REPORT ON ROOF AND ROOF COVERING

INTRODUCTION

- Roof is the uppermost covering provided over a building with a view to protect the building from rain, heat, wind, snow etc.
- A roof consists of a frame work supported on walls or columns.

CONSIDERATION POINTS FOR ROOF

- **A roof should be------**

1. Structurally sound and strong enough to carry dead and live load carefully.
2. Durable against adverse effects like rain, wind sun etc.
3. Have efficient water- proofing and drainage provision.

4. Provide desire insulation against heat and sound.

CLASSIFICATION

FLAT OR TERRACE ROOF

PITCHED OR SLOPED ROOF

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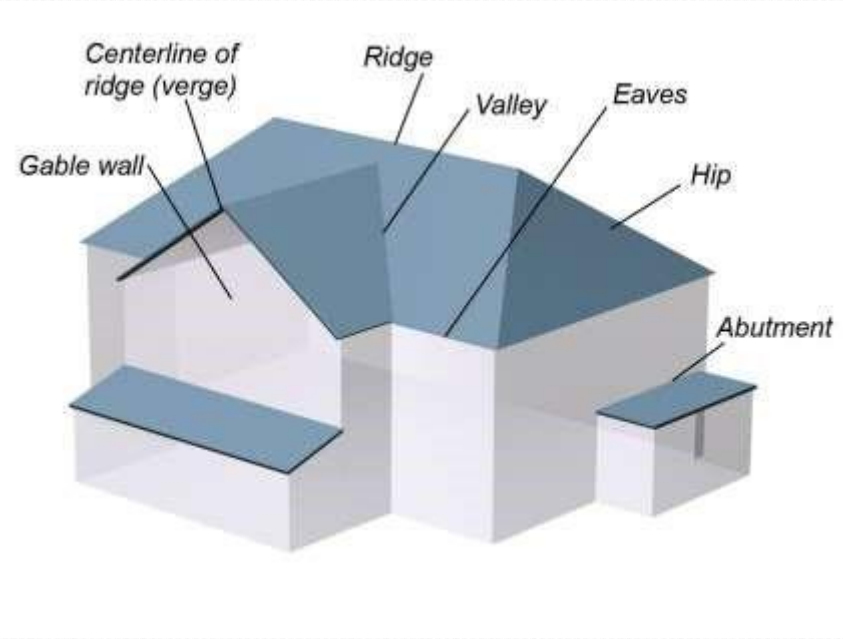
- This type of roof is considered for hilly areas or in very heavy rainfall areas.
- It can be made from timber, structure steel, R.C.C. and prestressed concrete.
- It is used industrial, public and residential buildings all.
- Normally , slope should not be exceed 60* and minimum 10*

- Some times ventilators have to be provided in pitched roofs to dispose of fuel and contaminated air and smoke on slopping sides of the roof or at ridge.

TYPES OF PITCHED ROOF

- Lean to roof
- Coupled roof

- Couple- closed roof
- Scissors roof
- King- post roof truss
- Queen – post roof truss
- Mansard roof truss
- Composite roof truss
- Truncated truss
- Bel-Fast truss
- Steel truss



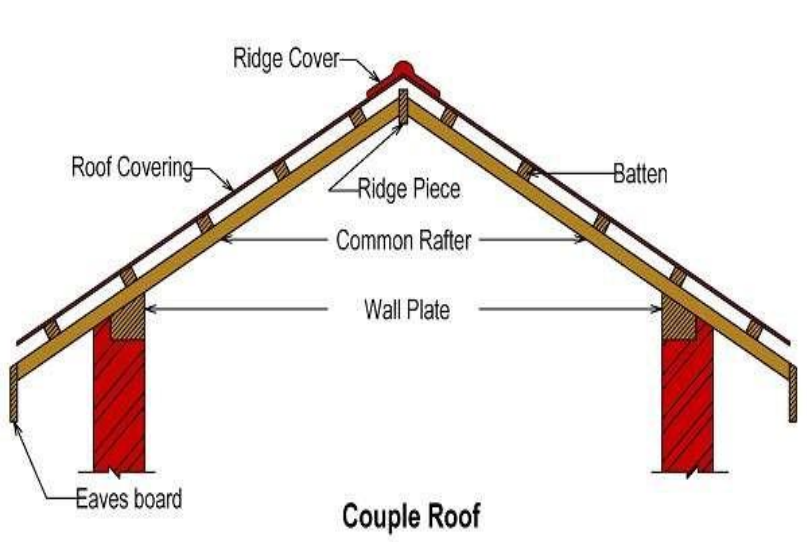
LEAN TO ROOF

- Has slope one side only

- Can be used up to span of 2. 40m.
- At upper ends the rafter are nailed to the wooden wall plate, placed on corbel which may be of stone, brick or steel, at the lower ends the rafter nailed to the wooden post plate.
- Commonly used for sheds, verandahs , out houses.

COUPLED ROOF

- Has slope on both sides of the ridge
- Maximum span of 3.7m.
- It is formed by a pair of inclined rafters with their upper ends nailed to a common ridge piece and lower ends nailed to the wooden wall plates embedded in masonry on the top of the wall on either end.



- Rafters are fixed at suitable intervals and battens are nailed on their top.

COUPLE- CLOSE ROOF

- Maximum span of 5m.

- Same as coupled roof except ,rafters are connected by third horizontal member near the lower ends of the rafters, Which is known as tie beam.
- For increased span a vertical rod is introduced between ridge piece and the tie beam, known as king rod, prevents tie from sagging.

COLLAR ROOF

- Span vary from 4m to 5.5 m.

- Similar to couple- close roof except the tie beam is fixed higher than the feet of the rafter , known as collar beam.
- The roof space can be utilized as ceiling can be fixed to the collar beams and exposed portions of the rafters.

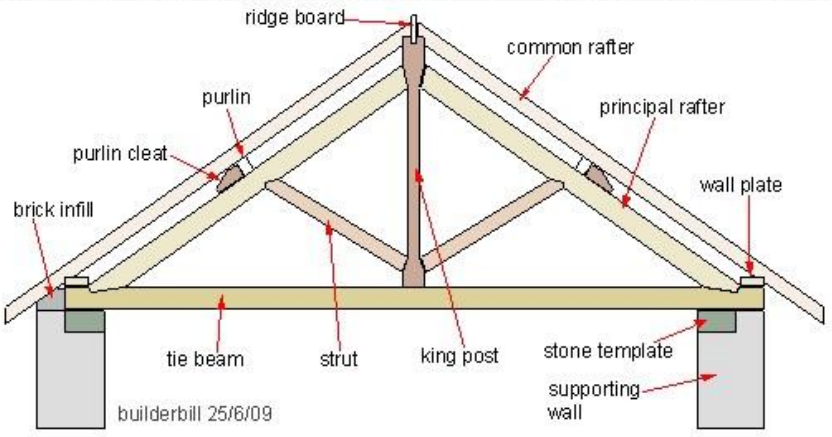
SCISSORS ROOF

- Similar to coupled -roof , has two common rafters but this roof is strengthen by two additional members , known as scissors.
- Each scissors member is connected to wall plates with common rafter at one end.
- This roof can be utilized same as collar roof.

KING POST ROOF

- Span vary from 5m to 8m or 9m.
- The truss consists of two principal rafters, one tie beam, two struts and a king posts.
- The trusses are connected to each other through **purlins** which are placed at right angles to the sloped rafters and secured to them through cogged joints and cleats.
- Suitable joints are made among various members of the truss. **These are**

1. Joint between king post & tie beam
2. Joint between king post & struts
3. Joint between principal rafter & top of strut
4. Joint between principal rafter & the king post top

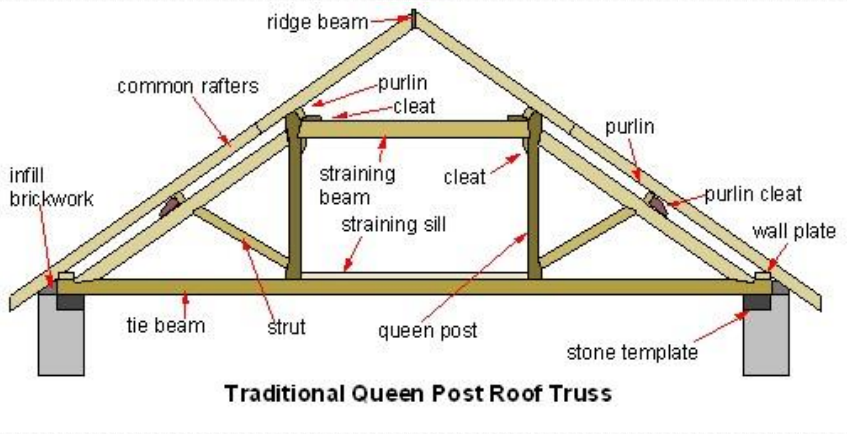


Traditional King Post Roof Truss

QUEEN POST TRUSS

- Spans greater than 9m and less than 14m, and up to 18m.
- The truss consists two queen posts, two principal rafters, struts, tie beam, straining beam, straining sill and purlins etc.
- The queen post truss is further modified by one more upright member called princess.
- The joints are similar to a king post truss exception of-

1. Joint at the head of queen post
2. Joint at the feet of queen post



Traditional Queen Post Roof Truss

3. Ceiling joists of timber are fixed at the bottom of tie beams in all types of truss.

MANSARD TRUSS

- Just a combination of king post and queen post truss, in which lower part of the truss is of queen post type and upper part is of king post type.
- The truss has two pitches, the lower vary from 60* to 70* and upper from 30* to40*
- This truss has become obsolete these days because of its odd shape and does not give good appearance.

COMPOSITE ROOF TRUSS

- Made by using timber and mild steel sections. Compressive members are made of timber and tensile ones that of steel.

TRUNCATED TRUSS

- Has top surface finished flat and lower

part of the truss just like mansard truss.

BEL- FAST TRUSS

- Made from timber sections and top surface is curved rather than slope.
- Span up to 30m.
- Also known as Bowstring truss or Latticed roofing truss.

STEEL TRUSS

- Made by using rolled steel structural members
  .
- Most suitable section is angle iron for steel truss.
- When span exceeds 10m it proves economic than timber truss.

FLAT OR TERRACED ROOF

- The roof whose top finished surface has a slight slope, at an angle of 10* to the horizontal to drain of rain water.
- It may be constructed in R.C.C., flag stone, bricks, tiles etc.

FLAT ROOF

- **ADVANTAGES**

1. Easy and simple construction
2. Give best appearance to multi storeyed buildings
3. Can be made fire resistance
4. Has better insulating properties
5. Covered most surface area than curved or slopped area.
6. Terrace can be used for playing, gardening or sloping purposes

- **DISADVANTAGES**

1. More cost than sloped roof
2. Can not be used over large span
3. Not suitable in heavy rain fall area
4. Difficult to trace and rectify the leakage

5. Progress of construction is very slow compared to slopped roofs.

TYPES OF FLAT ROOFING

- Mud terrace roofing

- Brick jelly or Madras terrace roofing
- Mud phuska terracing with tile paving
- Bengal terrace roof
- R.C.C. flat roof

MUD TERRACE ROOF

- Cheapest form of roofing and is used where rain fall is less.
- Made by white earth mud containing large amount of sodium salts.
- Commonly constructed in Punjab, M.P. and Maharashtra.

BRICK JELLY OR CHENNAI TERRACE

- Most commonly used in Chennai so it is called Chennai terrace.

MUD PHUSKA TERRACING WITH TILE PAVING

- Common in Delhi, Punjab, U.P. and Haryana.

- Mostly used over R.C.C. slab or jack arc roofing.
- Has very good water proofing and heat insulation properties.
- Mud Phuska is prepared by mixing straw and lots of water.
- Finished terrace is cured about 10 days.

BENGAL TERRACE ROOF

- Mostly used in Kolkata or surrounding areas to cover verandahs

R.C.C. FLAT ROOF

- No beams are required and R.C.C. is casted directly over the walls of room, if span of room is small[3 or 3.5mm].
- If span is large than intermediate beams which may be of R.C.C. or rolled steel joists are used then R.C.C slab casted over them.

ROOF COVERING

- It is a material which provides a protective barrier over the frame work of roof structure.
- It is actually visible when viewed from over the roof.
- It acts as a barrier against sun, heat, wind , rain and other such elements.

- It take loads only of that portion over which they are supported.

TYPES OF ROOF COVERING

- Roof covering is depends on the selection of covering material according to local condition and requirements, such as cost, roofing structure, availability of material, durability, heat insulation, weight of covering, fire resistance, slop and so on.
- **There are many types of roof covering commonly used.**

1. Thatch covering
2. Shingles
3. Tiles
4. Asbestos- cement sheets
5. Slates

6. Galvanized corrugated iron sheets
7. Sheet metal roof covering
8. Bituminous felts
9. Glass covering

THATCH COVERING

- Mainly used in rural areas and very low cost houses

- The frame work to support the thatch consists of round bamboo rafters, tied with split bamboos and are placed at right angles at suitable intervals.

- This roofs give very bed smell due to rotting of materials it difficult to stay under the roof, so never allowed to good work.

SHINGLES

- Shingles are nothing but thin timber rectangular boards about 1cm thick.
- Preferred in hilly areas where wood is easily available at low cost, in place of tiles or slate.
- Wooden shingles from well seasoned timber are placed in a similar manner.
- Shingles length vary from 30cm to38cm and widths from 6cm to 25cm.

- Shingles do not provide adequate protection against cold or heat.

TILES

- The tiles are named according to their shapes, sizes and their region.
- Plain tiles, pan tiles, half round tiles , pot tiles are some names according to their shapes.
- Allahabad tiles, Mangalore tiles are some of the patterned tiles derived names from the regions.

- For laying the tiles a ground work is prepared by fixing batten to the common rafters,.
- I case of superior work tiles are laid on batten fixed over the boarding.

ASBESTOS CEMENT SHEETS

- Asbestos cement is a mixture of cement and powdered asbestos then converted in to thin sheets or tiles.
- Do no require any protective coating and not decay or eaten by insects , durable, light, cheap and fire resistance that's why commonly used for sloping roof.
- Big six and Trafford sheets are commonly used , available in 2 to 3cm. Length.
- While laying A.C. sheets , should be ensured that their smooth surface is kept upwards and end
- marked kept towards the ridge , not towards eaves.

SLATES ROOF COVERING

- Slates are is obtained from sedimentary rocks of lime stone or s and stone.
- Common size of slates vary from 60cm * 35cm to 25cm* 12cm. And thickness from 1.6mm to 4.8mm.
- Available in grey, purple, red, blue and black color
- It can be fixed by various method such as fixed on the batten or fixed on timber rafters, or laid on wooden boarding or fixed on roof framework.

- There are two methods of fixing slates depending upon the position of nail holes–

1. Centre nailing and
2. Head nailing

GALVANISED CORRUGATED IRON SHEETS

- G. I. sheets are manufactured like Big six A.C. sheets.
- The sheets are gal vanished with zinc to prevent from rusting and other weather effect .

- Durable, fire resistant, light in weight but transmit heat or cold easily
- Very much as roof covering for factories , workshops etc.

SHEET METAL ROOF COVERING

- Copper sheets, lead sheets, zinc sheets are some ex. of this type of roof covering.
- Copper and lead sheets are very costly however zinc sheets can be used but not long lasting.
- Sheets may be 7.5cm wide and 20cm long and 14 to 16 gauge thick.
- The ground work for fixing of these sheets more or less same as slates and tiles.

TAR OR BITUMINOUS FELTS

- Tar or bituminous is used as covering material. It is not a roof covering itself but a sort of flexible membrane which can be laid to render the roof leak proof.
- Durable, impervious, non porous, do not melt or soften under heat, flexible.
- But can not stand the wear and tear traffic, do not give good appearance, do not provide a self supporting structure .

GLASS COVERING

- Mostly used on roofs of industrial buildings, factories etc to admit light through the roof.
- It is not used these days because of Very costly covering, Difficult to keep these surfaces clean and water tight, etc .