for class one and $\pm 8\%$ for other classes



REFERENCES

- Building Materials: Products, Properties and Systems by Ghambir, Tata Mc Graw Hill, Delhi
- Building Materials by Prabin singh; S.K.Kataria & Sons., 2012
- Building Materials by S. Duggal; New Age International Publishers.



JECRC Foundation



**JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE**

*Thank
you!*

STAY HOME, STAY SAFE