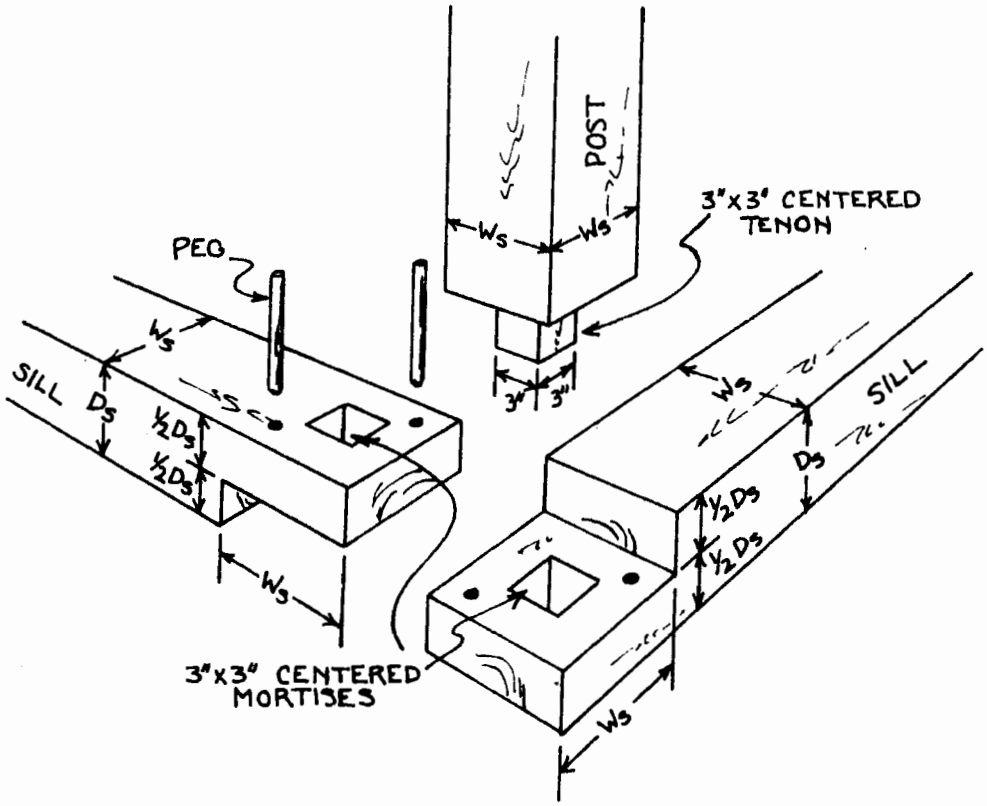
CORNER JOINTS AT SILL

THE REQUIREMENTS OF THESE JOINTS ARE TO CONNECT AND LOCK SILL TIMBERS AT RIGHT ANGLES AND TO PROVIDE A MORTISE TO RECEIVE A TENON FROM THE CORNER POST.

THE TENON IS LOCATED IN THE POST SO THAT THE OUTSIDE FACES OF THE POST ARE FLUSH WITH THE OUTSIDE FACES OF THE SILLS. TO MAKE CERTAIN THAT THE BOTTOMS OF THE TIMBERS ARE FLUSH WITH THE FOUNDATION, LAYOUT MEASUREMENTS ARE TAKEN FROM THE BOTTOM EDGE. USE A FRAMING SQUARE TO LAY OUT THESE JOINTS.

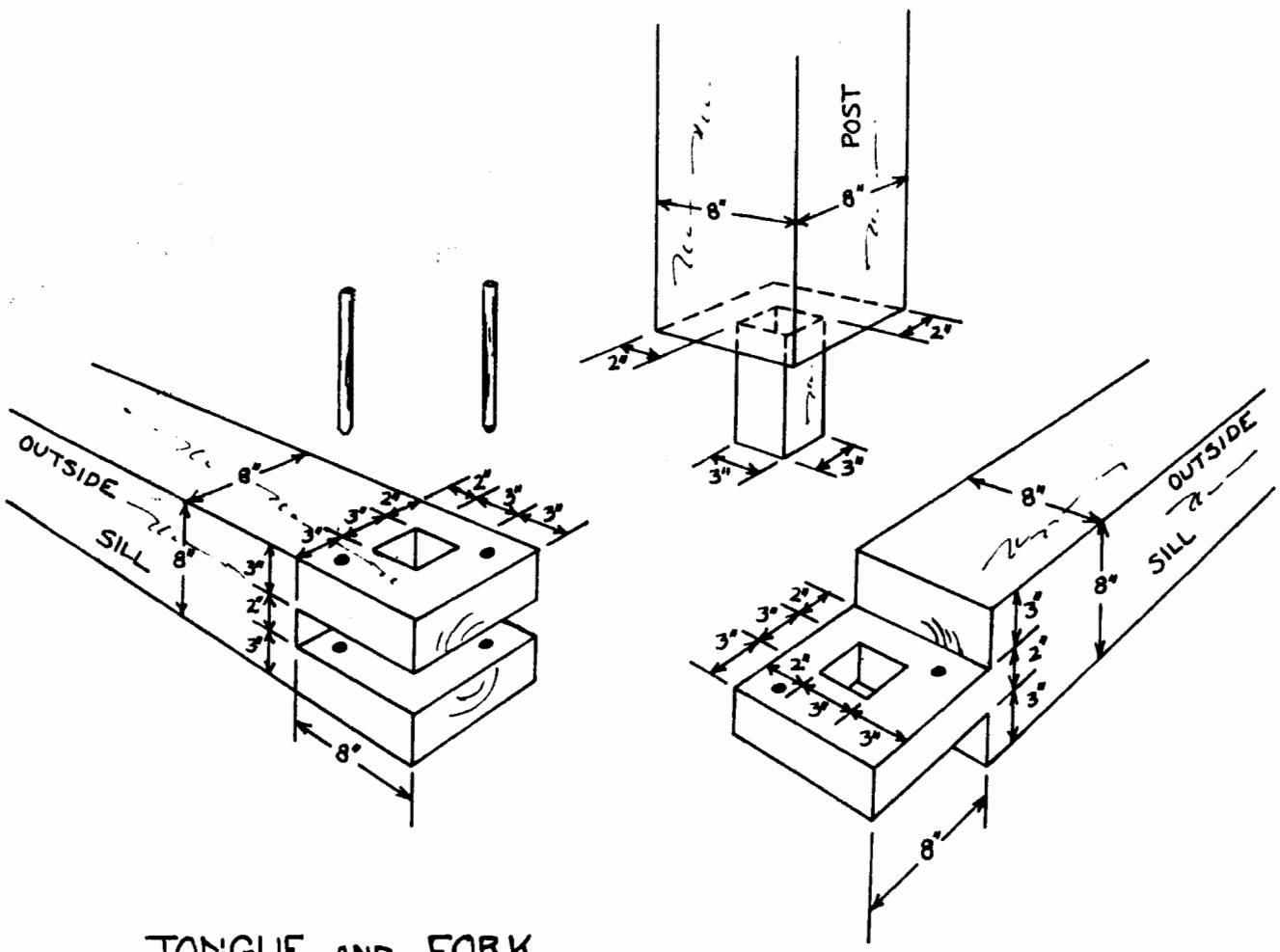


HALF LAP WITH THROUGH-POST TENON

THE HALF-LAP JOINT (ABOVE) IS THE EASIEST TO CUT. THE THROUGH TENON FROM THE POST AND THE PEGS LOCK THE JOINT TOGETHER.

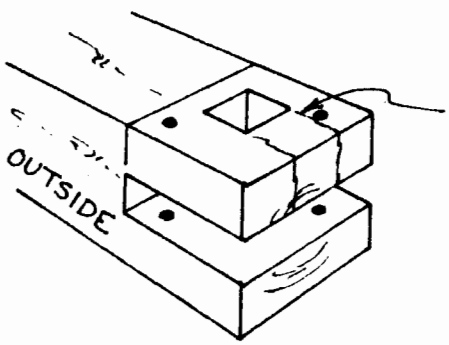
CONT....

CORNER JOINTS AT SILL.... CONT.



TONGUE AND FORK WITH THROUGH-POST TENON
(ILLUSTRATED WITH 8" X 8" POST AND SILL TIMBERS)

ANOTHER METHOD FOR JOINING THE SILL TIMBERS IS A TONGUE-AND-FORK JOINT (ABOVE). WITH THIS CORNER JOINT AND THE OTHER TWO ILLUSTRATED THE POST MORTISE THROUGH THE SILL TIMBERS CAN BE EITHER CENTERED OR OFFSET TOWARD THE INSIDE. THE POST TENON WOULD HAVE TO BE LOCATED ACCORDINGLY. THIS OFFSET REDUCES CHECKING AT THE ENDS OF THE SILL TIMBERS BY LEAVING MORE WOOD AT THIS VULNERABLE LOCATION (LEFT).

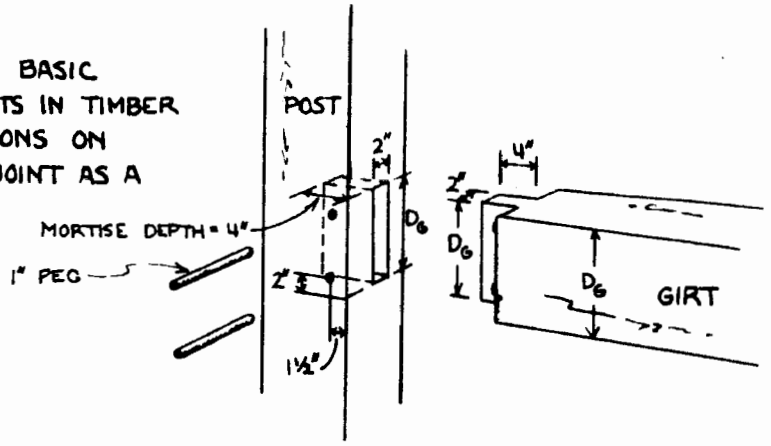


POTENTIAL CHECKING REDUCED BY LEAVING MORE WOOD (OFF-SETTING MORTISE TOWARD INSIDE CORNER).

CONT....

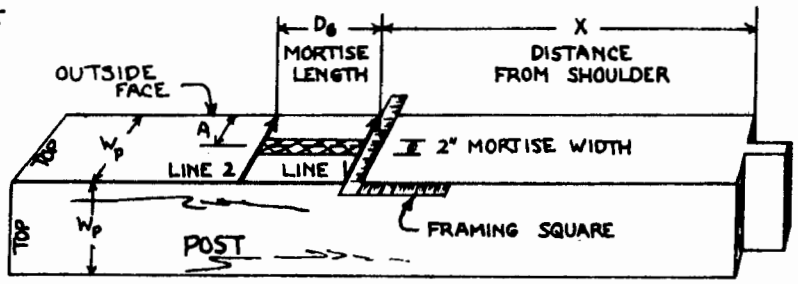
THE MORTISE AND TENON

THIS JOINT IS ONE OF THE MOST BASIC AND COMMONLY ENCOUNTERED JOINTS IN TIMBER FRAMING. MANY JOINTS ARE VARIATIONS ON THIS JOINT OR MAY INCLUDE THIS JOINT AS A PART OF ANOTHER JOINT.



MORTISE LAYOUT

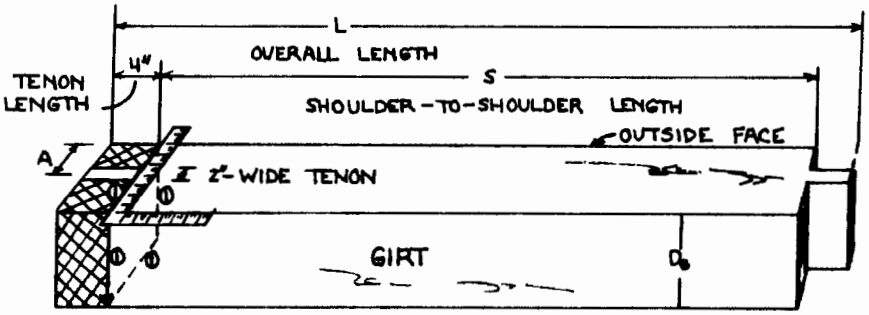
- MARK DISTANCES X AND $X+D_G$ FROM SHOULDER.
- WITH FRAMING SQUARE, DRAW LINES 1 AND 2 ACROSS TIMBER AT TOP AND BOTTOM OF MORTISE.
- MARK DISTANCE "A" FROM OUTSIDE EDGE.
  1) $A = \frac{1}{2} W_p$ FOR CENTERED MORTISE.
  2) A = PREDETERMINED DISTANCE FROM OUTSIDE FACE IF MORTISE IS NOT TO BE CENTERED.
- DRAW 2"-WIDE MORTISE CENTERED AT DISTANCE "A".



MORTISE LAYOUT

TENON LAYOUT

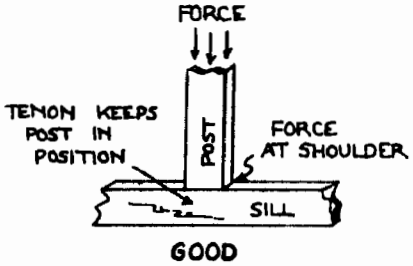
- MARK DISTANCES "S" AND S+4" FROM SHOULDER.
- DRAW SQUARING-OFF LINE 1.
- MARK DISTANCE "A" (SEE MORTISE LAYOUT).
- DRAW 2"-WIDE TENON CENTERED AT DISTANCE "A".



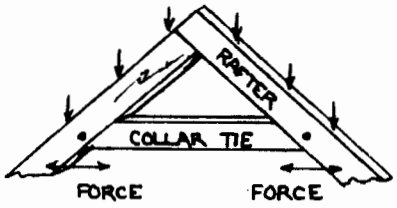
TENON LAYOUT

PEG HOLES

MARK AND DRILL INTO TIMBER WITH MORTISE, AS SHOWN IN UPPER DRAWING.



GOOD

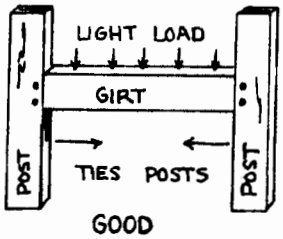


TIES AND SUPPORTS RAFTERS

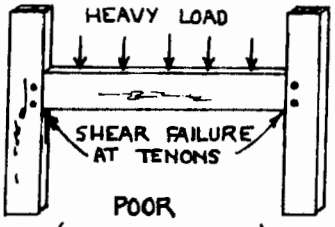
GOOD

LOCATIONS FOR JOINT

TO THE RIGHT IS AN ILLUSTRATION SHOWING LOCATIONS WHERE THE SIMPLE MORTISE AND TENON JOINT CAN BE USED AND WHERE IT IS NOT SUITABLE.



GOOD

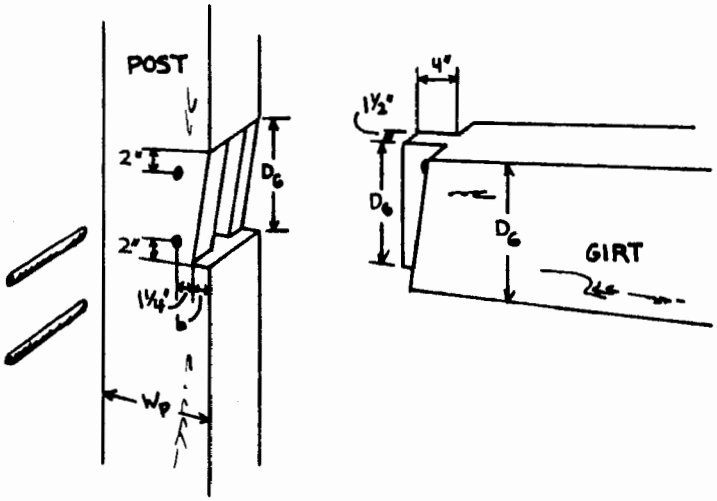


POOR

(USE SHOULDERED MORTISE & TENON)

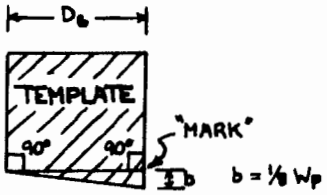
THE SHOULDERED MORTISE AND TENON

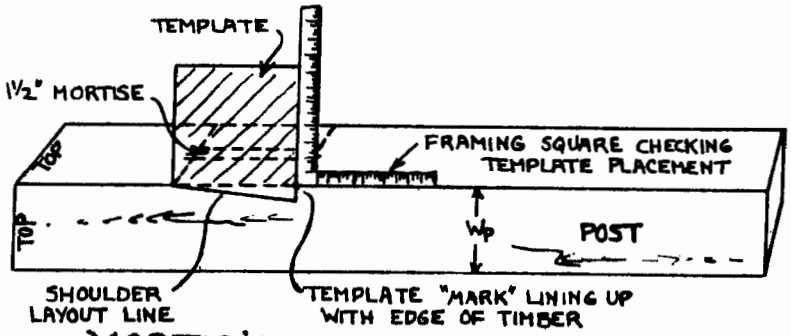
THE SHOULDERED MORTISE AND TENON JOINT SHOULD BE USED IN PLACE OF A SIMPLE MORTISE AND TENON WHEN THE GIRT IS BEARING A FULL FLOOR LOAD. THE SHOULDER BEARS MOST OF THE VERTICAL WEIGHT OF THE GIRT AND THE PEGGED TENON HOLDS THE JOINT TOGETHER.



MORTISE LAYOUT

- LAY OUT 1½"-WIDE MORTISE EITHER CENTERED OR PREDETERMINED DISTANCE FROM OUTSIDE.
- MAKE TEMPLATE AS SHOWN.
- PLACE TEMPLATE WITH "MARK" LINING UP WITH EDGE OF TIMBER. BE CERTAIN THAT TEMPLATE IS SQUARE WITH TIMBER.
- MARK SHOULDER LAYOUT LINE.
- PLACE TEMPLATE ON OPPOSITE SIDE OF TIMBER AND REPEAT.
- LOCATE PEG HOLES AS SHOWN ABOVE.

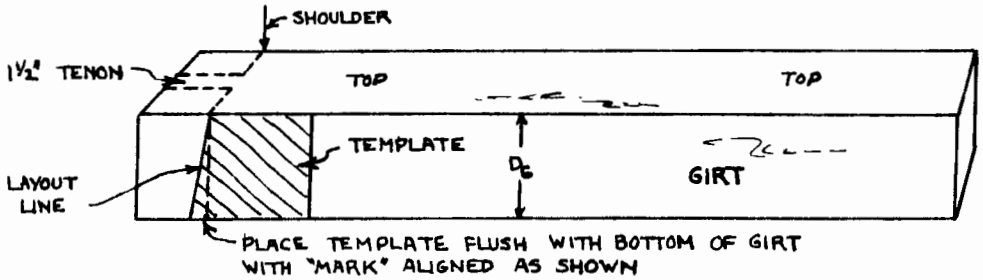




MORTISE LAYOUT

TENON LAYOUT

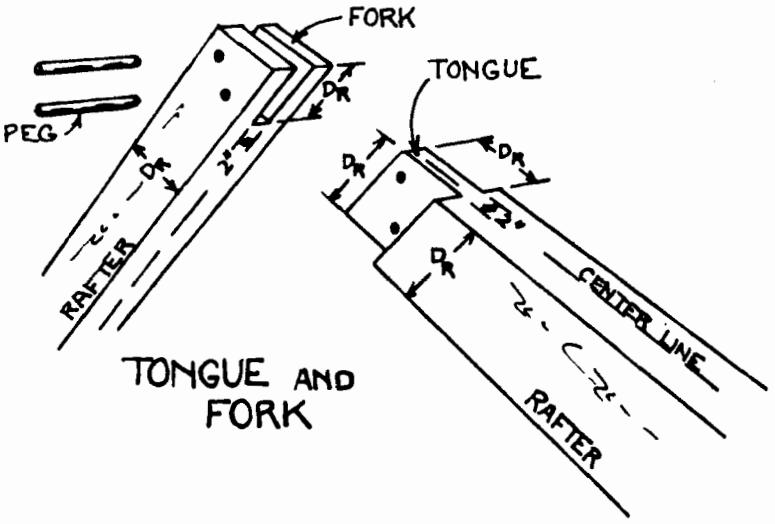
- LAY OUT 1½"-WIDE TENON EITHER CENTERED OR PREDETERMINED DISTANCE FROM THE OUTSIDE.
- PLACE TEMPLATE ON GIRT.
- DRAW SHOULDER LAYOUT LINE.
- PLACE ON OPPOSITE SIDE AND REPEAT.



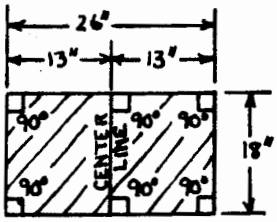
TENON LAYOUT

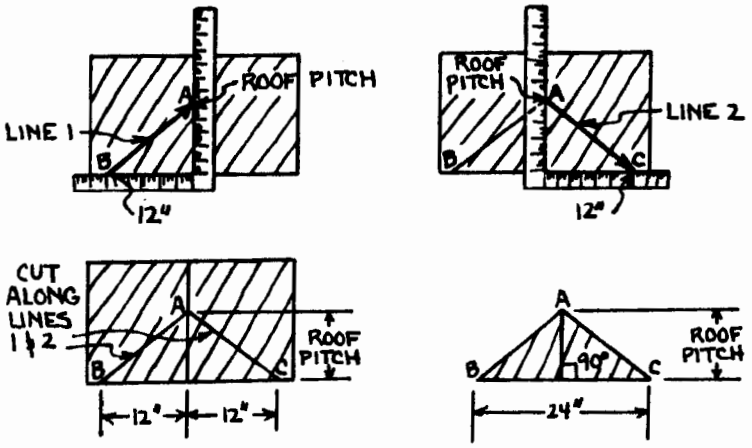
TONGUE AND FORK AT RAFTER PEAK

THE TONGUE-AND-FORK JOINT IS A METHOD OF JOINING RAFTERS WITHOUT USE OF A RIDGE POLE. THE ROOF PITCH MUST BE KNOWN TO LAY OUT THIS JOINT.



TONGUE AND FORK

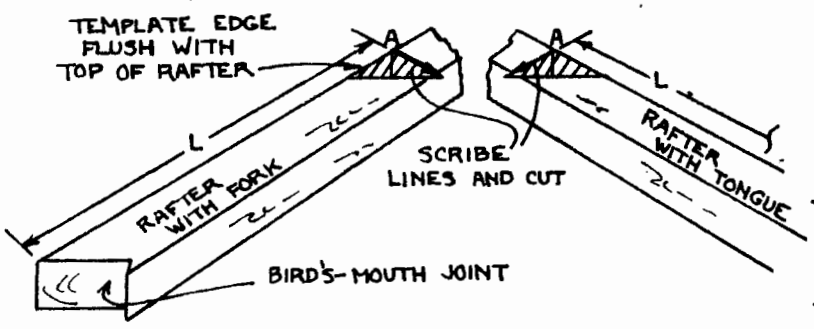


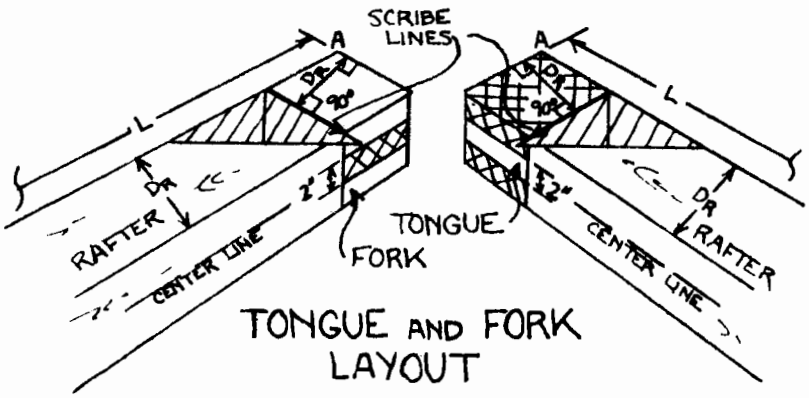


MAKING THE TEMPLATE

MAKING THE TEMPLATE

- CUT PLYWOOD RECTANGLE APPROX. 26" x 18". MAKE CERTAIN ALL RIGHT ANGLES ARE 90°. DRAW CENTER LINE AS SHOWN (LEFT).
- PLACE FRAMING SQUARE AS SHOWN TO CONSTRUCT LINES 1 AND 2 (LEFT).
- CUT ALONG LINES 1 AND 2 TO COMPLETE TEMPLATE. TEMPLATE SIMULATES ROOF PEAK WHERE POINT A IS PEAK OF RAFTERS.





TONGUE AND FORK LAYOUT

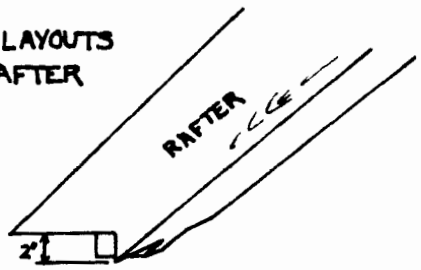
TONGUE AND FORK LAYOUT

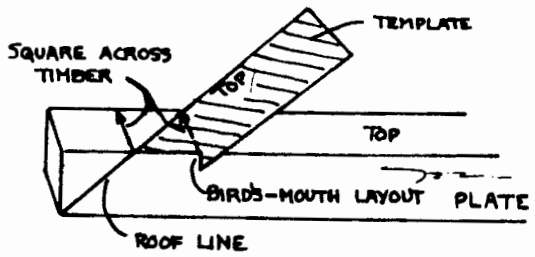
- AFTER RAFTER FEET BIRD'S MOUTH JOINTS HAVE BEEN CUT, MEASURE UP PREDETERMINED DISTANCE L AND MARK POINT A (LEFT).
- PLACE TEMPLATE ON RAFTER WITH POINT A ON RAFTER LINING UP WITH POINT A ON TEMPLATE. SCRIBE LINES AS SHOWN AT LEFT.
- REPEAT ON OPPOSITE SIDE OF RAFTER. CUT ALONG THESE LINES THUS CUTTING RAFTERS TO OVERALL LENGTH.
- SLIDE TEMPLATE DOWN RAFTER DISTANCE D_R. SCRIBE LINES. REPEAT ON OPPOSITE SIDE. THIS MARKS OUT AREA FOR TONGUE AND FORK JOINT.
- ON LEFT RAFTER, DRAW 2"-WIDE CENTERED MORTISE AS SHOWN.
- ON RIGHT RAFTER, DRAW 2"-WIDE CENTERED TONGUE (OR TENON).
- MARK AREA TO BE REMOVED.

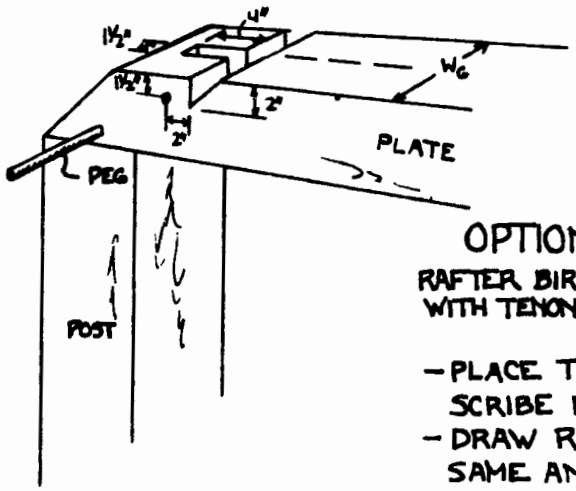
RAFTER FEET BIRD'S MOUTH JOINT.... CONT.

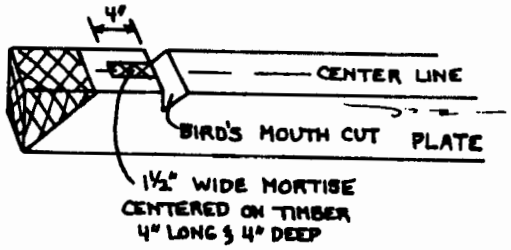
THE MORTISES

THE MORTISE LAYOUTS FOR THE FOUR RAFTER FEET FRAMING OPTIONS ARE ILLUSTRATED.





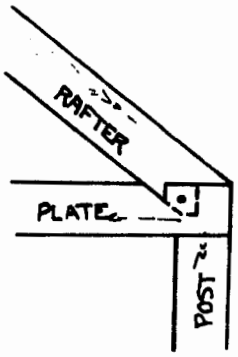




OPTION I

RAFTER BIRD'S MOUTH WITH TENON AT PLATE.

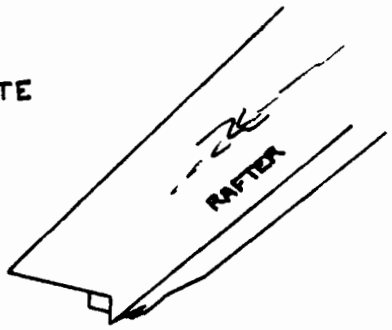
- PLACE TEMPLATE ON PLATE AS SHOWN ABOVE. SCRIBE BIRD'S-MOUTH NOTCH.
- DRAW ROOF LINE ACROSS PLATE. THIS LINE HAS THE SAME ANGLE AS THE "TOP" EDGE OF TEMPLATE.
- LAY OUT 1½"-WIDE MORTISE FROM BIRD'S-MOUTH AS SHOWN ABOVE.

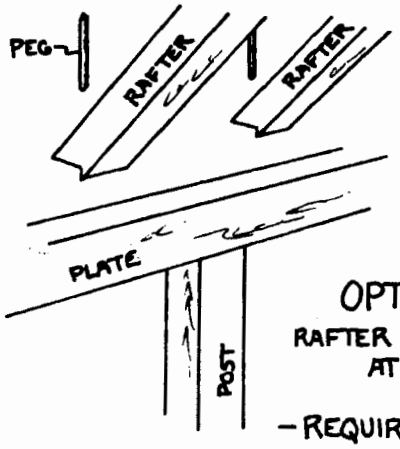


OPTION II

RAFTER BIRD'S MOUTH WITH TENON AT PLATE.

- LAYOUT IDENTICAL TO OPTION I EXCEPT PLATE END IS CUT SQUARE.

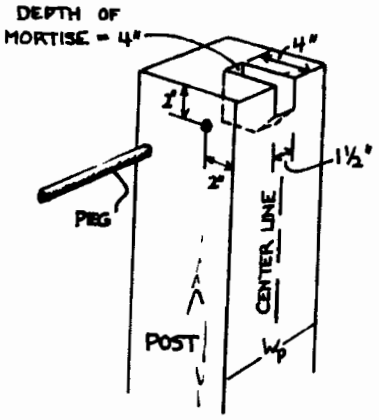




OPTION III

RAFTER BIRD'S-MOUTH AT PLATE.

- REQUIRES NO MORTISE FOR BIRD'S MOUTH OR TENON. RAFTERS ARE PEGGED TO PLATE.



OPTION IV

RAFTER BIRD'S MOUTH WITH TENON AT POST.

- REQUIRES 1½"-WIDE MORTISE AS ILLUSTRATED.