



LECTURE NOTES : BRICKS IN CIVIL ENGINEERING MATERIALS

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PREFACE

Alhamdulillah, we are grateful to Allah S.W.T The Almighty for His help that enabled us to complete this e-book. This e-book is written based on the curriculum by Polytechnic Malaysia for Diploma in Civil Engineering. It covers a basic knowledge about Bricks In Civil Engineering Materials and suitable as reference for students and lecturers. Furthermore, we would like to thank our colleagues in Department of Civil Engineering, Sultan Mizan Zainal Abidin Polytechnic who gave a lot of encouragement, support and contribution in preparing this e-book until it was published.

May Allah The Almighty bless this effort and reward all the good that has been given in the process of preparing and completing this e-book.

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SYNOPSIS

This lecture notes introduces the bricks and blocks including its types, properties and usage. Lecturer and student will also be exposed to basic knowledge of brick bonding in brickwork and their fundamental principles of brick bonding in brick arrangement.



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1.0

INTRODUCTION TO BRICKS AND CONCRETE BLOCK



1.1 BRICKS

INTRODUCTION

Nowadays, bricks seem to be commonly used in building materials. It is most ancient and most recognized building materials. Man has used brick for building purpose for thousands of years. Bricks date back to 7000 BC, which makes them one of the oldest known building materials. They were discovered in southern Turkey at the site of an ancient settlement around the city of Jericho. Bricks material mostly popular in ancient Egypt about 3,500 BC ago, during Roman Empire in 11th century, Renaissance Period in 16th century and until nowadays, it is still been used. The first bricks, made in areas with warm climates, were mud bricks dried in the sun for hardening. Bricks were made by hand until about 1885. Once the Industrial Revolution broke out, the brickmaking machinery was introduced. Consequently, the number of clays that could be made into brick was greatly increased which influenced the production capacity.



1.1 BRICKS

MATERIAL USE FOR MAKING BRICKS

Clay is the naturally raw material used for producing most bricks. It consists mainly of silica and alumina. Suitable clays for brick making are reds, marls, gaults, loams, knotts and plastic, clay shales, refractory clays and brick earth.

The Stage Of Manufacture

1. Excavation of the raw materials



Clay Excavation

The clay is excavated by machine from quarries close to the brickworks or brought into the brickwork from other quarries.

2. Preparation the raw materials



Clay Grinding and Mixing

Clay is prepared by crushing and/or grinding and mixing until it become a uniform consistency. Some clays have to be weathered so that soluble salts are washed out of them.

1.1 BRICKS

MATERIAL USE FOR MAKING BRICKS

The Stage Of Manufacture

3. Moulding

The moulding technique is design to suit the moisture content of the clay. The following methods below being described in order of increasing moisture content.

(a) Semi-Dry Process

Process which is used for manufacture of fletton bricks (ex London bricks-now part of Hanson brick) utilies a moisture content in the region of 10%.



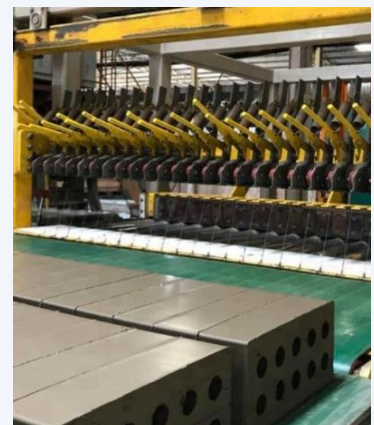
Fletton Brick Press

(b) Stiff Plastic Process

This utilies clays which are tempered to a moisture content about 15%. A stiff plastic consistency is obtained, the clay being extruded and then it compacted into a mould under high pressure.

(c) Wire Cut Process

Clay is tempered to a moisture content about 20% and must be process to form a homogenous material. This is extruded to a size which allows for drying and firing shrinkage and units are cut to the correct thickness by tensioned wire.



Wire Cut Process

1.1 BRICKS

MATERIAL USE FOR MAKING BRICKS

The Stage Of Manufacture



Chamber/Tunnel Dryer

4. Drying

Newly made bricks called “green bricks” are slowly dried by standing them in the open or drying chambers . It helps to remove as much moisture as possible to prevent the formation of cracks, twist and warps while the bricks are fired.



Firing of Bricks

5. Firing Clay Bricks

The purpose of firing is to transform the relatively weak dried clay into strong, durable bricks. The firing of bricks is a complex subject, because of the large difference in the types of clay used, in the methods of manufacture, in the types of kiln used and in the types of products.

1.1 BRICKS

CLASSIFICATION OF BRICKS

Bricks are classified according to their variety, quality and type.

Variety

Bricks may be divided into four(4) broad varieties whether it made from clay, sand and lime or concrete.



Facing Bricks

1. Facing Bricks

These are made in a wide variety of colour and surface textures so as to be durable and attractive to look at.



Common Bricks

2. Common Bricks

These bricks are for general purpose walling which is most likely to be below ground level, externally rendered or internally plastered. These bricks are not given particularly attractive surface features but are hard and durable.

1.1 BRICKS

CLASSIFICATION OF BRICKS

Bricks are classified according to their variety, quality and type.

Variety

Bricks may be divided into four(4) broad varieties whether it made from clay, sand and lime or concrete.

3. Engineering Bricks

These brick are exceptionally hard and dense which have a low porosity and therefore absorb very little water. Engineering bricks are intended fro walls that are heavily loaded or exposed to risk and frost damage.

4. Refractories Bricks

Specially selected clays are used to made these kind of bricks to withstand very high temperatures.

1.1 BRICKS

CLASSIFICATION OF BRICKS

Bricks are classified according to their variety, quality and type.

Quality

There are three(3) qualities of brick.

1. Ordinary

Durable enough to be used in the external face of a building. They can resist frost attack and there is no limit on their soluble salt content.

2. Internal

These bricks need to be protected when it used externally. There is no limit on their soluble salt content and they need not to be frost resistant.

3. Special

Special quality bricks must be very durable to withstand harsh weather conditions where they will constantly soaked with water and attacked by frost. These bricks must have a limited soluble salt content.

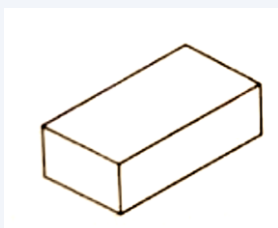
1.1 BRICKS

CLASSIFICATION OF BRICKS

Bricks are classified according to their variety, quality and type.

Type

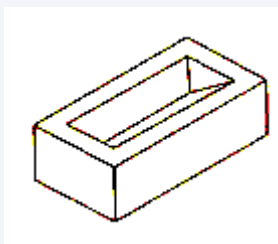
There are five(5) main types of bricks.



Solid Brick

1. Solid

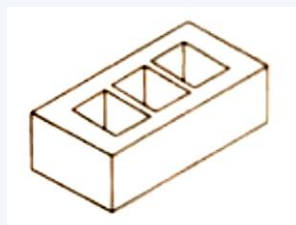
The volume of pores in a solid bricks must not exceed 25% of the total volume of the brick.



Frog Brick

2. Frog

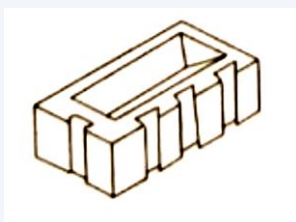
A frog formed by the depression in one or both bed faces of a brick. The volume of the frog must not exceed 20% of the total brick volume.



Hollow Brick

3. Hollow

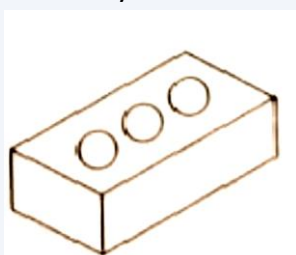
The volume of the larger holes must not exceed 25% of the total brick volume.



Keyed Brick

4. Keyed

Dovetail grooves in one header and one stretcher face to provide a key for plaster or rendering.



Perforated Brick

5. Perforated

Volume of the small holes will exceed 25% of the total brick volume.

1.2 OTHER BRICKS

CALCIUM SILICATE BRICKS

It is commonly called as sand lime bricks on site and made from a carefully controlled mixture of 90% from silica sand plus 10% lime. This mixture is pressed into steel moulds and then steam hardened.

Colours

Basic colours of calcium silicate bricks which are very smooth and of regular shape is white. Different powder pigments added during the mixing stage of manufacture gives a range of facing brick colours. There are multi colours and rustic surface texture available.

Size

215mm x 102.5mm x 65mm

Compressive Strength

Identical looking white calcium silicate bricks of different strength batches are identified by paint colour marking of the packs as shown in table 1.1

Table 1.1 : Calcium Silicate Bricks-Compressive Strength Classes

Class	Mean Compressive Strength Not Less Than (N/mm ²)	Colour Marking Of Packs
7	48.5	Green
6	41.5	Blue
5	34.5	Yellow
4	27.5	Red
3	20.5	Black

1.2 OTHER BRICKS

CONCRETE BRICKS

It is cast from a mixture of fine aggregate and Portland cement pressed into steel moulds. The compressive strength of these bricks are determined by the natural setting and hardening process of cement. They may solid or frogged and available for facings, commons and engineering quality.

Colour

Basic colour of these bricks are grey due to the Portland cement. Inorganic powder pigments are used to produce a range of plain and multi colour bricks.

Size

215mm x 102.5mm x 65mm



Concrete Bricks

Compressive Strength

Commons and facings are made with a compressive strength of 21 N/mm² while engineering quality is at 40 N/mm².

1.3 BLOCKS

CONCRETE BLOCKS

Concrete blocks are produced in a range of size and shapes. The face side is usually 450mm x 225mm. The thickness of these block varies from 37mm up to 225mm and the weight from 6.3 to 15kg. These block are produced in solid, hollow and multi cuts format.

Concrete Blocks



FOUNDATION BLOCKS

These blocks are manufactured in widths from 250mm to 335mm and used below ground level and designed to support cavity walls. They may lightweight or dense. The dense may require two persons to bed them.

Foundation Blocks



Clay Blocks



CLAY BLOCKS

Clay blocks manufacture is similar to clay brick which is using the extrusion/wire cut method. These blocks are made from finely washed clay with certain special properties which is forced through extruding machine. The blocks are usually 300mm long and 225mm high and the thickness range from 37mm to 100mm for partition walls.

1.3 BLOCKS

SPECIAL BLOCKS

These block is such as the return block are usually designed to stiffen walls where bonding could cause weakness. Some manufacturers produced blocks with an insulant bonded to the outside face while others produce hollow blocks with an insulant inserted in the voids.

Precast block for walling built can be divided into two main categories.

1. Load Bearing Wall

These blocks are made by precast in moulds and compacted with the aid of vibration or moulding machines involving the use of compressed air, or a combination of both method. Concrete comprised of Portland cement and a variety of aggregates such as crushed stone, rock ballast, shingle and etc. are usually used to made these blocks.

2. Non Load Bearing Wall

These blocks also can be made by precast in moulds. It also can be produced in slab format and cut to size when set and are usually made with cement and a variety of lightweight materials such as fly ash, burnt coke and etc.

1.3 BLOCKS

BLOCK SIZE

As describe in BS 2028 a block is a walling unit exceeding the dimensions for bricks stated in BS 3921. The block height should not exceed either its length or six times its width.

Precast concrete block are specified as Type A, Type B and Type C. Their size are list in Table 1.2

Table 1.2 : Block size

Type Of Block	Length x height (mm)	Thickness (mm)
A	400 X 100	75, 90, 100, 140, 190
	400 X 200	140, 190
	450 X 225	75, 90, 100, 140, 190, 225
B	400 X 100	75, 90, 140, 190
	400 200	
	450 200	75, 90, 100, 140, 215
	450 225	
	450 300	
	600 200	
	600 225	
C	As above but intended for non load bearing walls	As above but intended for non load bearing walls

1.4 PROPERTIES OF BRICKS

INTRODUCTION

The essential properties of bricks may be conveniently discussed under following four headings below.

PHYSICAL PROPERTIES

MECHANICAL PROPERTIES

THERMAL PROPERTIES

DURABILITY PROPERTIES



1.4 PROPERTIES OF BRICKS

PHYSICAL PROPERTIES

SHAPE



Sharp Edges and Regular Surface of Bricks

The standard shape of an ideal brick is truly rectangular. It has Well defined and sharp edges. The surface of the bricks is regular and even.

SIZE



Variety of Brick Sizes Depends On The Country

The size of brick used in construction varies from country to country and from place to place in the same country.

COLOUR



Variety of Brick's Colour

The most common colour of building bricks is under the class of red. It may vary from deep red to light, buff and purple.

DENSITY



Variety of Density Based On Type of Clay Used

The density of bricks or weight per unit volume depends mostly on the type of clay used.

1.4 PROPERTIES OF BRICKS

MECHANICAL PROPERTIES

COMPRESSIVE STRENGTH

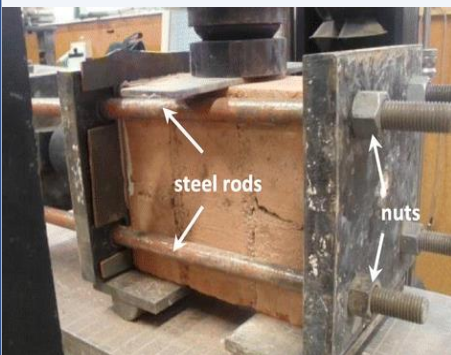
- i. It is the most important property of bricks especially when they are used in load-bearing walls.
- ii. The compressive strength of a brick depends on the composition of the clay and degree of burning.

FLEXURE STRENGTH

- i. Bricks are often used in situations where bending loads are possible in a building. As such, they should possess sufficient strength against transverse loads.
- ii. It is specified that the flexural strength of a common building brick shall not be less than 10 kg/cm^2 .
- iii. Best grade bricks often possess flexural strength over 20 kg/cm^2 .



Load Bearing Walls Using Bricks Construction



Bricks Flexural Strength Test Set Up

1.4 PROPERTIES OF BRICKS

THERMAL PROPERTIES

- i. Besides being hard and strong, ideal bricks should also provide an adequate insulation against heat, cold and noise.
- ii. The heat and sound conductivity of bricks vary greatly with their density and porosity.
- iii. Very dense and heavy bricks conduct heat and sound at a greater rate.



Water Absorption Test on Bricks



Frost Action on Bricks



Efflorescence on Bricks

DURABILITY PROPERTIES

ABSORPTION VALUE

This property is related to the porosity of the brick.

FROST RESISTANCE

When bricks are used in cold climates, their decay due to this phenomenon of “frost action” may be a common process.

EFFLORESCENCE

It is a common disfiguring and deteriorating process of bricks in hot and humid climates.

1.5

USAGE OF BRICKS & CONCRETE BLOCKS

Brick/concrete block plays very important role in the field of civil engineering. They are used as an alternative of stones in construction purpose.



Walls Construction

CONSTRUCTION OF WALLS



Floor Construction

CONSTRUCTION OF FLOORS

CONSTRUCTION OF ARCHES & CORNICE



Arch Construction



Cornice Construction

CONSTRUCTION OF RETAINING WALL



Retaining Wall Construction

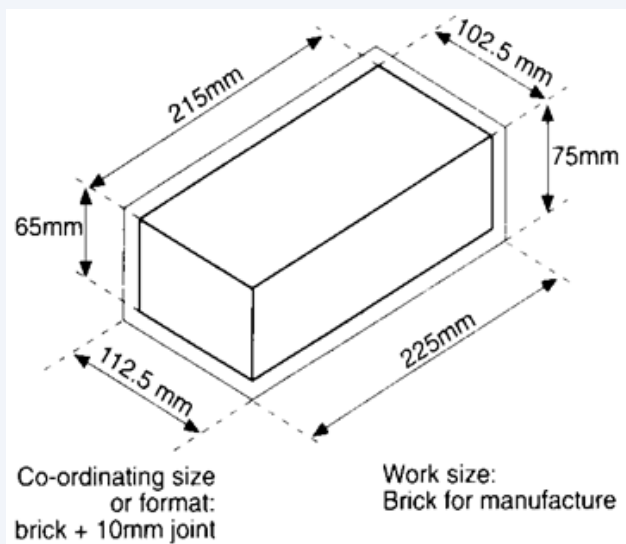
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BASIC KNOWLEDGE IN BRICKWORK

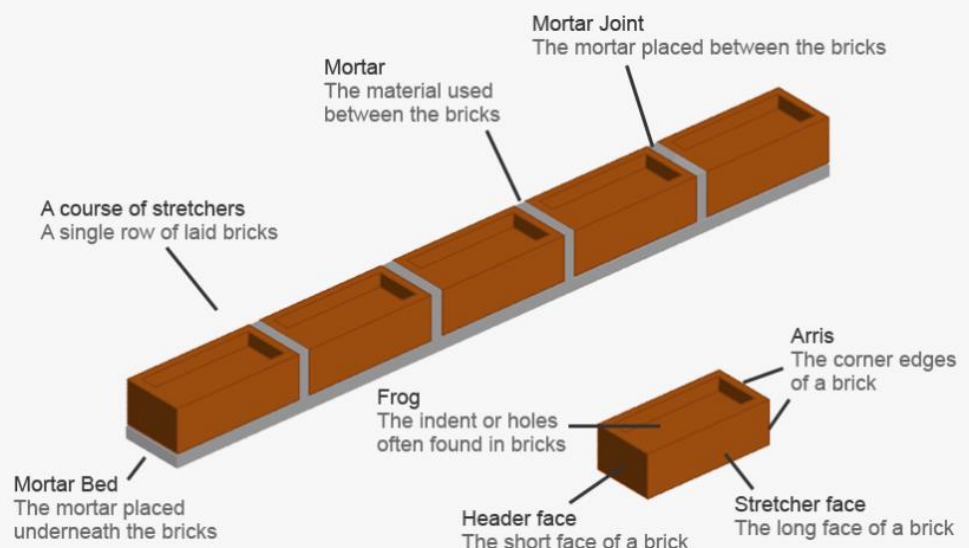


2.1 PART & DIMENSION OF BRICK

1. The standard co ordinating size for brickwork is 225 mm x 112.5 mm x 75 mm (length x depth x height). This includes 10 mm mortar joints.
2. The standard size for a brick itself is 215 mm x 102.5 mm x 65 mm (length x depth x height).



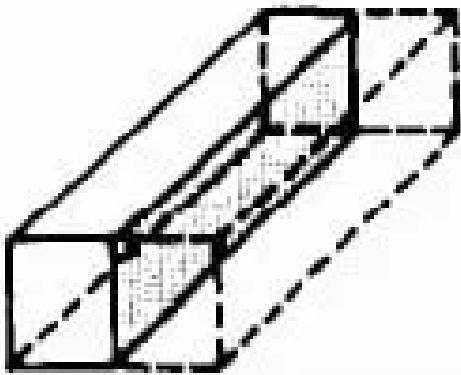
Standard Size For Brick : Co-Ordinating (nominal and Work (actual)



2.2 TYPES OF CUT BRICK

INTRODUCTION

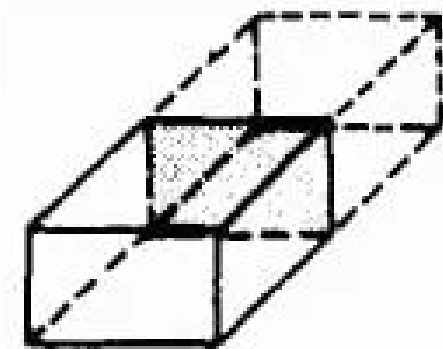
CLOSER TYPES



Closer Cut

It is a portion of a brick with the cut made longitudinal and used to close - up bond at the end of the course. A closer helps in preventing the joints of successive courses (higher or lower) to come in a vertical line. It may be various types.

BAT TYPES



Bat Cut

When a brick is cut across the width, the resulting piece is called bat. Thus, a bat is smaller in length than the full brick.

2.2 TYPES OF CUT BRICK

CLOSER TYPES

1. QUEEN CLOSER (HALF)

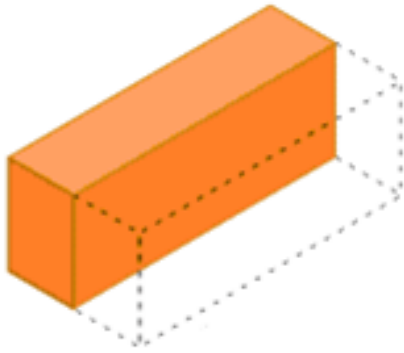
- i. When a brick is cut along its length, making it two equal halves then. It is called *queen closer*.
- ii. The width is half as wide as the original brick. This is also called as *queen closer (half)*.

2. QUEEN CLOSER (QUARTER)

- i. If a queen closer is broken into two equal pieces then it is known as *queen closer quarter*.
- ii. The width is half as wide as the original brick. This is also called as *queen closer (half)*.

3. MITRED CLOSER

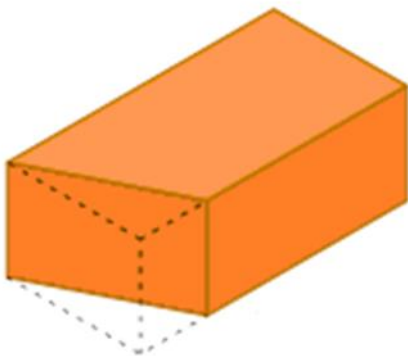
- i. It is a portion of a brick whose one end is cut splayed or mitred for full width.
- ii. The angle of splay may vary from 45° to 60° . Thus, one longer face of the mitred closer is of full length of the brick while the other longer face is smaller than its length.



Queen Closure (Half)



Queen Closure (Quarter)

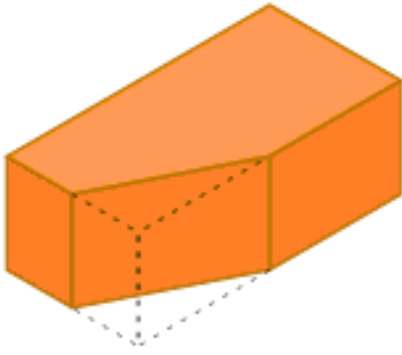


Mitred Closer

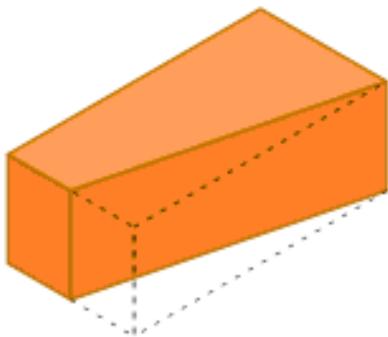
2.2

TYPES OF CUT BRICK

CLOSER TYPES



King Closer



Beveled Closer

4. KING CLOSER

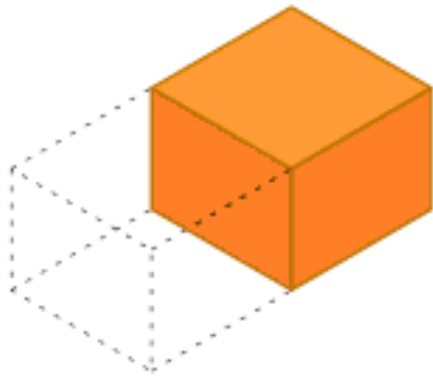
- i. If a brick is cut in such a way that the width of one end becomes half that of a full brick, while the width at the other end is equal to the full width, then it is called as *king closer*.
- ii. It is obtained by cutting out a triangular portion of the brick between the center of one end (width side) and the center of the other end (lay side). Thus it has half header and half stretcher face.

5. BEVELED CLOSER

- i. It is a form of king closer in which the whole length of the brick (ie. stretcher face) is chamfered or beveled in such a way that half width is maintained at one end and full width is maintained at the end other end.

2.2 TYPES OF CUT BRICK

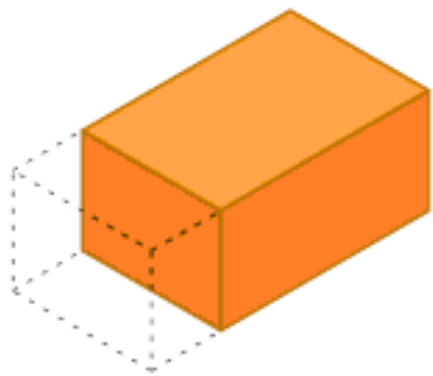
BAT TYPES



Half Bat

1. HALF BAT

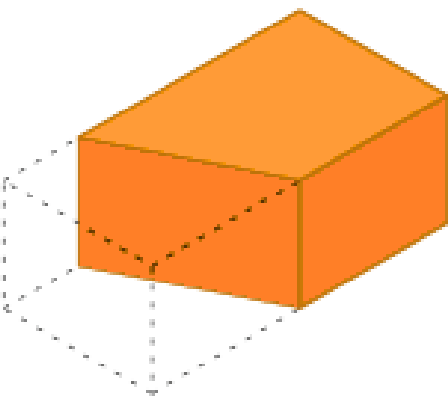
- i. If the length of the bat is equal to half the length of the original brick, it is known as *half bat*.



Three Quarter Bat

2. THREE QUARTER BAT

- i. It is a form of brick bat having its length equal to three quarter of the length of a full brick.



Beveled Bat

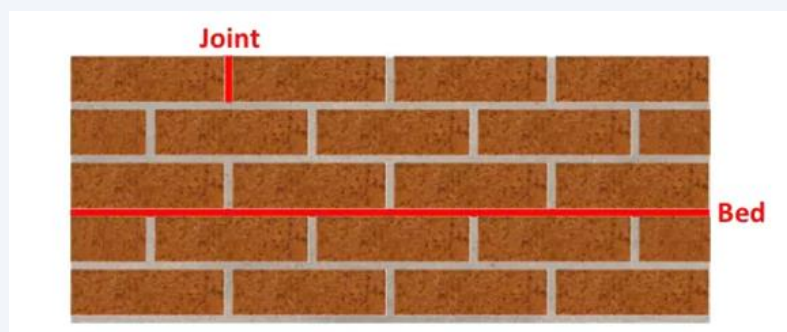
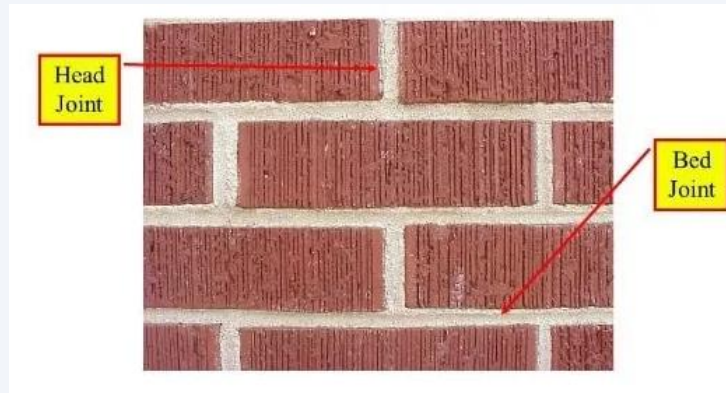
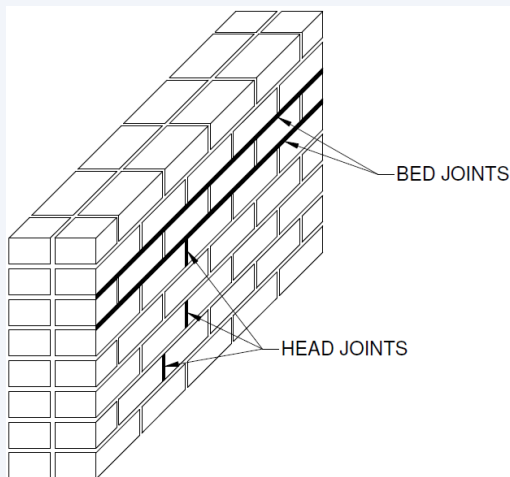
3. BEVELED BAT

- i. A brick bat is called *beveled bat*, when its width has beveled.

2.3 TERMINOLOGIES IN BRICK BONDING

HEAD JOINTS & BED JOINTS

Every brick is separated by beds and joints of mortar. The horizontal sections of mortar are called as a bed and the vertical sections is joints. The purpose of the beds and joints is to allow for slight variations in the dimensions of each brick.



Head Joints and Bed Joints

2.3

TERMINOLOGIES IN BRICK BONDING

OTHER TERMINOLOGIES

LAPPED

It is the horizontal distance between the vertical joints of successive brick course

PERPEND

It is an imaginary vertical line which includes the vertical joint separating two adjoining bricks.

RACKING/STEP

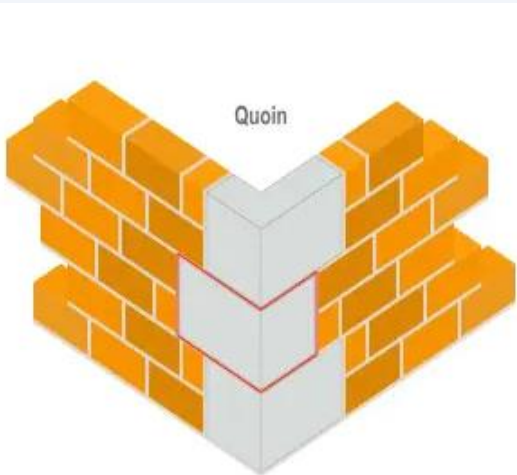
It is the termination of a wall in stepped fashion as shown in figure.

TOOTHING

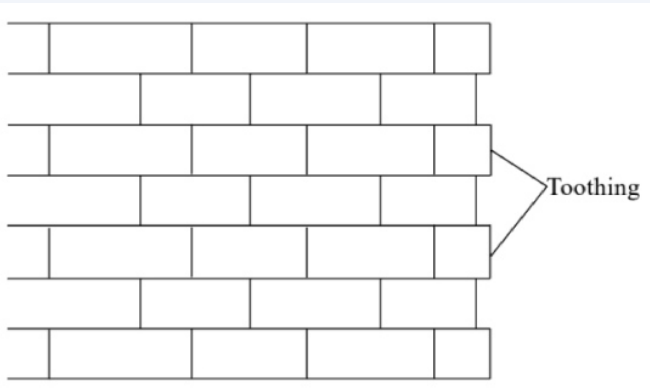
The purpose of tothing the brickwork is to allow for plumbing to be taking higher than racking back would normally allow.

QUOIN

It is brick or block at the corner of a wall.



Quoin

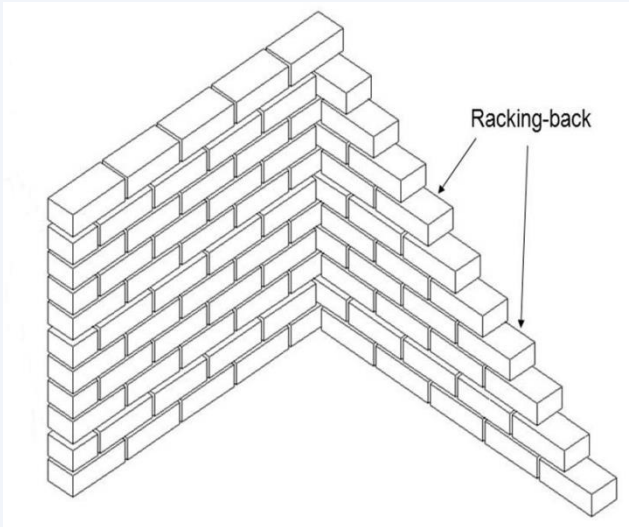


Tothing

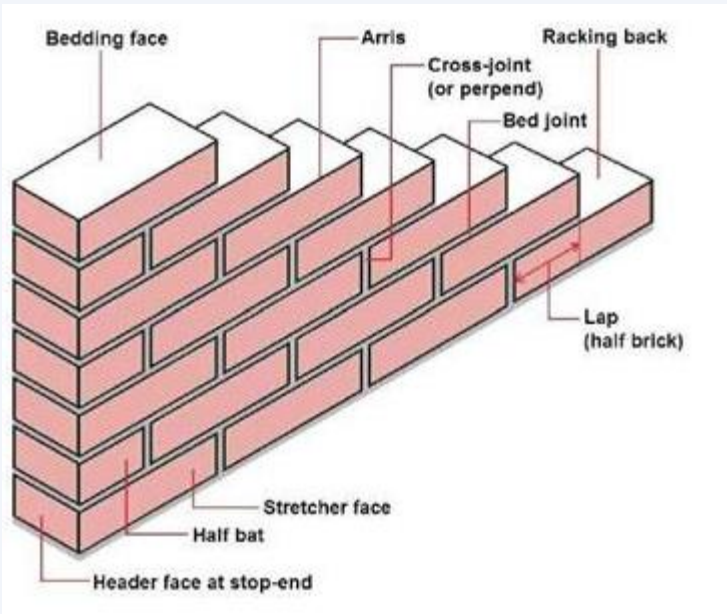
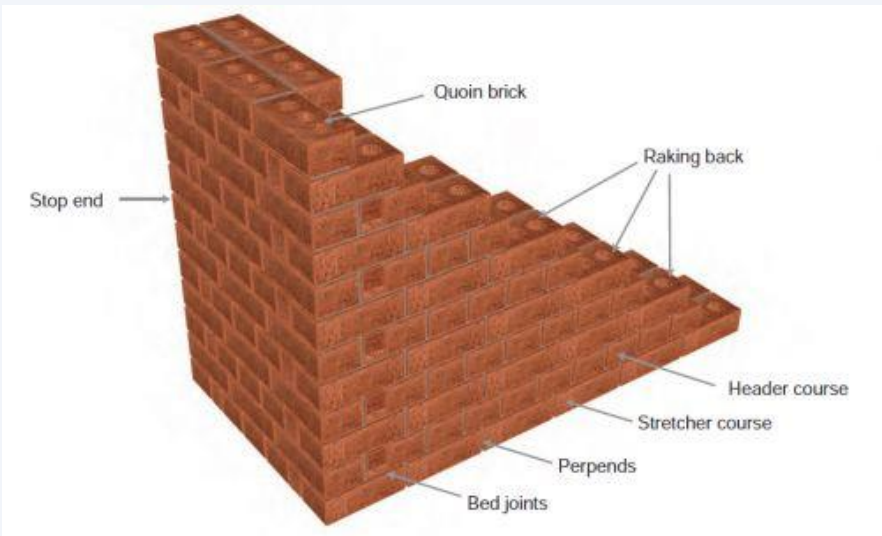
2.3

TERMINOLOGIES IN BRICK BONDING

OTHERS TERMINOLOGIES



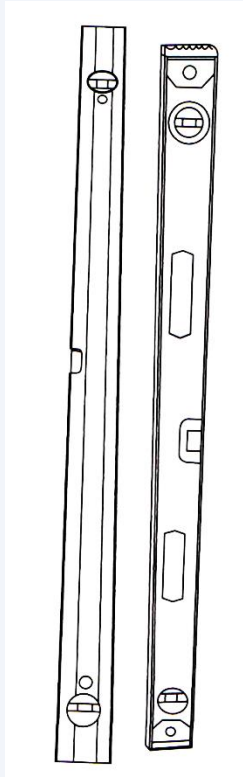
Racking/Step



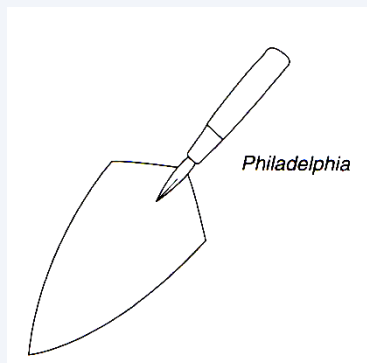
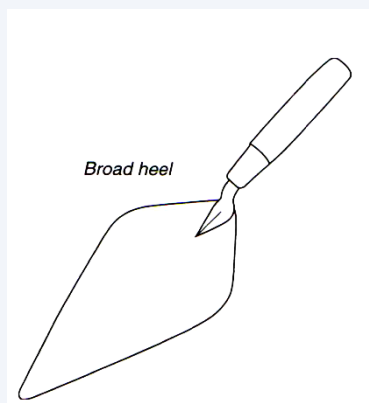
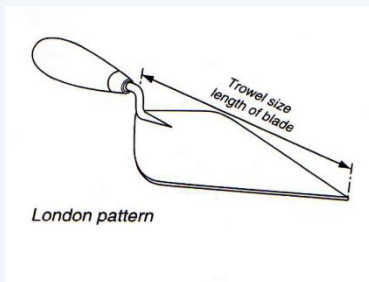
Brick Terminologies

2.4 BRICKLAYING TOOLS

BASIC BRICKLAYING TOOLS



Spirit level



Brick Trowel

1. Long Spirit level or 4'(1200mm) level

Used for leveling/building corners and checking for level and plumb.

2. Small Spirit level or 2'(600mm) Level

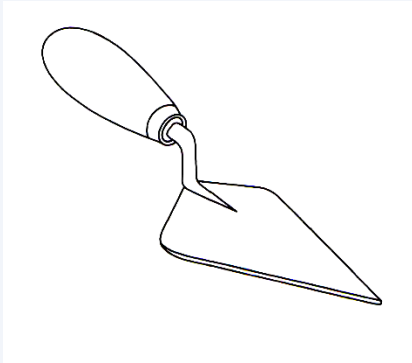
Used in situation for speed and where the long level is awkward and clumsy for an example, at a tight corners, piers or raking on roof.

3. Brick Trowel

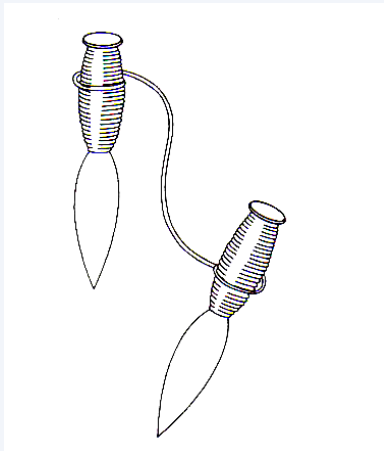
This is the most heavily worked item for bricklaying. It is used for gathering and spreading mortar and for rough cutting some kinds of brick. Available in a range of shapes, size and thickness of steel with blade length from 230mm to 330mm. The choice of trowel has a lot to do with personal preference.

2.4 BRICKLAYING TOOLS

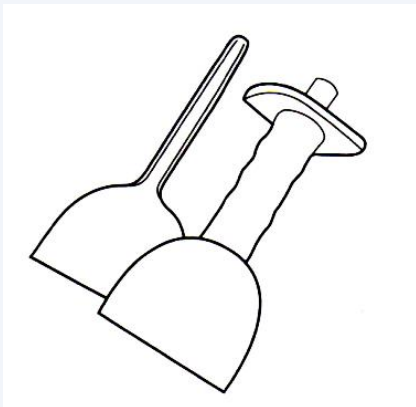
BASIC BRICKLAYING TOOLS



Pointing Trowel



Line & Pins



Bolster Chisels

4. Pointing Trowel

Used for filling up of joints and cracks and also for struck point.

5. Line & Pins

Used for controlling level, line, plumb and gauge of any walls

6. Cold Chisel

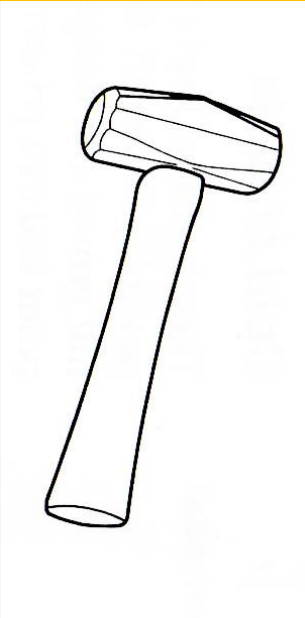
Used to removed any concrete or obstructing material in the path where bricks are to be laid.

7. Bolster Chisels

Used to cut a brick. Made with a 100mm width blade and it can be supplied with or without rubber or plastic collar for hand protection. It must be kept sharp for efficient operation.

2.4 BRICKLAYING TOOLS

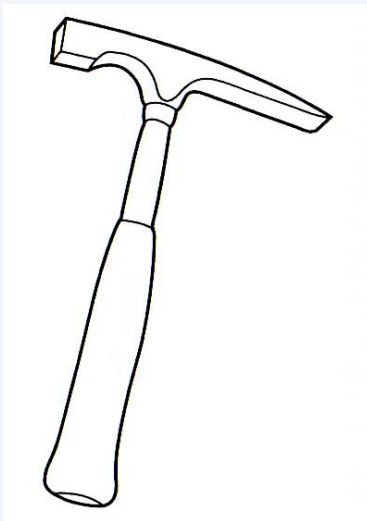
BASIC BRICKLAYING TOOLS



Lump Hammer

8. Lump Hammer

Used to hit bolster or other chisels.



Brick Hammer

9. Brick Hammer

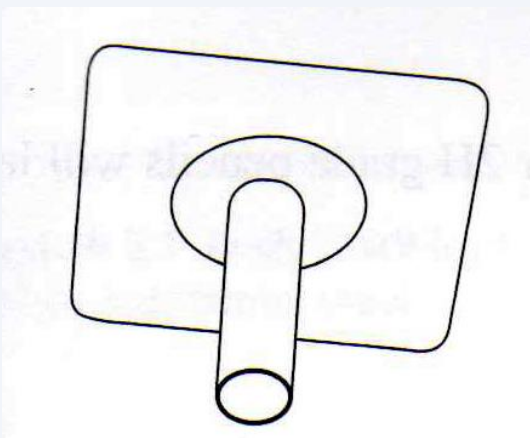
Used for rough cutting for very hard brick which can damage a trowel. It has one hammer head and one forged chisel end used to reground when worn.

10. Hand Hawk

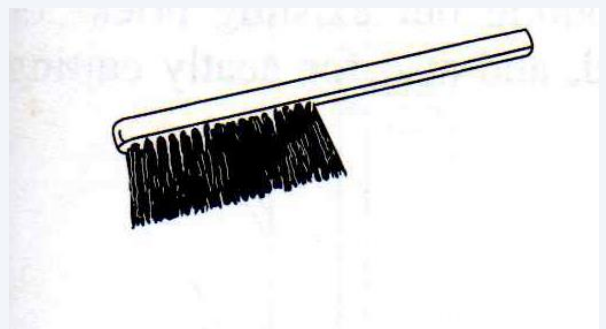
Used to place mortar to be used with a pointing trowel.

11. Hand Brush

Used to lightly brush brickwork face after finished the work.



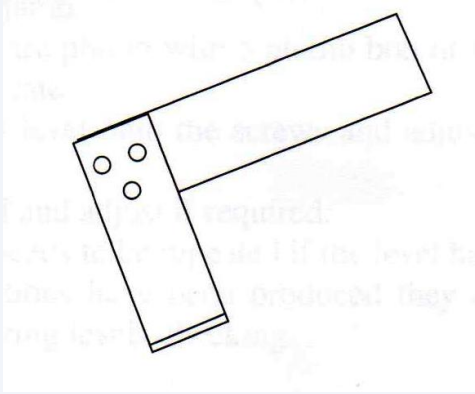
Hand Hawk



Hand Brush

2.4 BRICKLAYING TOOLS

BASIC BRICKLAYING TOOLS



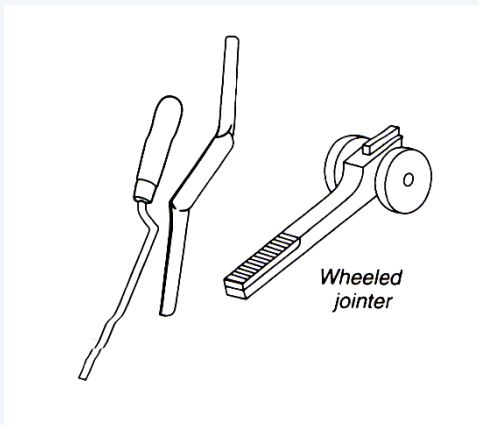
Square

12. Square

Used to mark a brick accurately before cutting.

13. Measuring Tape

Used for measuring purpose .



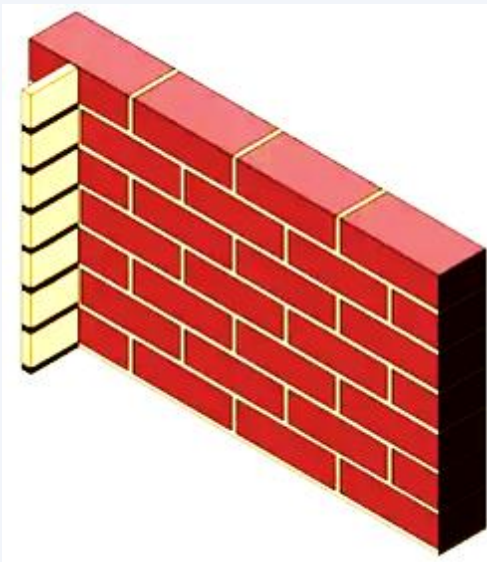
Jointing Tools

14. Jointing Tools

Used for applying a permanent finish to the exposed surface of mortar joints.

15. Gauge Rod

Gauge rod is used to ensure that the beds of mortar between each brick are uniform and to monitor overall wall height as each course is laid. Gauge rod can be made either by using timber or stainless steel.



Gauge Rod

3.0

BRICK BONDING



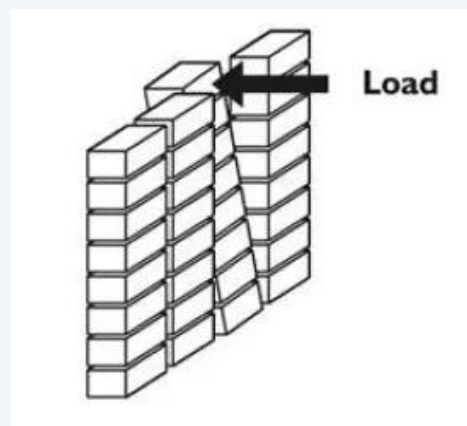
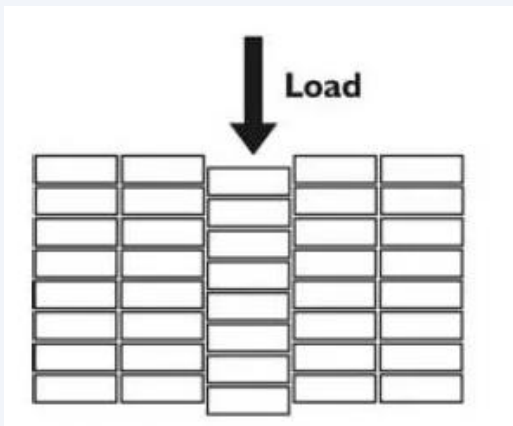
3.1 PRINCIPLE IN BRICK BONDING

PURPOSE OF BONDING

Main reason for bonding brickwork are:-

1. To ensure that any loads are distributed.
2. To strengthen a wall.
3. To ensure that it is able to resist sideways or lateral pressure.

The straight joints of an unbonded wall make it weak and tend to fail.



Unbonded Wall

3.1

PRINCIPLE IN BRICK BONDING

PRINCIPLES OF BONDING

- i. To maintain the strength, bricks must be lapped one over the other in successive course along the wall and its thickness.
- ii. Should be no straight joint in a wall, that is no vertical joints should coincide in consecutive courses. (Set out the $\frac{1}{2}$ or $\frac{1}{4}$ lap).
- iii. Follow the brick bonding pattern which is design by the designer.
- iv. It's important to control the stability and the strength of the wall.
- v. It's important to control the esthetical value in the surface of brick wall.
- vi. To be effective, the bonding must distribute the loading evenly throughout the length of the wall, so that each part of the wall carries a small amount of the load.

3.2 TYPES OF BONDS IN BRICKWORK

INTRODUCTION

There are several bonds in general use, but for the beginning or learning purpose bonds in brickwork for Header Bond, Stretcher Bond, English Bond and Flemish Bond will be explained.

1. Stretcher Bond

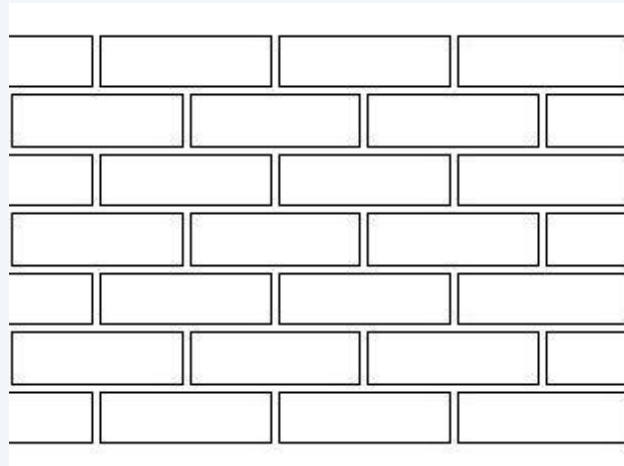
- i. Stretchers refers to the long face or part of brick.
- ii. It is constructed by laying the bricks in the mortar such that only then stretcher face of the bricks remain exposed.
- iii. It also referred as a Running Bonds as it consist of a continuous running pattern.
- iv. It is most commonly used as a facade for the main masonry structure and the construction garden walls, boundary walls, division walls, chimney stacks and etc.

Advantages of Stretcher Bond

- i. It is easy and simple to construct.
- ii. Skilled manpower is not required for the construction of stretcher bond.

Disadvantages of Stretcher Bond

- i. Stretcher bond cannot be used in case of full width thick brick walls as they are suitable only for half brick thick walls such as partition walls.

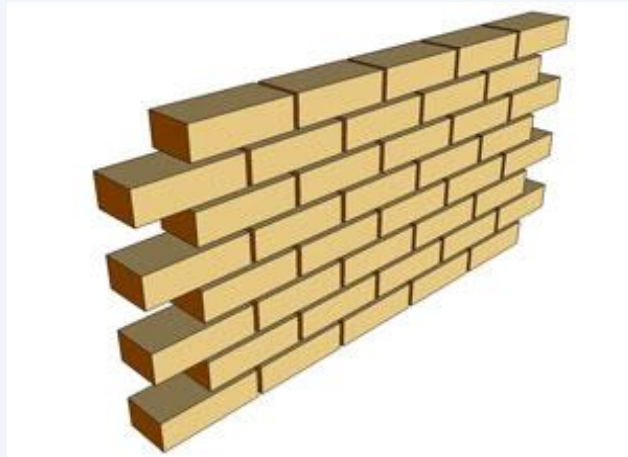


Stretcher Bond

3.2 TYPES OF BONDS IN BRICKWORK

Disadvantages of Stretcher Bond

- ii. When the structure has long span or height, the masonry walls cannot be constructed using stretcher bond as it can't withstand the load imposed.
- iii. For landscaping and architectural masonry constructions, stretcher bond is not desirable.



Stretcher Bond

3.2 TYPES OF BONDS IN BRICKWORK

2. Header Bond

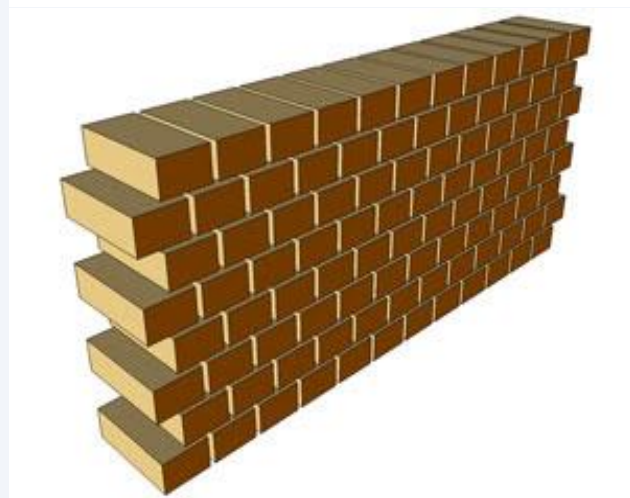
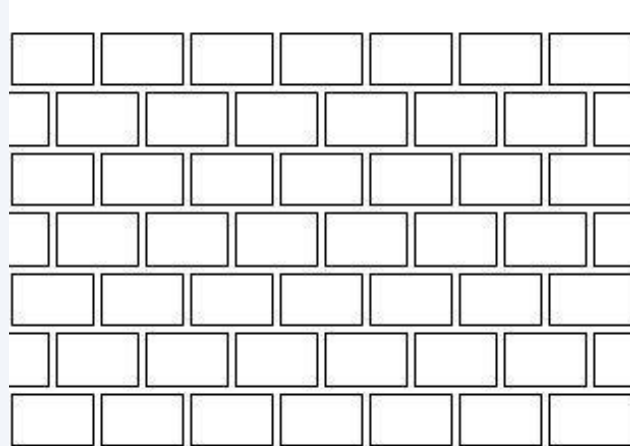
- i. A brick course laid flat with the short end of the brick exposed.
- ii. This method is particularly strong as the width of the wall is the whole length of a
- iii. Historically it was used for buildings of high quality, often used for curved brickwork.

Advantages of Header Bond

- i. It is easy and simple to construct.
- ii. Skilled manpower is not required for the construction as in header bond.

Disadvantages of Header Bond

- i. It does not have considerable strength in the direction of the wall.
- ii. It is not desirable for the construction of aesthetically important masonry structures.



Header Bond

3.2 TYPES OF BONDS IN BRICKWORK

3. English Bond

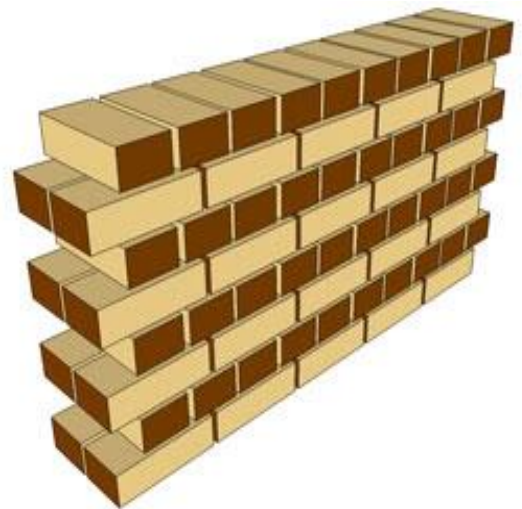
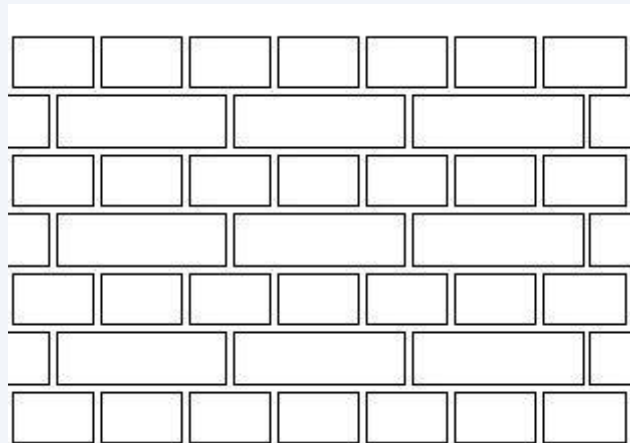
- i. It comprises of alternate courses of headers and stretchers.
- ii. It provides a strong bond with no straight joints occurring in any part of the wall.
- iii. It is used in walls where strength is preferable to appearance.

Advantages of English Bond

- i. It offers great strength and stability.
- ii. It can be used for the construction of masonry walls of almost all thickness
- iii. Highly skilled manpower is not required for the construction of such a bond.

Disadvantages of English Bond

- i. It is not very aesthetically pleasing.
- ii. This type of bond construction is comparatively expensive.
- iii. There is a higher possibility of moisture ingress through the traverse joints.



English Bond

3.2 TYPES OF BONDS IN BRICKWORK

4. Flemish Bond

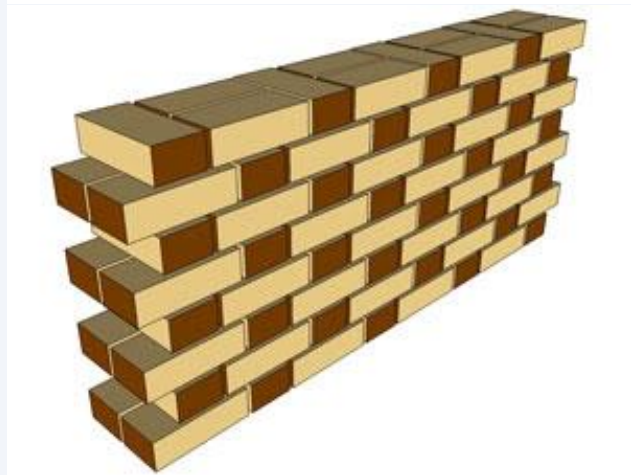
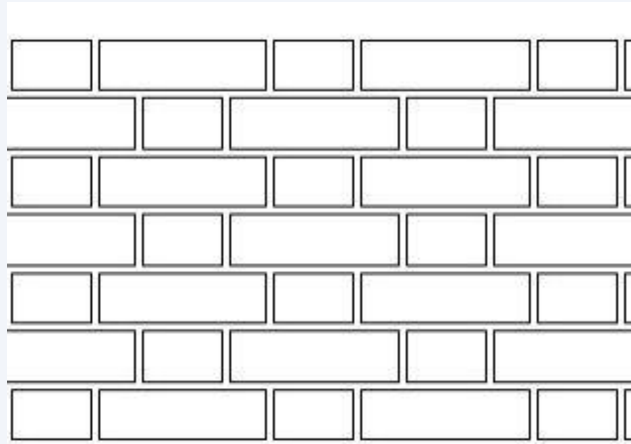
- i. Alternate headers and stretchers in the same course.
- ii. It used in brick walls of a decorative nature.

Advantages of Flemish Bond

- i. It is highly appealing in terms of appearance.

Disadvantages of Flemish Bond

- i. It requires highly skilled manpower for construction.
- ii. It is not as strong as the English bond.



Flemish Bond

3.3 MORTAR POINTING AND JOINTING

DIFFERENCE BETWEEN JOINTING AND POINTING

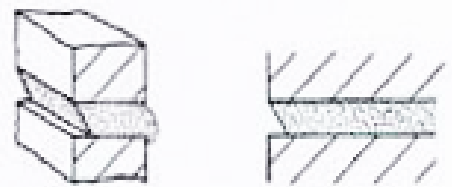
Jointing is finishing the mortar joints between newly laid bricks. Meanwhile pointing is applying a small amount of mortar into the face joint between bricks (either newly laid or in old brickwork). In new brickwork, pointing can apply harder mortar to increase weather protection on exposed faces. In old brickwork, pointing is often used to repair mortar joints which have been eroded by exposure to the elements.

TYPES OF JOINTING

Mortar Jointing

Struck Joint

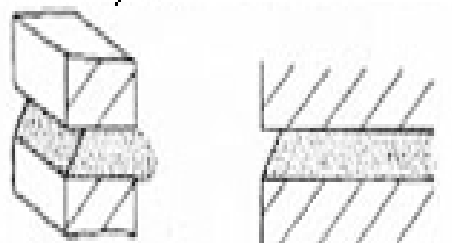
- i. Used to emphasize horizontal joints.
- ii. Poor weather joint, as water will penetrate on lower edge.



Struck Joint

Weather Joint

- i. Used to emphasize horizontal joints.
- ii. Acceptable weather joint with proper tooling.



Weather Joint

3.3

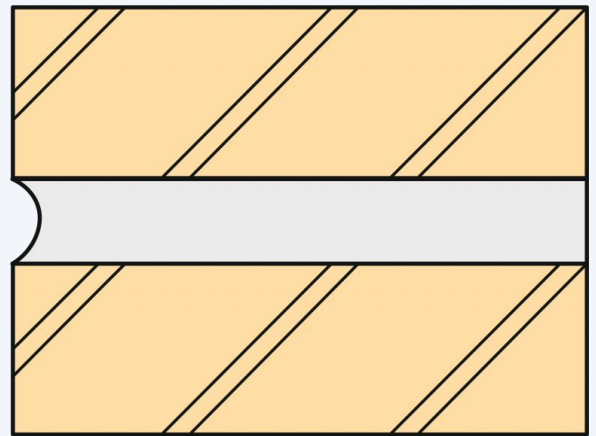
MORTAR POINTING AND JOINTING

TYPES OF JOINTING

Mortar Jointing

Concave Joint

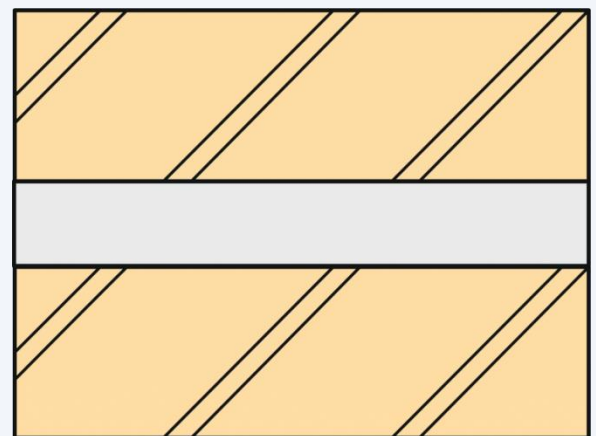
- i. Concave finish is obtained by rubbing a suitably shaped tool over the joint.
- ii. Mostly used for external work.



Concave Joint

Flush Joint

- i. Mortar is compressed into the joint and finished flush with the face of the brickwork.
- ii. It may be used for internal or external work.
- iii. Obtained by rubbing over the joints lightly with a piece of cloth.



Flush Joint

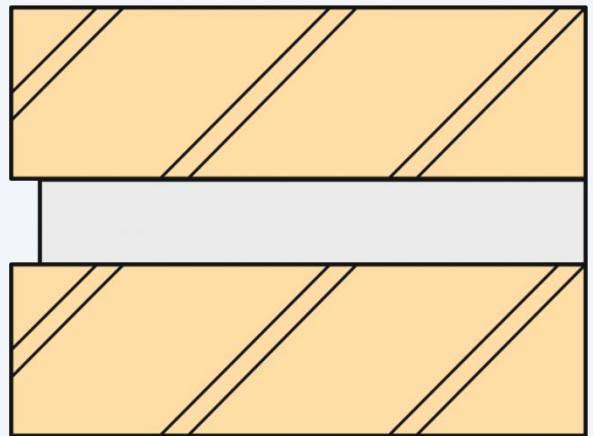
3.3 MORTAR POINTING AND JOINTING

TYPES OF JOINTING

Mortar Jointing

Square Recessed (Raked) Joint

- i. Mortar is pressed back firmly into the joint with a metal jointer or a piece of wood the exact width of the joint.



Square Recessed (Raked) Joint

4.0

EXERCISE



4.1 QUESTION

Question 1

Name the process where the brick has to be cut to the correct thickness using tensioned wire.

Question 2

State the correct standard size of a metric brick without the allowance of joints.

Question 3

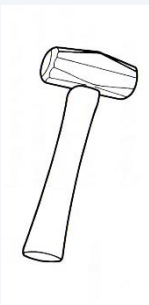
List the most suitable PPEs when cutting bricks with a club hammer and bolster.

Question 4

Name the piece of timber/steel marked off with bricks course, used for checking the overall brick/wall height.

Question 5

Identify the tool shown below.

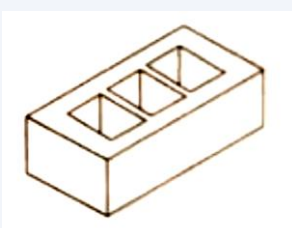


Question 6

State the main reason for bonding the brickwork.

Question 7

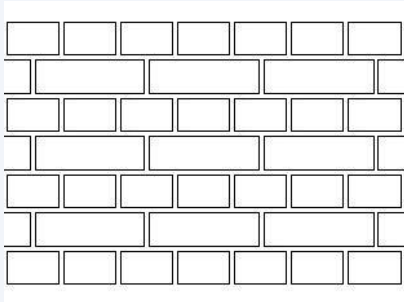
Identify the type of brick shown below



4.1 EXERCISE

Question 8

Identify the bond shown below.

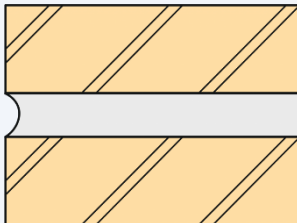


Question 9

Name the bond which consist of alternate headers and stretchers on each course.

Question 10

Name the joint finish shown below.



4.2 ANSWER

Question 1

Wirecut bricks process

Question 2

215mm X 102.5mm X 65mm

Question 3

Eye protector

Question 4

Gauge rod

Question 5

Lump hammer

Question 6

1. To ensure that any loads are distributed.
2. To strengthen a wall.
3. To ensure that it is able to resist sideways or lateral pressure.

Question 7

Hollow brick

Question 8

English bond

Question 9

Flemish bond

Question 10

Concave joint

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