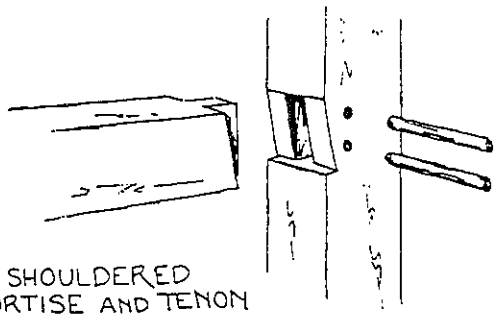
2004 June 21, Tuesday
Fairview College

TIMBER FRAMING TODAY

MASSIVE TIMBERS, SOME WEIGHING AS MUCH AS 500 POUNDS, ARE CUT AND FRAMED TOGETHER USING TIME-TESTED MORTISE AND TENON JOINTS. THESE TIMBERS, ONCE RAISED AND PEGGED INTO POSITION, FORM WHAT WE CALL A TIMBER FRAME. FOLLOWING ANCIENT TRADITION, NO NAILS OR METAL FASTENERS OF ANY TYPE ARE USED.



SHOULDERED MORTISE AND TENON

PLANNING

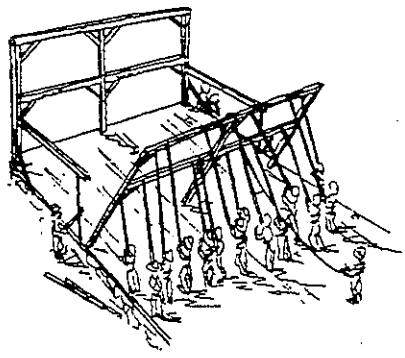
CAREFUL AND THOROUGH PLANNING IS VITAL FOR BUILDING WITH TIMBERS. THE ENTIRE FRAME, INCLUDING ALL JOINTS, MUST BE DESIGNED BEFORE ONE TIMBER IS CUT.

FRAMES PREPARED IN THE SHOP

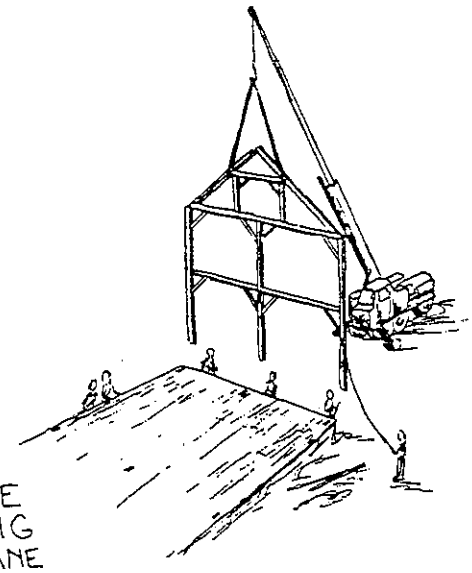
THE KEY TO SUCCESSFUL TIMBER FRAMING IS IN THE PRECUTTING OF THE TIMBERS. THE POSTS, BEAMS, AND BRACES ARE SAWED TO LENGTH AND THE MORTISES AND TENONS ARE DRILLED AND CUT. WHEN ALL THE TIMBERS ARE CUT, PLANED, SANDED, AND MARKED, THE FRAME IS READY FOR ASSEMBLY AT THE SITE.

HOW THE FRAMES ARE RAISED

AT THE BUILDING SITE, THE POSTS AND BEAMS ARE FITTED TOGETHER IN BENTS ON THE GROUND AND PEGGED. WHERE OUR FOREFATHERS USED MANY MEN, ROPES, POLES, AND PULLEYS, TODAY WE CAN USE A CRANE TO LIFT ONE ENTIRE BENT INTO PLACE AT A TIME. THESE ARE JOINED WITH CONNECTING TIMBERS, THEN PEGGED, AND THE FRAME IS COMPLETED.

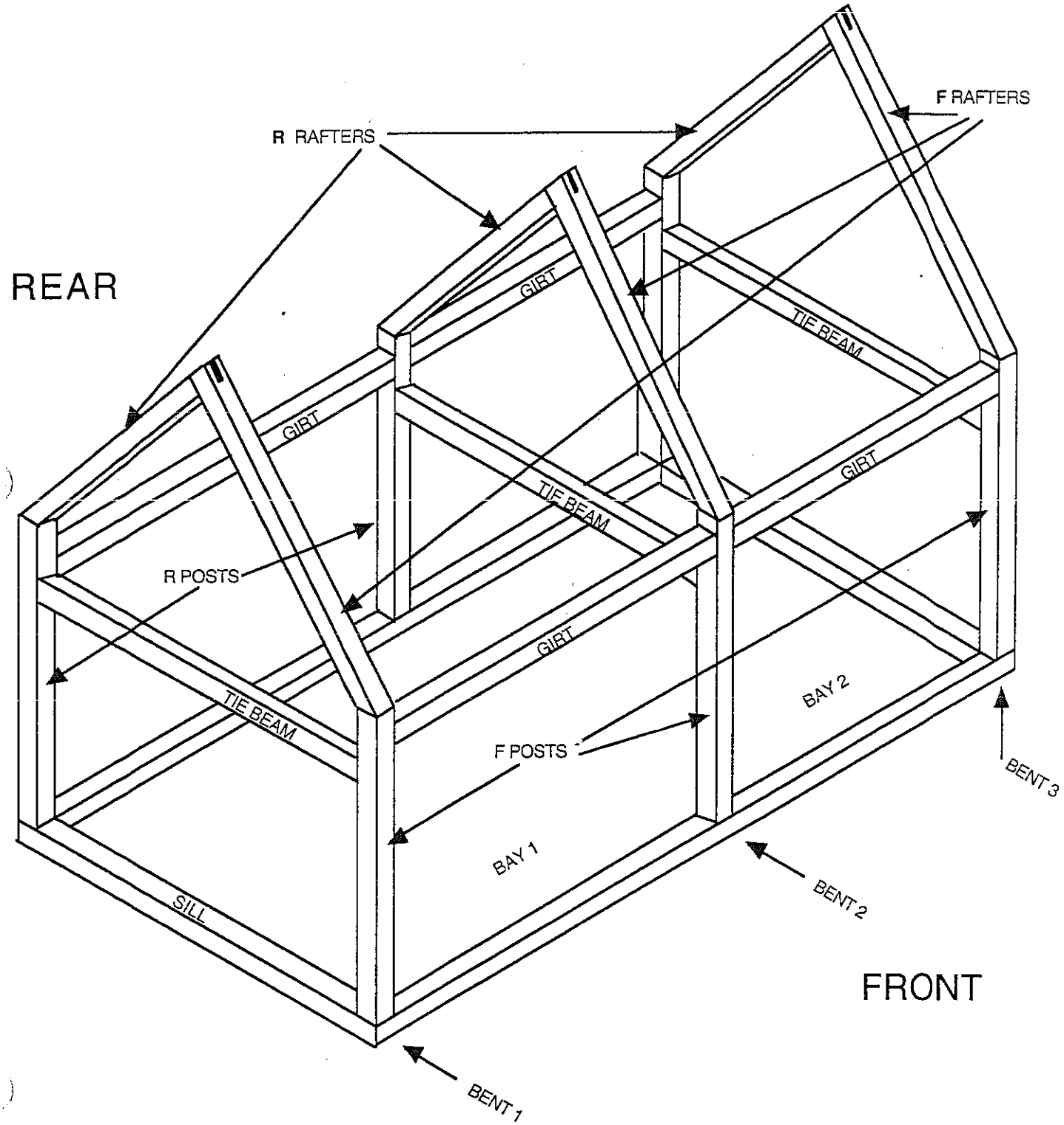


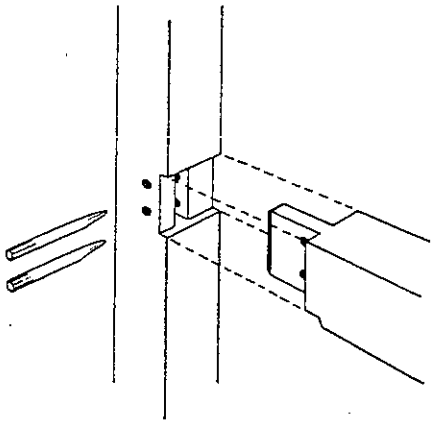
BARN RAISING BY HAND



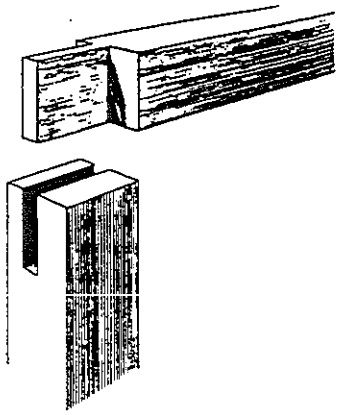
FRAME RAISING BY CRANE

SIMPLIFIED LAYOUT; NO BRACES, PURLINS OR COLLAR BEAMS SHOWN

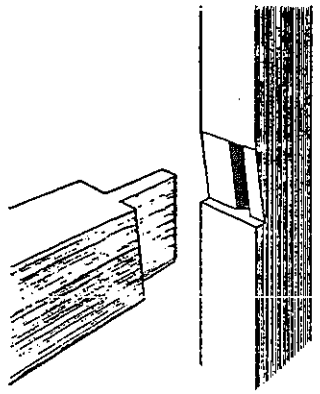




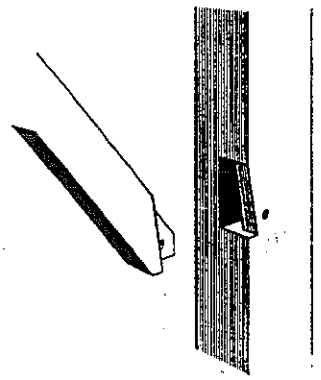
The mortise and tenon joint



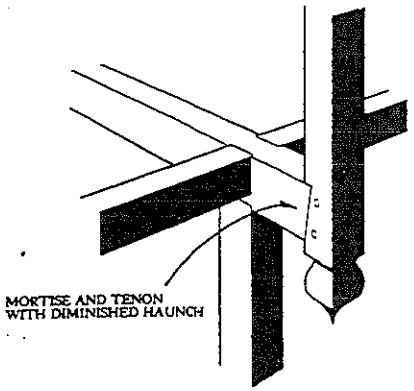
The open mortise and tenon



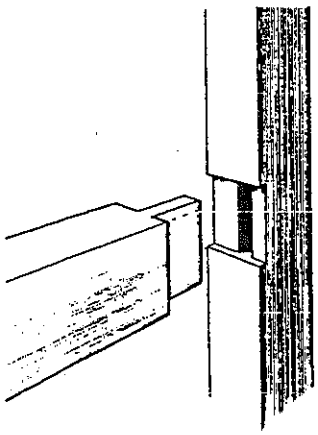
Mortise and tenon with diminished haunch



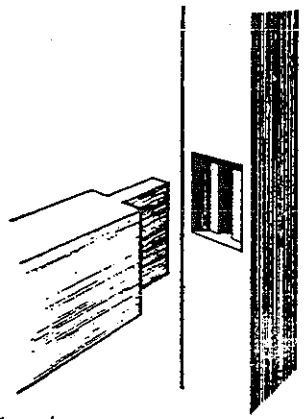
Mortise and tenon with diminished haunch used for brace



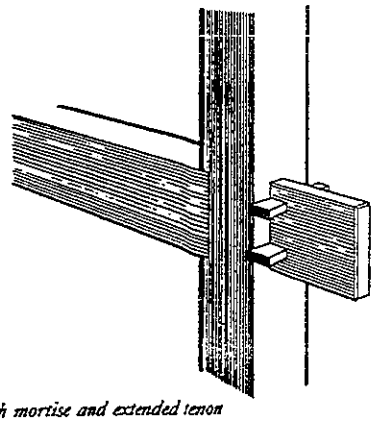
Mortise and tenon with diminished haunch used to support jettied post.



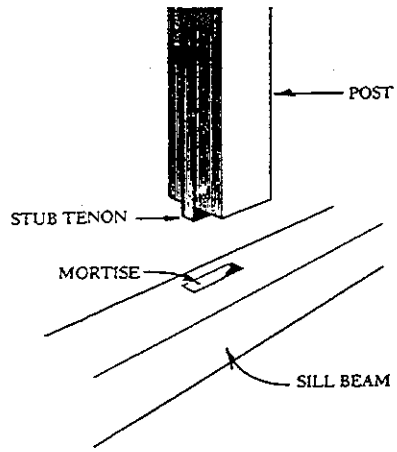
Through mortise and tenon with shoulders. The mortise is cut entirely through the timber.



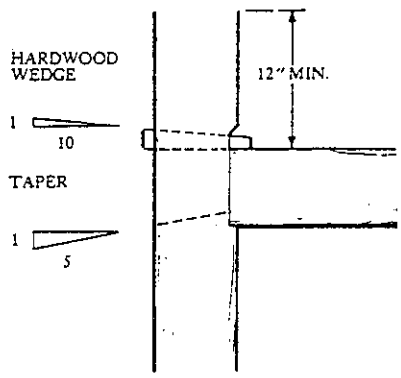
Housed mortise and tenon



Through mortise and extended tenon



Stub mortise and tenon



The joint is strongest if the wedge is driven in the direction shown and the timber extends beyond the joint a minimum of 12 inches.

Index

Schedule, Introduction

TIMBER SELECTION

Criteria Look for the Natural Crown (Curve)
Look at Knots with relation to the placement of notches
Select faces relating them to the inside of the structure

Place timber on saw horses or blocks and determine outside face or faces on timber. Use the above criteria as a guide. When doing girts and beams, it makes no difference which end is started first.

All knee braces mortises are done last.

All layout measurements should be checked twice before cutting begins. All timbers **must** be approved for cutting by an instructor.

Rafters are the most difficult frame members.
Posts are sometimes equally difficult.
Please ask for further explanations before beginning.

All measurements are taken from the outside face of timbers. This leaves the outside of the building flush and puts any variations to the inside.

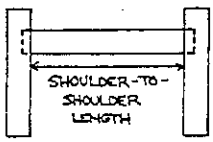
All measurements should be made precisely and accurately. There is no need to hurry your work. Please ask for assistance at any time and do not hesitate to ask questions, no matter how simple they seem.

The tools are very sharp - **PLEASE BE CAREFUL.**

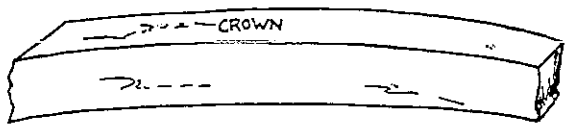
Try to identify other participants who are working on the same bent and work together. Good luck and enjoy yourself!

TIMBER LAYOUT
THE FIRST STEPS

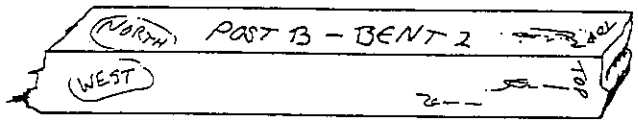
1) PLACE TIMBER ON A PAIR OF STURDY SAWHORSES.
2) DETERMINE CROWN OF TIMBER. FOR HORIZONTAL FRAME MEMBERS, CROWN SHOULD BE POSITIONED ON TOP (FIG. A).
3) DECIDE WHICH SIDE(S) OF TIMBER YOU WISH TO BE VISIBLE IN THE ROOM AND THOSE WHICH WILL NOT BE SEEN.
4) LABEL TIMBER WITH LUMBER CRAYON WITH "CROWN", "OUTSIDE FACE", "POST", "GIRT," ETC. AND LOCATION IN FRAME (FIG. B).
5) SQUARE OFF ONE END OF TIMBER USING A FRAMING SQUARE. THE FRAMING SQUARE IS HELD AGAINST ONE EDGE OF TIMBER AS SHOWN (FIG. C) AND LINE IS DRAWN. FRAMING SQUARE IS THEN MOVED TO NEXT EDGE AND LINE IS CONTINUED DOWN NEXT SIDE. BY CONTINUING THIS PROCESS, A CONNECTING LINE IS FORMED THAT MEETS AT THE ENDS (FIG. C, LINES 1,2,3,4).
6) CUT OFF END ALONG SQUARING-OFF LINE.
7) MEASURE FROM CUT END THE OVERALL LENGTH AND MARK ON OPPOSITE END (FIG. C).
8) SQUARE OFF AND CUT THIS END. THE TIMBER NOW IS CUT TO OVERALL LENGTH WITH SQUARED ENDS (FIG. D).
9) LAY OUT FIRST TENON FROM ONE END. THIS WILL LOCATE THE FIRST SHOULDER (FIG. E). SQUARE LINE AROUND TIMBER AT SHOULDER.
10) MEASURE FROM 1ST SHOULDER THE SHOULDER-TO-SHOULDER LENGTH ⅛ MARK. (IT MAY BE EASIER DOING THIS AFTER 1ST TENON HAS BEEN CUT.) SQUARE LINE AROUND TIMBER AT 2ND SHOULDER (FIG. E).
11) THE <u>SHOULDER-TO-SHOULDER LENGTH</u> IS THE CLEAR SPAN OF THE TIMBER BETWEEN THE TIMBERS IT CONNECTS.



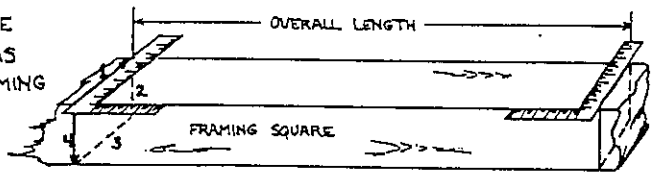
12) THE <u>TENON LENGTHS</u> ARE DETERMINED FROM THE TYPE OF JOINT DESIRED.
13) THE <u>OVERALL LENGTH</u> INCLUDES SHOULDER-TO-SHOULDER LENGTH PLUS LENGTH OF BOTH TENONS (FIG. F).
14) MORTISES ARE THEN LAID OUT, MEASURING FROM ONE OF THE SHOULDERS. A FRAMING SQUARE IS AGAIN USED (FIG. G). (DETAILS FOR LAYING OUT DIFFERENT JOINTS ARE GIVEN LATER.)



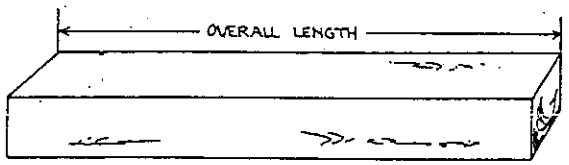
A—LOCATE CROWN UP (EXAGGERATED VIEW)



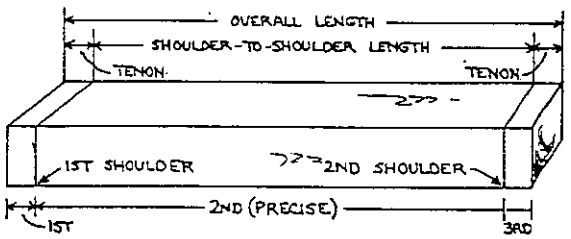
B—LABELING TIMBERS



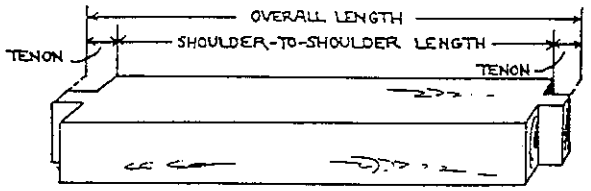
C—SQUARING OFF ENDS



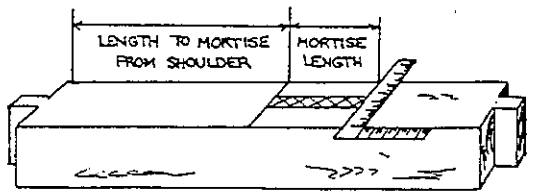
D—TIMBER WITH ENDS SQUARED OFF AND CUT TO OVERALL LENGTH



E—ORDER OF LAYING OUT TENONS AT ENDS OF TIMBER



F—TIMBER WITH END TENONS CUT



G—LOCATING MORTISE

Bent 1 * Tie Beam -3-

General: Tie Beams are the connecting members across the Bent.

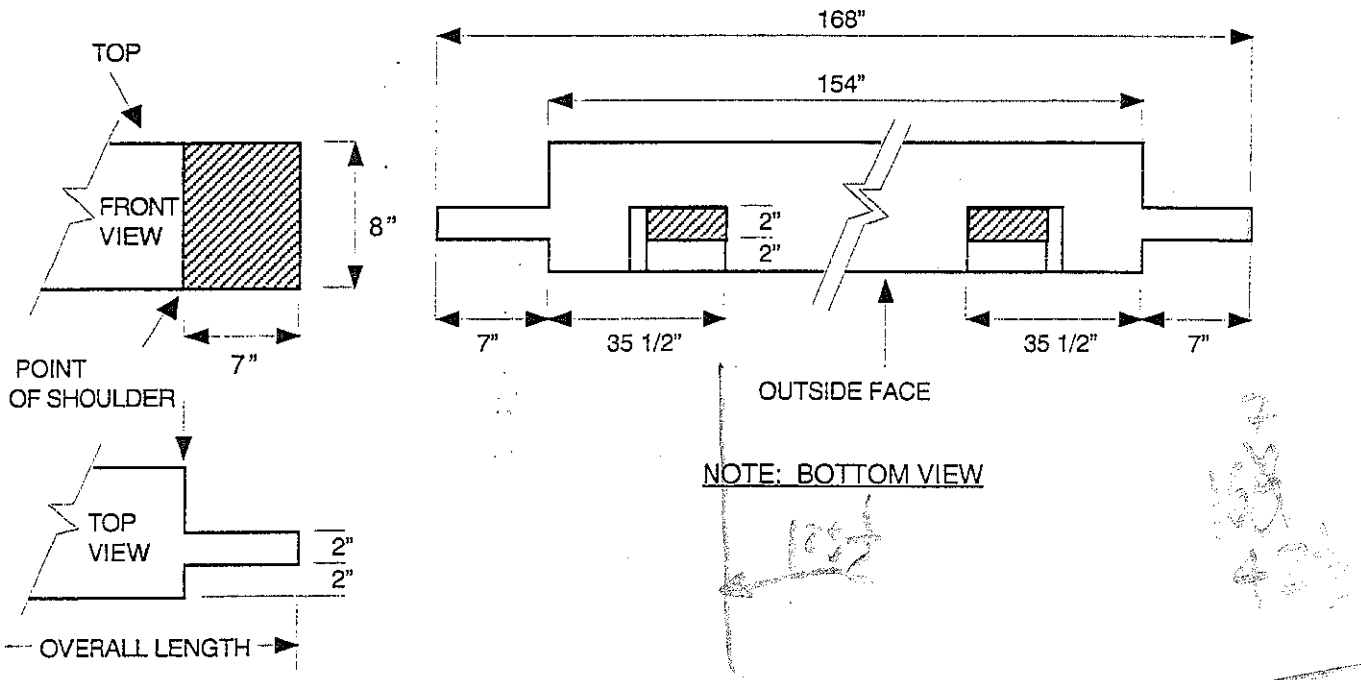
Material for this timber is 8"x 8". Total number of notches is 4
Total overall length is 168". The CROWN of this timber should be UP.

Procedure: Square one end of the timber.
Determine and mark the OUTSIDE FACE. Mark the Bottom
After marking all notches, measure overall length and square the other end.

Tenons: One 2" x 8" x 7" long shouldered tenon on each end. These tenons are located 2" in from the OUTSIDE FACE.
See drawings below.

Mortises: Two knee brace mortises are located on the bottom, in line with each tenon. These mortises are measured from the tenon shoulder, and 2" in from the outside face.

Refer to the Knee Brace Drawings for additional details.



*** *Remember - Ask for explanations at anytime*
*** *Check to see who else might be working on a similar timber*
*** *Have your layout and measurements checked before cutting*
*** *Look for demo notches in the shop*

Bent 2 * Tie Beam

General: Tie Beams are the connecting members across the Bent.

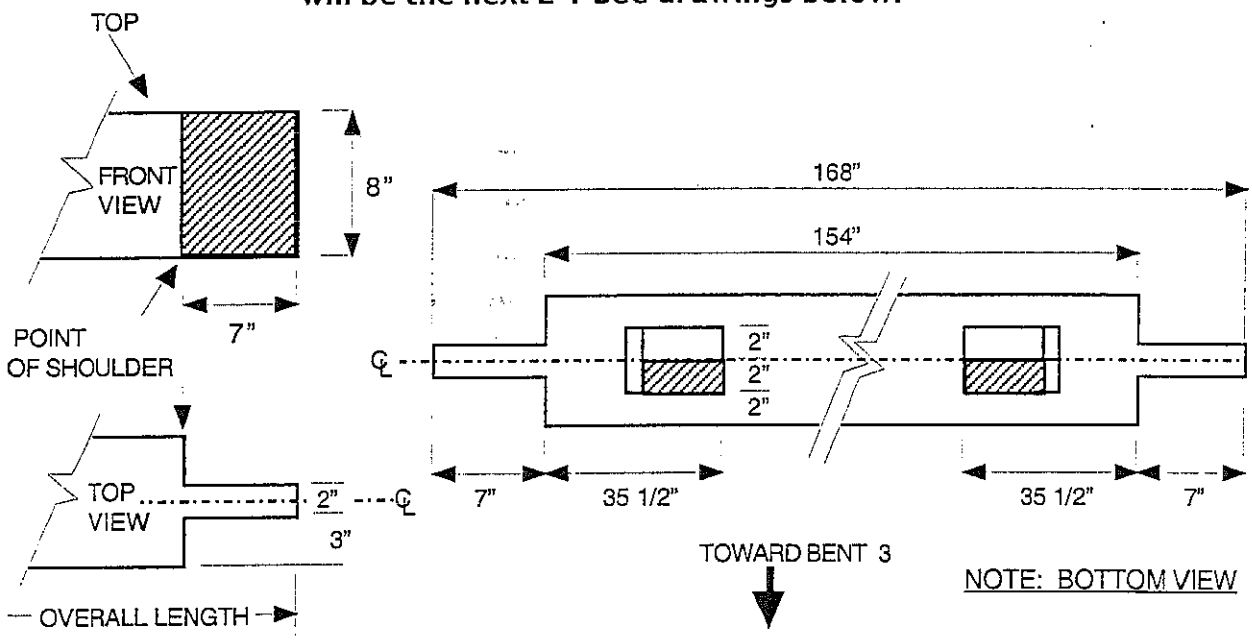
Material for this timber is 8" x 8". Total number of notches in this beam is 4. Total overall length is 168". The CROWN of this timber should be UP, and marked as TOP.

Procedure: Square one end of the timber. Determine and mark the OUTSIDE FACE. Mark the BOTTOM.
After marking all notches, measure overall length and square the other end.

Tenons: One 2" x 8" x 7" long shouldered tenon is on each end and is CENTERED in the middle of the beam. See drawings below.

Mortises: There is a corresponding Knee Brace Mortise for each tenon. These mortises are IN LINE with the tenon and centered on the bottom of the tie beam. The mortise is measured from the tenon shoulder.

* Note: The knee brace mortise is located towards Bent 3. * On the bottom, measure in 2" from the Bent 3 side of the tie beam. The deep mortise will be the next 2", and the 1/2" pocket will be the next 2". See drawings below.



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Bent 3 * Tie Beam

General: Tie Beams are the connecting members across the Bent.

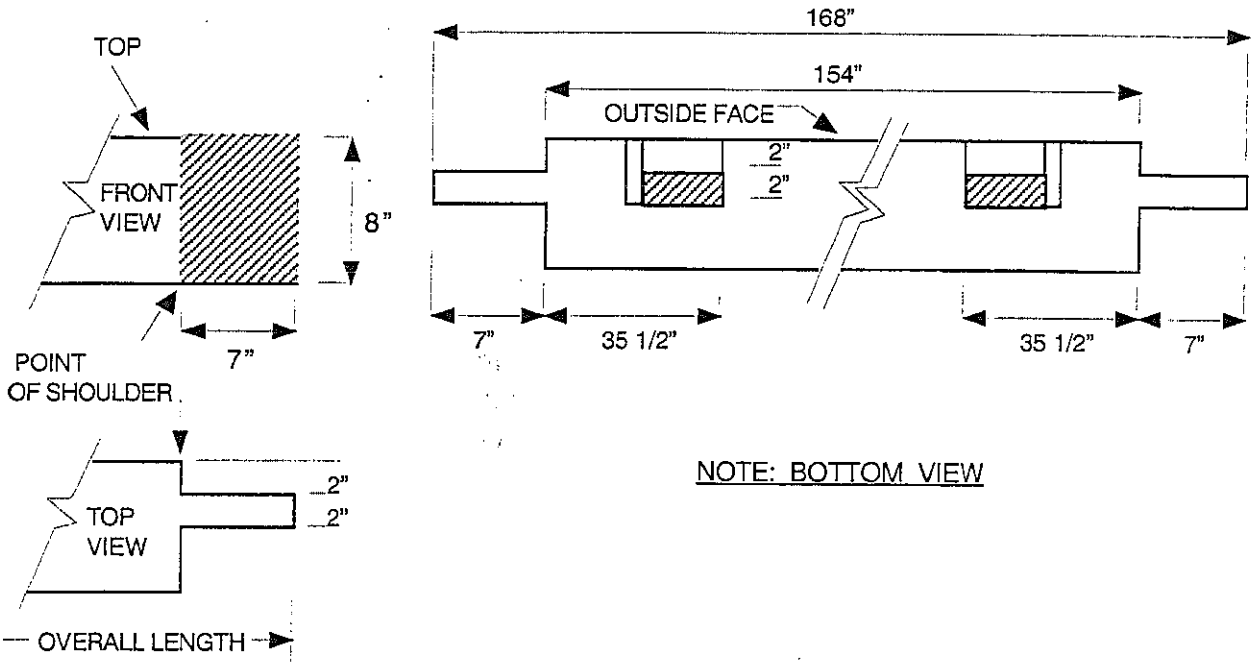
Material for this timber is 8" x 8". Total number of notches is 4. Total overall length is 168". The CROWN of this timber should be UP.

Procedure: Square one end of the timber.
Determine and mark the OUTSIDE FACE. Mark the BOTTOM.
After marking all notches, measure overall length and square the other end.

Tenons: One 2" x 8" x 7" long shouldered tenon on each end. These tenons are located 2" in from the OUTSIDE FACE.
See drawings below.

Mortises: Two knee brace mortises are located on the bottom, in line with each tenon. These mortises are measured from the tenon shoulder, and 2" in from the OUTSIDE FACE.

Refer to the Knee Brace Drawings for additional details.



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*** *Look for demo notches in the shop*

Bent 1 * Rafter F

General: The rafter is the main roof supporting timber, and is on top of the bent posts.

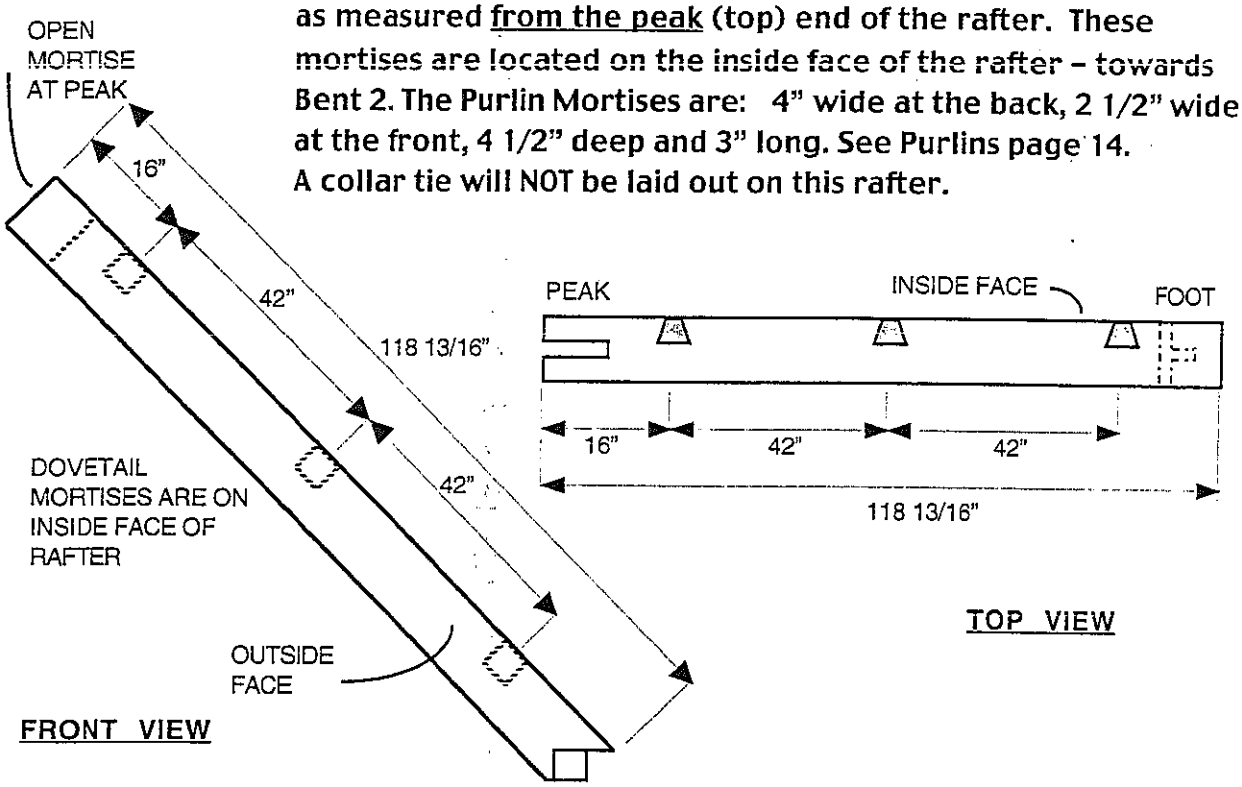
Material for the posts is 8" x8". Total number of notches for this timber is 6. Total overall length is approx. 118 13/16"
The CROWN of this timber should be UP, and marked as TOP

Procedure: Determine and mark OUTSIDE FACE. Square the PEAK end of the Rafter. After marking the notches, measure overall length and layout the FOOT of the rafter.

Tenons: A shouldered tenon is at the foot end of the rafter. The tenon is 2" wide, and 4" long located in the center of the timber.
See Rafter Foot Tenon drawing.

Mortises: One 2" x 8" open mortise is at the peak end of the rafter and is located in the center of the timber.
As the roof pitch is 12/12, the top cut is at 90 degrees.

Three dovetail purlin mortises are centered at 16", 58", and 100" as measured from the peak (top) end of the rafter. These mortises are located on the inside face of the rafter – towards Bent 2. The Purlin Mortises are: 4" wide at the back, 2 1/2" wide at the front, 4 1/2" deep and 3" long. See Purlins page 14.
A collar tie will NOT be laid out on this rafter.



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*** *Look for demo notches in the shop*

Bent 1 * Rafter R

General: The rafter is the main roof supporting timber, and is on top of the bent posts.

Material for the posts is 8" x 8". Total number of notches for this timber is 6. Total overall lengths is approx. 118 13/16"
The CROWN of this timer should be UP, and marked as TOP.

Procedure: Determine and mark OUTSIDE FACE. Square the PEAK end of the rafter. After marking the notches, measure overall length and layout the FOOT of the rafter.

Tenons: A shouldered tenon is at the foot end of the rafter. The tenon is 2" wide, 4" long located in the center of the timber. See Rafter Foot Tenon drawing.

Tenons: One 2" x 8" tenon is at the PEAK end of the rafter and is centered on the timber. As the roof pitch is 12/12 , the top cut is at 90 degrees.

Three dovetail purlin mortises are centered at 16", 58", and 100" as measured from the peak (top) end of the rafter. These mortises are located on the inside face of the rafter - towards Bent 2. The Purlin Mortises are: 4" wide at the back, 2 1/2" wide at the front, 4 1/2" deep and 3" long.
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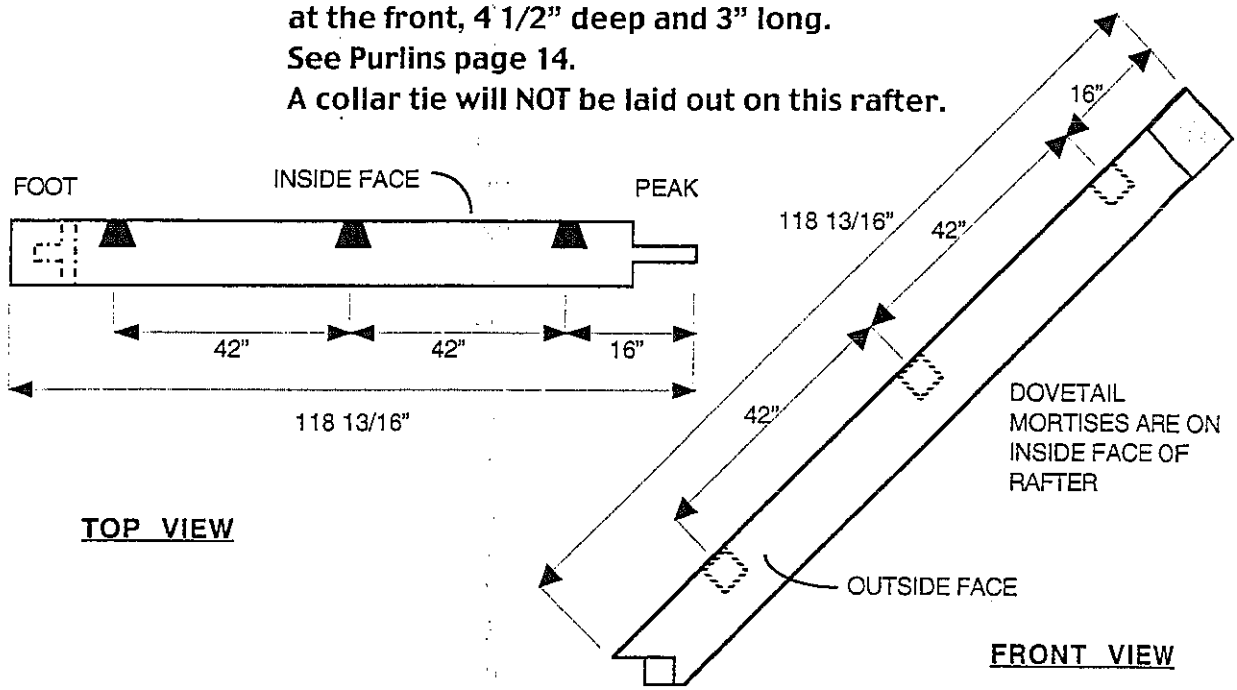
A collar tie will NOT be laid out on this rafter.



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*** *Look for demo notches in the shop*

Bent 2 * Rafter F

General: The rafter is the main roof supporting timber, and is on top of the bent posts.

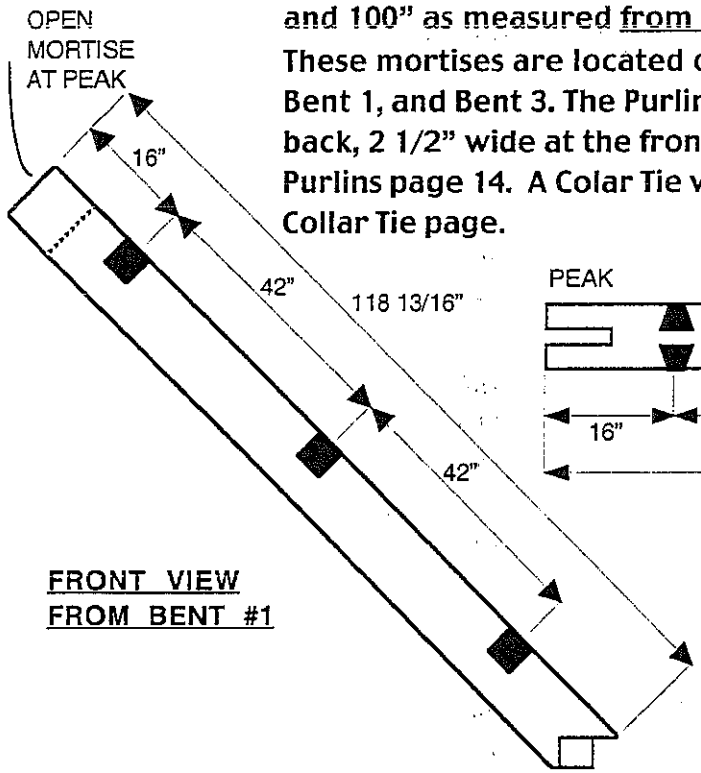
Material for the posts is 8" x 8". Total number of notches for this timber is 8 (9). Total overall length is approx. 118 13/16".
The CROWN of this timber should be UP, and marked as TOP.

Procedure: Square the PEAK end of the rafter. After marking the notches, measure overall length and layout the FOOT of the rafter.

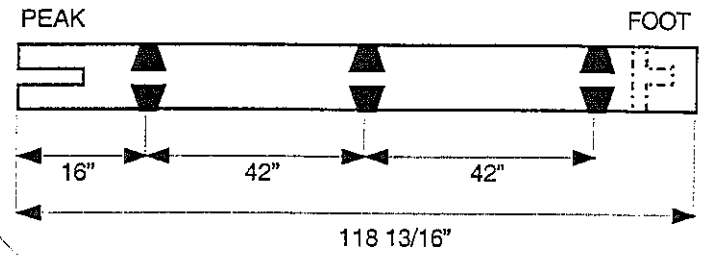
Tenons: A Shouldered tenon is at the foot end of the rafter. The tenon is 2" wide, 4" long and located in the center of the timber. See Rafter Foot Tenon drawing.

Mortises: One 2" x 8" Open Mortise is at the PEAK end of the rafter and is located in the center of the timber. As the roof pitch is 12/12, the top cut is at 90 degrees.

Three pairs of dovetail purlin mortises are centered at 16", 58", and 100" as measured from the peak (top) end of the rafter. These mortises are located on both sides of the rafter –towards Bent 1, and Bent 3. The Purlin Mortises are : 4" wide at the back, 2 1/2" wide at the front, 4 1/2" deep and 3" long. See Purlins page 14. A Colar Tie will be laid out on this rafter. See Collar Tie page.



FRONT VIEW
FROM BENT #1



TOP VIEW

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*** *Check to see who else might be working on a similar timber*
*** *Have your layout and measurements checked before cutting*
*** *Look for demo notches in the shop*

Bent 2 * Rafter R

General: The rafter is the main roof supporting timber, and is on the top of the bent posts.

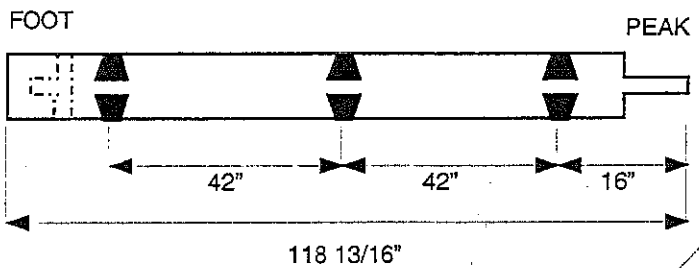
Material for the posts is 8" x 8". Total number of notches for this timber is 8 (9). Total overall length is approx. 118 13/16".
The CROWN of this timber should be UP, and marked as TOP.

Procedure: Square the PEAK end of the rafter. After marking the notches, measure overall length and layout the FOOT of the rafter.

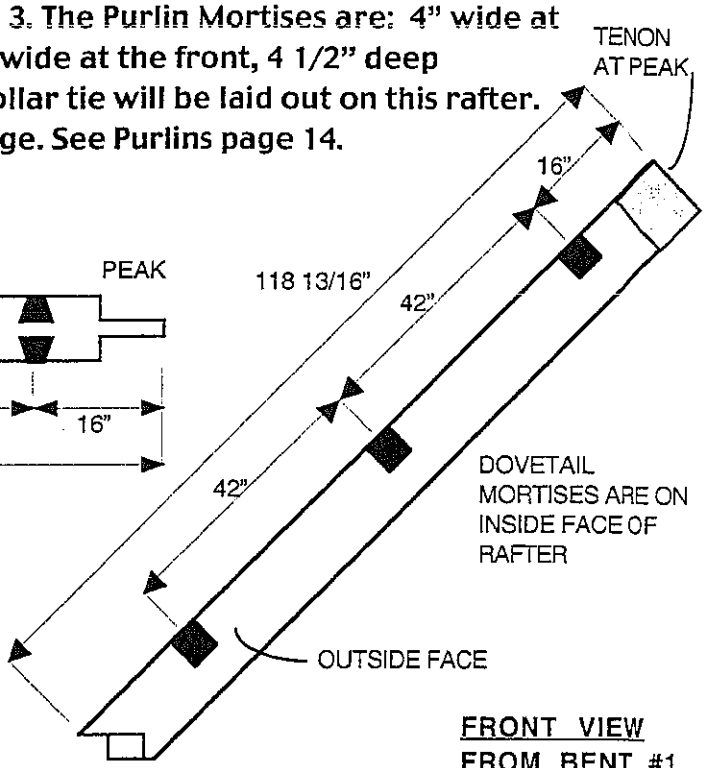
Tenons: A shouldered tenon is at the foot end of the rafter. The tenon is 2" wide, 4" long and centered on the timber. See Rafter Foot Tenon drawing.

Tenons: One 2" x 8" Tenon is at the PEAK (top) end of the rafter and is centered on the timber. As the roof pitch is 12/12, the top cut is at 90 degrees.

Three pairs of dovetail purlin mortises are centered at 16", 58", and 100" as measured from the peak (top) end of the rafter. These mortises are located on both sides of the rafter – towards Bent 1, and Bent 3. The Purlin Mortises are: 4" wide at the back, 2 1/2" wide at the front, 4 1/2" deep and 3" long. A Collar tie will be laid out on this rafter. See Collar Tie page. See Purlins page 14.



TOP VIEW



FRONT VIEW FROM BENT #1

*** *Remember - Ask for explanations at anytime*
*** *Check to see who else might be working on a similar timber*
*** *Have your layout and measurements checked before cutting*
*** *Look for demo notches in the shop*

Bent 3 * Rafter F

General: The rafter is the main roof supporting timber, and is on top of the bent posts.

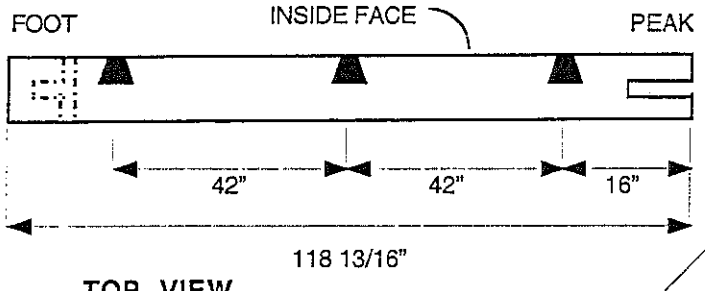
Material for the posts is 8" x 8". Total number of notches for this timber is 6. Total overall length is approx. 118 13/16".
The CROWN of this timber should be UP, and marked as TOP.

Procedure: Determine and mark OUTSIDE FACE. Square the PEAK end of the Rafter. After marking the notches, measure overall length and layout the FOOT of the rafter.

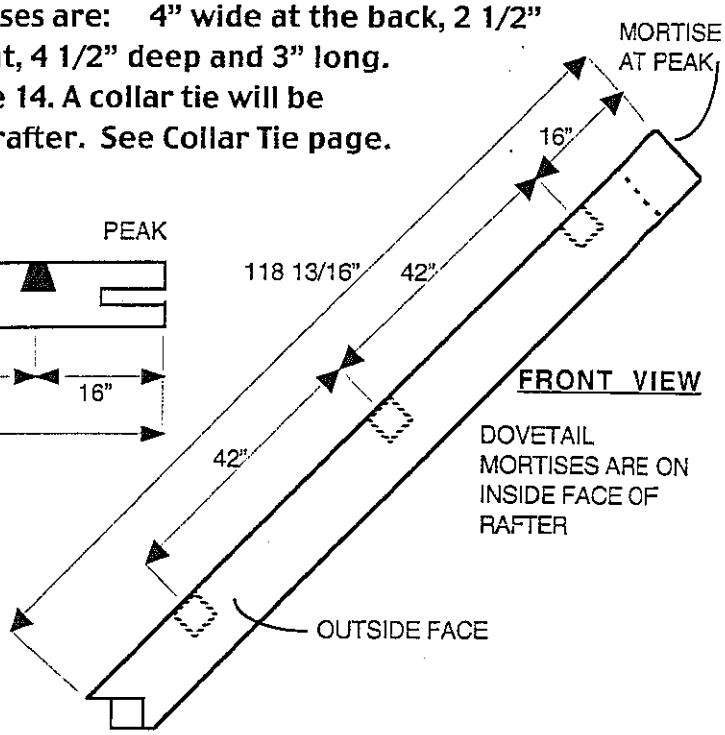
Tenons: A shouldered tenon is on the foot end of the rafter. The tenon is 2" wide and 4" long, centered on the timber. See Rafter Foot Tenon drawing.

Mortises: One 2" x 8" Open mortise is at the PEAK end of the rafter and is centered on the timber. As the roof pitch is 12/12, the top cut is at 90 degrees.

Three purlin dovetail mortises are centered at 16", 58", and 100" as measured from the peak end of the rafter. These mortises are located on the inside face of the rafter – towards Bent 2. The Purlin Mortises are: 4" wide at the back, 2 1/2" wide at the front, 4 1/2" deep and 3" long. See Purlins page 14. A collar tie will be laid out on this rafter. See Collar Tie page.



TOP VIEW



FRONT VIEW

DOVETAIL MORTISES ARE ON INSIDE FACE OF RAFTER

*** *Remember - Ask for explanations at anytime*
*** *Check to see who else might be working on a similar timber*
*** *Have your layout and measurements checked before cutting*
*** *Look for demo notches in the shop*

Bent 3 * Rafter R

General: The rafter is the main roof supporting timber, and is on top of the bent posts.

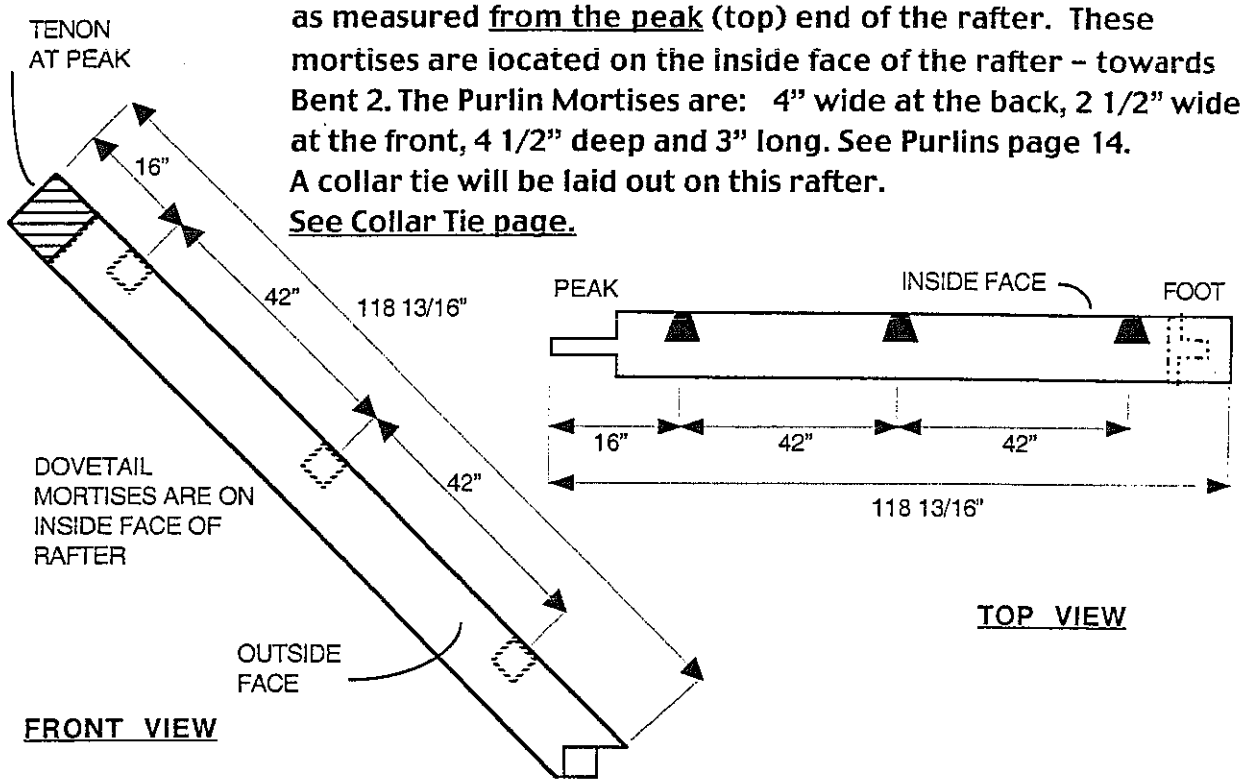
Material for the posts is 8" x 8". Total number of notches for this timber is 6. Total overall length is approx. 118 13/16".
The CROWN of this timber should be UP, and marked as TOP.

Procedure: Determine and mark OUTSIDE FACE. Square the PEAK end of the rafter. After marking the notches, measure overall length and layout the FOOT of the rafter.

Tenons: A shouldered tenon is on the foot end of the rafter. The tenon is 2" wide, 4" long and centered on the timber. See Rafter Foot Tenon drawing.

Tenons: One 2" x 8" Tenon is at the PEAK end of the rafter and is centered on the timber. As the roof pitch is 12/12, the top cut is at 90 degrees.

Three dovetail purlin mortises are centered at 16", 58", and 100" as measured from the peak (top) end of the rafter. These mortises are located on the inside face of the rafter – towards Bent 2. The Purlin Mortises are: 4" wide at the back, 2 1/2" wide at the front, 4 1/2" deep and 3" long. See Purlins page 14.
A collar tie will be laid out on this rafter.
See Collar Tie page.



*** *Remember - Ask for explanations at anytime*
*** *Check to see who else might be working on a similar timber*
*** *Have your layout and measurements checked before cutting*
*** *Look for demo notches in the shop*

Girts

General: Girts are connecting members of the frame that join Bents.

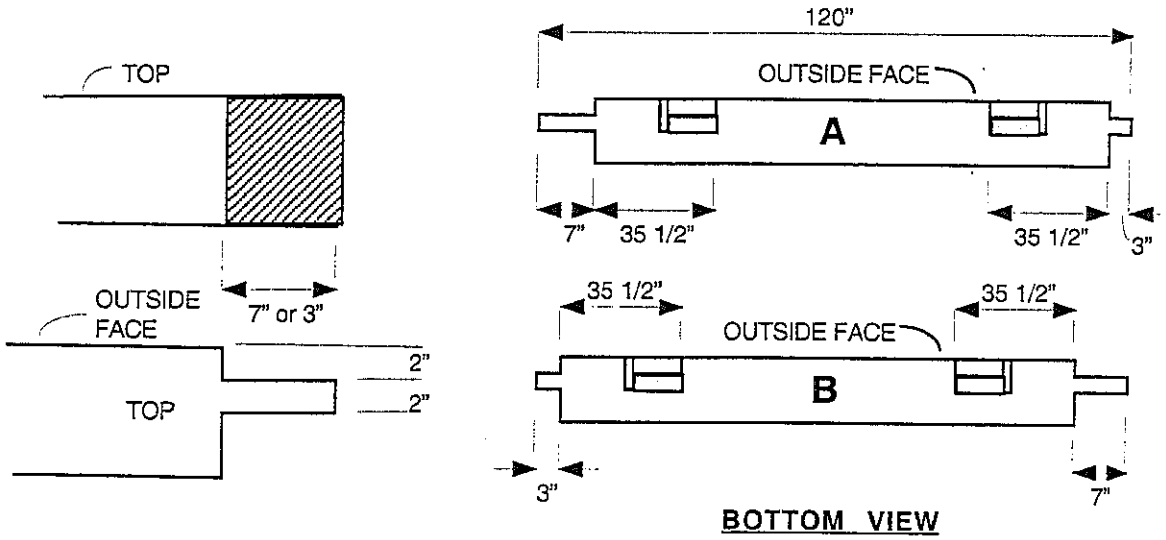
Material for this timber is 8" x 8". Total number of notches in the Girt is 4. Total overall length is 120".
The CROWN of this timber should be UP, and marked as TOP.

Procedure: Square one end of the timber. Determine and mark the OUTSIDE FACE. Mark the Bottom.
After marking all the notches, measure overall length and square the other end.

Tenons: One shouldered tenon 2" x 8" x 7" long on one end of the timber. One shouldered (stub) tenon 2" x 8" x 3" long on the other end of the timber.

Both tenons are 2" in from the Outside Face . See drawings below.

Mortises: Two Knee Brace mortises are 35 1/2" measured in from tenon shoulder, and located on the bottom, 2" in from Outside Face. See Knee Brace mortises page.



BOTTOM VIEW

GIRT A – TWO PIECES, ONE FOR BAY 1 FRONT AND ONE FOR BAY 2 REAR

GIRT B – TWO PIECES, ONE FOR BAY 2 FRONT AND ONE FOR BAY 1 REAR

*** *Remember - Ask for explanations at anytime*
*** *Check to see who else might be working on a similar timber*
*** *Have your layout and measurements checked before cutting*
*** *Look for demo notches in the shop*

Sills (OPTIONAL)

Side Sills

Using an 8" x 8" timber, cut and square to 132" overall length. Lay out the SCARF as follows:

On one end, measure 2" down from the top of the timber. From this same end, measure 24" back along the top and mark. Now, measure down 6" and mark. Connect this point back to the 2" mark on the end and finish by squaring off the other 2" down to the bottom of the timber. Accurately transfer and layout the notch on the other side of timber and proceed with the notch, See drawings.

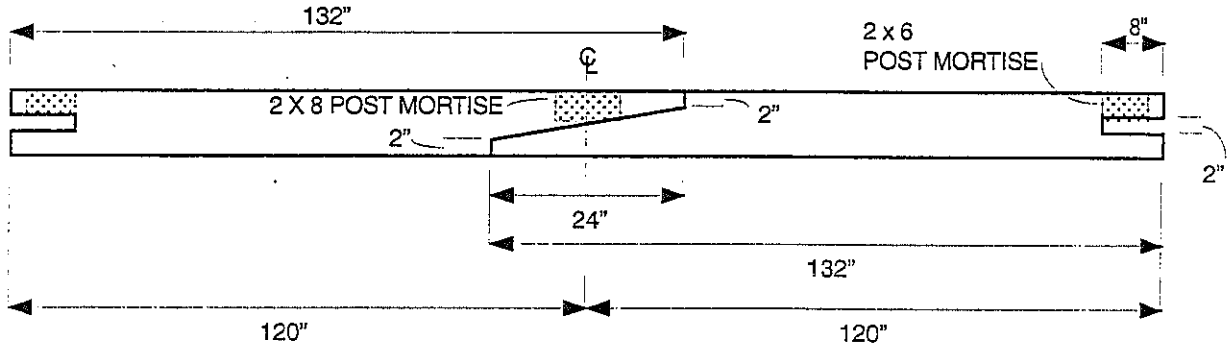
Mortises:

One 2" Open Mortise is required on each end of sill, 8" long centered on the timber, and from side to side.

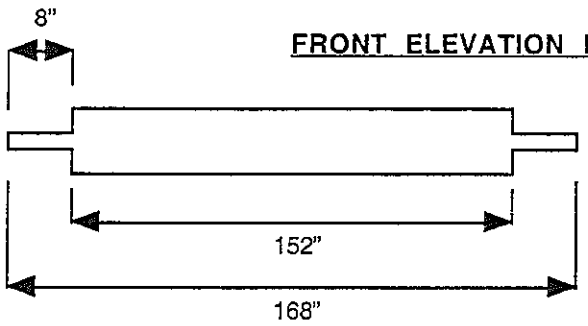
Three Sill mortises are required, to seat the posts. These are of different sizes. See Sill Mortise drawing.

End Sills:

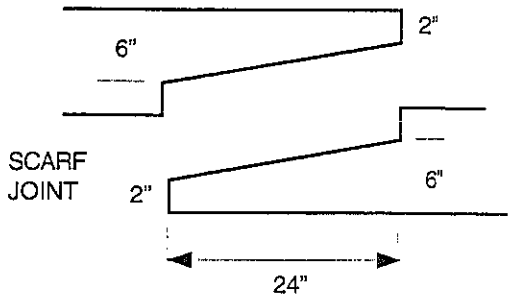
Using an 8" x 8" timber, cut and square both ends to 168" overall length. Cut a 2" tenon that is 8" long on each end of the side sill. This tenon is located in the center of the timber, as shown below.



FRONT ELEVATION FRONT AND BACK SILLS



END SILL



*** *Remember - Ask for explanations at anytime*

*** *Check to see who else might be working on a similar timber*

*** *Have your layout and measurements checked before cutting*

*** *Look for demo notches in the shop*

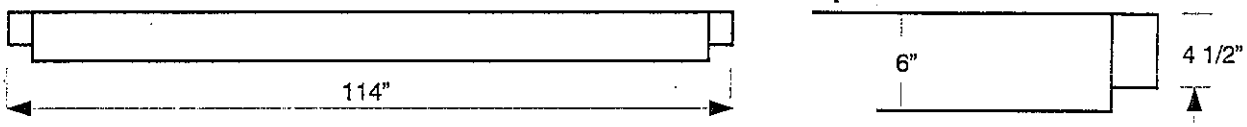
Purlins

General: Purlins are the horizontal roof framing members which span the rafters between the bents.

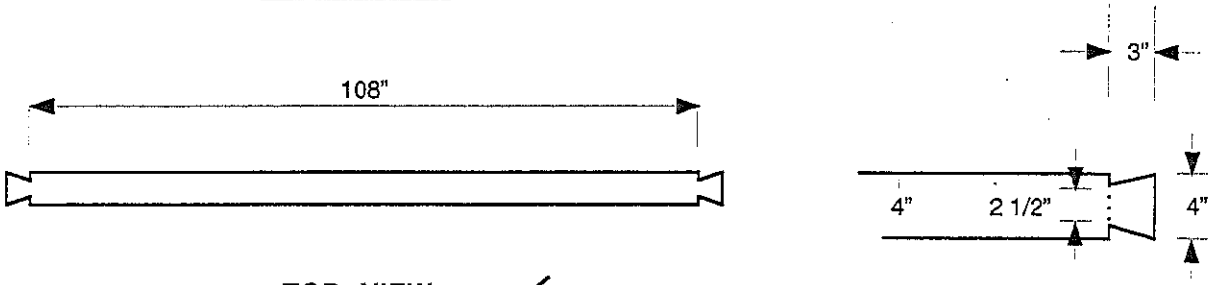
Material for the purlins is 4" x 6"
Total number of notches will be 2
Total overall length of the purlin is 114"
The CROWN of this piece should be UP, and marked as TOP

Procedure: Square one end of the timber. Mark the TOP.
After marking the notches, measure overall length and square the other end.

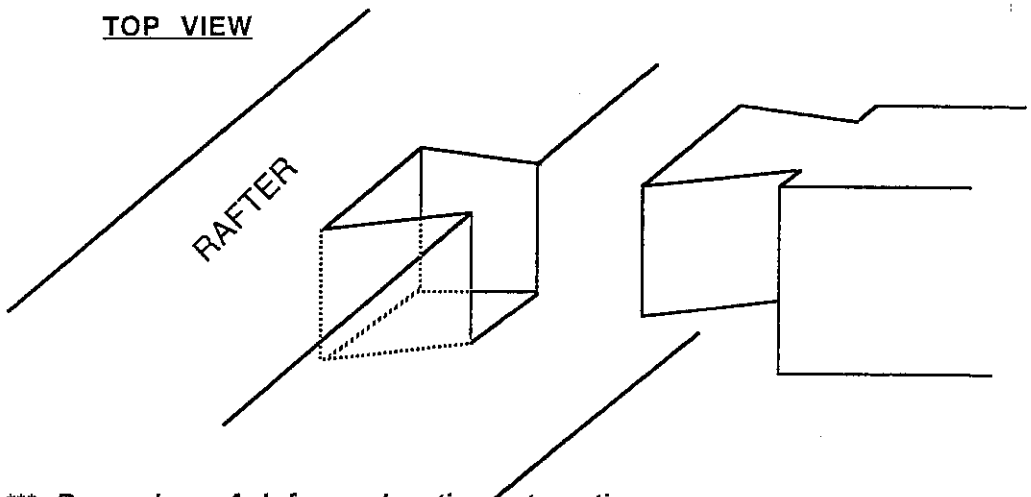
Tenons: The DOVETAIL Tenons are: 3" long
4" wide at the back (width of purlin)
2 1/2" wide at the front
4 1/2" deep



FRONT VIEW



TOP VIEW



*** *Remember - Ask for explanations at anytime*
*** *Check to see who else might be working on a similar timber*
*** *Have your layout and measurements checked before cutting*
*** *Look for demo notches in the shop*

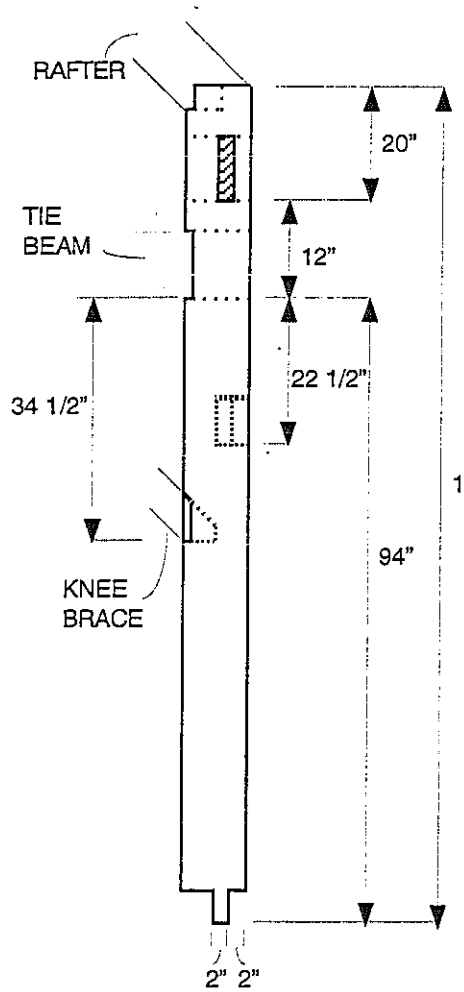
Bent 1 * Post F

General: Material for the posts is 8" x 8".
Total number of notches in this post is 6
Total overall length is 126", which includes still tenon.

Procedure: Square one end of the timber. Determine and mark the OUTSIDE FACE(S). One face will be to the end of the building, and the other face will be to the front. (See drawings)

Tenon: One 2" x 6" Sill tenon on the bottom of the post, 4" long. This tenon is aligned with Girts – see Sill Mortise Drawing for layout. This tenon is located 2" in from front outside faces.

Mortises: One 2" x 8" Girt mortise, 2" in from Front Outside face, located 106" up from the bottom of the post. Note 1" housed shoulder.



One 2" x 8" Tie Beam mortise, 2" in from End Outside face, and beginning 94" up from the bottom of post. Note 1" housed shoulder.

Two knee Brace mortises, located below the Tie Beam and the Girt. Both are 2" in from the respective outside faces, and are located 34 1/2" down from the Tie Beam or Girt respectively.

See Knee Brace mortise info sheet

One 2" x 3 5/16" x 4" long Rafter mortise, and 1" x 8" shoulder, centered in the top of the post .
See Rafter Foot Tenon drawings page 23.

VIEW FROM OUTSIDE BENT 1

*** *Remember - Ask for explanations at anytime*
*** *Check to see who else might be working on a similar timber*
*** *Have your layout and measurements checked before cutting*
*** *Look for demo notches in the shop*

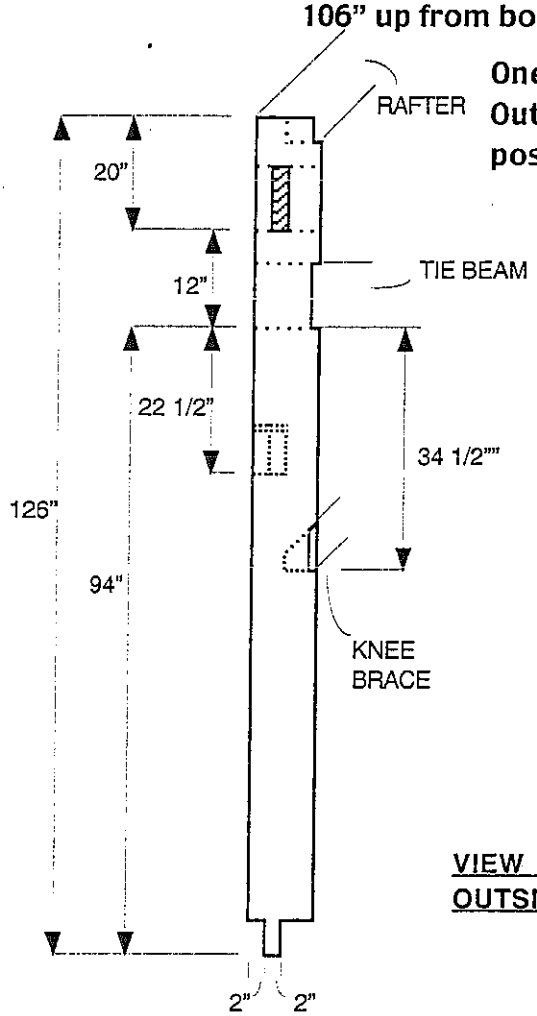
Bent 1 * Post R

General: Material for the posts is 8" x 8"
Total number of notches in this post is 6
Total overall length is 126", which includes sill tenon

Procedure: Square on end of the timber. Determine and mark the OUTSIDE FACES. One face will be to the end of the building, and the other face will be to the rear. (See drawings)

Tenon: One 2" x 6" Sill tenon on the bottom of the post, 4" long. This Tenon is aligned with Girts – see Sill Mortise Drawing for layout. This tenon is located 2" in from outside faces.

Mortises: One 2" x 8" Girt mortise, 2" in from Rear Outside face, located 106" up from bottom of post. Note 1" housed shoulder.



One 2" x 8" Tie Beam mortise, 2" in from End Outside face, and beginning 94" from bottom of post. Note 1" housed shoulder.

Two Knee Brace mortises, located below the Tie Beam and the Girt. Both are 2" in from the respectively outside faces, and are located 34 1/2" down from the Tie Beam or Girt respectively. See Knee Brace mortise info sheet.

One 2" x 3/5/16" x 4" long Rafter mortise, and 1" x 8" shoulder centered in the top of the post. See Rafter Foot Tenon drawings page 23.

VIEW FROM
OUTSIDE BENT 1

*** *Remember - Ask for explanations at anytime*
*** *Check to see who else might be working on a similar timber*
*** *Have your layout and measurements checked before cutting*
*** *Look for demo notches in the shop*

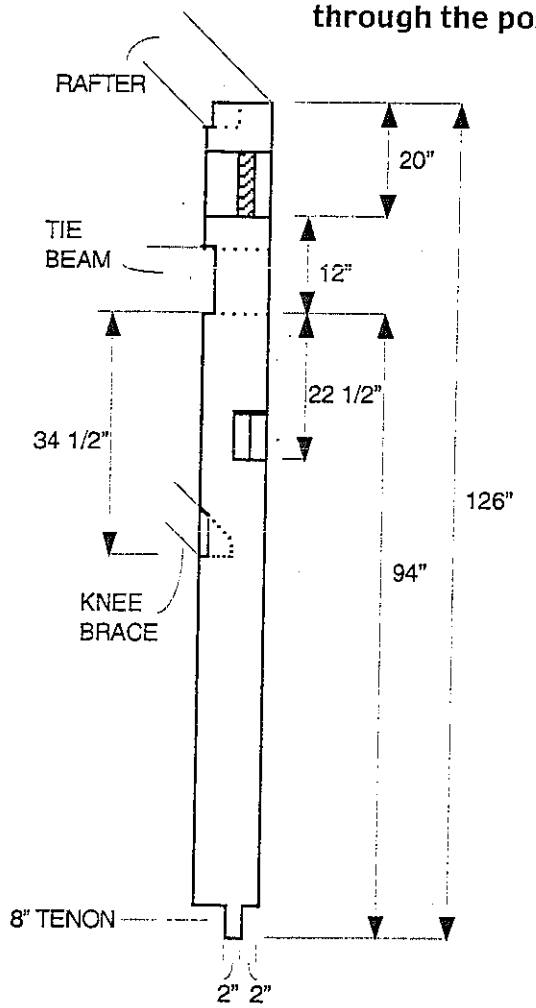
Bent 2 * Post F

General: Material for the posts is 8" x 8"
Total number of notches in this post is 8
Total overall length is 126", which includes sill tenon

Procedure: Square one end of the timber. Determine and mark the OUTSIDE FACE(S). One face will be towards Bent 3, and the other face will be towards Bent 1. (See drawings)

Tenon: One 2" x 8" Sill tenon on the bottom of the post, 4" long. This Tenon is aligned with Girts – see Sill Mortise Drawing for layout. This tenon is located 2" in from the front outside face.

Mortises: One 2" x 8" Double Girt mortise is 2" in from the front outside face and begins 106" from the bottom. This mortise goes through the post. Each housed shoulder is 1".



One 2" x 8" Tie Beam mortise is centered in the post and starts at 94" from bottom, note 1" housed shoulder.

Three Knee Brace mortise 34 1/2" down from the Girt and Tie Beam mortises respectively. See Knee Brace Mortise info sheet.
The two Girt knee brace mortises are 2" in from the front outside face. The Tie Beam Knee brace mortise is centered on the post with the deep mortise located to the Bent 3 side of the center line.*
The 1/2" pocket is on the Bent 2 side of center.

One 2" x 3 5/16"x 4" long Rafter mortise, and 1" x 8" shoulder is centered in the top of the post. See Rafter Foot Tenon drawings page 23.

VIEW FROM BENT 1

*** *Remember - Ask for explanations at anytime*
*** *Check to see who else might be working on a similar timber*
*** *Have your layout and measurements checked before cutting*
*** *Look for demo notches in the shop*

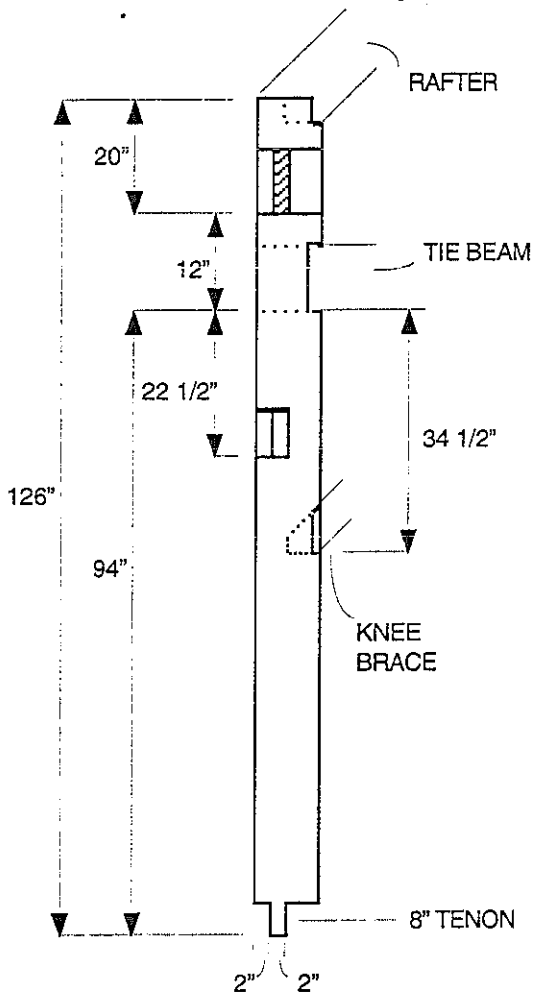
Bent 2 * Post R

General: Material for the posts is 8" x 8"
Total number of notches in this post is 8
Total overall length is 126", which includes sill tenon

Procedure: Square one end of the timber. Determine and mark the OUTSIDE FACE. The face will be to the rear. (See drawings)

Tenon: One 2" x 8" Sill tenon on the bottom of the post, 4" long. This Tenon is aligned with Girts – see Sill Mortise drawing for layout. This tenon is located 2" in from the rear outside face.

Mortises: One 2" x 8" Double Girt mortise is 2" in from the rear outside face and begins 106" up from the bottom of post. This mortise goes through the post. Each housed shoulder is 1".



One 2" x 8" Tie beam mortise is centered in the post and starts at 94" up from the bottom of post, note 1" housed shoulder.

Three Knee Brace mortises, 34 1/2" down from the Girt and Tie Beam mortises respectively. See Knee Brace mortise info sheet.
The two Girt knee brace mortises are 2" in from the rear outside face. The Tie Beam knee brace mortise is centered on the post with the deep mortise located to the Bent 3 side of the center line. The 1/2" pocket is on the Bent 2 side of center.

One 2" x 3 5/16" x 4" long
Rafter mortise, and 1" x 8" shoulder, is centered in the top of the post. See Rafter Foot tenon drawings page 23.

VIEW FROM
BENT 1

*** *Remember - Ask for explanations at anytime*
*** *Check to see who else might be working on a similar timber*
*** *Have your layout and measurements checked before cutting*
*** *Look for demo notches in the shop*

Bent 3 * Post F

General: Material for the posts is 8" x 8"
Total number of notches in this post is 6
Total overall length is 126", which includes sill tenon

Procedure: Square one end of the timber. Determine and mark the OUTSIDE FACE(S). One face will be to the end of the building, and the other face will be to the front. (See drawings)

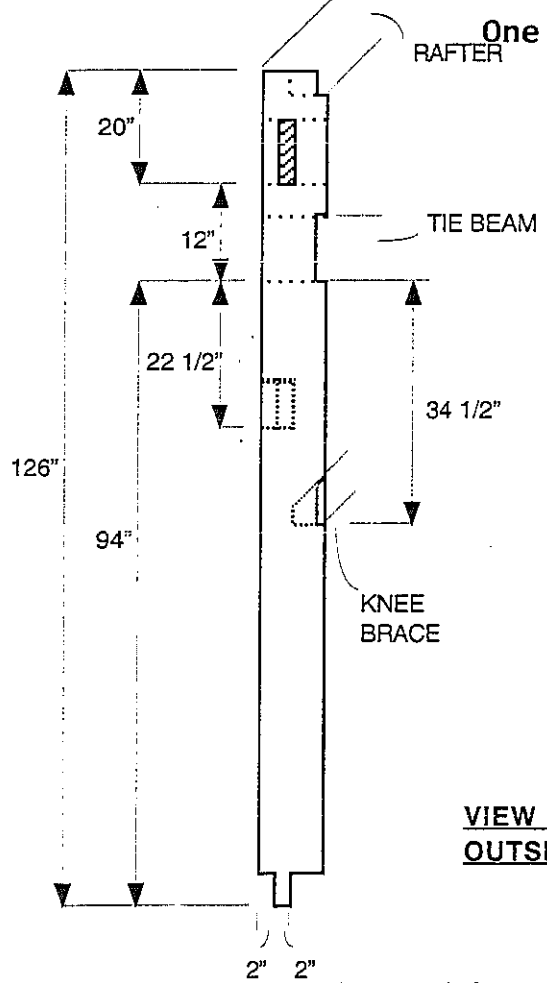
Tenon: One 2" x 6" Sill tenon on the bottom of the post, 4" long. This Tenon is aligned with Girts – see Sill Mortise drawings for layout. This tenon is located 2" in from front outside faces.

Mortises: One 2" x 8" Girt mortise, 2" in from Front Outside face, located 106" up from the bottom of the post. Note 1" housed shoulder.

One 2" x 8" Tie Beam mortise, 2" in from End Outside face, and beginning 94" up from bottom of post. Note 1" housed shoulder.

Two knee Brace mortises, located below the Tie Beam and the Girt. Both are 2" in from the respective outside faces, and are located 34 1/2" down from the Tie Beam or Girt respectively. See Knee Brace Mortise info sheet.

One 2" x 3 5/16" x 4" long Open Rafter mortise, and 1" x 8" shoulder, centered in the top of the post. See Rafter Foot Tenon Drawing page 23.



VIEW FROM
OUTSIDE BENT 3

*** *Remember - Ask for explanations at anytime*
*** *Check to see who else might be working on a similar timber*
*** *Have your layout and measurements checked before cutting*
*** *Look for demo notches in the shop*

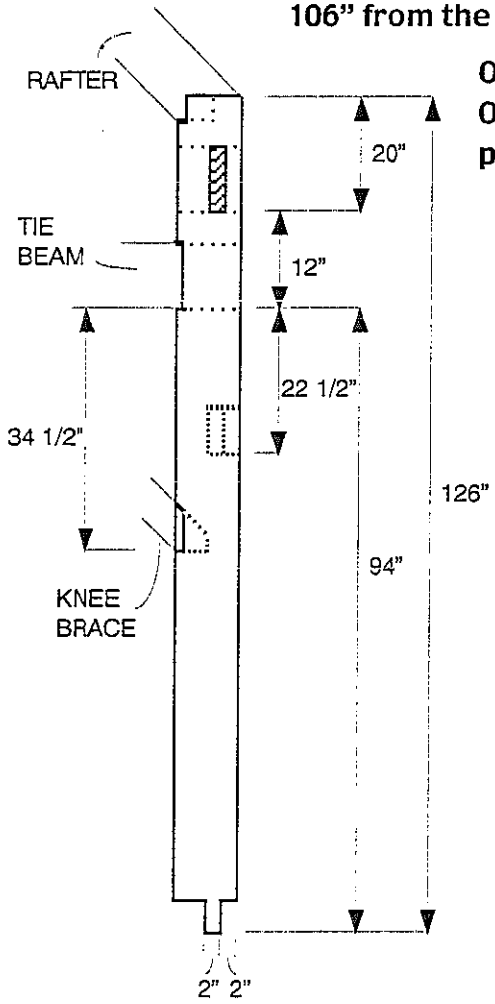
Bent 3 * Post R

General: Material for the posts is 8" x 8"
Total number of notches in this post is 6
Total overall length is 126", which includes sill tenon

Procedure: Square one end of the timber. Determine and mark the OUTSIDE FACE(S). One face will be to the end of the building, and the other face will be to the rear. (See drawings)

Tenon: One 2" x 6" Sill tenon on the bottom of the post, 4" long. This Tenon is aligned with Girts - see Sill Mortise drawings for layout. This tenon is located 2" in from the Outside faces.

Mortises: One 2" x 8" Girt mortise, 2" in from Rear Outside face, located 106" from the bottom of the post. Note 1" housed shoulder.



One 2" x 8" Tie Beam mortise, 2" in from End Outside face, and beginning 94" from bottom of post. Note 1" housed shoulder.

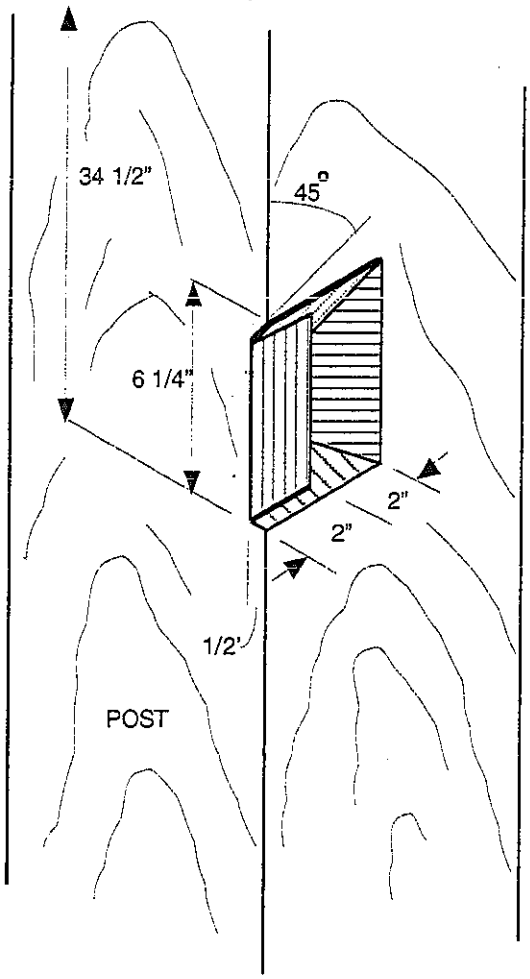
Two Knee Brace mortises, located below the Tie Beam and the Girt. Both are 2" in from the respective outside faces, and are located 34 1/2" down from the Tie Beam or Girt respectively. See Knee Brace Mortise info sheet.

One 2" x 3 5/16" x 4" long Rafter mortise, and 1" x 8" shoulder, centered in the top of the post. See Rafter Foot Tenon drawings page 23.

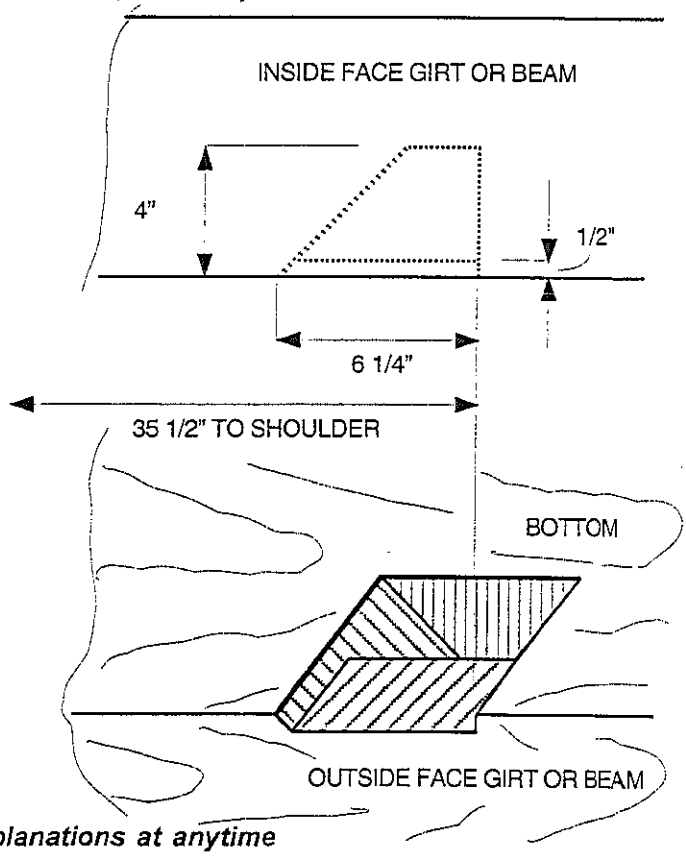
*** *Remember - Ask for explanations at anytime*
*** *Check to see who else might be working on a similar timber*
*** *Have your layout and measurements checked before cutting*
*** *Look for demo notches in the shop*

Knee Brace Mortise Layout

1. From the tenon shoulder, of GIRT or TIE BEAM measure back 34 1/2" plus 1" for shoulder or 35 1/2". For POSTS measure down from the GIRT or TIE BEAM mortise 34 1/2" – Mark.
2. From this mark, measure back towards long point of GIRT or TIE BEAM or back towards top of a POST 6 1/4". Mark
3. On Timber: Measure 2" in from outside face. Draw a line. Now measure an additional 2". Draw line.
   On Side: Measure 1/2" into timber and draw line. At 6 1/4" mark draw line 45 degrees to meet 1/2" line.
   Notching: Drill out mortise – but not the 45 degree slope area. – do not drill out 1/2" ledge area.

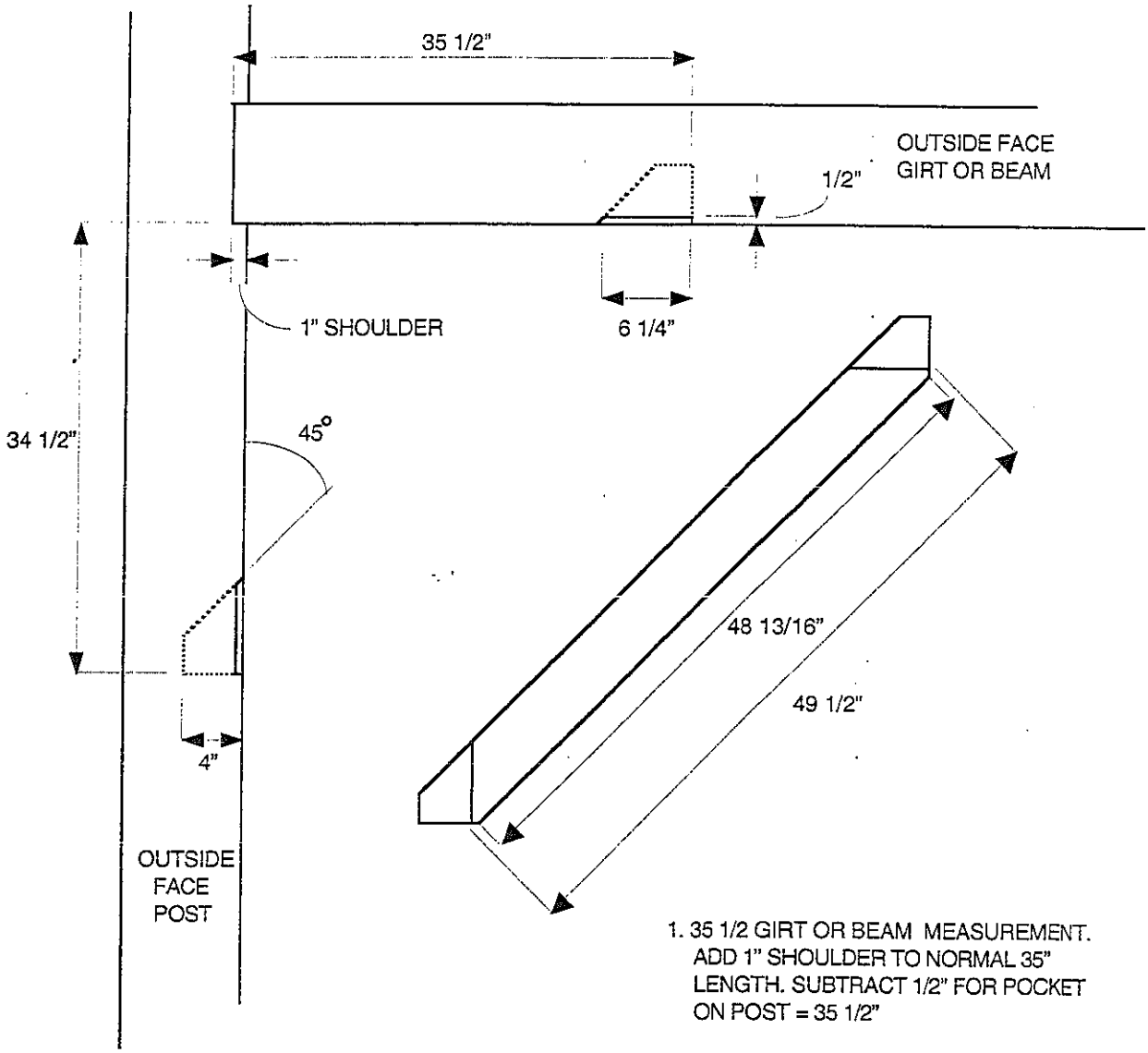


Clean out mortise.
From side, saw down to 1/2" line. Remove with chisel. Try a brace.



*** *Remember - Ask for explanations at anytime*
*** *Check to see who else might be working on a similar timber*
*** *Have your layout and measurements checked before cutting*
*** *Look for demo notches in the s*

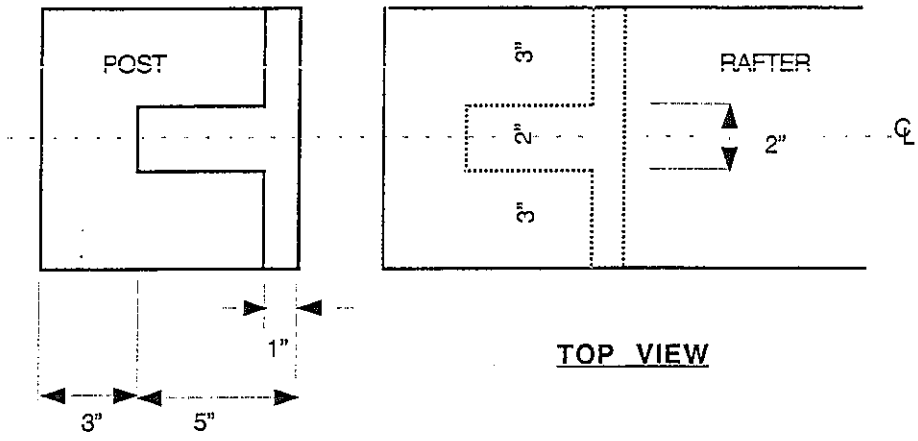
KNEE BRACE



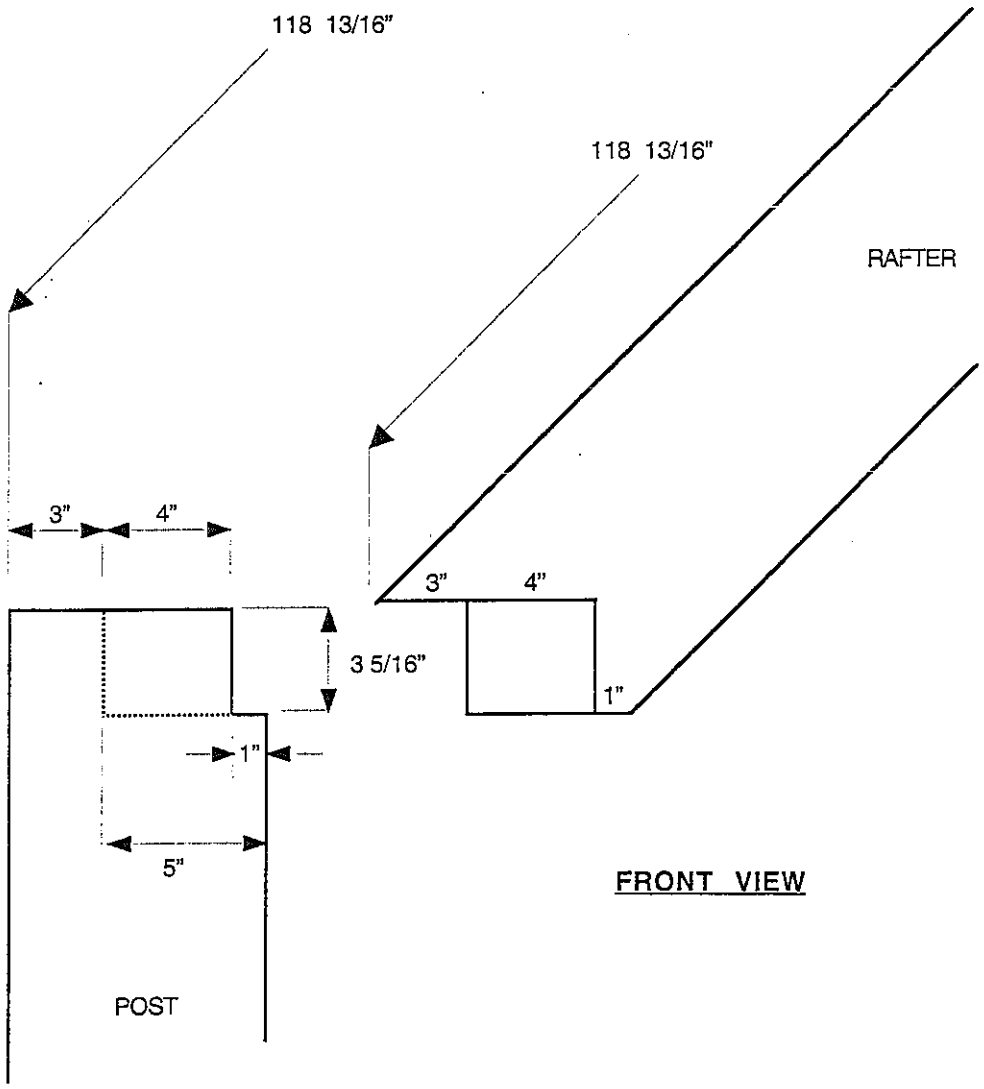
1. 35 1/2 GIRT OR BEAM MEASUREMENT. ADD 1" SHOULDER TO NORMAL 35" LENGTH. SUBTRACT 1/2" FOR POCKET ON POST = 35 1/2"

2. 34 1/2" POST MEASUREMENT. MEASURE 35" DOWN FROM GIRT OR BEAM. SUBTRACT 1/2" FOR POCKET ON GIRT/BEAM = 34 1/2"

RAFTER FOOT TENON



TOP VIEW



FRONT VIEW

MATERIAL LIST

JUNE 2003

4 PIECES 8" X 8" X 10 feet:

= 4 GIRTS

18 PIECES 8" X 8" X 12 feet:

= 6 POSTS
= 6 RAFTERS
= 4 FRONT & BACK SILLS
= 2 EXTRA

6 PIECES 8" X 8" X 14 feet:

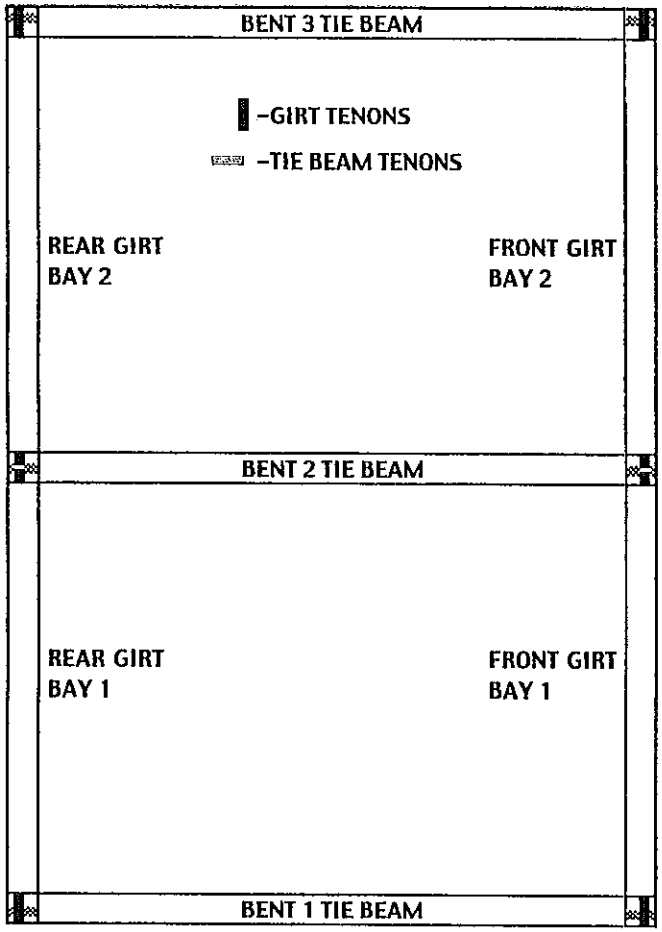
= 3 TIE BEAMS
= 2 END SILLS
= 1 EXTRA

15 PIECES 4" X 6" X 10 feet:

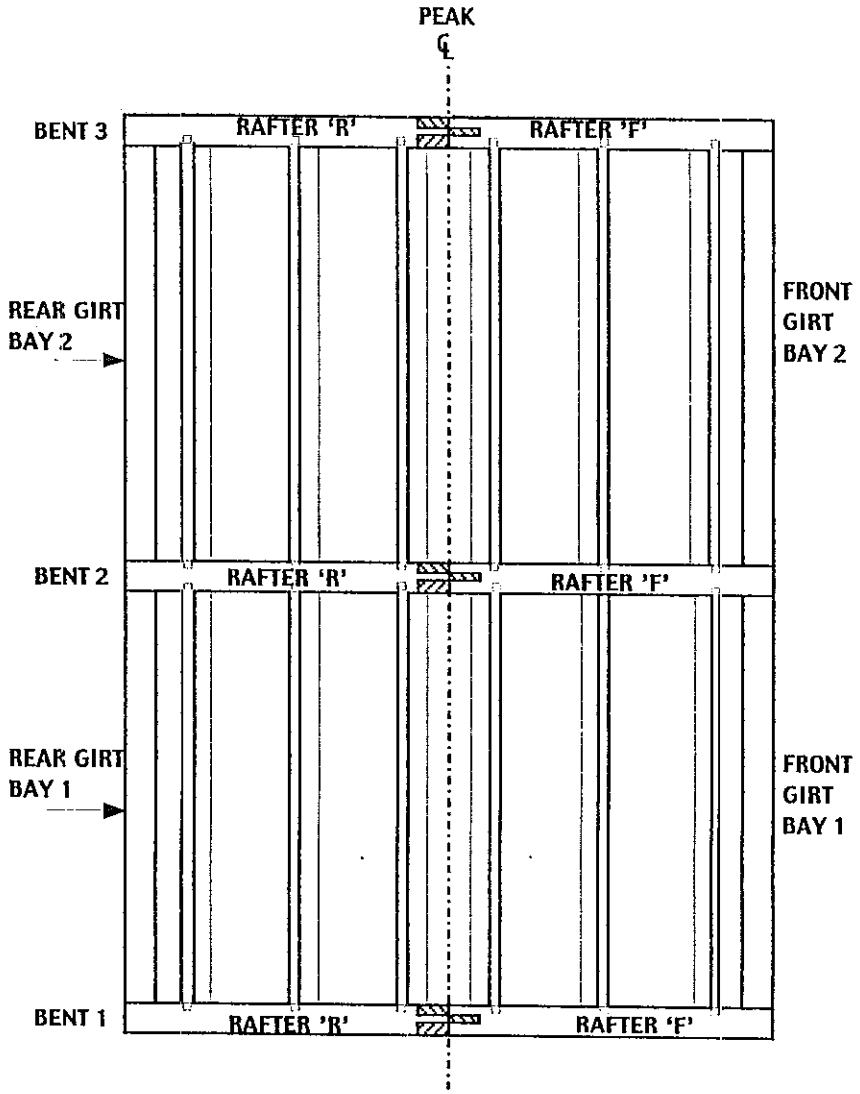
= 12 PURLINS
= 3 COLLAR TIES

14 PIECES 4" X 4" X 5 feet:

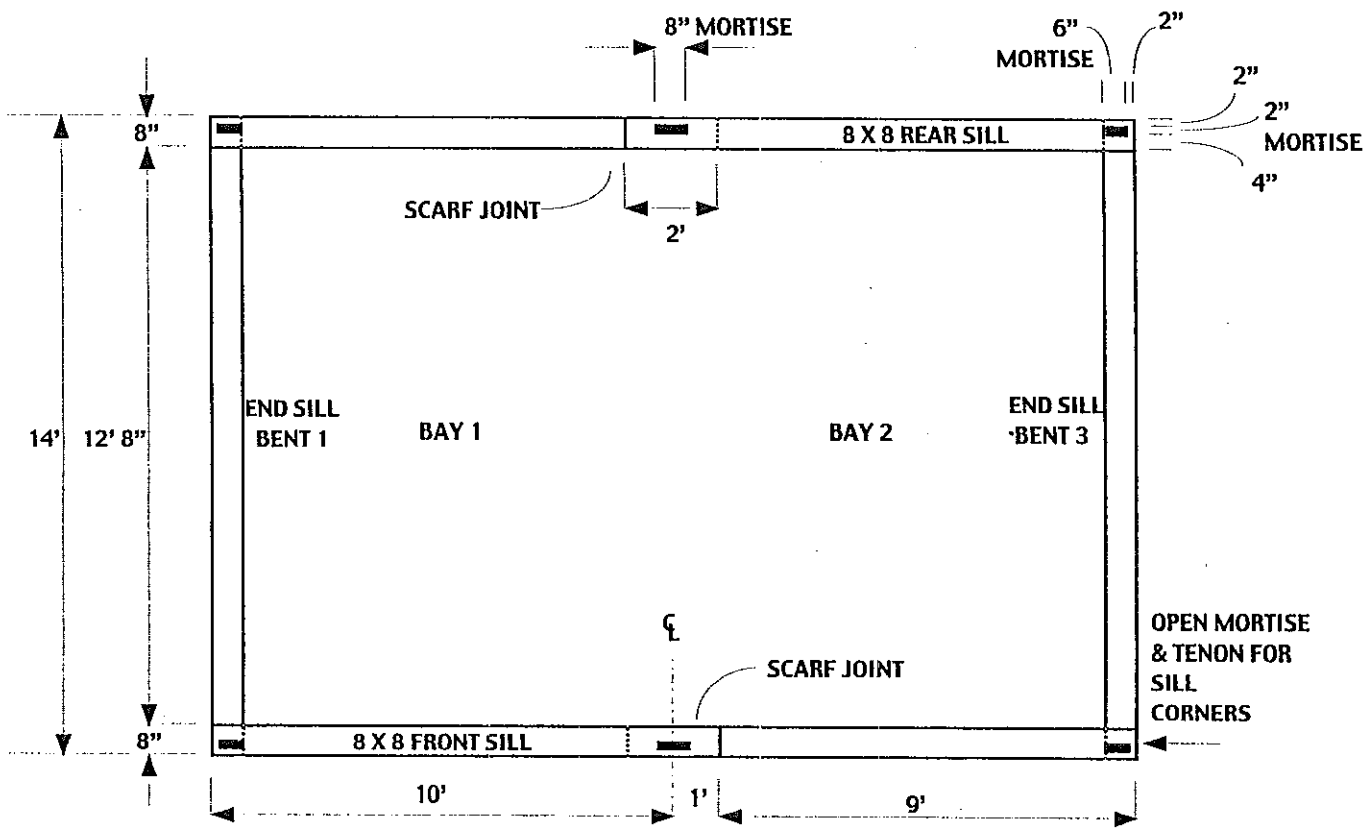
= 14 BRACES



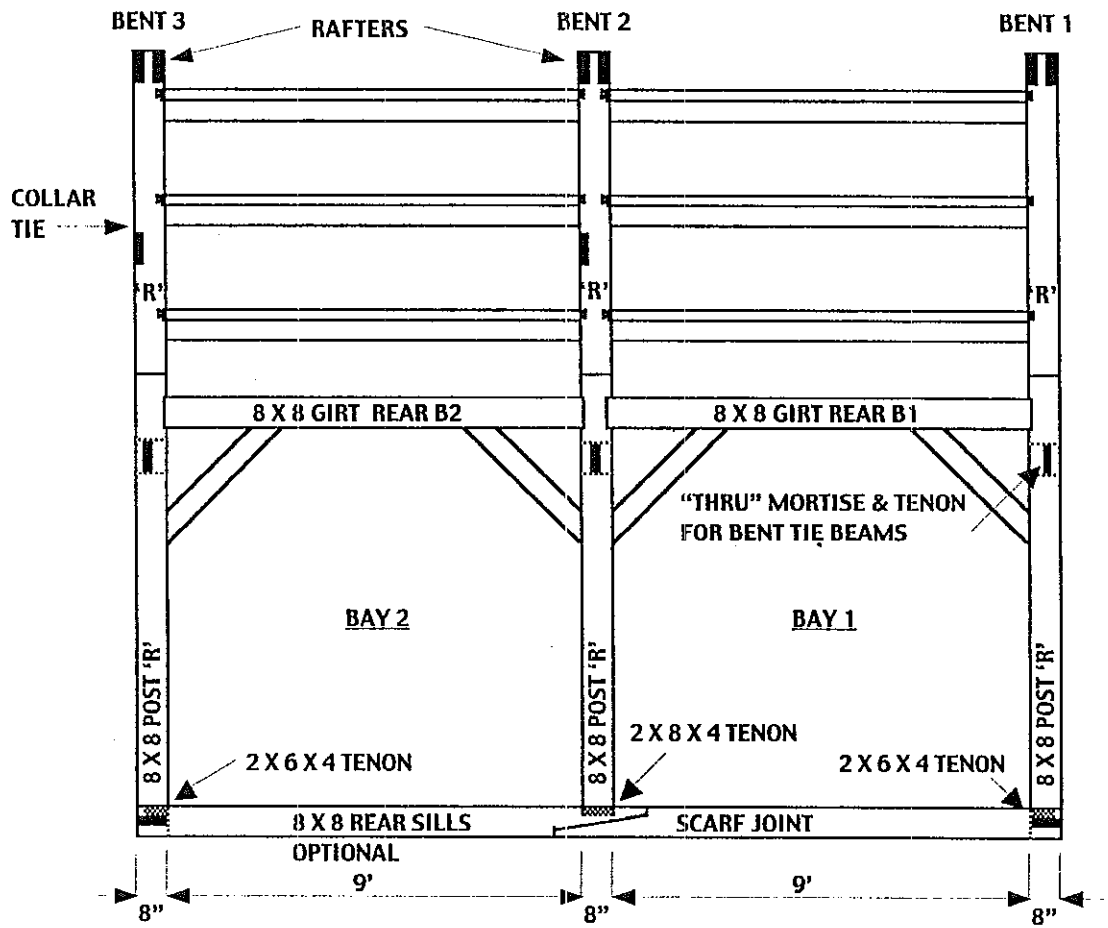
PLAN VIEW
TENONS – TIE BEAM & GIRTS



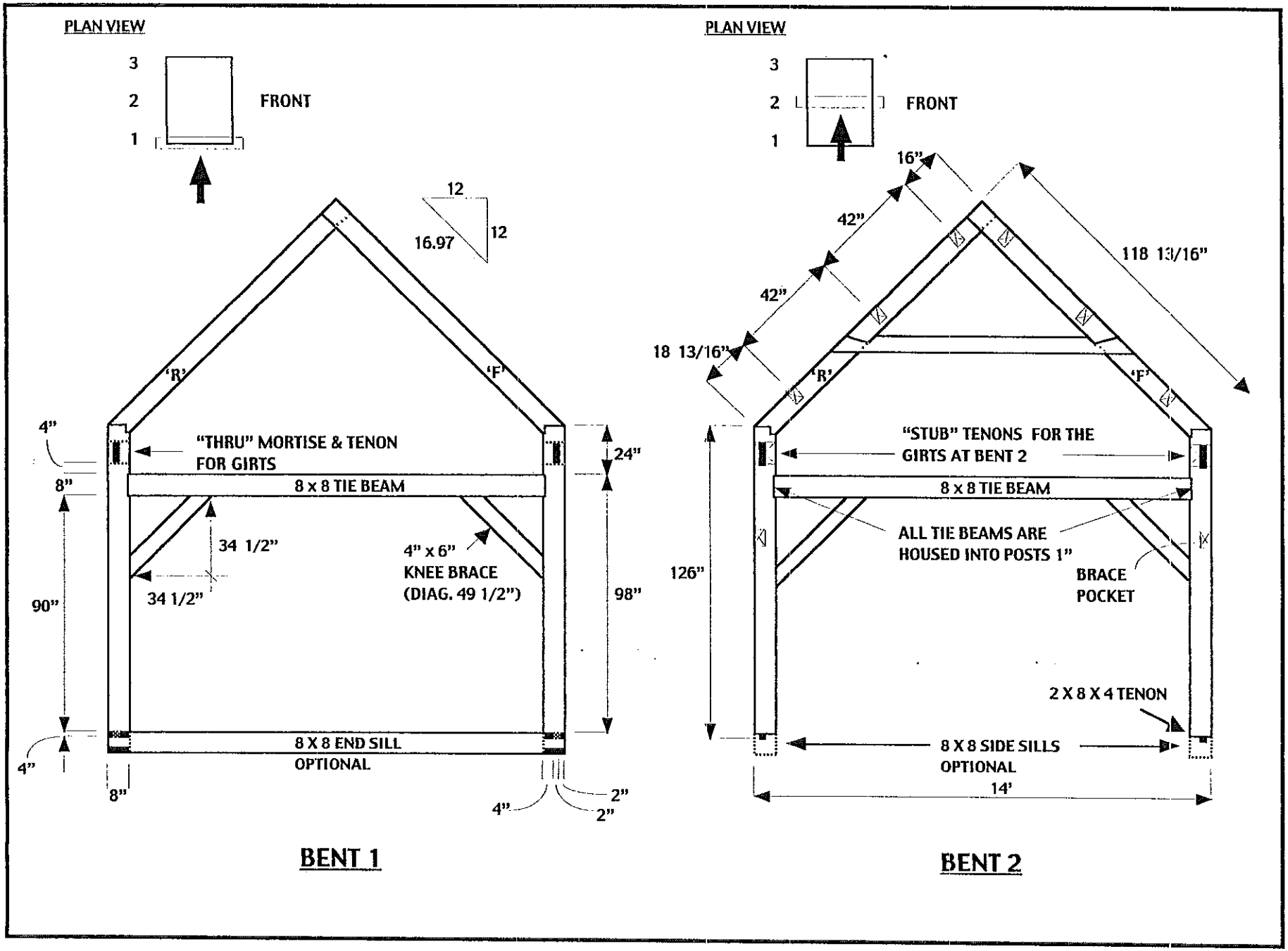
PLAN VIEW ROOF

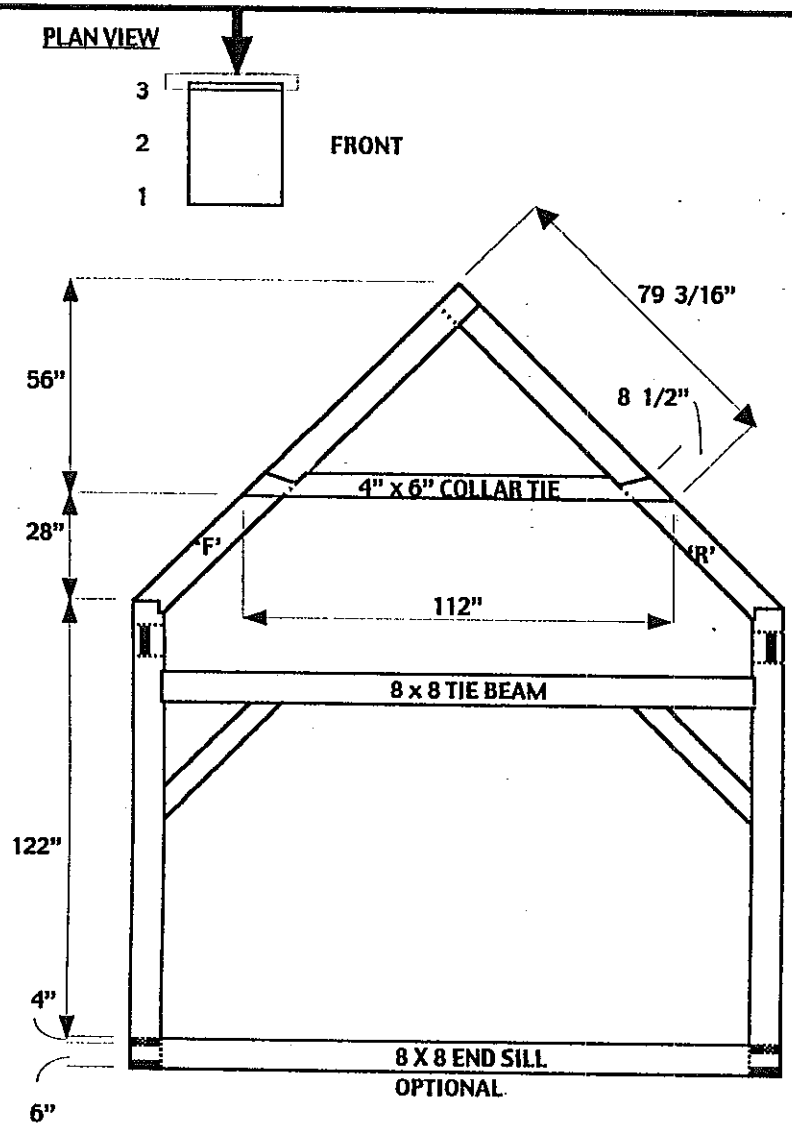


PLAN VIEW
SILL LAYOUT
OPTIONAL



REAR ELEVATION


PLAN VIEW
3
2
1
FRONT
12
16.97
12
'R'
'F'
4"
"THRU" MORTISE & TENON
FOR GIRTS
8"
8 x 8 TIE BEAM
24"
34 1/2"
4" x 6"
KNEE BRACE
(DIAG. 49 1/2")
34 1/2"
90"
98"
8 X 8 END SILL
OPTIONAL
4"
8"
4"
2"
2"
BENT 1
PLAN VIEW
3
2
1
FRONT
16"
42"
42"
118 13/16"
18 13/16"
'R'
'F'
"STUB" TENONS FOR THE
GIRTS AT BENT 2
8 x 8 TIE BEAM
ALL TIE BEAMS ARE
HOUSED INTO POSTS 1"
BRACE
POCKET
126"
2 X 8 X 4 TENON
8 X 8 SIDE SILLS
OPTIONAL
14'
BENT 2


PLAN VIEW
3
2
1
FRONT
79 3/16"
8 1/2"
56"
4" x 6" COLLAR TIE
28"
'F'
'R'
112"
8 x 8 TIE BEAM
122"
4"
8 X 8 END SILL
OPTIONAL
6"

BENT 3