

## Module 6 – Wall Sheeting

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### Chapter 1

During this module on wall sheeting installation you will become acquainted with the procedures necessary for applying wall sheeting to the exterior of a metal building. We will take a look at how to ensure your building is square and plumb, how to properly handle wall panels, the steps for leveling girts and pre-drilling panels, how to install insulation, and of course actual wall sheeting application.

Before we get started there are a few items to consider. First make sure to review the specific manufacturer's erection drawings before installing walls. Second are the basic tools and equipment you'll need for the job and a few tips to make sure you're using the tools in the safest possible manner. On the job site you'll obviously be working with and around heavy metal girts and columns as well as walking under areas where workers are above you. So you'll want to make sure to wear a hard hat, boots, and other appropriate personal protective equipment required by OSHA. And since you'll often be drilling through metal sheeting and creating sharp metal shavings you want to make sure your eyes are protected at all times by safety glasses.

Wall sheeting can be extremely sharp and can easily cut your hands and fingers. So whenever it's necessary to lift a panel, consider wearing protective gloves. To keep panels from slipping through your hands you may want to wear gloves with tacky palms and fingers.

Since falls are one of the leading causes of accidents on any job site, scaffolding and baskets are of special concern. Scaffolding should be leveled, secured, and should always be assembled with guard rails in accordance with OSHA requirements by a competent person to protect you and your fellow workers from falls. And toe boards should be used to prevent objects from falling and hurting those working below.

Forklifts, booms, or scissor lifts should be driven by trained operators. Erectors must be harnessed and tied off whenever they're working in a boom or when required by OSHA regulations. Check with your supervisor if you are unsure the requirements, prior to operating any equipment.

Power hand tools are essential to the installation of wall sheeting panels. In this module we will show you the use of drills, screw guns, power nibblers, and power shears. It's very important your power tools are plugged into an extension cord that's in good repair and that the cord is connected to a ground fault circuit interrupter. A GFI outlet will prevent any unnecessary shocks when you're working around wet areas. In this chapter we will become familiar with the basic framing elements of a metal building.

As you can see, a metal building consists of just a few basic components. The large vertical beams are most commonly called columns and the light gauge horizontal substructure members are known as girts. Along the bottom of the columns attached to the foundation is c channel or base angle and on the very top of the columns, at the intersection of the wall and roof, are eave struts. Next are the rafters that run across the building and are bolted on top of the columns. And attached to the rafters for roof support are purlins. Wall sheeting is fastened at the base at the girts and at the eave strut.

## **Chapter 2**

Once the building has been framed we first need to assure that the building is square and plumb. Visually check to make sure that each column is in line using a laser or a transit. If the columns are out of line or the building seems out of plumb, you can adjust the tension cable braces. To plumb the columns, adjust the vertical steel cables or rods that crisscross between columns. You can bring the building into square by adjusting the horizontal steel cables that crisscross between mainframe rafters. If you are uncertain about how to correct the problem, talk with your supervisor to see how you should proceed. Once the columns are in line go ahead and install the c channel or base angle. Be sure to follow the manufacturer's guidelines carefully. First cut the base angle or c channel to fit properly between columns and opening frames at the slab. As specified in the erection drawings drill a series of fastener holes appropriately spaced. Next, using a hammer drill with a specified concrete bit, drill the holes in the concrete for your expansion fasteners using the holes in the c channel as your guide for proper placement. Then, with expansion fasteners secure the base into position.

## **Chapter 3**

Before we begin installing our wall sheeting panels, let's first go over a few installation tips. Our most important tip will help you determine the direction a building's siding should be hung. If sheeting direction is not specified on your erection drawing, simply decide what corner of the building will be seen most often by visitors or other traffic and then start your sheeting on the building's opposite corner. If you follow this basic procedure most of your lap joints will be concealed from the primary sight line.

After the base angle, or in this particular case a c channel, is installed it is time to install the base trim. This is done by beginning at the trailing corner of the wall and carefully cutting a 45 degree angle in the base trim. C Channel or base angle should be marked for fasteners in increments to appropriately offset for the wall panel fastener line. This will prevent a base trim fastener head from bolting through the wall panel at the base. The base trim can then be screwed to the c channel or the base angle depending on your particular manufacturer specifications. Some manufacturers require that caulking be used for sealing the base trim. Be sure to use only manufacturer recommended materials and use them in the manner specified.

Next you want to make sure that your girts are level from building corner to building corner. On this building we are using both flush girts that run in the same plane between columns and bypass girts which attach to the outside flange of the columns. Remember your sheeting will be fastened to the building girts, so a plumb and level girt means that an erector has little chance of missing the target when sheeting is fastened into position.

With that said you should realize that a sagging girt is not unusual and can be easily remedied with the help of girt props. Girt props are nothing more than two by fours or two by sixes cut to the specified length and temporarily placed under a girt to lift it level. Measure to determine the length of the girt props at the column. Girt spacing is generally between 7' 3-1/2" to 7' 6" above the finished floor, depending on manufacturer specifications, and then a maximum of 6' thereafter. Now, with a wood saw cut the girt props to the proper length. When using a girt prop above ground level be sure and properly secure it into place to avoid injury to

workers or material below. Of course it is not necessary to cut girt props for the entire building. A half-dozen props will get you started and then can be moved as sheeting progresses.

Once you're certain the frame is plumb and square you can move your sheeting closer to the building so that it's convenient and readily accessible for installation. Wall panels are usually moved from their initial storage area up close to the building using a forklift. This process is called material staging. If using a forklift keep in mind that traveling on rough ground can cause the panels to bounce and even bend so move slowly and cautiously. If panels are over 20' long you want to use a spreader bar or slings on the forklift. A spreader bar or sling will distribute the weight of the long panels more evenly and help prevent buckling. Since moisture can permanently stain sheeting panels, make sure that each bundle is cribbed and slanted. This simple step will help prevent water from accumulating on the sheeting surface or from getting trapped between panels.

Now we are ready for pre-drilling. We first need to create a template or pattern sheet. To do this, take one sheet of siding and place it on top of a couple of pallets or other sturdy material. Refer to your erection guide for proper handling of wall panels. To prevent buckling on longer panels do not lift from the ends. Have two workers pick up the sheet from the sides.

At the building, measure from the base to the girts and to the eave strut for fastener location. Next transfer those measurements to your pattern sheet. During this process you want to avoid using any type of scribe or pen that can leave a permanent mark and possibly jeopardize your job's appearance. Now with a 1/8 or 3/16" drill bit, drill the fastener holes in your template. Once all your holes have been drilled, temporarily place the template against the building wall and check to make sure all the holes are properly aligned. If all the holes are okay you can get ready to pre-drill the rest of your panels. With the template set aside, stack 10 to 12 additional sheets on top of their own pallet or cribbing. To prevent scratches be careful not to drag the panels one on top of the other. Next, align the bottoms of each panel. If the panels are out of line you can use this two-man technique for aligning them. Be sure only to use wood held firmly against the bottom and top of the sheets while striking the wood with a sledgehammer. Now after alignment place your pattern sheet on top of the stack and then lightly clamp all the panels together using an appropriate clamp. It's not unusual for the length of sheets to vary from 1/4 to 1/2". This discrepancy is perfectly acceptable because a panel must only be aligned at the base of a building. Excess material along the top of a wall will eventually be covered by trim stock. This applies to wall sheets manufactured for side walls.

Wall sheets manufactured for end walls on a metal building with a pitched roof will vary in length to accommodate the slope of the roof. Most often the manufacturer will ship these wall sheet panels from shortest to longest in one or more bundles. You will need to re-sort the panels in the panel sequence required for the end walls. For this building two workers remove the panels from the single bundle and organize them according to the length from shortest at one corner to longest at the ridge and back to shortest at the other corner. They will end up with two stacks; one for each of the end walls. Check with the manufacturer's prints to confirm the sequence of sheets by length. Sorting should be done prior to pre-drilling.

Now with the same size drill bit used for the template pre-drill your stack of panels. By only drilling 10 or 12 sheets at a time you have a smaller chance of breaking a drill bit or of getting your holes out of alignment. Pre-drilling is a relatively straightforward process. The only tip you might want to remember here is pre-drill just enough wall sheets for that day's work and consider the possibility of weather delays. Sheets that have been pre-drilled and then left at the job site and exposed to moisture can easily rust and once again jeopardize your job's appearance.

## **Chapter 4**

It's now time to apply the first run of wall insulation. Remember to read the label on each roll of insulation carefully to be sure of where and how it's to be used in this specific build. You

will find the information for determining location, size, type, and R-value clearly displayed on the label. It's important to note that during windy situations insulation may be difficult or next to impossible to apply. So on windy days check with your supervisor to learn how you should proceed.

There are a variety of acceptable methods for applying insulation. On this building we will use the bottom-up method. Your first step is to locate the roll that was specified by the manufacturer for the first run on the wall. This roll should be 12" wider than the width of the first. This ensures the insulation joints are not lined up with the metal panel joints and prevents working directly at the edge of a panel when folding and sealing the tabs. Unroll it on the dry slab and cut it to the proper length allowing for the specified extra overhang. Additional runs should be either the same width or twice the width of wall panels depending upon the building specifications.

Our first piece is then rolled up with the top edge out and is pre-positioned on the dry slab aligned for the first run to be installed. A strip of two-sided tape is then applied to the top edge of the c channel or base angle to temporarily hold the insulation in place near the slab. Now two-sided tape should also be applied at the eaves to temporarily secure the insulation at the top position.

At this point this particular manufacturer requires the installation of foam closures. To do that you must first apply a second strip of double face tape to hold the foam closures in proper alignment and position. This tape is applied below the other roll of tape and about a half inch above the bottom sheeting ledge of the base trim. Now measure to determine where the center of each panel will fall and mark the base trim. This mark will then be used to install the foam closures for proper fit as well as to align panels for proper modulation. Peel away the adhesive protector strip on the double face tape and place the foam closure carefully about 1/4 inch off the bottom of the base angle trim. The next piece is installed per this manufacturers detail as shown and the process is repeated to the end of the wall.

Next with the vinyl face of the installation toward the building interior raise the insulation outside the girts to a man positioned above the ground level. The erectors must be careful not to overstretch or poke holes into the insulation. Temporarily secure the top of the insulation with welders vise grips, or other clamps. Leave about 6 inches of insulation which should be just enough for underneath the flashing and then cut away the remaining roll if there is excess material. Carefully stretch the insulation tightly between the base and the eave. At the base, the ground workman scores the insulation without cutting the facing and tears away the insulation below the scored area. The workman then folds the bottom of the facing back over itself approximately 6 to 12 inches. This protective fold helps to prevent water from being whipped into the insulation throughout the life of the building. The finished insulation should be smooth, plumb, and as wrinkle free as possible. If the insulation vinyl is damaged or torn it can be repaired with special tape that has the same face.

## **Chapter 5**

Now we're ready to install the first panel. Move it from the stack of pre-drilled sheets to the workers on scaffolding, in this case a rustgo wagon. Be careful not to bend or damage the sheets while moving it to the wall. During this process you want to make sure that your hands and gloves are clean and dirt free. Dirty hand prints can be difficult to clean and take up valuable time.

Next, temporarily place a 1/8" spacer under the bottom edge of the sheeting panel. You can use a washer for this. This spacer leaves enough room for panel expansion that's common during different seasons or weather conditions. Here we will use the marks made for the foam closure placement to determine the wall sheeting modulation. This will verify that you're not stretching the wall panel. This will also help to prevent oil canning and assures that you will end correctly for the building trim. Once you've made sure that the panel is plumb and you check

with the erector's drawings to ensure that the panel is placed the proper distance from the building's corner, you can fasten the first sheet into place with structural fasteners. To prevent scratches make sure your screw gun socket is free of metal shavings. To avoid over-tightening fasteners be sure the clutch on your screw gun is properly adjusted. Now begin fastening the panel from its bottom trailing edge of the sheet.

This particular manufacturer suggests you fasten from the trailing edge to the leading edge. Move up one row and then again work from the trailing edge to the leading edge. Make sure that you or your crew members do not begin the next row of fasteners until the rows below have been filled using this sequence. If fasteners are applied out of sequence the panel will more likely than not bow or bend resulting in an unsatisfactory installation. This bending effect or oil canning needs to be prevented. Make sure that your structural fasteners are driven in straight and not too tight. Fasteners should be snug but to prevent dimpling of the panel should not be over torqued.

Once the first wall sheet is in place you can hang a second sheet of insulation. As before, raise the insulation, secure it to the base and then cut away the remaining roll. To maintain a continuous vapor retarder some manufacturers specify that you seam the sections of insulation together at the laps. To do this, unfold the insulation edge strips and then with quick seal tape, secure the two sections together. Now press together firmly. Where the panels overlap be sure to use a special wall stitch fastener to connect the overlapping panel edge. Drive that in at a 15 degree angle toward the trailing edge in order to draw the lap in tight. The remaining wall will be covered in exactly the same manner we just reviewed. Apply your insulation first and then cover it with wall sheeting.

When you come to a window or door opening cut the wall sheet panel to the appropriate height and width using nibblers or power shears. Never use an abrasive saw blade as this will cause the panel to rust along the cut edge. Before you reposition your scaffold make a point to gently clean off any smudges or metal chips that may be clinging to installed panels. Here's one final note. As mentioned earlier, wind conditions can become a problem when installing wall sheeting. So on windy days where safety or job quality is a concern, make sure to talk with your supervisor before you attempt to hang any wall sheeting.

## **Chapter 6**

The installation is now basically complete but there are still a few items that should be addressed. Before leaving the job site take a few minutes to look down the sides of the walls for any bulging. Bulging panels may be a sign of missed or improperly seated fasteners. Check for any metal shavings that may have been caught by the base trim. Metal shavings can quickly rust and stain base trim and should be swept away as soon as possible. Finally, clean up the work area by disposing of any scrap material and if necessary gently scrub any handprints off the wall sheeting.

This presentation was created by the Metal Buildings Institute and is one of several training modules available to metal building erectors. We hope that it has helped you in understanding the basic procedures for installing wall sheeting.