

# Manual for Roofing Installation

## at

### Sanyati Baptist Hospital

#### Some Safety Precautions

Always wear protective gloves when working with steel panels to avoid cuts from sharp edges. When cutting or drilling steel panels, always wear safety glasses and sweep off any metal shavings immediately to prevent eye injury from flying metal fragments. If you must walk on a metal roof, take great care. Metal panels can become slippery, so always wear shoes with non-slip soles. Avoid working on metal roofs during wet conditions when the panels can become extremely slippery.



#### General Installation Information

Ensure that the structure is square and true before beginning panel installation. If the structure is not square, the panels will not properly seal at the sidelaps. Start the first panel square to eave by using the 3, 4, 5 Triangle Method. Green or damp lumber is not recommended. Moisture released from the damp lumber may damage the metal panels. Nails installed in green or damp lumber may back out. Remove any loose metal shavings left on the roof surface immediately to prevent corrosion. After installing roof, remove any debris such as leaves or dirt to prevent moisture from getting trapped on panels.



## Removing the Old Roofing Material

The old roof is a cement/fiber corrugated material that is heavy and brittle. A flatbar will allow you to pull out the nails holding these panels in place. Be careful when removing the panels. They can be sharp, hot, and heavy. These old roofing panels belong to the hospital and they will need to secure them and determine how or who might receive them. Please do not give any of the materials away. First, it does not belong to the makeover. And secondly, how things are distributed can have a tremendous impact on life in Zimbabwe. This also includes personal items you might want to leave behind or giveaway. Please consult with someone who is living there before you gift anything.



### TIP

“Oh be careful little feet where you stand.” Watch where you place your feet! The wood is old and the ceilings are damaged in many places.

Be sure to work together. Helping each other will add to safety and working a longer day on the project.

### TIP

These nails pull out fairly easily. Care should be given not to damage the panels. The hospital will reuse these on the compound. Also save the nails so they can be reused as well.

Using a flat bar or “wonderbar” pulls the nails out nicely. Those bars are there already.





### Tip

Bring some 3" exterior deck screws and driver bits with you. These screws work well when replacing or scabbing on to the wood and cause less vibration to the rafter and walls than a nail!

Using screws allows repairs without all the banging on things.

### Inspection of the Rafters and Top Plate

Over the last dozen years the white ant (termite) has had free range of the hospital. The combination of wooden rafters and leaky roofs created the perfect diet for these ants. In March 2011 we sprayed the hospital and destroyed area mounds; however, the damaged and rotting wood is still there.

Be sure to inspect and replace any rafters or top plates that are in question. Most of the wood used in building the hospital was rough cut lumber and therefore varies in size. Today's lumber is a little more uniform and may not line up. Please make sure the tops of the rafters supporting the roofs are even.



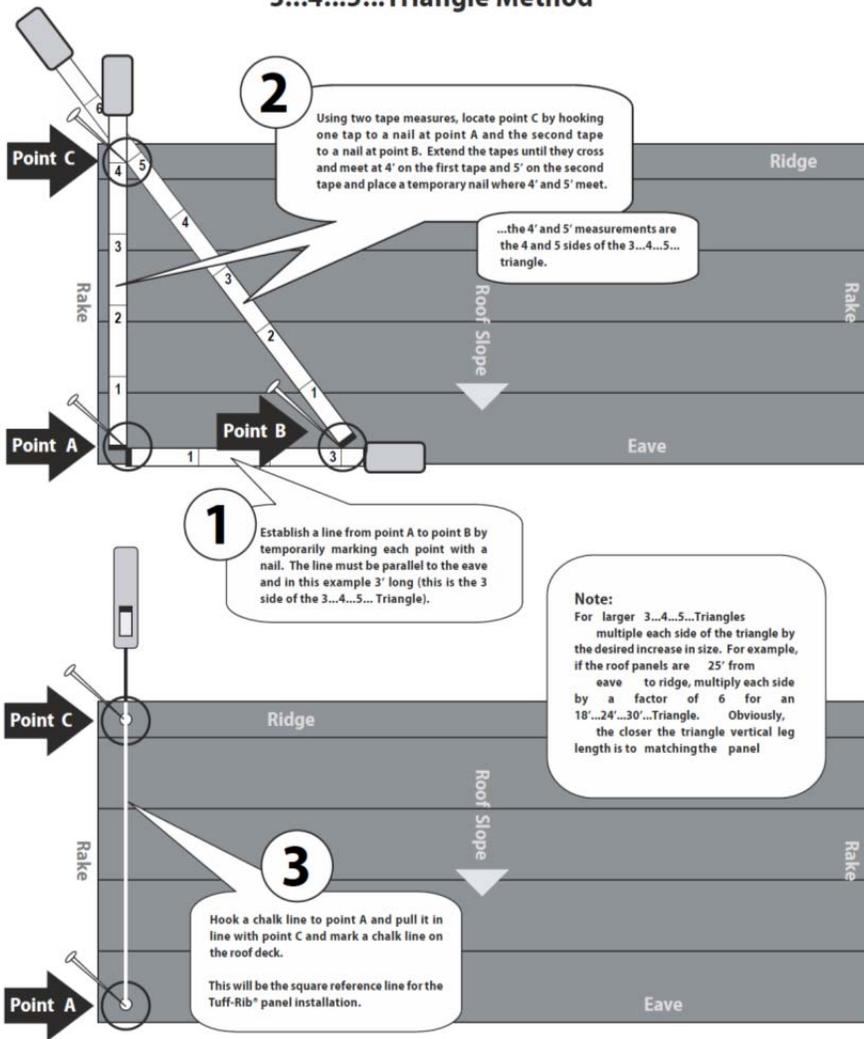
### Termites

In Zimbabwe termites are everywhere. You will see mounds reaching nearly thirty feet high and sometimes engulfing entire trees.

This pest, also known, as a white ant, has had free range at the hospital for several years before a preventative maintenance program was set up.

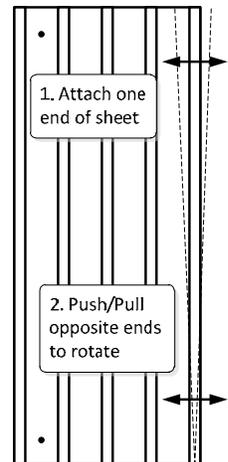


### 3...4...5...Triangle Method



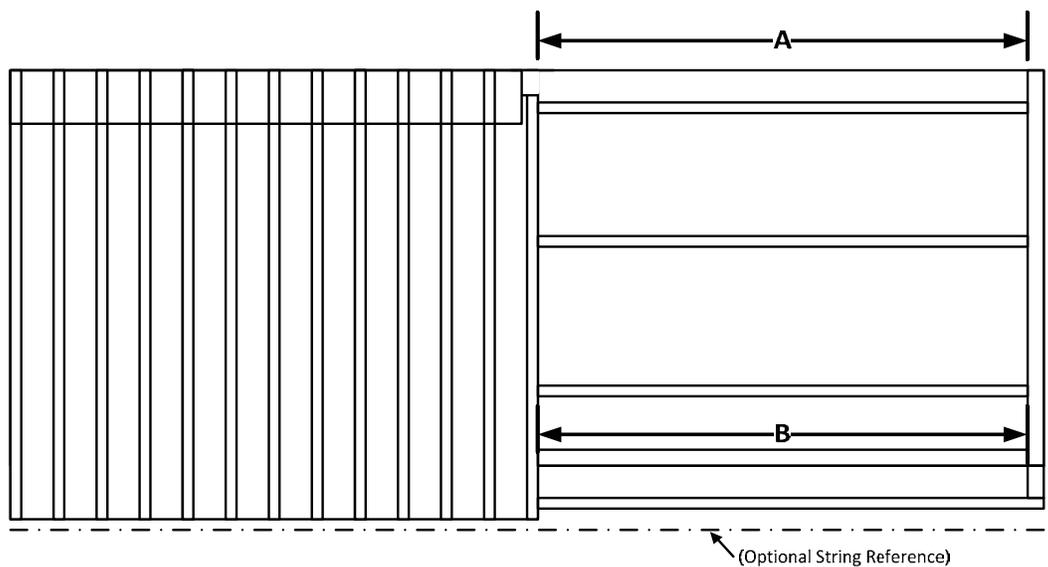
**Hint!**  
A string line can be stretched the length of the building to use as a reference for the bottom edge.

### Stretching Sheet to Rotate



### Approaching the End of a Building

Take reference measurements to see if the sheets are parallel with end of the building. Slight adjustments can be made over multiple sheets by screwing in the far side and pushing or pulling the sheet ends. It is a good idea to check 10-15 feet from the end to give room to make adjustments. Using a string reference can help keep the sheets in line or indicate the need for rotational adjustments early.



### Removing the Chinking

The old roof was a wide corrugated cement fiber material and the chinking was done with that profile. Since the IBR has a different profile this old chinking has to be chipped down to provide a level surface for the new roofing material. Once the new roof is installed the gaps between the roof and wall will have to be re-chinked. Caution should be given in not removing too much chinking and therefore creating more work later.



### TIP

The bricks on the building are old and soft. The high sand content of the brick makes them draw moisture. It is easy to over remove or dislodge bricks and create repair work for yourself!

### Additional Purlins

In addition to replacing rotting wood, additional purlins may need to be run in order to support the new roofing. The distance between the purlins should not exceed more than four feet.

### What is Chinking?

Chinking is the mortar mix that is applied to the exposed areas created by the profile of the panel and the top of the wall. These gaps need to be filled in with the mortar so that weather elements, bugs, and small critters will not gain excess. There is Portland and sand there with a wheelbarrow.





### TIP

Screwing down the new panel in the middle of every valley works well. The only exception is where the panels overlap. Here you want to put screws on both sides of the peaked profile.

### Installing the IBR Panels

The best method of installing these IBR panels is to place the panel on one side of the gable. Be sure it is giving good coverage off the eave and there is enough at the ridge to be covered by the cap. Make sure the panel is square and running parallel with the previous panel. Once you have that side in place put the companion panel on the other side of the gable. Repeat the steps to insure it is in the proper location before screwing them in place. Once the panels are screwed in place then attach the ridge cap on top. The ridge caps only cap one panel, therefore this is the best method to make sure everything will line up and look professional.

Remember these buildings are old and not square. This should not serve as an excuse for sloppy work, but an awareness of how to make it look its best should be kept in mind. There can be a fine line between spending too much time making it cosmetically perfect and making sure it is a job honoring Jesus with our service.

### TIP

Two people installing the ridge caps work well. Have one person stand on the cap and the other screw it in place. This creates a good tight fit. Be sure to use a string so the caps are lining up properly. Also be sure if you replace any purlins supporting the cap they are in the correct place.





## Notice

In the top picture notice how the ridge caps are wandering. Using a string across the roof or a chalk line will prevent this.

In the bottom photo you will notice the screw pattern. A screw is placed in the middle of the valley for each purlin.

When the panels overlap the screws go on both sides of the overlap (still in the valley) but closer to the rise of the profile.

Obviously seeing roofs already done will help establish the pattern. Also the On Site Job Coordinator will be there to guide your team through the project.



## The Fasteners We Use

The fasteners we use have a 5/16 head. You may want to bring some of these bit drivers with you just in case they break or the side wall wears out.

Also, use caution to make sure the fastener is driven all the way. The metal roofing tends to ride up the screw giving the appearance of a tight fit, however it may require further torquing. On the other hand, over tightening the fasteners will result in dimpling the metal or causing damage. It will take a few fasteners to get the “feel” for when a fastener is properly tightened.

Be sure and pop the cap on squarely and tightly.



## Fastening

The fasteners we have come in two sizes. The longer one (65mm), pictured above right, is for the panels to the purlins. A shorter one (25mm) is for putting metal to metal.

The fastener has a capped washer head. Drive the fastener so that the washer is compressed securely against the metal. Do not over drive the fastener as this will form a dimple that can collect water and cause leakage. If a fastener missed the purlin leave the screw, pop the cap on, and caulk around it.

Standing over the screw, depressing the panel with your feet on either side of the screw will help snug the fastener to the purlin. Then finish tightening using the drill motor as a wrench (non-powered).



## TIP

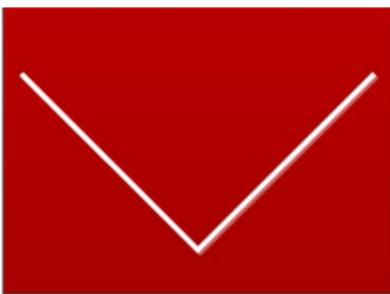
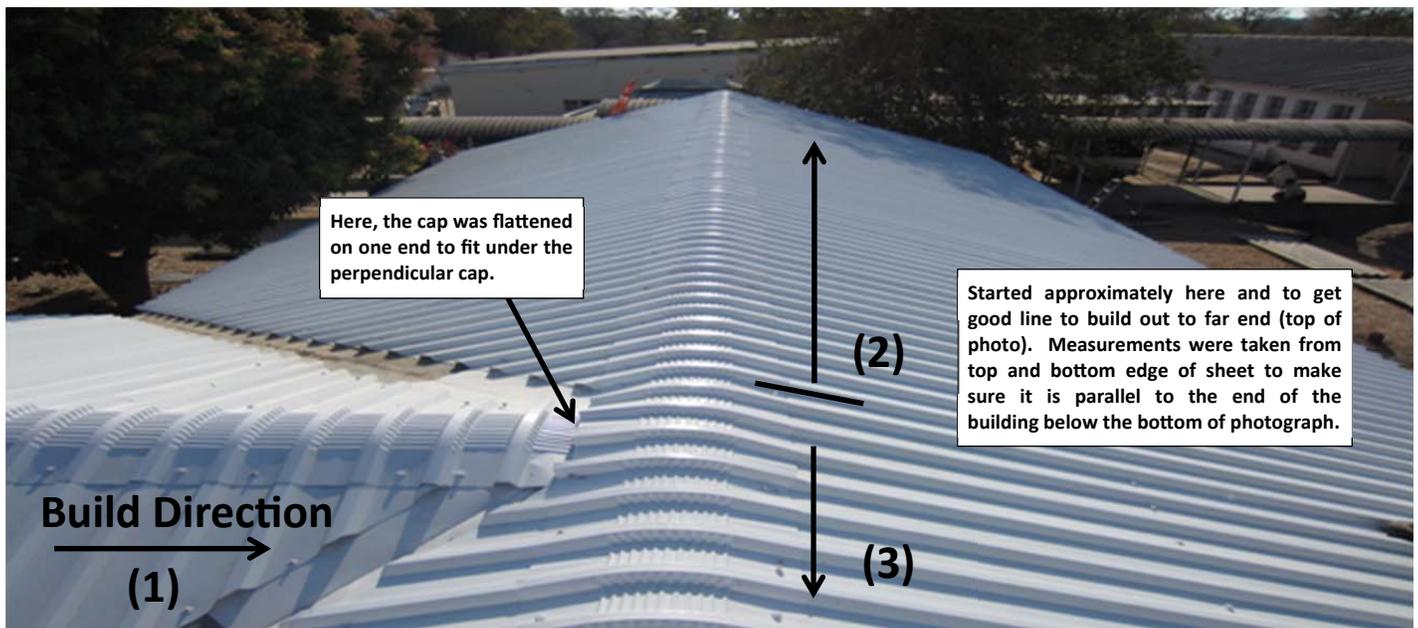
Panels need to be kept straight! There are several methods to do this, but do not think “eyeballing” the roof line will do the trick. Using a string or caulk line will help keep the panels in line. Be careful not to “bump” the string out of place. Remember just a little out with each panel can lead to a major problem as it is multiplied down the line.

## Valleys

Several of the buildings have a valley. Valleys are notorious for being areas to have potential leaks. Please make sure you properly install the V-channel and the steel IBR panels in the valley. Screws in the V-channel should be high enough so the panel covers the screw. Bring the panel into about 3" off the center of the valley. This will provide good flow for rain water and limit how much trash can gather in the valley. If the existing flashing is in good condition, leave it below the new material.

Additionally, think through the installation before cutting material. There is little extra material on site so every piece is important. Try to use pieces that were previously cut. Paint the edges of cut pieces to limit exposed metal.

There are many ways to approach the build. The method below was used to allow the roofing turn to continue down the long end while part of the team focused on closing out the tedious valley area. This method required a double overlap over the starter sheets. Plan out an appropriate attack for your team.



The V-Channel

This v-channel was fabricated for us from the same steel stock. Each piece is 3.0 meters long. It may be necessary to flatten the panel out to an angle that will match the valley.



(Photo rotated 90° from above photo.)

### A Picture is Worth a Thousand Words

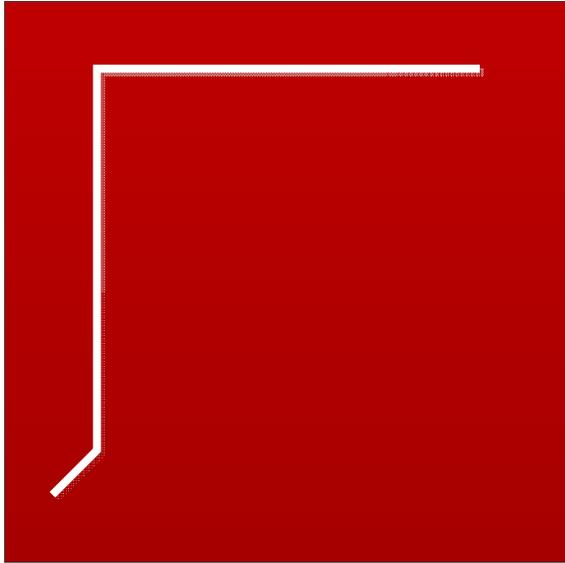
This picture shows a lot of activity going on. On the gabled roof you see the new IBR panels on the left and the old fiber cement panels on the right. In the center is a covered walkway and the old roofing is being removed.

You will also see the old chinking on the wall that fits the old roofing profile. This old mortar will have to be chipped off before the new roofing panels can be put in place.

Also notice that only a small section is removed at a time. Typically in the dry season there is little danger of rain, however a team does not want to remove more than you can put back. Depending on team size, you can have a few people removing the old, some working on rafter inspection and replacement, others removing the chinking, and then still others working on installation. Once the panels are in place new chinking can be added.

**Note:** please be careful in the treatment of the IBR panels. Do not bend or scratch them. This will provide a place for rust to start destroying the metal.





### Fascia

Another piece of trim that was fabricated out of the steel stock metal is this piece here. This trim can be used for fascia or for a rake on the gable ends.

For fascia, place it under the IBR panel like you would a drip edge. Note: Sanyati has a variety of treatments with their fasciae. Some buildings have none at all and others have narrow or very wide fasciae.

The rake should be placed on top of the IBR panel. This will prevent weather and insects from getting inside and provide a nice trimmed look.



## TIP

Did you know the heavier the person the more weight on a roof? Make good decisions on how many people and who goes on the roof. Not everyone needs to be up there to be effective.



## Safety First

Naturally working on a roof takes a watchful eye and an amount of caution. Use walk boards where you get up and down off the roof in order to protect the panel. Be sure to only walk on the valleys. Stepping on the top profile peak will bend the panel.

Bring some foam to sit or kneel on to not only protect the panel but to reduce the heat off the roof. This will also prevent you from slipping. Wearing sneakers or tennis shoes will protect the finish on the panel and keep you from slipping



## Help Us Out

You can help the team coming behind you by adding additional thoughts, tips, photos, or comments to this manual. If you have content to add or clarification needed please contact either:

Douglas Kelley

[dkelley9257@bellsouth.net](mailto:dkelley9257@bellsouth.net)>

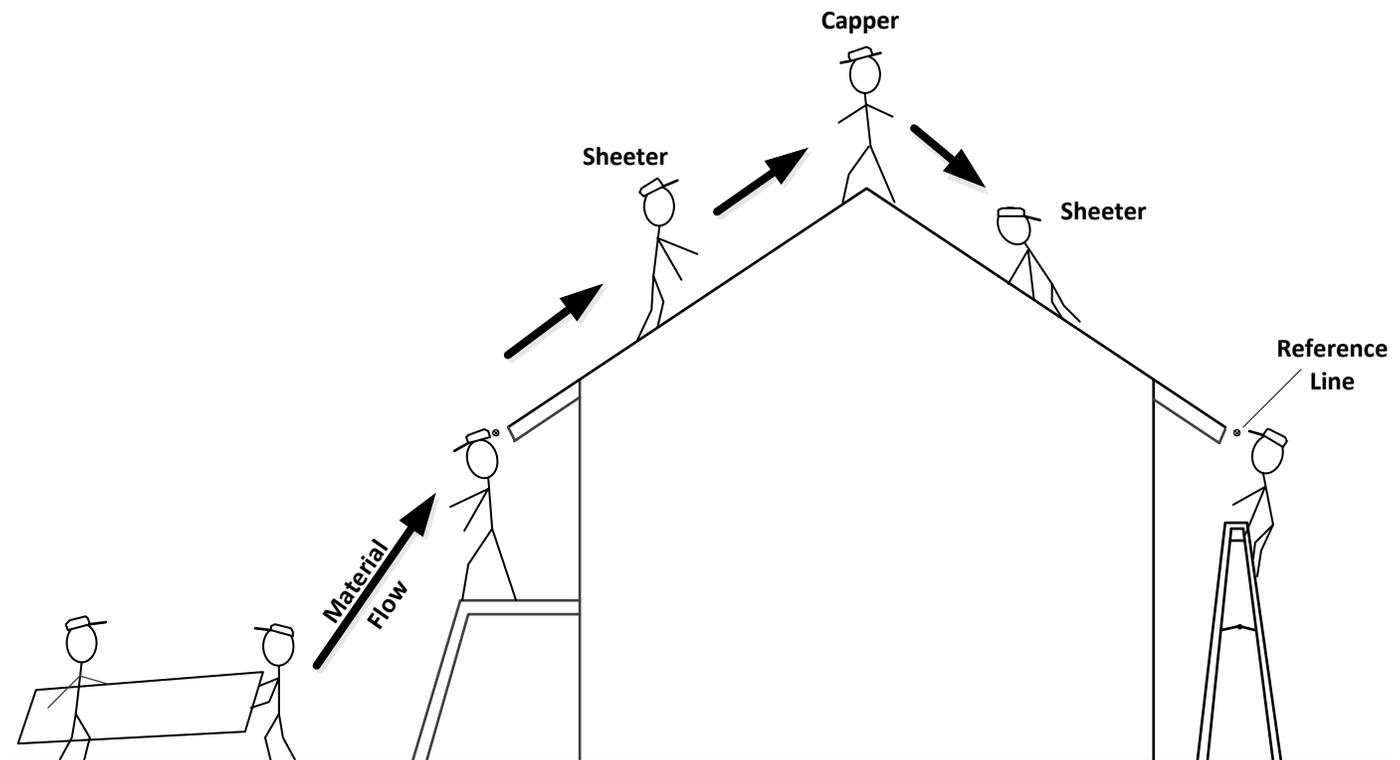
or

Peter Sierson

[psieron@charter.net](mailto:psieron@charter.net)

### Recommended Approach (worked well for one team, define your own)

1. Remove a reasonable section of material. Allow part of your team to move ahead of the sheeters to repair structure and chip the edges.
2. Put a reference line down the length of the building to use as a guide for the bottom edge. It does not have to follow it perfectly, but it helps keep the roofing going down straight without a lot of intermediate measuring.
3. Feed the material up from one side and have 2 people installing the sheets, one on each side. (An optional third person would be useful to focus on capping.)
4. Have one person each side aligning and screwing from a ladder or scaffolding. This person (on each side) can give guidance to quickly set the sheet
5. Other team members can be feeding material up from one side.



### Some Additional Thoughts

We do have a complete list of tools available of what you will find on site. However, just to let you know, we use Porter Cable 18v NiCad battery operated tools. There are a few DeWalt, but for the most part Porter Cable is used.

The power there is 220 volt so do not bring 110 volt power tools. Additionally, the power is unreliable at Sanyati so we typically use battery operated tools.

We do have ladders and scaffolding there. Walking boards are planks. We are looking for a good set of sky hooks if you have any in your area let us know. If someone on your team is searching for sky hooks then you need to know there is great snipe hunting down by the river after 10:00.

If you have any questions about what to pack, how to prepare, how much money to bring, cultural differences then be sure to check out the website

[www.sanyatimakeover.com](http://www.sanyatimakeover.com)

If you cannot find it there then contact Peter Sierson, Project Coordinator for the Sanyati Baptist Hospital Makeover.

[psierson@charter.net](mailto:psierson@charter.net)

