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 – 5(BRICK & STONE MASONRY)
Presented by – *T*eekam 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
- objective,
- Course outcome
- Scheme and Syllabus
- Text Books
- Reference Book

MASONRY

Masonry may defined as the construction of building units bonded to ushers with mortar. The building units may be stones, bricks, or precast concrete blocks. Depending upon the types of buildings units used,

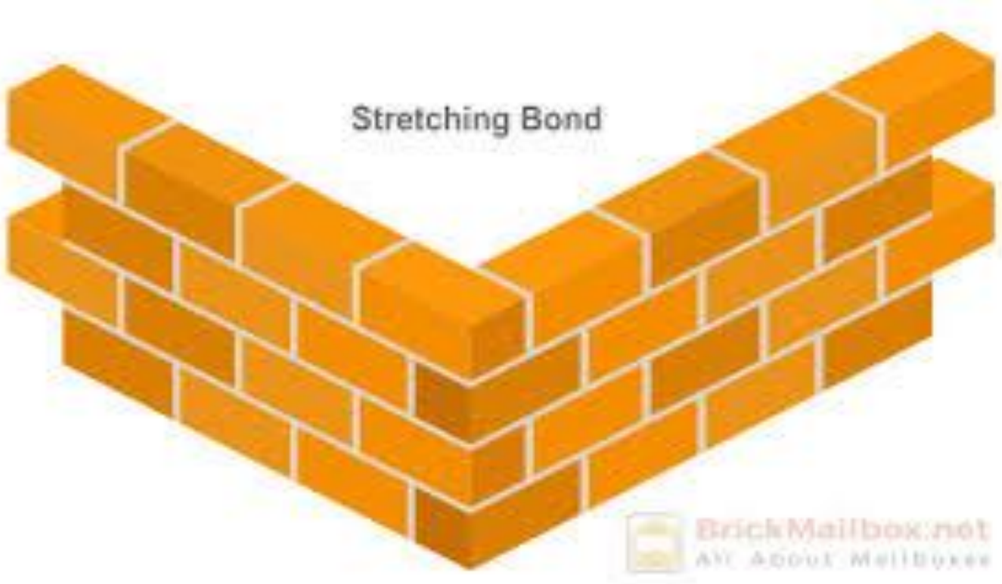
MASONARY can be classified into following categories :

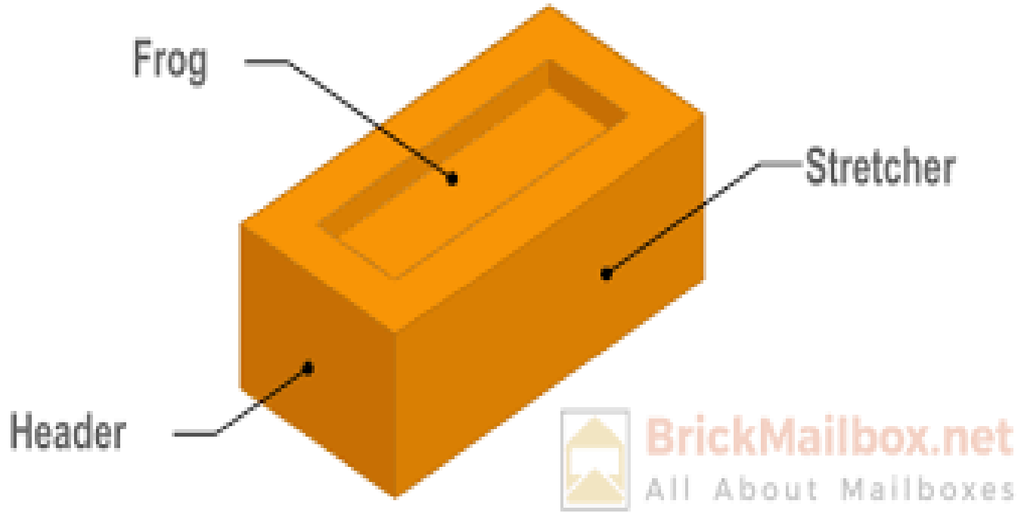
- Stone Masonry.
- Brick Masonry.

Some Important Terms Used In Masonry

STRETCHER:

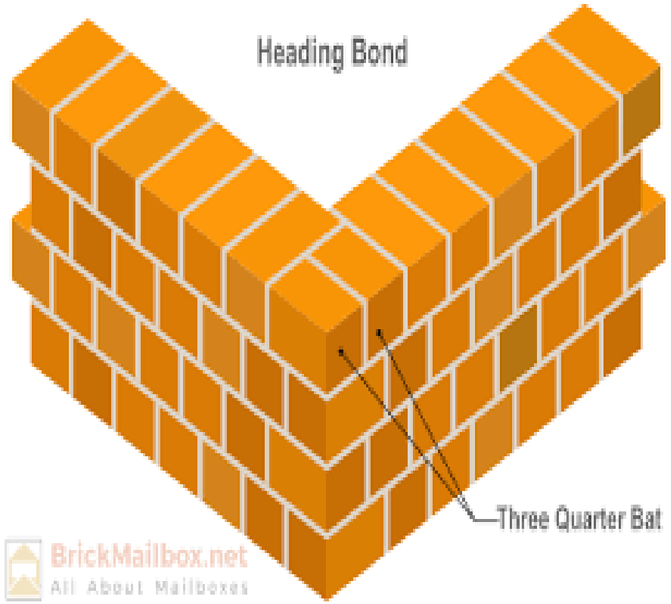
A brick, laid with its length horizontal and parallel with t he face of the wall or other masonry member is called a "**Stretcher**" and a course, in which, all the bricks are laid as Stretchers is called a **“Stretching course" or "Stretcher course".**

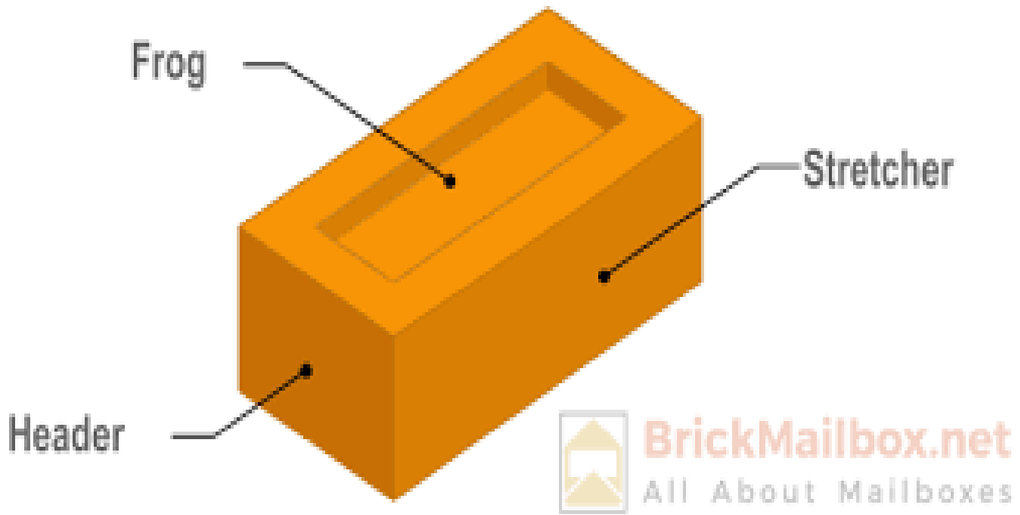




2. HEADER:

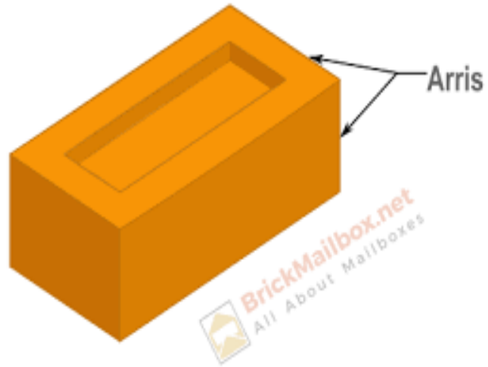
A brick laid, so that only its end shows on the face of a wall is called a "Header" and a course, in which all the bricks are laid as headers, is known as "Heading Course" or "Header course“.





3. ARISE:

The edges formed by the intersection of the plane surfaces of brick are called the arises and they should be sharp, square and free from damage.

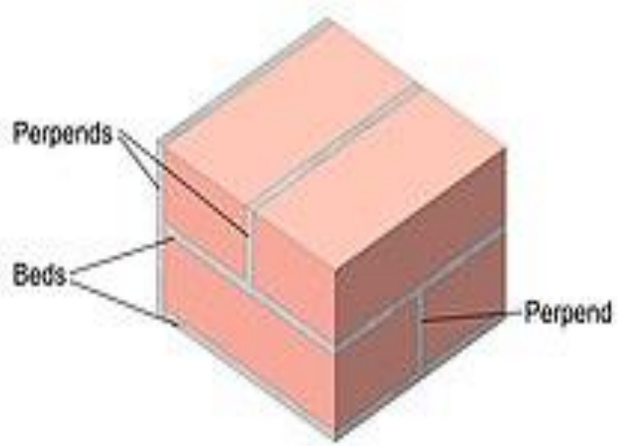


4. BED:

It is the surface of stone perpendicular to the line of pressure. It indicates the lower surface of bricks or stones in each course.

5. BED JOINT:

If the joint is parallel to the bed of bricks or stones in a course then it is termed as bed joint.



6. PERPENDS:

The vertical joints separating the bricks in either length or cross direction are known as the Perpends.

7.BOND:

Bond is the arrangement of bricks or stones in each course, so as to ensure the greatest possible interlocking and to avoid the continuity of vertical joints in two successive courses, both on the face and in the body of a wall.

8.COURSE:

Each horizontal layer of bricks laid in mortar in a brick work is called a "**course**".

9.BRICK BATS :

The pieces of bricks, cut long their length and having width equivalent to that of a full or half brick are called "**Brick bats**“.

10.QUEEN CLOSER:

Queen closer is a brick, which is half as wide as full brick and is made by cutting a whole brick lengthwise into two portions. These are generally used next to the Quoin header for creating bonds in brickwork.

11.KING CLOSER:

A brick, whose one diagonal piece is cut off one corner by a vertical plane passing through the center of one end to the center of one side.

12.BEVELED CLOSER:

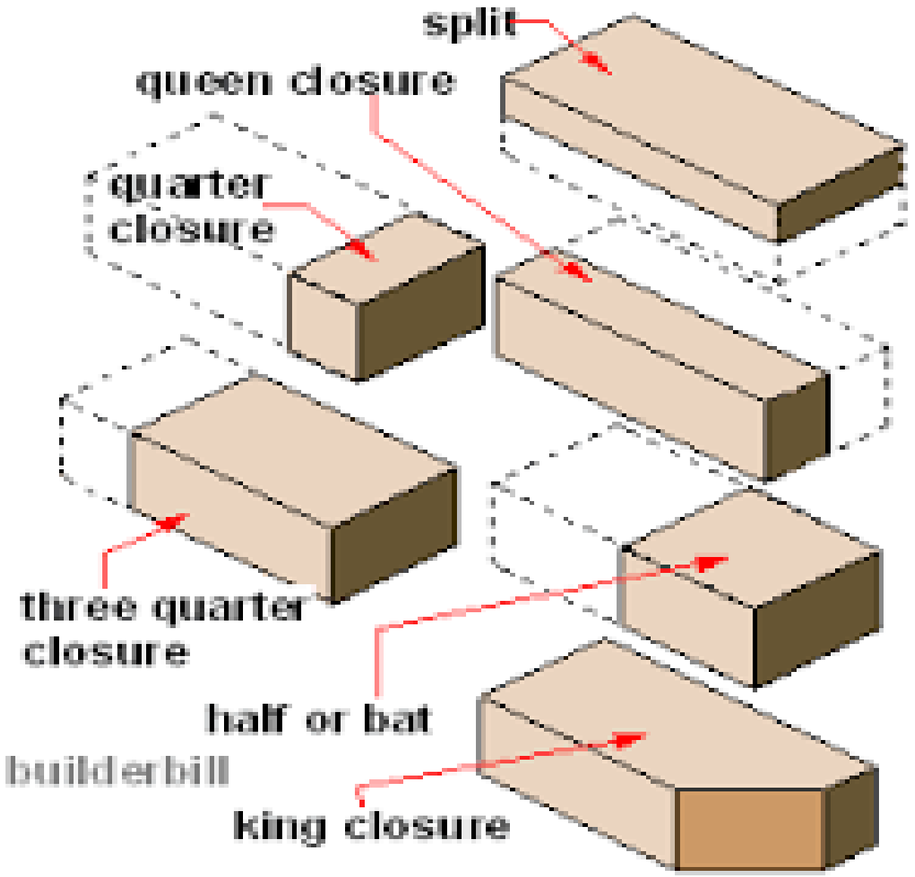
A brick cut longitudinally along a vertical plane, starting at the middle of one end to the far corner. One quarter of the brick is cut off in this way.

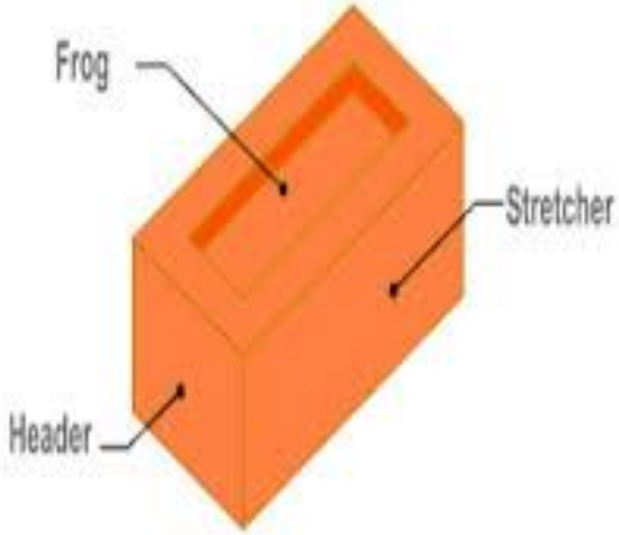
13.BULLNOSE :

A brick with rounded corners is called a**"Bull Nose Brick"**

14. FROG

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





BRICK MASONARY

- Bond is the arrangement of bricks in each course, so as to ensure the greatest possible interlocking and to avoid the continuity of vertical joints in two successive courses, both on the face.

TYPES OF BONDS

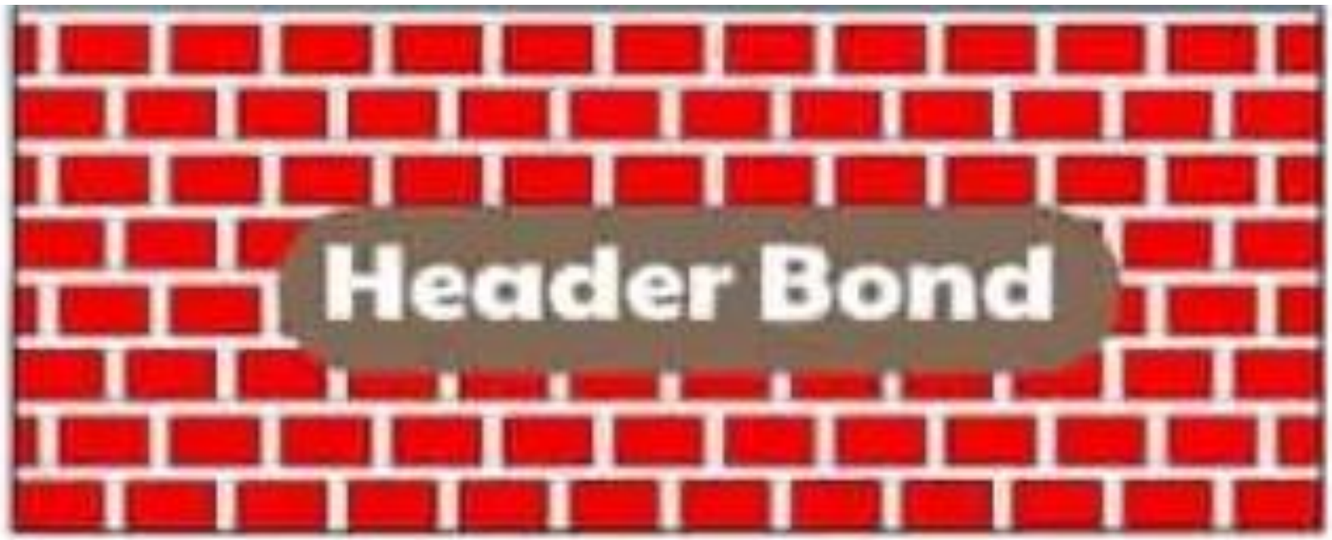
1) Stretching Bond
2) Heading Bond
3) English Bond
4) Flemish Bond
    (i)Double Flemish Bond
    (ii)Single Flemish Bond
5) Garden Wall Bond
    (i)English Garden Wall Bond
    (ii)Flemish Garden Wall Bond
6) Raking Bond
    (I) Herring Bone Bond (II) Diagonal Bond
7) Dutch Bond

1.STRETCHER BOND

- The bond in which all the bricks are laid as stretchers in every course is called "**Stretcher bond".**
- Used in not more than one brick partition walls

2.HEADER BOND

- The bond in which all the bricks are laid as headers in every course of a wall is called **"Header bond".**



3.ENGLISH BOND

- This bond consists of headers and stretchers laid in alternative courses.
- It is strongest of all the bonds.
- It provides rough appearance especially for one brick thick walls.
- There are no noticeable continuous vertical joint in the structure built in this bond.
- Much attention is not required in providing this bond.
- Progress of work is more.
- It is costly because the use of brick bats is not allowed.
- In stretcher course , the stretcher have a minimum lap of one fourth of their length.

4.FLEMISH BOND

- In this type of bond, each course is comprised of alternate headers and stretchers. Every alternate course starts with a Header at the corner *i.e.* quoin header). Quoin closers are placed next to the quoin header in alternate courses to develop the face lap. Every header is centrally supported over the stretcher below it.

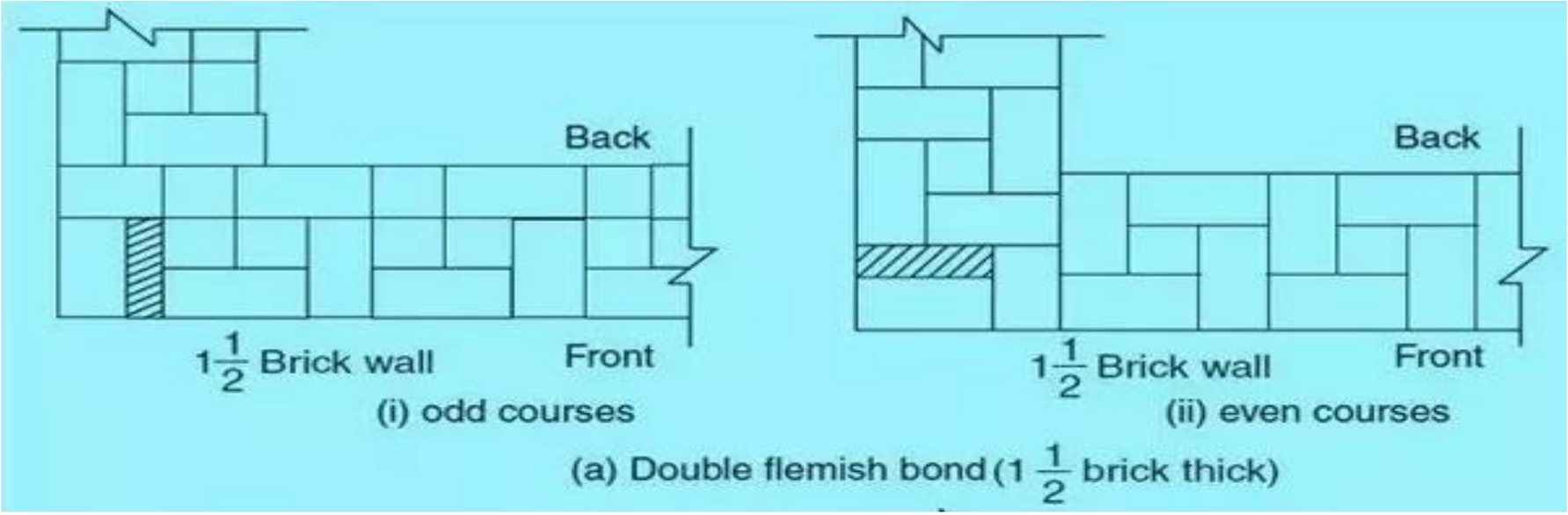
Flemish bonds are of two types :

(i) Double Flemish bond

(ii)Single Flemish bond.

(i) Double Flemish Bond:-

- The bond in which headers and stretchers are laid alternately in each course, both in the face and back of the wall, is called **Double Flemish Bond.**
- In the double Flemish bond, each course presents the *same appearance* both in the front face as well as in the back face.
- Flemish bond presents better appearance than English bond.



(a) Double flemish bond ($1\frac{1}{2}$ brick thick)

Special Features Of Double Flemish Bond

1)Every course consists of headers and stretchers placed alternately

2)The facing and backing of the wall, in each course, have the same appearance.

3)Quoin closers are used next to quoin headers in every alternate course.

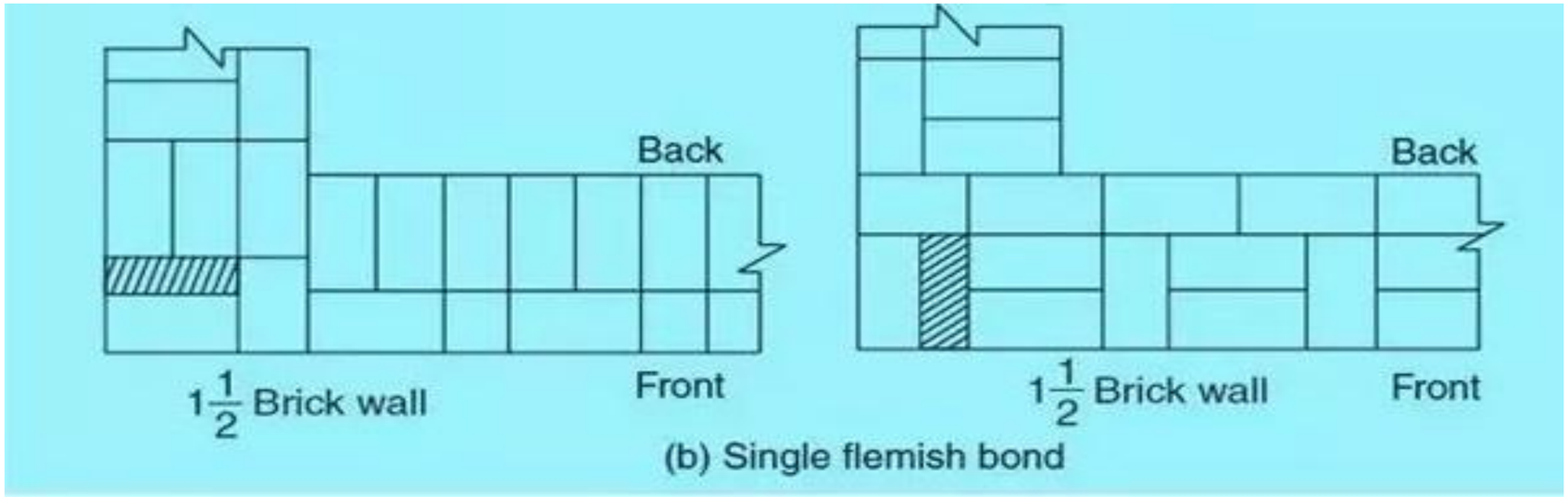
4)In walls having thickness equal to odd multiple of half bricks, half bats and three-quarter bats are amply used.

5)For walls having thickness equal to even multiple of half bricks, no bats are required. A header or stretcher will come out as header or stretcher on the same course in front as well as back faces.

(ii) Single Flemish Bond:

- The bond provided in a wall with Flemish bond in facing and English bond in backing is called **"Single Flemish bond" or "Cross bond".**

- This bond combines the advantages of both English and Flemish bonds and simultaneously eliminates their disadvantages.



(b) Single flemish bond

Single Flemish bond : Single Flemish bond is comprised of double Flemish bond facing and English bond backing and hearting in each course. This bond thus uses the strength of the English bond and appearance of Flemish bond. However, this bond can be used for those wall s having thickness **at least equal to 1 ½** brick. Double Flemish bond facing is done with good quality expensive bricks.

However, cheaper bricks can be used for backing and hearting.

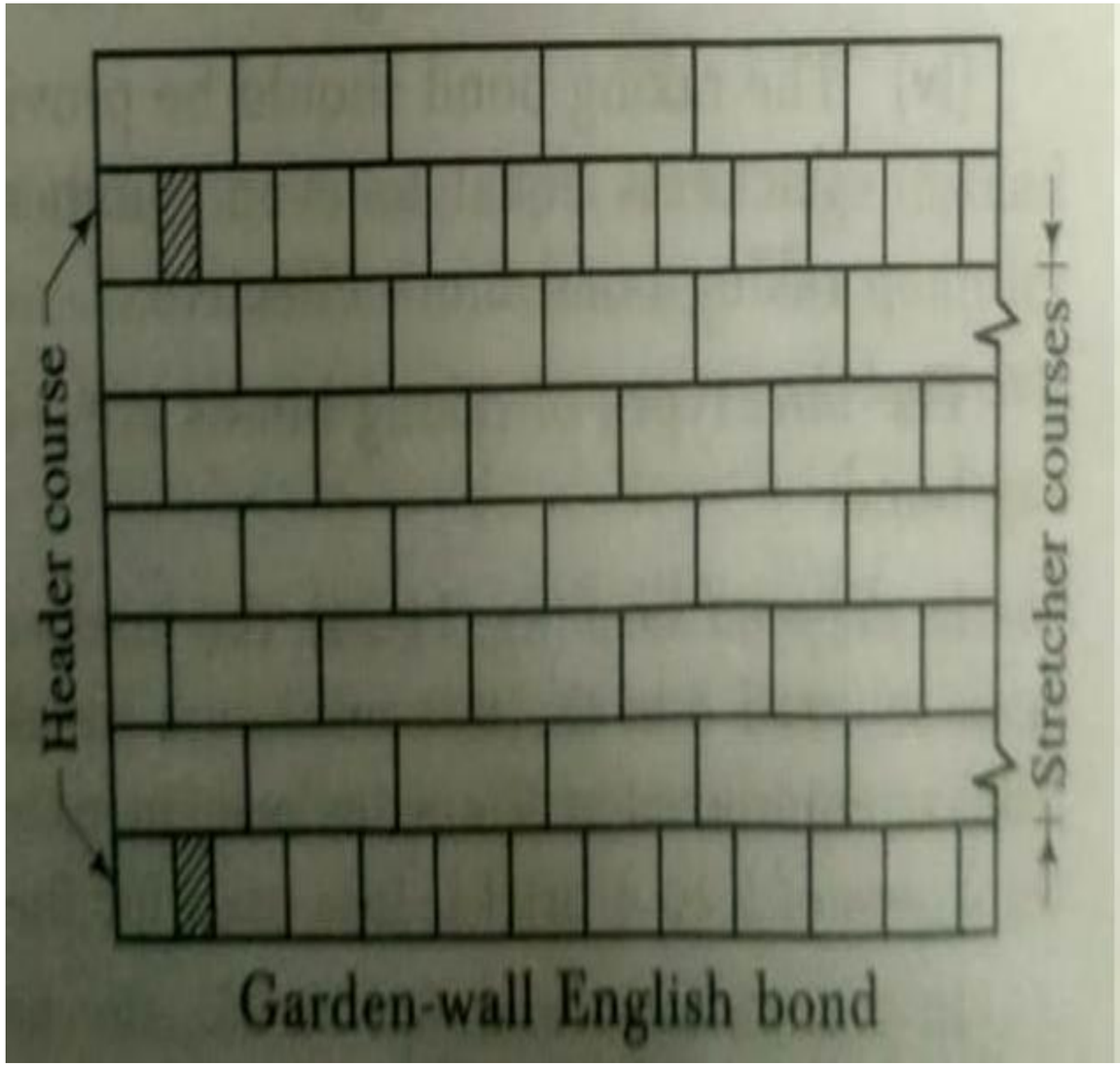
Differences between English bond and Flemish bond

Sr No.	English Bonds	Flemish bond
1	This bond consists of headers and stretchers laid in alternative courses.	This bond consists of headers and stretchers laid alternatively in each course.
2	It is strongest of all the bonds.	It is less strong for walls having thickness more than 13 ½ inches.
3	It provides rough appearance especially for one brick thick walls.	It provides good appearance for all thickness of walls.
4	There are no noticeable continuous vertical joints in the structure built in this bond.	There are partly continuous vertical joints in the structure built in this bond.
5	Much attention is not required in providing this bond.	Special attention is required in providing this bond.
6	Progress of work is more.	Progress of work is less.
7	It is costly because the use of brick bats is not allowed.	It is economical because brick bats are allowed for forming this bind.

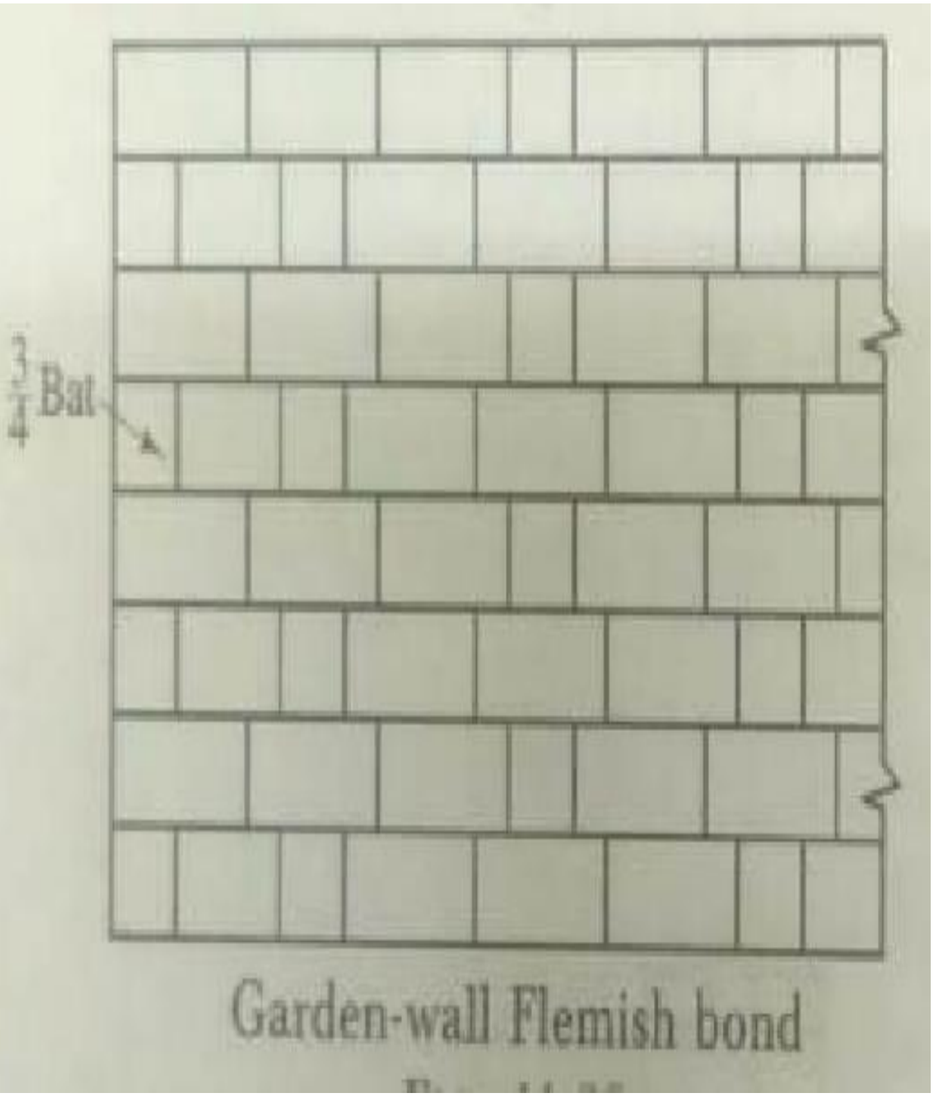
5.GARDEN WALL BOND

This bond is used for constructing one brick thick garden walls, boundary walls, and other walls such as outer leaves of cavity walls to provide good appearance.
The height does not exceed 2 m.

- Two types Flemish bond:-
  - **(i) English garden wall bond**
  - **(ii) Flemish garden wall bond**



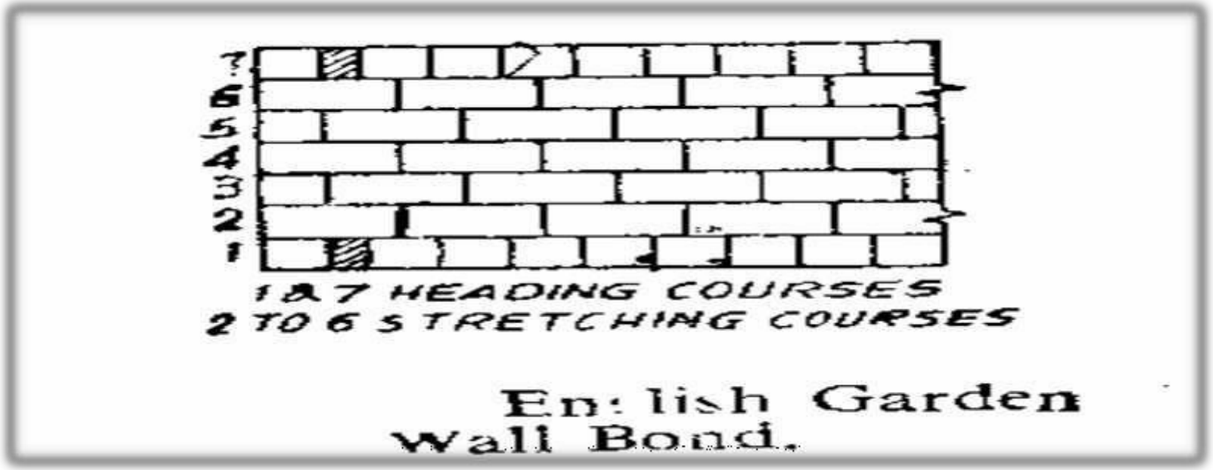
Garden-wall English bond



Garden-wall Flemish bond

(i) English garden wall bond

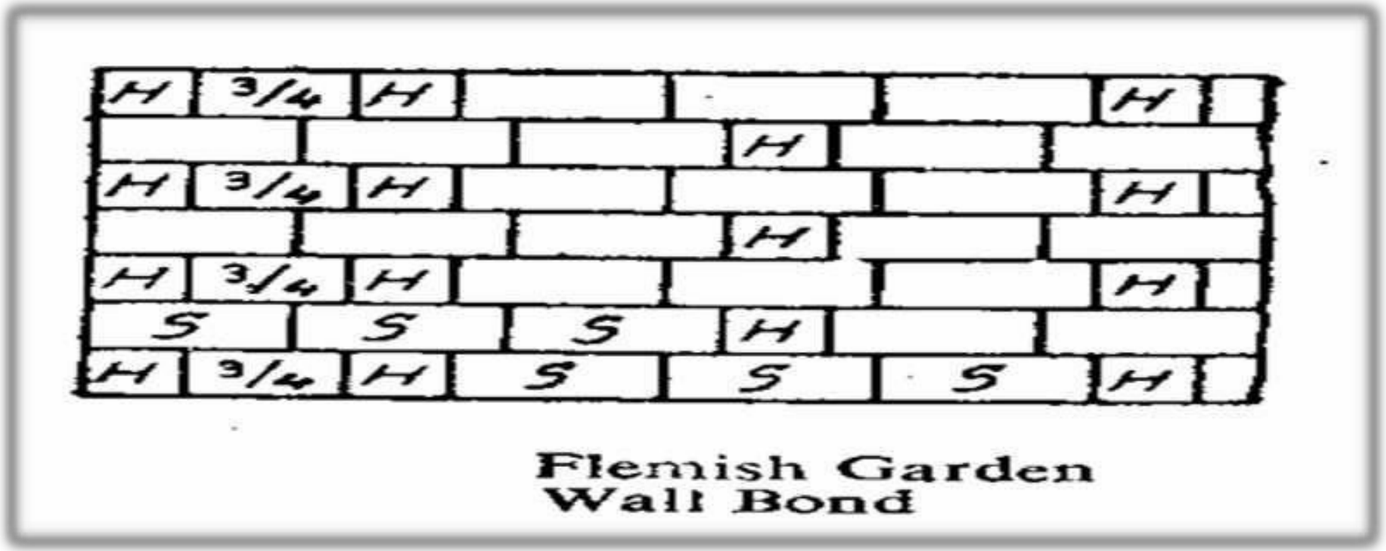
- The garden wall bond in which a heading course is provided after 3 or 5 stretching courses is called "**English Garden Wall Bond**".



English Garden Wall Bond.

(ii) Flemish Garden wall bond:

- In this bond a header is provided after 3 or 5 stretches in each course.



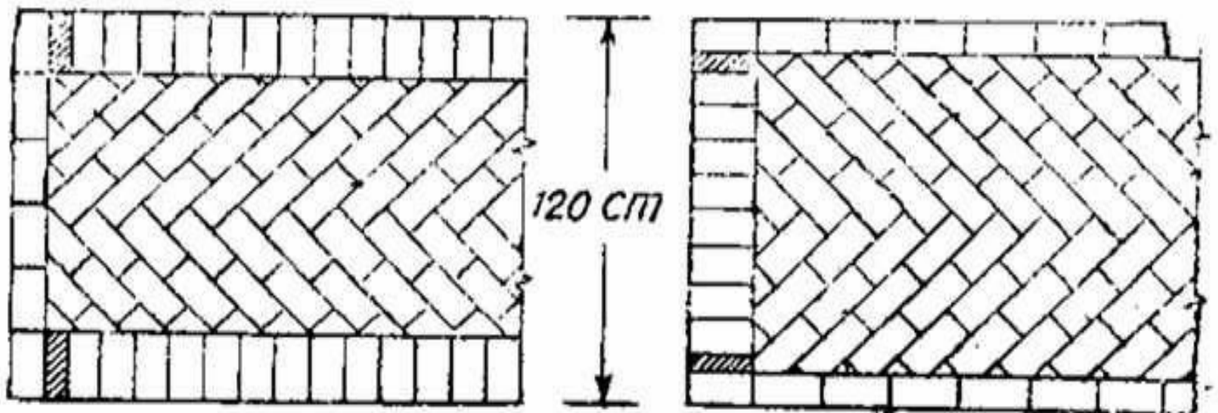
Flemish Garden
Wall Bond

6.RAKING BOND

- It this type of bond alternate course are placed in different directions to get maximum strength in the wall.
- Two types Flemish bond:-
  - **(i) Herring wall bond**
  - **(ii)Diagonal wall bond**

(i) Herring Bone Bond

➢The raking bond in which bricks are laid at an angle of 45 degree , starting at the central line and proceeding towards the facing and backing of the wall, is called "**Herring Bone Bond“.**



Hearing bone Bond.

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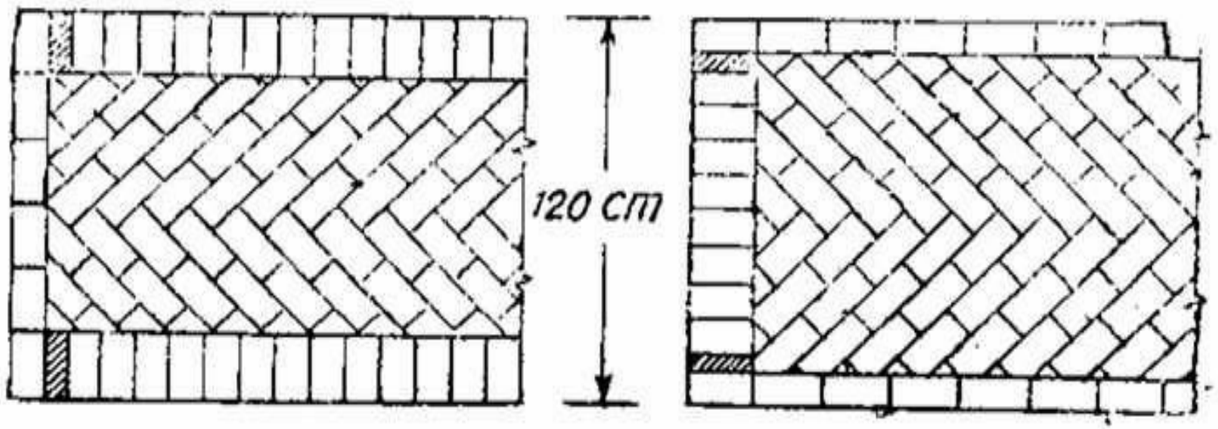

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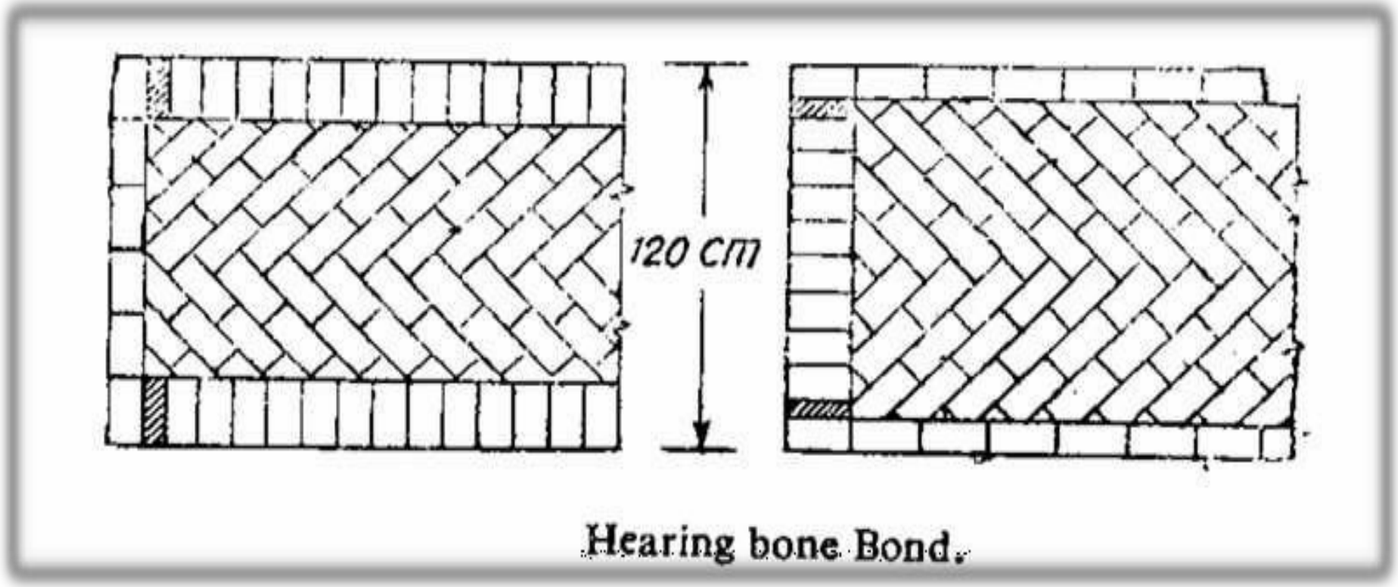
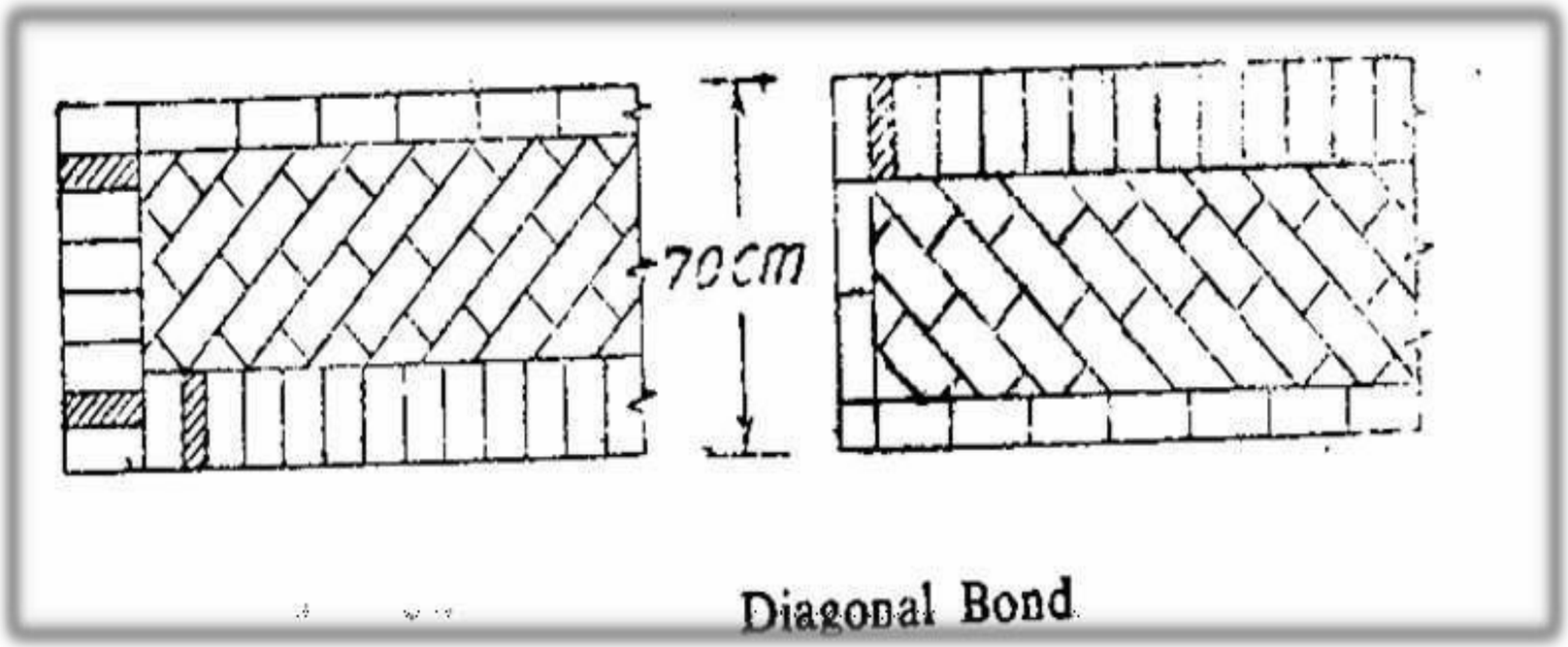


Hearing bone Bond.

(ii)Diagonal Bond:

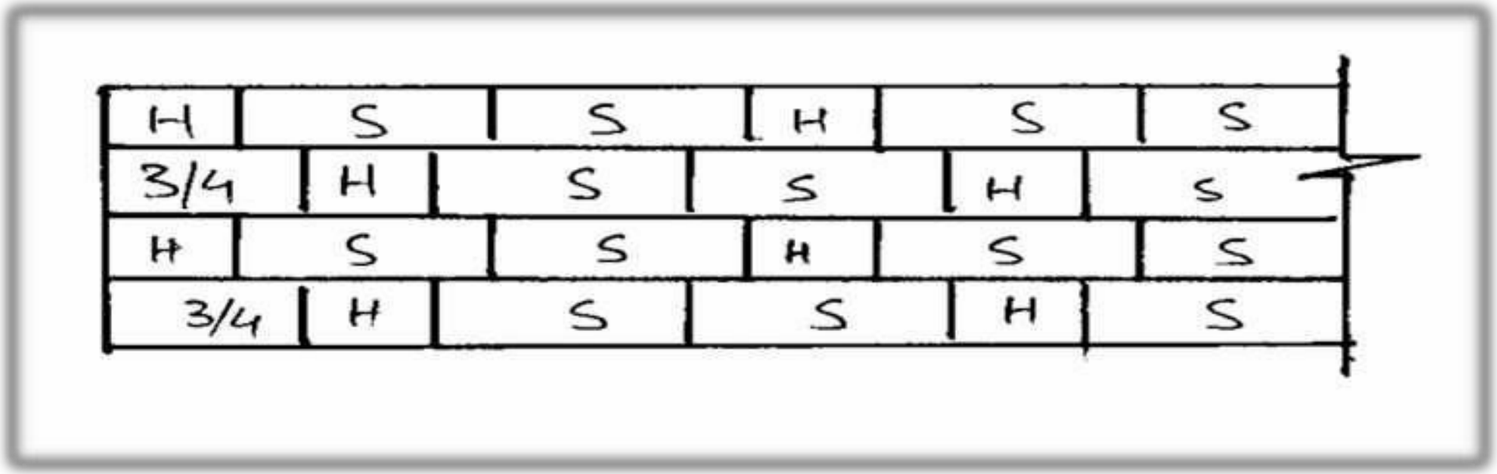
➢The raking bond in which bricks are laid starting from the corner in parallel rows inclined to the facing and backing of the wall is known as "**Diagonalbond**".



Diagonal Bond

7.DUTCH BOND

- This bond in which two stretchers and one header are laid alternately in each course is called " **Dutch Bond**".
- This bond is used in the construction of boundary walls.



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Thank you!

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