

Lecture-7

Brick Masonry

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OVERVIEW

Bonds in Brick Masonry

T-junction in
Masonry

Cross-Junction

Squint junction





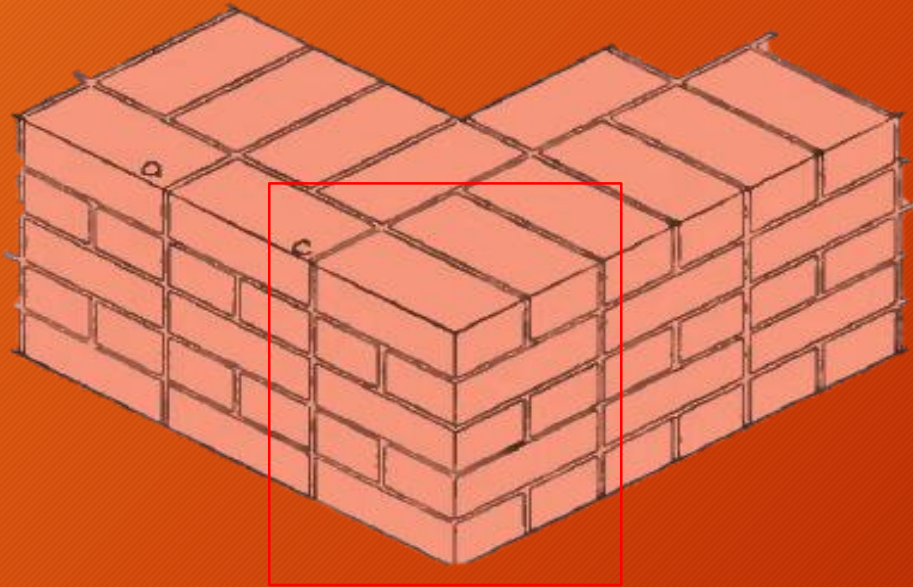
BONDS IN BRICK MASONRY

RULES FOR GOOD BRICK BONDING

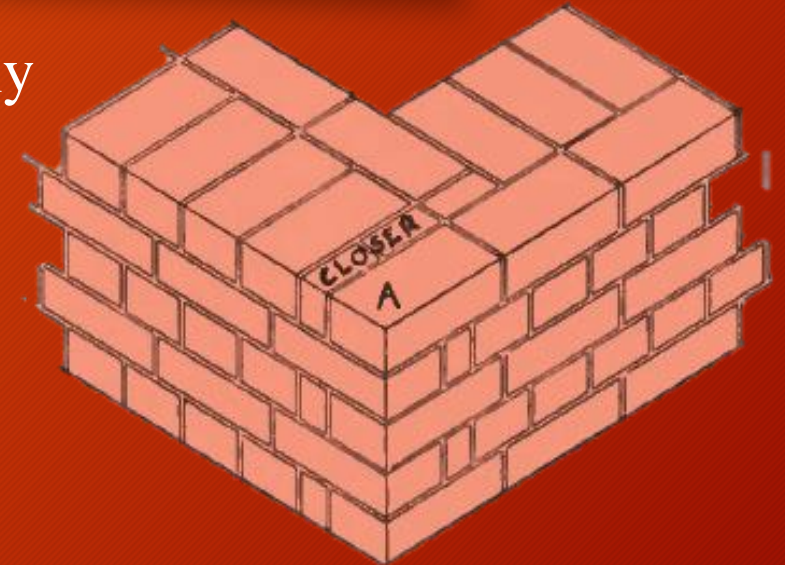
- ✓ Uniform in size.
- ✓ Bricks arranged uniformly throughout the wall.
- ✓ Bats are used as little as possible.
- ✓ The bricks in the interiors of wall laid as headers, that is, across the wall.
- ✓ The lap should not less than 2 and one-fourth($1/4$) inches.
- ✓ The vertical joints in every other course should be vertically over one another.

GOOD BRICK BONDING

The manner in which bricks are arranged in a wall is obviously of great importance to the appearance and strength.



Incorrect way of arranging bricks, because vertical joints are at same position.

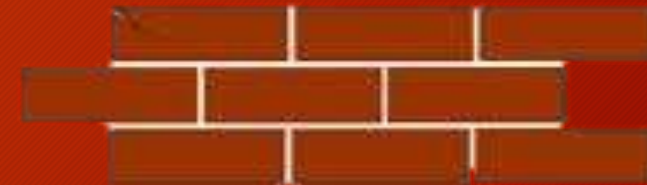
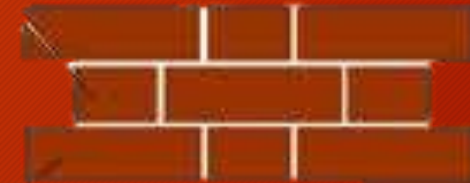
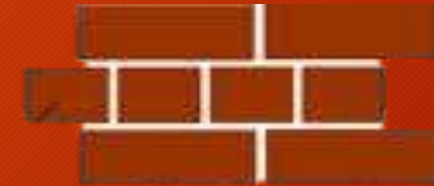


Correct arrangement of bricks : This picture shows the correct arrangement of bricks showing the overlapping of bricks due to insertion of closer next to the corner brick.

This makes the wall to act as a **homogeneous body**. This process of overlapping is called "**BONDING**".

BONDS IN BRICK-WORK

1. English bond.
2. Flemish bond.
3. Header bond.
4. Stretcher bond.
5. Facing bond.
6. English cross bond.
7. Brick on edge bond.
8. Dutch bond.
9. Raking bond.
10. Garden wall bond

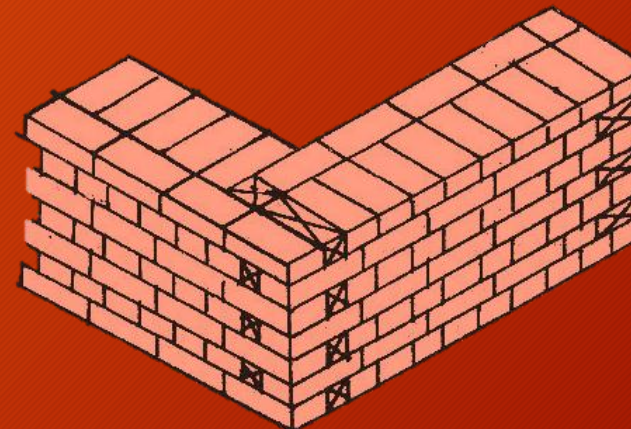


ENGLISH BOND

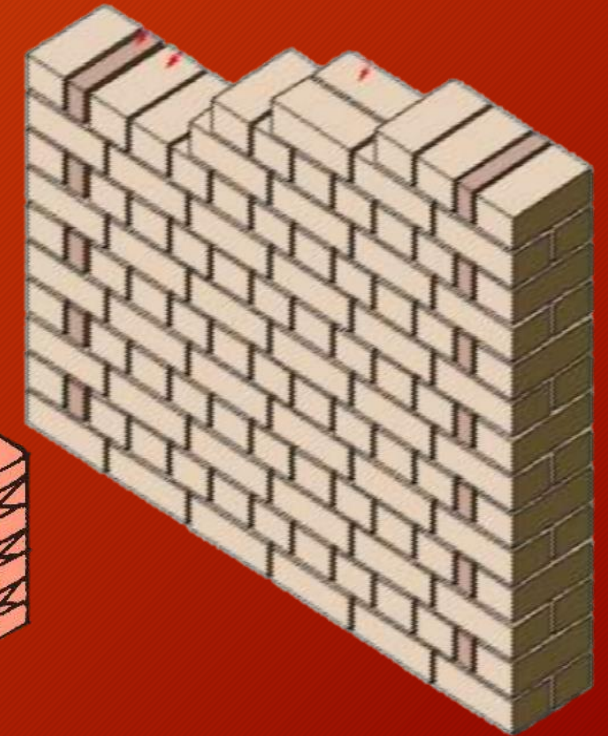
- Bricks are laid in alternate courses of headers and stretchers.
- There is a chance of penetration of damp through transverse joints.
- Queen closures are inserted next to headers to produce overlap.
- English bonds are the strongest but it is to be noted that the continuous vertical joints are to be avoided.
- Appearance is not as good as Flemish bonds.

DISADVANTAGES:

- Penetration of **damp** through transverse joints.
- Appearance **not as good as Flemish bond**



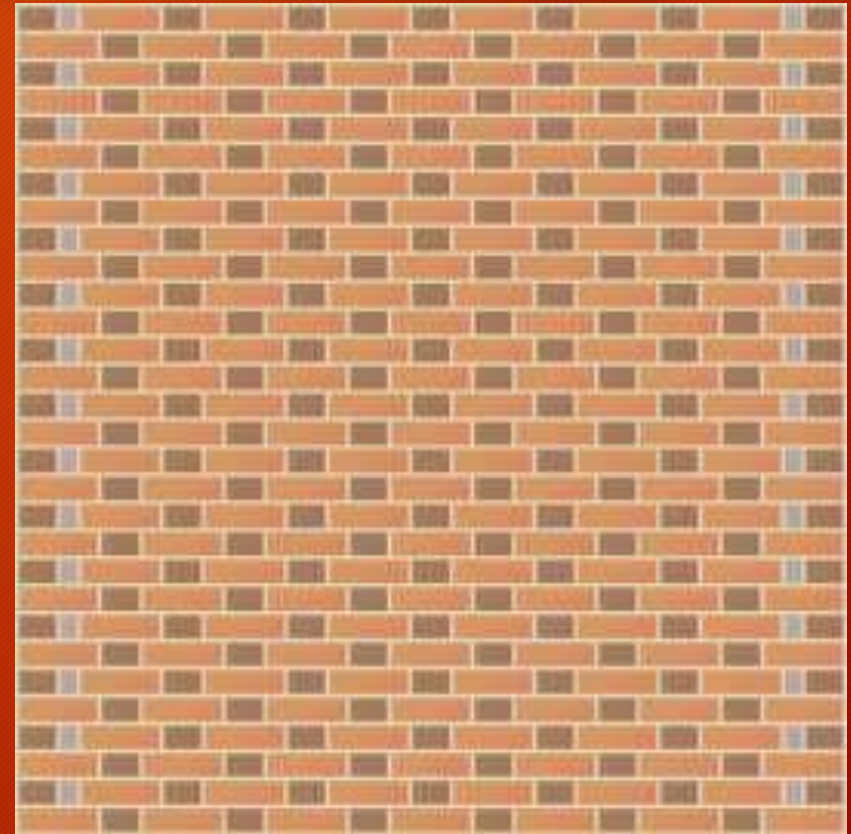
English bond 1½ BRICK THICK



English bond 1 BRICK THICK

FLEMISH-BOND

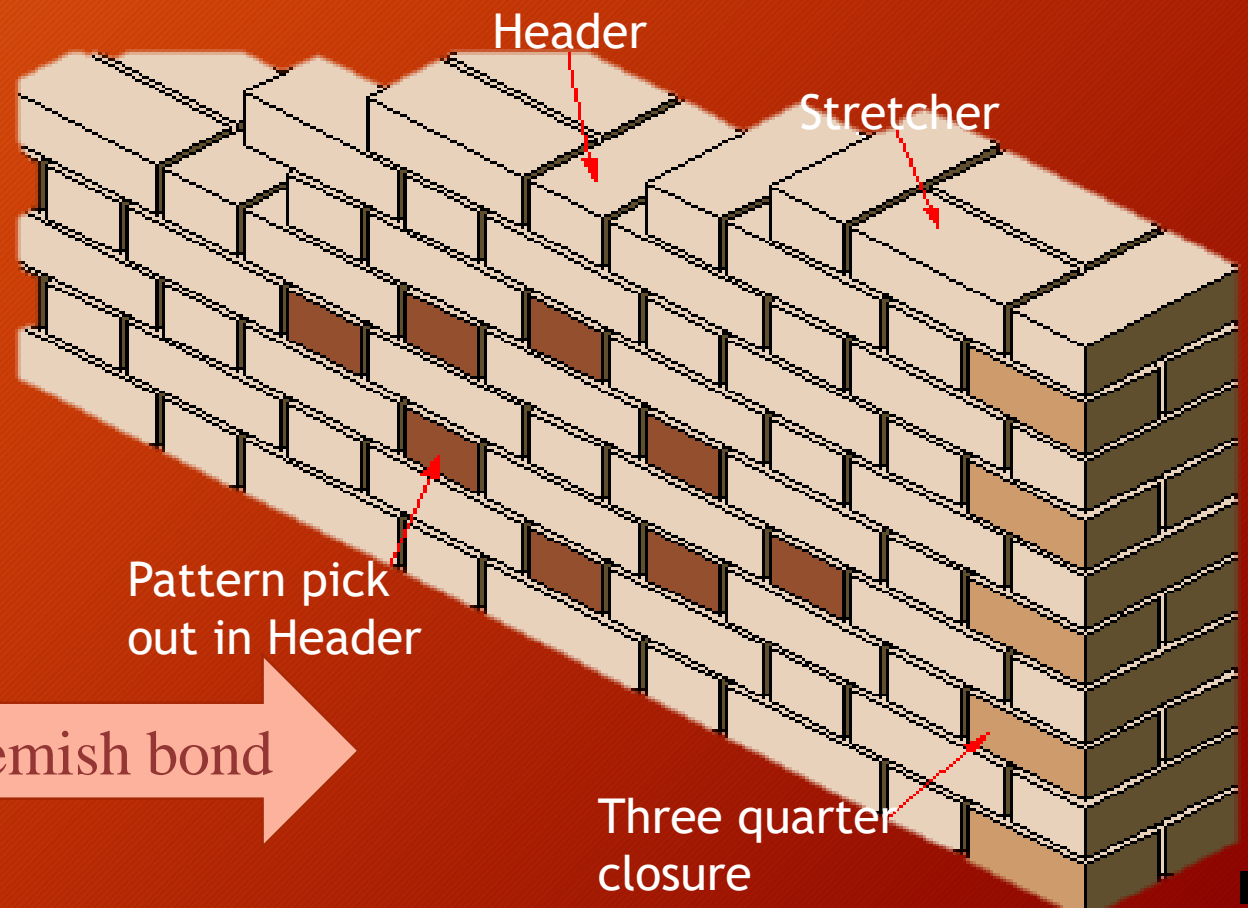
- This bond has **one** stretcher between headers, with the headers centered over the stretchers in the course below.
- When a course begins with a stretcher, the course will ordinarily terminate with a stretcher at the other end.
- Flemish bond is weaker than English bond



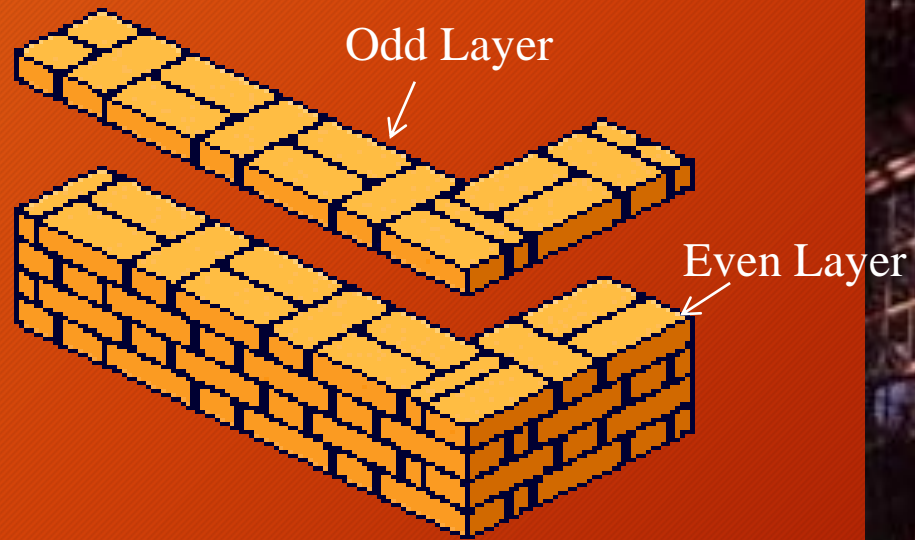
FLEMISH-BOND

1. Single Flemish bond
2. Double Flemish bond

Single Flemish bond: In bricklaying, an arrangement of bricks such that each course consists of alternate bricks having their short sides (headers) and long sides (stretchers) facing outwards, with alternate courses being offset.



SINGLE FLEMISH BOND



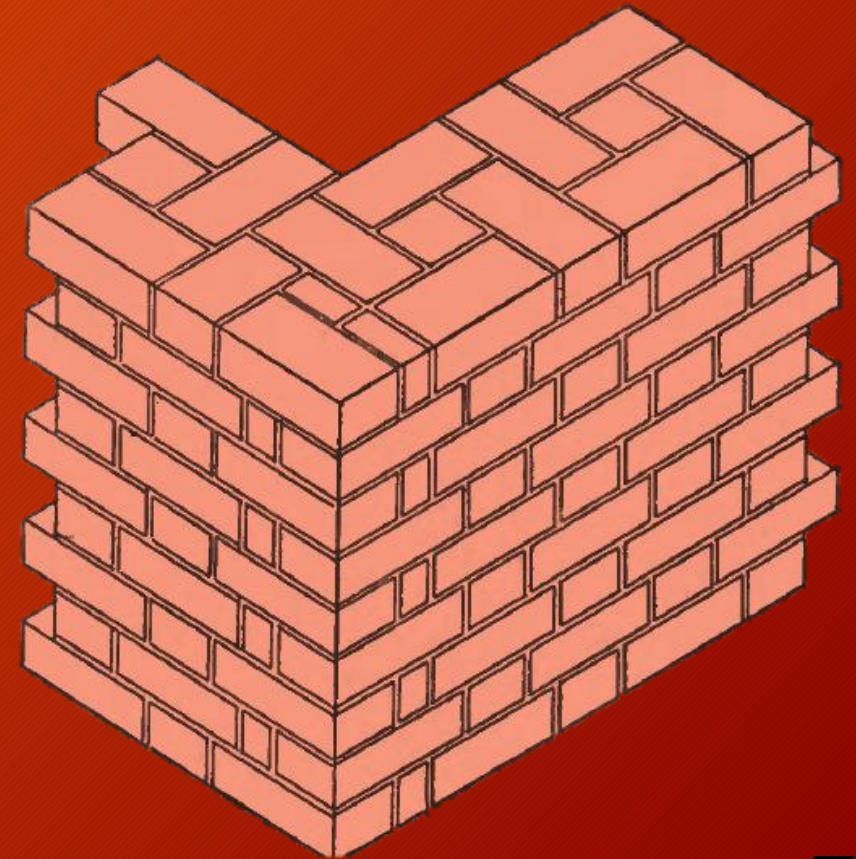
FLEMISH-BOND

Double Flemish Bond is

- Used for walls requiring a good appearance and strength.
- Not employed for wall less than 1 and a half bricks thick.

ADVANTAGES OF FLEMISH BOND

- It is highly economical.
- Walls one brick in thickness are easier to produce a fair face on both sides in Flemish than in English bond.
- The appearance of Flemish bond is more appealing to eye than that of English bond.



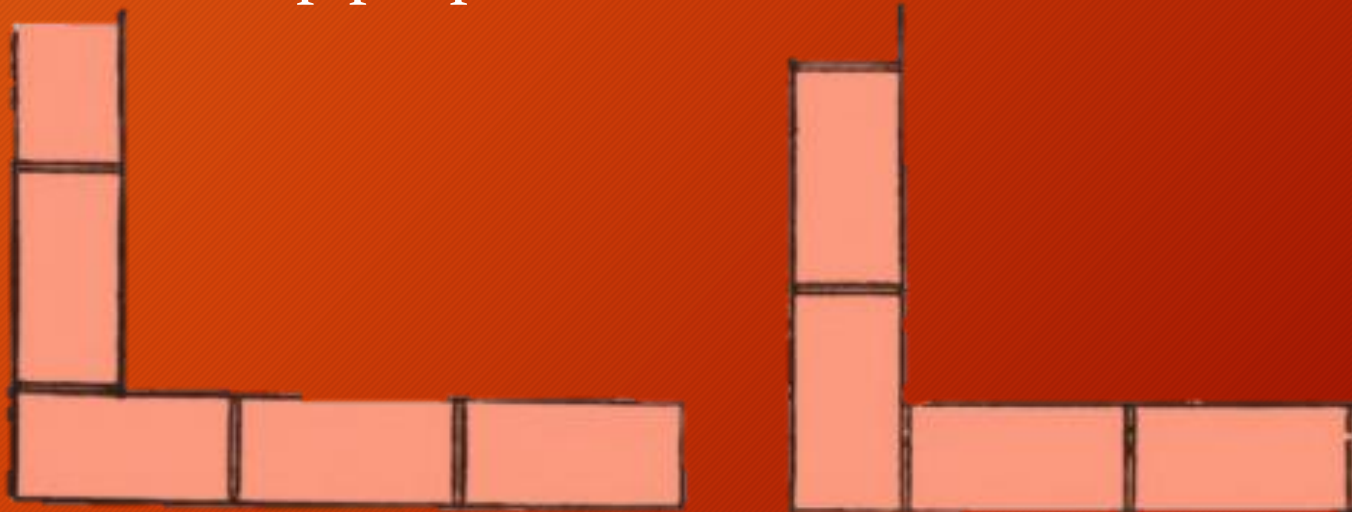
DIFFERENCE BETWEEN ENGLISH BOND AND FLEMISH BOND

Difference between English bond and Flemish bond are as follows:

1. English bond is much stronger than flemish bond for the walls thicker more than *1½ brick*.
2. Flemish bond shows more attractive and pleasing appearance of masonry work.
3. Flemish bond is economical as it uses broken brick bats, although it requires some extra mortar for additional joints.
4. Uses of flemish bond is a bit difficult than english bond. Flemish bond requires more skilled labour and supervision.

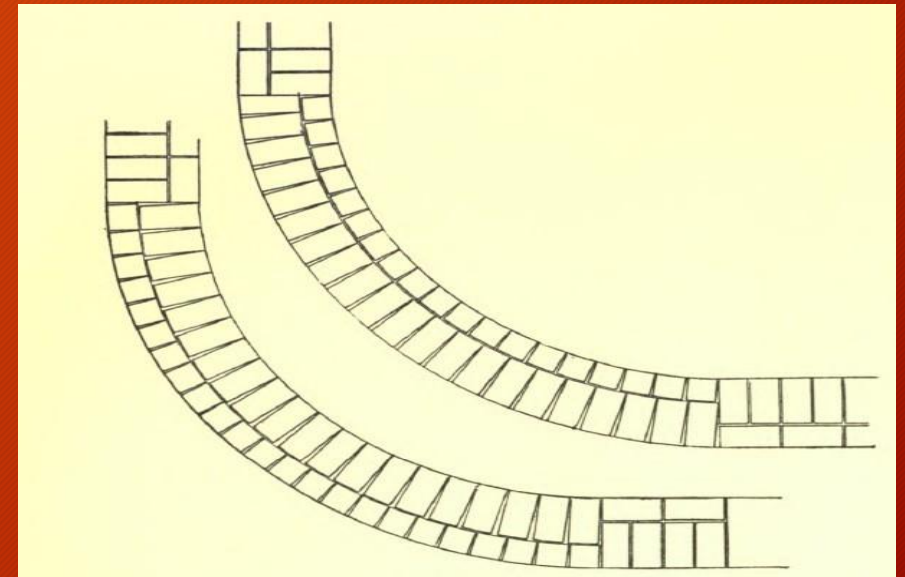
STRETCHER BOND

- Bricks are laid in stretchers.
- Used in walls of **half – brick** in thickness.
- Due to its constant occurrence in the last position it is also called Chimney Bond, Running Bond.
- This bond doesn't develop proper internal bond.



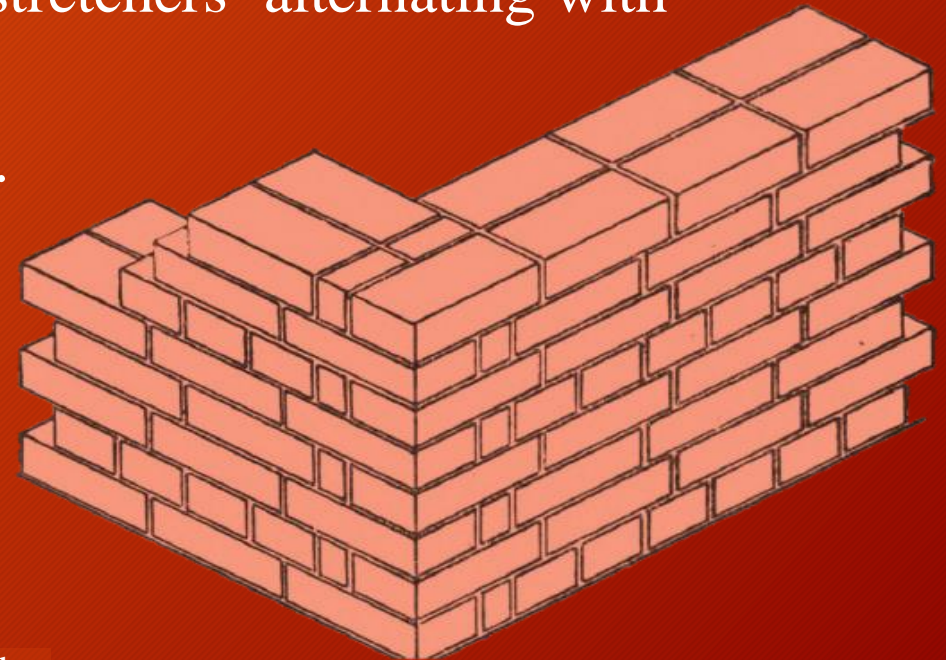
HEADER BOND

- ❖ Heading or Header Bond is laid on headers.
- ❖ Used for round quick sweeps.
- ❖ **Should never be used in straight work as it is very weak.**
- ❖ This bond is used for facing of curved surface and footings in foundations.



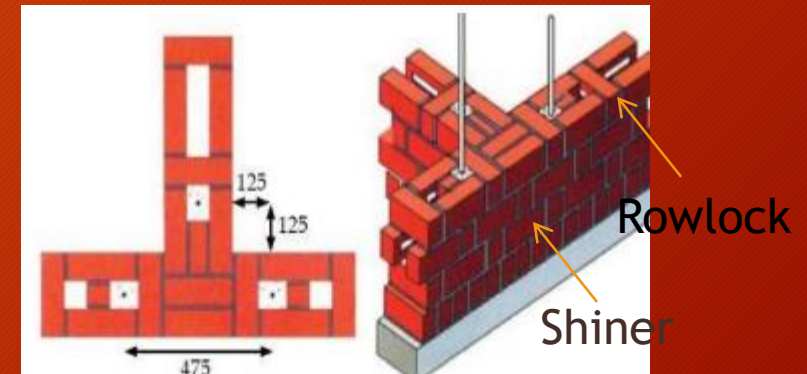
GARDEN-WALL BOND

- Used for 9 inch wall.
- Used when a **fair face** is required on both sides.
- Wall is composed of three or four courses of stretchers alternating with one of headers.
- It is mostly used in construction of garden wall.



RAT TRAP BOND

- It is made by placing the bricks on their sides having a cavity of 4" (100 mm)
- Alternate course of stretchers and headers.
- It is still used in India as an economical bond.

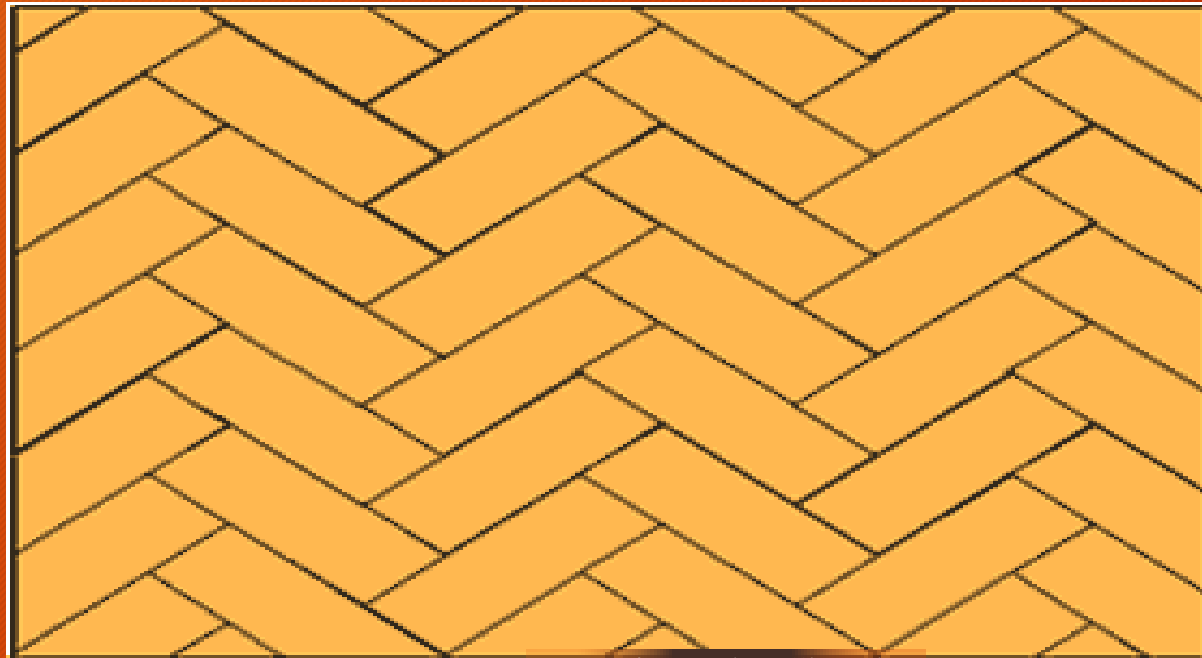


ADVANTAGES OF RAT TRAP BOND

- It is **highly economical** because it can make a wall of one brick thickness with fewer bricks than a solid bond.
- **Strength is equal to the standard 10" (250 mm) brick wall, but consumes 20% less bricks.**
- **Cost saving on material is 26%** as compared to the traditional 10" brick wall.
- Maintains **thermal comfort** inside the building due to air medium.
- Bricks aligned on both sides, plastering not required.
- It is quite **strong as building** constructed about 40 years ago still does not show any signs of distress.

HERRINGBONE BOND

It is a purely decorative bond.
It is used in floor and wall panels.



JUNCTIONS

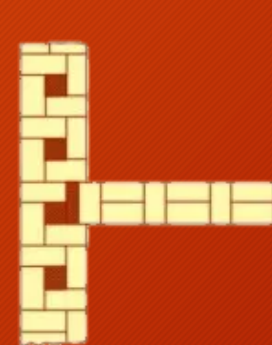
Junctions is that connection which is formed at the meeting of one (subsidiary) wall at same **intermediate position of another wall**. When both these walls meet at right angles, we get a tee-junction, we have a cross-junction or intersection. However, if the subsidiary wall meets the main wall at some intermediate point, and if the angle formed between the two is other than a right angle, a *squint junction* is formed.

□ Junctions are of the following types:

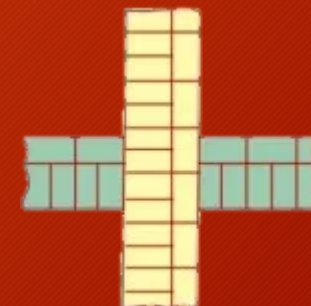
□ (a) Right angled junction

- Tee Junction
- Intersection or cross junction

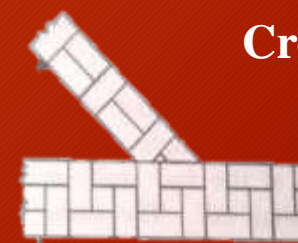
(b) Squint junction



Tee Junction



Cross-junction



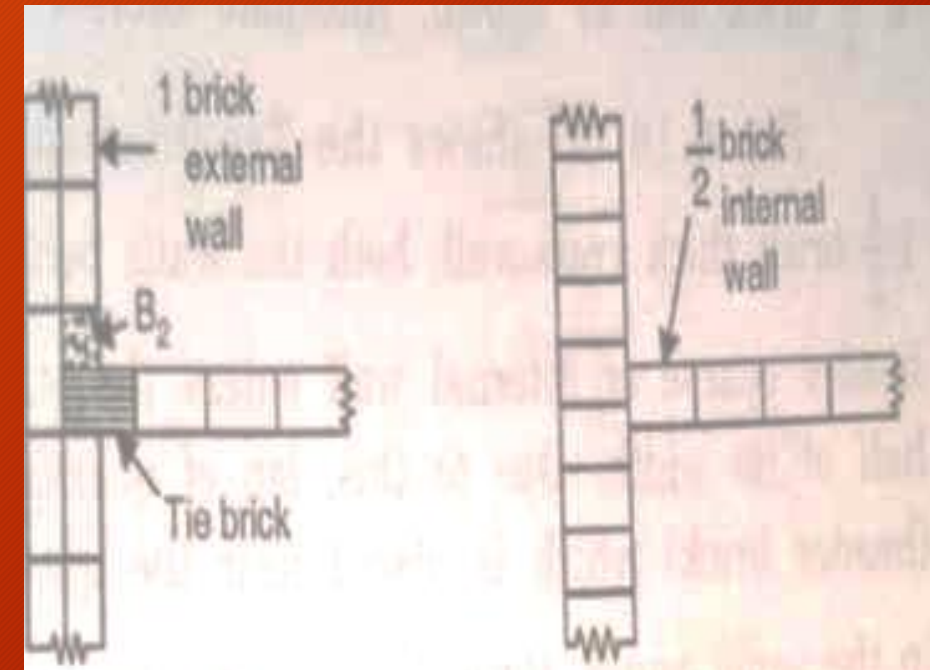
Squint junction

TEE JUNCTION

□ External and Internal walls in English Bond

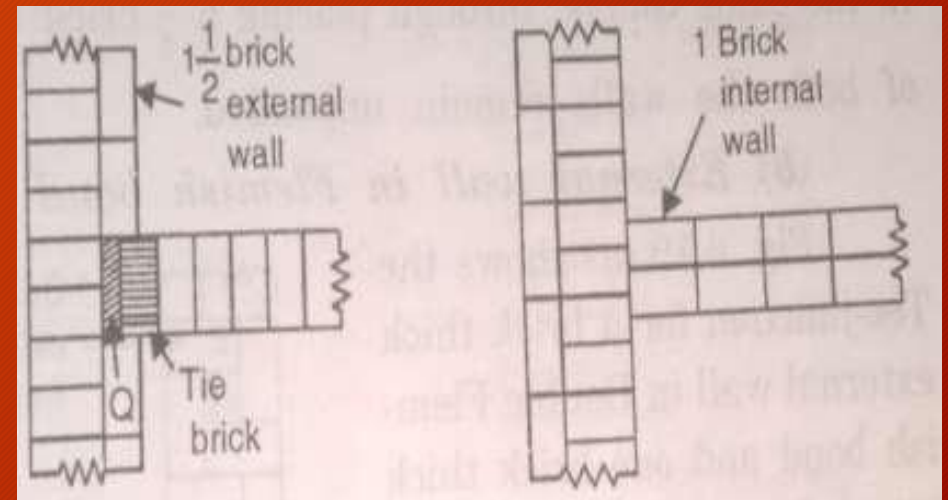
Tee junction is formed when the internal walls at its end meets external wall at some intermediate position. Tee-junctions can be either in English bond or in Flemish bond.

Figure shows a one-brick thick external wall and a half brick thick internal wall (partition wall), both walls being Constructed in English bond. **Bond is obtained by making alternate courses of internal wall entering into the stretcher course of the main wall.** Due to this, lap of half brick is obtained through the brick (shown shaded). Alternate courses of both the walls remain unbonded



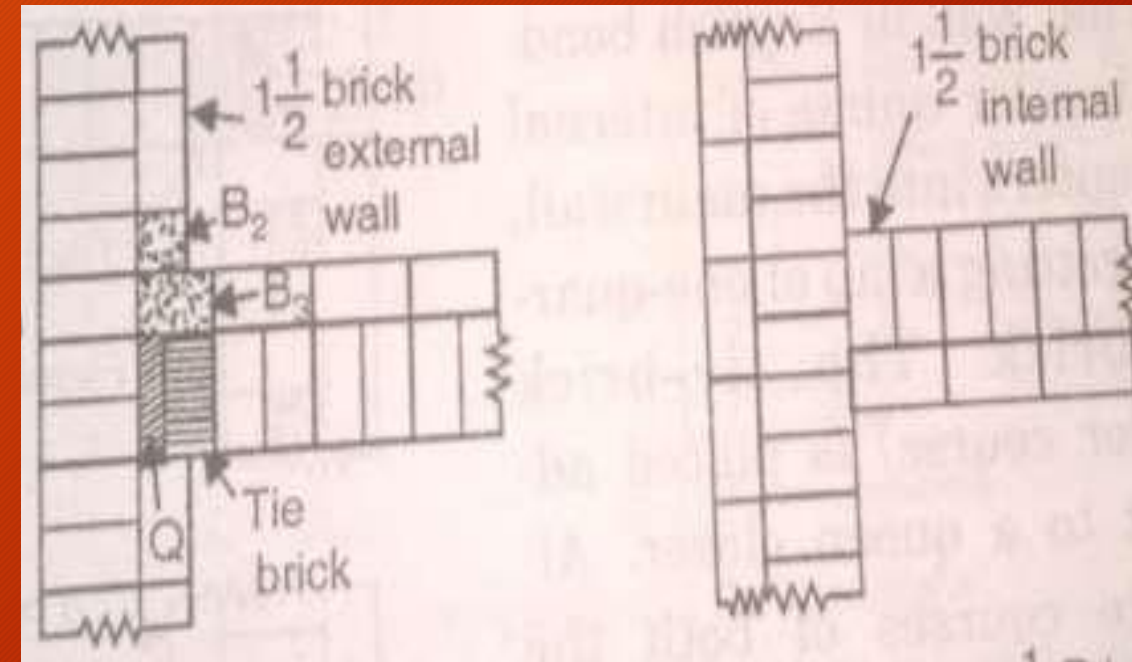
TEE JUNCTION

Figure shows the tee junction between $1\frac{1}{2}$ brick thick external wall and one-brick thick internal (cross) wall, both the walls being constructed in English bond. Here, the **header course of internal wall centers the stretcher course of the main through half of its width**. Due to this, lap of quarter-brick is obtained through the tie-brick, which is placed near the queen closer (Q). Alternate course of both the walls remain unbonded.



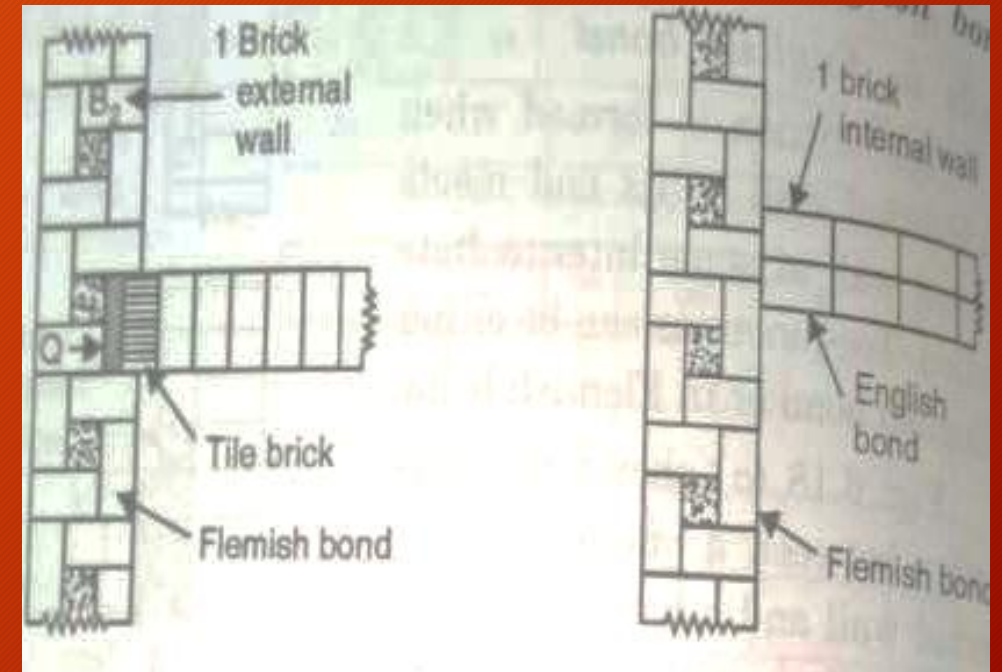
TEE JUNCTION

It shows the Tee-junction between $1\frac{1}{2}$ brick thick external wall and $1\frac{1}{2}$ brick thick internal wall, both the walls being constructed in English bond. In alternate courses, the **header brick at the junction enters the stretcher courses of the main wall**. The tie-brick (shown shaded), placed near the queen closer (Q) furnishes a lap of quarter brick. Additional courses of both the walls remain unbonded.



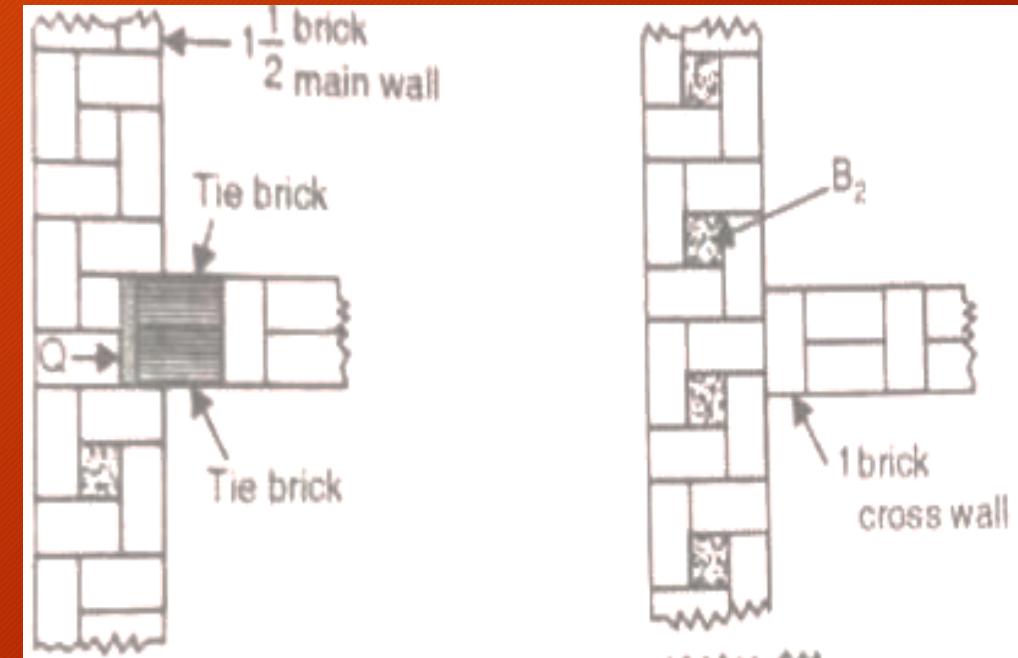
EXTERNAL WALL IN FLEMISH BOND AND INTERNAL WALL IN ENGLISH BOND

Figure shows the Tee-junction for a brick thick external wall in Double Flemish bond and one brick thick internal wall in English bond. The header course of internal wall enters into the main wall, thus getting a lap of one-quarter brick. The tie-brick (header course) is placed adjacent to a queen closer. Alternate courses of both the walls remain unbonded.



EXTERNAL WALL IN FLEMISH BOND AND INTERNAL WALL IN FLEMISH BOND

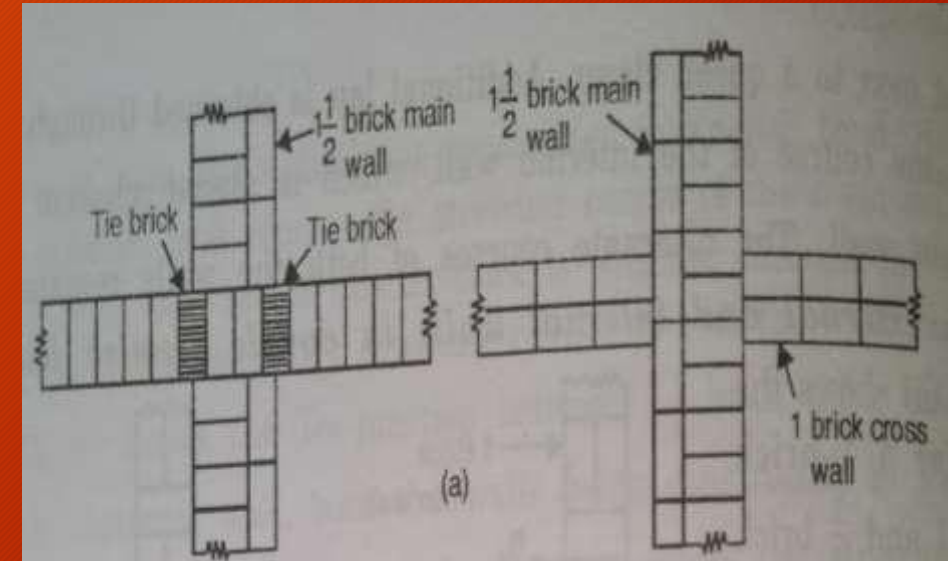
Figure shows the Tee-junction for a $1\frac{1}{2}$ brick thick main wall and one-brick thick cross wall, both being constructed in double Flemish bond. In alternate course, the **stretcher bricks of the cross wall enter into the main wall through quarter brick**. A queen closer (Q) is placed next to it in the main wall. Alternate courses of both the walls remain unbonded.



CROSS JUNCTION OR INTERSECTION

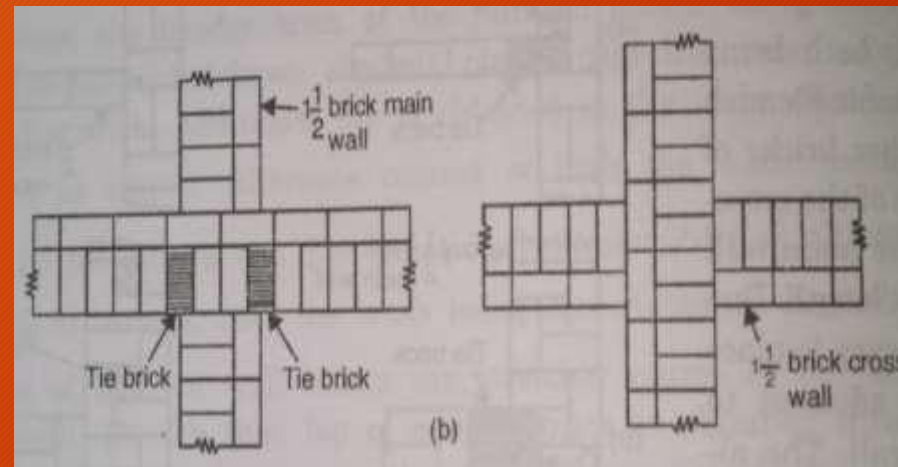
A cross-junction is formed when two internal walls cross each other at right angles. One of the walls may be called as the main wall while the other of lesser thickness as cross wall.

A cross junction between $1\frac{1}{2}$ brick thick main wall and 1 brick thick cross-wall, both being constructed in English bond. The header course of cross-wall enter into the main wall: the tie bricks thus give a lap of quarter brick on both sides.



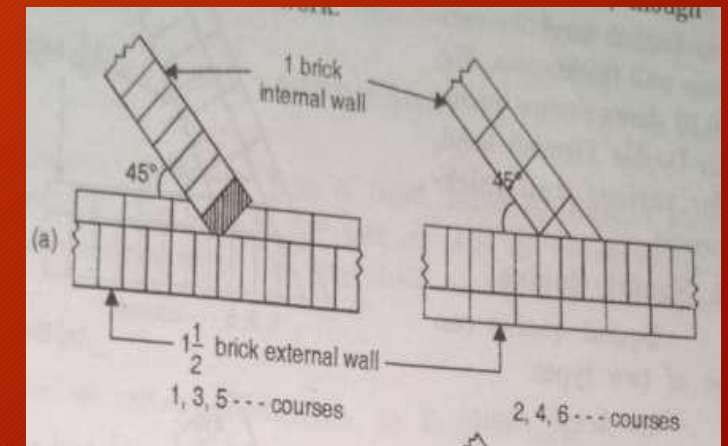
CROSS JUNCTION OR INTERSECTION

A cross junction between two walls, each of $1\frac{1}{2}$ brick thick constructed in English bond. A lap of quarter brick is obtained through header courses, on both the sides. Alternate courses thus remain unbonded.



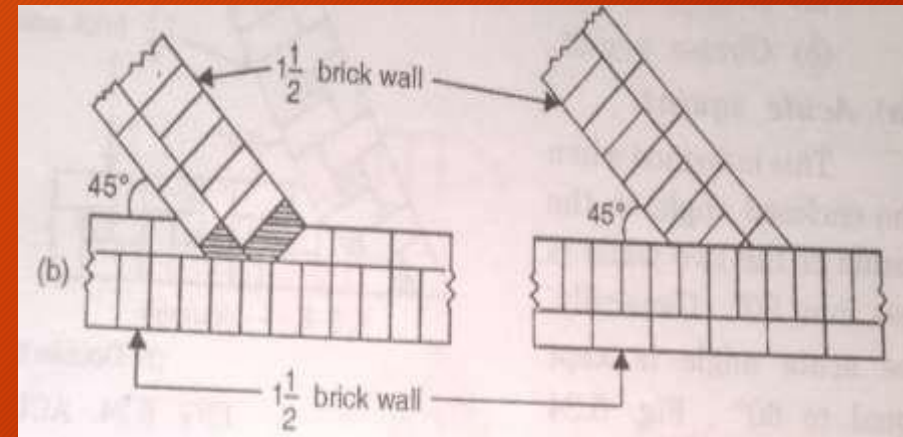
SQUINT JUNCTION

- A squint junction is formed when an internal wall meets an external continuous wall at an angle other than 90° . Usually, the angle of squint is kept at 45° , though squint junctions are not very common in brick work.
- Figure show a squint junction between $1\frac{1}{2}$ brick thick external wall and a 1 brick thick internal wall, both being constructed in english bond. The header courses of the cross-wall is taken inside the main wall, thus getting the required bond. Alternate courses of both the walls remain unbonded.



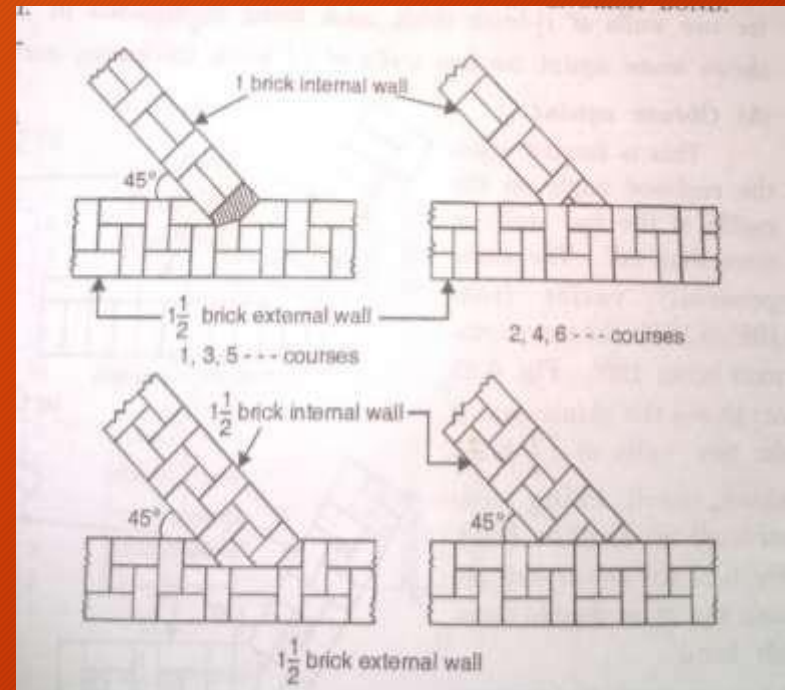
SQUINT JUNCTION

A squint junction between two walls each of $1\frac{1}{2}$ brick thickness and constructed in English both. The header bricks are taken inside the main wall. Alternately courses remain unbounded



SQUINT JUNCTION IN DOUBLE FLEMISH BOND

- Fig. Shows the squint junction for the walls constructed in Double Flemish bond. These junctions are quit difficult to be constructed.



Refernces

- Building Construction by Sushil Kumar
- **Building Construction by B.C. Punmia; Ashok Kumar Jain and Arun Kumar Jain**
- **Building Construction & Materials by Gurcharan Singh**

The image shows the interior of a church, looking towards the altar. The walls are made of light-colored brick. A large, rectangular opening in the wall is filled with a grid of small, rectangular windows. The light from these windows illuminates the interior. In the foreground, there are rows of wooden pews. The ceiling is dark and appears to be made of wood or metal. The overall atmosphere is quiet and solemn.

Thank you