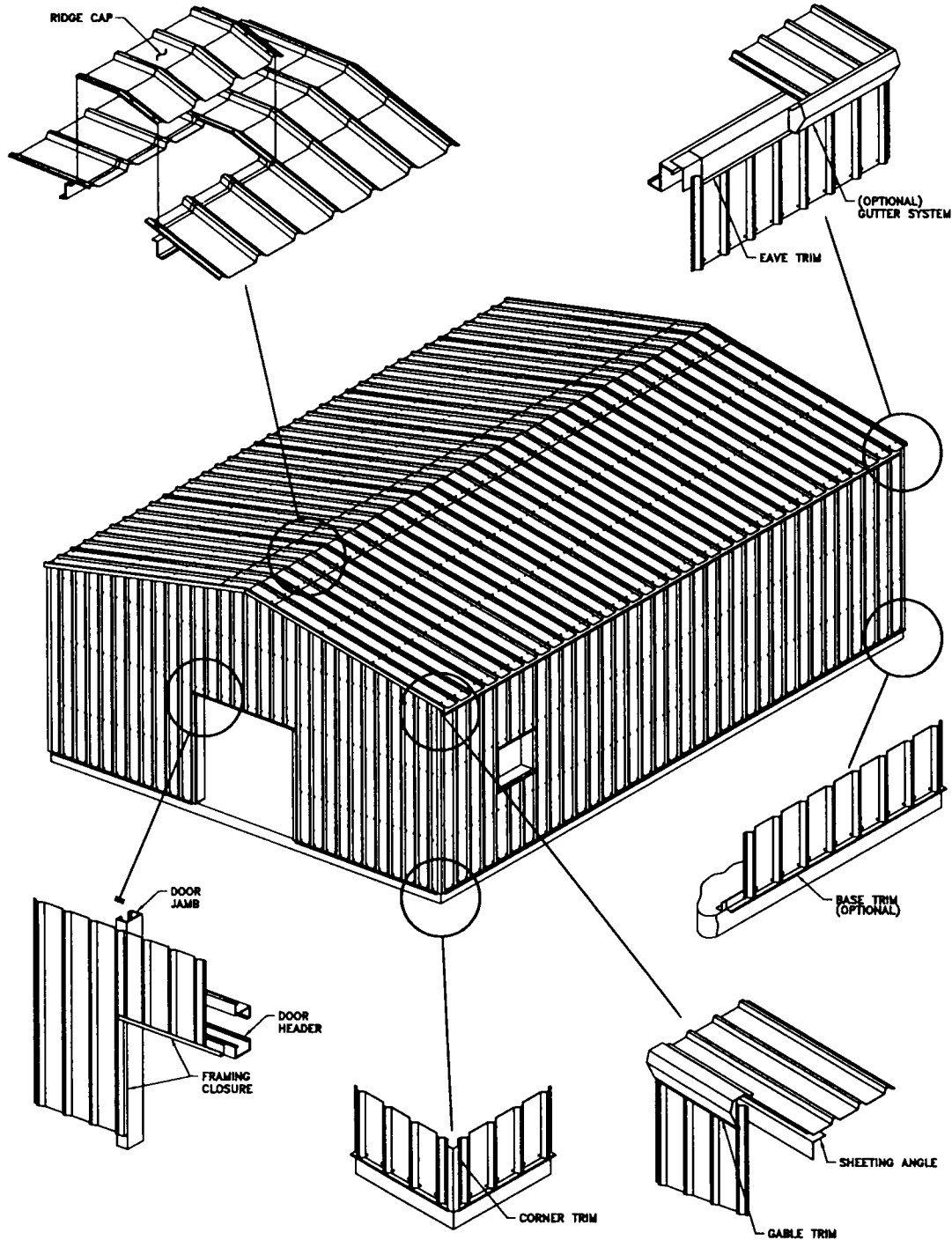


# Building Erection Guide



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# INTRODUCTION

The Steel Building Manufacturer produces high quality, pre-engineered metal buildings. However, these buildings become structures only after erection. Quality erection is essential if the manufacturer, its dealers, the erection crew, and the owner are to realize lasting pride and satisfaction in the buildings.

This manual has been prepared to help guide the erection of the buildings. It is a summary of the techniques in use in the metal building industry, which are believed to be most representative of good erection practices. These procedures and methods are by necessity general in nature. The erector should always, especially in special circumstances, use proven and safe erection methods.

This erection manual is intended only as a supplement to the erection drawings that are furnished with each building. These drawings show the customer's buildings as engineered and fabricated according to his/her requirements. The buildings erection drawings will always govern with regards to construction details and specific building parts.

The information contained in this manual is believed to be reliable. However, the manufacturer disclaims any responsibility for damages that may result from use of this manual since the actual erection operations and conditions are beyond the manufacturer's control. It is assumed that only experienced, knowledgeable erectors with trained crews and proper equipment will be engaged to do the erection.

It is emphasized that the manufacturer of metal building components is not engaged in the erection of its products. Opinions expressed about erection practices are intended to present only a guide as to how the components should be assembled to create a building. The experience, expertise and skills of the erection crews as well as the equipment available for handling the metal determines the quality of erection and the ultimate customer satisfaction of the completed building.

# IMPORTANT CONSIDERATIONS

Upon request, the manufacturer or its marketing service may supply the name(s) of potential vendors that supply additional components and contractors to install concrete and erect the building components or to perform other work pertaining to the installation and erection of the building components. Neither the manufacturer nor its marketing service has investigated such vendors and contractors. The provision of the name(s) does not constitute a recommendation of their skill or competence.

It is important to the buyer to rely solely on his own investigation when selecting a vendor or contractor. It is also important to check for comparisons and to be completely satisfied as to price, quality, and timeliness as to the job. The manufacturer and its marketing service or other affiliates are not, nor will be involved in construction. Any representation or agreement between dealer or contractor and buyer concerning delivery, construction, modifications or other items are between the parties thereto.

This manual is intended to provide buyers and their erectors with some recommended procedures for erecting their building components. However, the manufacturer is not liable for the quality of erection, safety procedures during erection, poor foundation design or construction, site preparation, site selection, including soil and drainage testing or the negligence of other parties.

Because of the wide variations throughout the country in loading and zoning requirements and environmental conditions (snow, wind, ect.), it is the responsibility of the builder or owner to make certain that the building conforms to all codes and is adequate to withstand local environmental conditions. When necessary, and upon specific request, the building manufacturer can engineer and supply building components to meet special requirements, at moderate additional cost.

Your purchase order requires that you purchase liability coverage for before, during and after construction to insure against any loss or damage during or after construction.

Before starting construction, we suggest that you read the erection procedure and thoroughly study the specific erection drawings marked "For Construction" supplied with your building. This will allow you to plan the work properly and could avoid unnecessary delays during construction. You should also familiarize yourself with the laws and regulations governing permitting, labor and employment, safety, materials handling and disposal, and any other issues which may apply to your business.

Corrections of minor misfits and a reasonable amount of cutting and reaming are considered a part of erection. Errors in fabrications which prevent the proper assembly and fitting of parts by moderate use of reaming, chipping, or cutting should be reported to the fabricator, so that he may either correct the error or approve the method of correction to be used.

# SAFETY COMMENT

The manufacturer has a commitment to produce quality building components that can be safely erected. However, the safety commitment and job site practices of the erector are beyond the control of the manufacturer.

It is strongly recommended that safe working conditions and accident prevention practices be the top priority on any job site.

Local, State and Federal safety and health standards should always be followed to help insure worker safety.

Make certain all employees know the safest and most productive way of erecting a building. Emergency telephone numbers, location of first aid stations and emergency procedures should be known by everyone present at the site.

The manufacturer intends that this manual be interpreted and administered with sound judgment consistent with good safety practices.

# PRE-ERECTION

While your building is being fabricated, numerous pre-erection plans can be made to simplify the buildings erection. The contract department will advise dealers of scheduled completion and delivery dates and details in order that the erector may schedule personnel and equipment.

## **Access to the Site**

The vehicles transporting tons of building parts must gain access to the building site from adjacent highway or road. Such access should be visualized and prepared in advance of arrival. All obstructions overhead and otherwise must be removed and the access route graveled or planked if the soil will not sustain the heavy wheel loads.

Permission should be obtained to trespass over other owner's property in gaining access to the building. Even though such permission is thought unnecessary, the good will of the other owner should be solicited and is generally assured when such permission is requested.

The buildings site should be carefully inspected to insure that there is enough room to physically perform the tasks required to erect the building. Application of sheeting and trim can be expensive when there is not sufficient working space because of the nearness of adjacent buildings or other obstructions.

The availability of any required utilities should also be considered at this time. Take careful note of any overhead electric lines or other utilities to avoid hazards and damage.

# Foundation

## General information

Foundation design and construction are the most important steps in the building process, and the contractor or owner is ultimately responsible for the quality of the foundation. It must be noted that improper or inadequate foundation construction will severely limit the building performance and could lead to costly repair or rebuilding.

It is essential that the building foundation meet certain design assumptions and load conditions. For this reason, all building foundations should be designed by a local soils engineer, in accordance with the local city, county and state codes.

Certain basic guidelines and considerations for foundation design are outlined on the anchor bolt drawings furnished by the company. Careful consideration of the following notes will be helpful in completing the foundation.

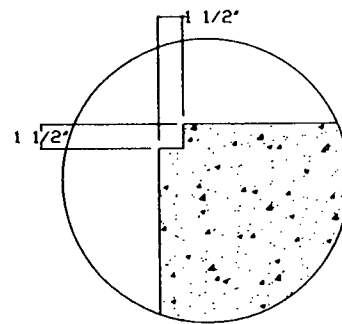
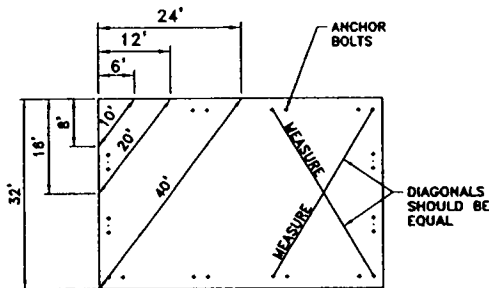
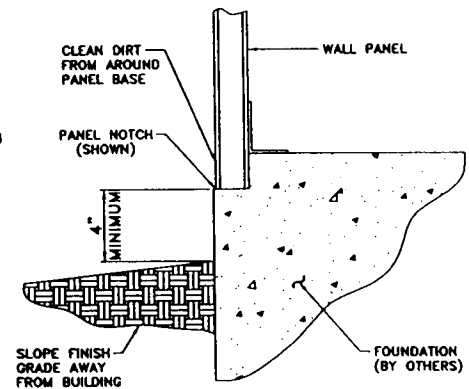
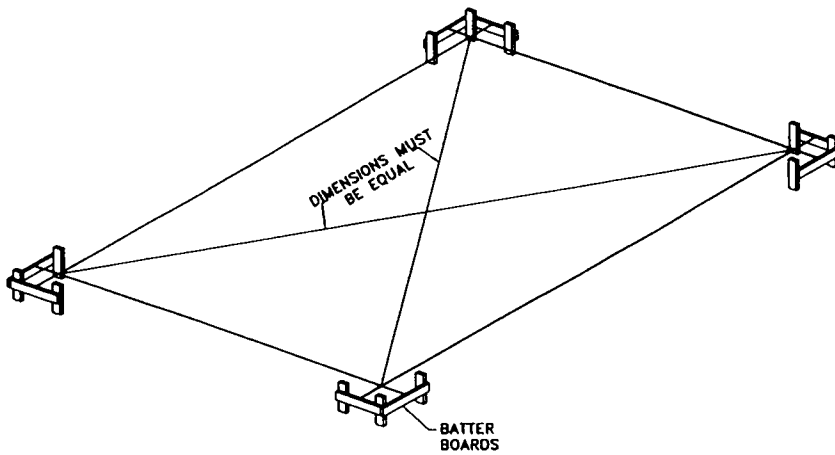
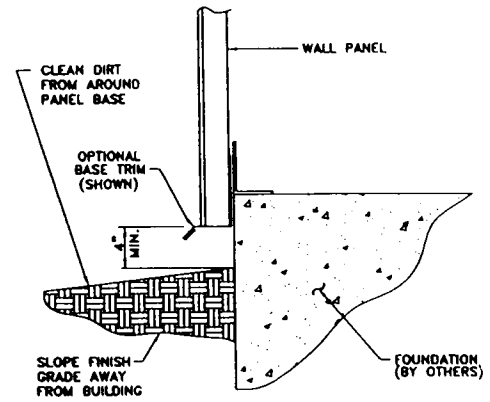
## Important Notes

1. Your building is manufactured to close tolerances and therefore requires a square and level foundation. Several methods may be used to achieve the proper foundation.
2. The top of the floor or foundation must be square, level and smooth, and the anchor bolts accurately set to a tolerance of  $\pm 1/16$ " on dimensions within the group spacing for and individual member. All other dimensions shall be within  $\pm 1/8$ "
3. All embedded structural steel (including reinforcing bars, wire mesh and anchor bolts) will not be supplied by the building manufacture

### Foundation Layout.

Regardless of the type of foundation that is used and its specific configuration, the foundation outline should be carefully and accurately laid out before any excavation is made. Whenever possible, a transit or similar means should be used to layout the foundation perimeter: this will insure accurate placement of corner measures and in turn, insure a square foundation.

For the greatest accuracy, measure the diagonal and adjust the string lines until the two diagonal dimensions are equal. If the diagonal lengths are equal, the framing will be square.

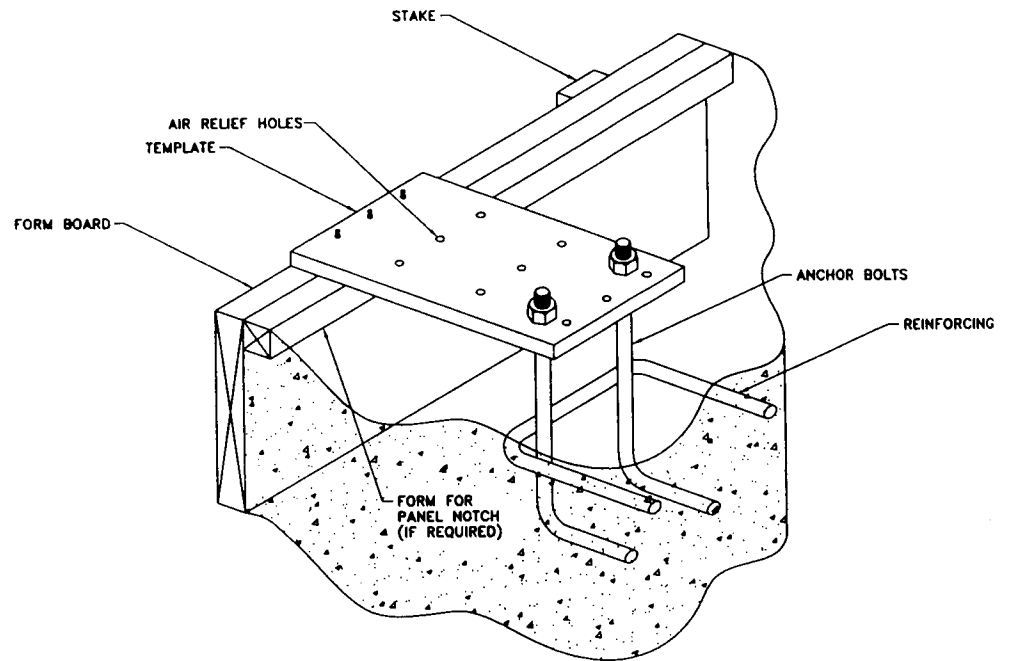


1 1/2" x 1 1/2" Notch Forming (Optional)  
Notice Above

Another method of assuring a square foundation is the Right Triangle Method. Use the dimensions of the two sides of the right triangle A and B as shown in the chart and adjust the string lines to obtain the proper length for C. Check Square at all four corners.

In no case should building erection be started on green concrete. Anchor bolt may pull loose, concrete can spall (chip out along edges) and equipent may crush or crack slab. Normal Portland cement concrete should cure at least seven days, and high-early-strength concrete at least three days before the structural columns are erected.

It is extremely important that all anchor bolts be placed accurately in accordance with the anchor bolt plan. Before pouring concrete, study carefully the following general notes describing size, type and position of anchor bolts



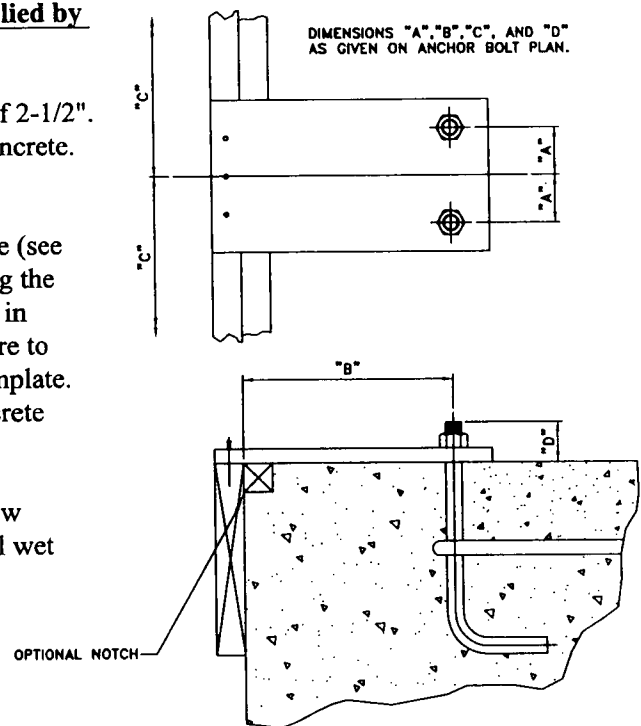
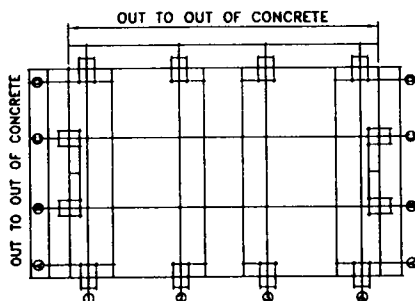
### Setting Anchor Bolts

1. Use ASTM a307 Anchor Bolts or equivalent. **Not supplied by building manufacturer.**

2. The threaded portion of the bolt should be a minimum of 2-1/2". Anchor bolts should project 2" minimum above surface concrete. (Refer to Anchor Bolt setting plan)

3. All Anchor Bolts should be held in place with a template (see Diagram) or similar means in order to remain plumb during the pouring of the concrete. All templates should be prepared in advance so that they can be quickly nailed in place. Be sure to clean all machine oil from bolts before placing them in template. The bolt threads should be covered or protected from concrete during pouring.

4. Air Relief holes should be drilled in the template to allow trapped air to escape. When floating concrete, vibrate until wet concrete appears at top of air relief holes



USE 1 1/2" x 1 1/2" BLOCK TO FORM OPTIONAL BASE NOTCH. THIS WILL CLOSE PANEL CORRUGATION FROM BELOW PANEL.

Dimensions given on the anchor bolt plan, provided with the construction drawings.

# Unloading Operations

Pre-planning unloading operations involving careful, safe and orderly storage of all materials is an important part of the erection. Job sites where storage space is restricted require detailed planning. An efficient layout of materials in the order of the erection process can save a great deal of money, by eliminating costly double handling of materials. While set procedures are not possible in all cases, special attention should be given to the following items.

NOTE- Trucks are loaded to maximize efficiency, trailer weight and insure safety. Unfortunately, the shipping department cannot load trucks per customer request.

## THINK SAFETY AT ALL TIMES

### 1. Location of carrier vehicle during unloading

Unload material near their usage points to minimize lifting, travel, and re-handling during building assembly

### 2. Prepare necessary ramp for truck

The edge of the concrete slab should be protected to minimize the danger of chipping or cracking from truck traffic if the materials are to be laid out on the slab. One important consideration is the fact that materials stored on the slab may subject workers to possible injury from falling objects.

### 3. Schedule lifting equipment (by Erector)

The type and size of lifting equipment is determined by the size of the building and the site conditions. Length of boom, capacity and maneuverability of lifting equipment will determine its location for both unloading and erection. Combining the unloading process with building erection usually minimizes lifting equipment costs.

### 4. Considerations of overhead electric wires

Overhead power lines are continuing source of danger, extreme care must be used in locating and using lifting equipment to avoid contact with power lines.

### 5. Schedule crew

Depending on the size, valuable time can generally be gained if the supervisor plans and watches ahead instead of getting tied up with a particular unloading chore.

As previously mentioned, a great amount of time and trouble can be saved if the building parts are unloaded at the building site according to a pre-arranged plan. Proper location and handling of components will eliminate unnecessary handling

# Check Shipment and Filing Claims.

-When shipments are received in the field, two inspectors are necessary.

-Note: Inspect all shipments prior to releasing the tie-downs for loads that may have shifted during transit.

1. If during the inspection, damages, or shortages of items are found, a report should be filed with the carrier immediately at the site. When damages are evident from the exterior at the time of receiving shipments. Panel crates should be opened and inspected for water damage. Galvanized or galvalume panel crates should always be opened and inspected for white or black rust.

2. Another check must be performed to determine the quantity received and their condition. If during this inspection damages or shortages of items are found upon opening the crates or cartons, a claim should be sent to the manufacture, no later than thirty (30) days after delivery.

Unless these two important inspections are made and any reports or claims are filed immediately, settlements become very difficult and usually all parties involved suffer the loss.

When filing claims either with the carrier, or with the manufacture, the claim should indicate the items in question, the bundle or container in question (if any), the actual quantity received, the quantity which should be received, or that which was damaged. This is important for quickly retrieving the necessary information. Also, other information such as the numbers, names and addresses of consignee's and consignor should be indicated on claims, as well as invoice numbers.

These procedures are primarily for your protection. A shortage discovered later than 30 days, can be caused by theft, misplacement, or other causes, and neither the carrier nor manufacture can accept responsibility.

**STRAIGHT BILL OF LADING—SHORT FORM—** Original Issued by  
ICC/SMU, subject to the conditions and tariffs in effect on the date of issue of this original Bill of Lading

380 14 th Street Ambridge, PA 15003  
 800-837-1482 Dispatch Department  
 Pager after 5:30 p.m. 1-800-508-7343, ph # (412) 970-0888















From: **DRIVER MUST CALL CUSTOMER 48 HOURS IN ADVANCE**

NAME OF CARRIER: \_\_\_\_\_ Date: \_\_\_\_\_

JOB NO. \_\_\_\_\_  
 TOTAL WT. \_\_\_\_\_

To: Consignee \_\_\_\_\_ Telephone Number \_\_\_\_\_  
 Street \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Special Instructions \_\_\_\_\_

QTY. # SHIPPED	EXTERNAL DESCRIPTION OF ARTICLES	SHIPPER CHECKED	CUSTOMER CHECKED
(pcs)	Structural Members - Tapered 		
(pcs)	Structural Members - Straight 		
(bundle)	C - Channels  Total No. pcs. _____		
(bundle)	Z - Sections  Total No. pcs. _____		
(bundle)	Floor Panels - Finish: _____ Total No. pcs. _____ <input type="checkbox"/> with skylights <input type="checkbox"/> without skylights 		
(bundle)	Wall Panels - Finish: _____ Total No. pcs. _____		
(skid)	Ridge Caps - Finish: _____ 		
(box)	Trim Package  "See Glossary"		
(skid)	Hardware  "See Glossary"		
(box)	Personal Doors 		
(box/skid)	Overhead Doors 		
(box)	Windows 		
(crate)	Ridge Vents 		
(crate)	Round Vents 		
(box)	Louvers 		
<b>TOTAL TOTAL NUMBER OF "BULK" ITEMS SHIPPED</b>			

**LOAD MUST BE TARPED AT ALL TIMES** | **DRIVER CAN NOT ACCEPT CASH OR PERSONAL CHECK** | C.O.D. AMOUNT \$ \_\_\_\_\_  
Check made by \_\_\_\_\_

per X \_\_\_\_\_ Shipper  
 C.O.D. CERTIFIED CHECK MUST BE IN DRIVERS POSSESSION BEFORE BUILDING IS UNLOADED.

DAMAGED OR MISSING "BULK" PACKAGES/BUNDLES MUST BE NOTED ON DRIVERS COPY OF THE BILL OF LADING IF REPLACEMENT IS REQUIRED. ANY OTHER CONCEALED SHORTAGES MUST BE REPORTED WITHIN 30 DAYS TO BE CONSIDERED VALID. (EXCEPT SHEETING)

It is the consignee's responsibility to assist the shipping agent upon delivery.

Designee or Agent \_\_\_\_\_ Driver's Signature \_\_\_\_\_  
 File Name \_\_\_\_\_

This Bill of Lading is subject to the terms and conditions on the face and reverse side hereof.

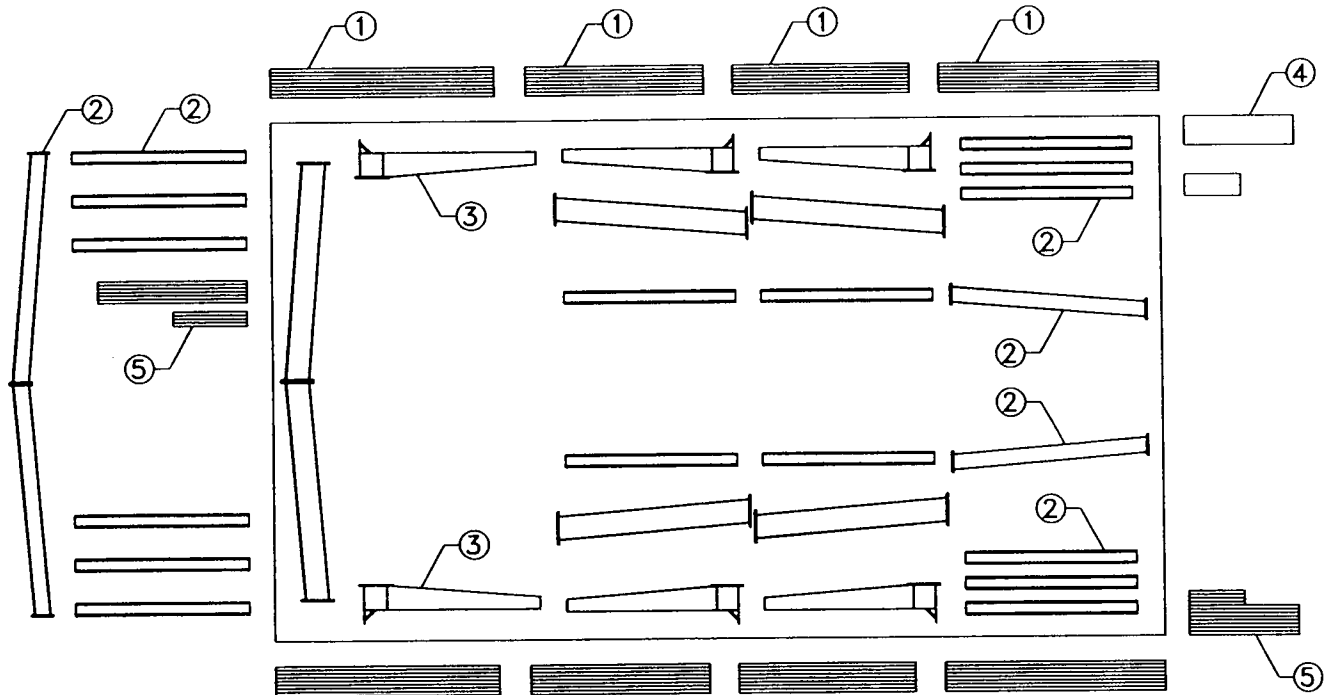
FACTORY COPY

## Material Layout

While the building material is unloaded, it should be placed in and around the building site near the place where it will be used. This is referred to as "Shaking Out". While each job will vary according to the size or site conditions, the layout below typifies an arrangement, which offers conveniences for assembly. Columns and roof beams are laid in position for rising. Girts, purlins, columns and braces are divided according to the requirements of each bay.

Each part is numbered for quick identification. Carefully check these numbers against shipping lists to insure that the correct parts and quantities have been received. Be sure to write any discrepancies on Bill of Lading while unloading.

The layout of materials illustrated below is provided as an aid to identify and locate building parts. Once the erection procedure has begun, however erection crews and machinery must have access to that portion of the building which is under construction.



1. GIRTS, EAVE CHANNELS AND PURLINS
2. END FRAMES AND ENDPOSTS
3. MAIN FRAMES
4. CLIPS, BOLTS, SCREWS, ETC.
5. ENDWALL GIRTS

# Material Handling and Storage

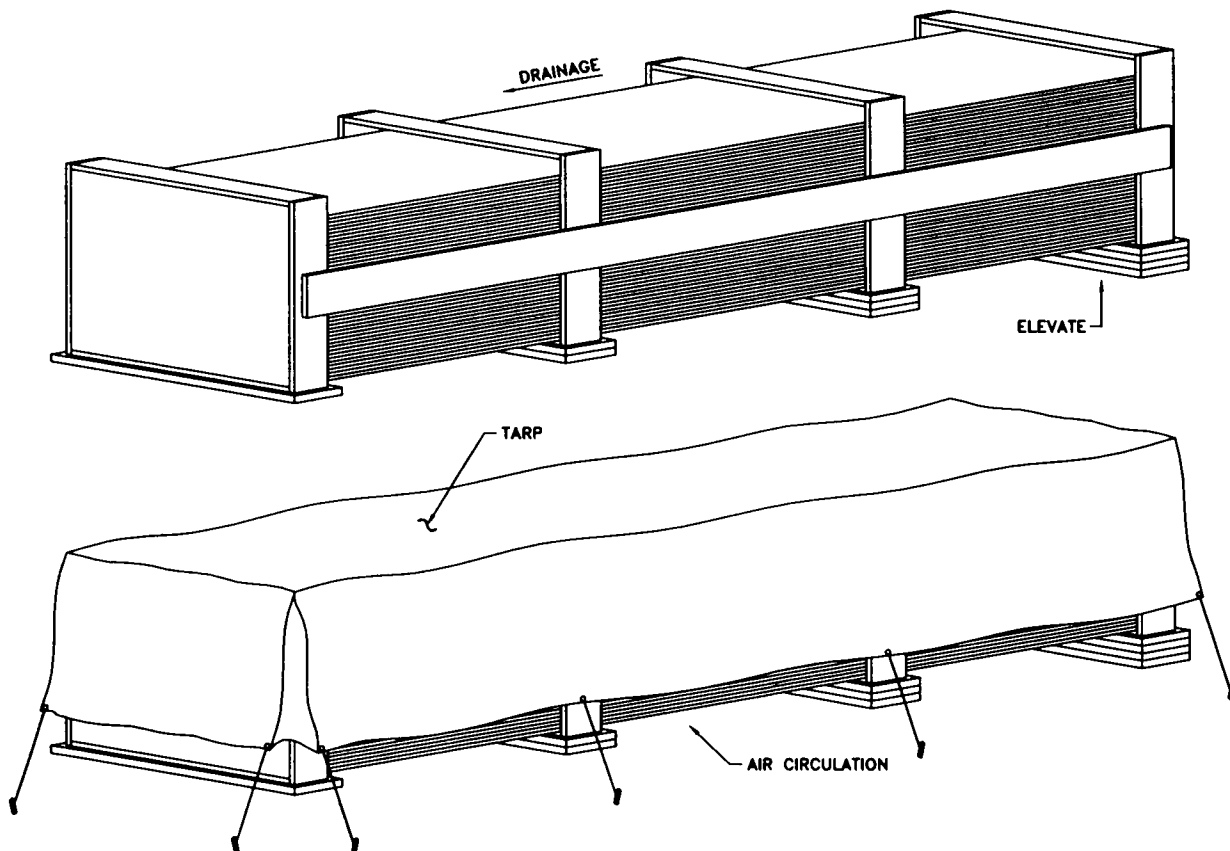
A tractor with loading forks and/or an all terrain forklift is necessary for unloading the components of a metal building. Care should always be taken to avoid damaging material.

NOTE: Long panels may be difficult to handle by lifting the bundle from beneath. Always spread the forks as wide as possible to prevent panels from bending. Even with the forks as wide as possible, it still may be necessary to lift certain loads with a spreader bar and a crane to avoid damaging material.

Blocking under the gray iron protects the slab from damage during the unloading process. It also facilitates the placing of slings or cables around the members for later lifting and allows members to be bolted together into sub-assemblies while on the ground. Extra care should always be exercised in the unloading process to prevent injuries from handling the steel and to prevent damage to materials and the concrete slab.

If water is allowed to remain on or in bundles of painted or coated parts for extended periods of time degradation will occur. The end result is shorter material life due to corrosion. Therefore, upon receipt of a job, all bundles of primed parts should be stored at an angle to allow any trapped water to drain away and permit air circulation for drying. If environmental conditions are such, tarps should be used to protect materials. Puddles of water should not be allowed to collect and remain on columns or rafters for the same reason.

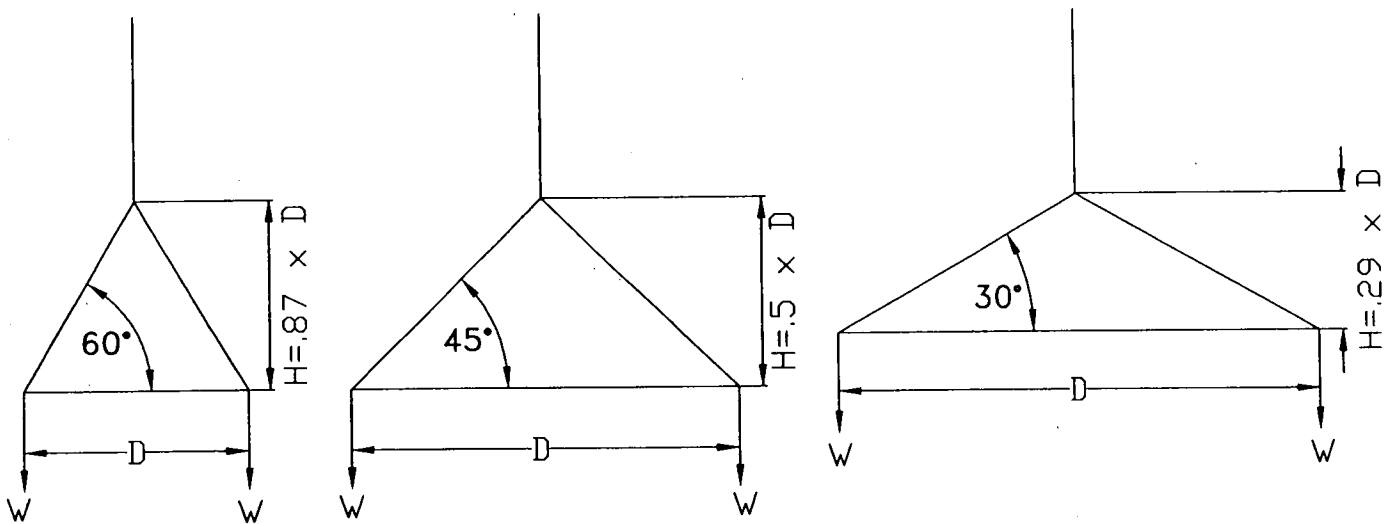
All primer should be touched up as required before and after the erection.



# Hoisting General Information and Precautions

**NOTE!** Erectors with experience in light steel member rigging, and lifting should do hoisting

The diagrams below show tension and hook height for lifting weights at various angles.



Note that cable tension increases as the lifting angle is decreased. It is of interest to note that if this angle is reduced to 15°, the cable tension is 3.9 times the vertical lift; at 10° it is 5.7 and at 5° it is 11.5. When tension in the cable increases, the compressive or bucking load on the peak rafter section also increases. Slings with low lifting angles should therefore be avoided both to protect the cable and to prevent bucking the rafter.

**Safety Note!** Check wire rope for broken strands, broken wires and kinking. Replace damaged, unsafe rope immediately. Always use equipment with an adequate safety margin over the lifted load!

# Tools

<p>           Bridge reamer            Broom, Push            Brush, wire            Cable, ½" diameter            Cable Clamps            Caulking Gun, open barrel            Chalk line, 100' long and chalk            Channel Locks            Chokers ½" cable, 6' long, eyes both ends                5/8" cable, 6' long, eyes both ends                ½" cable, 10'-14' long, eyes both ends            Cold Chisel            Come-a-long,            Dolly            Drift pin (barrel pin, bull pin)            Fire Extinguisher            Files, assorted            Hammers            Hand lines (rope), ½" - 5/8" dia., 40' - 60' long with                hooks            Load Binders            Pliers, Side cutters            Pop rivet gun (manual or electric)            Punch, center            Sawzall            Sawhorses            Scaffold - section with wheels            Screwdriver sets, flat and Phillips            Shear, portable panel            Slings, nylon, 4" wide, 10'-12' long            Snips, aviation (2 right-hand, 2 left-hand, straight cut)            Snips, large (bulldogs)            Spirit level 4' long            Spreaders, 1 set of ¾" diameter, 20' long, center eye                with hook ends            Square, framing            Square, try         </p>	<p>           Tape measure            Transit &amp; Level rod            Vise grips, sheet metal            Vise grips, standard            Vise grips, welding clamp            Wedge, steel            Wrecking bar            Wrenches                Adjustable                Open or Box end wrenches - (various sizes)                Socket wrench set            Cutting torch with 100' hose, bottle cart            Power Drill &amp; Drill bits            Hammer drill with 6 bits            Impact wrench and sockets            Power nibbler            Power shears            Screw gun                1900 RPM electric screw gun for self-drill screws            Welding hood with spare lens            Welding unit         </p>
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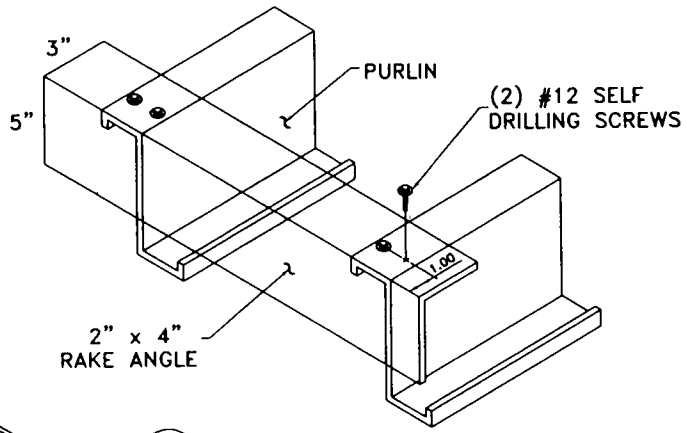
# Structural Framing Precautions

Responsible personnel, experienced in rigging and handling light steel members in a safe manner, should complete the layout, assembly and erection of steel. Improper handling can easily result in injury, delays and unexpected added costs. This is particularly true when raising assembled frames.

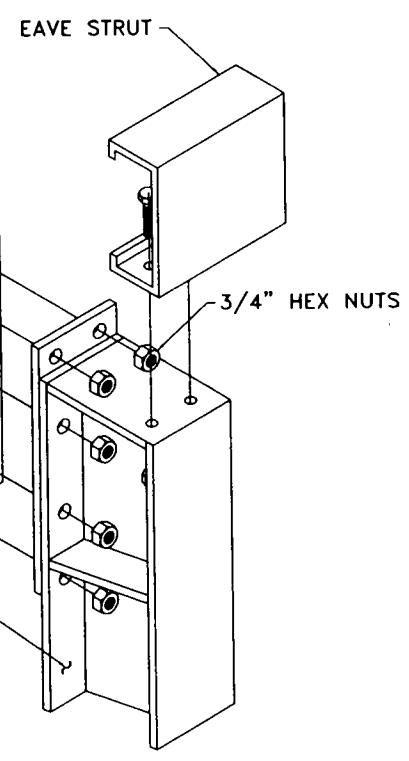
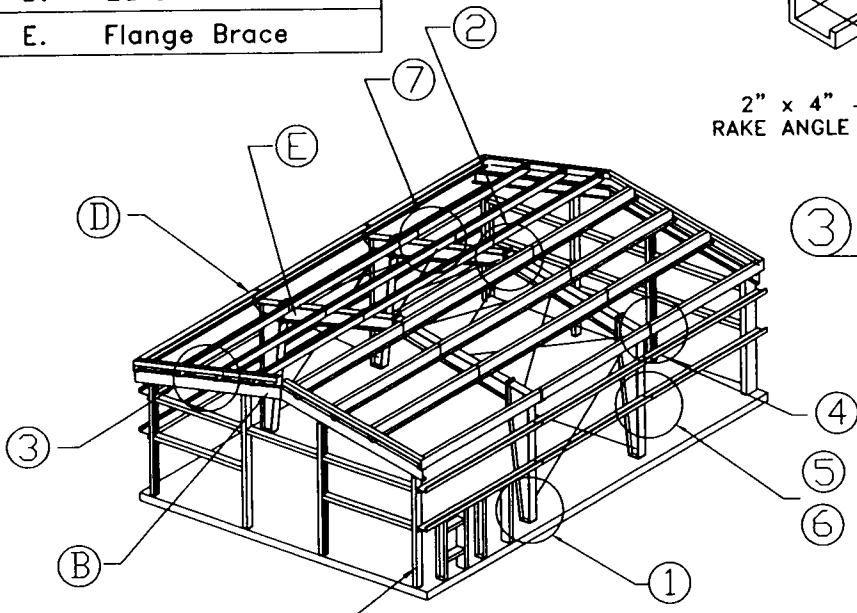
Keeping erection costs down

1. When safety practices are discussed and initiated in advance of any work procedures.
2. When the overall work of erecting the building is divided into individual jobs, and when each job is assigned (in proper sequence) to teams of workers consisting of from two to four workers each.
3. When individual workers are properly trained and instructed in advance as to what they are to do and in the safest way to do it. This eliminates time wasted while waiting to be told what to do next.
4. When building parts are properly laid out according to advance planning so as to avoid lost time in repetitive handling or in searching for specific items.
5. When as many parts as can be safely raised in a single lift are bolted together in subassemblies on the ground where assembly work is faster and safer, thereby, requiring fewer lifts and fewer connections to be made in the air.
6. When erection of the steel framework starts at one end and continues bay by bay to the other end of the building.
7. When the first bay is completed, the individual frames are erected and tied together by skeleton purlins, and the fill-in purlins are installed after the costly lifting equipment has been released.
8. When tools and equipment of the proper kind, in good, safe condition, available in sufficient quantity.

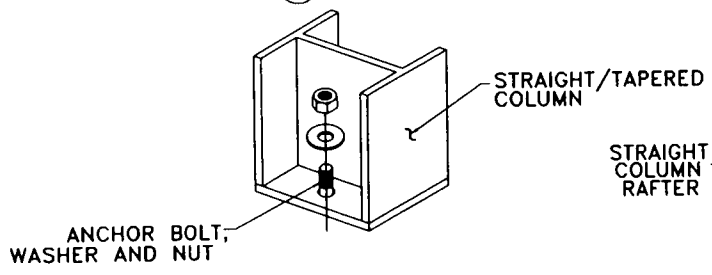
Standard Components	
A.	Column
B.	Rafter
C.	Girt
D.	Eave Strut
E.	Flange Brace



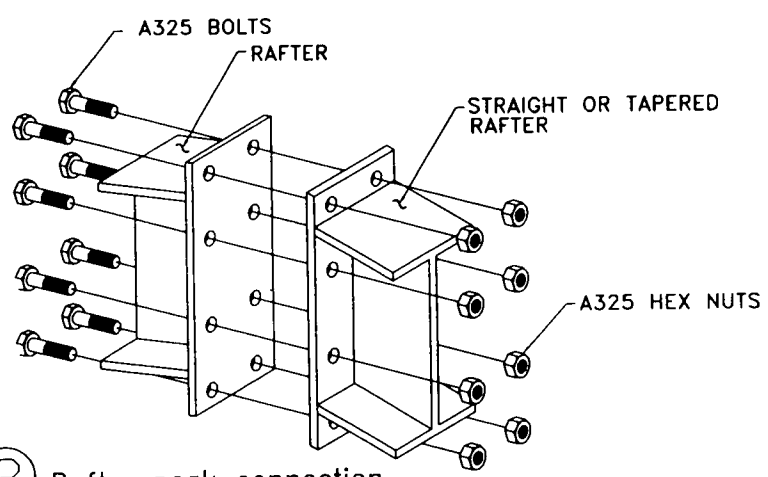
③ Rake angle to purlins



④ Rafter to column



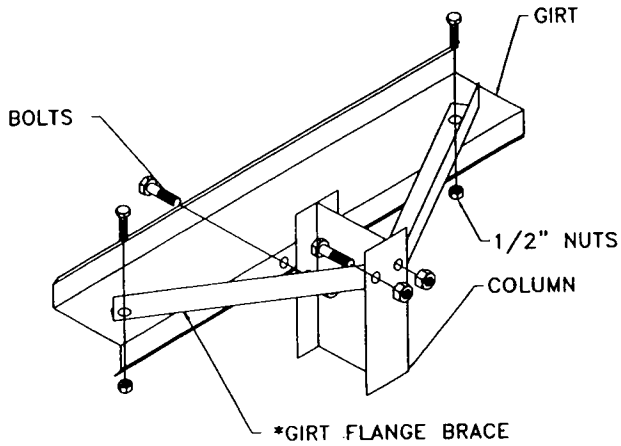
① Column to anchor bolt



② Rafter peak connection

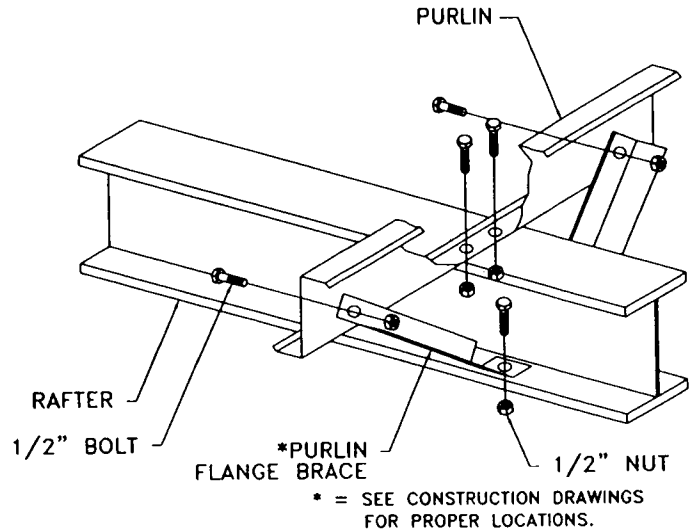
Standard Framing Connections

1. Column to anchor bolt
2. Rafter peak connection
3. Rake angle to purlins
4. Rafter to column
5. Bypass girt to column
6. Flush mounted girt
7. Purlin to rafter

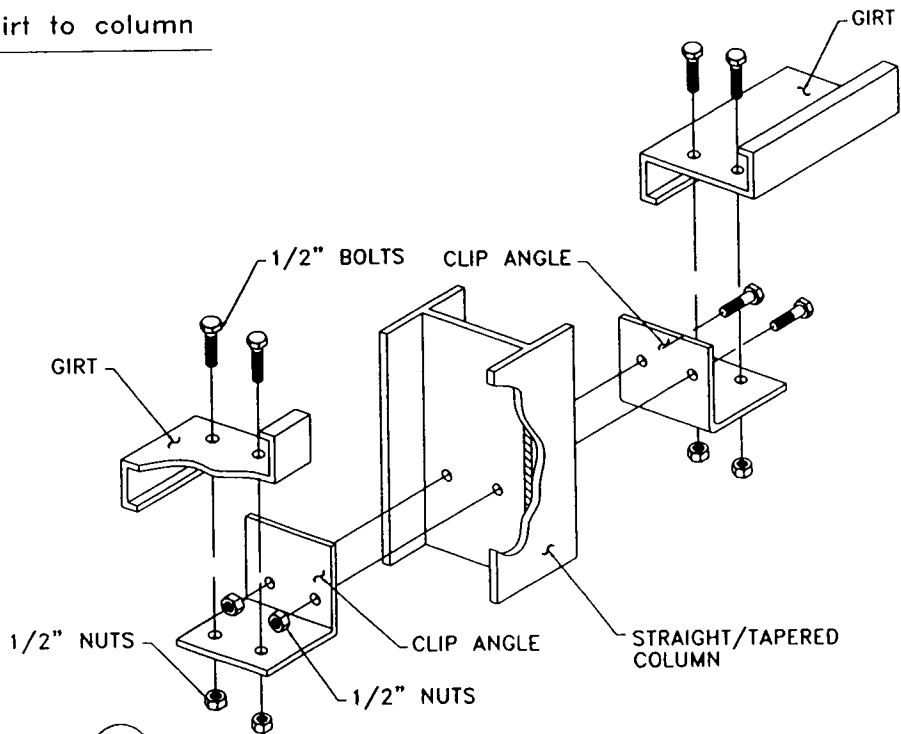


\* = SEE CONSTRUCTION DRAWINGS FOR PROPER LOCATIONS IF REQUIRED

⑤ Bypass girt to column



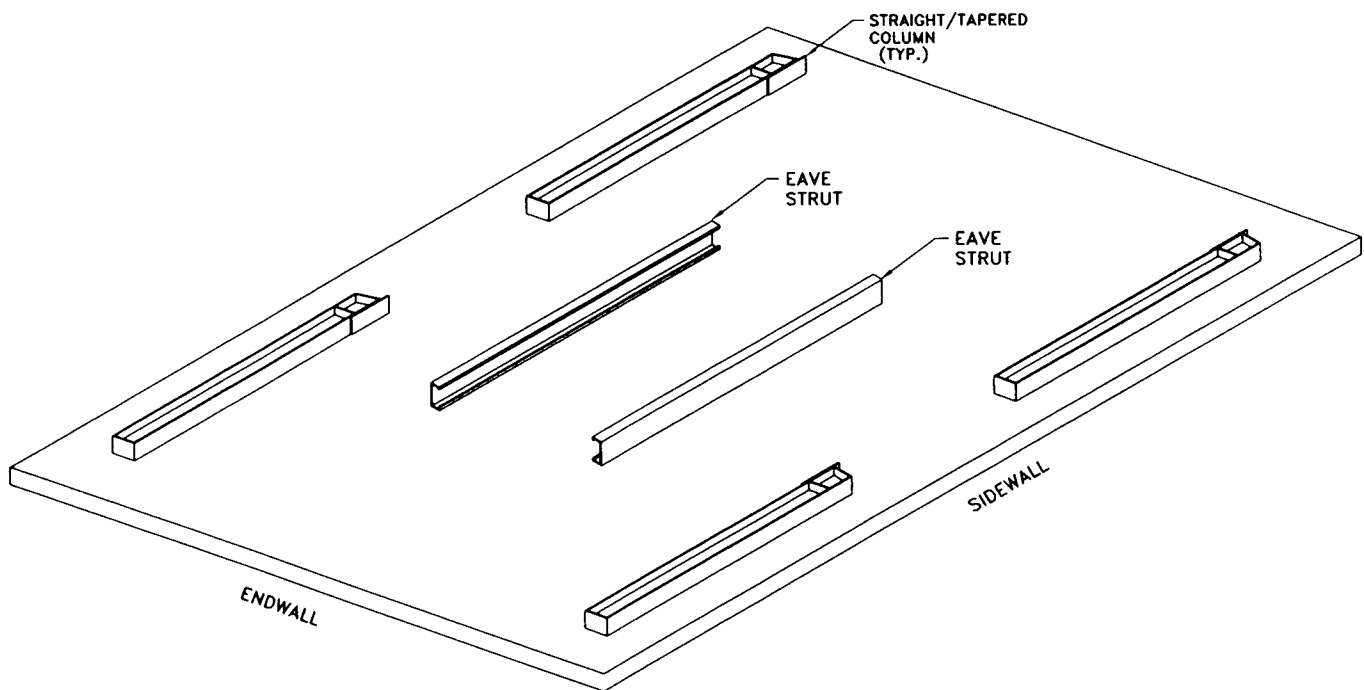
⑦ Purlin to rafter



⑥ Flush mounted girt

# PRE-ERECTING THE FRAMING

Lay out one bay of columns and eave struts as shown in below diagram. When material is laid out as in the below diagram, it is much simpler to keep the erection speed at a constant during the erection of the building.

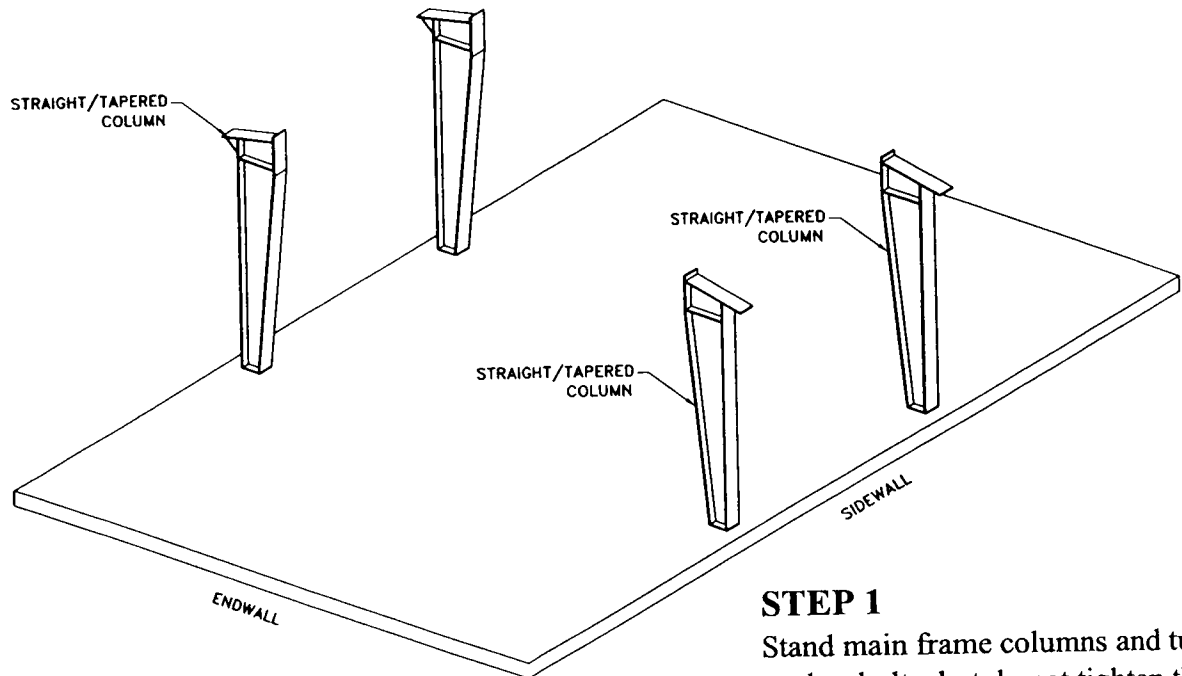


**Note:**

Remember before erection of the building that all the checklist has been gone through and all needed equipment is onsite. If not all the proper equipment is at the job site, the erection may take longer and also raise the cost of the erection.

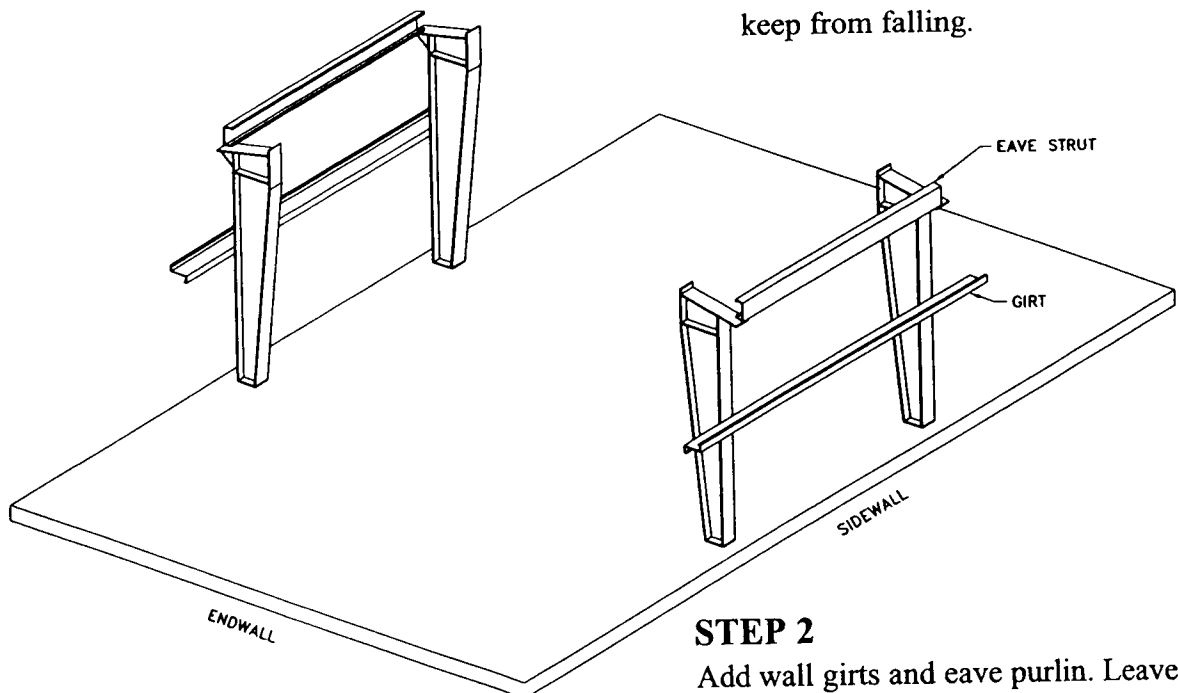
# ERECTING THE FRAMING

The intermediate or interior frames nearest the bearing endwall are usually erected first. This bay usually contains the diagonal bracing. The proper completion and plumbing of this bay is extremely important to the successful completion of the building.



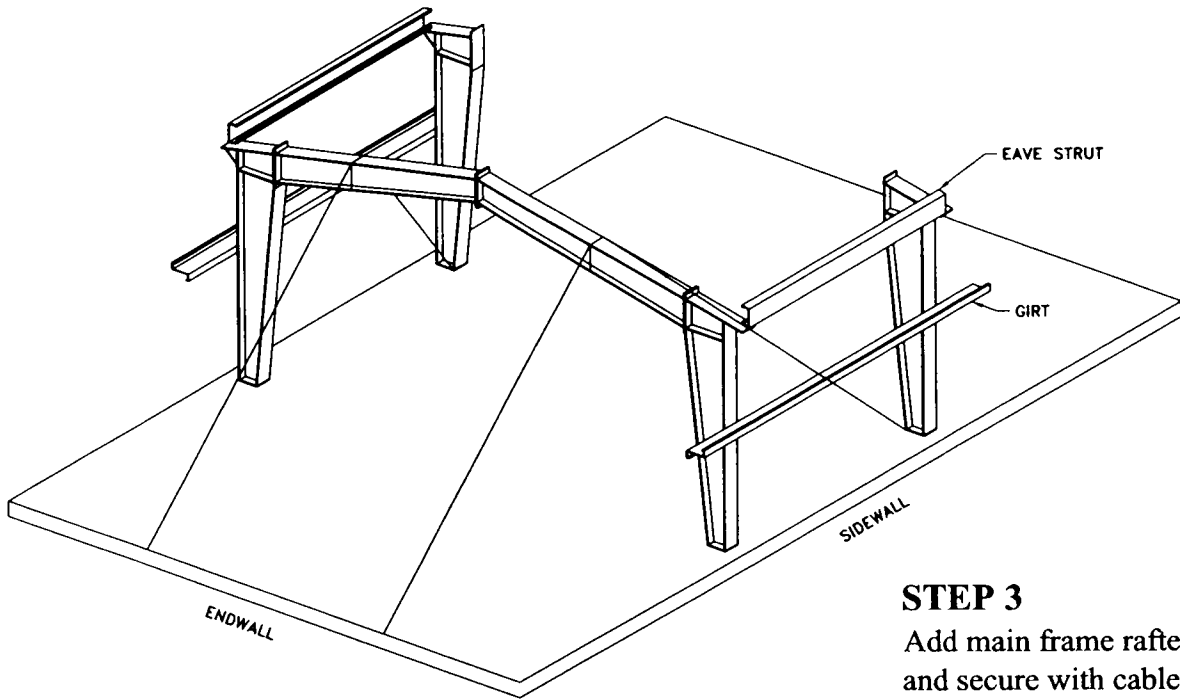
## STEP 1

Stand main frame columns and turn nuts on anchor bolts, but do not tighten them now. Frames may need temporary bracing to keep from falling.



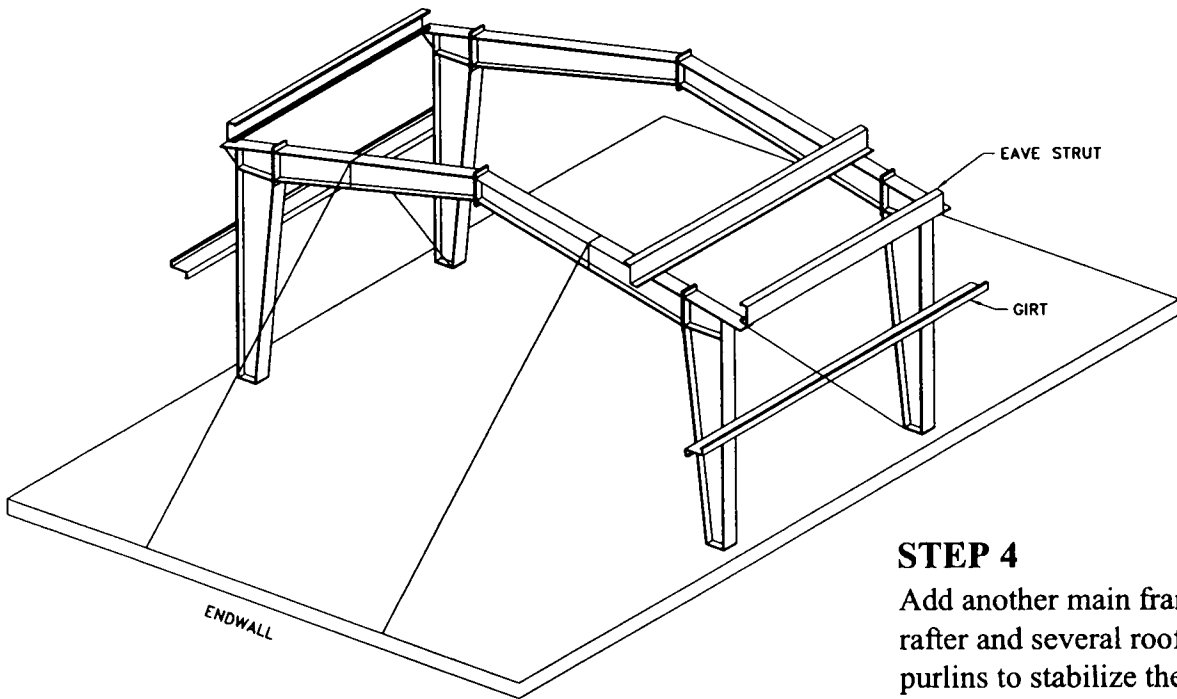
## STEP 2

Add wall girts and eave purlin. Leave bolts and nuts finger-tight for now.



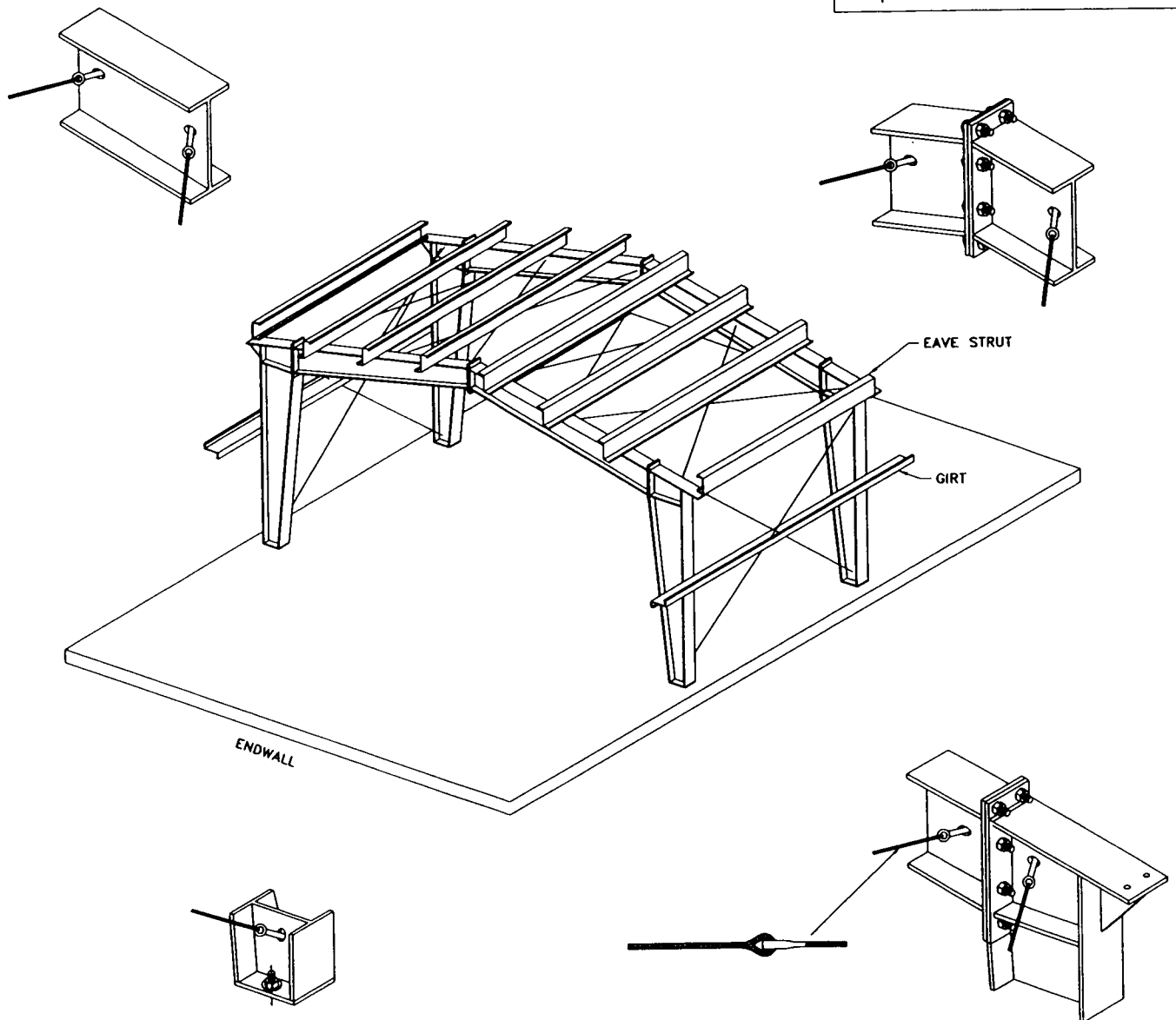
**STEP 3**

Add main frame rafter and secure with cable or rope, tighten connection bolts snug.



**STEP 4**

Add another main frame rafter and several roof purlins to stabilize the frame.

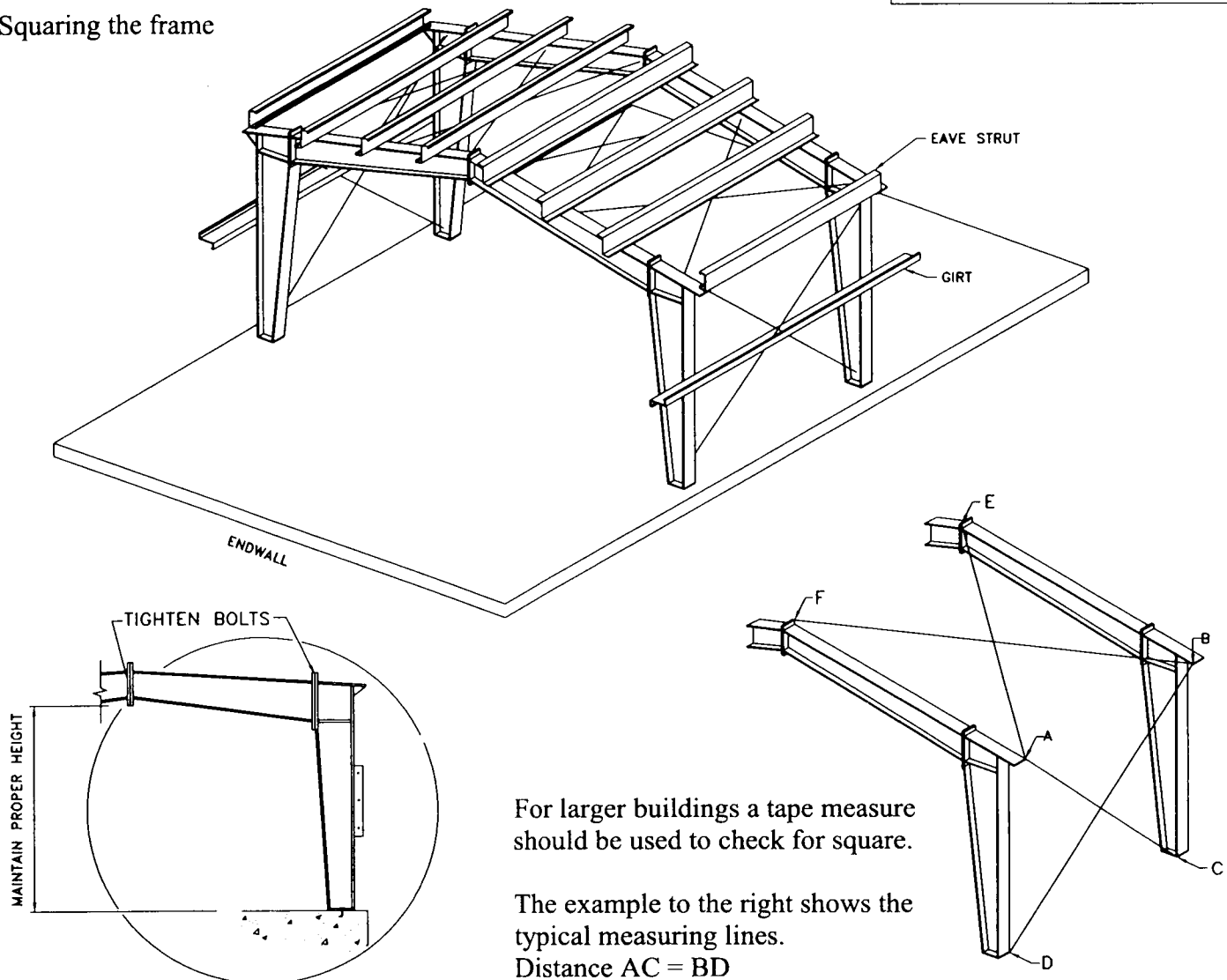
**STEP 5****COMPLETING, ADDING CABLE BRACING AND PLUMBING THE FIRST BAY**

After the first interior frames have been set, it is recommended that all purlins, girts and eave strut be installed with all bolts only snug. Additionally, the cable bracing should be added to the entire bay before proceeding further.

When this bay is properly and accurately plumbed and braced, the remaining members will automatically plumb and align themselves, when installed, to a large degree. Only a final check of the building plumb remains, and few adjustments, if any will be necessary.

**STEP 6**

## Squaring the frame



For larger buildings a tape measure should be used to check for square.

The example to the right shows the typical measuring lines.

Distance  $AC = BD$

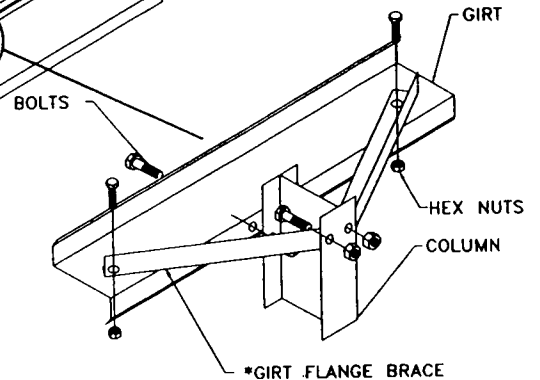
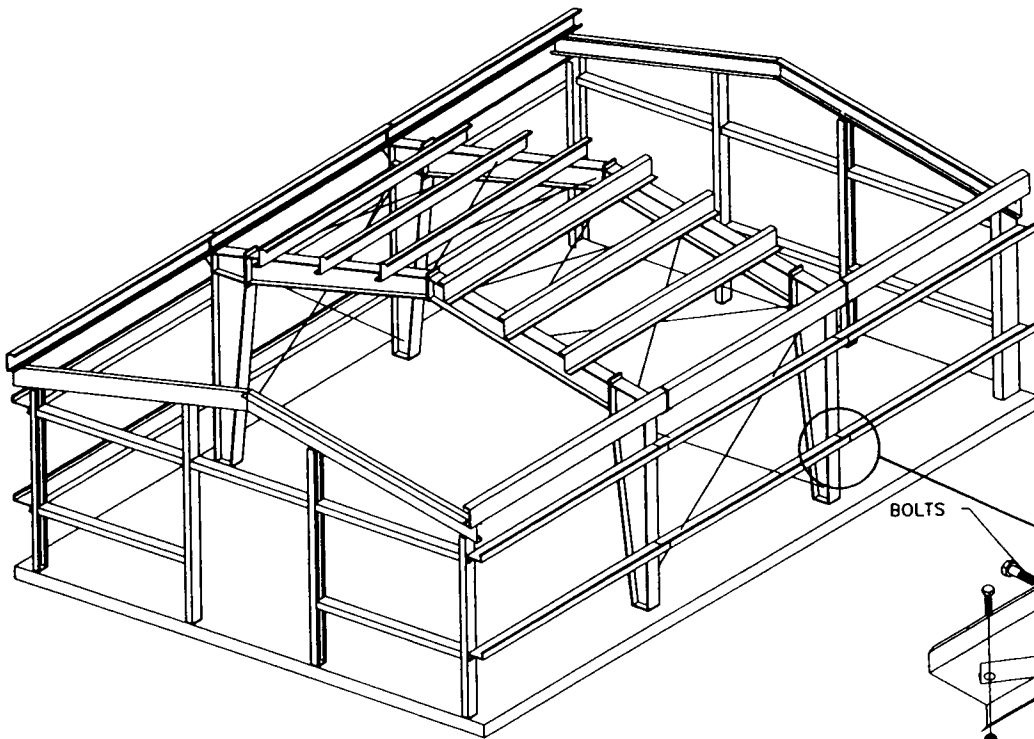
Distance  $AE = BF$

For buildings with an eave height of less than 16', a level with a minimum length of 4' can be used to plumb the framing.

Every column must be checked for plumb and every bay must be checked for square. A final check of building plumb is necessary and required adjustments must be made.

To adjust the building, start by putting minimal tension on the x bracing in an even fashion, measure and check for plumb and square. When the building is close to square, tighten all bolts to snug, and measure again. Continue to measure and tighten all around the frame until all bolts and cable bracing are tight, and the building is square.

Other methods of squaring such as the use of a transit are acceptable, however these processes are too in-depth to cover in this manual.



\* = SEE CONSTRUCTION DRAWINGS FOR PROPER LOCATIONS IF REQ.

## STEP 7

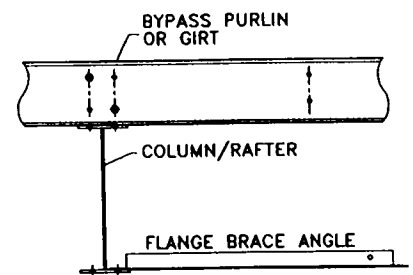
**Endwall Framing:** Add endwall columns, girts, rafters and eave struts.

When the remaining frame work is standing, the structure should be plumbed and squared. Refer to page 22 for basic plumbing and squaring techniques. Square the roof with the use of the cable braces. Taking diagonal measurements and adjusting the tension of the x-bracing will square the roof and aid in plumbing the endwalls. Some buildings will also have cable bracing in the endwalls which will additionally need to be adjusted tight while the frames are square.

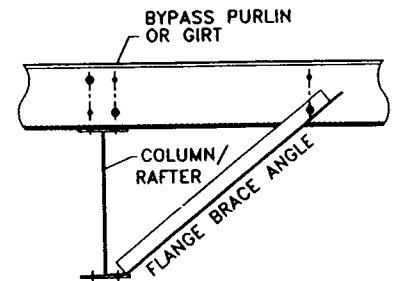
When the entire frame is square add the remaining girts and purlins in the same fashion as before. Additionally install flange braces, as defined in the erection drawings provided with your building. See example at right.

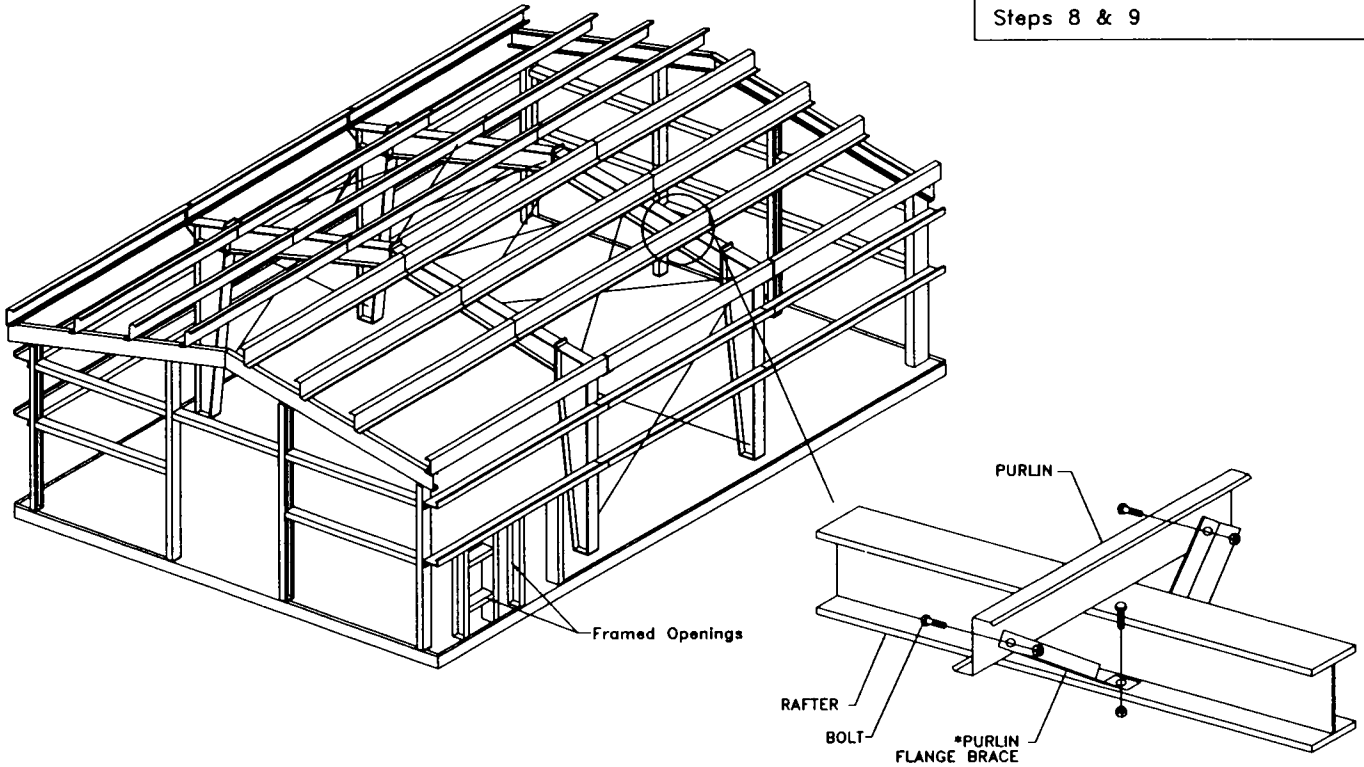
Typical examples of flange brace applications used to support roof purlins, and wall girts. In most applications the braces are on both sides of the column or rafter. (Refer to the erection drawings specific to your building for the exact locations of the flange braces)

Step 1  
Attach the flange to the column or rafter



Step 2  
Bend the flange to the girt or purlin and attach





\* = SEE CONSTRUCTION DRAWINGS FOR PROPER LOCATIONS.

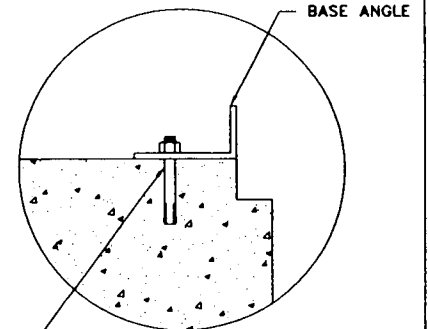
### STEP 8

At this point in the erection, any accessories that you have ordered with your building such as doors and windows should be accommodated for. Refer to the accessories section of this manual for any accessories that are pertinent to your building, and then refer to the erection manuals for details specific to your building.

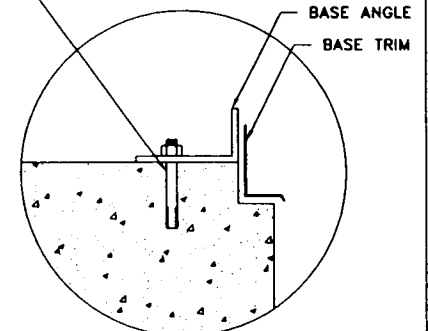
### STEP 9

After accommodations for any framed openings have been made, it is necessary for the base angle to be applied. Base angle is to be applied all the way around the concrete slab, except where openings are located. The base angle provides a clean solid edge for the bottom of the wall panel to anchor to.

Fastener must be adequate to safely resist the loads in the reaction report. (If applicable)



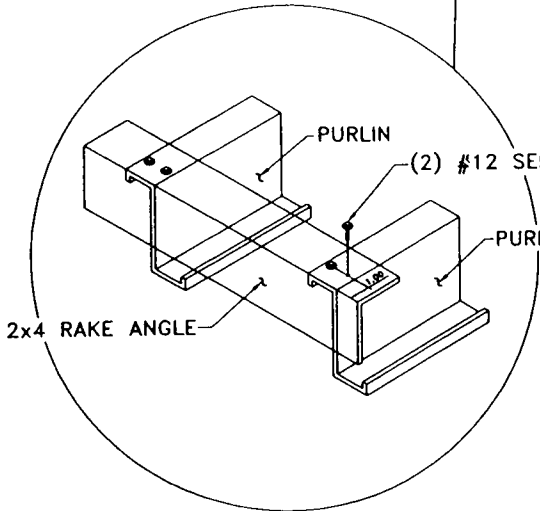
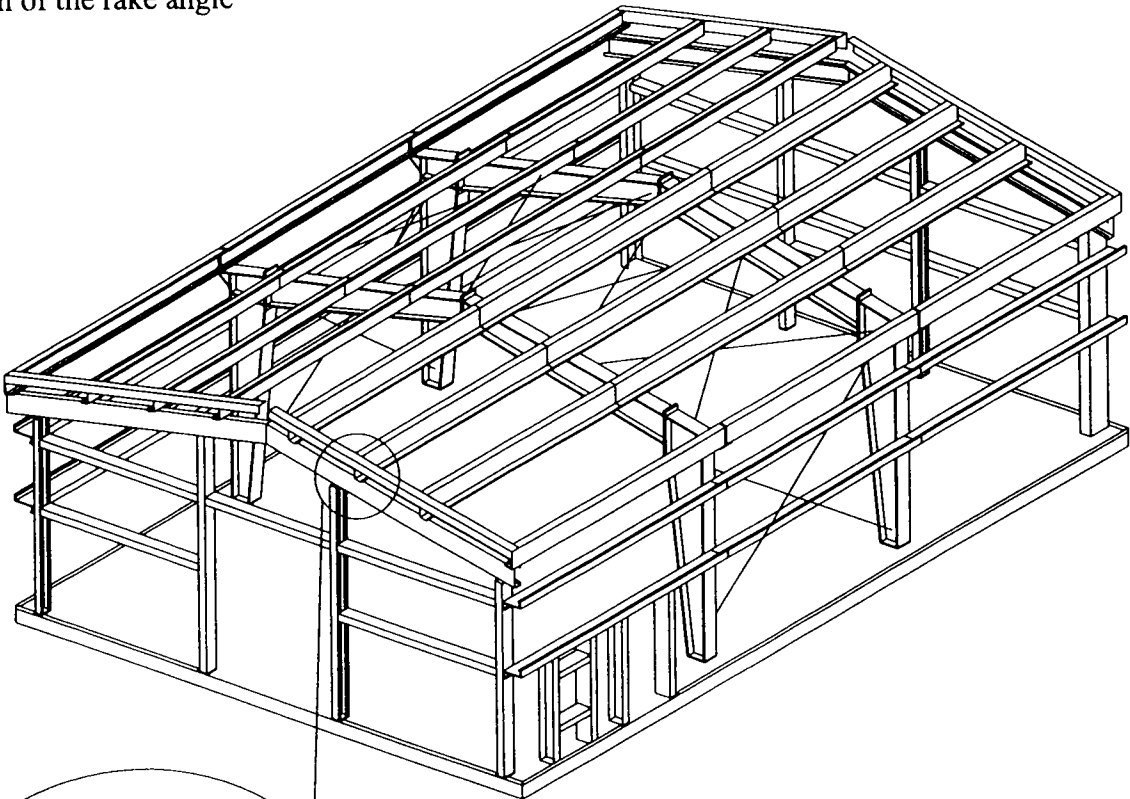
BASE ANGLE DETAIL



BASE ANGLE DETAIL / W  
BASE TRIM (OPTIONAL)

# STEP 10

## Installation of the rake angle

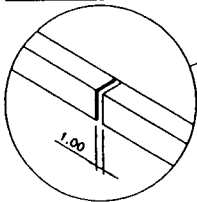


# STEP 10

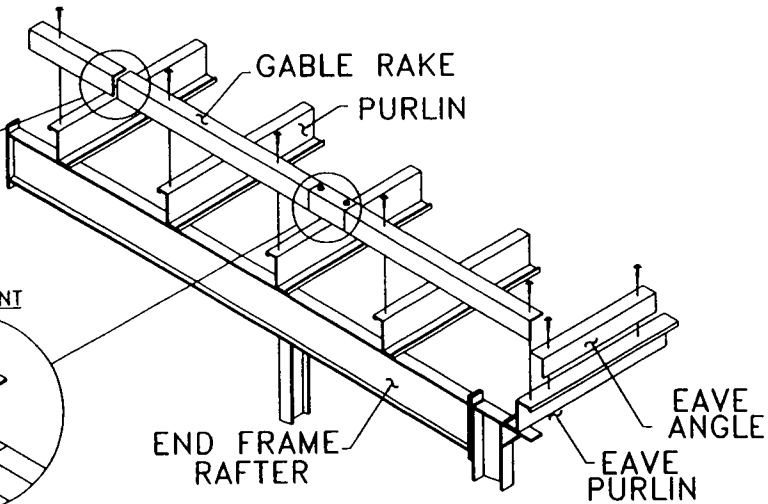
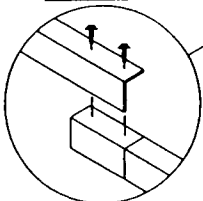
## Installation of the rake angle.

The rake angle provides added rigidity to the purlins and gives the wall panels a clean mounting surface.

EXPANSION JOINT

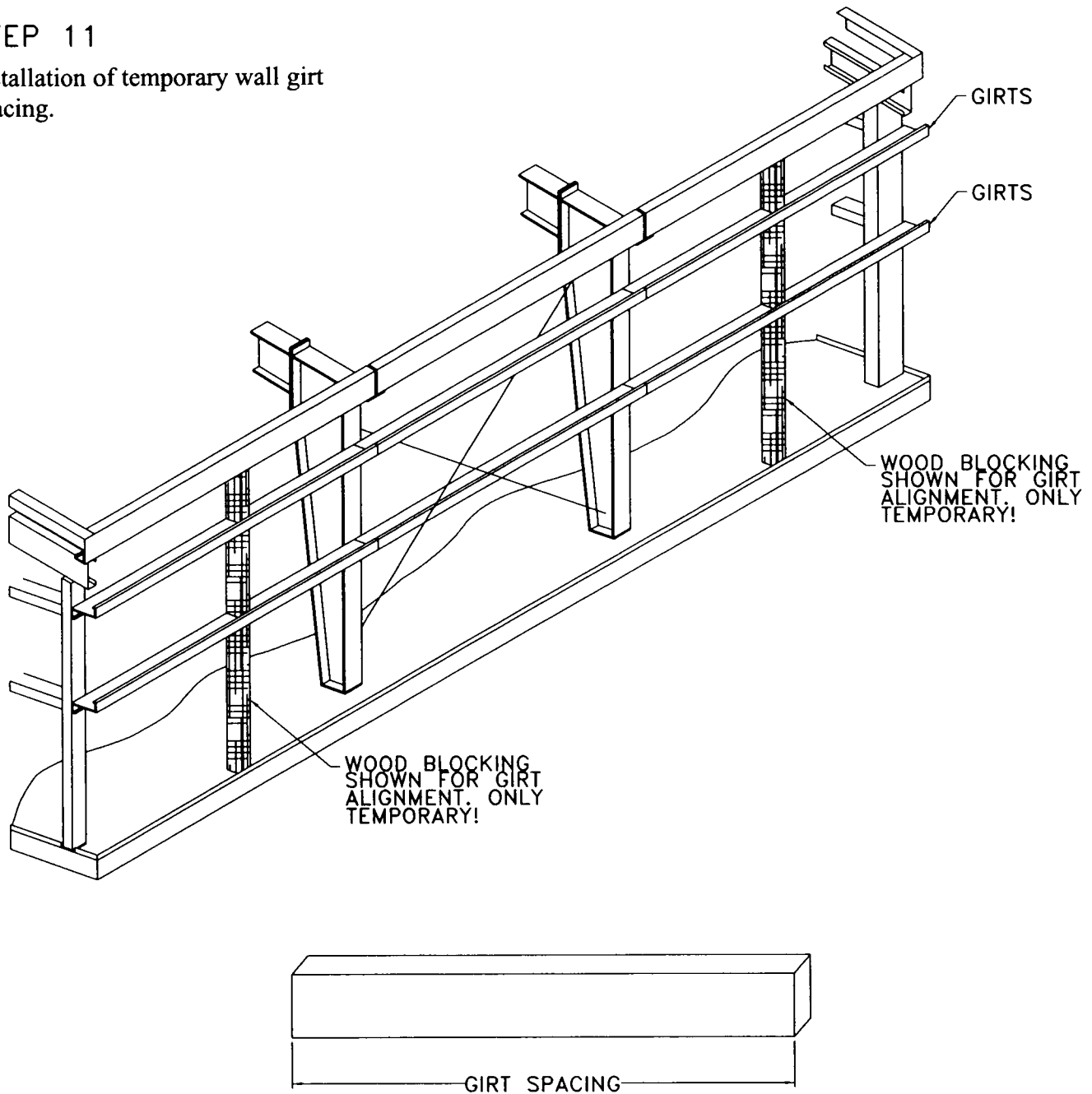


LAP JOINT



## STEP 11

Installation of temporary wall girt bracing.



Use rough lumber as temporary braces for wall girts. Cut brace length that will hold girts at the same height in center of bays as the height where girts attach to the structural columns. This will provide uniform screw lines when attaching wall sheets to girts. After the wall sheets are in place, remove these braces from the inside.

## Step 12

### Final Structural Framing Inspection

- Conduct final inspection on all structural bolts

Be sure that all connections have proper amount, size, and type of bolts installed, and are properly tightend.

Note: Turn of the nut method:

Bolts shall be installed in all holes of the connection and brought to a snug tight condition. Snug tight is defined as the tightness that exist when the plies of the joint are in firm contact. This may be attained by a few impacts of an impact wrench or the full effort of a man using an ordianry spud wrench. Snug tightening shall progress systematically from the most rigid part of the connection to the free edges, and then the bolts of the connection shall be retightened in a similar systimatic manner as necessary until all bolts are simultaneously snug tight and the connection is fully compacted. Then all bolts shall be further tightened by 1/3 of a turn. During the tightening operation there shall be no rotation of the part not turned by the wrench. Tightening shall progress from the most rigid part of the joint to it's free edges.

- Check wall for plumb and make necessary adjustments using shims where required

Check all framed openings for square and plumb.

- Apply touch-up primers to areas where field modifications were performed.

# SHEETING INSTALLATION

## General Sheeting Instructions

- Identify the sidewall sheets, the end wall sheets, and roof sheets. Prearrange them in a convenient location near the portion of the building being worked on. Be certain to use the correct length of sheet before fastening it to the building.
- Be sure all sheets are secured or protected from the wind at all times.
- Install the sidewalls sheets first, beginning on the side away from the primary source of the building, such as the rear of the building. This will produce the best appearance, because the sheeting laps will be on the side away from the viewer.

-Do not use tape sealant on laps when sheeting sidewalls

- Install the endwall panels next, again concealing the laps away from the front view of the building.

-Do not use tape sealant on laps when sheeting the endwalls

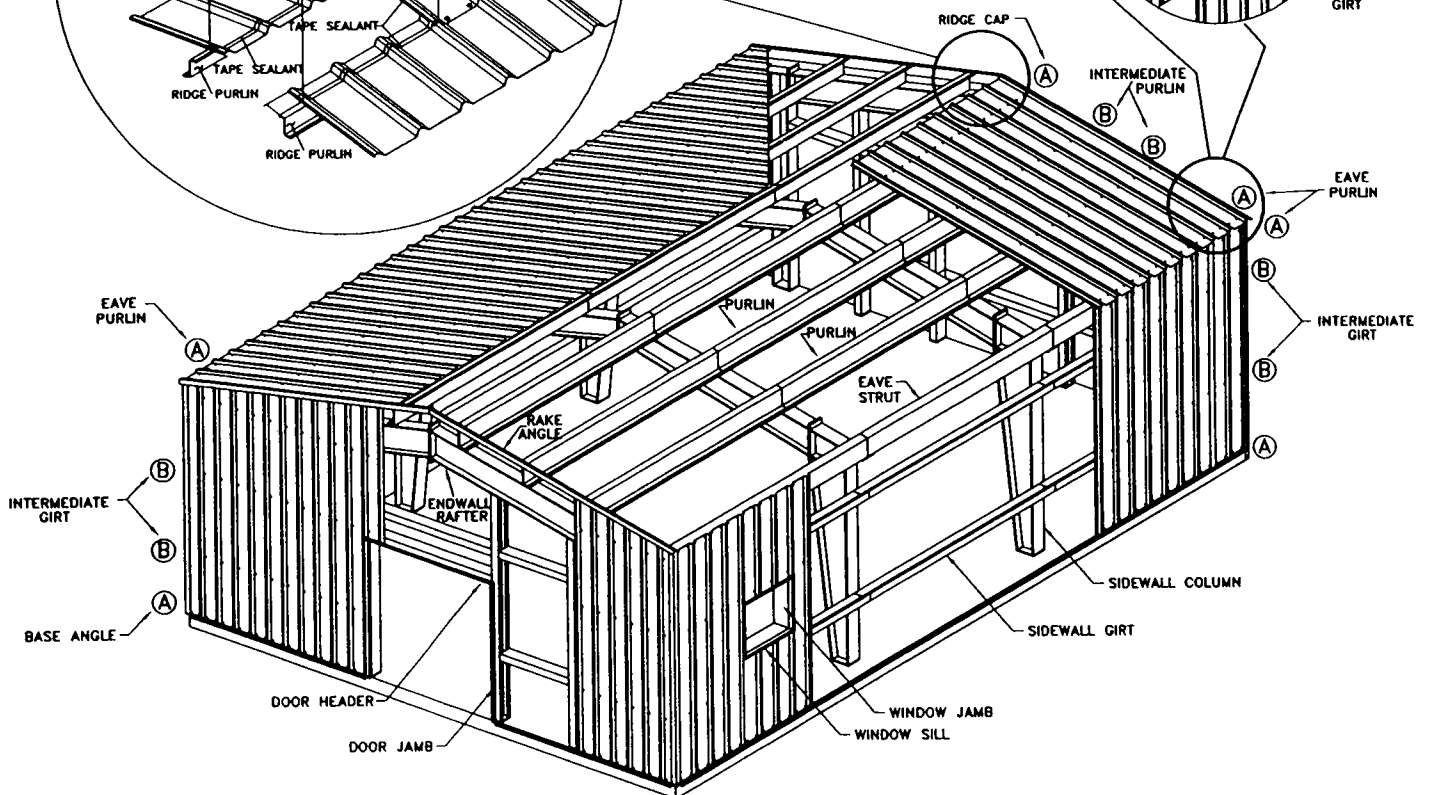
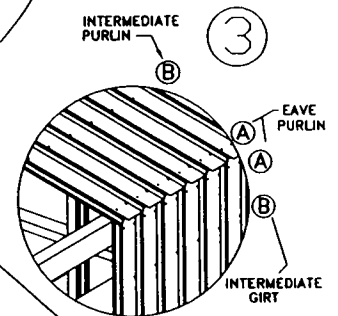
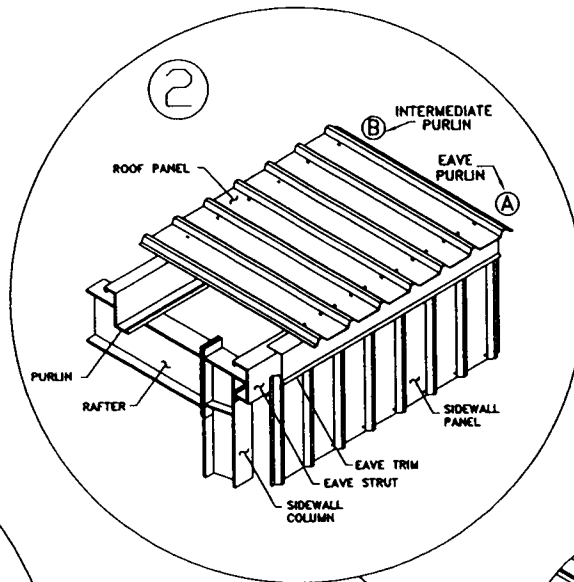
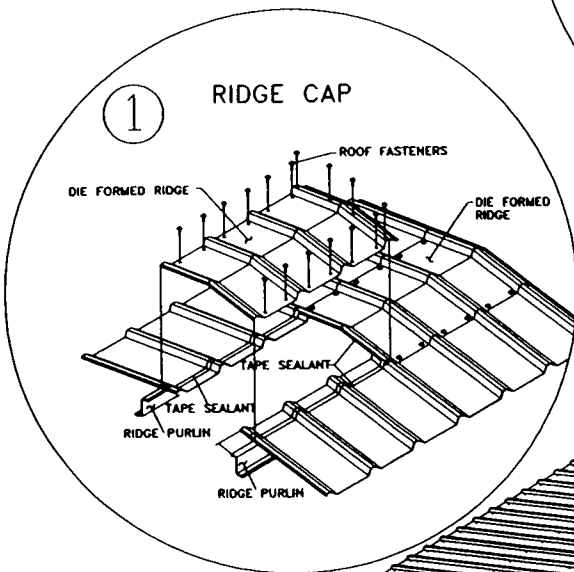
- The roof sheets are installed last. Start these so that the laps are away from the prevailing wind. It is standard practice to use tape sealant on laps when sheeting the roof.
- Use self-drilling screws #14 S.D.S at all locations where screws go through only sheeting or trim. Use self-drilling screws #12 S.D.S at all locations where they go through both sheeting and purlins or girts.
- For effective results, it is vital that an adjustable torque screw gun with 2,500 RPM be used for the self-drilling screws supplied with your building. Failure to use a 2,500-RPM gun speed will result in broken drill points on these screws.

Note - Occasionally the rubber washer may spin out from under the self-drilling screw head, replace it with a new self drilling screw. If this becomes frequent, reduce the torque on the screw gun or replace it as needed.

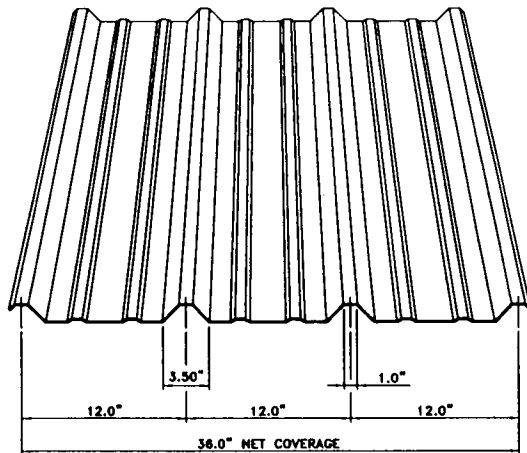
Note - Occasionally the screw holes of a self tapping screw may become oversized, use a #17 x 3/4" (by others) self tapping screw to correct this. If this becomes frequent, reduce the torque on the screw gun or replace it as needed.

Standard Sheeting  
Details

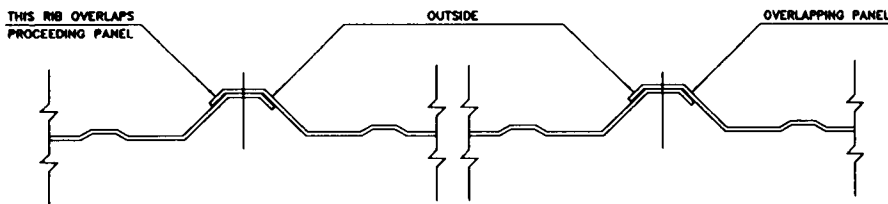
- |    |                    |
|----|--------------------|
| 1. | Ridge Cap          |
| 2. | Wall & Roof Panels |
| 3. | Wall & Roof Panels |



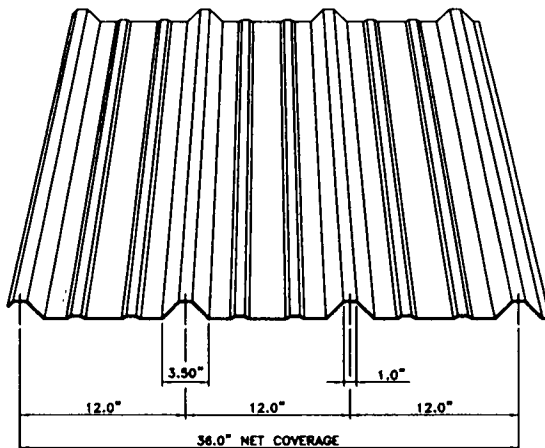
## R PANEL DETAIL



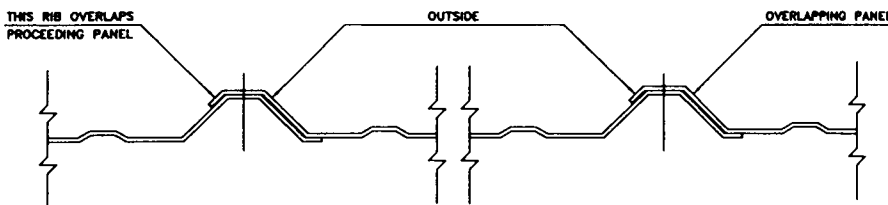
The "R" panels are designed for both roof and wall applications. Its symmetric profile allows for installation without regard to sheeting direction. Sheeting can be started from either end of the building; however, by applying the sheets towards the direction of the prevailing view, the overlap line on the side of every third rib will be less visible. Where heavy prevailing winds occur, place the edge to be lapped into the wind.



## PBR PANEL DETAIL



The "PBR" panels are designed for roof applications, but may be installed on the wall. The profile is the same as the R panel except for the addition of the support leg on the leading edge on one side. Erection of this panel requires that the proper direction of its application be established. The support leg allows for better nesting with the overlapping rib of the next panel. As shown below, the installation of the panels would proceed from left to right.

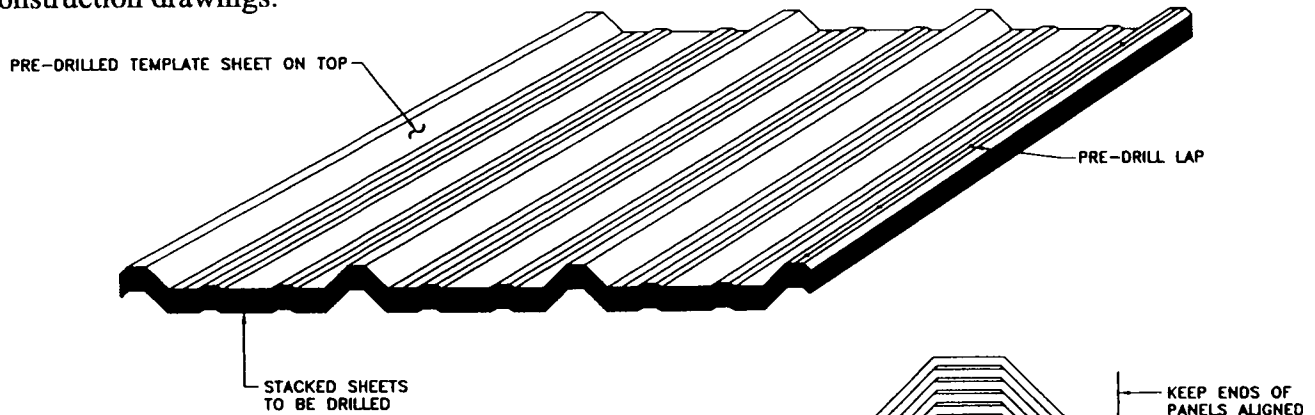


# Step 1 wall panel installation preparation

## Pre-drilling the High Lap Rib for Self Tapping Screws

Good alignment of the screws on the wall panels, will give the wall paneling a professional appearance. The best way to accomplish good fastener spacing is to pre drill fastener holes in the panels in identical locations.

**WARNING** - Reverse rolled panels require a different screw patterns. Please refer to your construction drawings.



Prearrange the sheeting in stacks near the area convenient to where they will be attached to the building. Measure the lengths of the sheets and check them with the area to be covered (pay special attention to the lengths so that you have appropriate materials to complete the sheeting.)

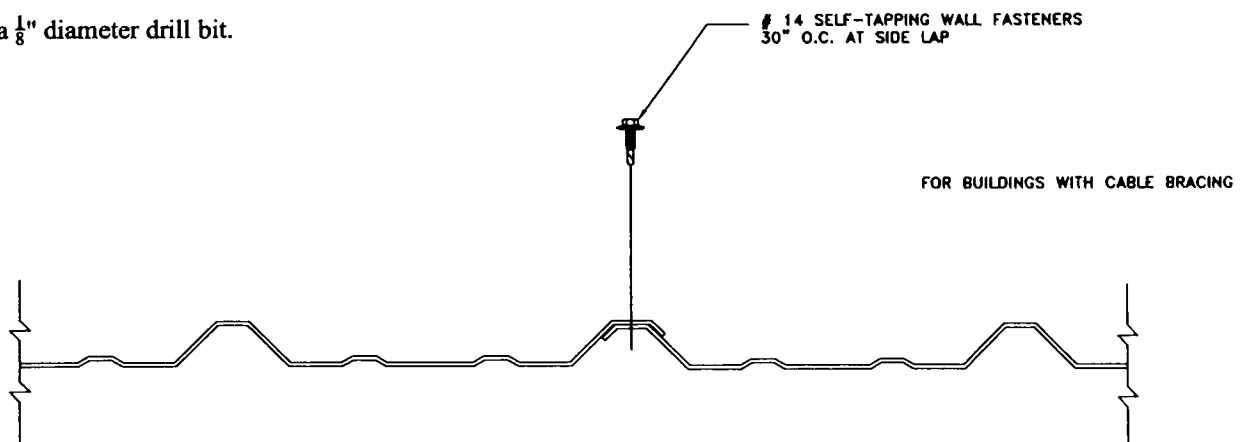
Make certain that the sheets at one end of the stack are lined up - this end should be set at the base of the building. Secure the stack firmly while drilling to prevent misalignment.

Stack the wall sheets to be pre-drilled with no more than 6 sheets to a stack.

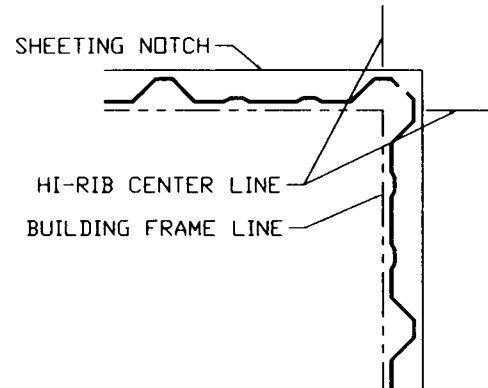
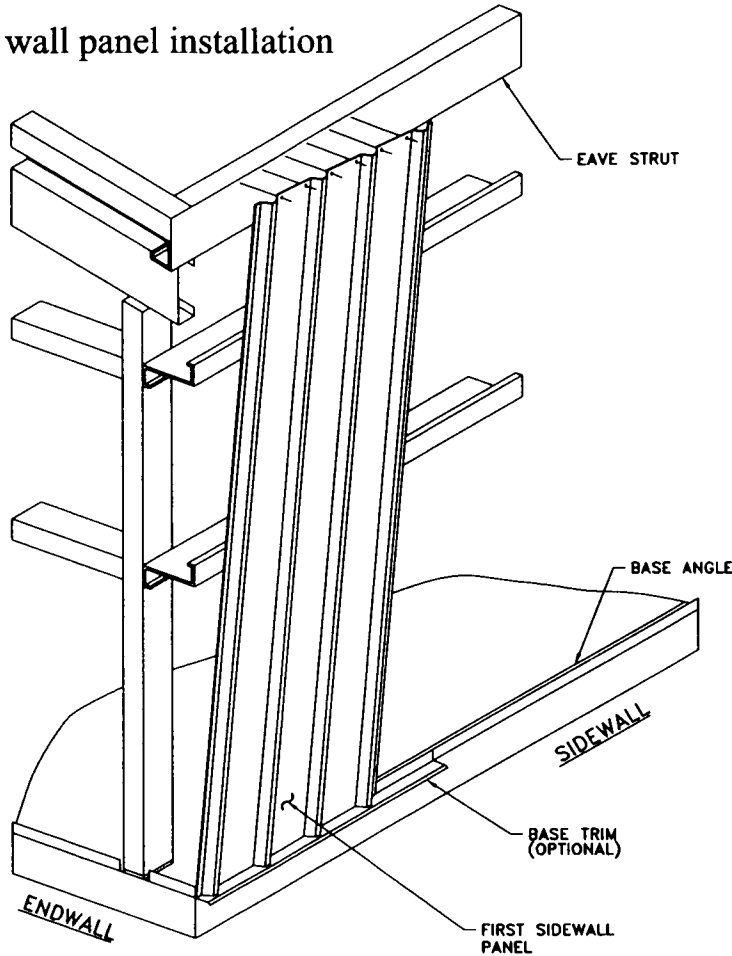
On the exterior lapping rib, mark the pilot hole to be pre-drilled. Start the pilot holes  $1\frac{7}{8}$ " from the base, and space them at every 30". (Refer to the erection drawings provided for specific spacings.)

Pre-Drilling one lap on each panel should be sufficient, giving uniform spacing at panel connection. Screw placements for girt attachments can easily be marked with a chalk line as panels go up.

Use a  $\frac{1}{8}$ " diameter drill bit.



# Step 2 wall panel installation



**Note:** If wall insulation is in your building, it should be installed prior to sheeting the walls. Refer to the Insulation section.

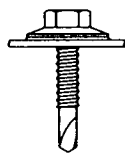
Take note of the primary point of view of the building. Start the siding at the opposite end of the building so the the laps will be hidden from view.

Start the paneling so that the first high rib center line is in line with the edge of the framing. As shown in the top right corner of this page. (Unless noted on construction drawings)

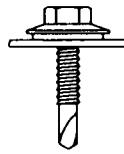
Before installing the first wall panel, notice the diagram on the next page, illustrating the standard ways of fastening the panel to the girts, base angle and the purlin angle.

Continue the sheeting until the entire sidewall is covered.

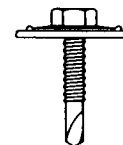
### FASTENER INSTALLATION \*



CORRECT



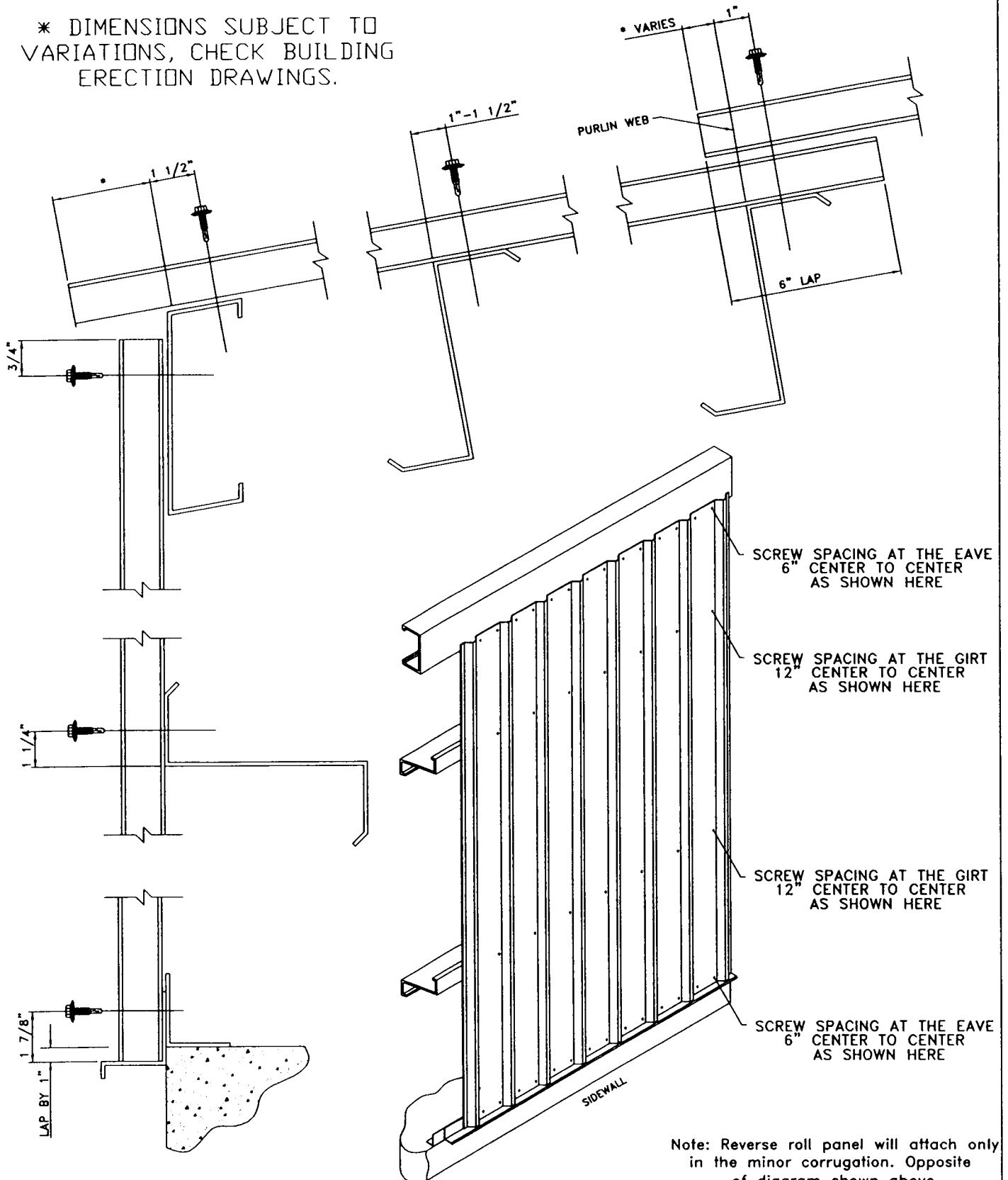
TOO LOOSE



TOO TIGHT

IT IS EXTREMELY IMPORTANT THAT PANEL FASTENERS BE INSTALLED PERPENDICULAR TO THE PANEL SURFACE AND WITH THE CORRECT AMOUNT OF TORQUE APPLIED FOR TIGHTENING TO INSURE PROPER SEALING OF THE WASHER.

\* DIMENSIONS SUBJECT TO VARIATIONS, CHECK BUILDING ERECTION DRAWINGS.



Note: Reverse roll panel will attach only in the minor corrugation. Opposite of diagram shown above.

Diagram represents the #12 self-drilling fasteners.

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STANDARD PANEL TO GIRT / PURLIN SCREW PLACEMENTS

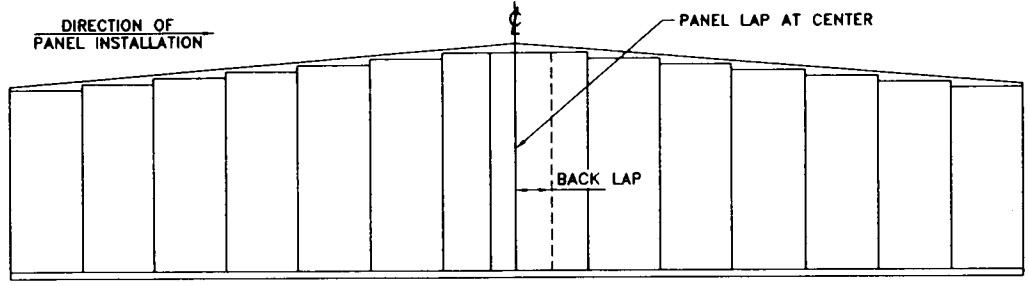
PAGE #: 31

REVISED: 1-01 BY: LS

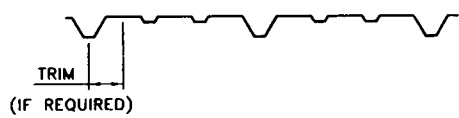
# Step 3

## Installation of the endwall panels

Install the endwall panels in the same fashion that the sidewall panels were installed. For the endwall, you will have to pay more attention to the panel length due to the slope. Take measurements of the area to be covered, and lay the appropriate panels out ahead of installation to ensure the correct panel placement.

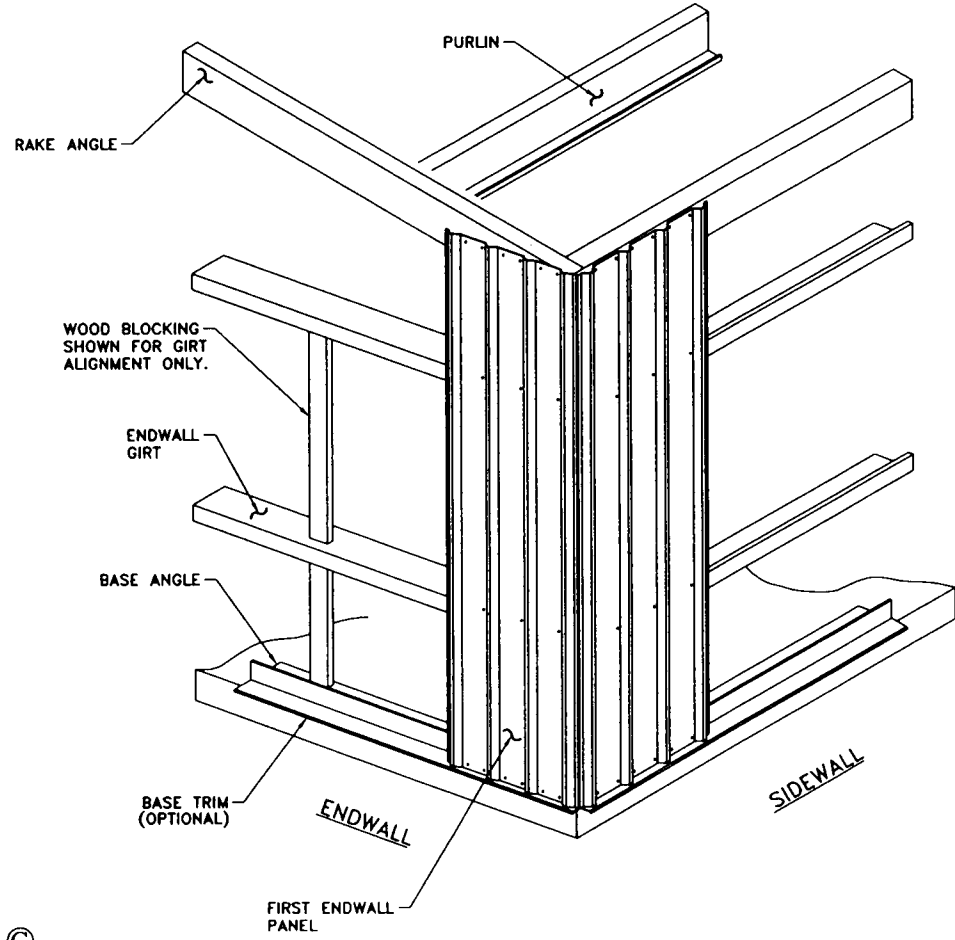


ENDWALL ELEVATION



THE TRIM DIMENSION IS MEASURED FROM THE CENTER OF THE FIRST MAJOR RIB. (REFER TO THE ERECTION DRAWINGS)

Note: For slopes of 2:12 or greater, top of endwall panels will have to be cut to follow the slope of the roof.



# Roofing Safety Precautions

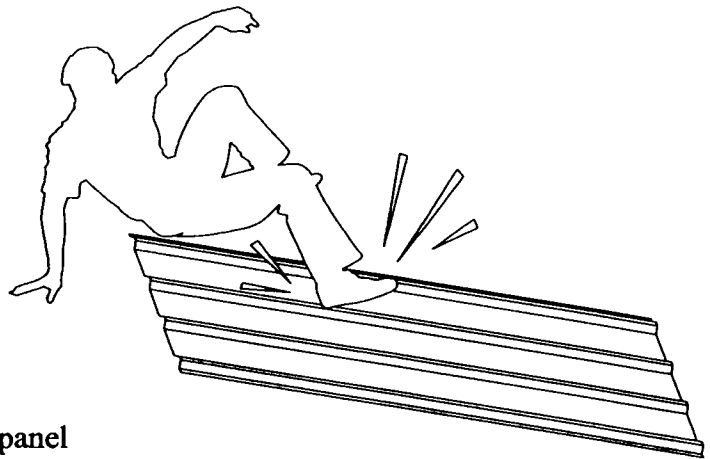
The manufacture strongly recommends that the erection crew is continuously trained in safe and productive work practices.

Installation of roof structures, insulation, or roof panels require workers with proper training, correct equipment, and constant alertness to minimize the danger of falls.

Hard hats should be worn on job sites to prevent injury from falling objects.

Roof panels must be completely attached to the purlins and to panels on either side before they can be a safe walking surface.

## Partially attached or unattached panels should never be walked on!



### Do Not

1. Step on high rib, especially at edge of panel
2. Step near crease in rib at edge of unsecured panel
3. Step on an unsecured panel

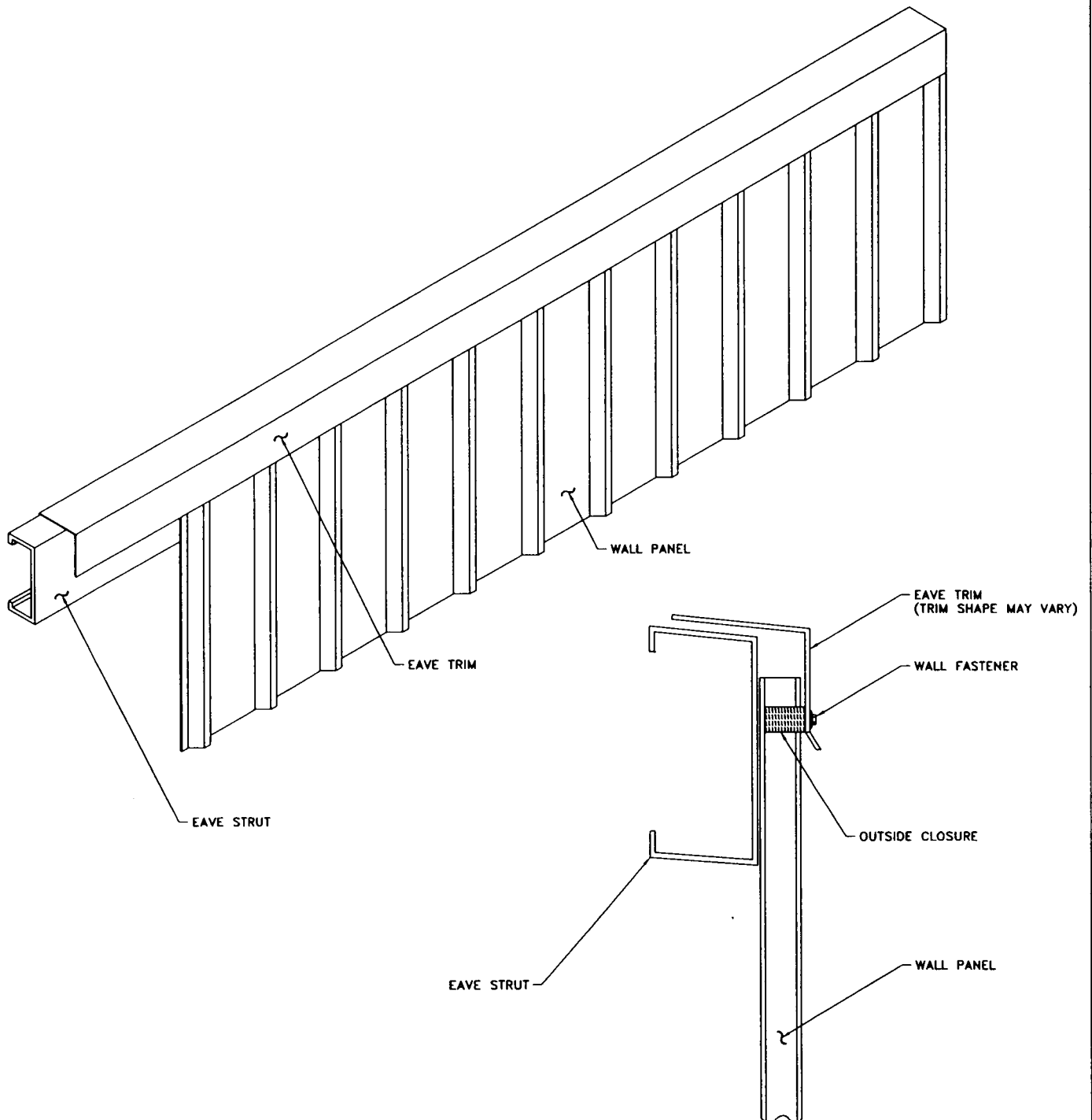
A single roof panel must never be used as a work platform. An OSHA approved runway as specified in OSHA safety and health regulations for the construction industry should be used for work platforms.

Panels may be oiled and slick. Oil protects the panel coil stock and finished panels from rust during shipping and storage. Additionally dew, frost or any other moisture may cause panels to be slippery. Be certain to wipe panels clean before installation begins.

Wear rubber sole work boots. When on the roof, use OSHA approved protection devices such as safety lines, safety nets or catch platforms. Employees should be continuously warned to never step on unsecured roof panels while on the roof.

All safety precautions referred to throughout this manual, all OSHA safety requirements or other customary or statutory requirements must be adhered to in order to maximize employee safety.

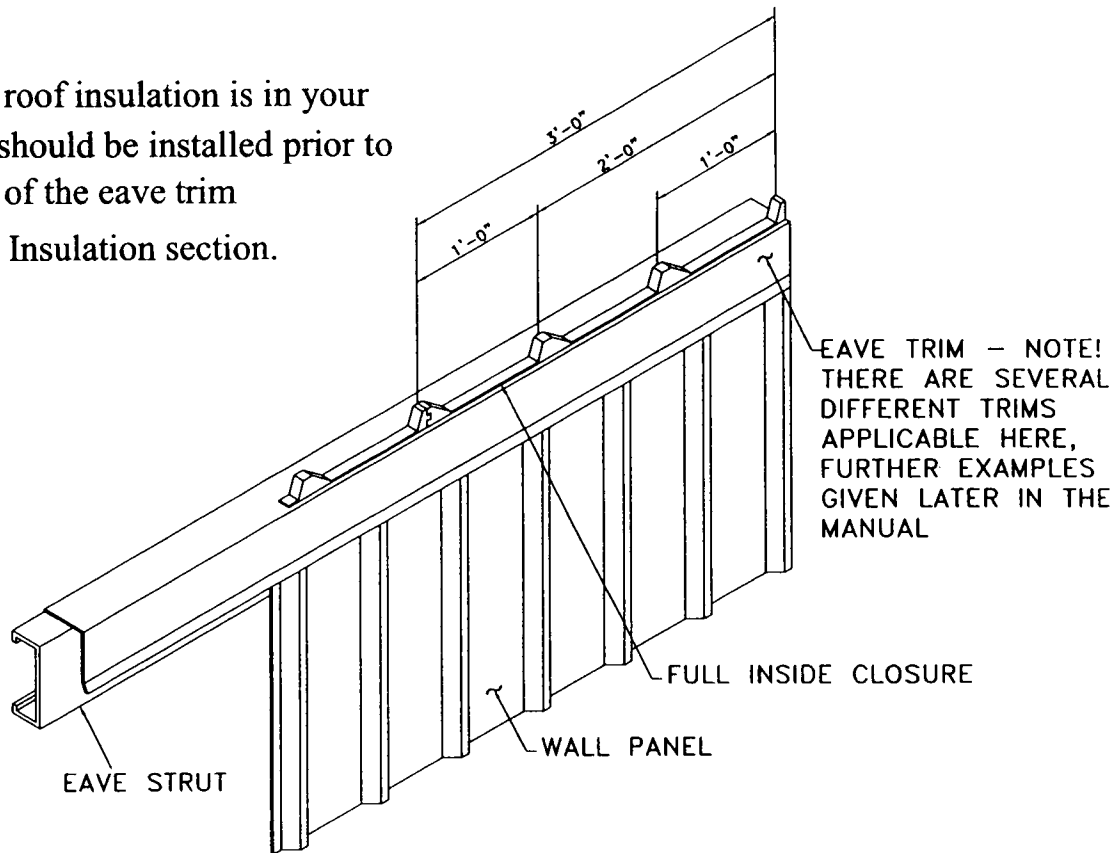
## Step 4 Install the eave trim



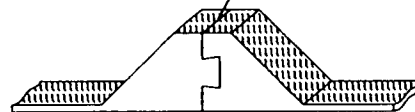
After installing the wall panels, the eave trim needs to be installed over top of the wall panels, and mounted to the eave strut. This will allow the roof panel to be installed without hitting the fastener, allowing a clean, distortion free installation. Additionally notice in the side view the foam outside closure strips.

## Step 5 Preparation of the eave

**Note:** If roof insulation is in your building, it should be installed prior to Preparation of the eave trim. Refer to the Insulation section.



CAULK CLOSURE SPLICE WHEN ICE & SNOW EAVE CONDITIONS MAY OCCUR.

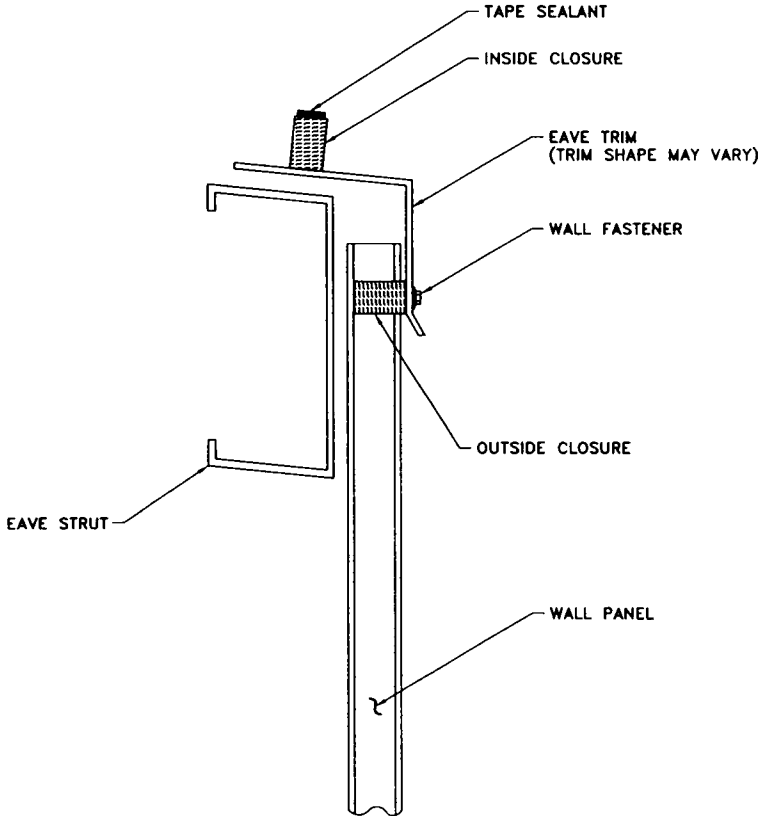


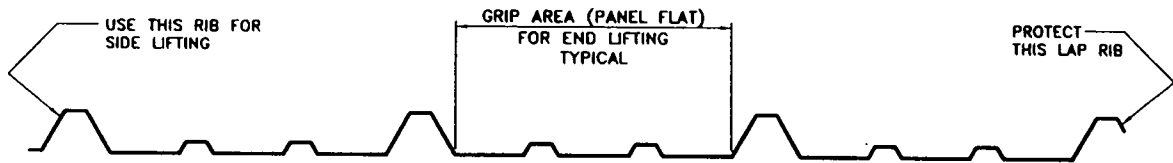
After installing the first run of insulation, prepare the eave for the first roof panel by applying foam closures along the eave outside of the insulation. Foam closures must be applied in a straight line and without voids. Do not stretch the foam closures. As shown, remove paper backing, and place starter piece on top of the eave angle. Align the major rib of the closure with the edge of the endwall roof line. Splice a full closure to the starting closure and apply along the top of the eave angle. If roof is subject to ice and snow buildup, the splice in the closure strip must be caulked to insure weathertightness.

# Step 5 (Continued)

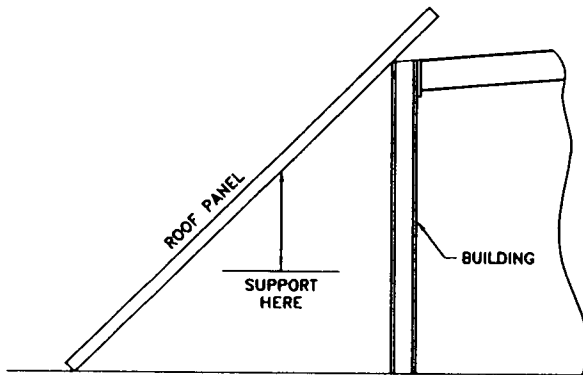
## Preparation of the eave

Along the top of the foam inside closure strips that have been placed along the roof eave, apply a run of tape sealant along the roof foam closure. Prior to removing the paper backing from the tape sealant, check and mark for proper alignment of the first roof panel. Note that self-tapping screw will require holes to be drilled in the supporting structure prior to installation. Continue mastic and closure run along the roof eave in preparation for the next roof panel.



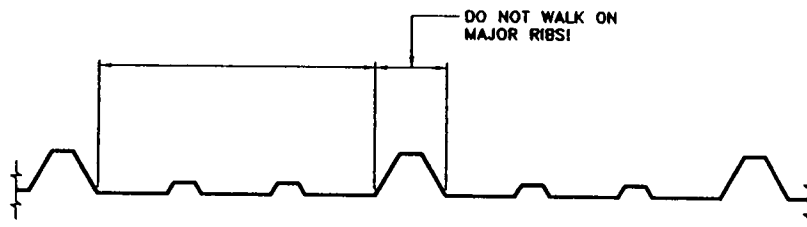
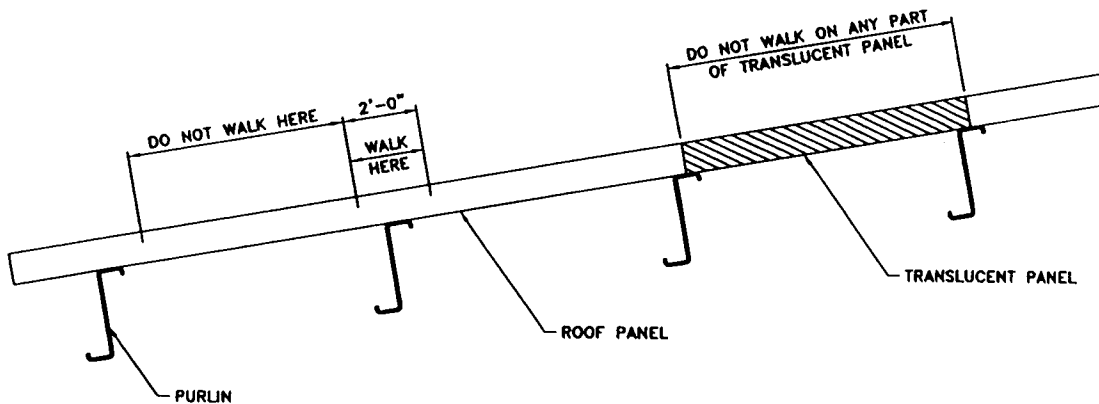


WHEN LIFTING SINGLE PANELS,  
USE ONLY THE POINTS SHOWN IN DRAWING ABOVE



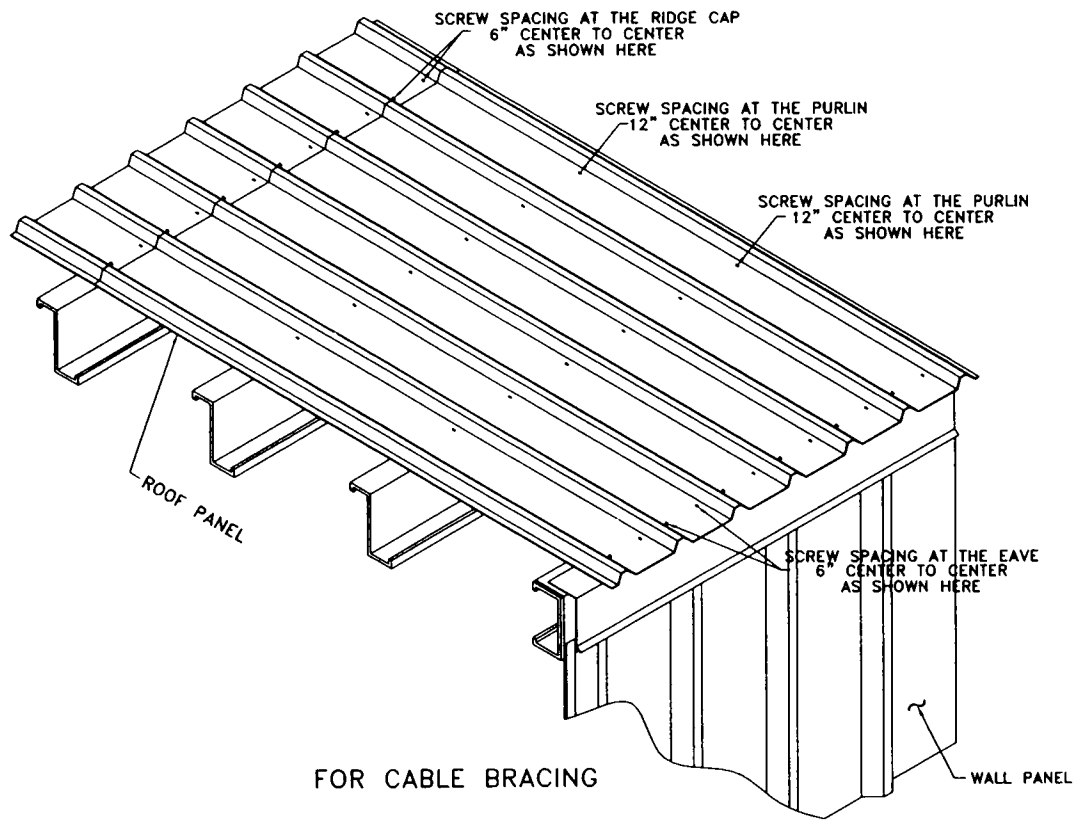
UPON COMPLETION OF ROOF  
INSTALLATION, ANY EXCESS  
FASTENERS, BLIND RIVETS,  
DRILL SHAVINGS, ETC. MUST BE  
REMOVED FROM ROOF AND GUTTERS  
TO PREVENT RUSTING.

ALWAYS SUPPORT PANELS  
FROM THE BACK WHILE LIFTING TO THE ROOF

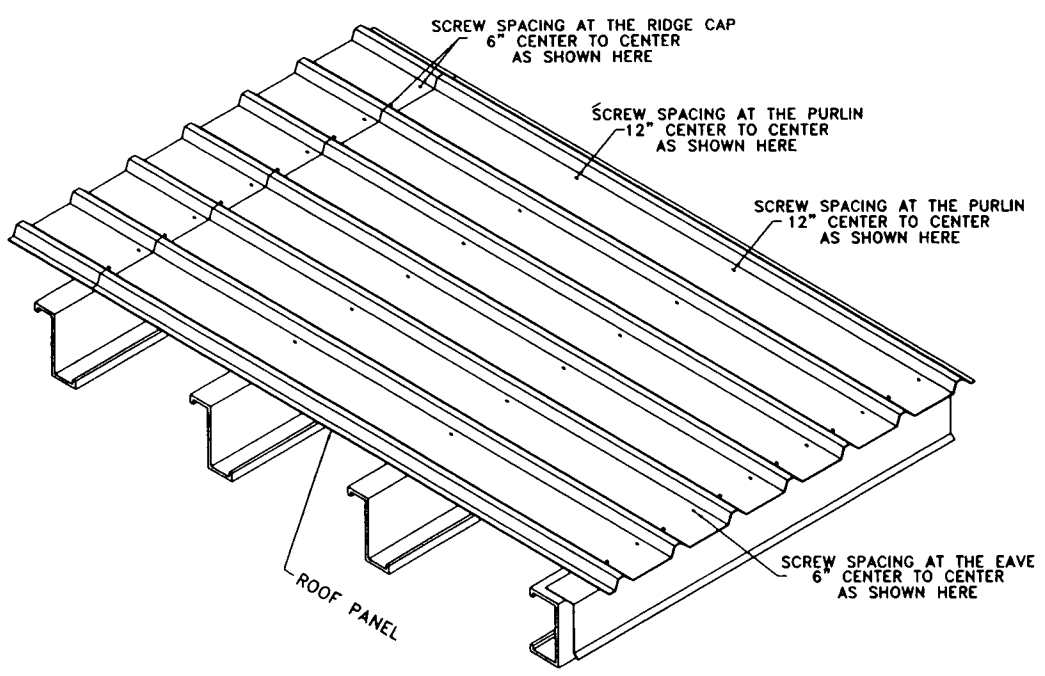


AVOID DAMAGE TO ROOF PANELS,  
WALK ONLY ON THE AREA INDICATED ABOVE.

FOR DIAPHRAM BRACING



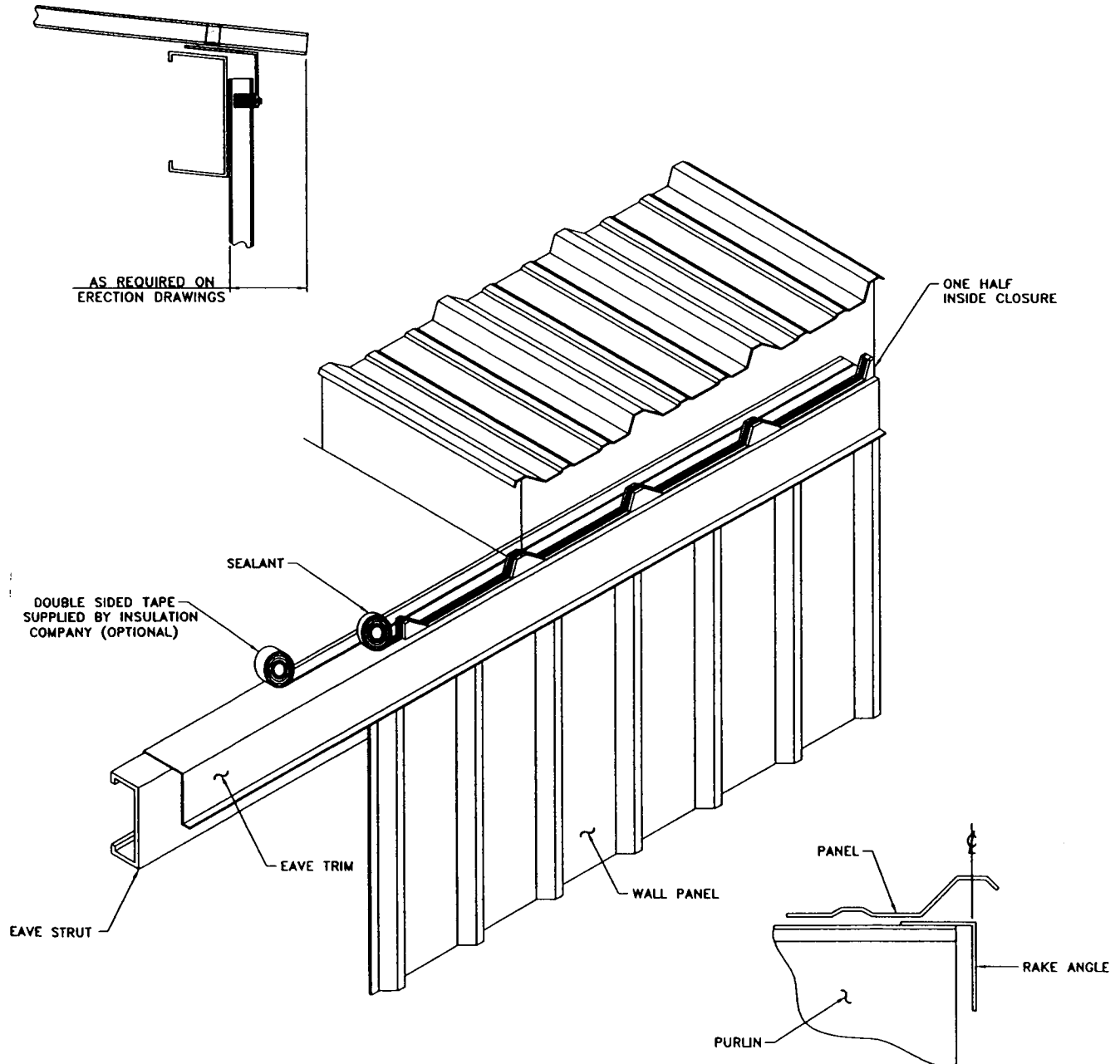
FOR CABLE BRACING



## Step 6

### Installation of the first panel

Once the eave is prepared, the first roof panel may be installed. Set the roof panel in place over the inside closure (after removing the paper from the mastic) insuring the major ribs of the panel nest properly with the inside closure. Extend the panel past the eave strut, (refer to the erection drawings for the exact distance,) or past the high rib on the wall panel. With the panel properly placed, secure the panel to the structure with appropriate fasteners. Refer to the previous page for fastener spacings.

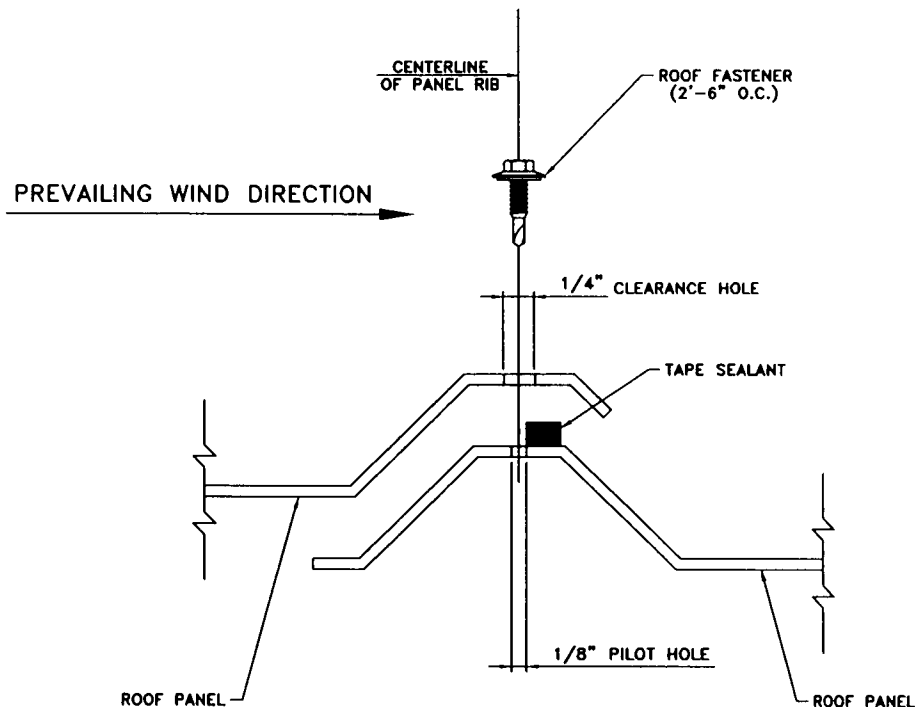


As on the wall panel installation, align the center of the high rib with the edge of the endwall rake angle. (Unless noted in erection drawings.)

# Step 7

## Sealing the panel side lap to accept the next panel

Apply the side lap tape sealant to the weather side edge of the lower panel's major rib as shown. The tape sealant should only be applied to clean dry surfaces. With the release paper in place, press firmly along the length of the sealant to insure proper adhesion. While removing the protective paper from the tape sealant, care should be taken not to pull the tape sealant away from the panel. Install the adjoining panel, positioning the overlapping rib with care. Drill at the center of the clearance holes in the overlapping panel, 1/4" clearance holes for the lap fasteners. Stitch the lap with the #14 self drilling fasteners supplied with the job. Never allow the sealant to be placed in other locations.



# Step 8

## Installation of the second roof panel

