



ROOF STRUCTURES

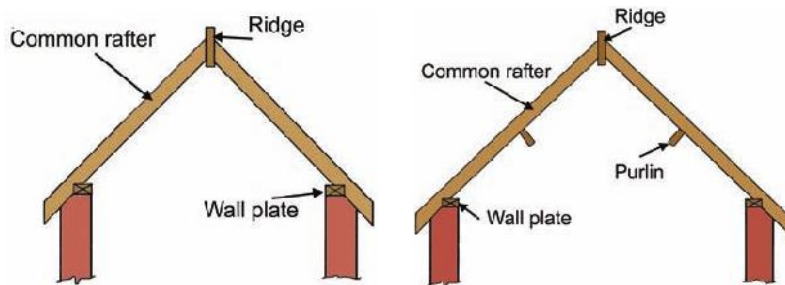
Roof Structures

Types of roof structure

Traditional roofs can be divided into three main types of structure:

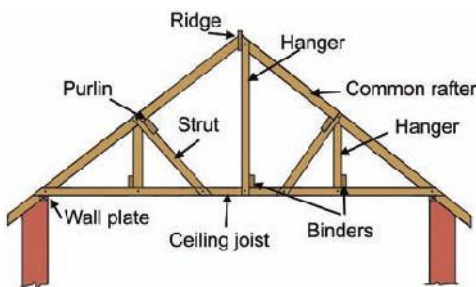
- Single roofs.
- Double roofs.
- Trussed roofs.

Modern construction methods make use of another type of roof structure and this is known as trussed rafter roofs (**see trussed rafter roofs**).

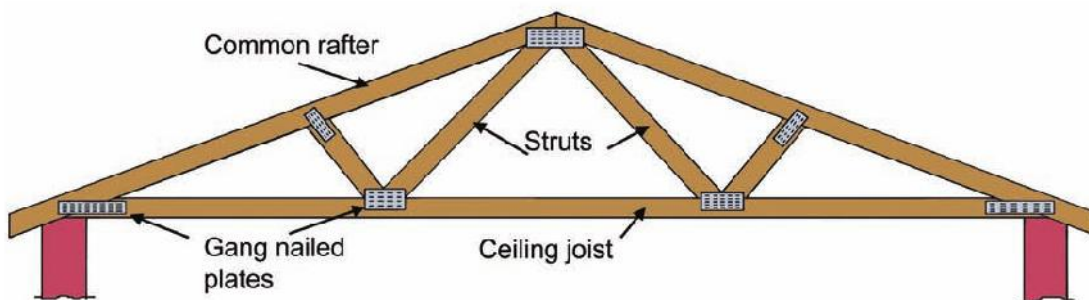


Single roof

Double roof



Trussed roof



Trussed rafter roof



Single roofs

Rafters of single roofs do not require any intermediate support. This type of roof has a number of limitations. It can only be used for small spans. If greater spans are required, larger roof sections would be needed. If the feet of the rafters are not tied together by means of a binder or roof joist, then this type of roof will have a tendency, under weight, to push the supporting walls outwards at the top causing structural failure of the walls.

Single roofs can be categorised as follows:

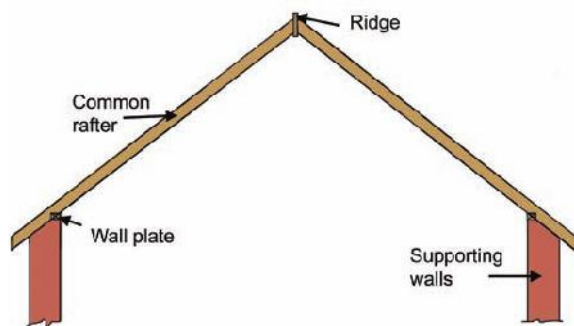
Couple roof – These can be used for building with a clear span of not greater than 3m and pitches less than 40°.

Collar roof – These can be used for buildings with a clear span not exceeding 4mm.

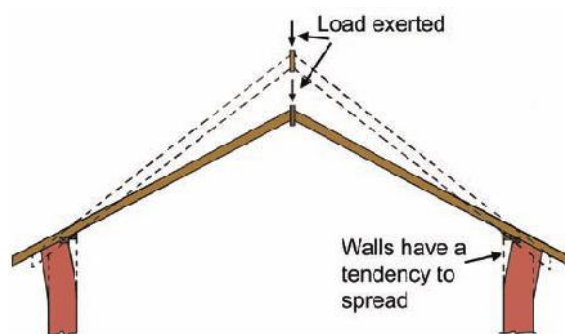
Close couple roof – These can be used for buildings with a clear span not exceeding 5.5mm and with pitches less than 25°.

Couple roof

This type of roof structure is very limited in its use. The roof consists of common rafters fixed at the ridge and at the wall plate. When subjected to any type of load or force acting vertically downwards the rafters will move outwards at their feet thus exerting thrust to the walls forcing them outwards and causing possible failure of the wall structure.



Couple roof



Couple roof under pressure

Roofs



SECTION 12

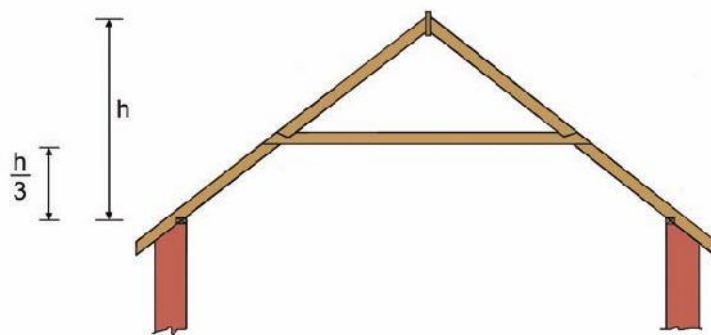
MODULE 3

SHEET 7

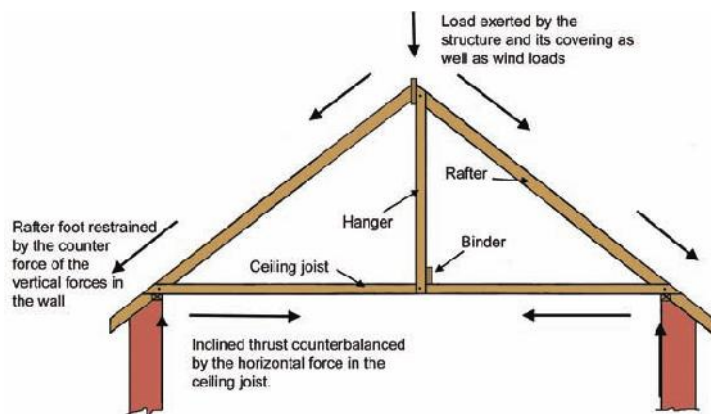
ROOF STRUCTURES

Collar roof

A collar roof incorporates a horizontal roof member positioned approximately one third of the distance from the ridge to the wall plate line. This extra roof member helps prevent the rafters from spreading when under load; this allows this type of roof structure to be used for greater spans than the couple roof. This design also gives a greater ceiling height if required.



Collar roof



Close couple roof

Close couple roof

This roof incorporates a main tie which is secured to the feet of each rafter and spans the width of the building. This added member forms a triangle which introduces the triangulation of forces within the structure. To stop the ceiling joist from sagging, a hanger is fixed to the rafter at the top and the ceiling joist at the bottom.

To further increase the strength of this structure, a binder is fixed to each ceiling joist and hanger. This binder runs parallel with the main wall and at right angles to the ceiling joist. This type of structure ensures that this type of roof can be used for great spans without the fear of the roof spreading under loads.