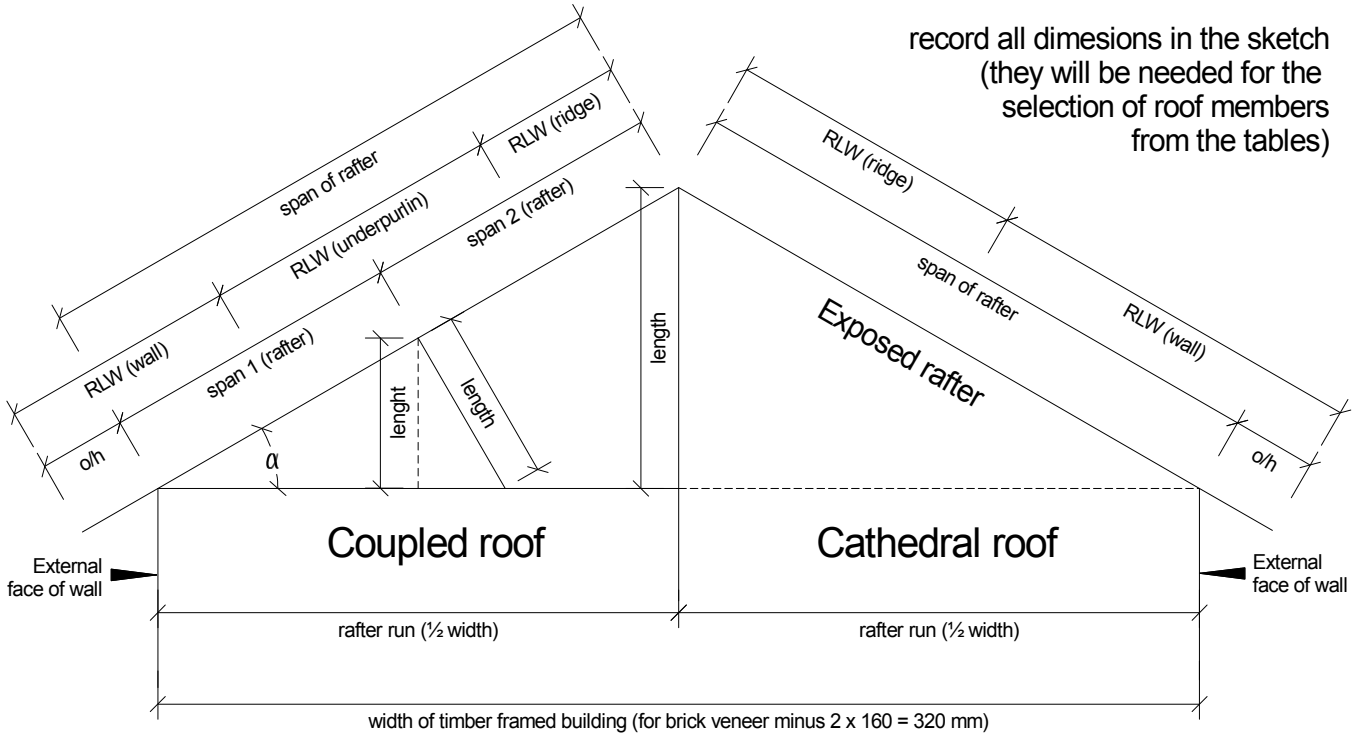
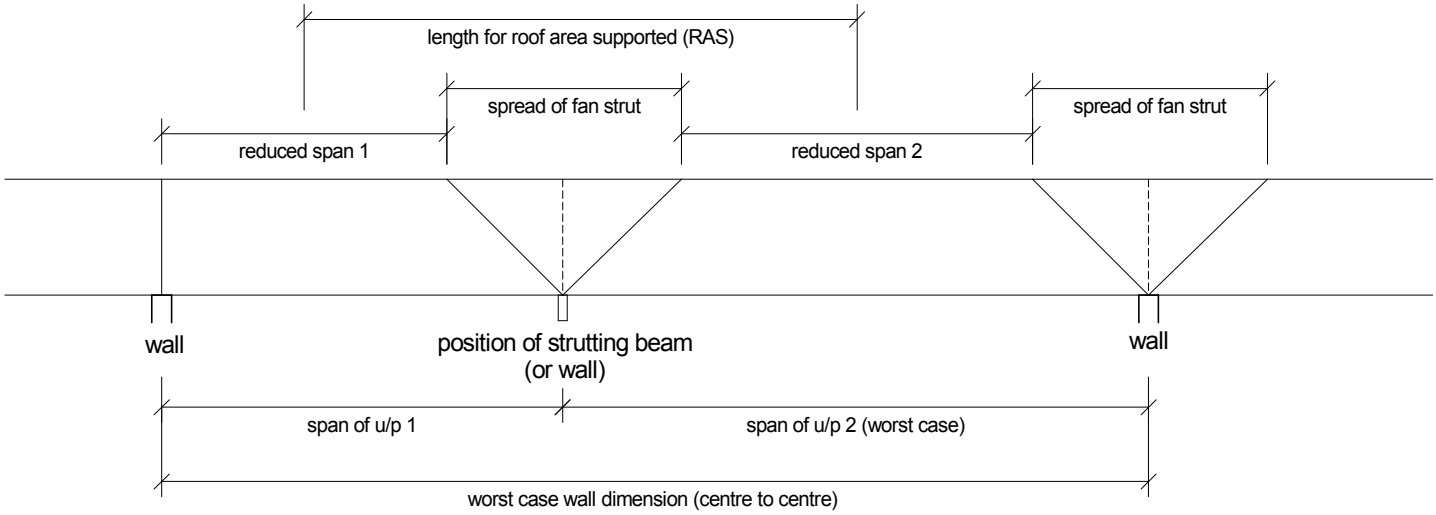
record all dimesions in the sketch
(they will be needed for the
selection of roof members
from the tables)



Rafter run = overall external width (timber framed, not for brick veneer) divided by two.
Rafter span = rafter run divided by cos α°.
Overhang = eaves width divided by cos α° (add dimensions for brick veneer).
Ridge strut = rafter run x tan α° .
Decide whether an underpurlin is needed; if it is place it at mid-span.
New rafter span = rafter span found in 2) divided by two.
Strut perpendicular to rafter = rafter span x tan α° (if u/p positioned at midspan).
Vertical strut to underpurlin = ridge strut length divided by 2 (if u/p positioned at midspan).
Roof load width (RLW) = rafter span (if placed at midspan) otherwise ½ span1 + ½ span2.

Underpurlin & Fan strut example



Determine the position of struts (usuallly on supporting walls).
If the distance between supporting walls is excessive a strutting beam may be needed.
Span of underpurlin can also be reduced if fan-strut is used.
Determine the length of the strut (perpendicular or vertical to rafter)
and the dimensions between the struts (or fan-struts).
Find the worst case and calculate the span of the underpurlin.
Roof load area = RLW × (½ u/p span left + ½ u/p span right from strut)
(with fan strut) = RLW × (½ u/p reduced span left + spread of fan strut + ½ u/p reduced span right)
Hanging beams are required if ceiling joist span is excessive.
Place hanging beams in center of room or if needed divide room length/width by 3 (4)
and space them equally.

Karl Boeing