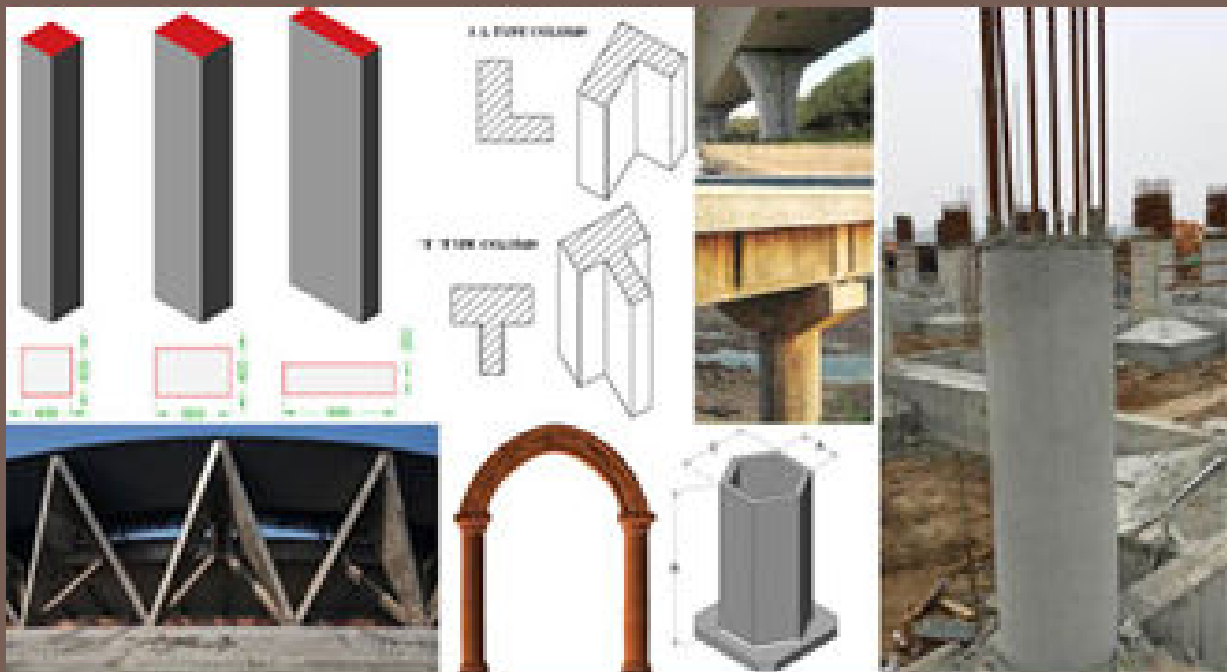


TYPES OF COLUMNS IN BUILDING CONSTRUCTION



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Types of Columns in building Construction

INTRODUCTION:

A vertical member whose effective length is greater than 3 times its least lateral dimension carrying compressive loads is called as a column.

Columns transfer the loads from the beams or slabs to the footings or foundations. The inclined member carrying compressive loads as in the case of frames and trusses is called as struts. The pedestal is a vertical compression member whose effective length is less than 3 times its least lateral dimension.

Why we provide Columns?

Primarily, Columns carry Axial Loads and therefore are designed for compression. Other loads from snow, wind or other horizontal forces can cause bending in the columns. Columns then need to be designed for Axial Load and Bending.

Types of Columns in Building Construction :

Columns are classified based on the several conditions which include:

1. Based on Types of Reinforcement
2. Based on Types of Loading
3. Based on Slenderness Ratio
4. Based on Shape
5. Based on Construction Material

Note: It's just a classification a column can be a combination of both types like a column can be Rectangular shape with tied column

Based on Types of Reinforcement

1. Tied Column

This type of column is commonly construction from reinforced concrete. Longitudinal reinforcement are confined within closely spaced tie reinforcement. It is estimated that 95% of all columns in buildings are tied.

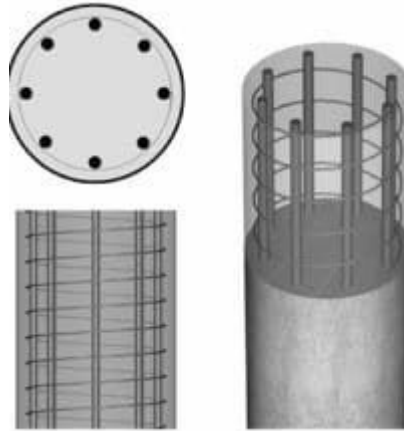


Tied Column

2. Spiral Column

Spiral column is also construction from reinforced concrete. In this type of column, longitudinal bars are confined within closely spaced and continuously wound spiral reinforcement.

Spiral reinforcement provide lateral restrains (Poisson's effect) and delays axial load failure (ductile).

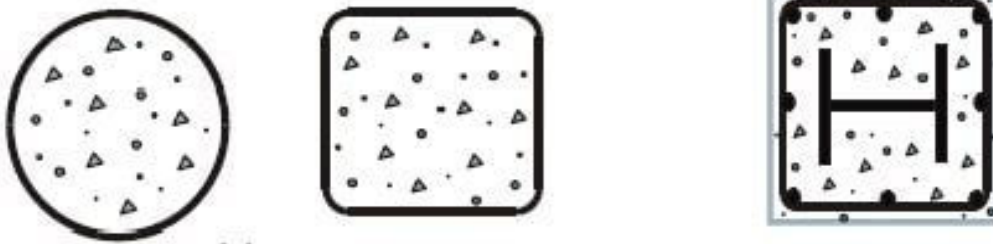


Spiral Column

3. Composite column

When the longitudinal reinforcement is in the form of structural steel section or pipe with or without longitudinal bars, it is called as a composite column.

This type of column have high strength with fairly small cross section, in addition to exhibit good fire performance.



Composite column

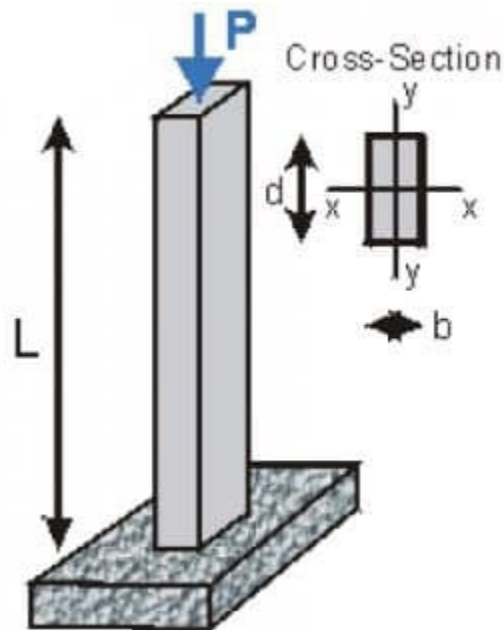
Based on Types of Loading :

4. Axially Loaded Column

If vertical axial loads act on the center of gravity of the cross-section of the column, then it is termed as axially loaded column.

Axially loaded column is rare in construction since coinciding vertical loads on the center of gravity of column cross section is not practical.

Interior column of multi-storey buildings with symmetrical loads from floor slabs from all sides is an example of this type of column.

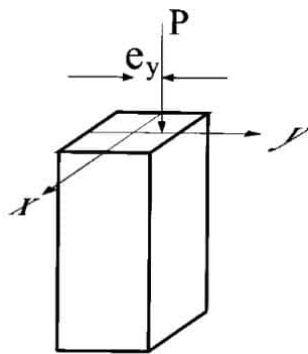


Axially Loaded Column

5. Column with Uniaxial Eccentric Loading

When vertical loads do not coincide with center of gravity of column cross section, but rather act eccentrically either on X or Y axis of the column cross section, then it is called uniaxially eccentric loading column.

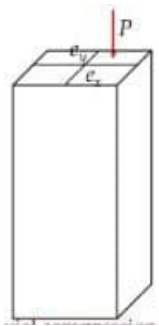
Column with uniaxial loading are generally encountered in the case of columns rigidly connected beam from one side only such as edge columns.



6. Column with Biaxial Eccentric Loading

When vertical on the column is not coincide with center of gravity of column cross section and does not act on either axis (X and Y axis), then the column is called biaxially eccentric loaded column.

Columns with biaxial loading is common in corner columns with beams rigidly connected at right angles at the top of columns.

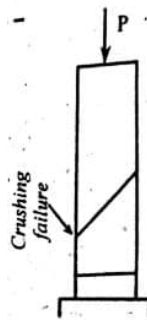


Based on Slenderness Ratio:

Based on slenderness ratio, (effective length/ least lateral dimension), columns are categorized as follow:

7. Short Column

If the ratio effective length of the column to the least lateral dimension is less than 12, the column is called as the short column. A short column fails by crushing (pure compression failure).



8. Long Column

If the ratio effective length of the column to the least lateral dimension exceeds 12, it is called as long column. A long column fails by bending or buckling.



Based on Shape :

Shape of Reinforced Concrete Column

9. Square or Rectangular Column

They are generally used in the construction of buildings., which are common in practice; these types of column are provided only if the shape of the room is a square or rectangular shape.

It is way much easier to construct and cast rectangular or square columns than circular ones. This is primarily for the ease of working with the shuttering and to support it from it collapsing due to pressure while the concrete is still in flowable form. The square and rectangular ones are better and less costlier to cast.



Square or Rectangular Column

10. Circular column

They are specially designed columns, they are mostly used in piling and elevation of the buildings. Why we use it in elevation? In order

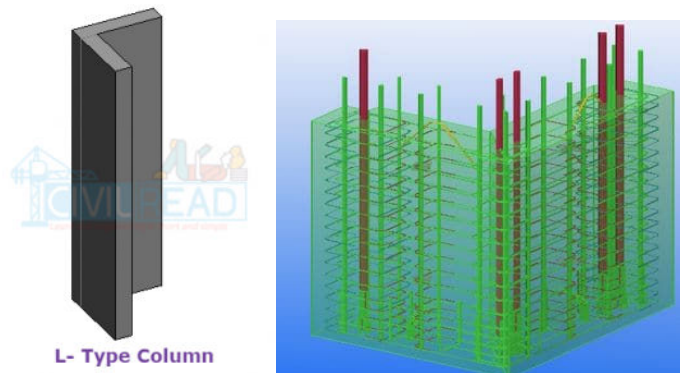
to avoid edges, we use this type of columns. they are also provided in sit out areas, auditoriums or fire assembly zones, where you have enough space for them not to hinder any movement of people or look bad with flat surfaces You can find circular columns as pillars of Bridges because there you don't need to flush them to anything. Also circular looks aesthetic there.



CIRCULAR COLUMN

11 .L-Shape Column

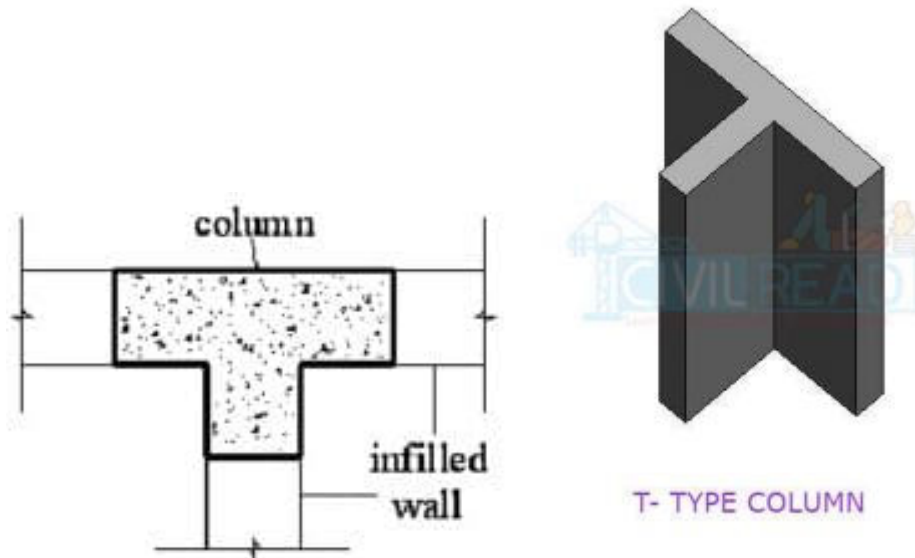
Commonly, L-shaped column is utilized in the corners of the boundary wall and has similar characteristics of a rectangular or square column.



L- Type Column

12.T-Shape column

It is utilized based on design requirements of a structure. T-Shaped column is widely used in the construction of bridges.



13 .V- Type Column:-

As a name itself, it showcasing the column is in V shape and generally used if the shape of the room is in trapezoidal. As it requires more amount of concrete when compared to the other columns.



14 . Hexagon Column:-

Hexagon columns are generally modified columns. It has six sides and it gives good pictorial view generally used in elevation. It is adopted to give a good look to the column. It is generally provided in open verandahs, Auditoriums, Cinema halls etc.



15 .Arch type columns:

These type of columns are used when the room has a shape of an arch. It is adopted where there is a no chance of building square or rectangular or circular type of column. it is rarely used as it possess very difficulty in casting.



16 .Y – Type Column:-

These types of columns are generally used in the construction of bridges, flyovers, etc.



Y TYPE COLUMN

17 .Y type Column with Arch:

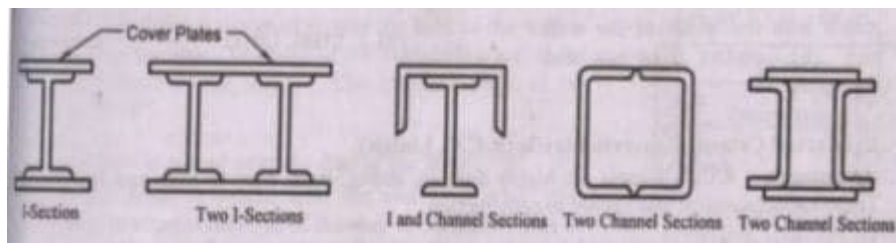
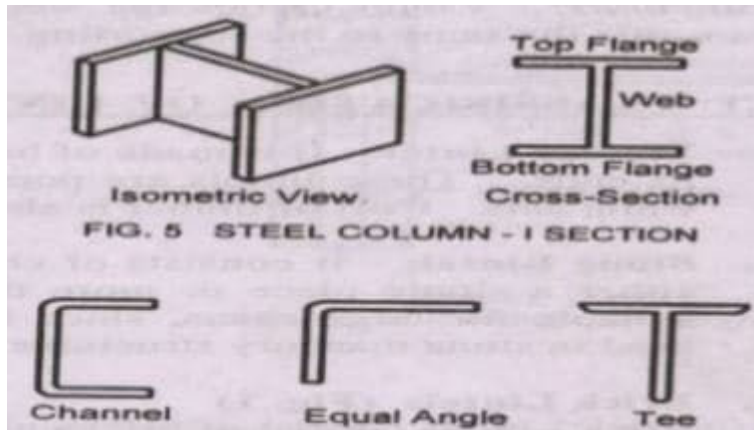
As it is same as Y-type Column but it has curved edges or sides. These are generally provided below the bridges and flyovers where there is a congestion of building more columns to withstand heavy loads on top.



Y TYPE COLUMN WITH ARCH

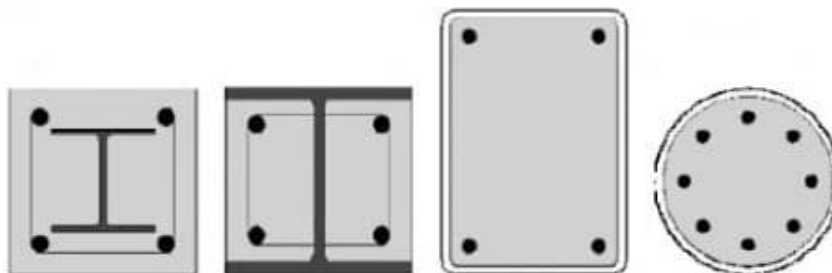
18. Shape of Steel Column

There are different standard and built up shape of steel columns which are shown in Fig. and Fig. Common shapes of steel columns include I, channel, equal angle, and T-shape.



19. Shape of Composite Column

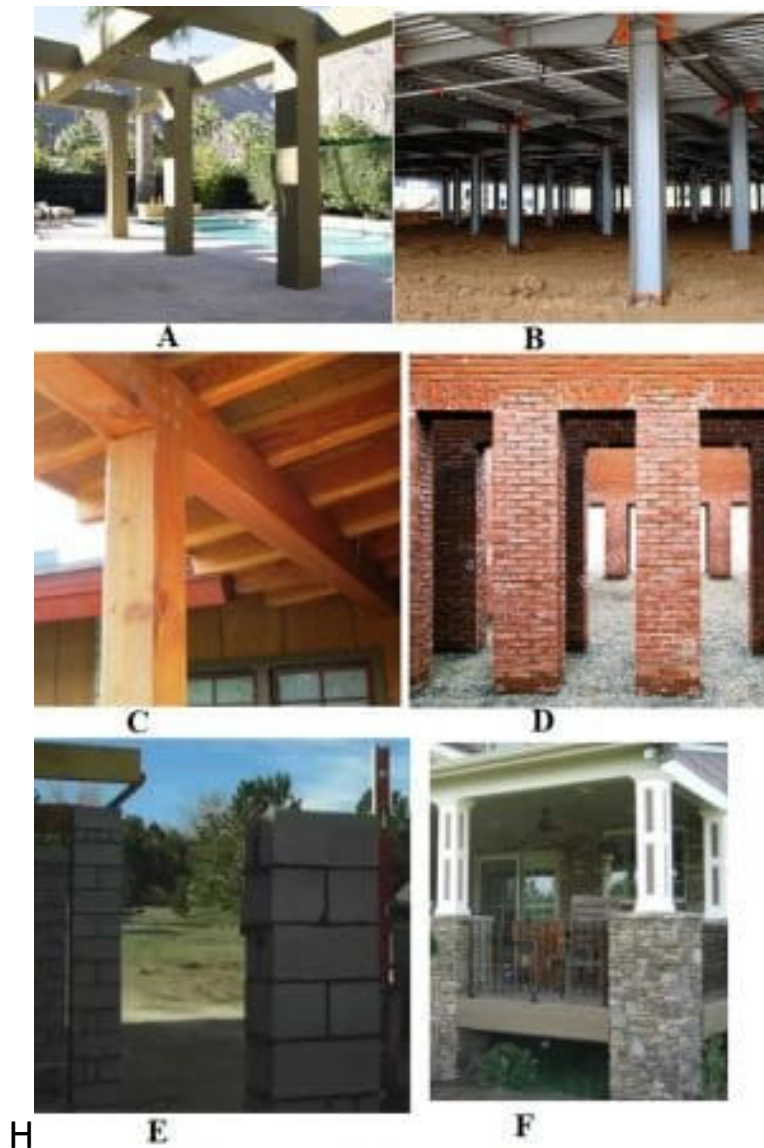
The usual shape of composite columns are shown in Fig.



Based on Construction Material:

Types of columns based on construction materials include

20. Reinforced Concrete, Steel, timber, Brick, Block, and Stone Column.



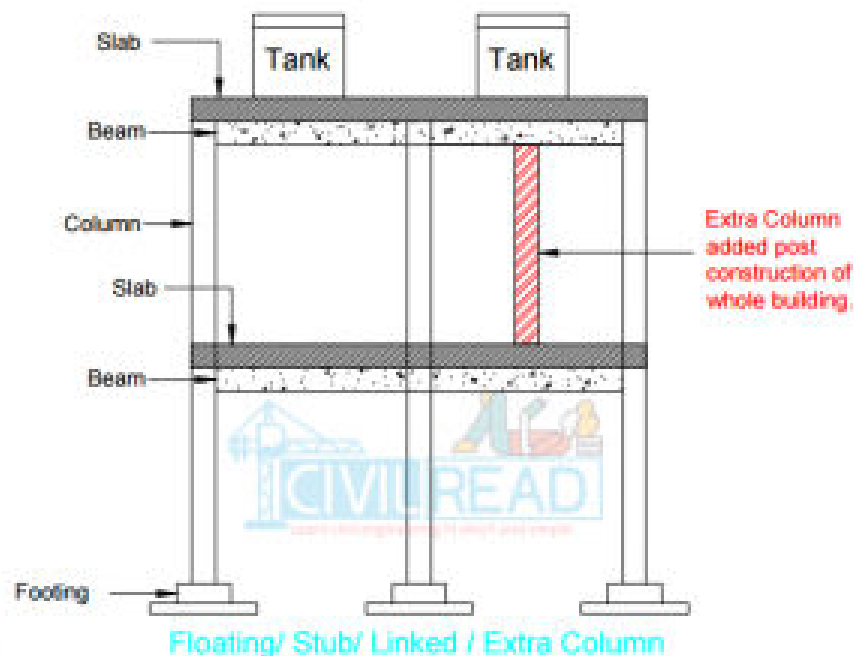
Types of Column; A-reinforced concrete, B- steel, C-timber, D-brick, E-block, and F-stone

Some other types:

22 .Stub Column/ Floating column / Linked Column:-

We know that column stands on the footing. but when coming to the stub column. It won't have any footing. The column stands on the slab or beam.

For making you clear, here I am giving an example, for suppose you constructed a house with a capacity of 50 members so according to the members using building you design a water tank. Suddenly due to the scarcity of land building is using by 90 members so initially, you are provided one tank which will sufficient to 50 members. Now, you have to provide another tank to cover all the 90 members. But you constructed a building with the design of only one tank but additionally, another tank is added in order to bear that load another column is added beneath the tank and it rests on either beam or column.



23 .Neck column:

It is a part of the column (any type of column) which is buried in earth is called Neck column. The word Neck column is usually used while building footings.

