

Chapter 8 - Roof Framing

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Timing & Prerequisites

- This phase of the project cannot begin until all wall framing has been completed and all walls have been plumbed.
- The House/Project Lead will work with the Construction Superintendent to coordinate these volunteer activities.
- The Roof sheathing may be done by a contractor on a house by house basis.

Components		
Trusses	Rakes	Sheathing
Sub-Fascia	Cornice Returns	Cat Walks
Common Trusses	Gable Trusses	

Materials Needed		
House	Garage	
Trusses & Rakes	Trusses & Rakes	Miscellaneous
Trusses – Main Roof Trusses – Porch Roof 2x4s (Rake) 2x6s (Rake) 1x6s (Porch Rake) 1/2" OSB (Gable) 1 3/4" Roofing Nails 8d Sinker Nails 2x4s (Wind Bracing) 2x4s (Temp Bracing) 2x4s (Cat Walks) 16d Sinker Nails 10d Sinker Nails Hurricane Clips Hanger Nails	Trusses – Garage Roof 1x4s (Rake) 1x6s (Rake) 2x6s (sub-fascia) 2x4s (Wind Bracing) 2x4s (Temp Bracing) 2x4s (Cat Walks) 16d Sinker Nails 1/2" OSB (Gable) 8d Sinker Nails Hurricane Clips Hanger Nails 1 3/4" Roofing Nails	Bathtub
Cornices Return	Cornices Return	Sheathing
2x8 or 3/4" OSBs 1x8s or 3/4" OSB (Porch) 2 1/2" Wood Screws 16d Sinker nails 1/2" OSB scraps	1x8s or 3/4" OSB 16d Sinker Nails 8d Sinker Nails	1/2" OSB 8d Sinker Nails H-Clips
Sub-Fascia	Sub-Fascia	
2x6s 16d Sinker Nails	2x6s 16d Sinker Nails	

Roof Truss Planning

Things to Consider

- The installation instructions in the engineering documents which accompany the roof trusses must be read and understood before installing the trusses. Contact the Construction Superintendent with questions.

Review the Roof Trusses Engineering Documents

The Engineering Documents identify the specifications for building and installing the roof trusses. These documents contain nailing patterns and bracing requirements.

Review these documents before installing the trusses and install per specifications. If there are questions or concerns, discuss them with Construction Superintendent.

Planning for Roof Trusses Preparation

Critical Issues

- The roof trusses are fragile until they are installed. Be careful not to bend them.
- The house roof trusses with the 2x6 sub-fascia installed will overhang the house walls by 14". This will allow for 1" Styrofoam insulation to be installed on the exterior walls and a 13" eave.
- The house roof trusses have a 16" energy heel to allow for 16" of attic insulation.
- Review the individual truss sheets for specific bracing notes and requirements.

Safety Issues

- Fully assembled gable trusses are very heavy. Many hands will be needed to move them.
- The trusses are built with very sharp metal plates. When handling them, cut-resistant gloves are required.

1. Determine which trusses will be prepared first. Start with the smallest trusses; these will be less heavy and easier to move once they are built. The larger trusses should be built close to a place where they can be accessed by the crane.
2. Determine the place where the crane will be setup.
3. Determine the best place for delivering the trusses.
 - a. A dry and level place.
 - b. A place with access for delivery truck.
 - c. A place without overhead power lines.
4. Determine the best place for building the trusses.
 - a. A dry and level place.
 - b. Near the storage area.
5. Determine the best place for storing the trusses.

- a. A place from which the crane can load and lift them.
- b. A dry and level place.
- c. A place without overhead power lines.

Organize and Store Trusses

1. Setup the work areas

- Set up a flat area for delivery of the trusses. Remove trash from the area where the trusses will be delivered. If necessary, add blocking under the trusses.
- Set up a flat area for building the trusses. This will likely be the same area where they were delivered.
- Set up a flat area for storage of the trusses. Once the trusses are prepped, they must be placed on blocking to keep them level.

2. Count trusses delivered

Before breaking the ties on the stack of trusses, mark one end of the trusses with a color marker or paint so you can keep them properly aligned later.

Separate the trusses into groups as identified on the truss plan. Each truss will be labeled with its identifier from the truss plan.

Ensure the correct number of each has been received. Notify the Construction Superintendent immediately if trusses are missing.

3. Orient the trusses

Review the truss documentation to determine the direction which the trusses are to sit on the house. Ensure the trusses are stored with the correct orientation.

4. Check the length of the trusses

Measure the trusses in each group to ensure the correct lengths for each section have been received. Notify the Construction Superintendent immediately if lengths are wrong.

House Gable Truss Preparation

Before the gable end trusses can be installed on the house, they must have the following added to them:

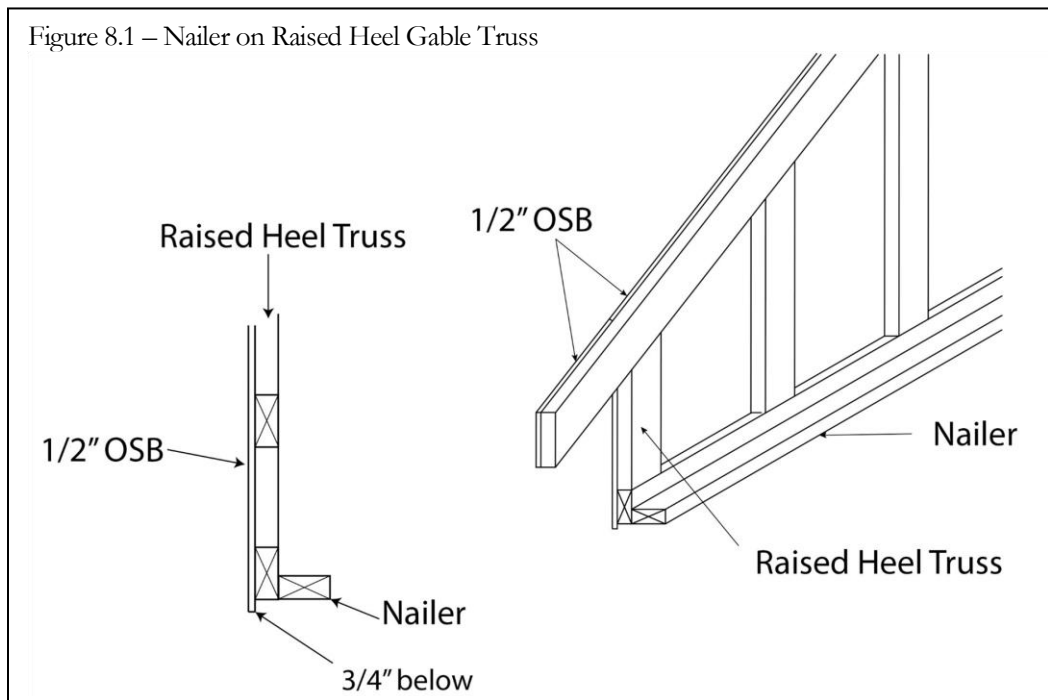
- Nailers
- Stiffeners
- OSB sheathing
- Rakes
- Cornice returns (Optional)
- Cornice return aluminum fascia (Optional)
- Anchors

Determine the Side to Prep

- Lay the gable trusses on a flat surface, such as on top of the pile of trusses.
- Reference the Engineering Documents and verify that the side of the truss which is facing up is the side of the truss which will be facing out when it is installed.

Install the Nailer

Along the bottom inside edge of the gable trusses, install a 2x4 nailer. This nailer will assist in securing the truss when it is being installed. (See Figure 8.1)



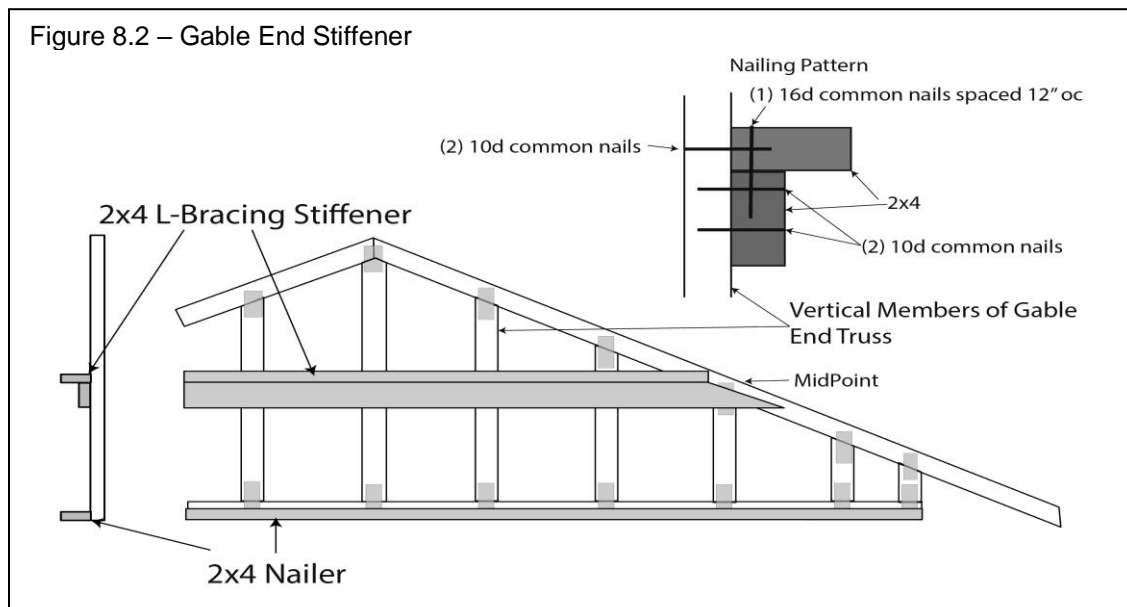
- Cut 2x4s for nailers to be installed across the bottom of the trusses to a length equal to the length of the bottom horizontal member of the length of the trusses.

- Position the 2x4s on end, under the truss; flush with the heels and flush to the bottom.
- Nail through the trusses into the nailer with 16d sinkers 1 every 12”.

Install Gable End Truss Stiffeners

The Engineer Documents may require stiffeners to be added to the gable end trusses. (See Figure 8.2)

- If the gable end truss height is less than 4’ 8”, no stiffeners are required.
- If the gable end truss height is 4’ 8” or more, install a 2x4 L-brace stiffener at mid height.
 - Turn the truss over with the inside facing up.
 - Mark the midpoint of the center vertical member.



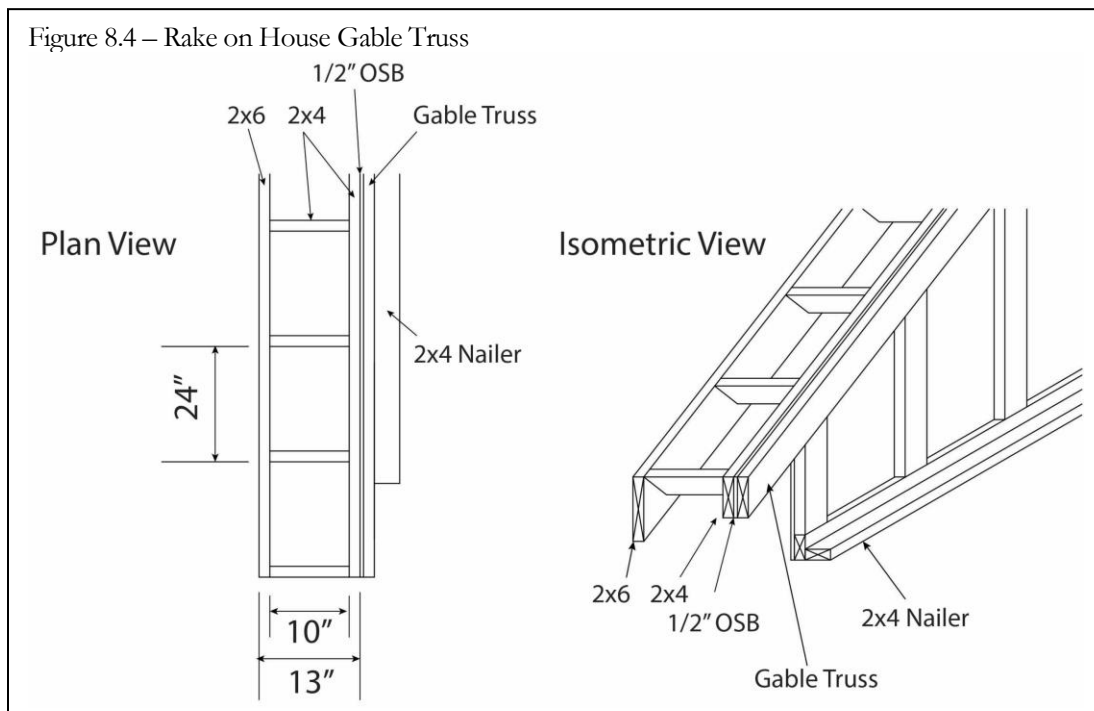
- Construct the L-brace from two (2) 2x4s cut to fit across the midpoint of the truss.
- Position the 2x4s in an “L” formation and attach the 2x4s together with 16d common nails; 1 nail every 12”.
- Position the L-brace stiffener at the mid-point of the truss and attach it to each vertical member with 10d common nails; 2 nails through the vertical 2x4 of the stiffener into each vertical member of the truss and 2 nails through the vertical members of the truss into the horizontal 2x4 of the stiffener.
- Turn the truss back-over.
- The diagonal 2x4 bracing which attaches to the stiffener will be added after the truss is installed.

Sheet Roof Gable/Transition Trusses

- Cut and nail 1/2" OSB to the trusses extending from 3/4" below the bottom member; to the top edge of the diagonal members; and out to the outside edges of the vertical raised heel members. Use 1 3/4" roofing nails, every 6" along the bottom edge of the OSB; every 16" along the top edge; and every 12" along the studs in the field.
- For transition trusses, only cover the part of the truss which will be above the lower roof. Install the OSB from 5" below the line for the simulated diagonal truss made above to the top edge of the diagonal member. Install the OSB like the Gable trusses. **Do not cover the area below the lower roof supports.**
- Add 1/2" OSB to the tails of the trusses to provide a spacer for the rake. Use 1 3/4" roofing nails.
- If the OSB extends above the top edges of the trusses cut it off flush with the top of the truss.
- For transition trusses, position the 2x4s, cut above for the simulated diagonal and vertical members, flush with the lines made above and attach with 16d sinkers; 1 nail every 16".

Install Rakes

If the house elevation shows an overhang on the gable end, build and install a rake on the gable end truss to create the overhang. (See Figure 8.4).



- For each side of the gable truss, cut 2x4s to fit along the diagonal members. These will be the back sides of the rakes. You may need more than one piece of 2x4 to cover the entire member.
- Cut 2x6s to fit over the 2x4s. These will be the front sides of the rakes. If more than one piece of 2x6 is required to cover a side, stagger the joints from the joints in the 2x4 below.
- If two or more pieces of 2x6 are needed to form the sides of the rake, cut a cleat to join the 2x6s.
- Plumb cut the 2x4s and 2x6s at the peak and at the tail of the trusses.
- Layout the rakes.
 - Mark the 2x6 with layout marks for the cross blocks.
 - Place one block at the bottom of the rake.
 - Place one block every 24" up the rake. Mark the block perpendicular to the edge of the rake.
 - Place one block at the top of the rake.
 - Transfer the marks to the 2x4s.
- Cut 10" 2x4 cross blocks for each mark on the rake.

Note If the rake will extend over a porch gable which will not be covered with 1" Styrofoam insulation, the rake will be a 12" rake. Cut the cross blocks to 9".
- Nail the blocking to the front 2x6 and the back 2x4 with 16d sinkers; 2 nails at each end of the cross blocking.
- Position the rake on the gable truss with the 2x4 face on the truss and attach the rake to the diagonal member of the truss using 16d nails. Toe-nail through the 2x4 rake and OSB into the diagonal member; 1 nail beside each side of each cross block and 1 nail midway between each cross block.
- Toe-nail the top ends of the two rakes together using 16d sinkers.

Transition Rakes.

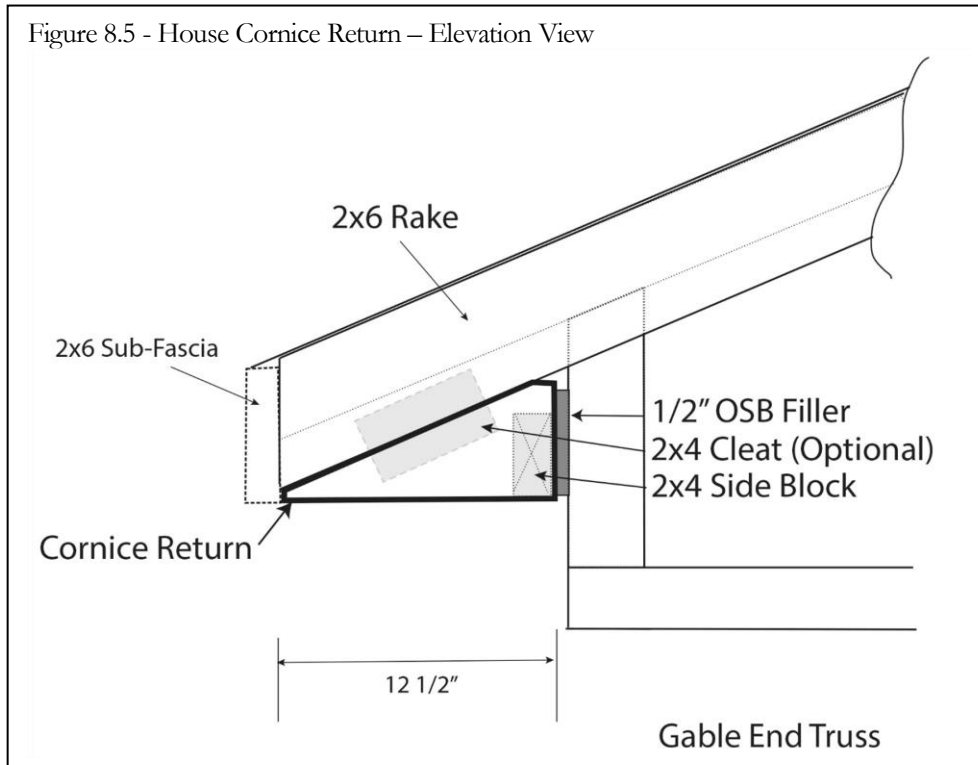
Some house models have overhangs on the transition trusses. If the elevation shows an overhang, install a rake on the transition truss. (See Figure 8.4)

- For the portion of the diagonal members which are not covered by the lower roof support, prepare 2x4s for the rake. These will be the back sides of the rakes. If the rake will intersect the lower roof supports, leave $\frac{3}{4}$ " between the rake and the lower roof supports.
- Lay 2x6s over the 2x4s. These will be the front sides of the rakes.
- Plumb cut the 2x4s and 2x6s at the peak and at the tail of the trusses.

- Measure the length of the rake to determine the number of cross blocks needed. You will need one 10" cross block for every 24" of the rakes and one block for each end.
- If you have 2 or more pieces of 2x6 forming the sides of the rake, cut a cleat to join the 2x6s.
- If more than one piece of 2x6 is required to cover a side, stagger the joints form the joints in the 2x4 below.
- Cut the 2x4 cross blocking.
- Lay the 2x4 and 2x6 sides of the rake together and mark the position of the blocking. Measure and mark the remaining blocks at 24" on center in both directions from the first mark.
- Separate the sides and insert the blocking.
- Nail the blocking with 16d sinkers; 2 nails at each end of the cross blocking.
- Position the rake on the gable truss with the 2x4 face on the truss and attach the rake to the diagonal member of the truss using 16d nails; 1 nail every 12".
- Toe-nail the top ends of the two rakes together using 16d sinkers.
- Repeat this process for the other side of the truss.

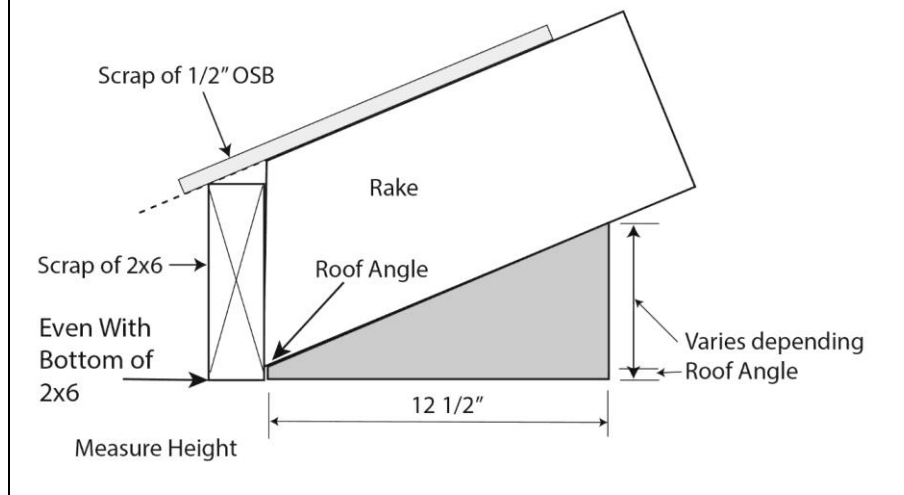
Build and Install Cornice Returns

The lower corners of the gable ends should be blocked out with triangular pieces of lumber and covered with aluminum fascia. The bottom edge of the triangular pieces will be flush with the bottom of the fascia on the eaves. (See Figures 8.5 & 8.6)



- The cornice return covers the area below the sub-fascia covering the ends of the eaves
- The cornice return fits below and at the bottom of the 2x6 front edge of the rake
- The face of the cornice return is even with the face of the 2x6.
- The bottom of the cornice return will be even with the bottom of the 2x6 sub-fascia.
- The inside edge of the cornice return will be even with the OSB sheathing on the perpendicular wall. This should bring that edge in line with the inside edge of the siding corner which will be installed later.
- Cut cornice returns from 12 1/2" pieces 2x6.
 - Use a scrap of 1/2" OSB and 2x6 to identify the length of the short side of the cornice return (See figure 8.6.).
 - The bottom of the cornice return will be 12 1/2".
 - Mark the top edge using the roof angle off of the top of the short side.

Figure 8.6 – Cornice Return Alignment



- Cut a 15" piece of 2x4 or 2x6 for the side block for each cornice return. The side blocks will extend from the back of the cornice returns to the wall. Screw the side block to the cornice return with 2 1/2" wood screws through the front of the cornice return.
- Attach the cornice return with the attached side block to the rake.
 - Either cut a small piece of 2x4 for a cleat. Attach the cleat to the back of the cornice return before installing it. Hold the cornice return in place and insert a 2 1/2" wood screw through the back of the rake into the cleat.
 - Or drill a 1/8" hole through the bottom of the cornice return 1" from the short end. Drive a 16d sinker up through the hole into the bottom of the rake.
 - Place a small scrap of 1/2" OSB (approximately 1 1/2" x 5") between the side block and the vertical energy heel of the gable truss. Nail the siding block to the side of the gable truss with 16d sinkers through the siding block and the scrap OSB into the gable truss.

Wrap Cornice Returns with Aluminum

- If possible, install the aluminum cornice return covers before lifting the trusses into place. This will eliminate working at heights in difficult positions. (See Chapter 16- Siding; Wrap Cornice Returns with Aluminum).

Install Gable Truss Fall Protection Anchors

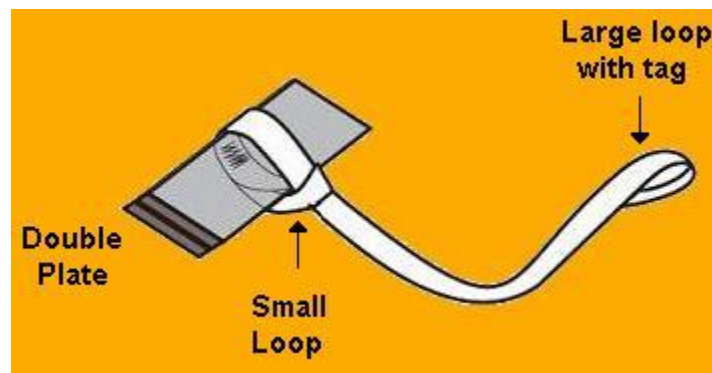
Safety Issues

- Visually inspect the anchor to ensure that it has not been damaged prior to installation and before each use. Avoid damage from corrosive chemicals, open flame, or spark. This product's only use is to provide an approved anchor point for workers engaged in acts that require the use of fall protection equipment.

- Read fully and understand all instructions before use. To ensure proper use, manufacturer's instructions must be followed under the supervision of a competent person trained in its installation. The user of Anchor Solutions anchors is reminded that before using this product the member of attachment must be braced, tied and fastened as to provide the required -strength and rigidity.
- ANCHOR SOLUTIONS ANCHOR IS A NON REUSABLE FALL ARREST ANCHOR. WE ASSUME NO LIABILITY FOR THE REUSE OF THIS PRODUCT.

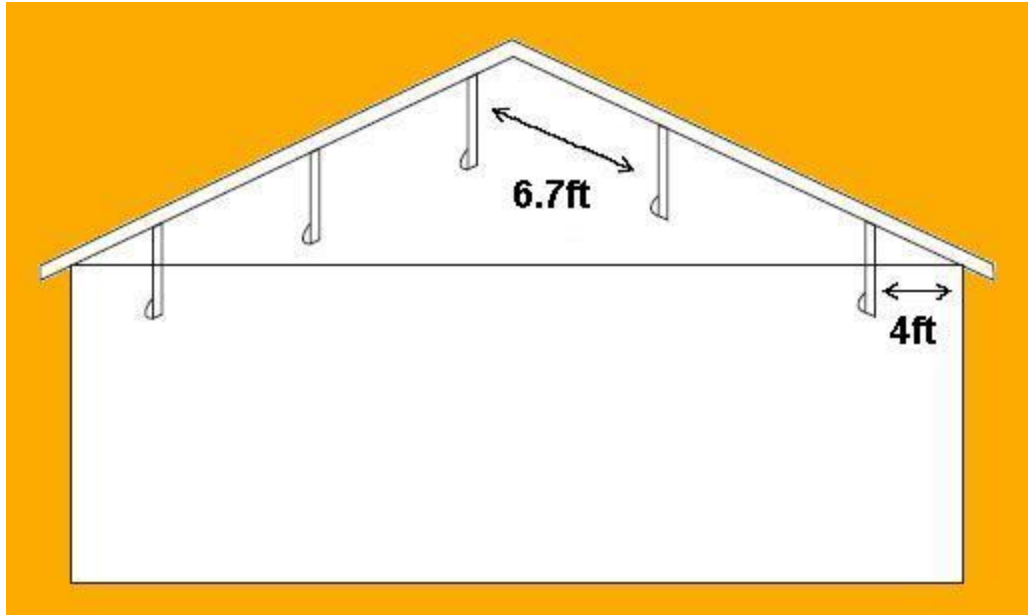
Anchors are to be added to the top of the gable end trusses which sit above porch roofs and lower 1st floor roofs to provide anchor points for fall protection systems. These anchor points must be used when working on the porch or lower roofs.

The anchor is made of 2" wide webbing. Each end has been folded over and stitched to itself creating a large loop at one end and a small loop at the other end.

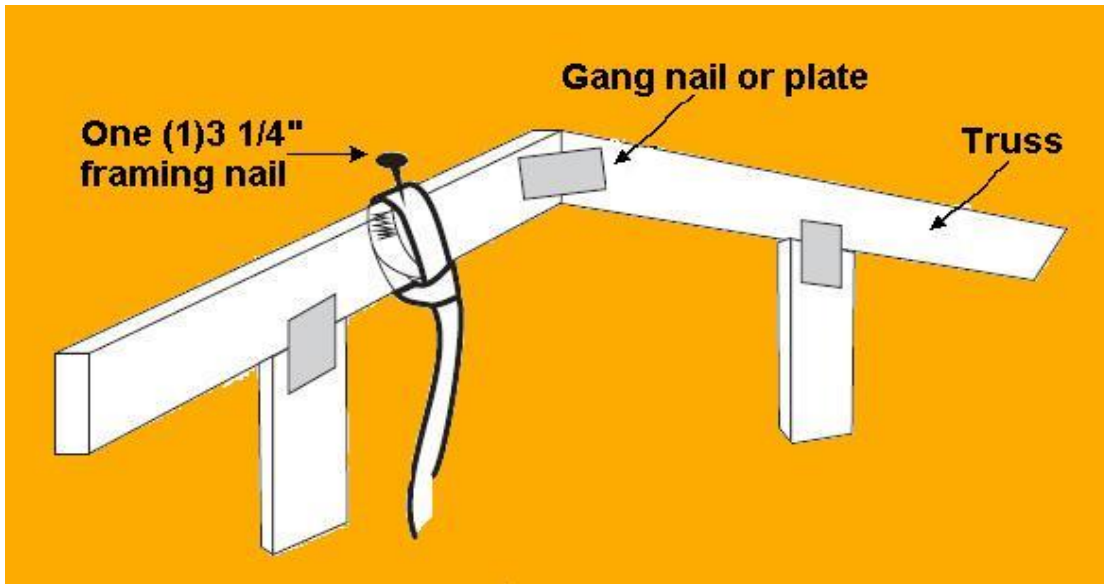


Gable End Roof Truss Anchors

Anchors must be installed on the gable end trusses which sit above a porch or lower roof before the trusses are installed. One anchor will be placed slightly right or left of the peak. The anchor will be placed to avoid the nailing plate. Additional anchors will be placed along the top diagonal member. They should be spaced 6 to 7 feet apart thereafter. The anchor at the lowest portion of the gable truss should be no more than 4 (four) feet from the corner of the structure.

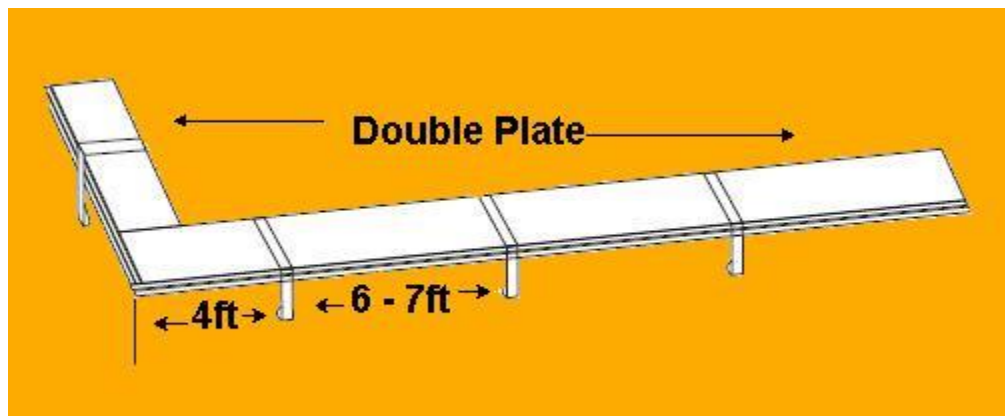


- Cut a 3" wide hole in the OSB sheathing just below the diagonal 2x4 member at each location where an anchor will be placed. The hole must be wide enough to allow the looped end of the anchor to pass through.
- Push the small loop through the hole.
- The large loop with the warning label passes through the smaller loop as the anchor is wrapped around the diagonal member of the gable truss.
- Pull tight to secure.
- Secure the anchor to the truss with a 16d sinker down through the anchor into the top of the truss. This will ensure the anchor will not slide out of position on the truss. Ensure that the anchor does not come in contact with the trusses nailing plate.
- The exposed portions of the anchor straps are to be cut and removed after as much Styrofoam insulation, upper soffit work and siding installation as possible are completed. The straps should be left up as long as possible and only cut when ready to install the pieces of soffit which will cover the strap.



Double wall plate

Anchors may be also installed on the double plate where additional fall protection is needed. They should be placed no more than 4 (four) feet from the corner and 6 feet apart thereafter. On gable ends, do not install anchors on the double plate. The anchors should be installed on the gable truss.



Anchors on double top plates should not be installed before the trusses. Installation of the anchor before the trusses are set could cause damage to the anchor as the trusses are dragged into position.

Cut Lifting Holes

- Cut two (2) 4" x 4" rectangular holes in the OSB sheathing about 15" below the peak of the gable end truss; 1 on each side of the center vertical member of the truss.

Position the truss for lifting

- With lots of hands, move the truss to a place where it can be accessed by the crane. Ensure it is not in the setup area for the crane.

Porch Gable Truss Preparation

Critical Issues

- The roof trusses are fragile until they are installed. Be careful not to bend them.
- The porch trusses with the 2x6 sub-fascia installed will overhang the porch beams by 12"; unless the trusses are built to continue the house roof out over the porch. No Styrofoam insulation is installed on the beams.

Safety Issues

- Fully assembled gable trusses are very heavy. Many hands will be needed to move them.
- The trusses are built with very sharp metal plates. When handling them, cut-resistant gloves are required.

Prepare the gable end trusses for porch roofs similarly to the gable end trusses for the house roof. (See "House Gable Truss Preparation" above).

Exceptions are:

- If the rake will extend over a porch gable which will not be covered with Styrofoam insulation, the rake will be built 12" wide. Cut the cross blocks to 9".
- These will not be raised-heel trusses.
- No Stiffeners will be required.
- These trusses will be installed without a crane.
- Cornice returns and aluminum fascia will be added later. The extra weight would make installation of the trusses harder and the aluminum might get damaged. These items can be easily added later.
- No anchors will be needed.

Gable End Trusses without a Rake

1. Install Nailers

- Repeat steps "Determine the Side to Prep" & "Install the Nailer" of "House Gable Truss Preparation".

2. Sheet Porch Gable Truss

- Repeat "Sheet Roof Gable Trusses" of "Prepare House Roof Gable Trusses".

3. Cut and Assemble Porch Siding Pocket (See Figure 8.8).

- Lay 1x4s along the diagonal members of the gable truss for spacers. Ensure they cover the entire diagonal member of the truss. Plumb cut the 1x4s at the peak and at the tails.

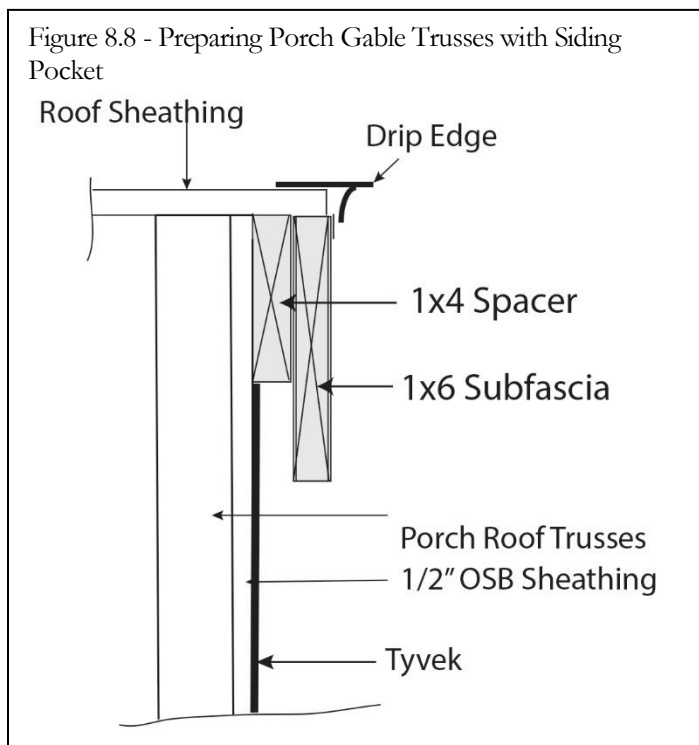
- Position the 1x4 spacers alongside of the diagonal truss; holding the top edge flush with the top of the diagonal members of the gable truss. Attach the spacers using 8d sinkers; one (1) nail every 12”.

4. Cover the OSB with Tyvek

- Install a layer of Tyvek over the OSB. Install rows of Tyvek starting at the bottom moving up to the top of the truss. Each row overlaps the previous row by 6”. Attach the Tyvek with 1” cap nails; three (3) rows with the nails 16” apart.

5. Attach Sub-fascia Boards

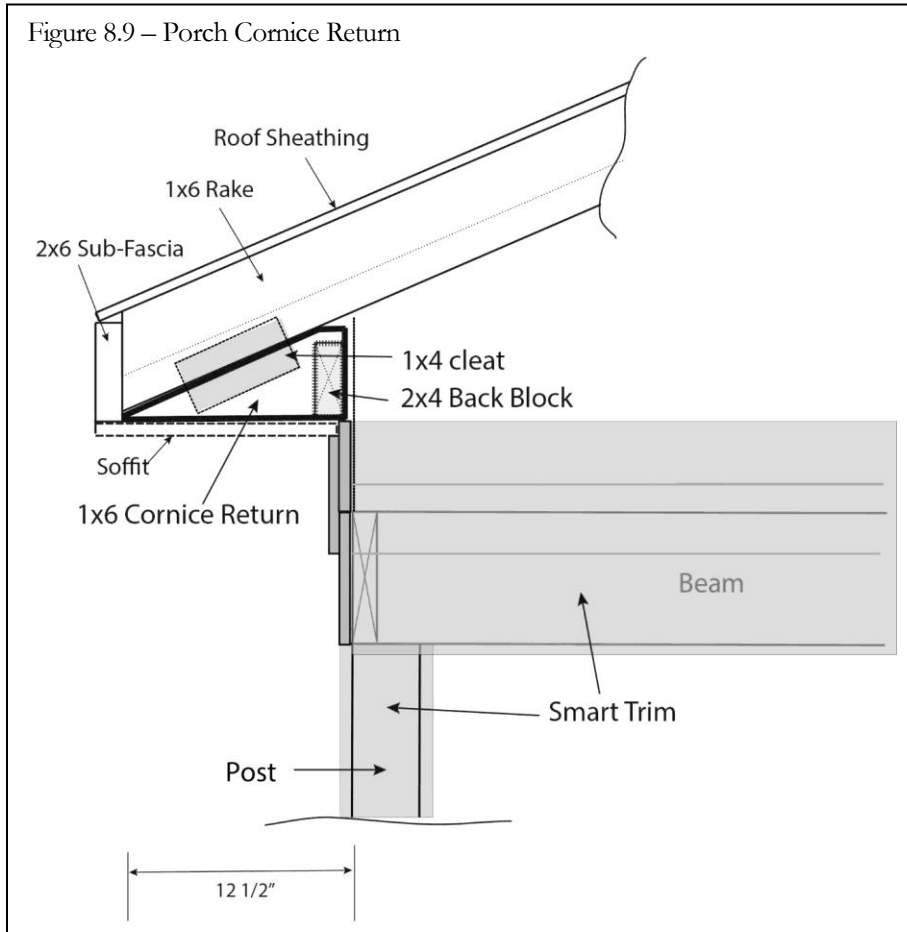
- Cut 1x6s for the sub-fascia boards which will fit over the 1x4 spacers forming a pocket for the siding.
- Plumb cut the 1x6s at the peak and at the tails.
- Position the sub-fascia board over the 1x4 spacers with the top of the board flush with the spacers.
- Nail the sub-fascia to the spacers with 16d sinkers; 2 nails every 12”.



6. Build Porch Cornice Returns. (See Figure 8.9)

- Cut cornice returns from a 1x6 at a length equal to the distance from the backside of the sub-fascia to the front side of the post below the cornice return. Cut the top edge to match the roof angle.
- Cut a short 2x4 back block and attach it to the bottom corner of the cornice return with 2 1/2” exterior screws.

- Cut a small 1x4 cleat and attach it to the diagonal edge of the cornice return with 1 ½” screws.
- Install the cornice return with 2 ½” exterior screws through the 2x4 block into the porch post and 1 ½” exterior screws through the 1x6 sub-fascia.



Garage Gable Truss Preparation

Critical Issues

- Prepping the garage gable end trusses will be very similar to prepping porch gable end trusses without a rake.

1. Install Nailers

- Repeat steps “Determine the Side to Prep” & “Install the Nailer” of “House Gable Truss Preparation”.

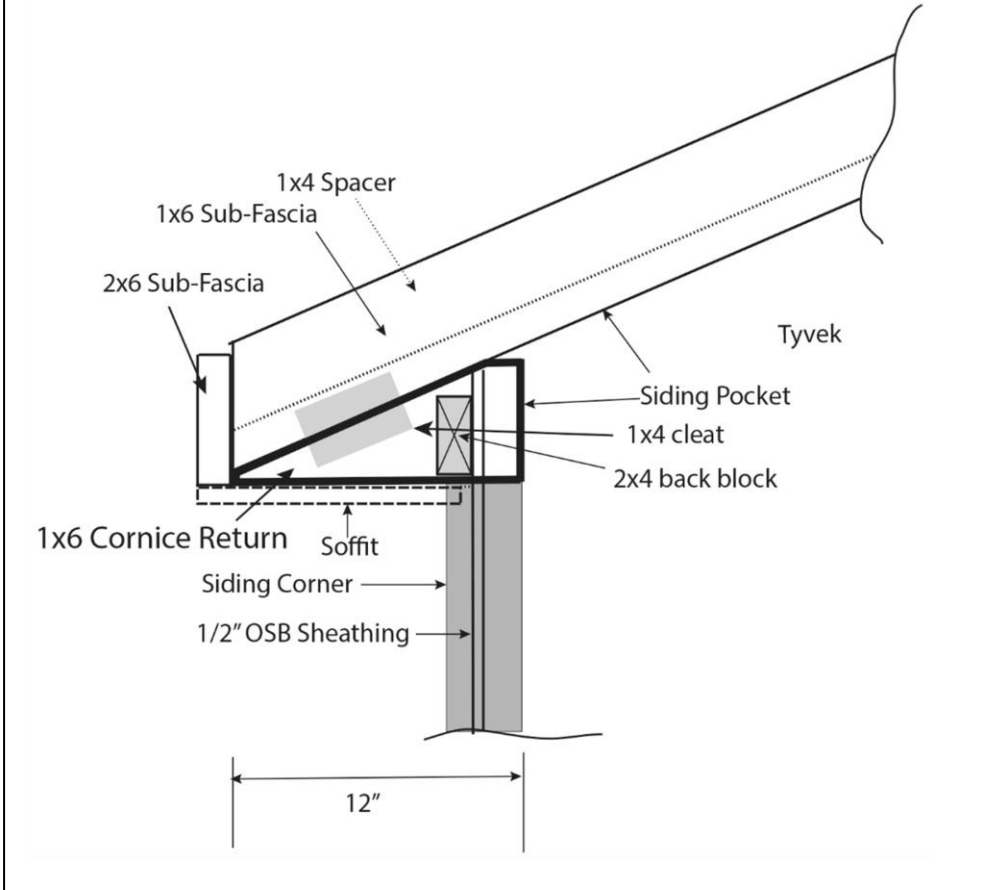
2. Sheet Porch Gable Truss

- Repeat “Sheet Roof Gable Trusses” of “Prepare House Roof Gable Trusses”.

3. Cut and Assemble Garage Siding Pocket (See Figure 8.10).

- Lay 1x4s along the diagonal members of the gable truss for spacers. Ensure they cover the entire diagonal member of the truss. Plumb cut the 1x4s at the peak and at the tails.
 - Position the 1x4 spacers alongside of the diagonal truss; holding the top edge $\frac{1}{2}$ " above the top of the diagonal members of the gable truss. Attach the spacers using 8d sinkers; one (1) nail every 12".
4. **Cover the OSB with Tyvek**
- Install a layer of Tyvek over the OSB. Install rows of Tyvek starting 6" below the bottom moving up to the top of the truss. Each row overlaps the previous row by 6". Attach the Tyvek with 1" cap nails; three (3) rows with the nails 16" apart.
5. **Attach Sub-fascia Boards**
- Cut 1x6s for the sub-fascia boards which will fit over the 1x4 spacers forming a pocket for the siding.
 - Plumb cut the 1x6s at the peak and at the tails.
 - Position the sub-fascia board over the 1x4 spacers with the top of the board flush with the spacers.
 - Nail the sub-fascia to the spacers with 16d sinkers; 2 nails every 12".
6. **Build Garage Cornice Returns.** (See Figure 8.10)
- Cut cornice returns from a 1x6 to a length of 12". This should bring that edge in line with the inside edge of the siding corner which will be installed later.
 - Cut the top edge to match the roof angle.
 - Cut a short 2x4 back block and attach it to the bottom corner of the cornice return with 2 $\frac{1}{2}$ " exterior screws.
 - Cut a small 1x4 cleat and attach it to the diagonal edge of the cornice return with 1 $\frac{1}{2}$ " screws.
 - Install the cornice return with 2 $\frac{1}{2}$ " exterior screws through the 2x4 block into the Garage and 1 $\frac{1}{2}$ " exterior screws through the 1x6 sub-fascia.

Figure 8.10 - Garage Cornice Return



Roof Trusses Layout

Critical Issues

- The roof trusses will either run from front to back or from side to side.
- The trusses should be stacked over the wall studs. Every other truss should be positioned over a wall stud.

1. Identify the Side of the House to be Used to Align the Trusses

Select the longest and straightest wall for aligning the trusses. Any variance in the positioning of the trusses will be most obvious on this side so it is the best choice.

2. Re-Check Alignment of the Walls

All exterior walls must be re-checked for straightness before setting the trusses. Refer to String Exterior Walls in the “Walls” chapter.

3. Mark Locations for the Gable Trusses

- The gable trusses will sit on the end walls with the OSB on the trusses aligning directly above the OSB on the wall. On each of the end walls, measure back 5” from the outside edge of the end wall’s top plate and draw a line for positioning the gable trusses. The front edge of the nailer will be aligned to this line.

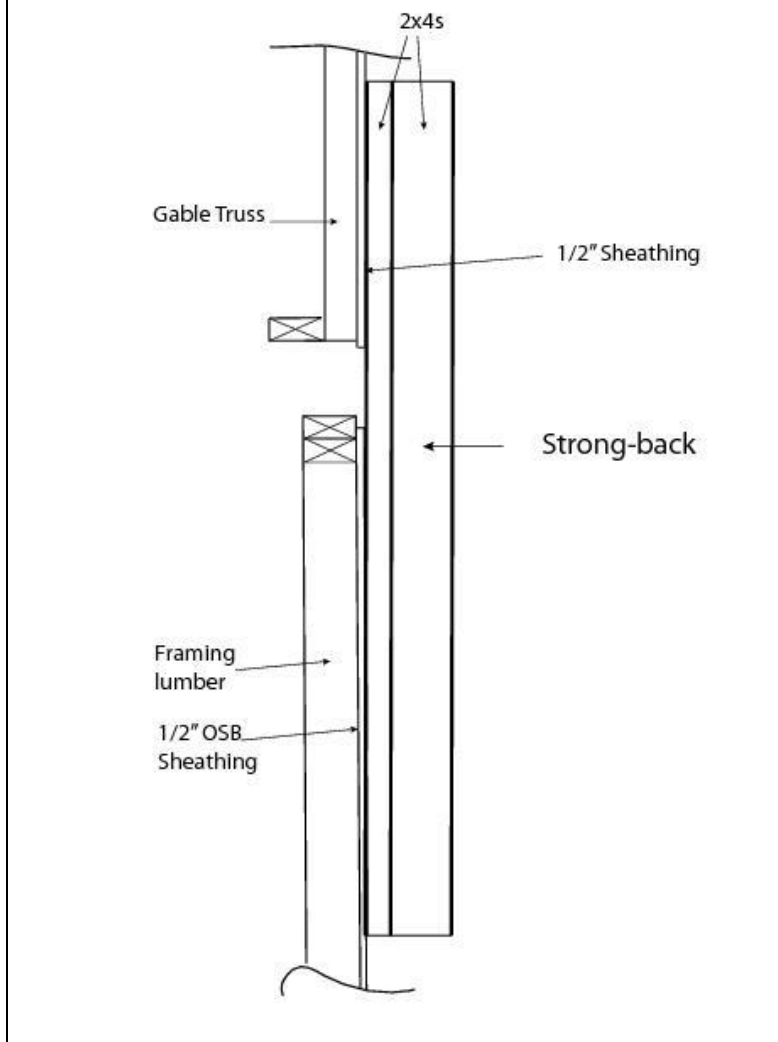
4. Mark Locations of the Common Trusses on the Top Plate

- Using a speed square, draw lines on the top plate for installing the trusses. Drawing two (2) lines 1 ½” apart, one for each side of the trusses will eliminate confusion for the installers.
- Start at the same end of the house from which the studs were laid out. Lay out the trusses at 24” OC from the outside of the top plate of the end wall. The two lines for the first truss will be marked at 23 ¼” and 24 ¾” from the outside edge of the end wall’s top plate. Continue down the side of the house adding 24”s to these measurements for each truss. Every other truss should be aligned with a wall stud below.
- Transfer these same marks to the opposite wall.

5. Mark Roof Trusses

- While the trusses are still stacked up, identify the side of the trusses which will be installed on the alignment side. Mark that side with spray paint.

Figure 8.11 – Strong-back



Install Strong-Back Bracing

On each wall on which a gable truss will be installed, install one or more strong-backs. These will support the gable truss when it is placed on the wall until the internal bracing is in place. (See Figure 8.11)

- Cut two (2) 2x4 to a length of 7' to 8'. Assemble them into a "T".
- Place the strong-back on the house in line with the framing lumber in the walls. Extend the strong-back up 2' above the wall and nail it into the framing lumber of the house with four (4) 16d sinkers.

Truss Pre-Installation Checklist

- Ensure the strong-backs are installed and secure.
- Ensure all the gable end trusses are prepped with:
 - nailers
 - stiffeners
 - rakes
 - lower roof supports
 - fall protection anchors
 - lifting holes
 - cornice returns (if possible)
 - cornice return covers (if possible).
- Ensure the proper side of each gable end truss has been prepped. (Rakes built on the side which will face outside the building)
- Ensure the truss layouts are correct and match the Engineering Drawings.
- Ensure the floor trusses; wall studs; and roof trusses stack from bottom to top.
- Ensure the work areas are clean and clear of trip hazards.





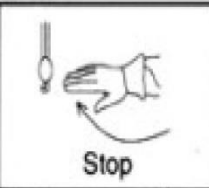
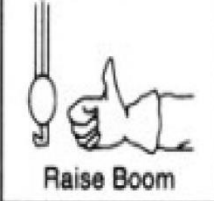
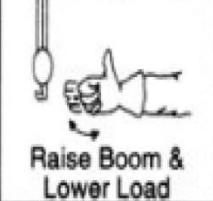
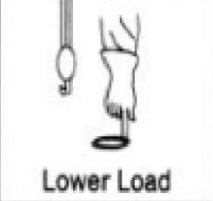
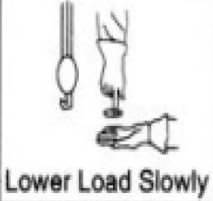

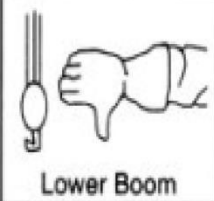

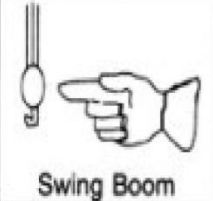


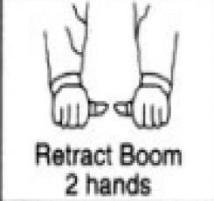




Crane Day

Setting up for the crane

Safety Issues

- Setup the control zone
 - Rope off the area under the crane boom and around the house.
- Post signage
 - Place “Crane Above” signage at the front and back of the yard.
- Check equipment
 - Check the slings and tag lines for cuts and snags.
- Limit the number of volunteers on site to only those needed to set the trusses.
- Assign Crane Signaler and Crane Riggers
 - Pick one volunteer whose only assignment will be to communicate with the Crane operator. This volunteer must be familiar with crane usage, proper loading and load movement.
- Assign one or more Crane Riggers. The Riggers will be responsible for properly securing the load. One of the Riggers must also man the tag line and ensure the load remains stable.
- Ensure the proper slings and tag lines are available.
- Review crane signals with Crane Operator to ensure you both understand the signals to be used.

Crane Hand Signals

 Main Hoist	 Auxiliary Hoist	 Hoist Load	 Hoist Load Slowly	 Stop
 Raise Boom	 Raise Boom & Lower Load	 Lower Load	 Lower Load Slowly	 Emergency Stop
 Lower Boom	 Lower Boom & Raise Load	 Swing Boom	 Swing Boom Slowly	 Travel (mobile eqpt)
 Retract Boom 2 hands	 Retract Boom 1 hand	 Extend Boom 2 hands	 Extend Boom 1 hand	 Dog Everything

Hoist Load – Used to raise the trusses off the ground. The load goes straight up.

Raise Boom – Used to raise the trusses above the second floor walls. The load will rise up but will also move closer to the crane.

Extend Boom – Used to move the trusses over the second floor walls. The load will move out but will also lift up.

Raise Boom and Lower Load – Used to make fine adjustments to the placement of the trusses. The load will move closer to the crane but will not raise up.

Lower Boom and Raise Load – Used to make fine adjustments to the placement of the trusses. The load will move further away from the crane but will not lower down.

Swing Boom – Used to move the truss left or right when placing the truss.

Lower Load – Used to lower the truss onto the walls.

Stop – Used to stop moving the truss and hold in place.

Place the Bathtub in the House

For a two-story house, it is much easier to get the bathtub unit into the house before the roof is installed. Using the crane, lift the tub into place. The crane operator has 2 large straps that will cradle the tub for lifting. Wrap around tub, place one end through the loop of the other end and hook on to the ball. Raise the tub and set it into place. (See Figure 8.12).

Set Roof Sheathing

For a two-story house, it is much easier to get the roof sheathing for the upper roof into the house before the trusses are installed. Split the stack of OSB roof sheathing into a pile for any lower roofs and a pile for the upper roof. Be sure to build the piles on scraps of 2x4, placed so the lifting straps can wrap around the pile at each end. Wrap the pile of OSB with the two (2) straps. Feed one end of each strap through the loop on the other end; then hook it to the ball. Using the crane, lift the upper roof stack of OSB onto the second-floor deck and set it perpendicular to the floor joists to distribute the weight. The stack must be set on scrap 2x4s to allow the straps to be removed. Do not place the OSB in an area that will need to be accessed to set the trusses.

Lifting the Trusses

Pass the ends of the strap through the holes or opening at the top of the truss, just below the diagonal member, and then hook both loops on the ball.

Figure 8.12 – Bathtub hooked to crane



Truss Setting

Set House Roof Trusses

1. Stage Truss Setting Materials

a) Place a supply of materials which will be needed to set the truss in a place where they can be quickly accessed. Placing the materials in the center of the house should keep them out of the work areas. Items to be staged, as shown in figure 8.13, are:

- a. Truss Spacers Restraint (TRBR)
- b. (4) 27" 2x4 blocks for first and last truss bay spacers
- c. (2) 14' 2x4s and (2) 12" 2x4 nailing blocks for gable truss supports
- d. (4) 12' 2x4s for common truss diagonal bracing
- e. Enough 2x4s for the cat walks.

b) Gable Truss Supports

Stage a 14' 2x4 and a 12" block of 2x4 for each gable truss. These will provide a diagonal support to the floor for the gable trusses.

c) Truss Spacer Restraint (TRBR) (See Figure 8.13)

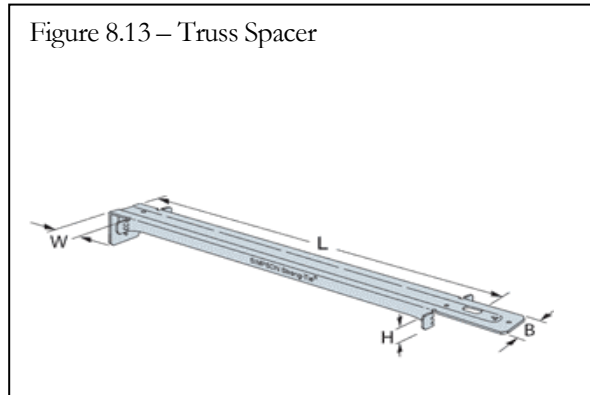
Stage two (2) truss spacers for each truss bay, except the first and last bays.

d) Short 2x4 Truss Spacers

Stage four (4) 27" 2x4 blocks. These blocks will be used to anchor the first and last common trusses to the gable end trusses.

e) Diagonal Common Truss Supports

Stage four (4) 12' 2x4s for each gable truss near each wall where the trusses will be installed. These will extend up at an angle from the mid-point of the diagonal members of the gable trusses to the peak and down from the mid-point to the tails.



2. Possible Truss Setting Assignments

a. **(Truss Nailers)** Assign two (2) volunteers to align the trusses and nail them to the top plate. Each volunteer will work from a 7' platform ladder positioned just inside the exterior walls. If exterior scaffolding is in place, the Truss Nailers may work from the scaffolding. The Truss Nailers must wear cut resistant gloves.

- b. **(Gable Nailers)** Assign two (2) volunteers to nail the overhanging OSB on the gable truss to the top plate. Each volunteer will work from either a shorter straight ladder (1st floor) or a longer extension ladder (2nd floor) positioned against the wall on which the gable end truss will sit.
- c. **(Bracers)** Assign two (2) volunteers to attach the truss spacers to the tops of the trusses; approximately 5' from the tails. Each volunteer will work from a 10' platform ladder positioned 4' to 6' inside the exterior wall.
- d. **(Support)** Assign one or two volunteers to provide the Bracers and Nailers with materials.
- e. **(Rigger)** Assign one (1) volunteer to hook up the trusses to the crane and tie on the tag line. The Rigger must wear cut resistant gloves.
- f. **(Movers)** Assign one or two volunteers to position the trusses for the Rigger. The Movers must wear cut resistant gloves.
- g. **(Tag Line)** Assign one (1) volunteer to manage the tag line.
- h. **(Signaler)** Assign one (1) volunteer to communicate with the crane operator.

3. Set First Gable Truss

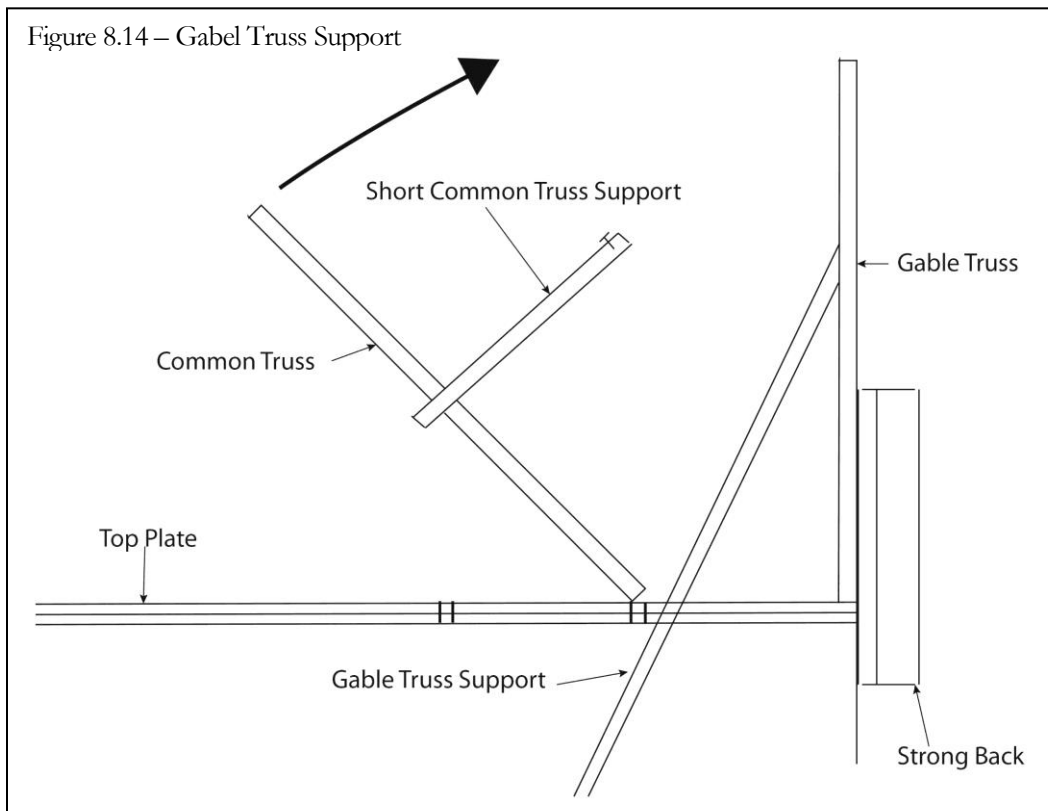
Safety Issues

- Communicate to the volunteers on site where the control zone has been set up and to stay out of it.

- a. The crane will lift the first gable end truss onto the top plate of the starting wall.
- b. The Truss Nailers will slide the heel of the truss to align with the outside edge of the top plate on the alignment side of the house (as identified above) and against the strong-back braces. The OSB on the truss should be flush with the exterior wall OSB.
- c. The truss must be sitting down snugly on top of the top plate. If the truss is bowed up, ensure the OSB on the truss is clear of the OSB on the wall.
- d. When the truss is in place, from the outside the Gable Nailers will toenail 16d sinkers down through the OSB and bottom member of the truss into the top plate; 1 nail every 16".
- e. The Gable Nailers will also nail the OSB overhanging the gable truss to the top plate of the wall with 8d sinkers; 1 every 8".
- f. Once the truss is anchored down from the outside, the Truss Nailers will nail it to the wall with 16d sinkers down through the nailer into the top plate.

4. Install "Gable Truss Supports"

- a. The Bracers will attach diagonal 14' 2x4 supports to the truss; one every 8' to 10' across the entire truss. Attach them about $\frac{3}{4}$ of the way up the vertical members with 16d sinkers through the support into the vertical member. The supports will extend down to nailing blocks on the floor.
- b. The Bracers will install the short 2x4 nailing blocks on the deck positioned above the framing lumber below the deck. Attach the blocks with 16d sinkers; 2-3 nails per block.
- c. While the Truss Nailers, using a 4' level, hold the truss plumb, the Bracers will attach the diagonal support to the nailing block with 16d sinkers through the side of the support into the nailing block.
- d. Make sure the angle of the brace is very steep so it does not interfere with setting the next truss. (See Figure 8.14).



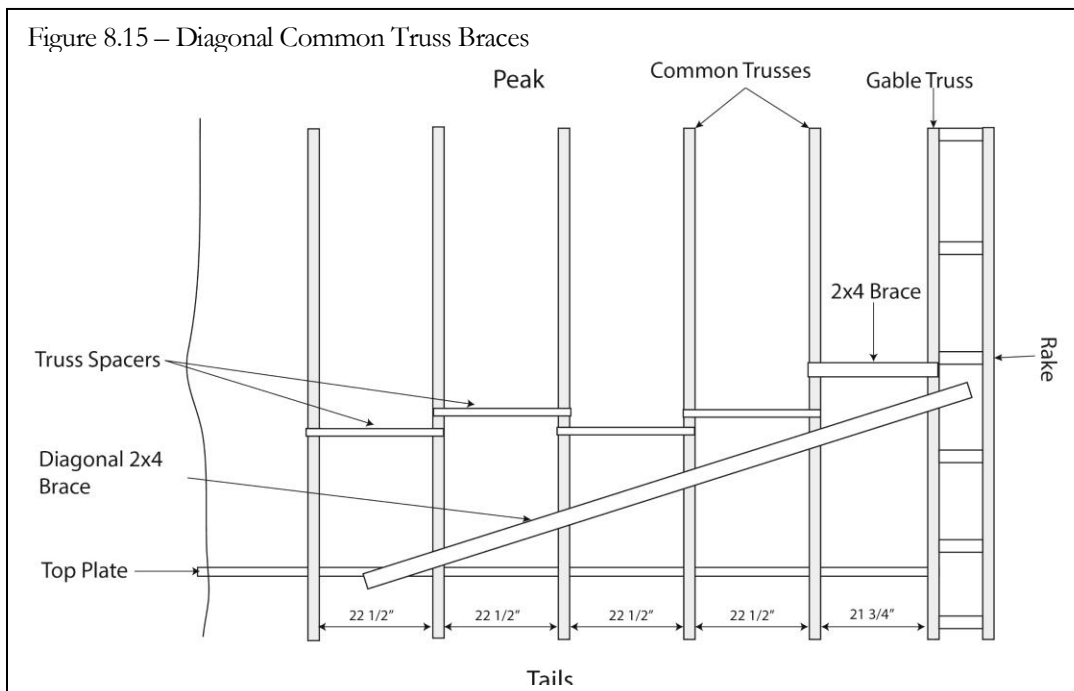
5. Set Common Truss.

- a. The crane will lift the truss onto the top plates of the side walls.
- b. The Truss Nailers will slide the heel of the truss to align with the outside edge of the top plate of the alignment wall.
- c. The truss must be sitting down snugly on the top plates. If the truss is bowed up, ensure the truss is clear of the center walls.
- d. Place the truss between the layout lines and aligned with the top plate.

- e. Temporary spacer blocks positioned between the truss and the previously installed truss will support the truss while it is being nailed and will prevent splitting out the sides. Toe-nail the truss into the top plate with 16d sinkers, 1 nail on each side of the truss.
- f. The Spacers will install the Truss spacers. Install one (1) spacer on each end of the truss; about 4' to 5' up from the tails. Attach the Truss Spacer to the top of the current truss and the previously installed truss with 1 3/4" roofing nails; 1 nail through the hole in each end of the spacer.
 - a. Attach the Truss Spacer to the previously installed truss first. Ensure the trusses are spaced 24" o.c.
 - b. The Truss Spacers will not fit in the first and last bays. A short 27" 2x4 block will be installed on each end of these trusses; anchoring them back to the gable end trusses. Plumb both the common truss and the gable end truss and attached the 2x4 brace with 16d sinkers; 1 nail in each end.

6. Install Diagonal Common Truss Braces

The Bracers will position a 14' 2x4 diagonally across the gable end truss and the next four (4) common trusses. They will attach the diagonal brace to each truss with a 16d sinker. (See Figure 8.15).



7. Store 2x4s for Catwalks

After half of the common trusses have been set, store inside of the trusses two (2) sets of 14' long 2x4s; one set on each side of the house. Load the 2x4s into an area of the trusses approximately 7' from the exterior walls;

resting on the horizontal members. Load into each side enough 2x4s to cover a distance 1 ½ times the length of the house. These are the catwalk boards and will be installed after the trusses are set and plumbed. (See “Install Cat Walks” below).

8. Set Last Gable Truss

Set the last gable truss using the same procedure as used to set the first gable truss. Also, add “Diagonal Common Truss Supports” to this end, as before.

Set Shed Porch Trusses

- Snap a chalk line on the house even with the tops of the porch beams.
- Nail a 2x4 ledger board on to the OSB above the chalk line with 16d sinkers every 16”. Nail into the studs behind the OSB.
- Mark the location of the trusses on the front beam. They should be 24” OC from one end. Follow the same procedure as “Layout the Roof trusses” above.
- Mark the ledger board with marks which match the beam.
- Set the porch gable end trusses
 - Set the porch gable end truss on top of the porch beam.
 - Flush the OSB on the truss with the OSB on the side of the house. The OSB on the truss should hang over the beam with the truss sitting on the beam.
 - Nail down through the horizontal member of the truss into the beam with 16d sinkers; 1 nail every 16”.
- Set the intermediate porch trusses
 - Set the trusses spanning between the ledger board and the front beam.
 - Position the trusses on the marks and toe-nail the truss into the top plate of the porch beams with 16d sinkers; 2 nails on each side.
 - Toe-nail the truss into the ledger with 16d sinkers; 2 nails on each side.

Set Garage Roof Trusses

The garage roof trusses are set using the same procedure as the house roof trusses. 7’ and 10’ platform ladders will be needed.

Truss Post-Installation Checklist

- Ensure all trusses are installed per the Engineering Drawings with the correct nailing patterns.
- Ensure all trusses are nailed down and secure.

- Ensure all temporary diagonal bracing has been installed.
- Visually check to ensure the truss tails line up.
- Visually check to ensure the trusses are all plumb, straight, and correctly spaced. Loosen supports and replumb as necessary.
- Ensure the work areas are clean and clear of trip hazards.

Sub-fascia

Install Sub-fascia Boards on Tails

Critical Issues

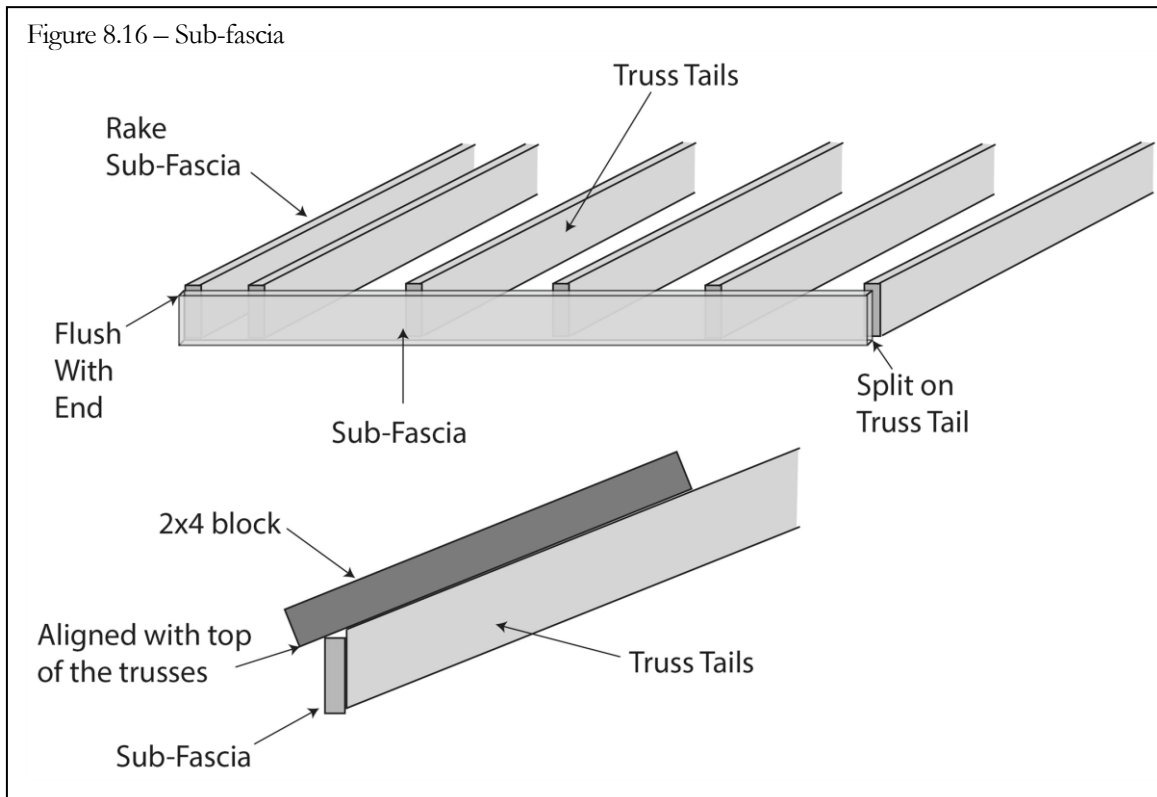
- At least two (2) volunteers on the correct ladders will be needed on the outside of the house and one (1) volunteer on the inside on a platform ladder will be needed.
- The trusses must be plumb before installing the sub-fascia.

Safety Issues

- The correct ladders must be used. On the outside of one story houses 16' extension ladders should be used. On the outside of two story houses 24' extension ladders should be used. On the inside of either, a 7' platform ladder should be used.

1. Measure and Cut Sub-fascia Boards.

Cut sub-fascia which will cover the tails of the trusses from 14' long 2x6s. The boards will extend from the outside edge of the first gable rake to the outside edge of the last gable rake. Joints between boards must fall in the center of a truss tail. (See figure 8.16)



2. **Install Sub-fascia Boards to Truss Ends.** (See Figure 8.16)
 - Set up two extension ladders on the outside of the house, one positioned at the end truss where the sub-fascia will be attached. Set up one platform ladder inside the house along the wall where the sub-fascia will be attached.
 - The volunteers on the outside of the house will lift the sub-fascia into position on the tails of the trusses to be covered. Start at the rake sub-fascia at one end of the roof.
 - The volunteer on the inside of the house will hold a 2x4 block on the top of the diagonal member of the truss.
 - The outside volunteer will push the sub-fascia flush to the bottom of the block and attach to the truss with 16d sinkers; 2 nails through the sub-fascia into the truss tails. The inside volunteer must ensure the truss is perpendicular to the top plate before attaching the sub-fascia.
 - Move the extension ladders and platform ladder down the wall to attach the sub-fascia to each truss.

Truss Heel Sheathing

Install Sheathing on the House Truss Heels

1. Cut pieces of ½" OSB to cover the area above the OSB sheathing on the exterior walls up to the bottom of the truss diagonal members. Joints between pieces of OSB must occur over vertical framing lumber.
2. Apply a bead of caulk across the top of the wall sheathing before installing truss sheathing.
3. Position the truss sheathing above wall sheathing and secure with 8d sinkers; 1 nail every 12" along the vertical framing lumber and every 8" along the horizontal framing lumber.

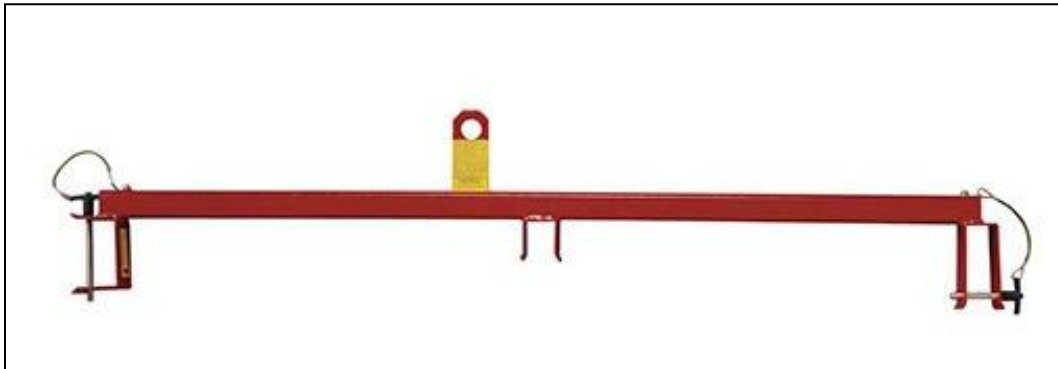
Install Sheathing on the Porch Truss Heels

1. Cut pieces of ½" OSB to cover the area from the bottom of the truss tails to the bottom of the porch beam. Joints between the pieces of OSB must occur over the end of a truss tail.
2. Cut pieces of ½" OSB to cover the area from the bottom of the truss gables to the bottom of the porch beam.
3. Position the truss sheathing along the bottom of the beam and secure with 8d sinkers; 1 nail every 12" along the bottom of the beam and every 8" along the horizontal framing lumber.

Common Truss Anchors

Once the trusses are all set and anchored, install the truss Super Anchors. These anchors will provide fall protection for completing the bracing for the trusses. These anchors will also be used by the roofers as they install the roof sheathing.

1. Remove all 3 pins by pressing in on the release button and pulling.
2. Slide the anchor over three (3) consecutive trusses.
3. Reinsert the pins, again pressing in on the release pins.



Truss Bracing

Install Diagonal Wind Bracing

Critical Issues

- Refer to the Truss Engineering Document to verify the specific instruction for truss bracing.

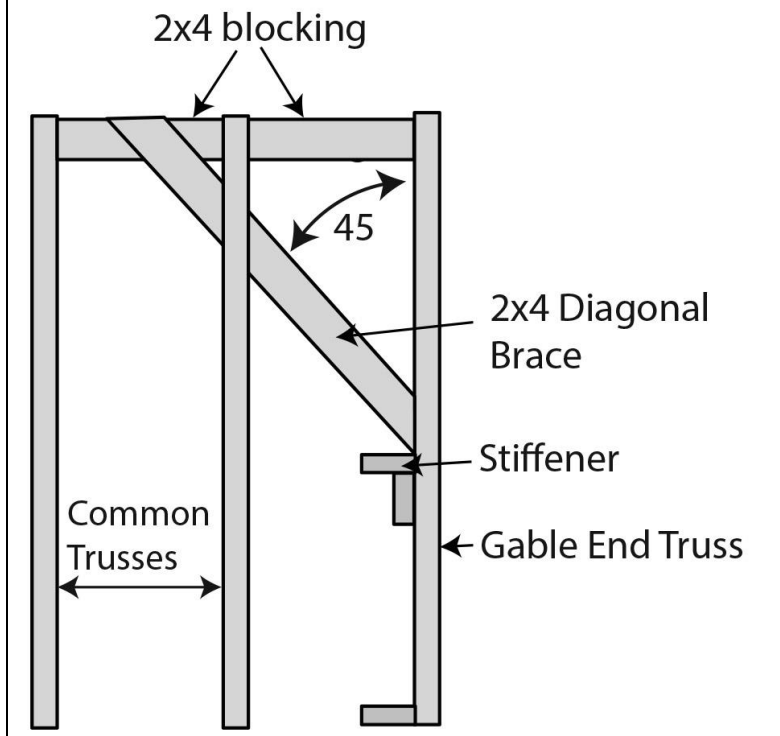
Safety Issues

- Installing the diagonal bracing will require working in the trusses. Workers must wear safety harnesses and be anchored to the truss anchor point above.

Diagonal braces must be added to the gable end trusses. The number, location and direction of the bracing depends on the height to the gable end truss. Bracing for each size gable end trusses is as following:

- Trusses taller than 7' 6", the bracing must be installed every 4' across the stiffener to 2x4 blocking between the tops of two (2) common trusses.
- Trusses between 4' 6" and 7' 6" tall, the bracing must be installed every 6' across the stiffener to 2x4 blocking between the tops of two (2) common trusses.
- Less than 4' 6", install one (1) brace from the peak of the gable end truss to 2x4 blocking between the bottom cords of two (2) common trusses.

Figure 8.17 – Gable End Truss Diagonal Bracing



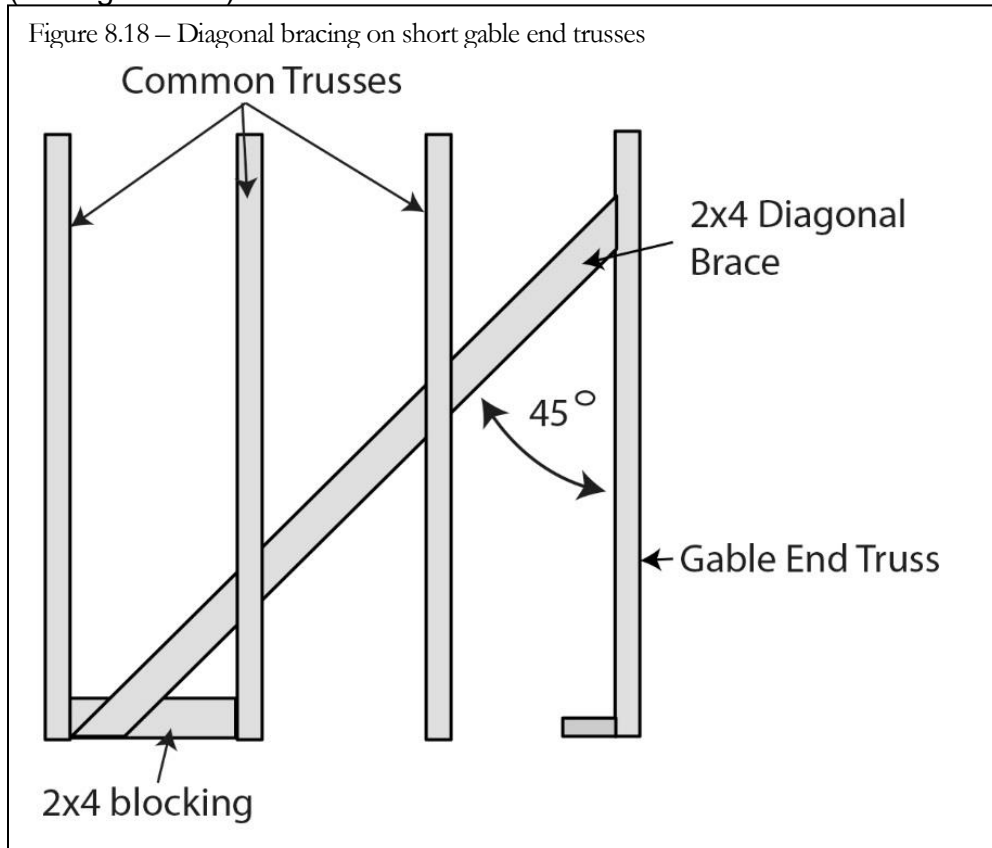
For trusses greater than 4' 6":

1. Mark the Stiffener with the location of the bracing.
2. Cut a 45 degree angle on the end of a 2x4. Hold the 2x4 in place on the stiffener at a 45 degree angle to the gable end truss. Mark the top of the 2x4 at the point where it crosses the plane along the top of the trusses. Cut the top of the 2x4 brace at a 45 degree angle at that point.
3. On the trusses on either side where the bracing crosses, mark the location of the 2x4 blocking. Cut a 22 1/2" 2x4 block and install it between the top of the two trusses at that point with 16d sinkers; 2 nails through each truss into the blocking.
4. Attach the 2x4 brace to vertical member of the gable truss just above the stiffener and blocking as shown in figure 8.17. Toe-nail the brace to the vertical member with 16d sinkers; and 2 nails on each side of the brace. Nail the brace to the blocking with three (3) 10d sinkers.

For trusses 4'6" or less:

1. Cut a 45 degree angle on the end of a 2x4. Hold the 2x4 alongside of the center vertical member of the gable end truss; just below the peak; and at a 45 degree angle. Mark the bottom of the 2x4 at the point where it crosses the plane along the bottom of the trusses. Cut the bottom of the 2x4 brace at a 45 degree angle at that point.
2. On the trusses on either side where the bracing crosses, mark the location of the 2x4 blocking. Cut a 22 1/2" 2x4 block and install it between the bottom of the two trusses at that point with 16d sinkers; 2 nails through each truss into the blocking.

3. Attach the 2x4 brace to the vertical member of the gable end truss with 10d sinkers; 3 nails through the brace. Nail the brace to the blocking with three (3) 10d sinkers. (See figure 8.18).

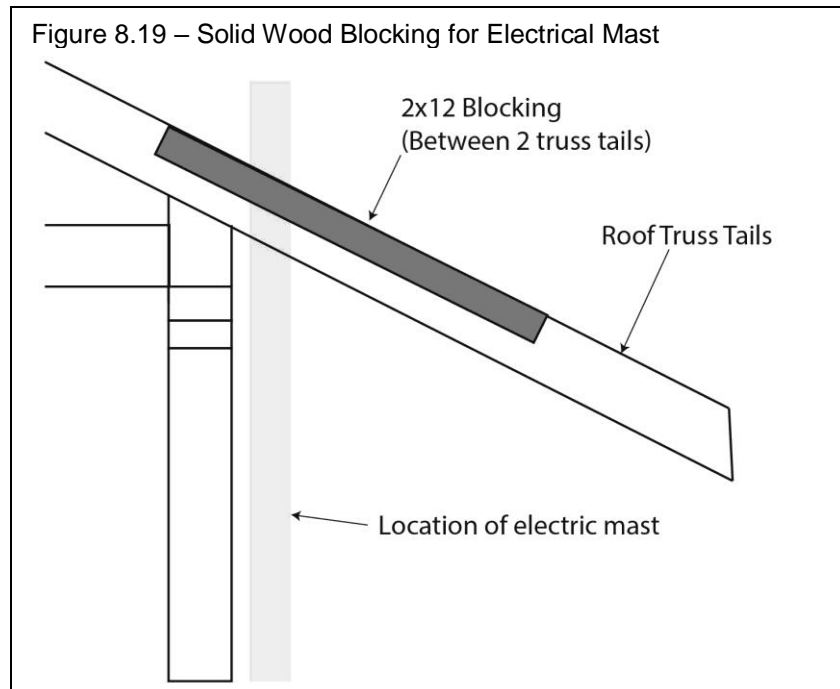


Install Cat Walks

- Nail the 2x4s cat walk to the trusses holding the trusses to 24" OC. Nail down through the 2x4 cat walks into the horizontal truss member, using 16d sinkers; 2 nails per truss. Ensure the lengths of 2x4 overlap by 1 bay.

Solid Wood Blocking for Electrical Mast

If the electrical mast will extend through the roof, identify its location and add 2x12 blocking between the roof trusses tails above that location. (see figure 8.19)



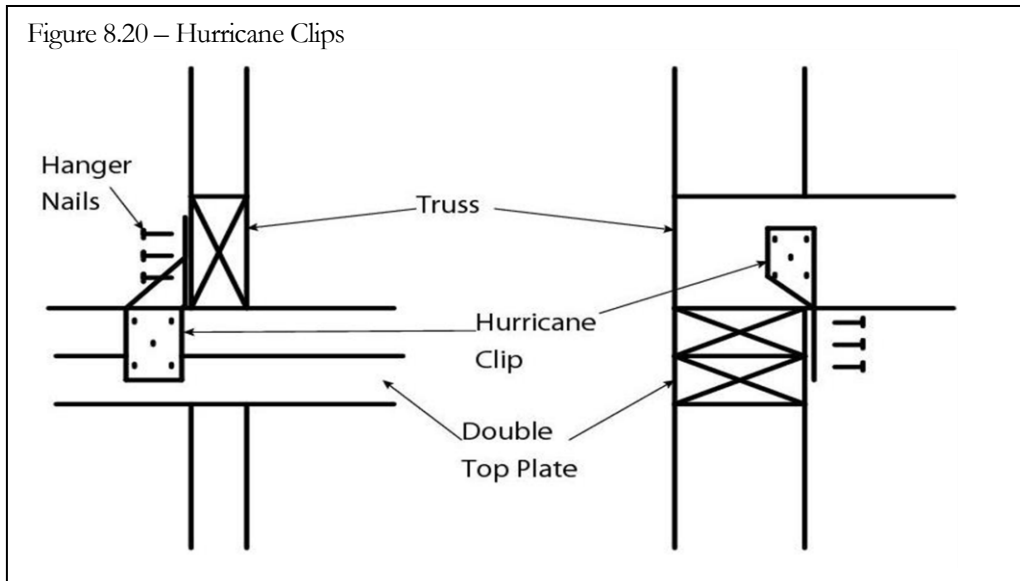
Install Hurricane Clips

Critical Issues

- Installing the hurricane clips is often dangerous to the fingers. Holding the nails with needle-nose pliers keeps the fingers out of the way of the hammer head.

Safety Issues

- Use the correct ladders. Platform ladders in open areas or straight ladders in close areas work best. Do not lean step ladders.
- Install the metal framing ties (hurricane clips) with hanger nails to fasten the trusses to the double top plate. (See Figure 8.20)
 - Hurricane clips are required for all house and garage trusses.
 - Install 1 tie to each end of each truss. Attach the plates using Simpson nails; a nail must be installed in every hole of the tie.
 - Make sure the tie is installed so the top fin does not hang below the truss.



Truss Bracing Check list

- Ensure wind bracing is installed to support the gable end trusses.
- Ensure the sub-fascia is all installed and securely nailed to each truss or rake tail.
- Ensure one hurricane tie is installed at each end of each roof truss and all holes are filled with hanger nails.
- Ensure the Joist hangers are all installed, and all nail holes are filled with hanger nails.
- Ensure all girder trusses are fully posted with double studs to foundation as required.
- Take pictures of completed items
- Ensure work site is clean and materials are properly stored before proceeding.

Roof Sheathing

Sheet the Roof

Critical Issues

- Most house roof sheathing is done by roofing sub-contractors. Check with the Habitat Superintendent for specific on each house.
- The roof sheathing is installed perpendicular to the trusses

Safety Issues

- Fall Protection is required on all roofs.

1. Install Fall Protection

- Install the anchors. The anchors will be attached to the trusses per the Manufacturer's instructions. One anchor is required for each person on the roof. (See "Common Truss Anchors" above).
- Each person on the roof must wear a harness and be attached to an anchor with a retractable lifeline.

2. Install First Row of Sheathing.

- Snap a chalk line across the tops of the trusses, 48 1/2" from the outside edge of the sub-fascia board. The first sheets of OSB will be aligned with this line.
- The sheathing cannot extend past the edge of the sub-fascia. With a 5-12 pitch roof the top edge of the sub-fascia will extend 3/16" past the bottom edge.
- Cut a 4x8 sheet of 1/2" OSB to a length to cover the rake and first three (3) bays; to the mid-point of the third common truss. Place the cut edge over the rake.
- Snap chalk lines across the first sheet of OSB at 24", 48" and 72" from the non-cut edge. These lines will be used to identify where to install the nails.
- Lay the first sheet of OSB on the tops of the trusses with top edge flush to the chalk line. This is best done from inside the house with two volunteers on platform ladders. All roof sheathing must be installed with the rough side up.
- Align top back corner with the edge of the rake sub-fascia and the chalk line, then nail top back corner to rake with one (1) 8d sinker. Align the top front corner with the chalk line and in the middle of the third common truss, then nail in place with one (1) 8d sinker.
- Pull the middle trusses to the chalk lines on the OSB and place one (1) 8d sinker through the top edge of the OSB.

- From an extension ladder, nail the bottom edge of the OSB to the trusses.
- Finish nailing each line with 8d sinkers every 8”.
- Continue sheathing the first row with full sheets of OSB using the same process. Loosely butt each sheet to the previous sheet.
- Cut the last sheet to fit over the front rake. This sheet must cover the gable rake, gable truss, and at least 2 trusses back. If the opening is too small, cut the previous sheet to 72”.

3. Install Slide Guards.

Safety Issues

- **Slide Guards are not fall protection. Anyone on the roof must wear a harness.**

- From an extension ladder, attach roof jacks to the top of the first row of OSB using 16d sinkers.
- Lay 2x6s across the jacks to form a slide barrier.

4. Install 2nd Row.

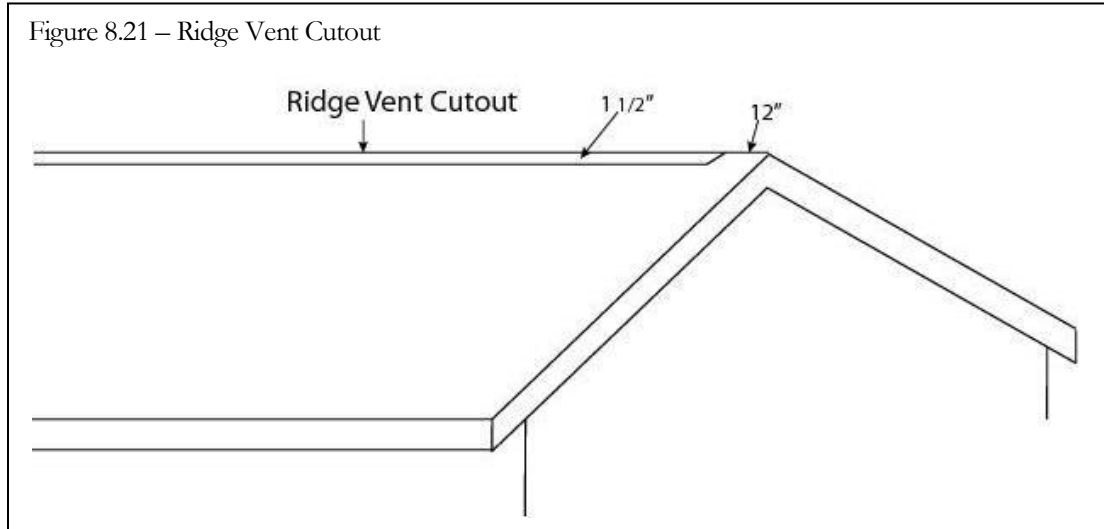
- Cut a piece of ½” OSB to cover the rake and the 1st bay to the middle of the 1st common truss. This will stagger the sheathing to ensure that no two vertical joints fall on the same truss.
- Snap chalk lines across the first sheet of OSB at 24” from the front.
- Install “H” clips between the 1st and 2nd rows of sheathing; 1 in the middle of each bay.
- Slide the half sheet of OSB into the “H” clips and flush with the back edge of the 2x6 rake sub-fascia. The front edge of the OSB should split the 1st common truss.
- Nail the top corner on the rake with 8d sinkers.
- Align the common truss with the chalk line and nail the top edge.
- Standing on the first row of sheathing, finish nailing each row with an 8d sinkers every 8”.
- Continue sheathing the second row using full sheets of OSB. Insert “H” clips at every space between the trusses.

5. Install Remaining Rows.

- Alternate starting with full and half sheets of OSB.
- Snap chalk lines on each sheet of OSB 24” OC.
- Install “H” clips between all remaining rows of sheathing; 1 in the middle of each bay.

6. Install Ridge Vent Cutout. (See Figure 8.21).

- The last row will be cut to a width which is 1 ½" less than the distance from the top edge of the previous row and the top peak of the house, except for the last 12" from either gable end. The last foot will continue to the peak. The space in the peak will allow the proper circulation for the ridge vent.



Roof Sheathing Checklist

- Ensure all the sheets have been completely nailed down.
- Ensure the Ridge Vent has been cutout.
- Ensure the sheathing does not extend over the sub-fascia.
- Ensure all the sheets have been secured with H-Clips.
- Ensure the seams between the sheets all landed on top of a truss.

Valleys & Over-Framing

Note: Volunteers must use harnesses & fall protection when working on roofs.

Planning for Intersecting Roofs

If the house has two (2) perpendicular roof lines which form a valley, then additional framing will be required. One of the roofs will be a through roof and the other roof will be an intersecting roof. (See Figure 8.22).

The through roof sheathing will be installed before the intersecting roof over-framing is installed.

Portions of the intersecting roof which do not connect to the through roof will be framed with trusses; starting with a gable truss and then with common trusses up to the point where the valley starts.

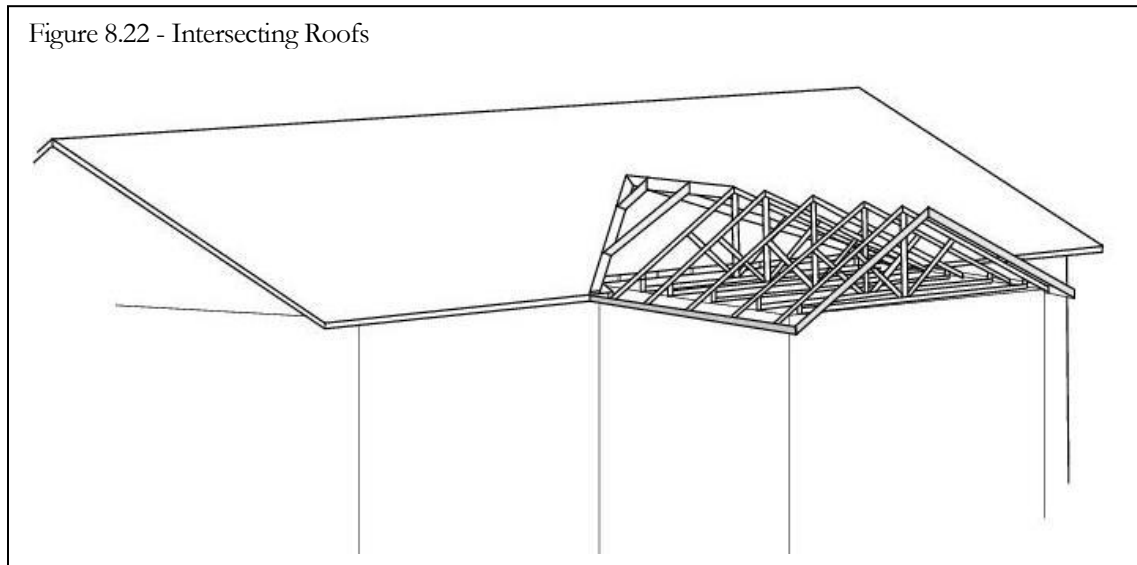
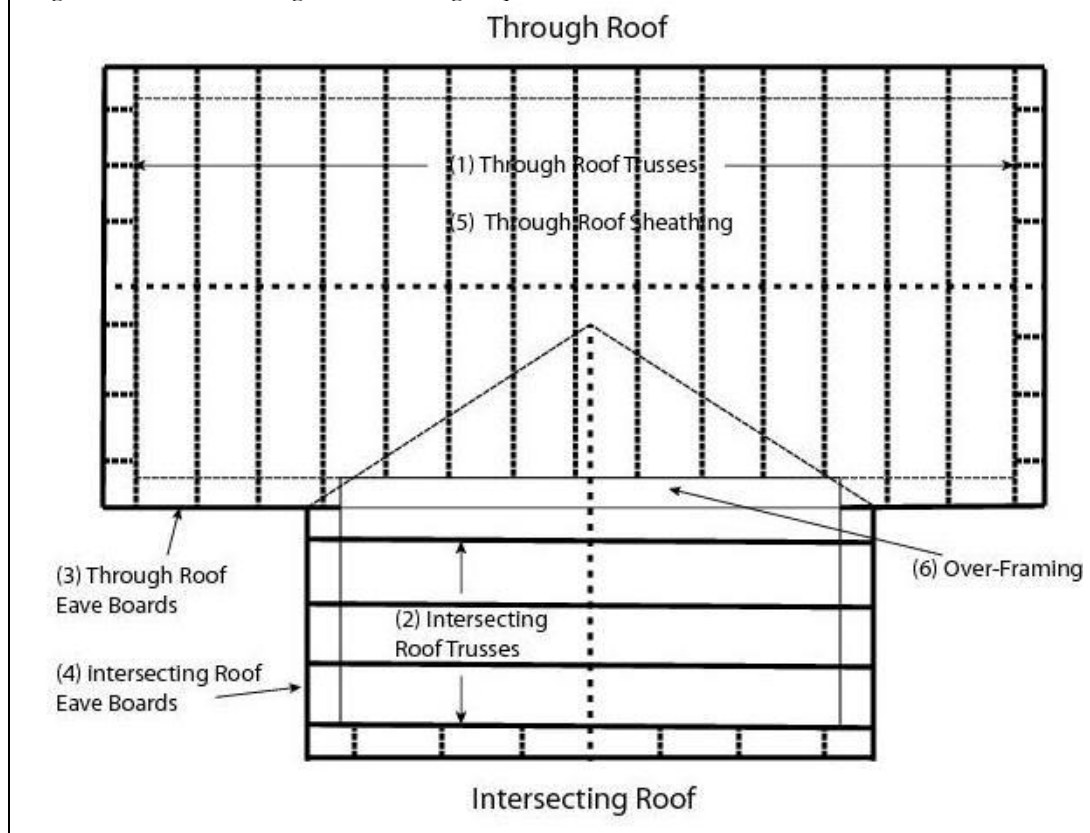


Figure 8.23 – Intersecting Roof Framing Sequence



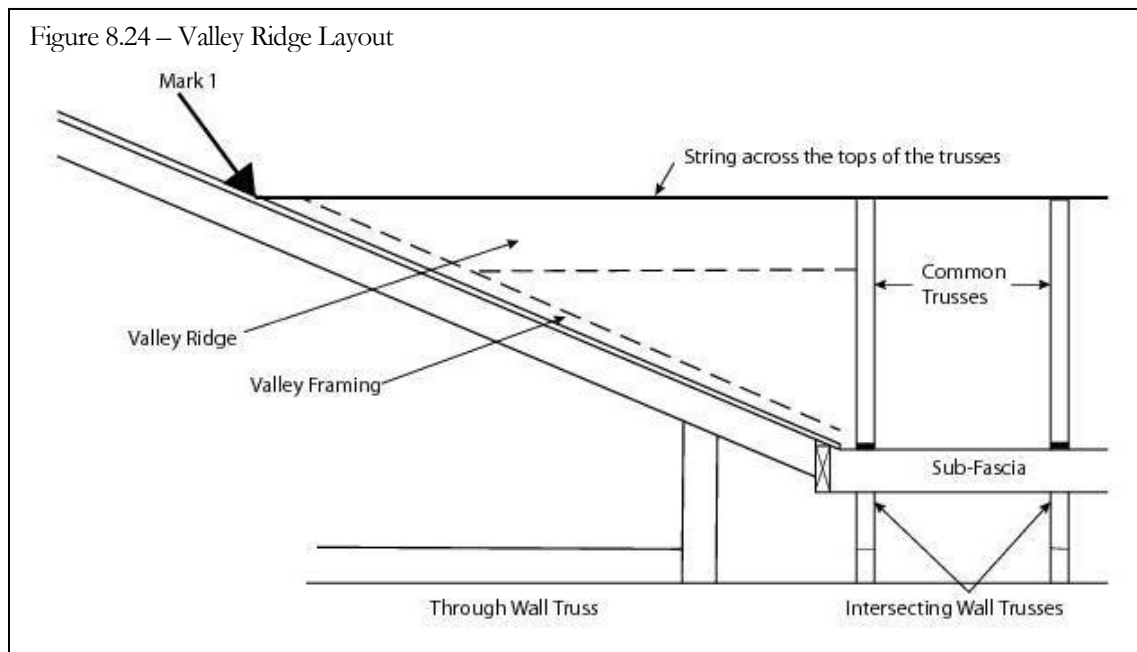
Install the Through and Intersecting Roof Framing

1. **Install Both Sets of Roof Trusses** (See Figure 8.23).
 - Step 1. Install the through roof trusses as described above in the section “Roof Trusses”.
 - Step 2. Similarly, install the intersecting roof trusses.
2. **Install the Sub-Fascia on Both Roofs** (See Figure 8.23).
 - Step 3. Cut and install 2x6 sub-fascias (Eave Boards) on the tails of the through roof trusses as describe above in the section “Roof Trusses”. Extend the sub-fascia to the wall sheathing of the intersecting walls.
 - Step 4. Cut and install 2x6 sub-fascias on the tails of the intersecting roof trusses. Extend the 2x6 sub-fascia from the gable truss to the 2x6 sub-fascia on the through wall. Nail the two sections of sub-fascia together with 16d sinkers through the back of one into the sides of the other.
3. **Install the Roof Sheathing on the Through Roof** (See Figure 8.23).
 - Step 5. Install the ½” OSB roof sheathing on the through roof as described above in section “Roof Trusses”. Cover the entire roof. The section which will be covered by the over-framing will be cut out later as the over-framing is being installed.

Install the Valley Framing

1. Mark Location for Valley Framing (See Figure 8.24)

- Attach a string to the peak of the gable truss of the intersecting wall. Stretch a string across the tops of the intersecting wall trusses until it touches the sheathing of the through roof and then make a mark on the sheathing at that point. Measure $\frac{3}{4}$ " up the through roof from the mark and make a second mark. The second mark is the tip of the valley ridge.
- Measure $\frac{3}{4}$ " up the through roof from the point where the through roof sheathing meets the intersecting roof sub-fascia.
- Draw a line from the second mark to the point where the sub-fascias from the intersecting roofs meet. If there are two valleys draw a line for each valley. These lines identify where the roofs will intersect and where the valley will be.
- Measure down from the lines $1\frac{1}{2}$ " and make a second set of lines. These lines identify the location for the top edge of the valley framing.

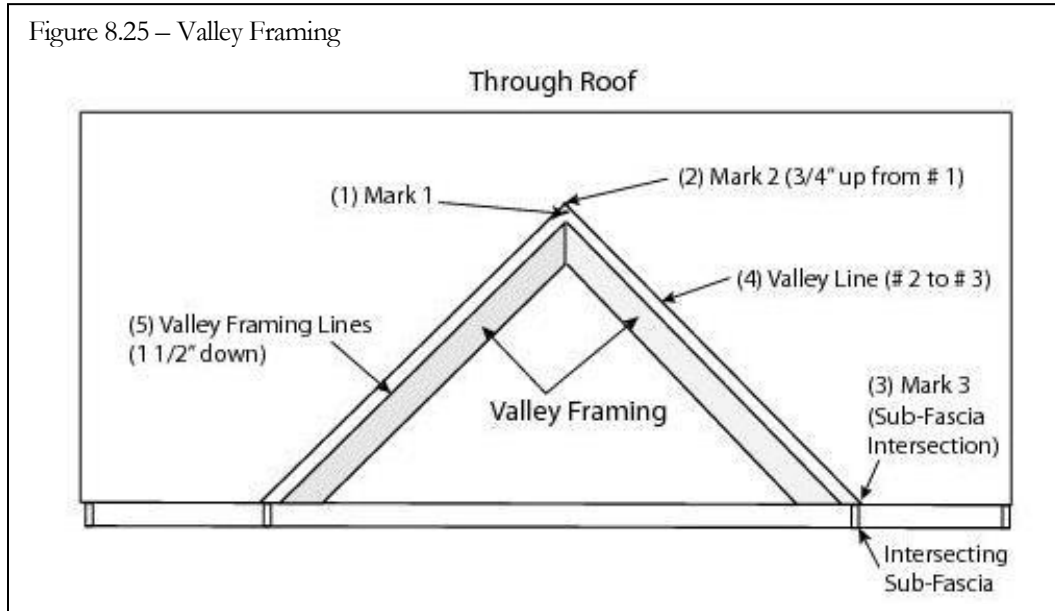


2. Install Valley Framing (See Figure 8.25)

- Measure and cut 2x8(s) for the Valley Frame. Measure the length of the second line(s) made above and cut the 2x8(s) to this length.
- Lay the 2x8 on the through roof flush with the second line and plumb cut the 2x8 at the peak. Cut the bottom along the roof sheathing.
- Install the 2x8 with the top edge flush to the second line.

3. Cutout Roof Sheathing

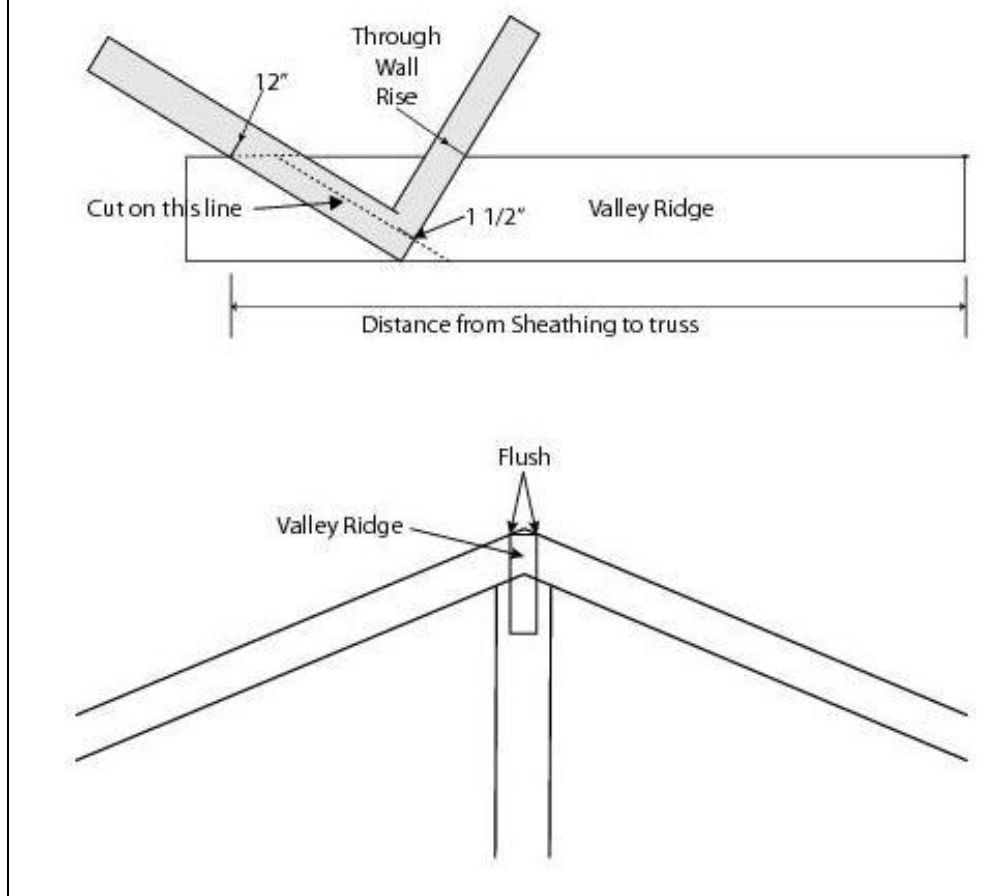
- If the area below the intersecting roof is living space (not a porch), set the blade on a circular saw to 2 ¼" and cut the roof sheathing on the through roof along the bottom of the Valley Framing. Remove the OSB to allow for insulating of the intersecting roof attic.



4. Install Valley Ridge (See Figure 8.26)

- Measure and cut a 2x8 for the Valley Ridge. Lay a long level across the peaks of the trusses on the intersecting roof. Measure the distance from the side of the last common truss to the Valley Framing. Cut an angle in one end of the 2x8 equal to the roof angle of the through roof; square cut the other end to the correct length.
- Position the Valley Ridge on the side of the last common truss with the top edges flush with the diagonal members of the truss. Set the other end on the Valley Framing. Check the level of the Valley Ridge. Shorten or shim the Valley Ridge until it is level.
- Attach the Valley Ridge to the truss with 16d sinkers through the truss into the end of the Valley Ridge. Toe-nail the other end of the Valley Ridge into the Valley Framing with 16d sinkers.

Figure 8.26 – Valley Ridge Installation



5. Install Valley Jack Rafter

- Lay out the Valley Jack Rafters at 24" o.c. from the last common truss. Measure back and mark the locations for the jack rafters across the top of the Valley Ridge. Then, using a framing square, mark the valley framing with the location of the jack rafters. (See Figure 8.27). Hold the short edge of the framing square against the last truss/rafter. Slide it down the truss/rafter until the end of the long edge touches the front edge of the Valley Framing.

Figure 8.27 – Valley Jack Rafter Layout

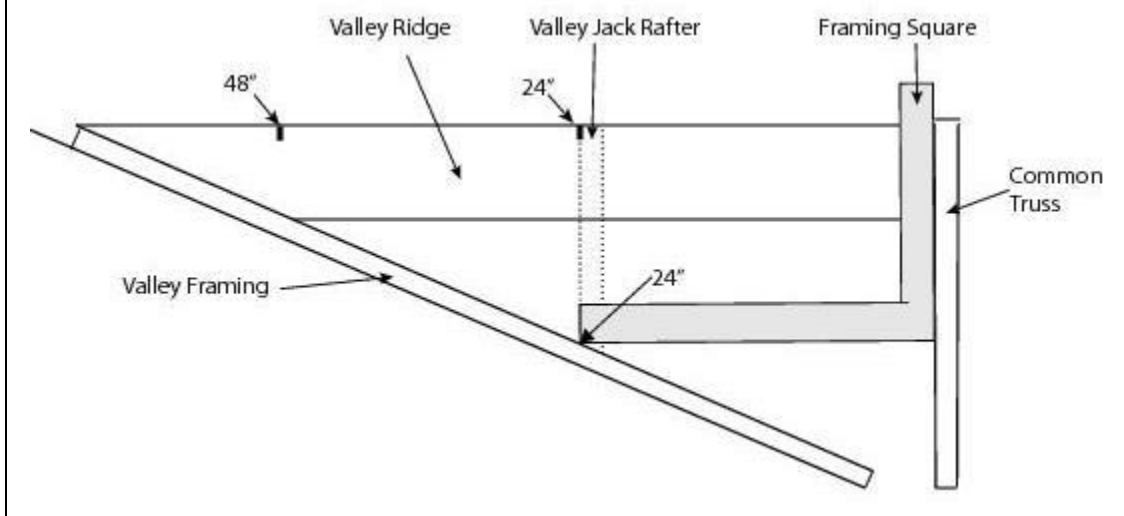
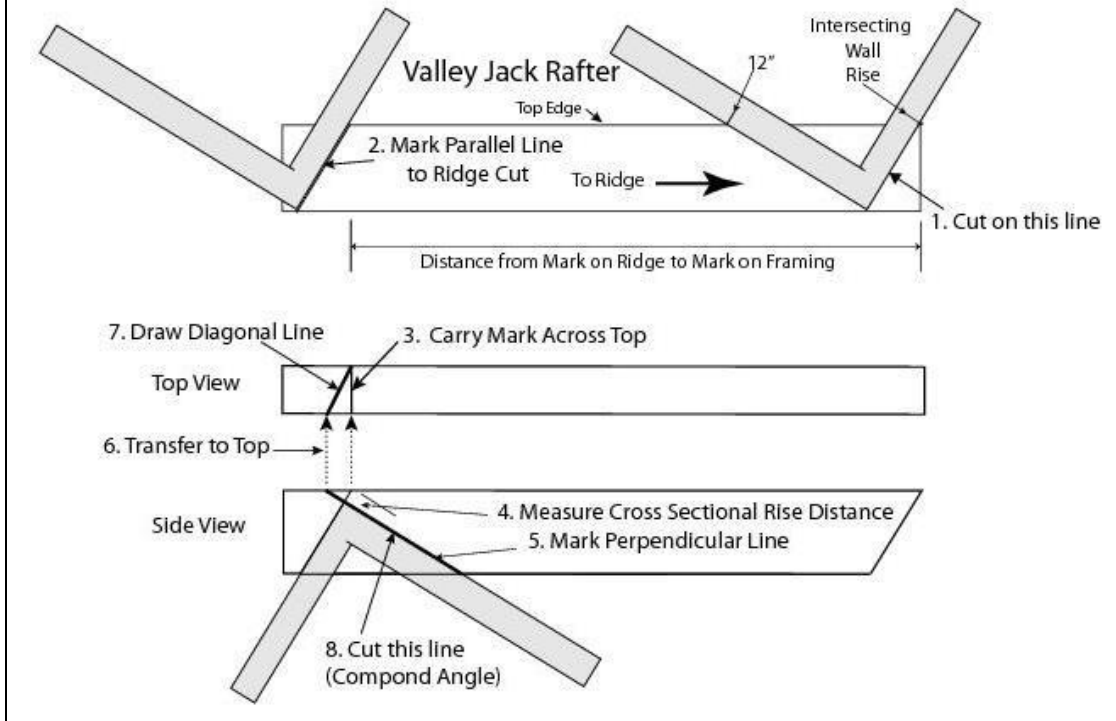


Figure 8.28 – Valley Jack Rafters



- Cut the Valley Jack Rafter. (See Figure 8.28). Cut 2x6s as follows:
 - Measure the distance from the mark on the top edge of the Valley Ridge to the mark on the Valley Framing. Then mark the top edge of the 2x6 with marks at these distances.
 - Using a framing square and the rise of the intersecting wall, mark the angle to fit into the ridge. See number 1 in the figure.
 - Set the saw at 0 degrees and cut the 2x6 on the line just made.

- Using the same process as above, make a parallel line at the bottom mark. See number 2 in the figure.
- Using a speed square, draw a line across the top of the 2x6 at the bottom mark. See number 3 in the figure.
- Using the rise of the through roof, find the Cross Section Rise from the table below. Measure down on the diagonal line at the bottom mark a distance equal to the Cross Section Rise and make a mark. See number 4 in the figure.

Cross Section Rise Value Table	
Through Roof Rise	Cross Section Rise
3 – 12	3/8"
4 – 12	1/2"
5 – 12	5/8"
6 – 12	3/4"

- Set a framing square on the 2x6 with the short edge flush to the diagonal line at the bottom mark and the point at the mark on that line. See number 5 in the figure.
 - Draw a line along the long edge of the framing square. This will be the cut line.
 - Extend the line to the top edge of the 2x6, and then carry that point to the top edge. See number 6 in the figure.
 - Draw a line from this point to the point where the perpendicular line meets the other side. See number 7 in the figure. This will define the angle of the saw for the cut.
 - Cut the line with the compound angle made in number 5 & 7.
6. Install the Valley Jack Rafter at the marks with 16d sinkers. Nail the top with the point flush to the top of the Valley Ridge. Place a scrap piece of OSB on top of the jack rafter extending it down to the through roof sheathing. If the bottom edge of the scrap OSB does not align with the valley line made earlier, shim or shorten the jack rafter as needed. Toe-nail the jack rafter into the Valley Framing with 16d sinkers.
7. **Install Intersecting Roof Sheathing**
- Install 1/2" OSB horizontally across the intersecting roof similar to the through roof. Cut the OSB to fit into the valley and back over the trusses. Use H-clips and 8d sinkers to install the sheathing.

Quality Assurance Checklist

- Perform a final check with the "Framing Checklist" in Site Docs.