

What is The Roof ???

roof is the covering on the uppermost part of a building. A roof protects the building and its contents from the effects of weather.

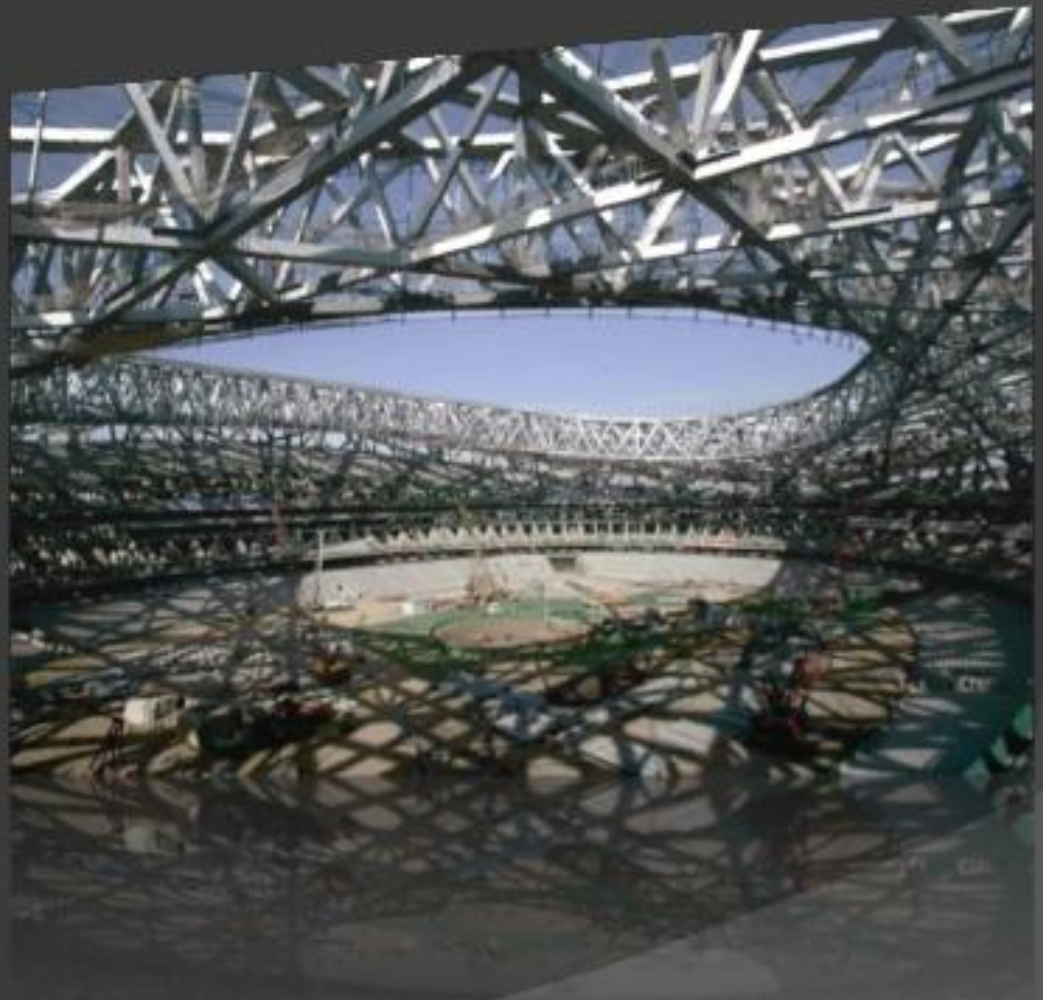
Structures that require roofs range from a letter box to a cathedral or stadium, dwellings being the most numerous.

In most countries a roof protects primarily against rain. Depending upon the nature of the building, the roof may also protect against heat, against sunlight, against cold and against wind.



Types of roof structure

- ▶ Flat roof
- ▶ Pitch roof
- ▶ Space frame
- ▶ Roof shell
- ▶ Folded plate
- ▶ Tensile structure



Pitched Roofs

- Slope of more than 10 degrees to the horizontal Surface.
- The slope of roof varies according to the span, climatic conditions, types of roof covering etc. In areas of heavy snowfall, steeper slopes of 1: 1.5 or 1: 1 are provided to reduce incidence of snow load of roof.
- Pitched roofs are generally constructed of wood or steel. Steel trusses (frames) and rolled steel sections are used in construction of pitched roofs.

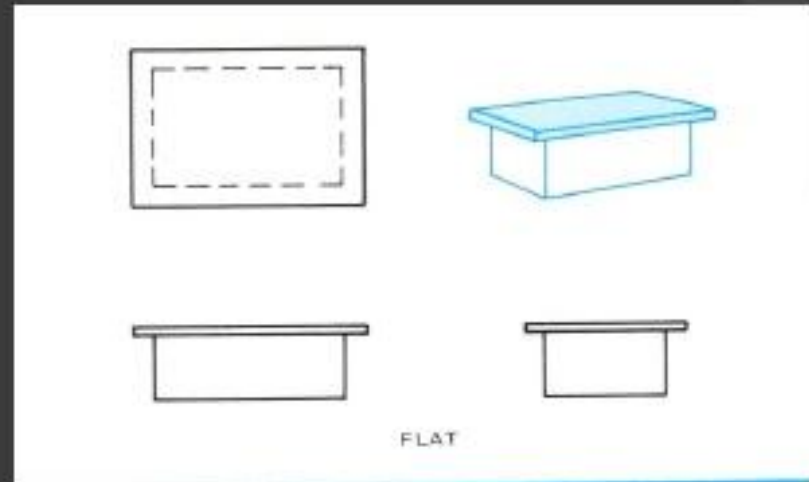
Roof Types

- Flat
- Shed
- Gable
- Hip
- Dutch Hip
- Gambrel
- Mansard
- Butterfly
- Dome



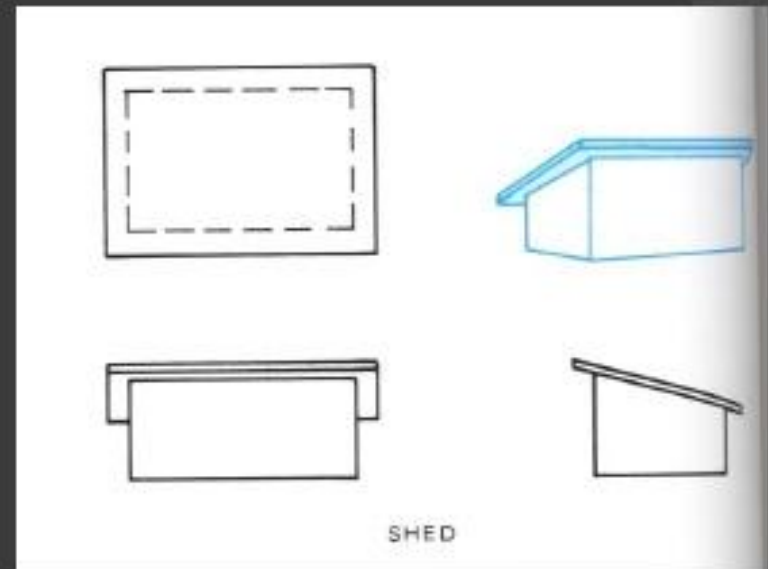
Flat

A flat roof is not truly flat but angled slightly to allow for water runoff. It is the cheapest to build initially but will cost you much more than other roof types in maintenance costs.



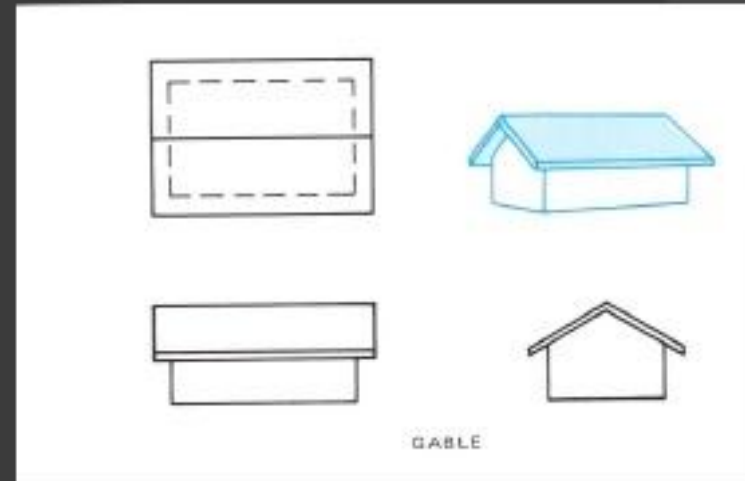
Shed

A shed roof is basically a flat roof with a slightly greater angle allowing for greater runoff. They are relatively easy to build and inexpensive as compared to most other roof types. They are usually used on home extension rooms and porches



Gable

A gable roof consists of two shed roof structures joined at the peak forming a ridge line.

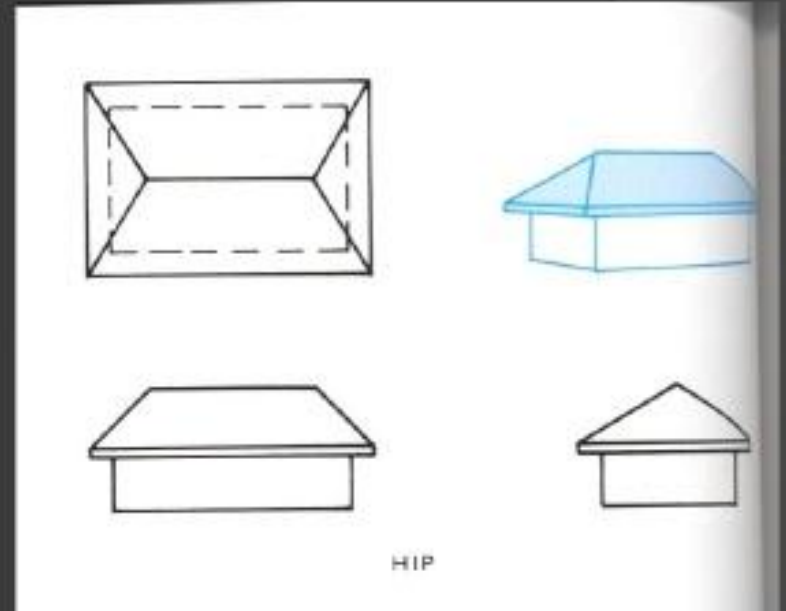


Gable Dormers

Dormers are room construction extensions from the roof structure. They usually have windows or doors on the front wall structure. Dormers are often used in 1 ½ story construction to provide light and ventilation to the upper story.

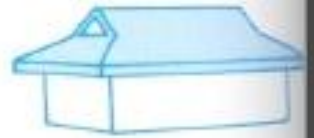
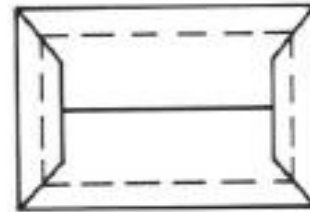
Hip

A hip roof is a gable roof with angled ends taking the place of the gable end of the structure.



Dutch Hip

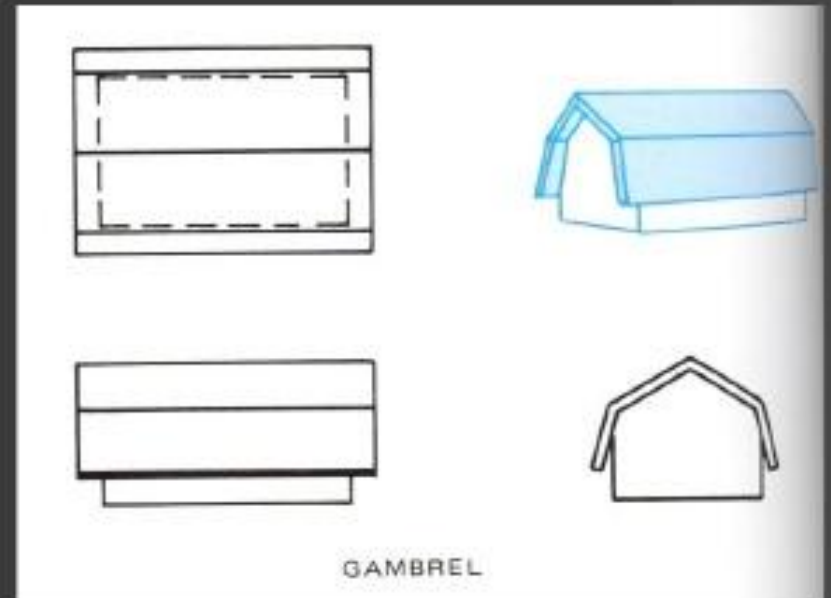
A Dutch roof design is a hip roof with small gable ends at the ridge allowing for attic ventilation



DUTCH HIP

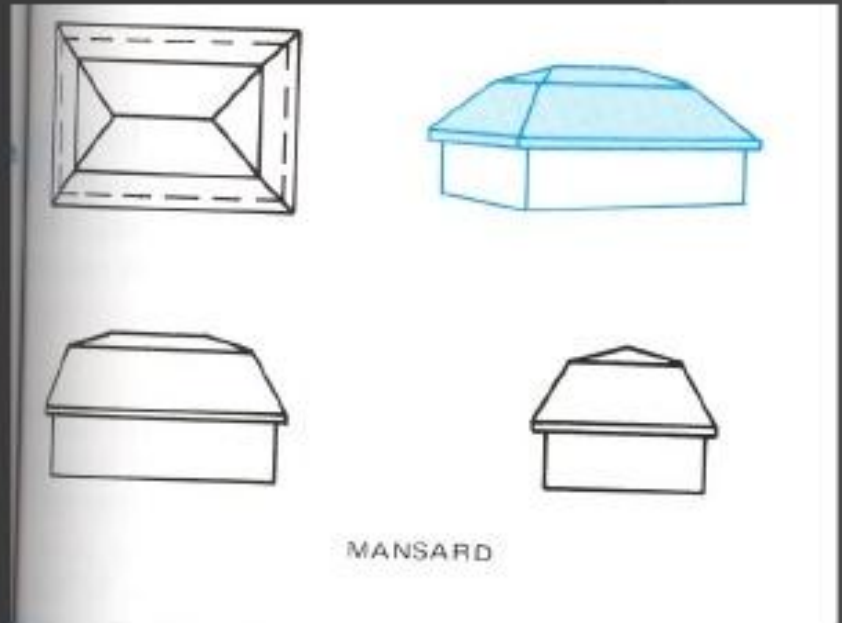
Gambrel

Gambrel roof design is similar to gable construction With two angles on each side. Steep lower surfaces and shallow angle top surfaces allow greater floor space in 1 ½ story construction



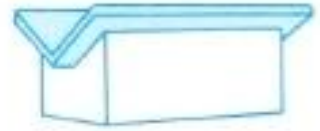
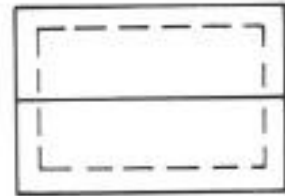
Mansard

Mansard roof construction consists of a compound hip roof design with a lower and upper hip format.



Butterfly

The butterfly roof is an inverted gable roof design creating a central valley for runoff. The design is visually stunning but impractical for water tightness.



BUTTERFLY

1. Flat roof

A roof is designated as flat if its slope is less than ten degrees. Slope less than 3:12 or 25 percent

Flat roofs have traditionally been used in hot climates where water accumulation is not a problem.

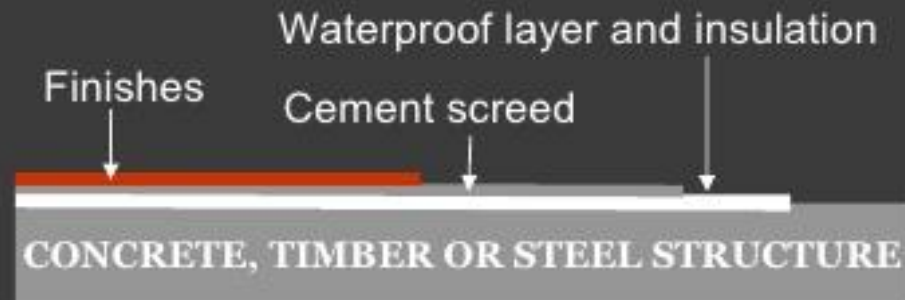
Structural decks ordinary used

- Wood panels over wood joist
- Solid wood decking over heavy timber framing
- Corrugated steel decking
- Sitecast concrete slab
- Precast concrete slab
- Panels of wood fibre bonded together with portland cement
- etc



Weatherproofing the flat roof

- The flat roof relied on some kind of membrane for keeping moisture out. In dry climates this is done with clay tiles, but in Canada asphalt, or rubber is necessary.



- Flat roofs are never actually flat, a subtle slope directs standing moisture to drains at edges, or inside.

Advantages Disadvantages of Flat roof Design:

• **Advantages:**

- No space lost below roof, i.e. no dead space
- Less material is used than in a sloped roof
- The rooftop is potentially useful as a terrace, or sleeping porch
- Potentially pleasing appearance
- Easier to build than a sloped roof

• **Disadvantages:**

- Roof elements can not overlap, hence waterproofing must be more complex, and more thorough
- Drainage is not automatic
- Support of snow load must be insured

Pitched Roof

- pitched roof is a roof structure where the roof leans to one side of the house. It is also known as lean-to roof. The rafters are connected to the highest wall and then it is inclined to a lower wall, which then forms the pitched roof.
- The rafters are often connected into the wall individually or even supported on a wall plate bedded within the wall.
- This type of roof can have no joist at all or have a tie or have a joist with a strut to give more strength.

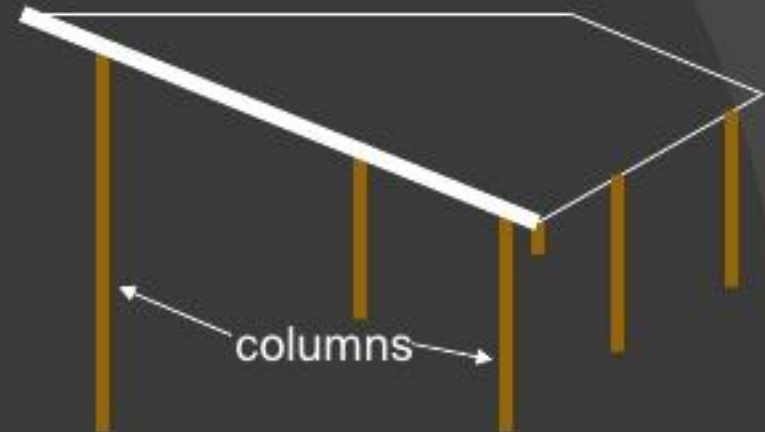


Pitched Roof Types

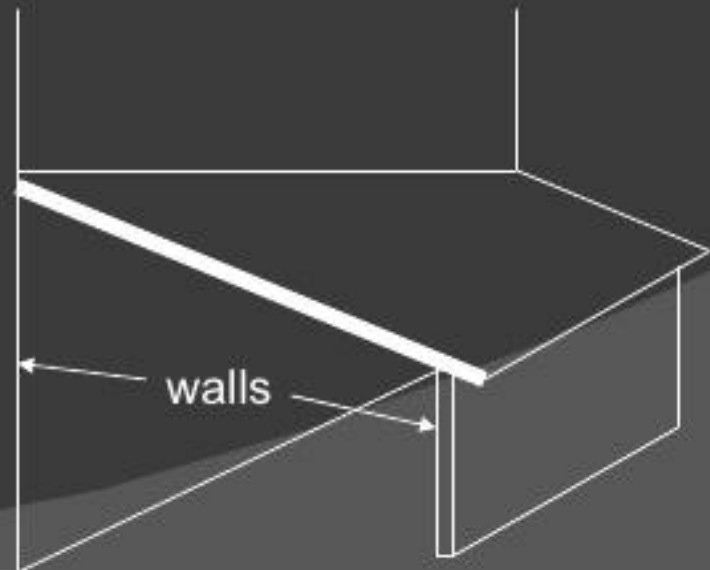
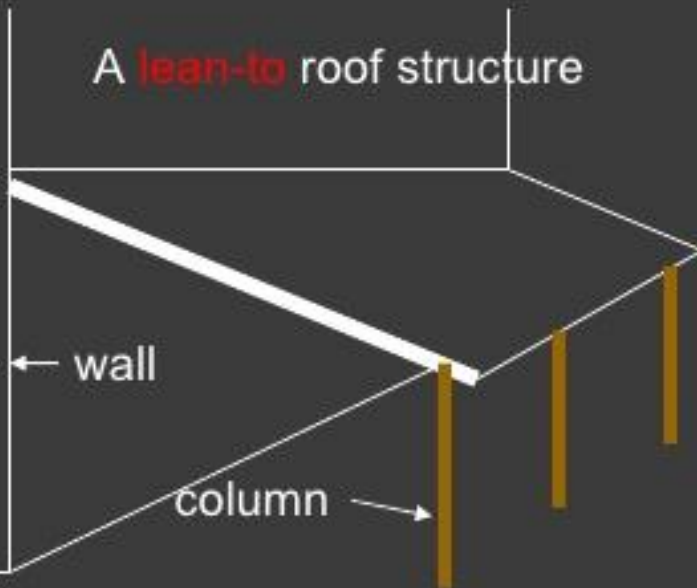
A pitched roof



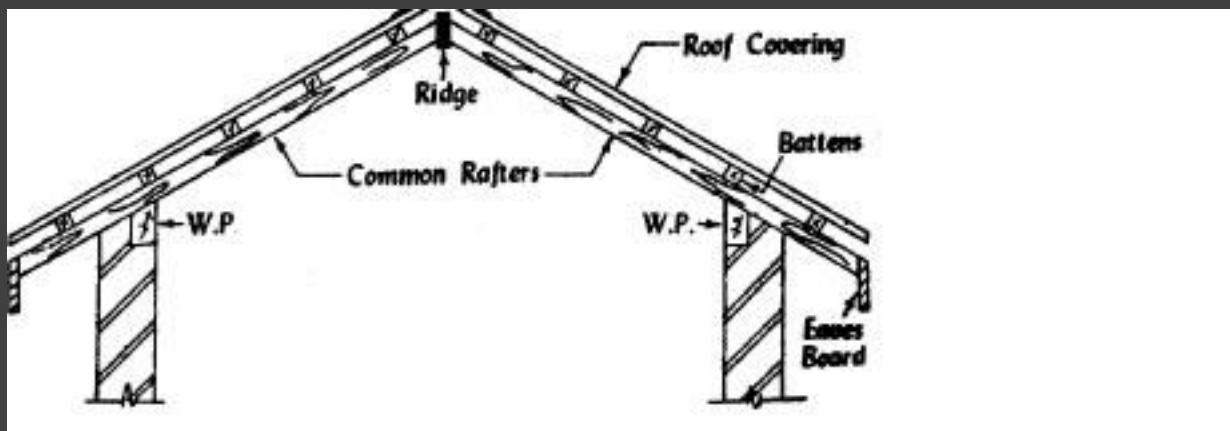
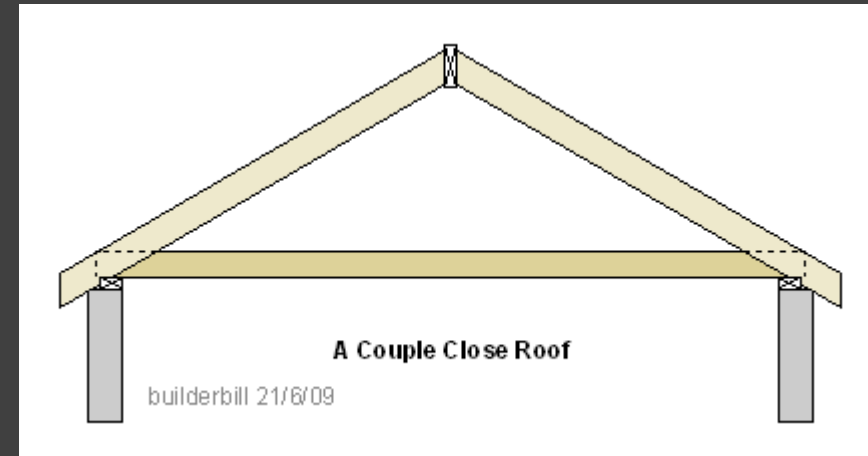
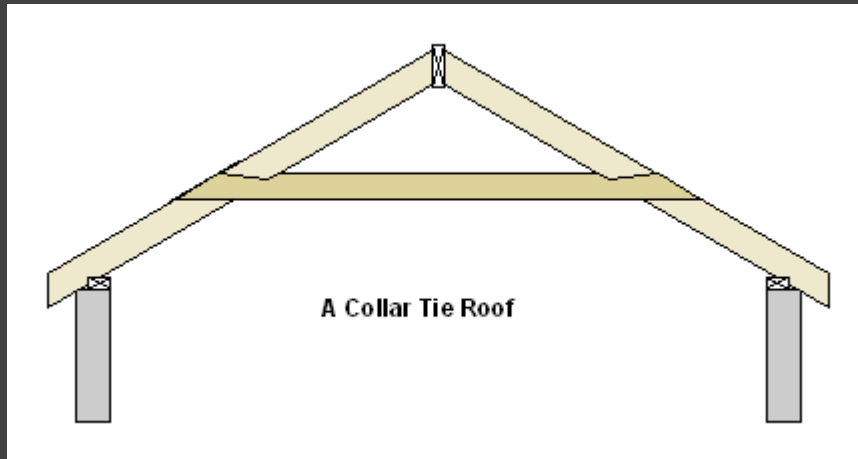
A **mono**-pitched roof structure

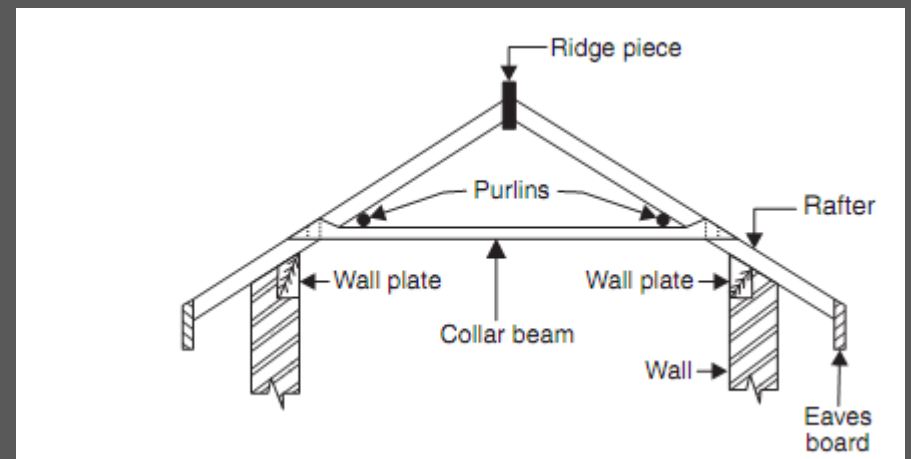
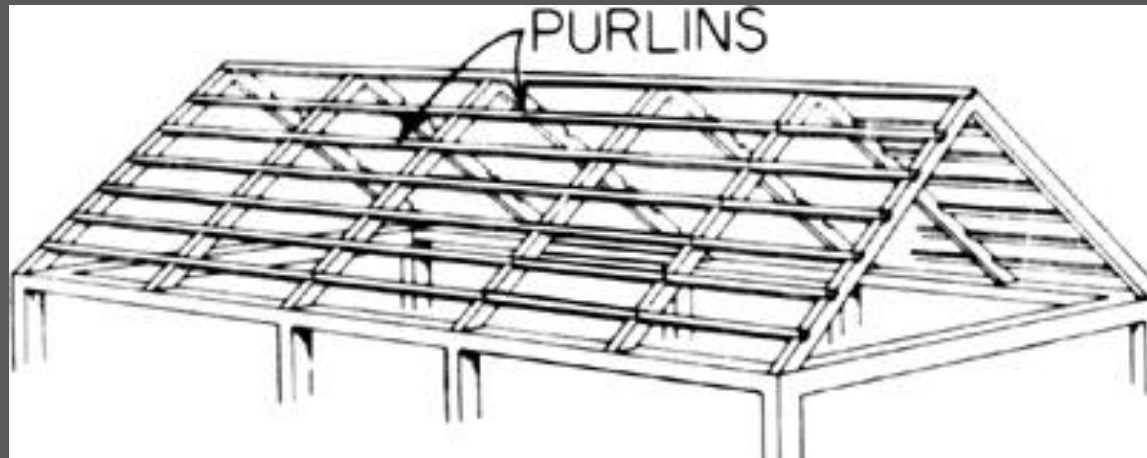


A **lean-to** roof structure



Pitched Roof Types





PITCHED ROOF:

**TIMBER
STEEL**

- truss
- truss



Truss built as from individual members



Truss fabricated from factory

steel



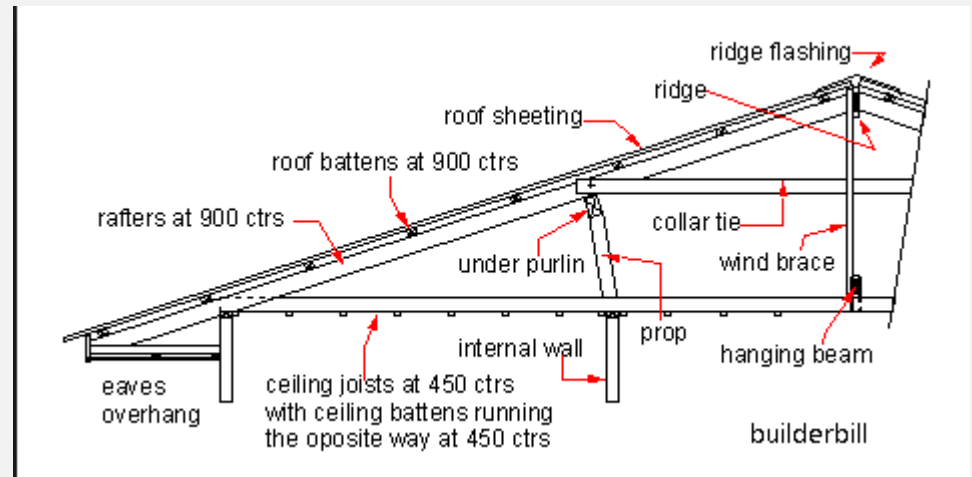
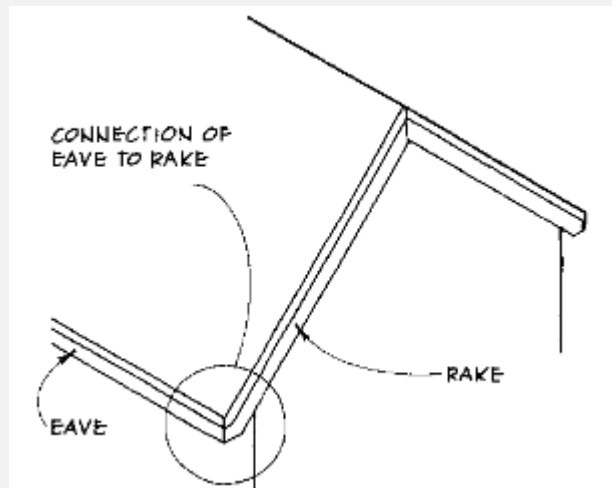
Gang nails

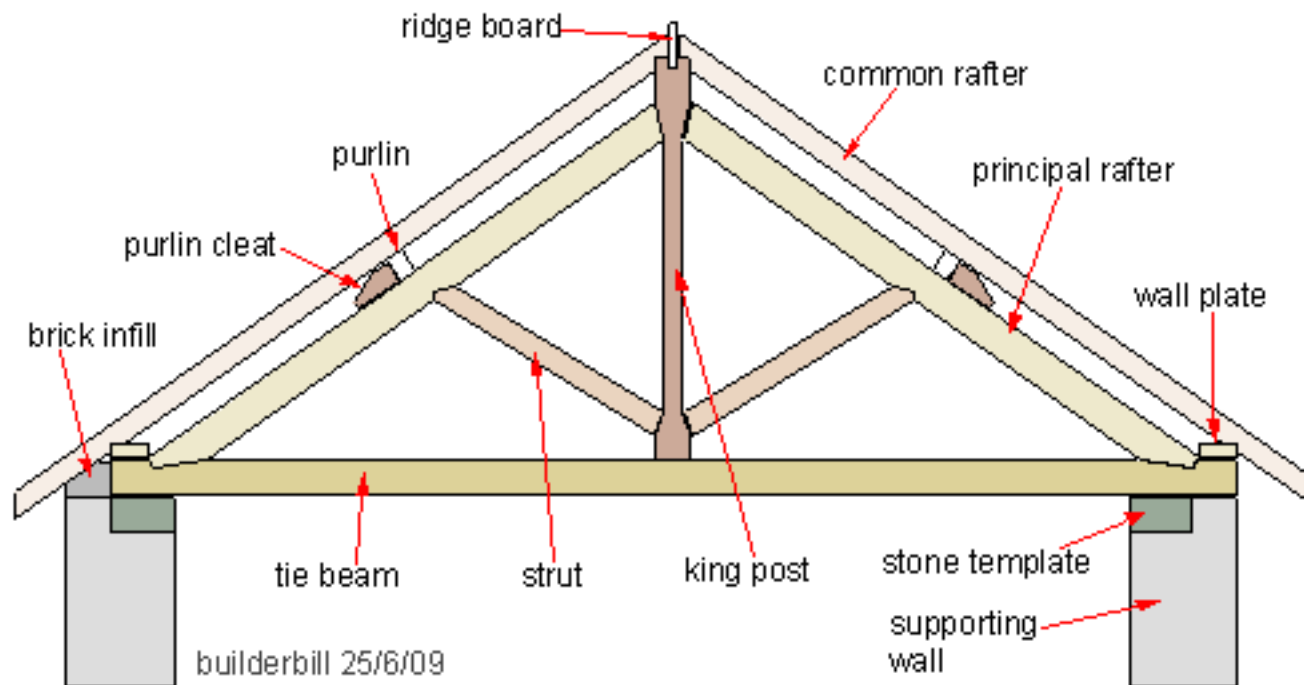
Truss fabricated from factory



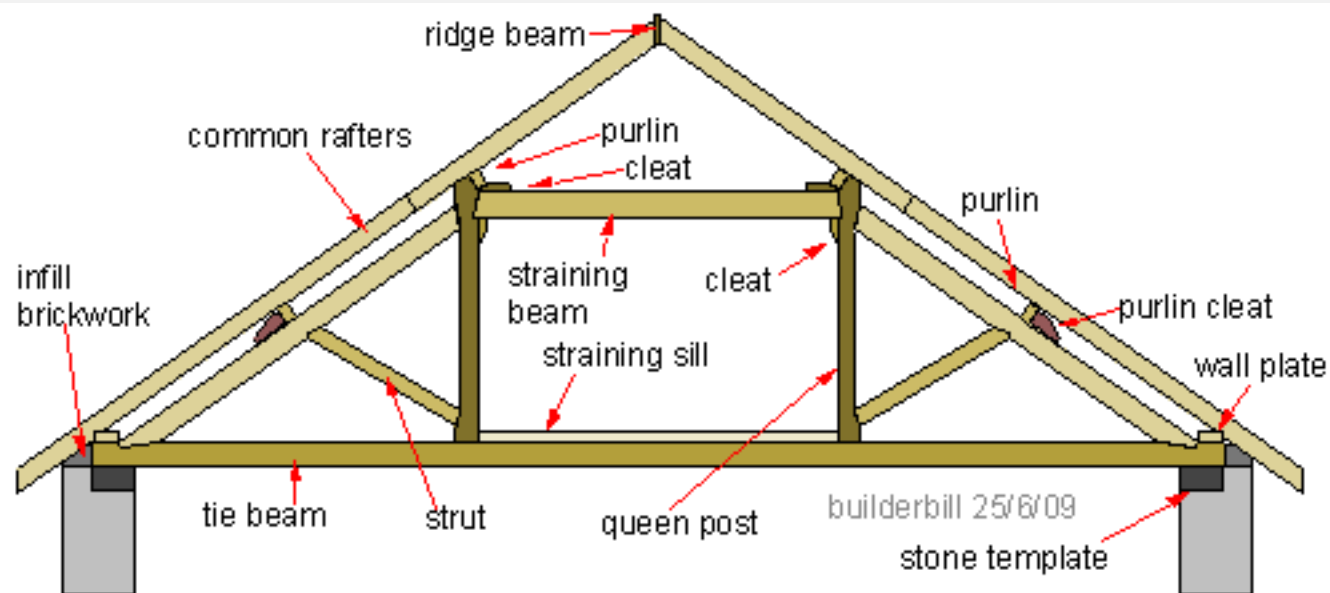
Whole roof structure built from steel

Terms on roof

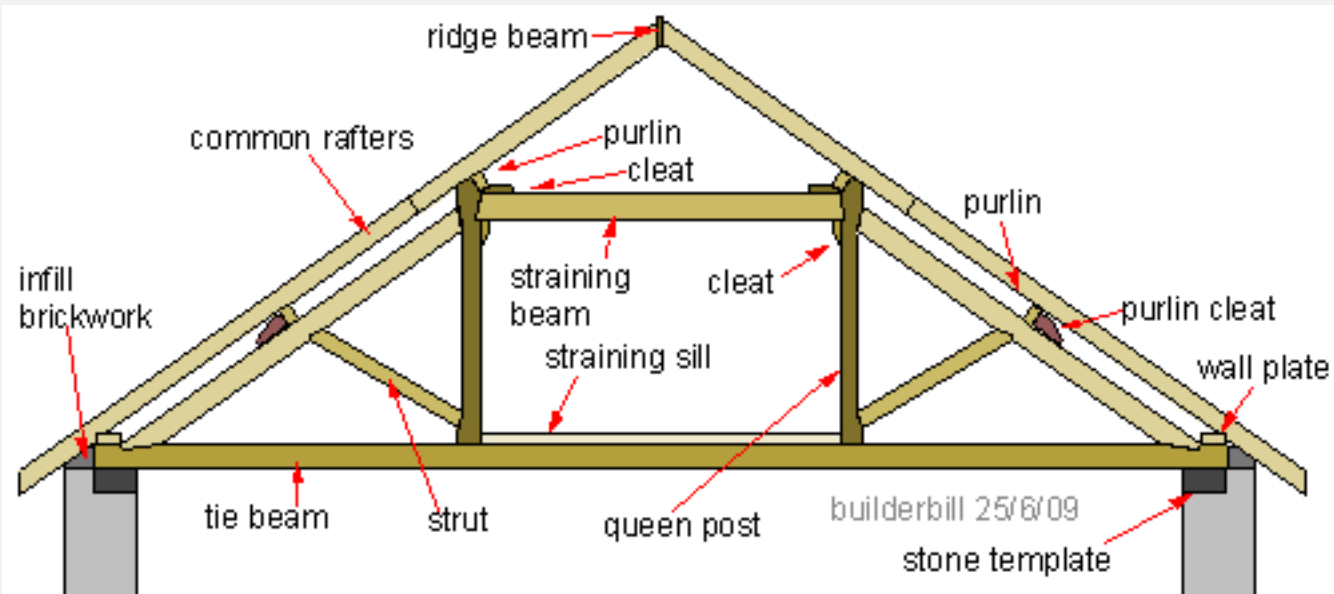




Traditional King Post Roof Truss



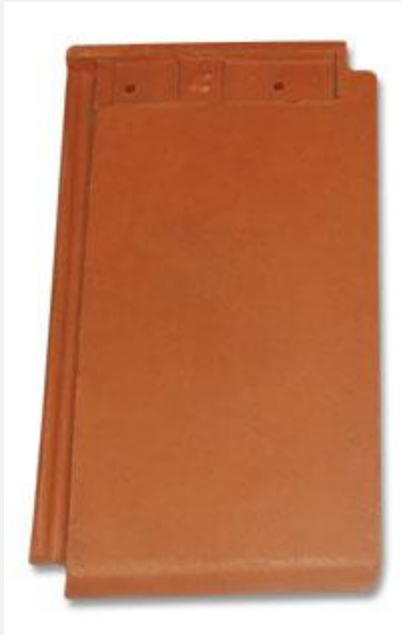
Traditional Queen Post Roof Truss



Traditional Queen Post Roof Truss

Tiles

- Roofing tiles
 - Plain Tiles
 - Pot Tiles
 - Pan Tiles
 - Allahabad Tiles
 - Mangalore Tiles



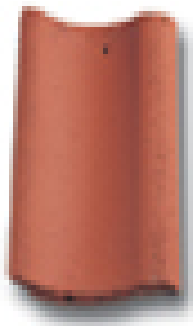
Plain Tiles



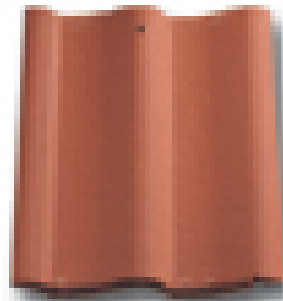
Pot Tiles



Pan Tiles

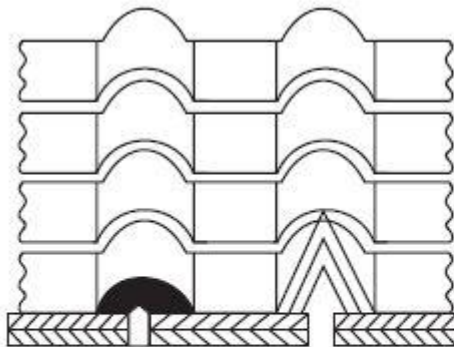


Shire Pantile

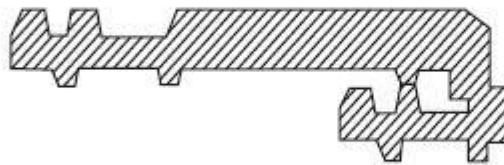


Double Pantile

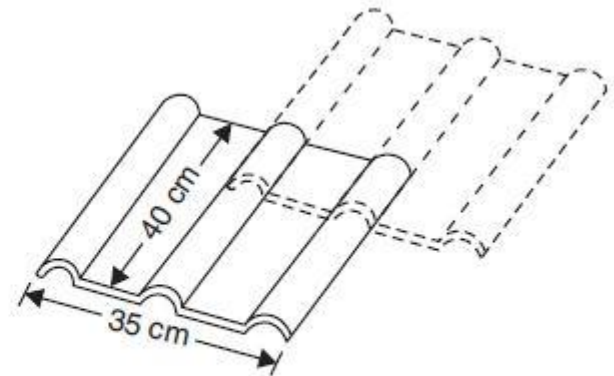
- Allahabad tiles are generally laid side by side and the joints are covered with half round tiles.
- Mangalore tiles are red in colour and they are of interlocking type.



(a) Allahabad tiles



(b) Mangalore tile



(c) Corrugated tiles

Fig. 5.2

Desirable properties of the roofing tiles

- they should not absorb moisture more than 20 per cent by weight.
- they should give pleasing look.
- they should be capable of taking load of a man safely, after they are supported on reapers.
- they should be durable.
- they should be uniform in shape and size.
- warpage should not exceed 2% along the edges and 1.5% along the diagonal.