

THE ROOFMASTER

A precision tool, designed to provide a modern alternative to the roofing square



SPECIFICATION

- Anodised aluminium construction
- Easy to read laser etched markings
- Angle cuts for all roof members
- Lengths of rafters marked on tool, no separate tables required
- Designed for ease of use
- Only the roof pitch angle is required to obtain all cut angles and rafter length

INTRODUCTION

THE ROOFMASTER HAS BEEN DESIGNED TO SIMPLIFY THE WORK OF THE CARPENTER ON SITE. WITH THIS TOOL THE SKILLED CRAFTSMAN SHOULD HAVE NO PROBLEM IN CONSTRUCTING TRADITIONAL ROOFS OF COMPLEX DESIGN.

The Roofmaster has been designed to cover all standard roof shapes based on rectangular or square plans. Pitch angles and rafter lengths for roofs pitched at between 16° and 75° have been covered.

Roofmaster consists of an anodised aluminium blade sliding between a lockable double sided fence. Laser engraved on each face of the blade are three main features.

1. A set of calibrated arcs, each designed to cover specific roof members.
2. Tables for length of common, hip and valley rafters per metre of run.
3. Information panels showing which edge of the blade to mark for the selected rafter cut.

Skilled craftsmen with experience of roofing, will be well acquainted with the terminology used in roof construction.

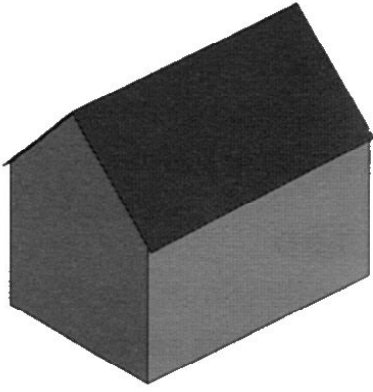
Part A. of this instruction manual, will explain to those with prior knowledge how to set and use the roofmaster.

Part B. gives more detailed information on roofing terminology and describes step by step, the setting out operations for the wall plates and each type of rafter.

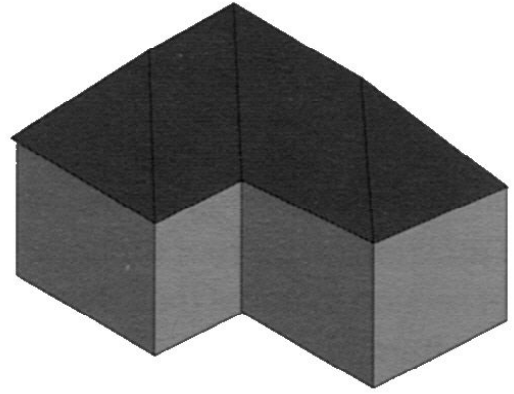
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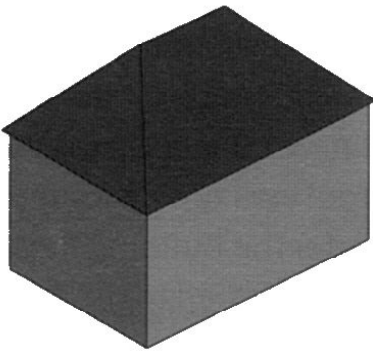
BASIC ROOF SHAPES



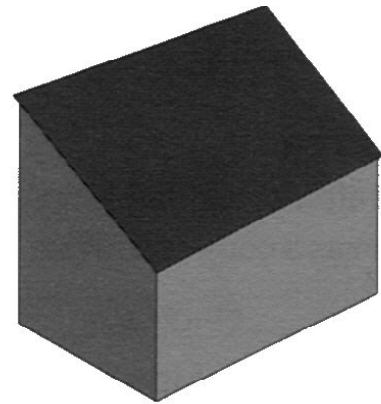
Gable



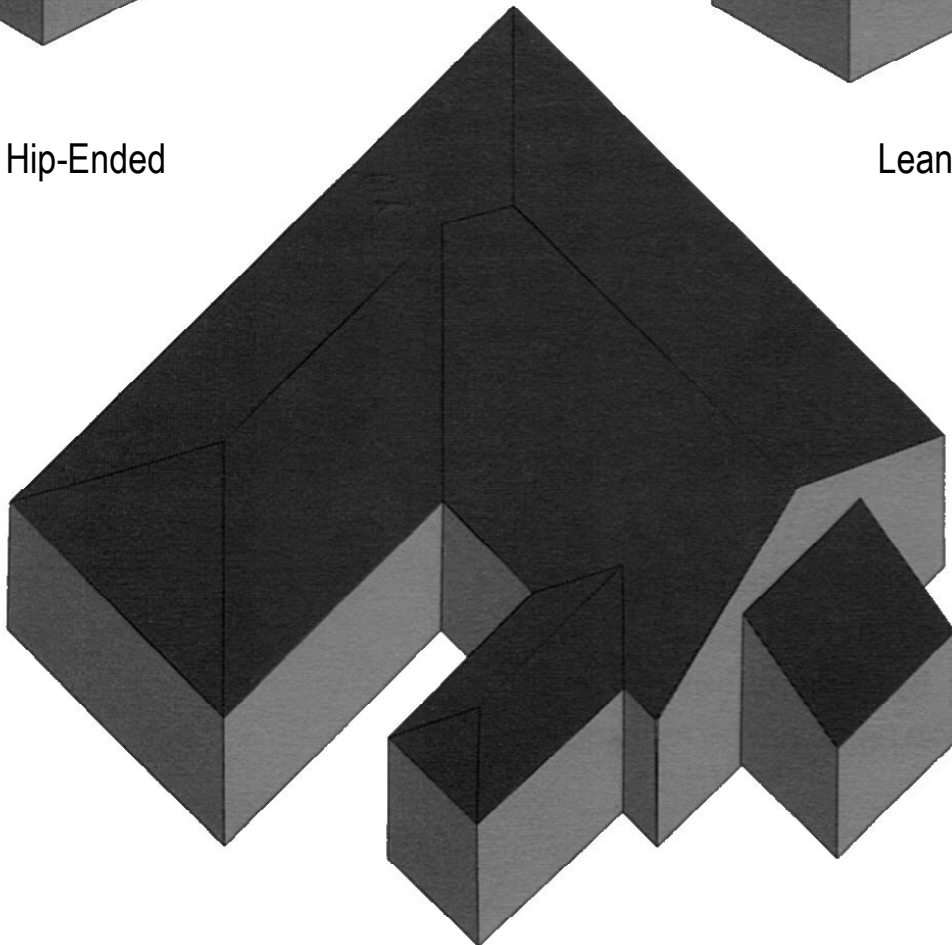
Hip and Valley



Hip-Ended



Lean-To



A combination of basic roof shapes can be used to form more complex roof structures

TERMINOLOGY

COMMON RAFTER

Forming the main structure of the roof, they run from wall plate to ridge board.

HIP RAFTER

Span from wall plate to ridge board at the external junction of two roof surfaces. Usually of deeper section material than that used for common rafters.

VALLEY RAFTER

Similar to a hip rafter they run from wall plate to ridge board at the internal junction of two roof surfaces.

CROWN RAFTER

The central rafter of a hipped end, usually the same section as a common rafter.

JACK RAFTER

Run from wall plate to hip rafter, they have compound angles at the junction with the hip rafter and reduce in length relative to their spacings.

CRIPPLE RAFTER

Similar to a jack rafter, but running from the valley rafter to the ridge board. They also reduce in length relative to their spacings.

PURLIN

A member of deeper section fixed at the midpoint of the common rafter to provide additional support. By using purlins the depth of the common rafter can be reduced.

LAY BOARD

Used in place of a traditional valley, the lay board is fixed to the upper surface of the common rafters to provide support and fixing points for the cripple rafters.

SADDLE BOARD

A board of usually 18mm ply, fixed to the first pair of common rafters set back from a hipped end. The saddle board provides support for the full depth of the hip rafter plumb cut.

WALL PLATE

100mm x 50mm sawn timbers bedded on mortar to the brick or block work. They provide a fixing for the rafters, and spread the load of the roof evenly to the supporting structure. Under building regulations the wall plates must be tied to the main structure with galvanised steel restraint straps.

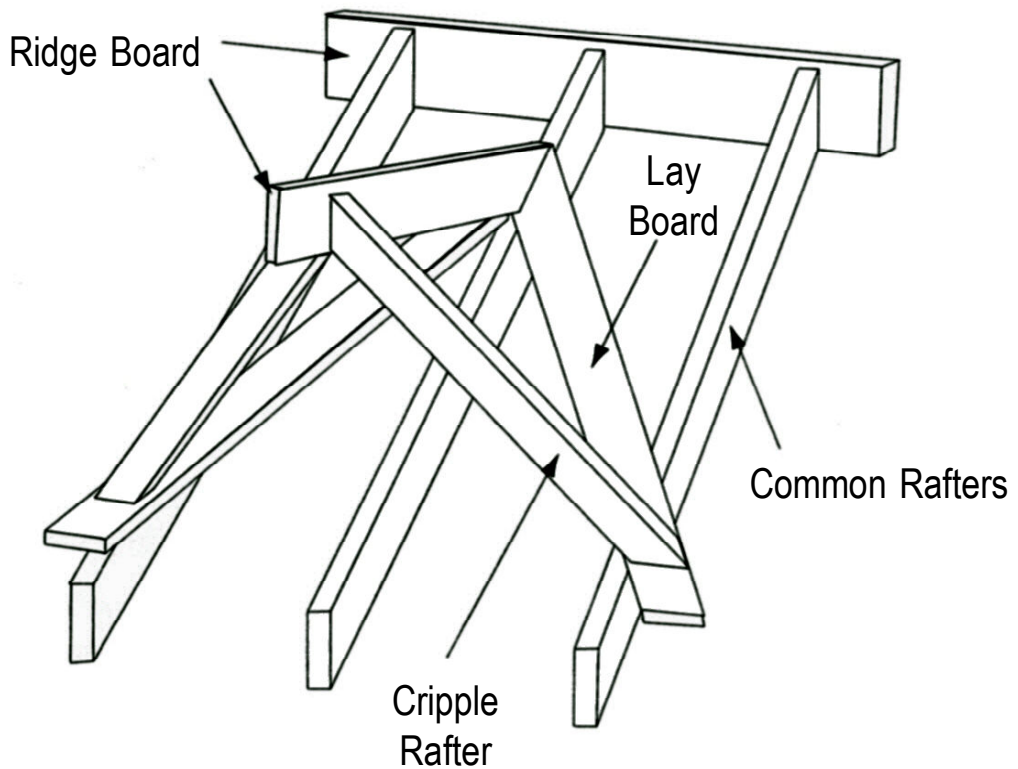
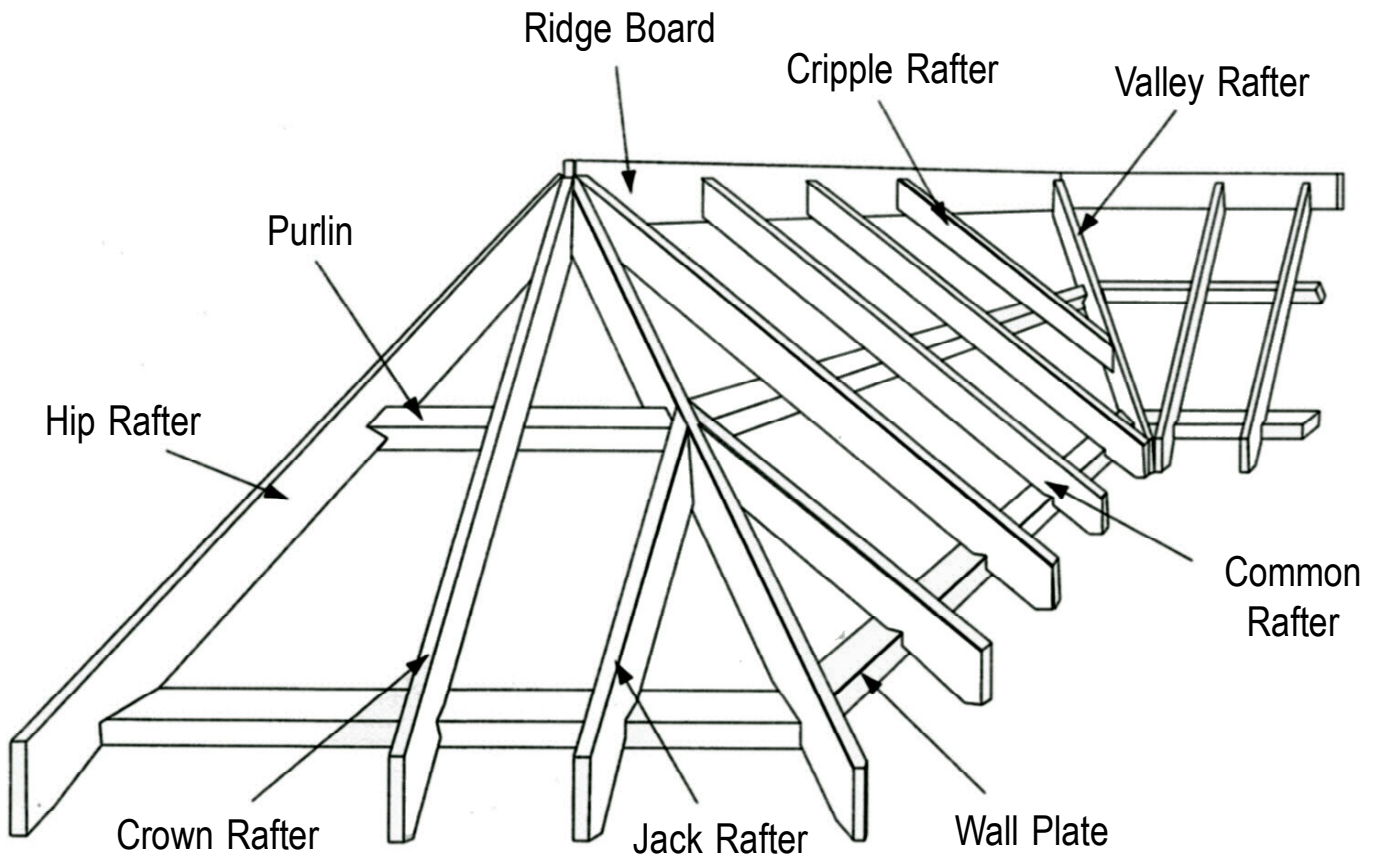
RIDGE BOARD

A horizontal member at the apex of the roof, providing a fixing point for the common rafters.

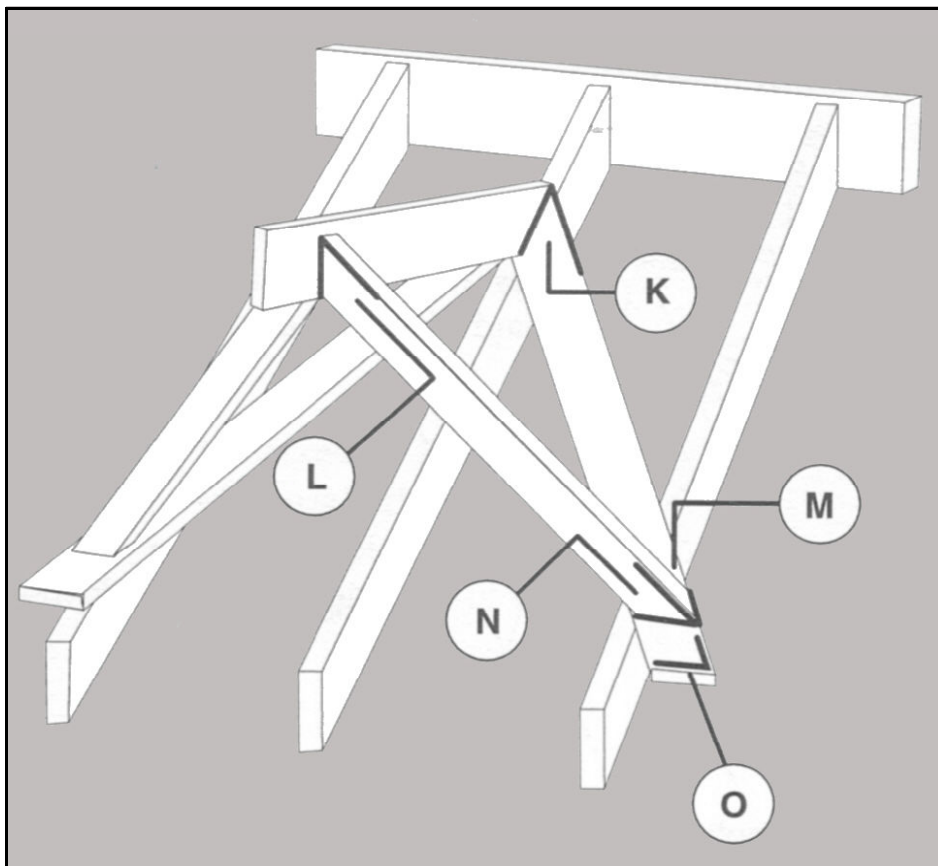
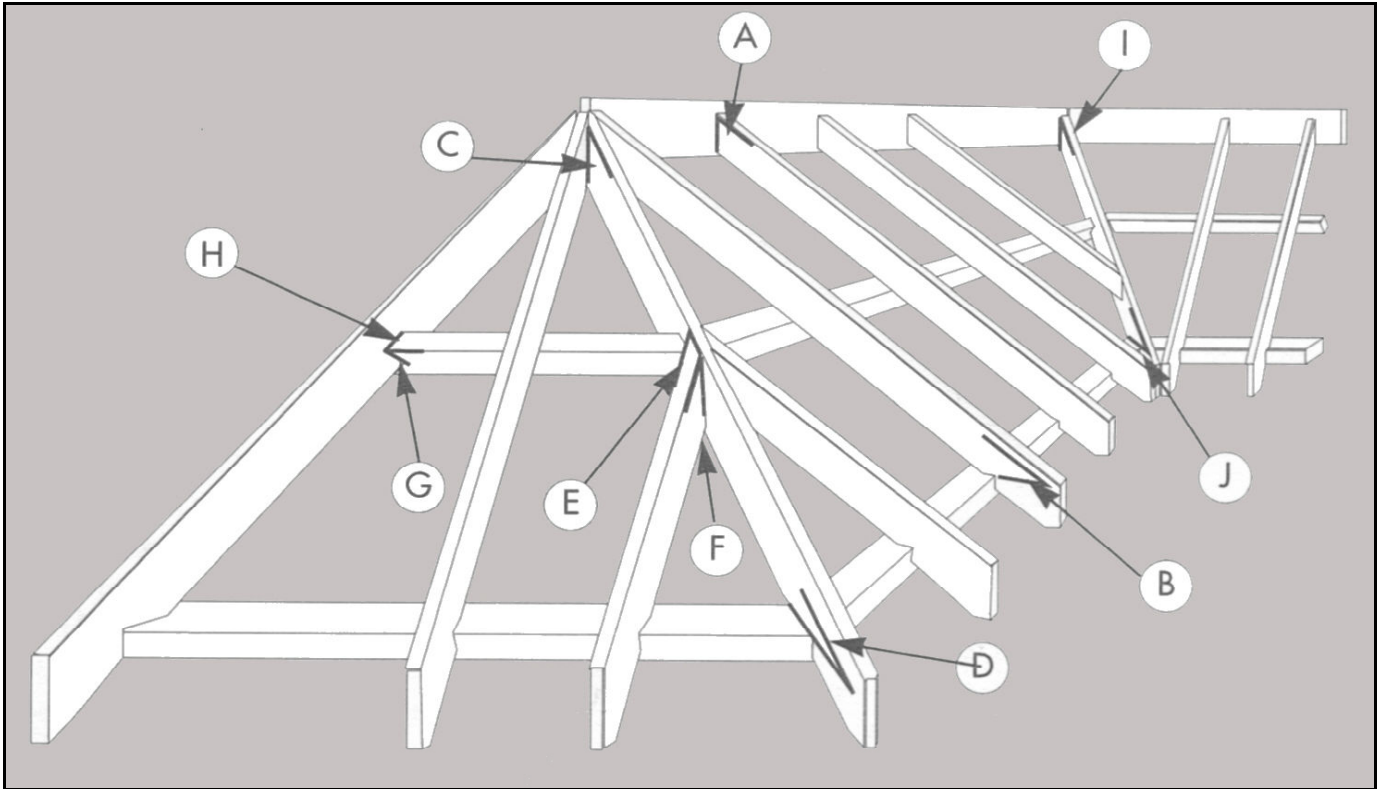
BIRDSMOUTH

The notch taken out of the foot of the rafter to fit over the wall plate.

ROOF COMPONENTS



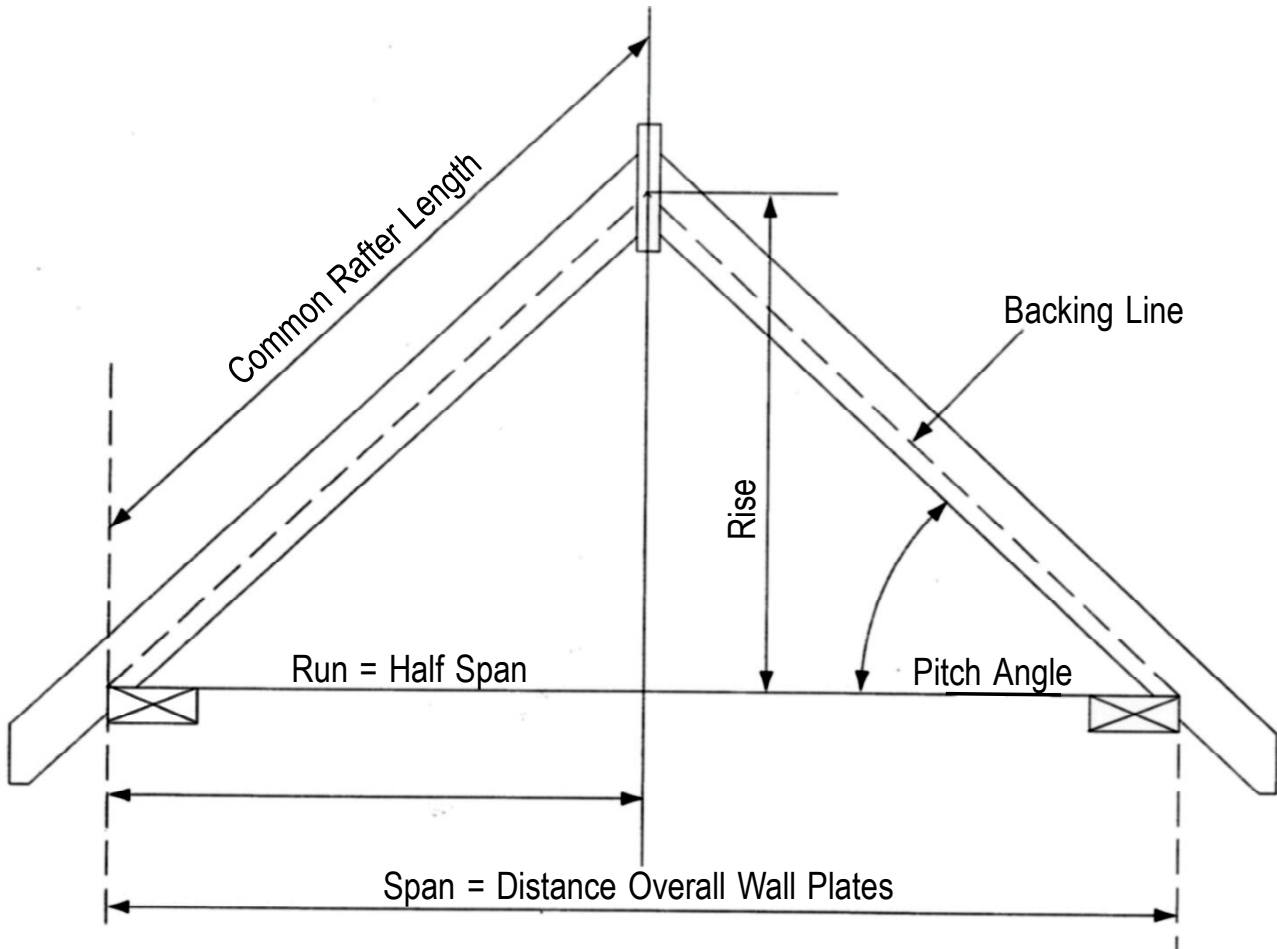
ROOF ANGLES



KEY

- A. Common rafter plumb cut
- B. Common rafter seat cut
- C. Hip plumb cut
- D. Hip seat cut
- E. Jack edge cut
- F. Jack side cut
- G. Purlin side cut
- H. Purlin edge cut
- I. Valley plumb cut
- J. Valley seat cut
- K. Layboard plumb cut
- L. Common rafter plumb cut
- M. Jack edge cut
- N. Common rafter seat cut
- O. Layboard seat cut

SETTING OUT TERMS



PITCH ANGLE

The angle at which the roof members are inclined to the horizontal. This angle will be specified by the architect or designer and shown on the relevant drawings.

SPAN

A critical dimension required for roof construction. It is the horizontal distance measured overall the wall plates.

RUN

The horizontal distance from the centre of the ridge to the outside of the wall plate. the run is equal to half the span.

RISE

The vertical distance from the top of the wall plate to the intersecting point of the backing lines.

BACKING LINE

The hypotenuse of the right angle triangle formed by the run and rise. The length of the backing line will be the true rafter length.

HANDLING THE ROOFMASTER

The compact size, lockable adjustable fence and easy to read laser etched markings make the Roofmaster the ideal roofing tool.

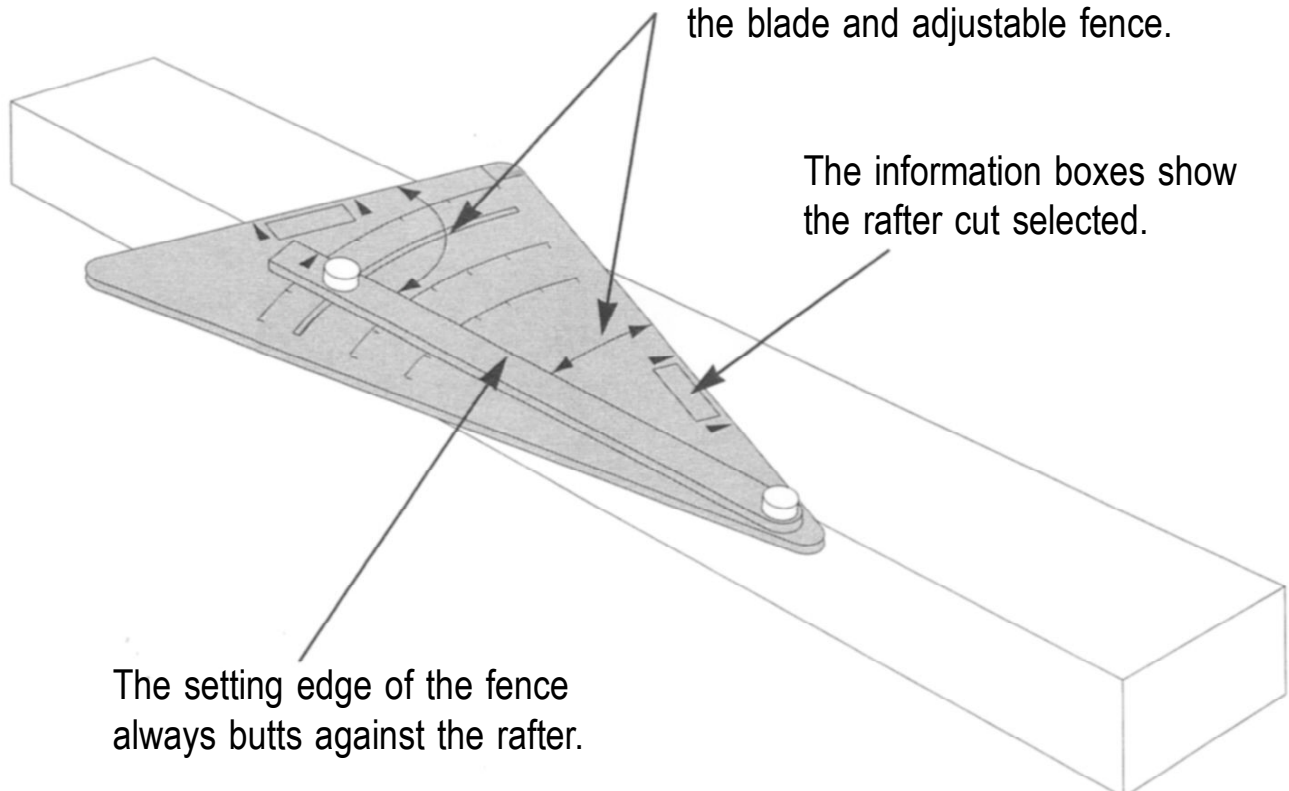
The concept of the Roofmaster is built on one main fact - the pitch angle of the roof to be constructed.

This angle will be specified by the architect or designer and shown on the relevant drawing. When this figure has been determined it is the only number required to set the tool for all roof members.

A graduated arc is designated to each particular roof member. The required cutting angles for any given member is obtained by setting the adjustable fence to the pitch angle number on the selected arc.

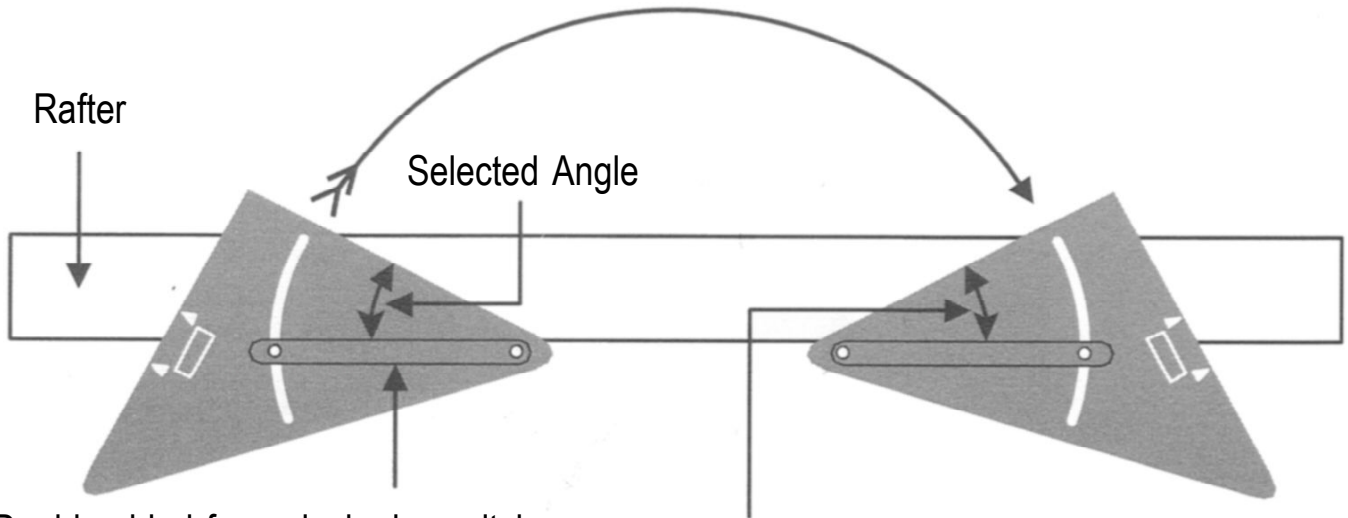
Information panels on each side of the blade indicate which edge to mark for the required angle.

The angles required will always be the acute angles contained within the right angle triangle formed by the blade and adjustable fence.



HANDLING THE ROOFMASTER

An important factor to recognise, is that, once the fence has been locked into position, the Roofmaster can be reversed to give either left or right hand cuts as necessary



Double sided fence locked on pitch angle for selected roof member arc.

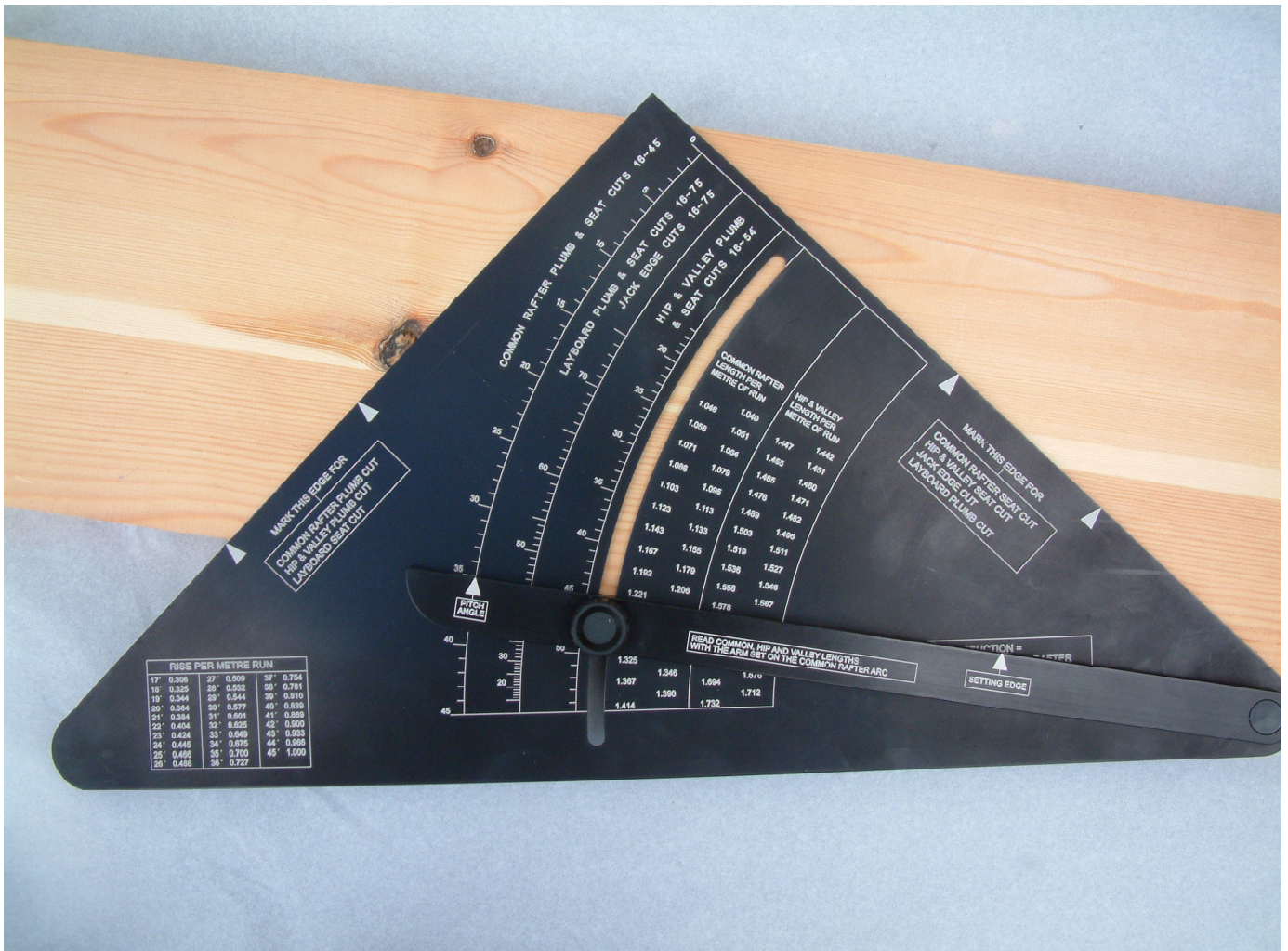
When the Roofmaster has been reversed, the correct angles will still be maintained even though the selected arc is on the opposite side of the blade.

Panels on each side of the blade give the rise per metre run for angles 17°- 70°.

Rise per metre run		
17°	0.306	27° 0.509
18°	0.325	28° 0.532
19°	0.344	29° 0.544
20°	0.364	30° 0.577
21°	0.384	31° 0.601
22°	0.404	32° 0.625
23°	0.424	33° 0.649
24°	0.445	34° 0.675
25°	0.466	35° 0.700
26°	0.488	36° 0.727

Rise per metre run		
37°	0.754	46° 1.036
38°	0.781	47° 1.072
39°	0.810	48° 1.111
40°	0.839	49° 1.150
41°	0.869	50° 1.192
42°	0.900	51° 1.235
43°	0.933	52° 1.280
44°	0.966	53° 1.327
45°	1.000	54° 1.376
		55° 1.428
		56° 1.483
		57° 1.540
		58° 1.600
		59° 1.664
		60° 1.732
		61° 1.804
		62° 1.881
		63° 1.963
		64° 2.050
		65° 2.145
		66° 2.246
		67° 2.356
		68° 2.475
		69° 2.596
		70° 2.747

EXAMPLES OF USE



CUTTING ANGLES

To find the plumb and seat cuts for a common rafter for a roof pitched at 35 degrees.

1. Select arc for common rafter cuts 16-45 degrees
2. Lock adjustable arm on number 35.
3. Hold tool with setting edge of fence firmly against rafter material.
4. Mark edges indicated by the information panels for the required cuts.

This sequence of operations is carried out on each arc to obtain the cut angles for all roof members.



RAFTER LENGTHS

The common rafter and hip and valley rafter lengths per metre of run, for roof pitches of 16-45 degrees and 45-72 degrees are engraved on each side of the blade.

To obtain the true lengths of these, the adjustable arm is set to the correct pitch angle figure on the common rafter arc. The numbers then aligned with indicators along the top edge of the arm will be the common rafters lengths per metre of run and the hip and valley length per metre of run.

When the figures shown are multiplied by the common rafter run, the true lengths of rafters will be obtained.

Note: The readings for Hip and Valley lengths per metre run are taken with the arm set to the pitch angle on the common rafter.

Rafter Lengths

Example: Roof pitch 35 degrees Span 6.486.

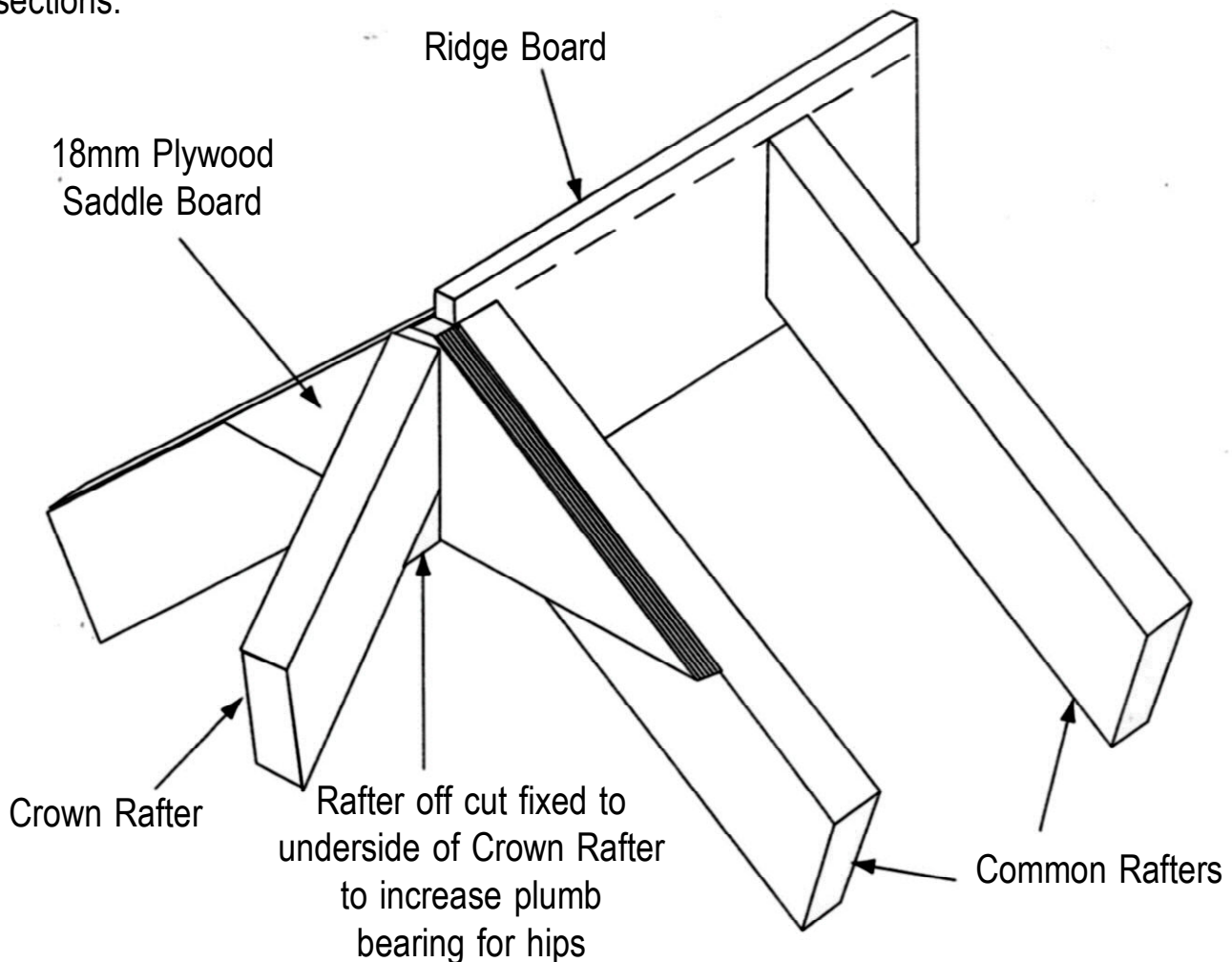
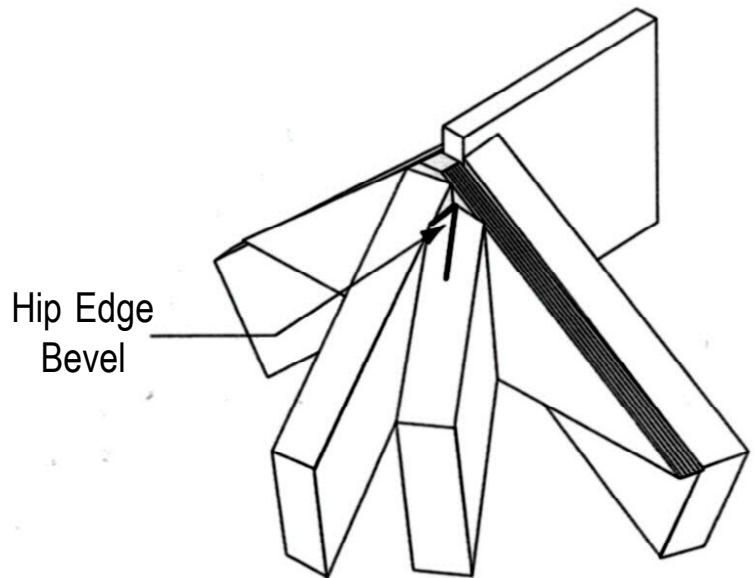
1. Arm set at No 35 on common rafter arc.
2. Readings aligned with indicators on adjustable arm
3. Common rafter run = $\frac{\text{span}}{2} = \frac{6.486}{2} = 3.243$
4. True length of common rafter = $1.221 \times 3.243 = 3.959$
 True length of hip and valley rafters = $1.578 \times 3.243 = 5.117$

RECOMMENDED METHOD OF CONSTRUCTION HIP, COMMON AND CROWN RAFTER INTERSECTION

There are several methods used in the construction of traditional cut and pitched roofs. The actual rafter length is dependant upon the method chosen, that described in this manual is a well established, practical method of producing a stable and solid roof structure.

A saddle board, usually of 18mm ply, is nailed to the first pair of common rafters to provide support to the full depth of the hip rafter plumb cut. The crown rafter is cut square onto the saddle board, with the hips cut to fit between the faces of the crown and common rafters.

How to obtain these cuts is explained in more detail in the following sections.



SETTING OUT WALL PLATES FOR A HIPPED END

1 Measure distance overall wall plates to determine the span, the run equals half the span.

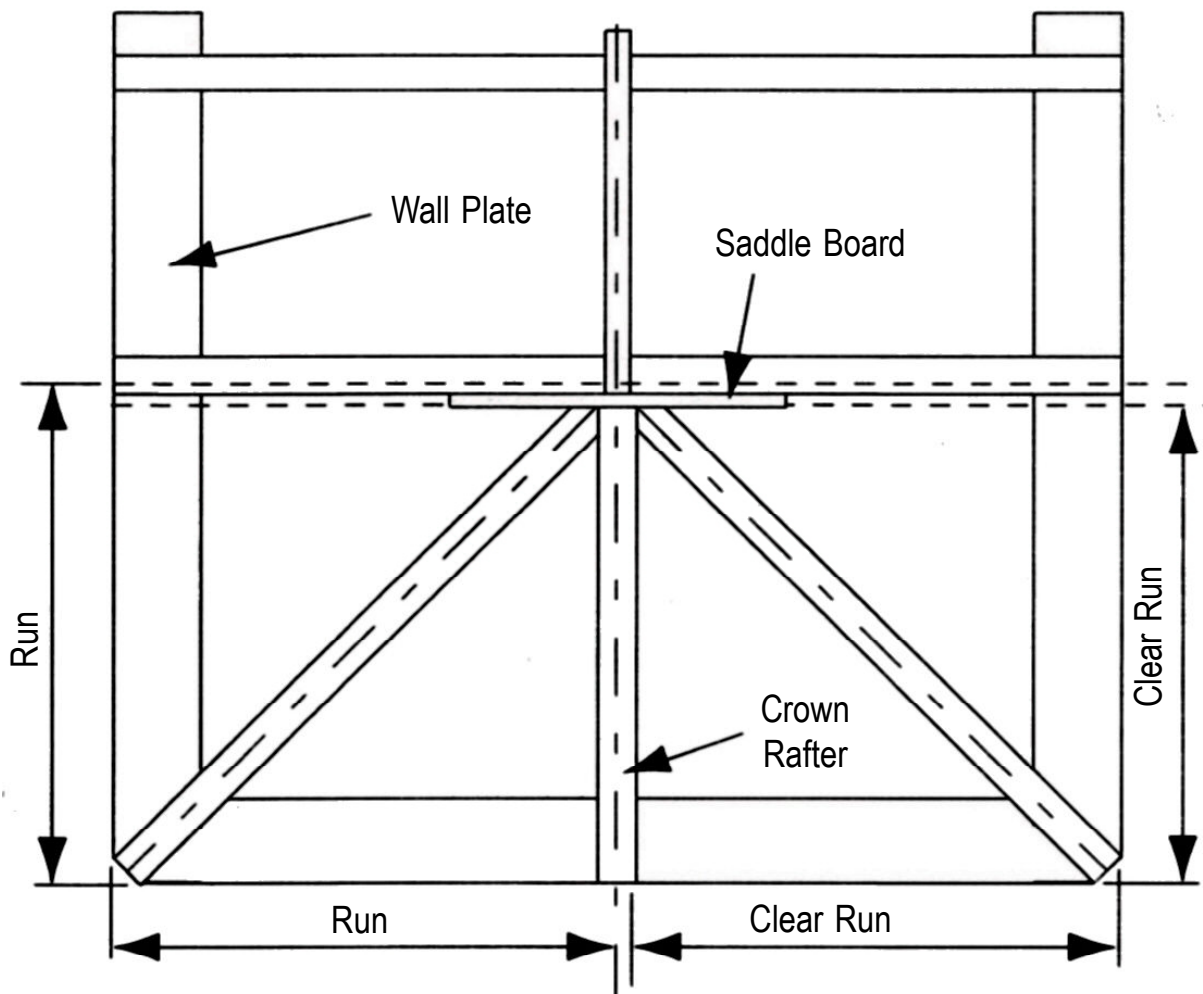
2 Set out centre line on wall plate, this will be the centre of the crown rafter.

3 Set back half the thickness of the crown rafter each side of the centre line.

4 Measure from outside of the wall plate to the face of the crown rafter to obtain the clear run.

5 Measure the clear run dimension along the plate from the hip end. This will give the face of the saddle board.

6 Mark the thickness of the saddle board back from this line to give the face of the first pair of common rafters.



COMMON RAFTER SETTING OUT

1 Mark plumb cut on face of rafter and square a line across the top edge.

2 Measure along rafter from this point, the true rafter length as obtained from the Roofmaster, square a line across the top edge.

3 At this point mark a second plumb cut.

4 From the first plumb cut measure in square, half the thickness of the ridge material.

5 At this point draw another plumb cut and square across the top edge. This is the cut off line.

7 At one third of the depth from the bottom of the rafter mark the common rafter seat cut. This will give the cut off lines for the birdsmouth.

6 Measure the length of the plumb cut and divide into thirds. The depth of the birdsmouth will be one third, with two thirds left on the rafter.

CROWN RAFTER SETTING OUT

1 Mark plumb cut on face of rafter and square line across the top edge.

2 Measure along rafter from this point, the true rafter length as obtained from the Roofmaster, square a line across the top edge.

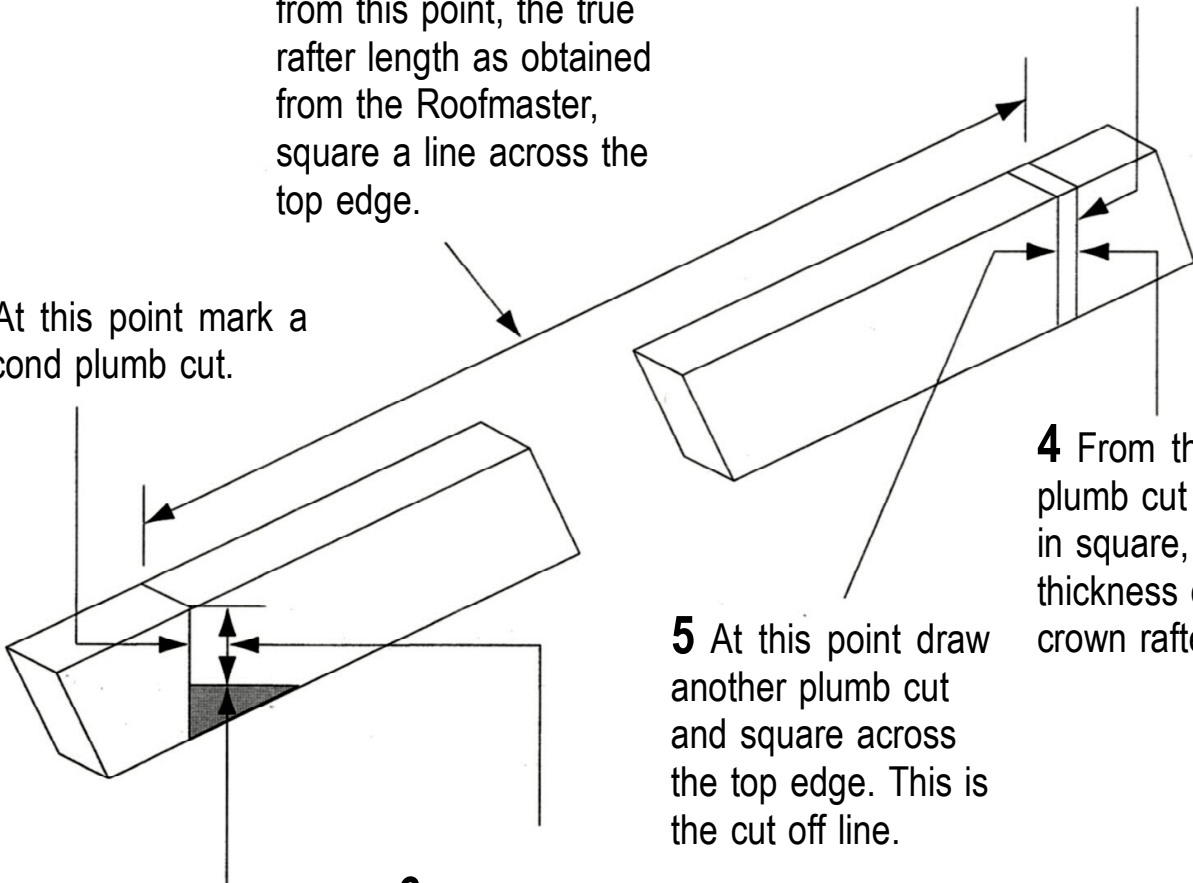
3 At this point mark a second plumb cut.

4 From the first plumb cut measure in square, half the thickness of the crown rafter.

5 At this point draw another plumb cut and square across the top edge. This is the cut off line.

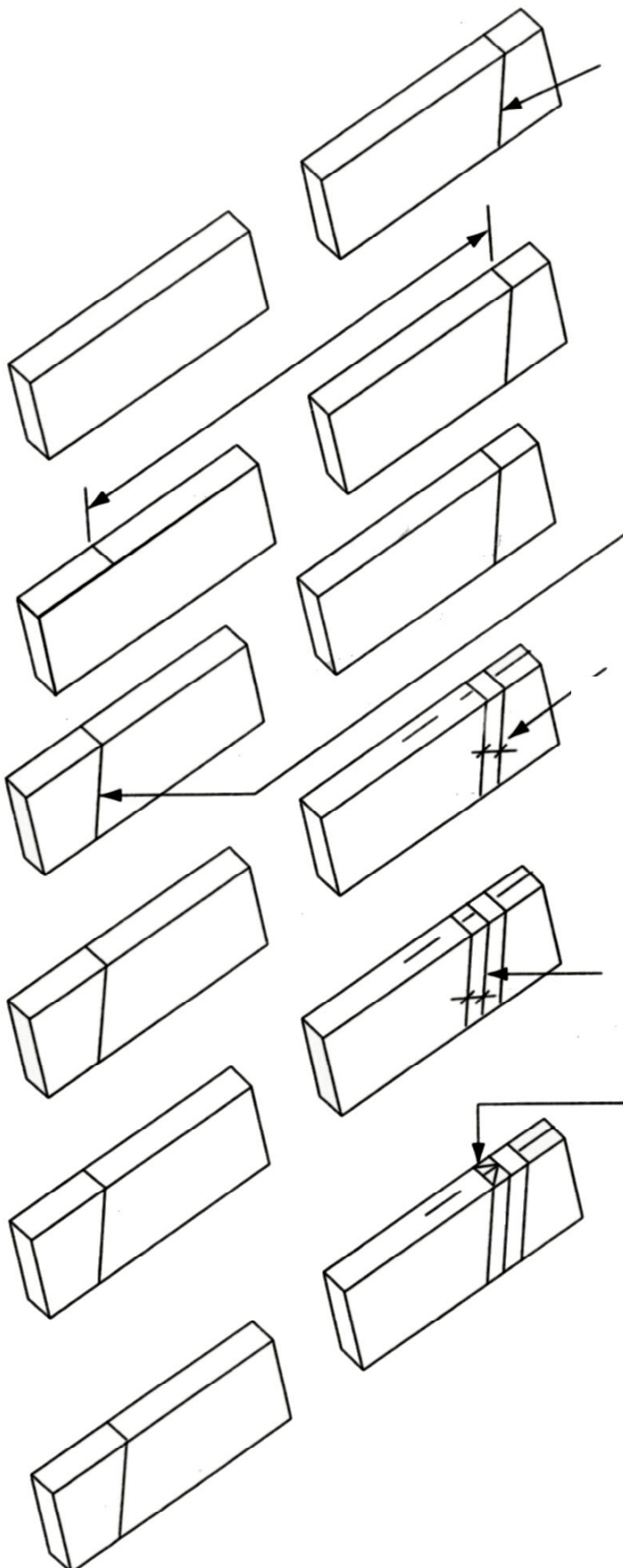
7 At one third of the depth from the bottom of the rafter mark the common rafter seat cut. This will give the cut lines for the birdsmouth.

6 Measure the length of the plumb cut and divide into thirds. The depth of the birdsmouth will be one third, with two thirds left on the rafter.



HIP RAFTER SETTING OUT

It must be noted that the setting out described below will only apply to the constructional method described earlier in this manual.



1 Mark hip plumb cut on one face of the hip rafter and square a line across the top edge.

2 Measure along the rafter from this point, the true hip length, as obtained from the Roofmaster. Square a line across the top edge.

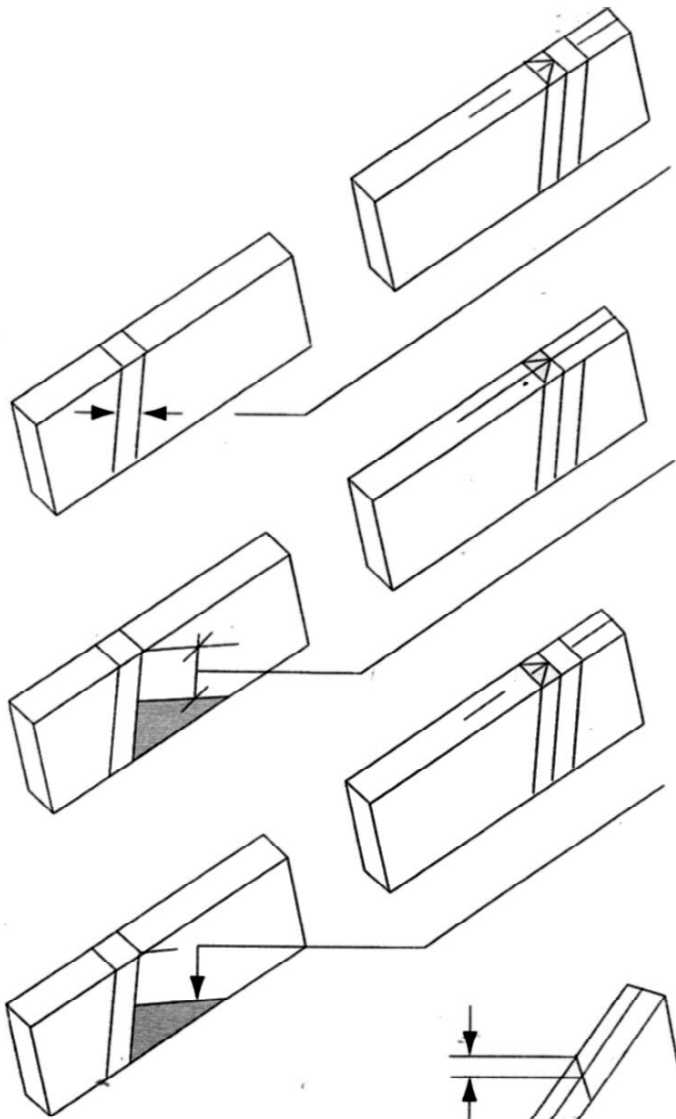
3 At this point mark another hip plumb cut.

4 Square to the first plumb cut measure in half the diagonal thickness of the common rafter, (see diagram 'B'), and mark another plumb cut. Square a line across the top edge.

5 From this plumb cut set back square half the thickness of the hip material and mark another plumb cut. Square a line across the top edge.

6 On the top edge of the rafter mark from the centre line set out in number '4' to the plumb cut set out in number '5', this will give the cut off lines for the hip edge cuts.

Note; This setting out is geometrically accurate, a physical check of the hip length should be made on site with a tape or rod for any minor adjustments that may be necessary.

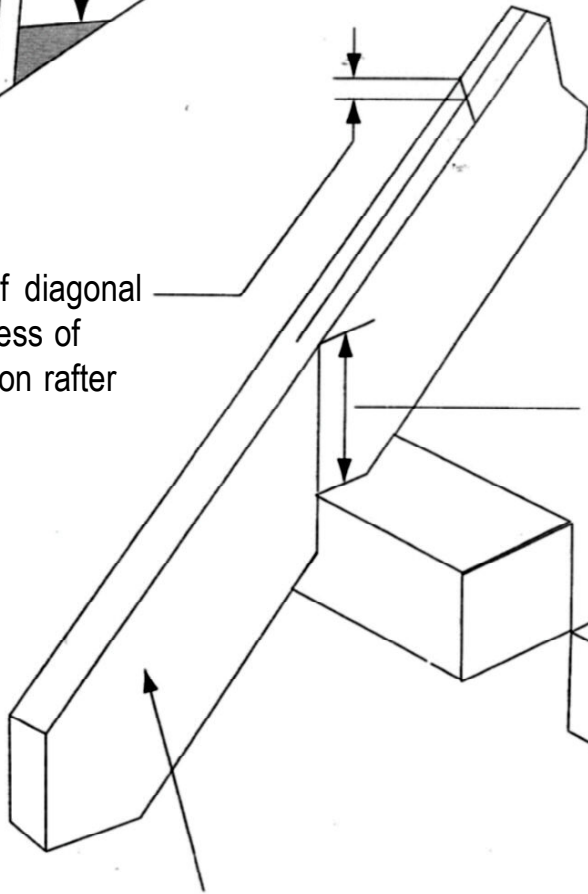


7 At the seat cut end of the rafter, measure in square, half the thickness of the hip material and mark a plumb cut. This dimension is the allowance made for the cut off at the corner of the wall plate. (See diagram 'B'.)

8 Measure the vertical distance of the plumb cut above a common rafter birdsmouth, (see daigram 'B'), and measure this distance down from the top of the hip rafter on the plumb cut marked at number '7'.

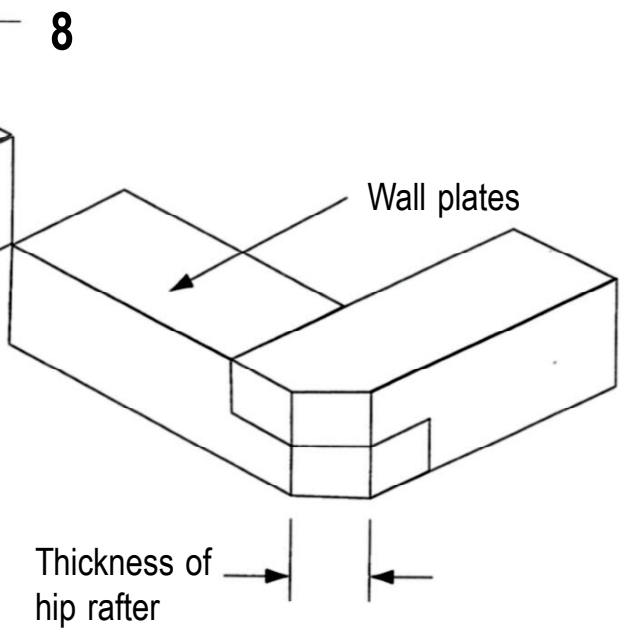
9 At this point mark a hip rafter seat cut to give the cut off line for the birdsmouth.

4 Half diagonal thickness of common rafter



Common rafter

DIAGRAM B



Wall plates

Thickness of hip rafter

VALLEY RAFTER SETTING OUT

1 Mark valley plumb cut on one face of the valley rafter and square a line across the top edge.

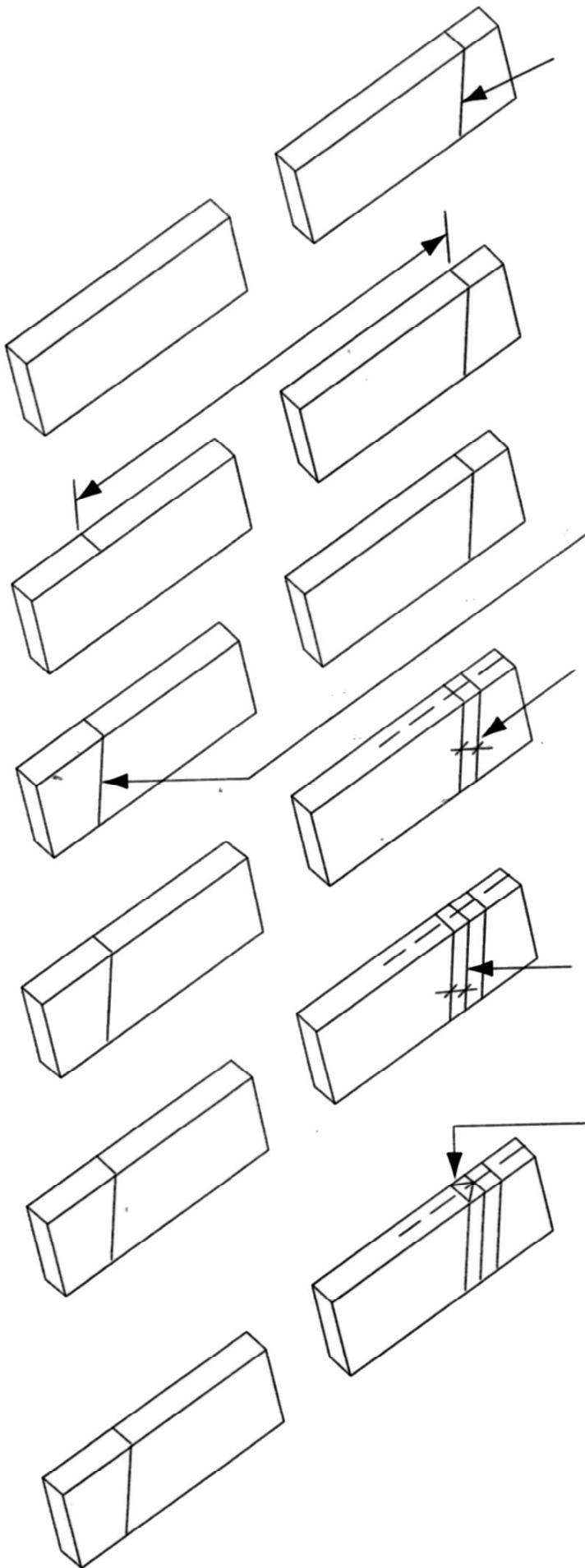
2 Measure along the rafter from this point, the true valley length, as obtained from the Roofmaster. Square a line across the top edge.

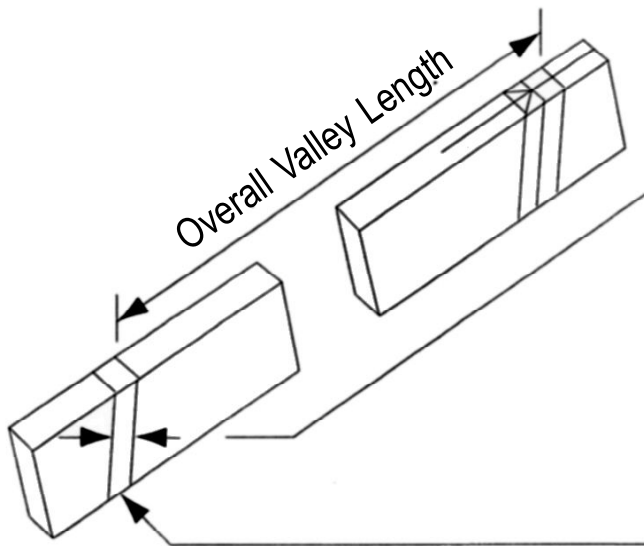
3 At this point mark another valley plumb cut.

4 The reduction in valley length will vary dependent upon the method of construction used. If, for example, the two ridges intersected at right angles, the reduction in length would be half the diagonal thickness of the ridge board. At this point mark another plumb cut. Square a line across the top edge and mark the centre of the rafter.

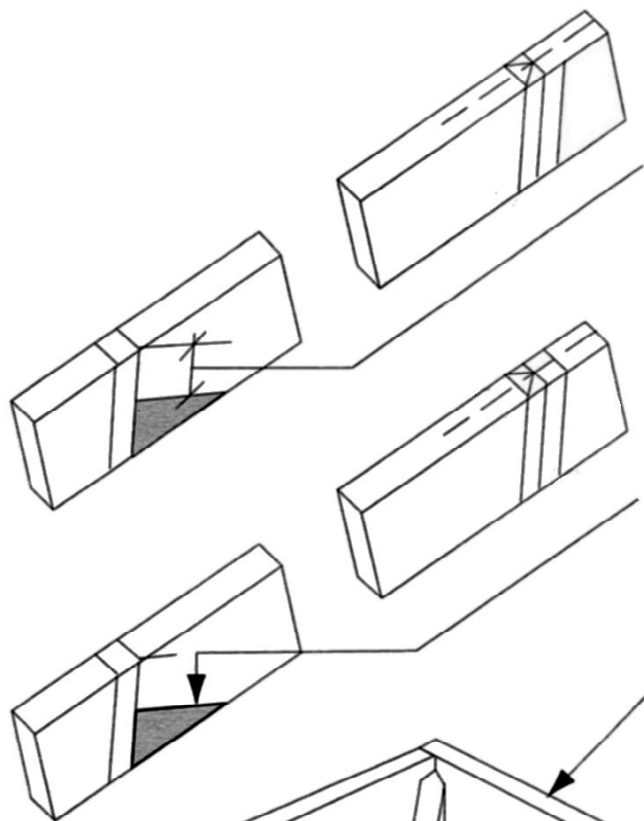
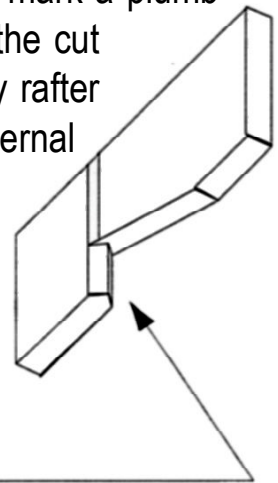
5 From this plumb cut set back square half the thickness of the valley material and mark another plumb cut. Square a line across the top edge.

6 On the top edge of the rafter mark from the centre line set out in number '4' to the plumb cut set out in number '5', this will give the cut lines for the hip edge cuts.



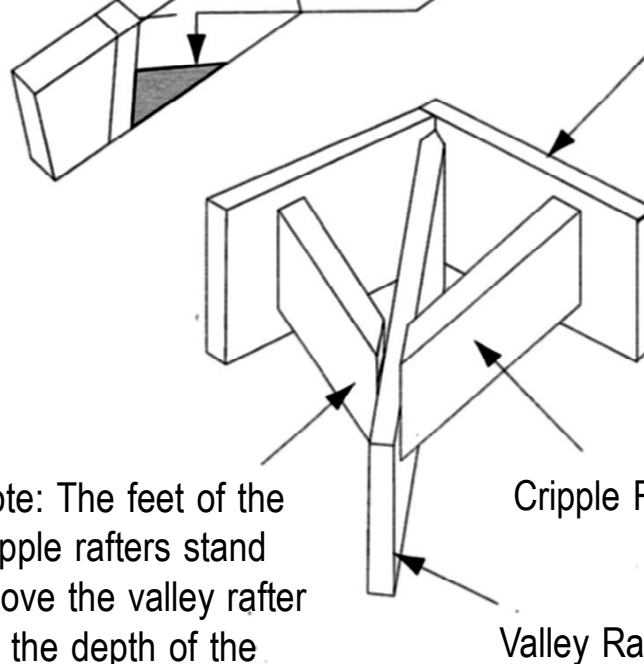


7 At the seat cut end of the rafter, measure out square, half the thickness of the valley material and mark a plumb cut. This dimension is the cut back to allow the valley rafter to sit neatly into the internal angle formed by the wall plates.



8 Measure the vertical distance of the plumb cut above a common rafter birdsmouth, (see diagram 'B'), and measure this distance down from the top edge of the valley rafter on the plumb cut marked at number '3'.

9 At this point mark a valley rafter seat cut to give the cut off line for the birdsmouth.

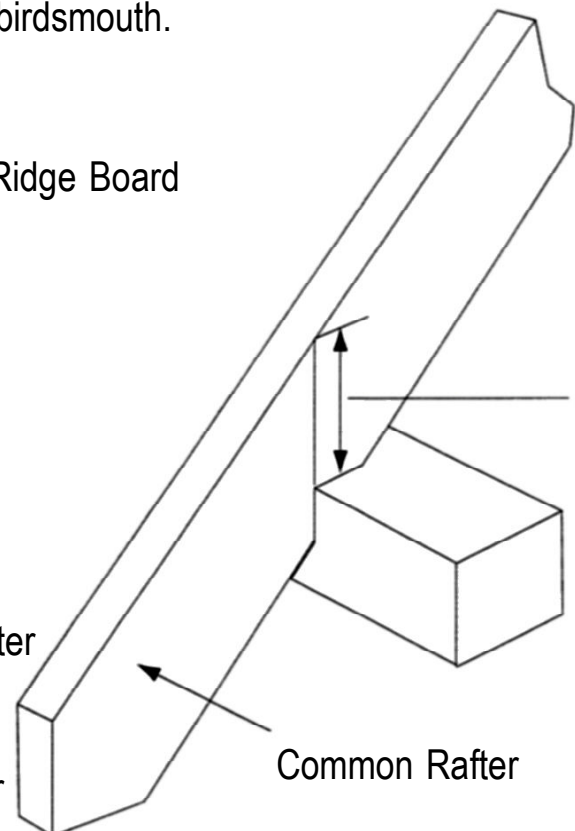


Ridge Board

Cripple Rafter

Valley Rafter

Note: The feet of the cripple rafters stand above the valley rafter by the depth of the hip backing angle.

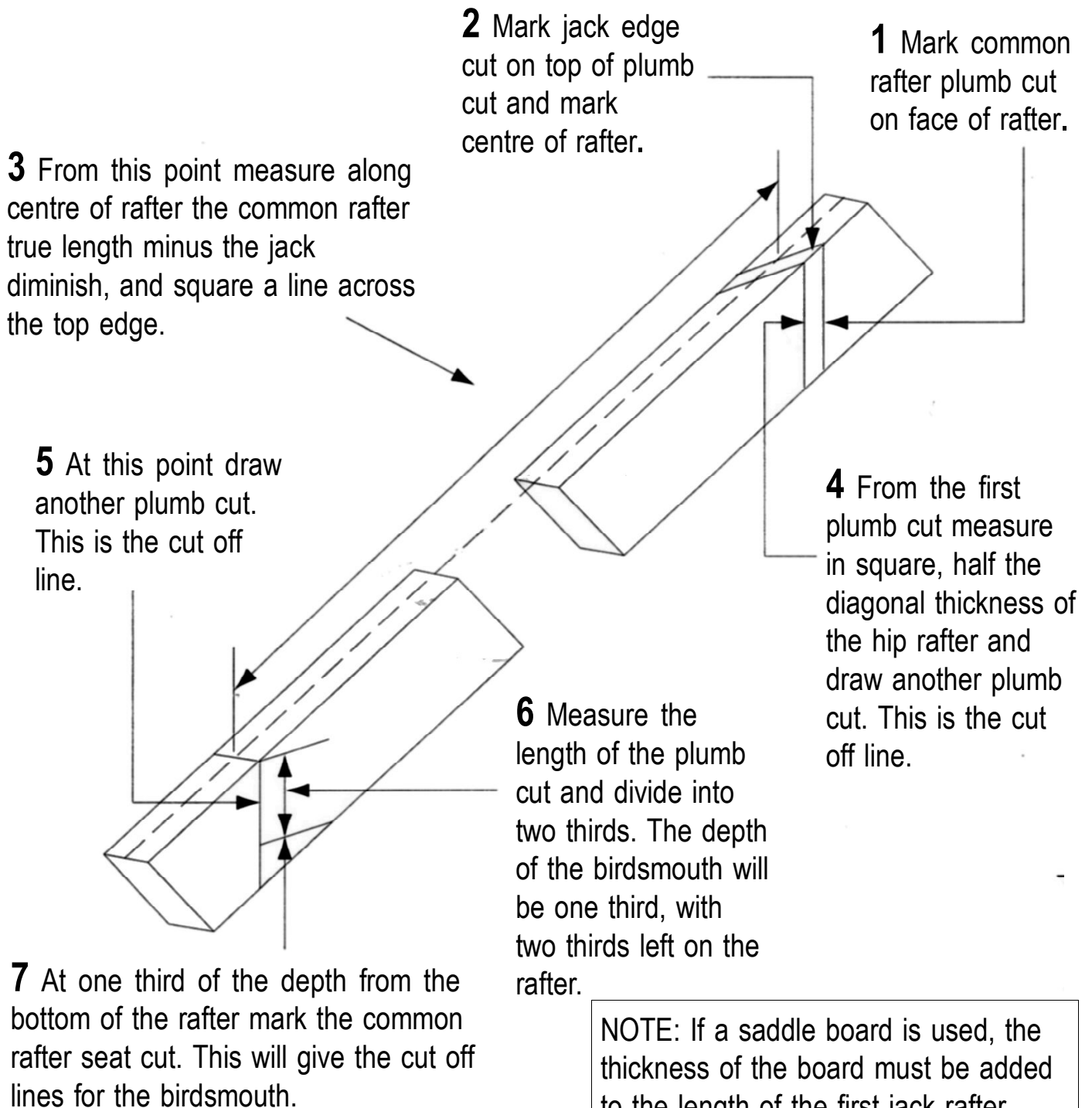


Common Rafter

Diagram B

JACK RAFTER SETTING OUT

The jack diminish equals the common rafter length per metre of run multiplied by the distance between the rafter centres, usually 400mm or 600mm



NOTE: If a saddle board is used, the thickness of the board must be added to the length of the first jack rafter, again measured square to the plumb cut. All following jack rafters will reduce in length by the standard jack diminish.