

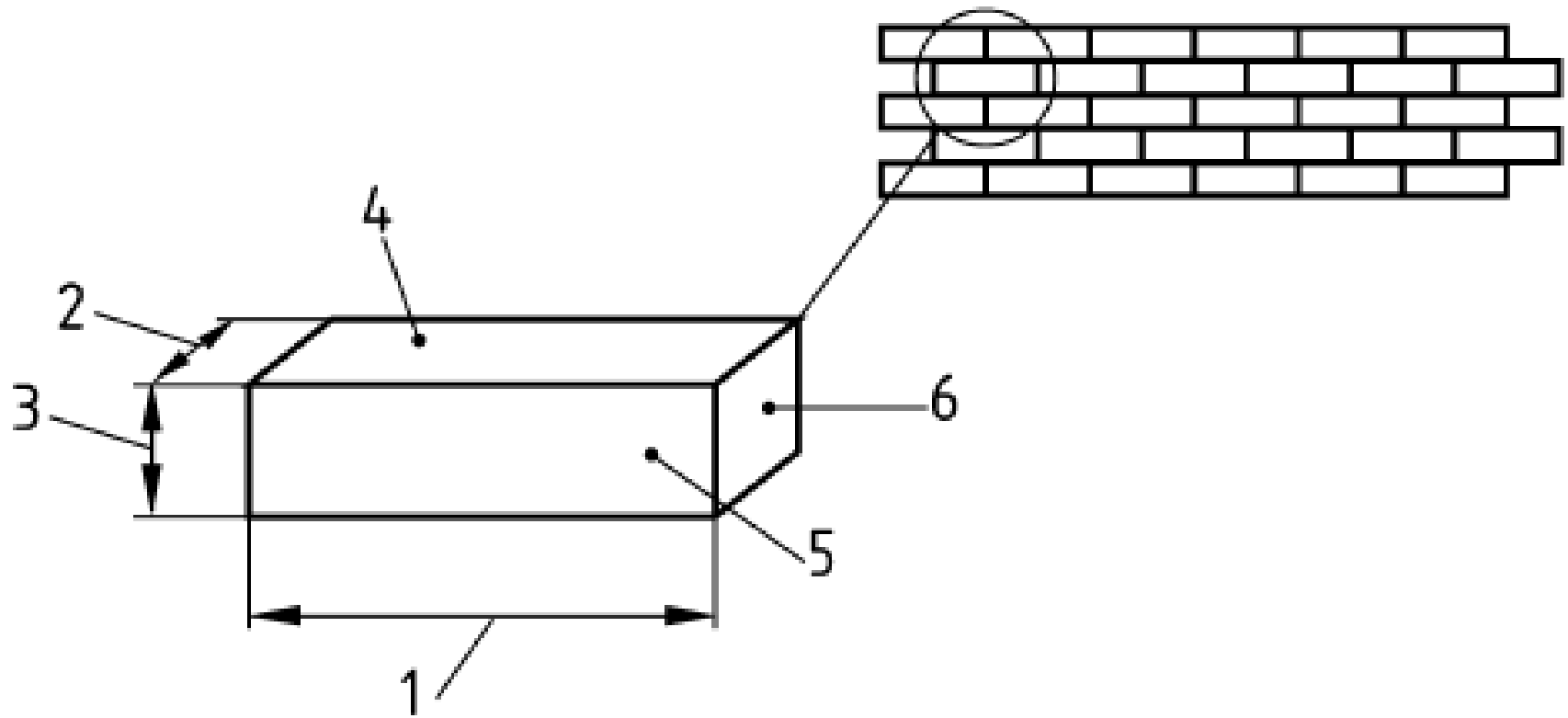
# **Brick Masonry**

# Brick

- Brick is a basic building unit which is in the form of rectangular block in which length to breadth ratio is 2 but height can be different.
- Normal size (nominal size)
- $9'' \times 4\frac{1}{2}'' \times 3''$
- Architectural size (Working size)
- $8\frac{11}{16}'' \times 4\frac{5}{16}'' \times 2\frac{11}{16}''$

- **Brick Masonary**

The art of laying bricks in mortor in a proper systematic manner gives homogeneous mass which can withstand forces without disintigration, called brick masonary.



### Key

1 Length

2 Width

3 Height

4 Bed

5 Face

6 Header

NOTE: This relates to the normal use of the masonry unit in the wall.

## Terminology:

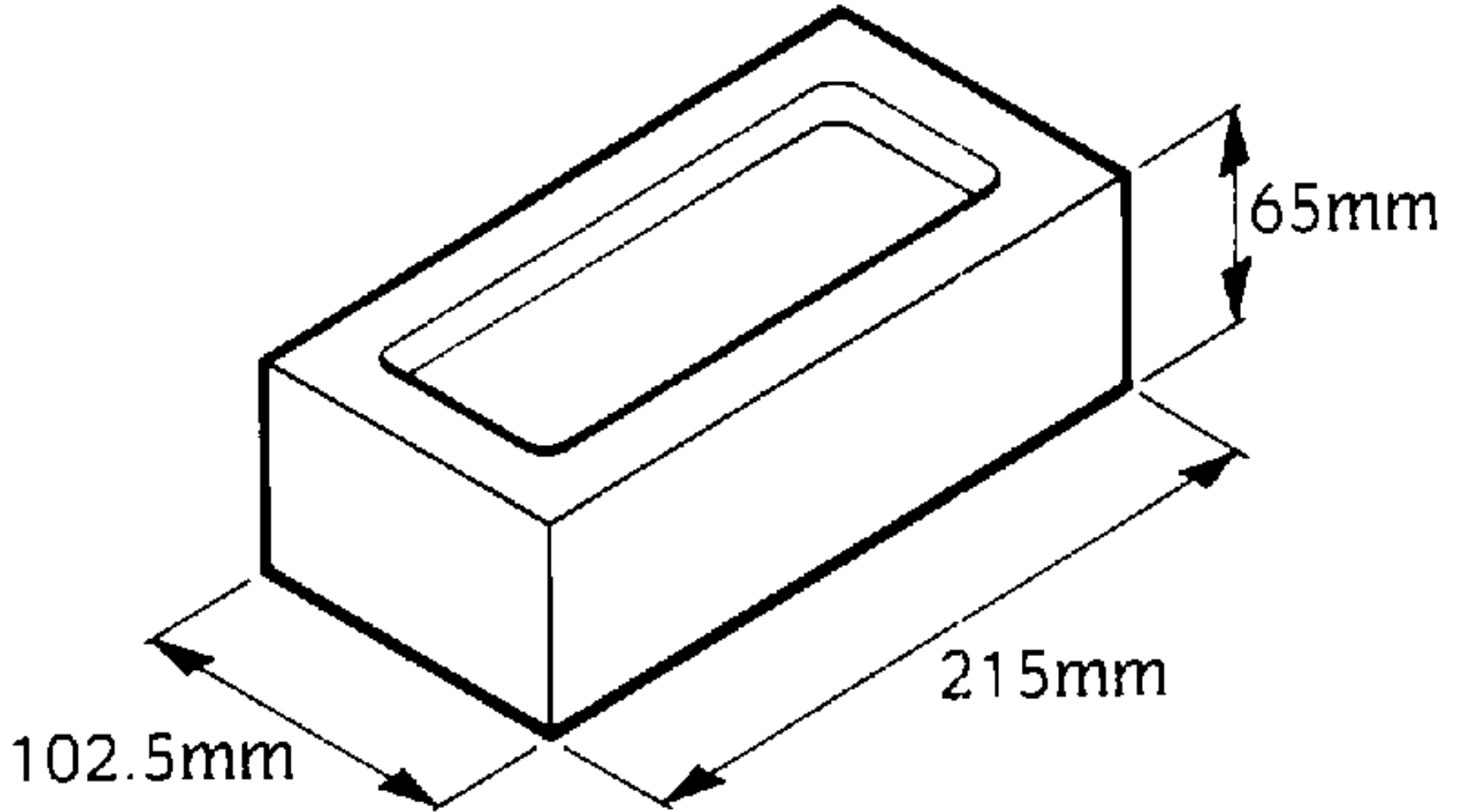
*The surfaces of a brick have names:*

- ❑ Top and bottom surfaces are beds.
  - ❑ Ends are headers and header faces.
  - ❑ Sides are stretchers or stretcher faces.
- Bricks are the subject of British Standard **BS 3921**.

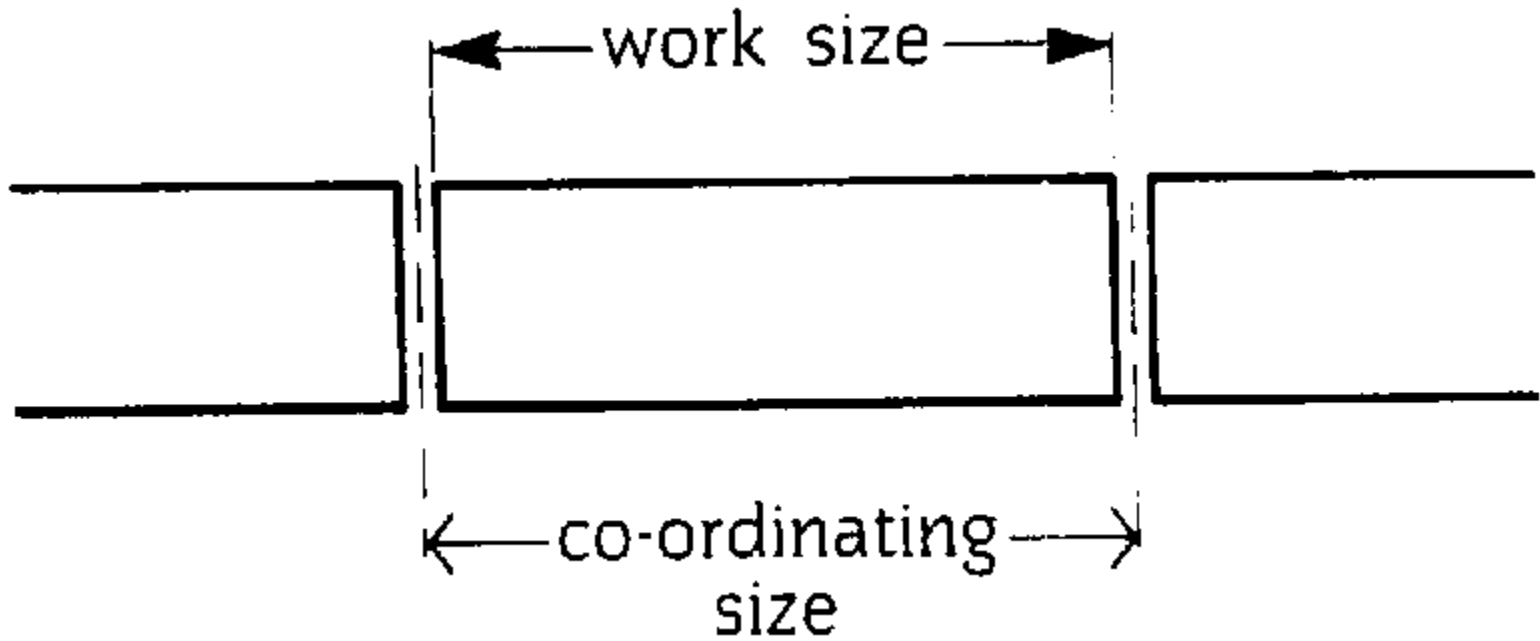
# Brick Sizes

A standard metric brick has coordinating dimensions of **225 x 112.5 x 75 mm** (9"×4½" ×3") called nominal size **and** working dimensions (actual dimensions) of **215 x 102.5 x 65 mm** (8.5" \* 4 \*2.5) called architectural size

# Brick Sizes



# Brick Sizes





The coordinating dimensions are a measure of the physical space taken up by a brick together with the mortar required on one bed , one header face and one stretcher face.

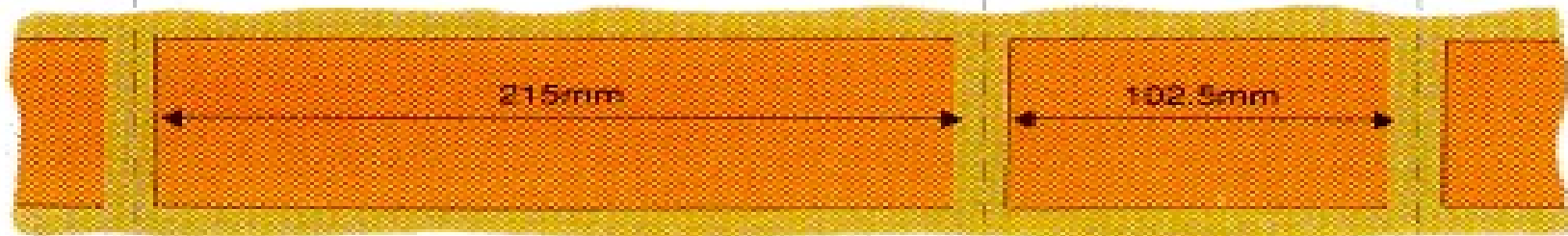
The working dimensions are the sizes to which manufacturers will try to make the bricks.

- Methods of manufacture for many units and components are such that the final piece is not quite the size expected but it can fall within the defined limits.
- This can be due to the things like shrinkage, distortion when drying out, firing etc.

The difference between the working and coordinating dimensions of a brick is **10mm** (0.5") and this difference is taken up with the layer of mortar into which the bricks are pressed when laying.

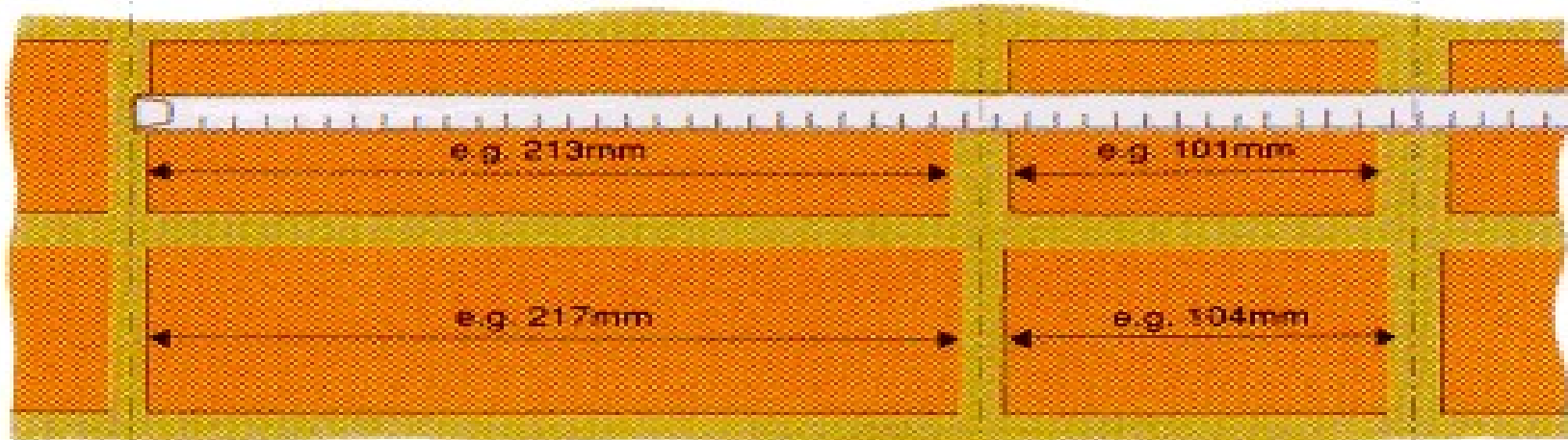
The working dimensions are also known as the nominal size of a brick.

WORK SIZE = co-ordinating size minus  
nominal 10mm joint



CO-ORDINATING SIZE  
(used for design and setting out)  
225mm

112.5mm



ACTUAL SIZE  
(as measured)

# Frog

- The depression provided in the face of a brick during its manufacturing.
- Depth of frog in a brick 10 to 20mm
- Frog should be upward. Why?

## Course

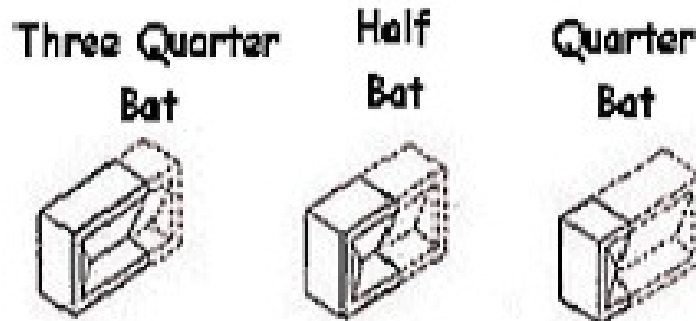
Each horizontal layer of bricks laid in mortar in any brick work is called coarse.

# Mortar Joints

Mortar placed horizontally below or on the top of a brick is called a bed.  
Mortar placed vertically between bricks is called a perpend.

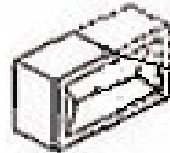
# Bats

- The portions made by cutting standard bricks across their width are known as brick bats.
- These are named according to their fraction of full length of a standard brick.



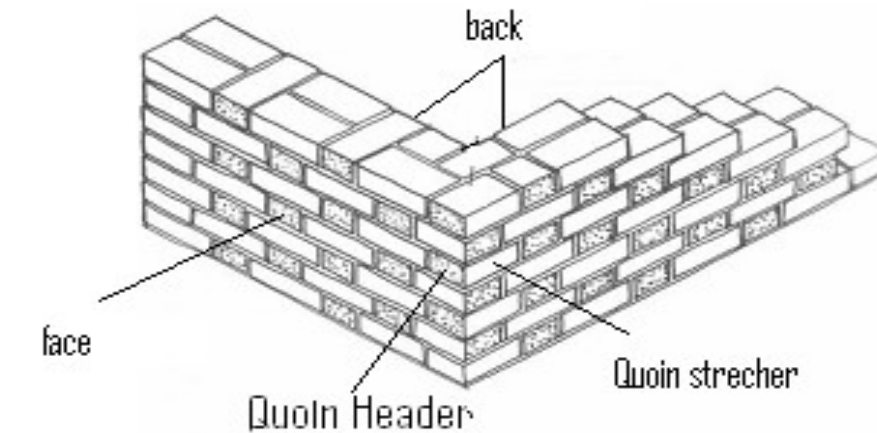
# Closers

- The portions made by cutting across their length in such a manner that their one stretcher face remains uncut or half cut.
- .queen closer
- King closer



# Quoins

- The external corners of walls are called quoins
- The brick which form the external corner is known as quoin brick.
- 



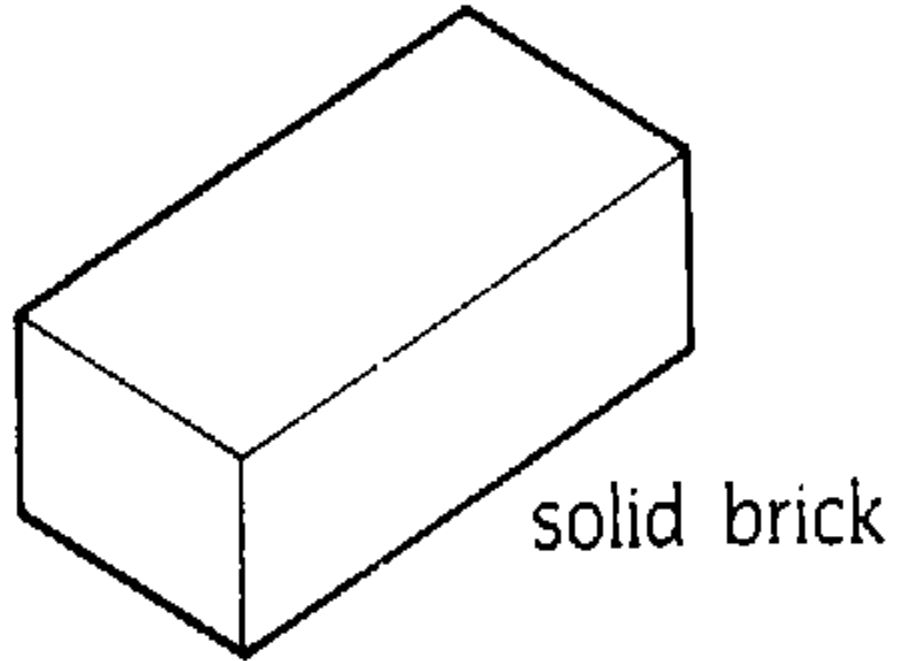
note:  
material which formed face called facing  
material which formed back called backing



# Types of Brick by Shape

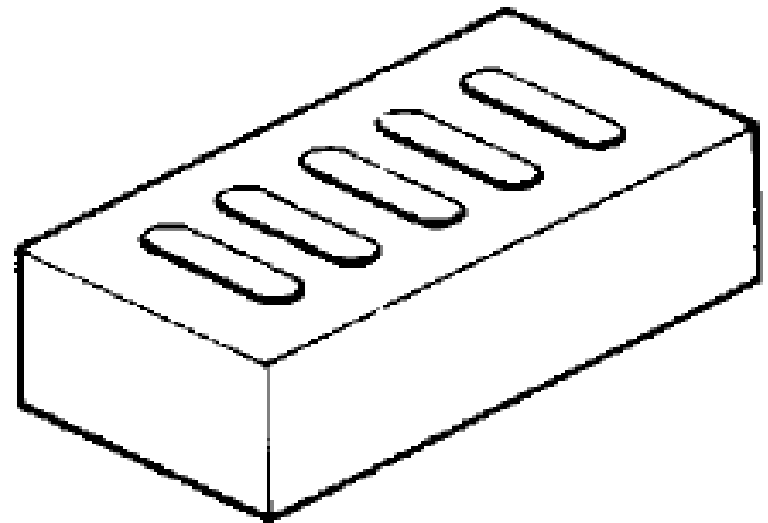
## I. Solid bricks

Solid brick shall not have holes, cavities or depressions.

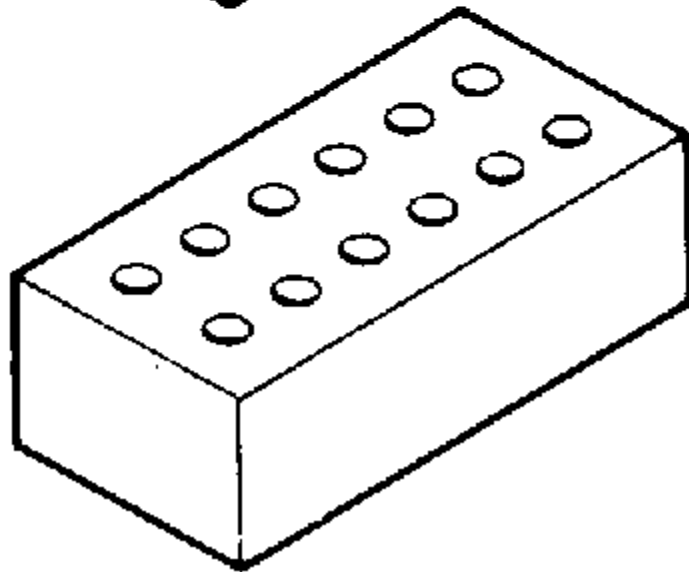
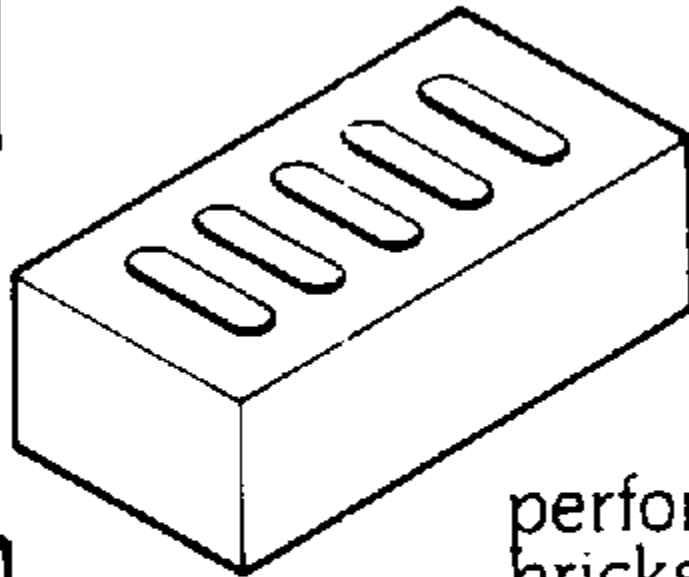
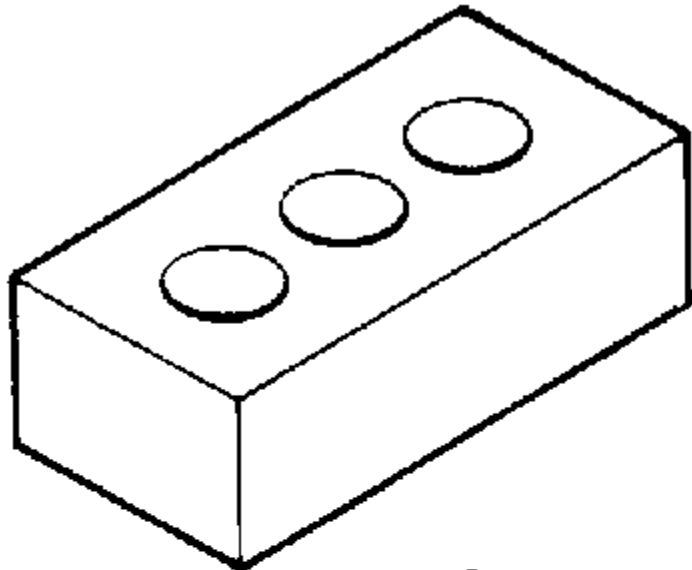


## II. Perforated bricks

**Perforated brick** shall have holes not exceeding the 25% of the gross volume of the brick; minimum 30% solid across the width of brick.



perforated  
bricks

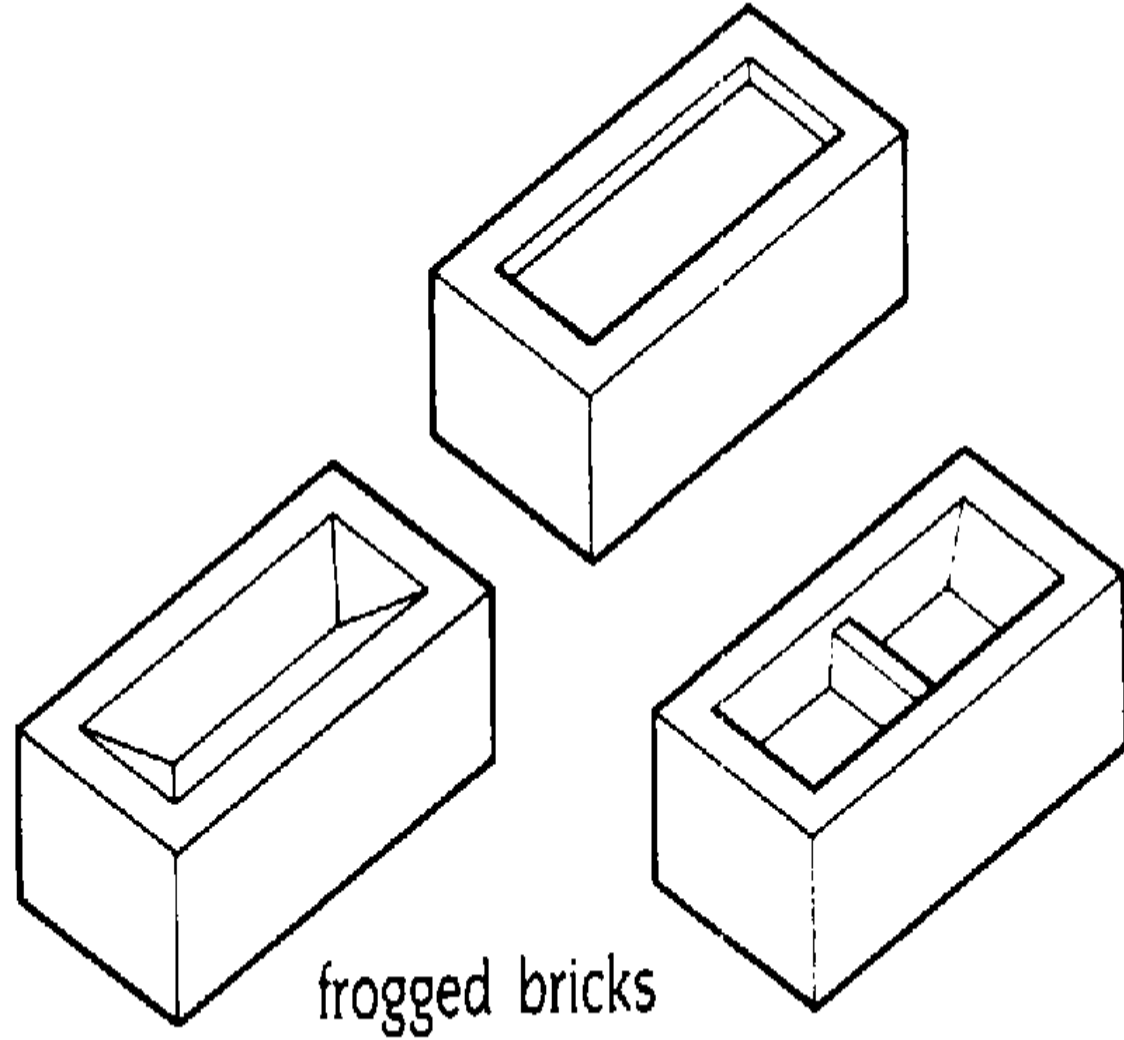


perforated  
bricks

### III. Frogged bricks

#### **Frogged bricks**

shall have depressions in one or more bed faces but their total volume shall not exceed 20% of gross volume of a brick.



## IV. Cellular Bricks

**Cellular Bricks** have cavities or depressions exceeding 20% of the volume in total.

# Masonry Wall Requirements

*The usual functional requirements of a masonry wall include:*

- i) Adequate strength to support imposed loads
- ii) Sufficient water tightness
- iii) Sufficient visual privacy and sound transmission
- iv) Appropriate fire resistance
- v) Ability to accommodate heating, air conditioning, electrical, and plumbing equipment
- vi) Ability to receive various finish materials

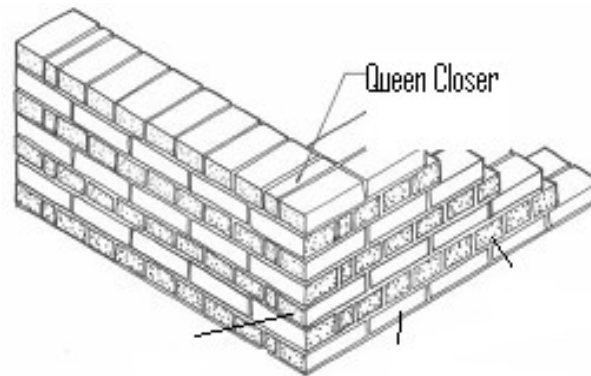
Cost

- vii) Ability to provide openings such as doors and window

# Bonds In Bricks

- The arrangement of bricks in brick work so that the vertical joints donot come over each other.
- Bonds in brick work is provided to achieve a united mass as soon as practicable to suit the length, height and thickness of brick work and stresses to which it is subjected

- To break the continuity of vertical joints and to provide proper bond in brick masonry portion of brick ( closers or bats) are provided in alternative courses.





# Brick Bonds:

Common types used in Pakistan are:

**i. Stretcher Bond**

**ii. Header Bond**

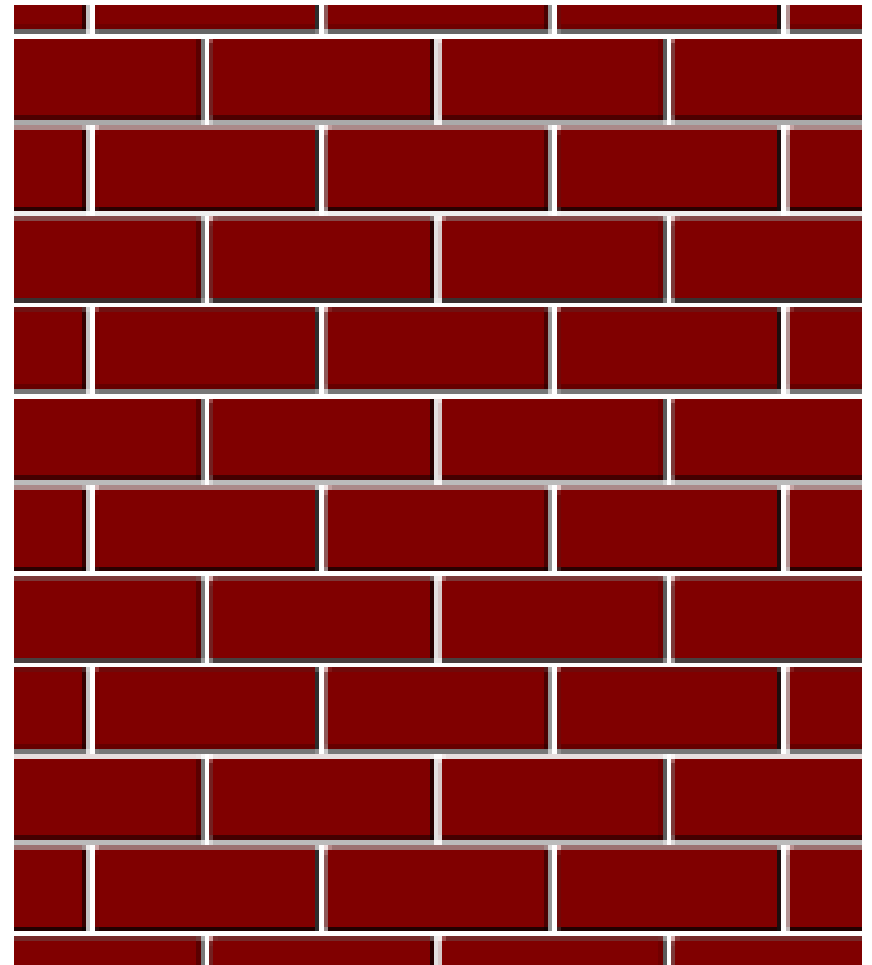
**iii. English Bond**

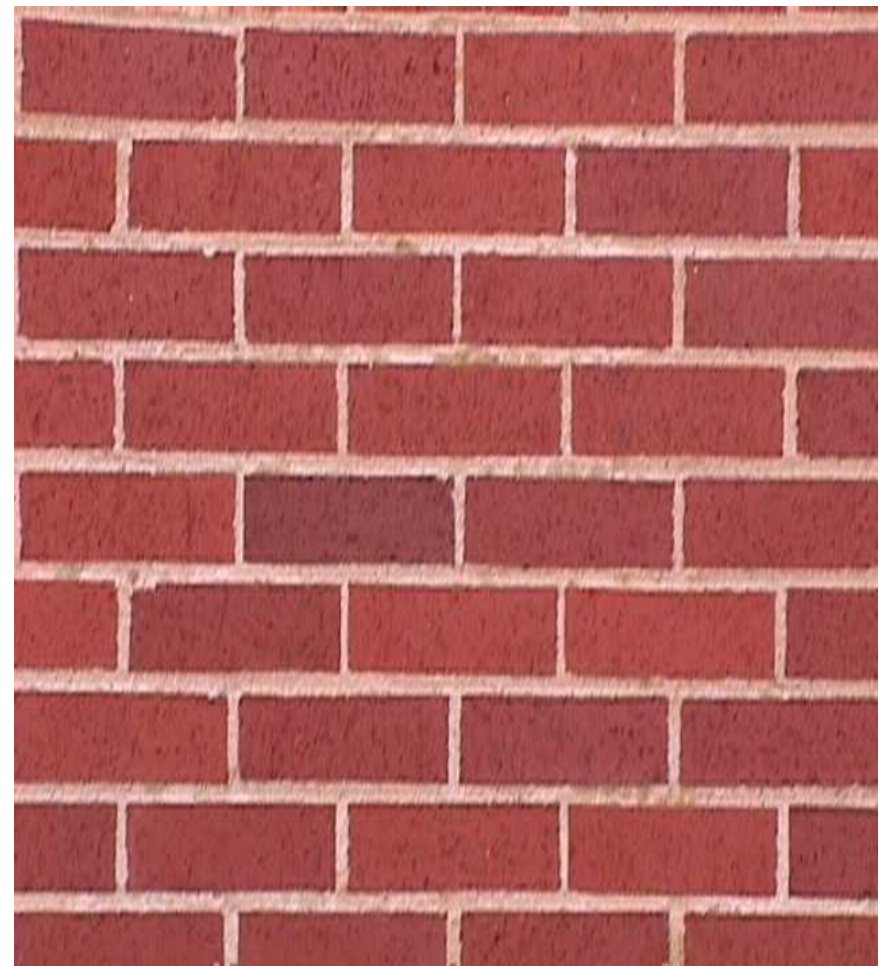
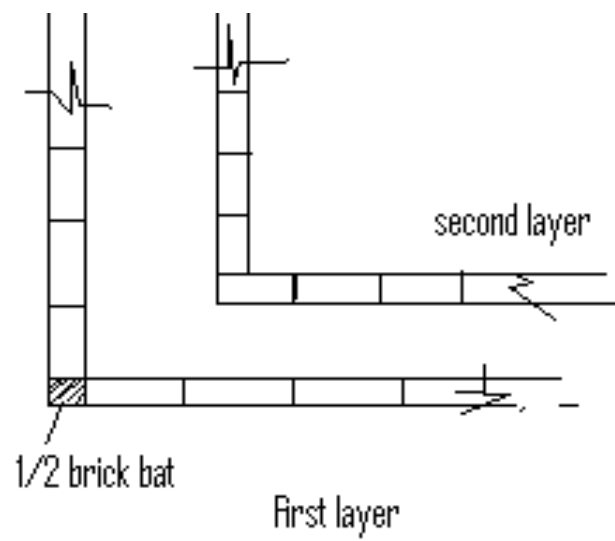
**iv. Flemish Bond**

# I. Stretcher Bond

## **Stretcher/Common Bond**

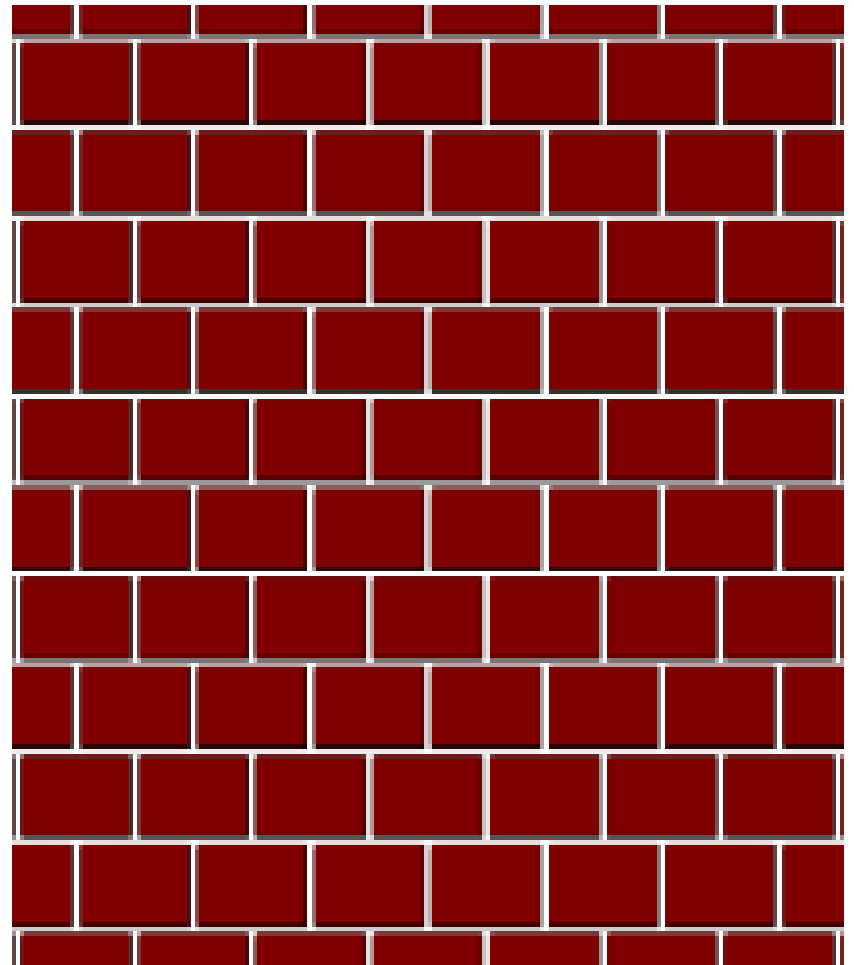
Only used for walls of half brick thickness (partition wall), this is the only practical bond which can be used on a wall of this thickness. To break the vertical continuity  $\frac{1}{2}$  brick bat is provided in alternating courses.

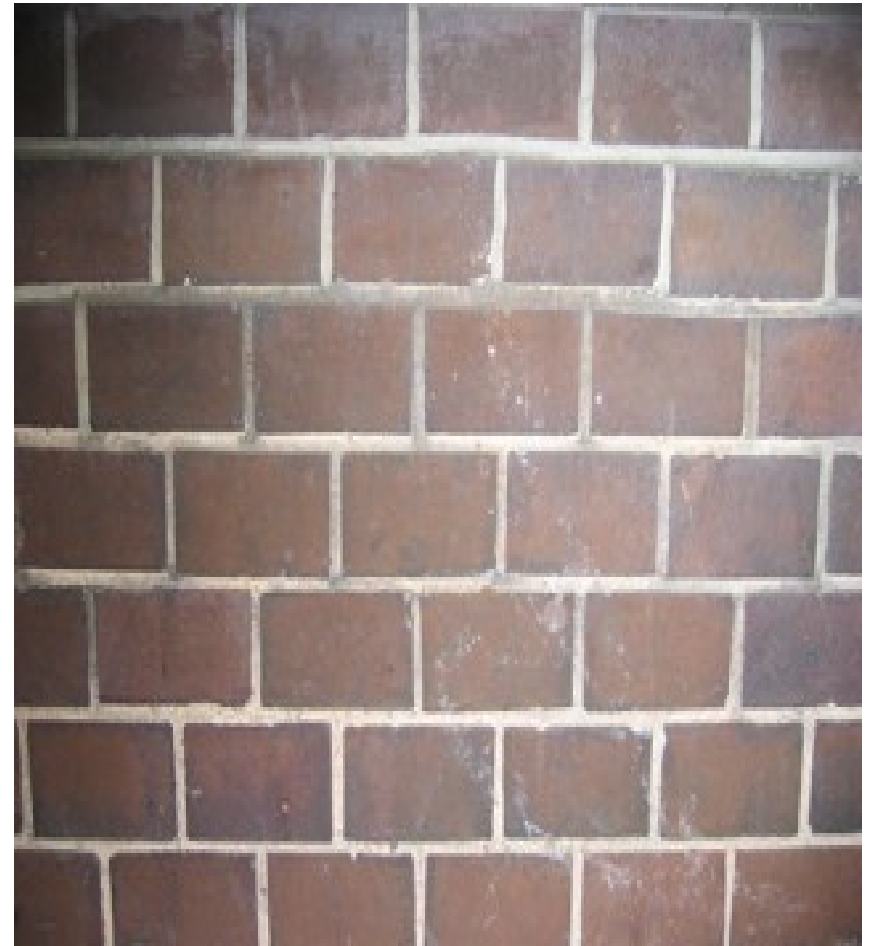
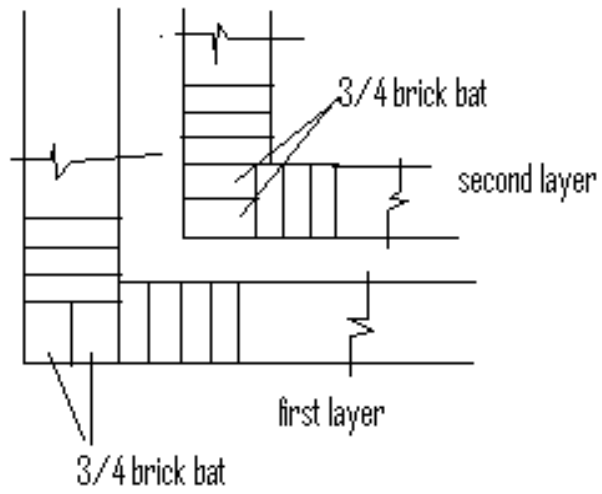




# Header Bond

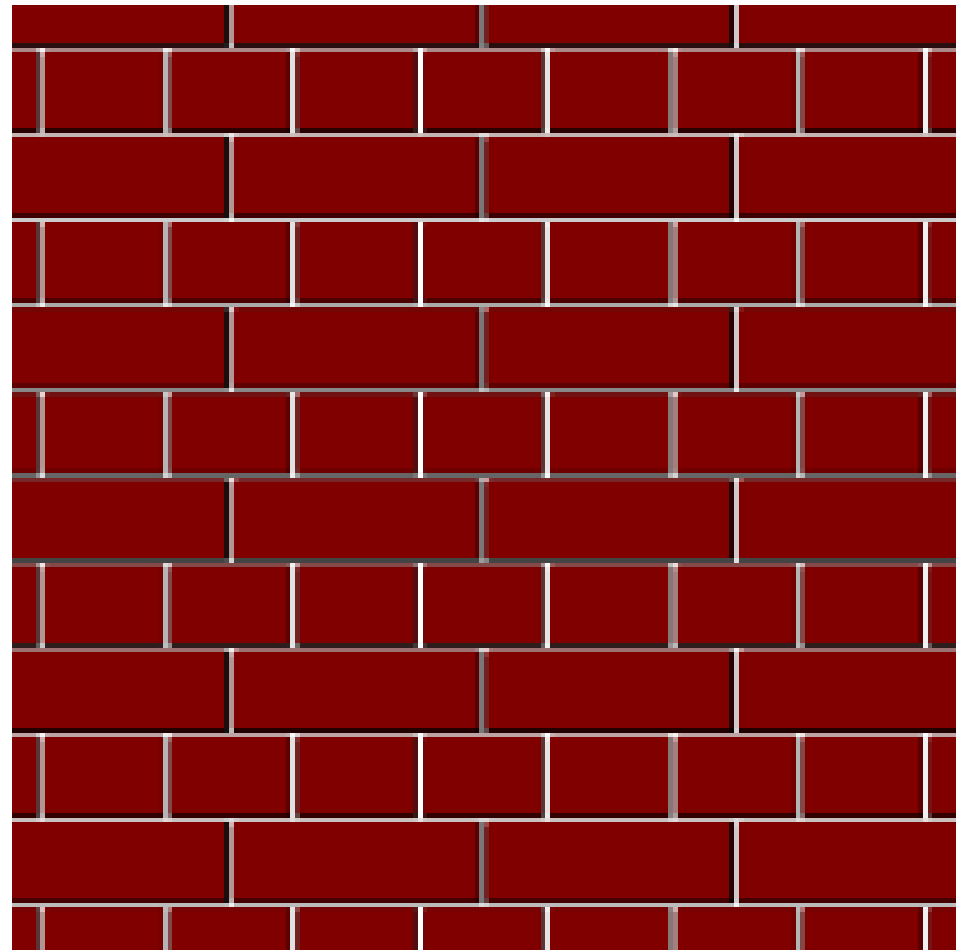
Header Bond (also known as **Spanish bond**) was a very common bond for bearing walls. It is composed of header bricks, set in rows that are offset  $\frac{3}{4}$  of a brick as a quoin brick in alternating courses, which produces a solid easy to lay bond.

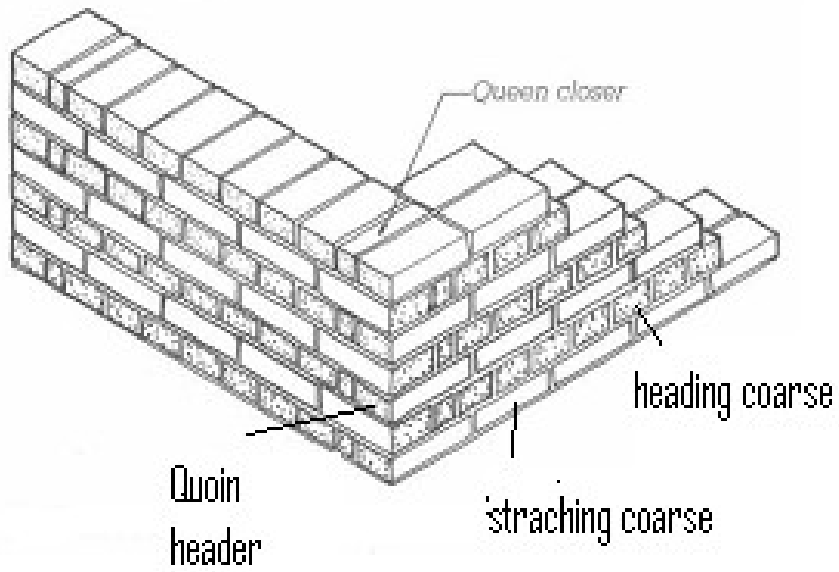




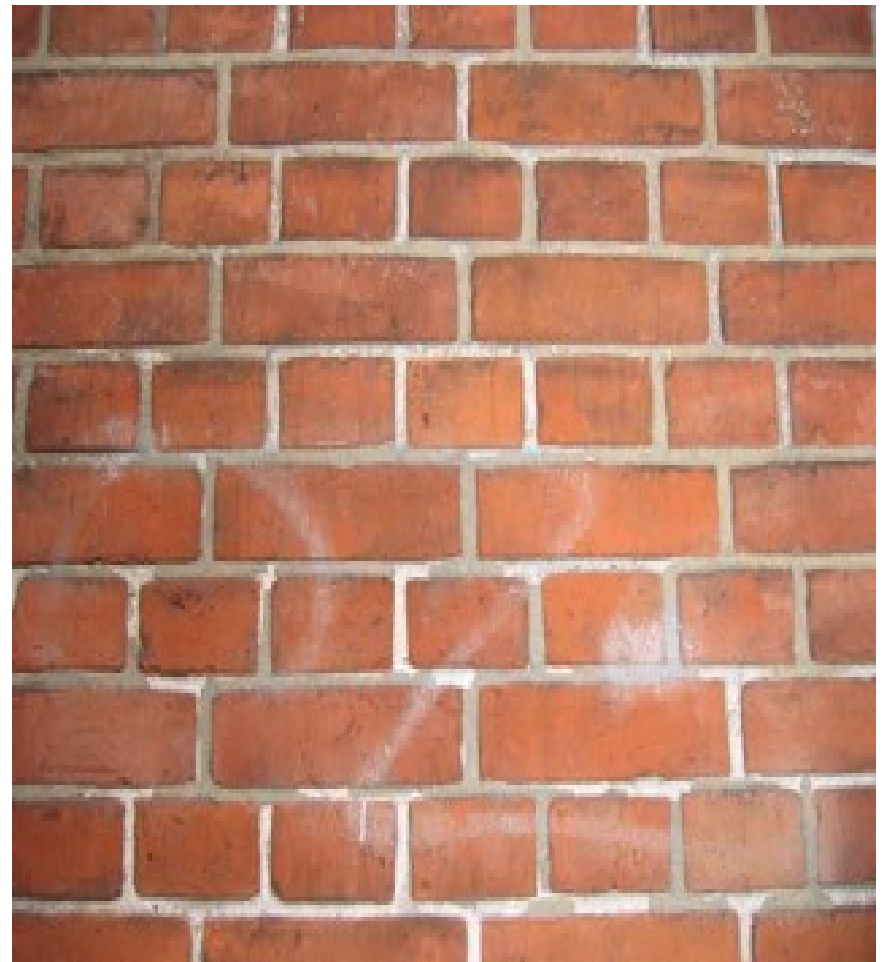
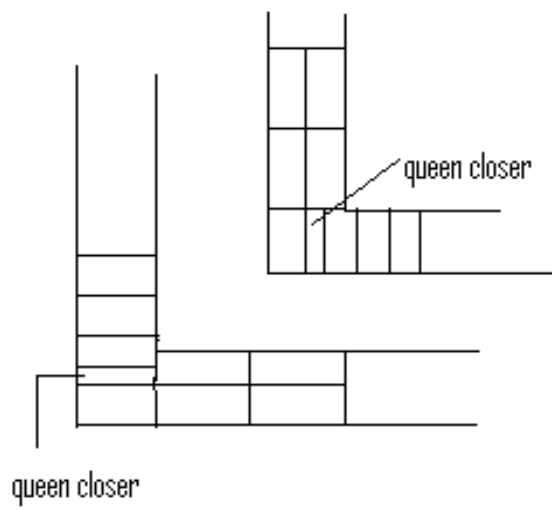
# English Bond

- The strongest bond
- This bond maximizes the strength of wall
- Pattern on the face of the wall shows distinctive courses of headers & stretchers.





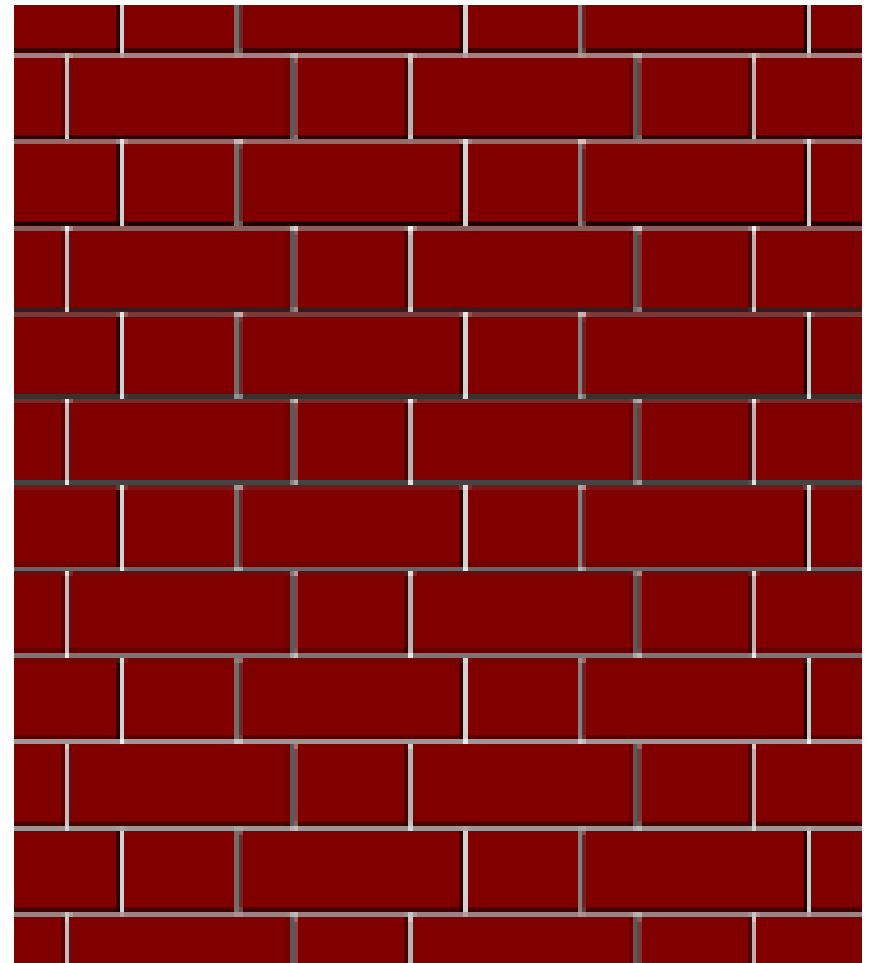
English bond





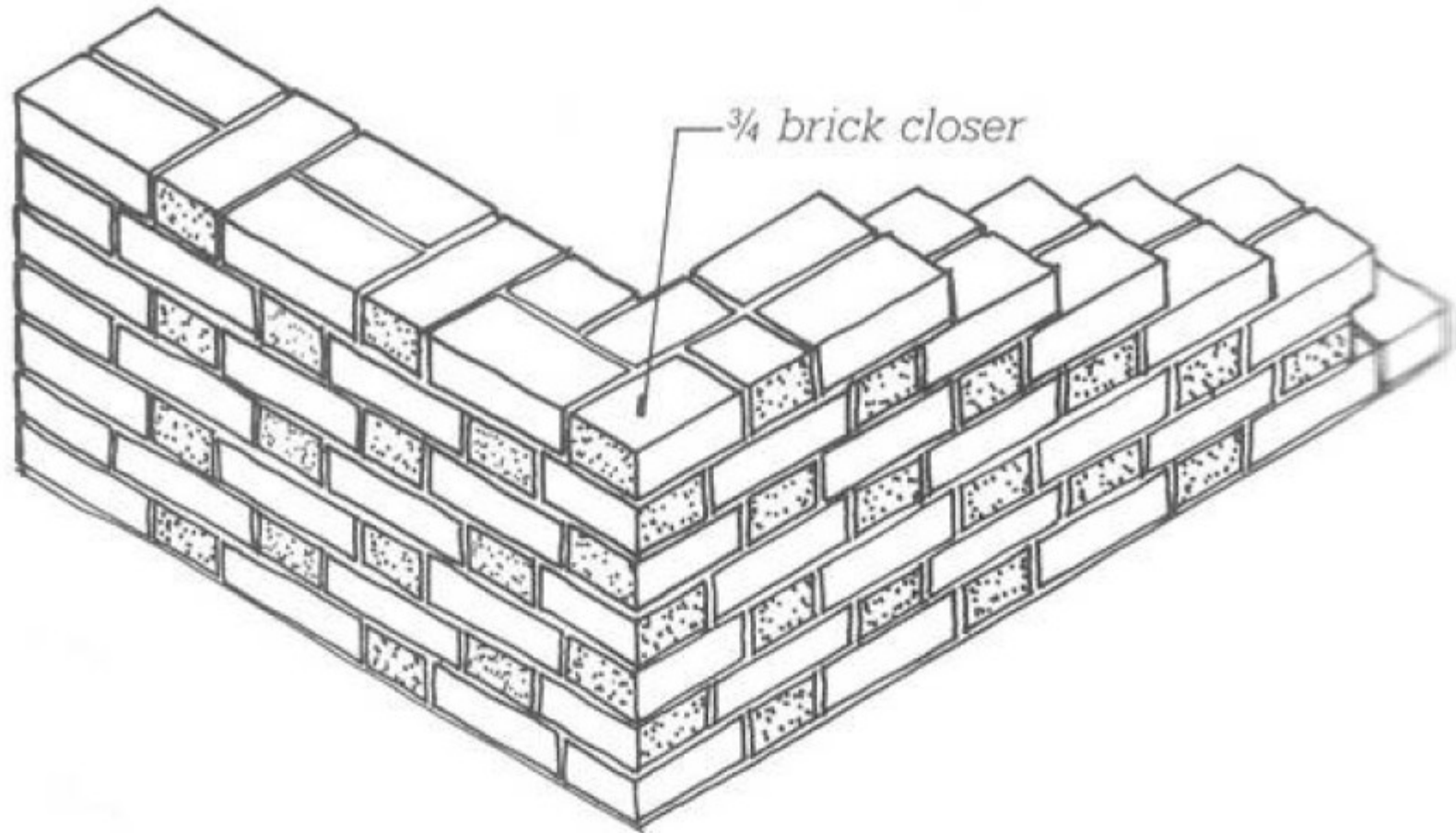
# Flemish Bond

- Not such a strong as English bond
- Decorative pattern on face of the wall shows alternate headers & stretchers in each with the headers centered under and over stretchers in adjacent courses.



- In this bond a queen closer is provided after every queen header in the alternate courses to break the continuity of vertical joints.
- Brick bats are to be used for forming this bond when thickness of wall is multiple of half brick.





*Flemish Bond alternates headers and stretchers in each course*

- Assignment

What is reinforced brick masonry .when is the brickwork reinforced? and its advantages and disadvantages.