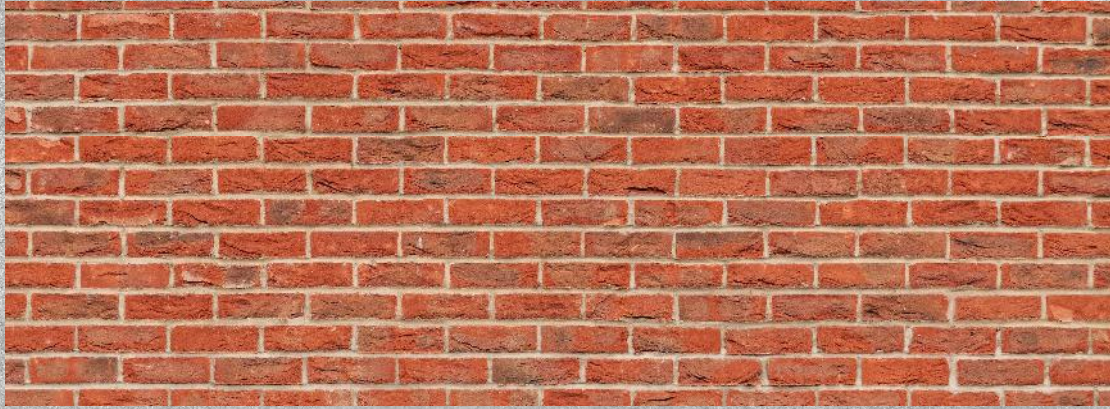


## Brick Cracks



Structural Guide

## Types of Cracks

Vertical Cracks



Straight Cracks  
Toothed Vertical Cracks

Horizontal Cracks



Below Slab Soft  
Above Slab  
At Pitch Roof Eave Level

Diagonal Cracks



Due to soil shrinkage  
Due to the heaving of soil  
Cracking at windows  
Thermal expansion



## Vertical Cracks

Straight Cracks

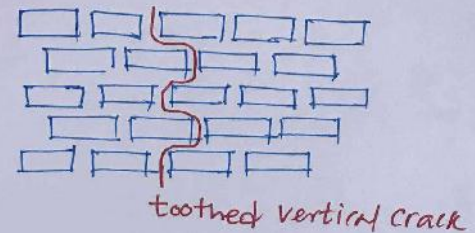
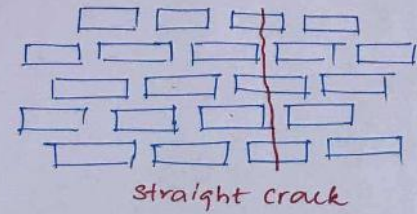
Toothed Vertical Cracks

### Causes for Cracking

Temperature Variations

Foundation Movement

Moisture Movement in Bricks



## Vertical Cracks – Temperature Variations

When the brick wall exposed to direct sunlight, it expands. These types of expansions are restrained by the cross walls, slabs, foundations, lintel, etc.

Certain compressive stress in the wall will be developed in the wall due above reason.

This compressive stress will be higher at the windows as the area of the wall is relatively smaller.

Masonry walls get shortened due to the creep when it is under the compression.

The compressed wall expands at night when the temperature of the wall drops and reaches its original state.

In this process, the tensile stress in the brick wall is developed and the tensile stress will be maximum at the window same as the compressive stress.

Compression and tension will be developed in the wall daily when it exposed to direct sunlight and cool at night.

Wall will crack in the process if the tensile stress is greater than the tensile strength of the wall.





## Vertical Cracks – Foundation Movement

Generally, these cracks are wider at the top of the building and they diminished toward the foundation. At foundation levels, these cracks become hairline cracks.

There will be a single crack on the two opposite sides of the building.

Mostly these types of brick cracks appear in the shrinkable clayey soil.

During the dry season, soil shrinks and swells when rains.

This expansion and contraction in the soil cause cracks in the building.



## Vertical Cracks – Moisture Movement

Mainly these type of cracks occurs when the brick absorbs the moisture and expands.

This expansion causes movement of the wall connected to the particular wall. This movement causes cracks.

Further, irregular bricks or nonstandards bricks also cause this issue and lead to brick cracks.

## Horizontal Brick Cracks

### Below the Slab

### Horizontal Cracks above the Slab

### Horizontal cracks at pitch roofs at every level

These types of cracks occur due to thermal effects. Differential stresses caused due to thermal effects crack the brick.

These cracks can be related to the creep of the masonry walls.

The settlement could cause cracks of this nature

## Diagonal Cracks in External Walls

### Diagonal Cracks Due to Movement of Soil by Shrinkage

Clayey soils that are subjected to shrinkage movement cause these types of cracks in the walls. When these types of soils are dry, their volume reduces and it leads to the settlement of the part of the structure. Further, drying of the soil towards the mid of the building is minimal as those areas do not expose to the environment. Therefore, shrinkage mostly occurs at the perimeter of the building. Therefore, these type of brick cracks occurs at the corners of the building.

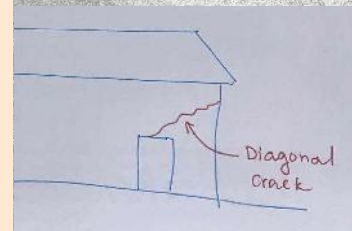
### Diagonal Cracks due to Heaving of Soil

These types of cracks are also occurring in shrinkable soils. When it dries, it shrinks extensively. When the water is added during the rains, it expands. This expansion lifts the building leading to diagonal cracks in the building.

### Diagonal Cracks at Windows

These cracks form due to the uneven stress distribution in the walls. Uneven stress was caused due to the reduced area of the wall at the window. This area carries smaller stress.

Diagonal cracks in the masonry walls are more common on load-bearing walls and these cracks are not that wider and they seem like hairline cracks.



Thank you



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