

## Module 8 – Standing Seam Roofs

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### Chapter 1

During this module you'll learn about the importance of developing and following a fall protection plan as well as some vital rules for safety when installing a standing seam roof. You will learn how to ensure that your building is square and plumb, how to lay out a roof according to the manufacturer's requirements, how to handle roofing materials and stage them properly. You will learn the proper way to install insulation in the roof, and finally you will learn how to install a standing seam roof system correctly so that it will provide years of trouble-free service even in harsh climates.

Safety on the job site is never more important than during the roofing phase. Simply put, there is virtually no margin of error when your life and health and those of your co-workers is on the line. You and your crew members should be in a constant state of training and retraining when it comes to safety. The first step toward safety begins before you ever arrive at the job site. Your supervisor has the responsibility to develop and provide to you a comprehensive safety plan that can be thoroughly reviewed by the entire crew. You see, if just one of your crew team members is not aware of the plan or is not committed to following it, he will not only be a danger to himself but also to the entire crew. In addition to good training it is vital that you have the proper safety equipment. This includes personal protective equipment required by OSHA as well as fall protection equipment that may be attached to the structure. It is also necessary that you have the right tools and lift equipment both for personnel and materials available on the job site. These will vary with each job.

Some rules that must be followed include: Stay alert constantly. The roof is no place for daydreaming on the job. Hard hats must be worn to prevent injury from falling objects or from equipment and material being moved around personnel. Never step on a translucent panel. They are not designed to support the weight of an installer or heavy tools or materials. Never step on an unsecured panel. Roof panels must be completely attached with fasteners to the purlins and two panels on either side or temporarily secured by c-clamps to the eave struts and purlins before they can be a safe walking surface. Never step on a rib at the edge of a panel. Never step near a crease in a rib at the edge of a panel. While a bundle of roof panels can be walked on safely, an OSHA approved runway should be used for work platforms whenever possible. Check the roof panels for chemical residue used in the manufacturing process. This can cause the panels to be extremely slippery. Be sure to wipe off any fluids that might be on the surface prior to walking on it. Rubber soled shoes will provide the best stability on the roof.

All safety precautions referred to throughout this module required currently by OSHA as well as other statutory or customary practices must be followed carefully in order to maximize safety.

## **Chapter 2**

The next step in preparation for installing a standing seam roof is to confirm that the building is square and plumb. To do this you can use a transit or a laser to check for plumb columns and you can measure between rafters to assure that the building is square. If a building is out of plumb you can adjust the vertical steel cables or rods that crisscross between columns. If a building is out of square you can adjust the horizontal steel cables or rods that crisscross between the mainframe rafters.

Now we are ready to mark the roof for module layout. The first step is to review the building manufacturer's drawings and specifications carefully for this particular job. You are looking for the drawings and details that specify panel location, flashings and trim detail mastics, sealants, and fastener types and locations to identify and gather all of the parts and materials we will need. This will include the roof panels, various fasteners insulation, mastics, sealants, as well as all the tools required for proper installation.

This particular frame was erected specifically for the production of this DVD module on standing seam roofs. It is unusual in that it stands less than 6 feet off of the ground. The typical roof you will be working on will be more than 6 feet off the ground and you will need to conform to all safety requirements that apply to the height you are working from. So please note that for this DVD training module these erectors are OSHA compliant because they are not up at normal heights. After we have looked over the drawings and specs carefully we are ready to stage our materials on the roof. On a typical roof you should use a crane or forklift with the appropriate serviceability to move your panels from the storage area they are in now.

## **Chapter 3**

The integrity and performance of a standing seam roof system depends on following the manufacturer's instructions to the smallest detail. We are now ready to begin the process for installing a standing seam roof. The first step called for by this particular manufacturer is for flashing to be installed at the eave. The installer should align one end beginning at the rake wall. Next measure and mark the flashing as shown for proper set back from the eaves according to the specs. Now, clamp the flashing piece securely in place at both ends. Then measure and mark the top of the flashing for the structural fasteners at the specified intervals. They must be placed in the right location as to not interfere with the rest of the components yet to be installed.

When you are working with galvanized material be sure you do not use a lead pencil because that would cause the metal to rust. Now use a screw gun to fasten the flashing to the eave strut to be sure to carefully align your fasteners. The next step is to install the eave trim called for in the specs. Clamp it securely into place at both ends.

Now we will cut the specified mastic for placement on the eave closures as shown. Notice that the mastic is not cut flush with the closure. The mastic around the eave closure must be long enough to lap onto the mastic at the edge of the eave cover flashing that will be installed in the following steps. Do not remove the protective layer on the other side of the mastic until you are ready to install the closure in place.

Now measure and mark the eave trim according to the specs for placement of the standing seam closures. After all the eave closures have been prepared for installation with mastic attached we are ready to install the eave closures.

To install a closure first remove the protective layer on the mastic. Then carefully center the closure on your mark and align it properly to the outside edge of the eave trim. Now using the required fasteners attach the eave closures through the eave trim and the eave flashing. When you reach the lap for the eave trim you will need to apply mastic on the leading edge as shown. When you reach the other rake wall, you will most likely need to cut the last piece of

eave trim using snips as shown. Remember that field cut edges should always be concealed whenever possible. The mastic at this seam will prevent water from being blown up under the roof panels.

After all the closures have been installed along the eave, we are ready to install a run of mastic along the entire eave as called for in the specs. The installer should press down firmly on the mastic along the eave trim and over each of the closures being sure to carefully follow the contour of these closures.

The next step is to measure and mark the purlins for roof panel modulation. It is vital that the panels be installed exactly on modulation or else you will run into complications that become more severe the wider the roof is. Begin at a rake wall and place your marks for locating each clip along all of the purlins. The mark is made at the leading edge of the clip and centered on the purlin. Remember you do not use the fastener holes in the standing seam clip for your alignment hole. These holes will only be used for positioning your clip with a hole finder as you will see in the steps ahead.

Next we will pre-drill the purlins using a 1/8 or 3/16 inch bit. Be sure to stay exactly on your marks. Here the installer is demonstrating for us how the holes will be used to align the standing seam roof clips on all of the purlins using an awl or other tool as a hole finder.

At this time we can install a single run of double face tape along the entire eave flashing. Notice the tape is aligned to the inside edge of the flashing fastener line. This tape will be used in the next step to temporarily hold the insulation in place until the roof panels are properly anchored. Do not remove the protective layer from the tape until you are ready to attach it to the insulation.

Now we are ready to lay out a starter run of roof panels which will be used as a walkway for the installers. In a safe manner compliant with all regulations they are laid out carefully across the purlins. Now clamp the panels at the bottom and top of each panel securely to the eave strut and the purlins. Notice that the erector does not step on the starter run until they are secured.

#### **Chapter 4**

At this point we need to locate our starter roll of insulation and position it ready to be rolled out. In most cases this roll will be identified as the starter roll on the label. The width of this first roll will most times be different than the rest of the rolls. Now carefully unroll the starter roll and position it to be installed aligned with the rake wall. Usually, but not always, the insulation fabricator will provide you with a starter roll that is pre-cut to the correct length.

Remember to be aware of where you are stepping at all times. Insulation has no ability to support the weight of a person. Now remove just enough of the tape protective layer to cover the width of the starter roll. Then stretch the insulation out and push it down in position against the double face tape. Next the installer should cut off the excess insulation being sure to leave enough vapor retarder for the fullback. Now on one eave we will score the insulation with a utility knife 6 to 12 in in order to fold the facing back over the fiberglass to prevent the wicking of water at the eave.

At this point we will install metal tabs to provide additional support for the vinyl backing of the insulation. You should use a structural fastener to anchor these tabs behind a metal closure in the high rib of the sheet. This prevents the fastener head from pressing through the low of the sheet and causing a leak over time. It is a good idea to go along the rake wall and place double face tape on the rake angle as needed. This will prevent the insulation from being caught by the wind and carried away before the roof panels have been installed.

#### **Chapter 5**

We are now ready for our first run of standing seam roof panels. We will start at the eave along the rake wall. First, align the panel at the eave. Next we will measure and mark the roof

panel for the fastener locations. There are dimples in the panels that must be used to determine the fastener intervals across the eave. So our marks are placed above each of these dimples on a straight line. Now remove the mastic protective layer under the area covered by the first run. Next a bead of butyl caulk is placed along the side of the eave closure where the first structural fastener will be attached. Measure and verify that the overhang is correct. Now press down firmly on the panel and attach it to the eave flashing using a screw gun and the supplied fasteners. The butyl caulking mastic must be compressed as shown. The eave closures will keep you on module at the eave when properly installed.

This is a standing seam roof clip. It is important to understand how it works. They have the ability to slide up slope and down slope to accommodate movement of the roof panels caused by contraction and expansion related to changes in temperature. Be sure you center the clip when installing it to be sure that there is room for movement. Now the installer can snap the clip onto the male edge of the panel and slide it centered over the purlins. The clip will hold the roof panel up off of the purlins as shown here. Make sure that the clip tab is in position to support the rib.

Next use a probe to find the pre-drilled hole in the purlin. Then using structural fasteners attach the clip to the purlin. Now back at the eave you can install the rest of the fasteners through the flat of the panel called for in the specs on your first panel. Here a structural fastener is also called for through the side of the rib and into the eave closure as shown. This particular manufacturer calls for a lap stiffener, sometimes called a backup plate, which needs to be installed over the purlin at each panel lap.

For our first run along the rake wall we will need to measure, mark and trim back the rake wall edge of the lap stiffener plates as shown using an appropriate cut off tool. Please note that this is only done on the first and last runs along the rake walls to prevent the lap stiffeners from interfering with the rake wall trim. Here a backup plate is inserted under the upslope edge of the first panel being careful to align the tabs as shown. Now the specified inch-and-a-half mastic is installed on the first panel 6in from the end of the panel and aligned with the factory notches. Now remove the protective mastic coating. Butyl caulk needs to be installed between the panels at the vertical surface beginning at the upslope end of the first panel according to the manufacturer specs. Now the second panel is positioned over the first and aligned. Then it is clamped into position at the lap on the leading edge using a c-clamp and on the trailing edge using a special standing seam vice clamp.

Next the required fasteners can now be installed at the lap. However, you must be careful not to allow faster to penetrate the purlin. This would interfere with contraction and expansion of the roof. Also remember that your lap stiffeners must float freely over the purlins as well. It is very important to install the right type of fasteners in the specified pattern as shown here. Notice again how the mastic compresses out onto the top horizontal shelf. The butyl caulk should squeeze out slightly and the minor ribs should line up perfectly. Mastic and butyl caulk prevent water from being blown up under a panel or from water damming up from ice buildup on the roof. Remember to never step on panels near the end lap. This may cause damage to your lap or perhaps injury or death from panels buckling.

## **Chapter 6**

Now that we have completed the first run from the eave to the ridge we are ready to begin the second run. The first step will be to locate the required roll of NAIMA certified insulation and roll it out. Then carefully align the insulation to provide a lap seam with a vapor retarder as shown. NAIMA Certified Insulation comes in both yellow and white fiberglass depending on the manufacturer's preference. Once again the fiberglass insulation is scored at the eave. Then the vapor retarder is folded over to prevent wicking. The insulation is then secured using metal tabs aligned with the closures to prevent penetration of the fastener heads.

At the eave, butyl caulk is first applied to the standing seam eave closure on the trailing edge and then on the top of the male leg of the standing seam for the first 6 inches in order to prevent backflow or wicking from the gutter. Now butyl caulk is applied to the leading edge standing seam closure as shown. Now position the first sheet of the second run aligned with the eave closures. The female edge of the second run is positioned over the male edge of the previous run. Be sure and check your overhang at the eave. Now step down firmly at each purlin where the clips are installed in order to snap the panels together on the standing seam. You may need to use a screwdriver to maneuver the standing seam female leg from time to time. Next, install the panel fasteners at the eave. Then install your standing seam roof clips at each purlin. Remember that the backup plates are not cut off on the rest of the runs until we reach the other rake wall.

Now we will install mastic at the end lap. Remember to remove the protective coat on the mastic covering the eave closures prior to seating the next panel. We now apply 6 in of butyl caulk just like we did on the first run. We will continue with this same process until we need to unroll another roll of insulation. Be sure to check that the right type and number of fasteners are installed at the specified locations. Continue with this same process until you reach the end of the rake wall.

## **Chapter 7**

Let's look now at the process for installing a translucent panel in a standing seam roof. Be aware that translucent panels will have distinct upper and lower ends and will be marked for the left or right side of the roof. The first step is to apply double face tape to the edge of the insulation frame. Now install the lap stiffener in the downslope panel. Next expand the insulation frame and position it according to the manufacturer's specs. Slide the downslope end of the frame into the major ribs of the downslope panel. Here we will allow for a 6-inch offset from the end of the previous panel to the cross piece of the frame. On the trailing edge side of the frame we will allow 1-3/8" from the adjacent panel. This standing seam clip was removed prior to placing the frame for the translucent panel. Now we will reinstall the fasteners through the clip and through the translucent panel frame into the purlin. On the leading edge at the upslope end of the frame we will install a fastener through the frame to the purlin.

Next score the insulation around the side of the frame with a utility knife. Be careful not to cut the vapor retarder. Now remove the insulation. From the corners we will now make a 45-degree cut for about 6 in. Then make a cut 6in off the end of the frame connecting to previous cuts as shown. Be sure to remove all the excess insulation from the vapor retarder. Now apply double face tape at the downslope and the frame as shown. Remove the protective facing from the tape and fold the vapor retarder over tightly and press against the tape. Next continue cutting down the side of the frame, cutting the vapor retarder for a 6-inch fold. This will be done around the rest of the frame.

Now cut and remove the vapor retarder from the center of the frame as shown. Next apply double face tape to the other end of the frame. Then, remove the protective coating and fold the vapor retarder over tightly and press it against the tape. Now peel back the protective coating on the tape along the sides of the frame. You will need to cut the protective layer around the standing seam clips. You will have to fold back the vapor retarder in the same manner.

Next, with matching patch tape, seal each of the four corners of the frame as shown. This is an important part of maintaining a good vapor retarder. After all of the corners have been sealed with patch tape, mastic can be applied to the top of the downslope panel in that run just like the other panels. Then butyl caulk is applied in the same manner as the other panels. Now position the panel in the frame as shown. Align the bottom of the panel to lap over the mastic on the previous panel. Now step down firmly on the female rib to snap the seam into place along the translucent panel. Next clamp the sides of the panel at the lap securely and install the

normal pattern of fasteners. Then insert the lap stiffener on the upslope end in a normal manner with the tabs over the translucent panel.

Now install mastic at the rib of the female side of the translucent panel as shown. Be sure not to kneel on the translucent panel. Next apply mastic at the top of the translucent panel in the same manner as the previous panels 6 in from the edge of the panel. Now remove the protective layer of the mastic. Next position and clamp the next roof panel in place. Then install the normal type and pattern of fasteners through the translucent panel. Standing seam clips are installed on translucent panels in exactly the same manner as regular panels. Remember to never step on a translucent panel. It will not support your weight and could result in serious injury or death.