Instructions on Ordering and Installing the Anchorpanel® Perimeter Foundation
03/18/07 Fast Track® Foundation Systems (800) 789-9694

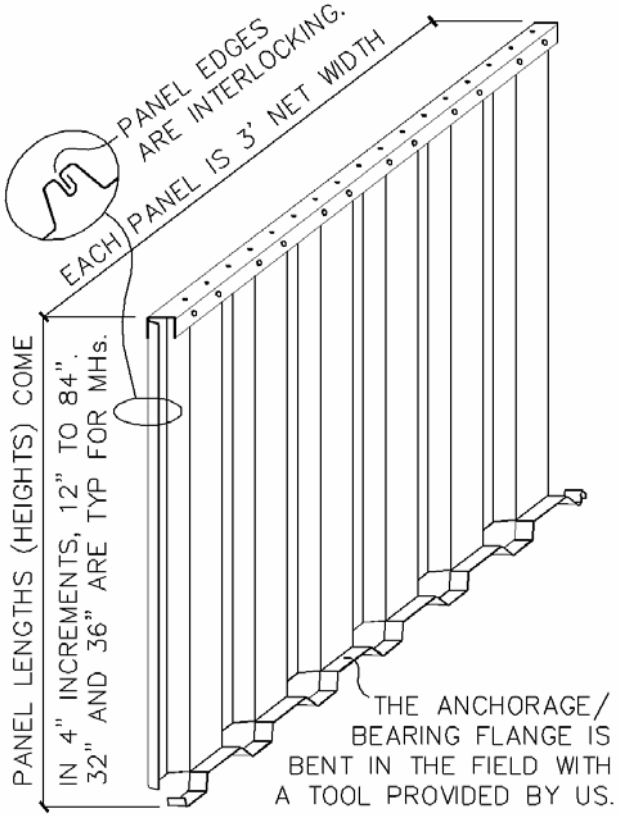
Introduction

The Anchorpanel® foundation system consists a series of heavily galvanized corrugated-structural-steel-panels that attach around the perimeter of a building and cast into a concrete footing. Fast Track fabricates these panels to suit each building installation, and we provide the necessary construction details. It is assumed that the panel installer is knowledgeable in the relevant construction trades, and understands the foundation construction details provided by Fast Track. It is the responsibility of the panel installer to determine which details and instructions apply to the project in question, and to contact Fast Track if there is uncertainty about panel installation. We also have a higher-quality version of the installation diagrams, construction details, as well as our DVD showing various projects. We are happy to mail any of these to you, or you can get them (except the DVD) at www.anchorpanel.com.

This guide does not have instruction on foundation construction in general, and it does not go into the safety issues that workers in this trade are supposed to know. **Where panels are to be installed on a home that is set in place, but not yet permanently braced, the panel installer must verify that the home has been properly set and braced, and is safe to work under and around, before beginning work on Anchorpanel.** Regardless of whether construction details provided by Fast Track or its agents show any details relating to bracing a home, this is not intended to be guidance for that. The responsible party working in the presence of the particular home and jobsite conditions needs to make the determination about sufficiency of supporting and bracing that home for safety.

Also, we do not provide site evaluation to determine the suitability of this or any conventional foundation. If you have any question about the suitability of your building site, the appropriate party would need to be consulted.

Ordering Panels



We provide custom sets of foundation panels directly to the installer, and ship from our nearest shop, directly to the jobsite via a common carrier truck with a hydraulic liftgate. Most foundations make up two pallets of nested panels. For your first order you will need to include a tool ($60) for bending the panel bottoms at the jobsite. Order lead-time is usually a few business days, including the shipping time, but this is affected partly by our current workload and mostly by the job location – carriers do not deliver daily to all locations. Remote locations may be served only weekly.

Panel Lengths:

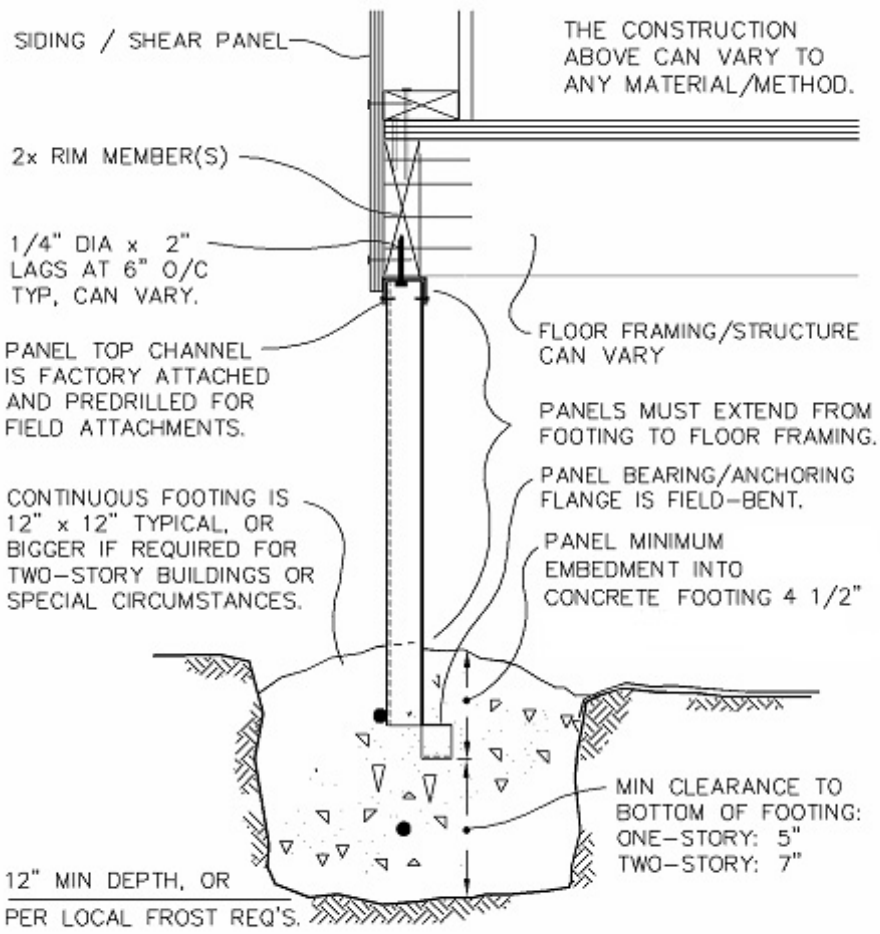
The most important part of an order is getting the panel lengths (heights) correct for your home installation. Please reread the previous sentence. Thank you.

Panels are 3 feet wide and are manufactured in lengths from 1 foot to 7 feet in 4” increments. On flat sites most manufactured homes will use at least 32” long panels; 36” is the most common length even for low-sets. Keep in mind that the minimum embedment into the concrete footing is typically 4 1/2”, and the minimum clearance to the bottom of the footing trench is 5”, and that flat lots are not perfectly flat – with the home being referenced to the high point. Sometimes it is a tough choice between two panel lengths. If, for example, you do not have absolute total control over the set of a manufactured or modular home, it is best to order the panels after at least the first unit is set. This is because setup crews tend to go higher than owners want, and clearance or drainage/flow issues may not become apparent until after the home arrives.

For sloping sites, we have software that figures out the set of panels needed and prints a layout diagram of where they all go. Input for this requires the distance down from the bottom of floor to the bottom of footing at the building corners and midpoints of walls and at any other location where the grade slope changes or if there is a dip or a rise anywhere mid-wall. Do not round off these measurements to match panel lengths. If the trenches are not dug yet, you can provide distance to top of grade (not as good), or you can specify panel lengths. Just be clear what dimensions you are providing!

Crawl Space Access:

Of course you will need enough panels to wrap the footprint, and you may need 3 more to create a 3' square access "popout" where the home will be backfilled too high to allow an opening in the foundation wall (explained more below). Otherwise, access is usually accomplished by installing a "Sill" panel – one that is say only 12" tall, creating an opening above for an access door. The door can be solid (of panel material) or an open frame with a screen, to provide venting.



ANCHORPANEL PERIMETER INSTALLATION

PANELS MUST BE COATED BEFORE BACKFILLING, SEE "COATING PANELS"

BACKFILL MUST BE ABLE TO DRAIN WATER AWAY FROM THE FOUNDATION

Ventilation:

Most codes require crawl space ventilation of 1/150th of the floor area. Venting is accomplished most often by using a "vent" panel at every 9 to 15 feet (often every fourth panel – 12' on center). This panel does not reach the home, the top remains 4" lower, and a vent liner is supplied to create an opening that is 4"x 36" (nominally one square foot of vent area). Instructions for this process are available from us. The most common practice of finishing the vents is to cut rectangular openings into a trim plank at the vent locations and to sandwich a screen between the trim board and the foundation (Home Depot usually carries a high quality aluminum gutter screen that works well for this purpose). Some builders prefer to make their screens of window screen assemblies, sized to fit these vents. Vent openings can always be cut into panels to match any needs. This foundation is low-velocity flood zone compliant, if vents are installed per FEMA-85 (allowing water to flow in and out of the crawl space). We are happy to provide a layout of panels that includes a number of vent panels, with the assumption that these vent openings are used in their entirety (screened), and if more venting is required, the panel installer will provide it by cutting openings or utilizing the crawl-space access opening to gain any additional required area. Some locations allow vent openings to be reduced significantly or even omitted, if various measures are taken (such as a vapor barrier on grade), but the installer (for factory-built homes) must verify that the vent design used does not conflict with home manufacturer's requirements.

Payment:

For at least your first order, we will finish it and prepare it for shipping, but we will not ship until we receive payment. If you will be in a hurry to get panels, please make a plan to provide payment quickly. We are set up for wire transfers, direct deposit, or accept personal master card and visa. Thank you.

Installing Panels

Maintain Consistency with Home Setup Instructions

Of course you must be consistent with the setup instructions for the home getting the foundation. Keep in mind that the Anchorpanel system is a permanent perimeter foundation with very secure attachment to the home, and so the typical auger tiedowns and any special brace/pier systems are not also required. For some very high-wind zones, however, it is possible that specific shear wall tiedowns are required (often for 2-story units in any wind zone). If your home is going in a very high-wind zone, and has tiedown straps located right at the perimeter wall, they would need to fasten to the Anchorpanel itself or to the concrete footing. Also, if the home needs any pre-adjustment to the perimeter (at door locations or at locations with excessive sag), then that type of issue is best addressed according to the home manufacturer's setup instructions before attaching it to the Anchorpanel system.

Tools Required

Besides the tools you already know about, like shovels and saws and extension cords and tie pliers and sledge hammers and rebar benders, you need a couple more unique tools for hanging panels. For bending the panel bottoms for anchorage into concrete, we make a **bending tool** that is required at the start of your first job. It costs $60. **Don't forget to order one if you need it!**

The other needed tool is a **carbide-toothed saw blade for cutting steel.**[1] A friction-blade can be used, but the heat it generates will negatively affect the panel galvanizing and the especially polymer coating on the pre-coated panels. When blades used in our shop operations are available, we will include one with your order at no charge. New blades are available for purchase as well. [1] Either way, you need to have eye and ear protection. A **face shield** and **ear muffs** are my favorite way to go, but many prefer ear plugs and safety glasses.

Just so you know, ¼" diameter lag screws need a **7/16" hex driver**. A "nut runner" attached to **a heavy-duty impact-clutch screw-gun** is the best option for installing the lags (battery operated guns will not hold up for long with these fasteners). For checking if panels are plumb, a **torpedo level** with an attached magnet is the best tool.

Materials Required to Hang Panels (Besides the Footing Concrete and Rebar, etc):

Fasteners - Usually ¼" diameter by 2" long lag screws at 6" o/c (or closer for special cases). They must be long enough to go into the rim joist at least 2", so use 3 ½" long if you have a 2x spacer at the panel attachment.

Construction Adhesive – Exterior grade, for bonding panels at the joints as you hang them. You need one small tube per about 10' length of 3' tall foundation. Don't use too much as it interferes with the caulking.

Urethane Caulking – You don't actually need this to hang panels, but you may as well get it with the construction adhesive. The caulking can be PL brand roof flashing adhesive, Sika Flex, or Vulkem brand. It must be waterproof, urethane caulking. One small tube will do about 20' of 3' tall foundation, but this can vary according to how the panel joints look. Smoothing the caulking with a gloved finger is required, so don't forget to get **disposable gloves**.

Rebar and Tie Wire – Yes, you know that you need this anyway, but to hang the panels you need to tie on the rebar as you go. Otherwise to hold the panel joints together at the bottom while the construction adhesive dries, you will need to have a bunch of **spring clamps**, or the like.

It is necessary to coat (or clad) the panels before backfilling them. For a water-emulsified tar coating you will typically require an **air compressor, etc**, a **hopper gun** (typically used for drywall texture), an extra **5 gallon bucket**, a large **paddle mixer**, and masking **tape and paper** (for the house). For a cement coating see the last page.

Before Hanging Panels:

The trenches are easier to clean out before panels are up, and it is easiest to make the corner bends for both of the required #4 rebars ahead of time, because tying a bar onto the panels is the easiest way to keep the joints closed. Bends for bars that will tie to panels are best made carefully to match the home corners (bend right at 90 degrees etc), especially where a single length of bar will have more than one bend (such as at a bay-window popout near a building corner), because this rebar is used to help align the panel bottoms. Two holes are provided in each panel for tying on rebar. The other rebar is simply put near the bottom of the footing per code requirements. I prefer to hang it in place with lengths of tie-wire.

Distributing Panels at the Jobsite:

If panels are not all the same length, then the different lengths need to be distributed roughly according to where they will install, so that they are all handy when needed to hang in place. If lengths vary considerably, it is best to have the panel delivery made at the side of the home that has the longer (heavier) panels. When spreading panels out, keep them out of the way of where other panels will have to be hung (don't lean them against the home where they are in the way of other panels that need to be installed), and it is best to keep the panels out of the dirt and mud as possible, especially the tops and inside faces. Remember, if you have varied lengths, we are happy to provide a panel layout diagram.

Bending the Anchoring Tabs:

The panel bottoms get that one-time 90-degree bend for anchorage into the footing, with the bending tool that we manufacture (Don't forget to order one if you don't have it). This bend is most easily made when the panels are all in the same location, when preferably you have a working surface there for doing the bending. Typically, you will want to bend each panel and then distribute it. We have a job trailer with the bending tool built into it, so that the panels are easily bent as they are unloaded and distributed.

Hanging Panels:

Panel hanging must start at one location, and then must go contiguously from that location, in one or both directions, until the last "closing" panel is hung. One may as well start at the most viewed or tallest corner (more on cutting the corners below), and end at the least visible location, or perhaps at an access opening. Once the first panel is hung, then the location of every other panel is determined, as the panels have a mating connection at adjoining edges. The exception to this rule is that the panel layout can be re-set in situations where an opening of variable width allows adjustment to be made.

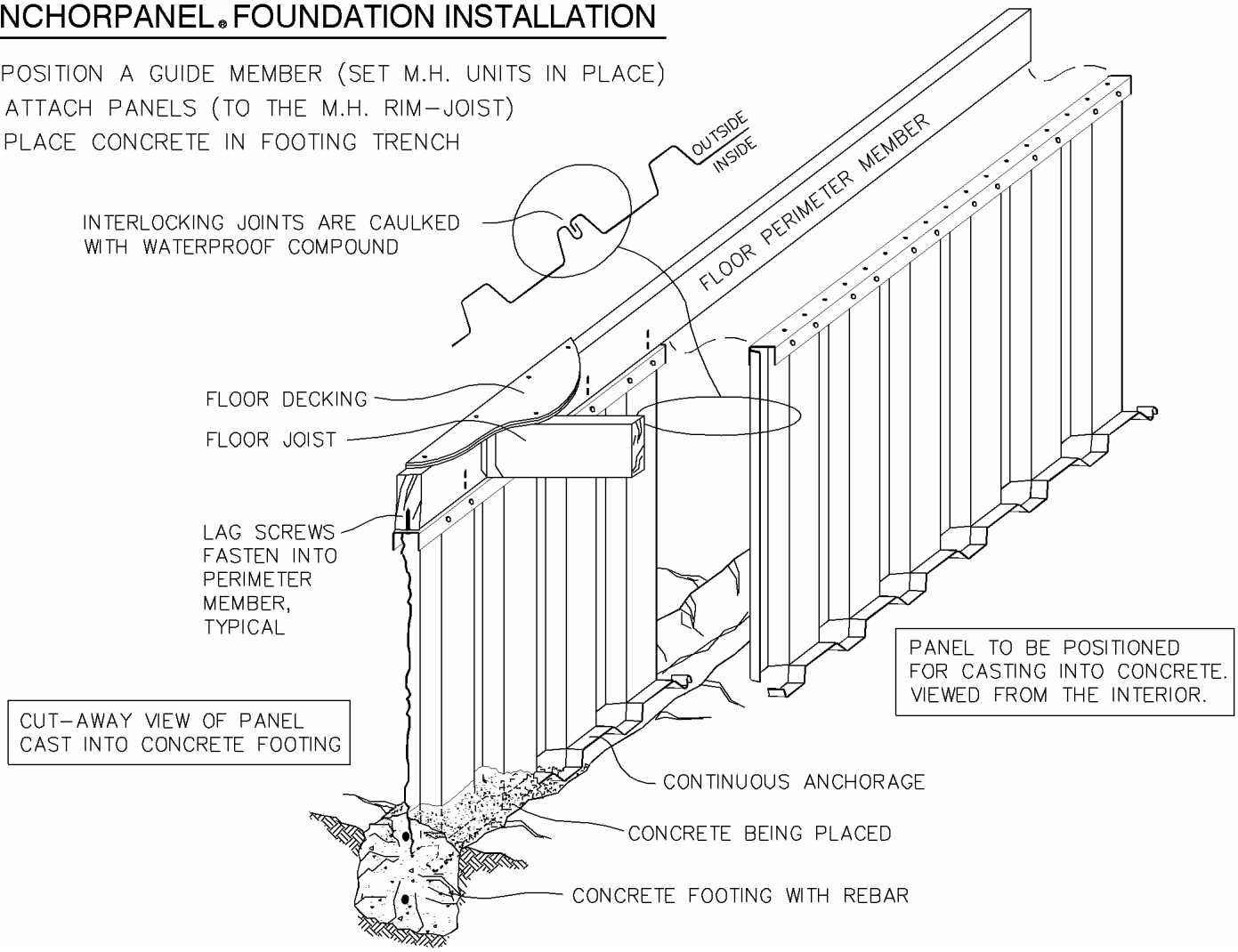
Panels are hung by simply holding them into place and then screwing in at least 2 of the lag screws. All of the fasteners (typically at 6" on center) should be put in now so you don't forget to put them all in later, and this prevents the need to go around the home again with the screw-gun and power cord.

The panels' male-female joints are glued together with the construction adhesive. A bead is applied to the female panel edge of each joint, on the side of female that will be behind the male edge as it goes into place. In other words, try to keep the stuff from squishing out at the joints because it will get in the way of the caulking that goes there later. The construction adhesive is mostly a cosmetic consideration and not a structural requirement of the system (all testing was done without it), but it does improve the shear strength of the panels over their tested values, so we recommend being more liberal with the stuff where panels are tall, especially at end walls.

Panels can be hung in either direction from already-hung panels. As a subsequent panel is going up, you mate it to the one already up, with the construction adhesive bead in place. Start slow and go fast as you get the hang of it. And then continue on down the line. To make a point about how fast this <u>can</u> go, three of us (experienced and prepared) hung 3' to 5' tall panels, along the length of a 64' home, in 20 minutes! (But then we had to go back and add the rest of the fasteners – not a recommended sequence)

ANCHORPANEL® FOUNDATION INSTALLATION

1. POSITION A GUIDE MEMBER (SET M.H. UNITS IN PLACE)
2. ATTACH PANELS (TO THE M.H. RIM–JOIST)
3. PLACE CONCRETE IN FOOTING TRENCH



PANELS REQUIRE COATING OR CLADDING BEFORE BACKFILLING

The most efficient way to keep the panel joints tight while the construction adhesive sets is to simply tie on the rebar that goes at the bottom of the panels (that's why it is best to bend up the bars beforehand). Holes are provided for this purpose at the panel edge, where tying on the bar will keep one panel tight against the other at the joint.

The last "closing" panel will meet the adjacent panel randomly. The typical edge connections will be replaced with an urethane-caulked lap of one panel over the other. This connection usually requires that excess panel material is cut off of one panel, but each situation will be a little different and may require some creativity. Seal up any exposed panel edge with the urethane caulk.

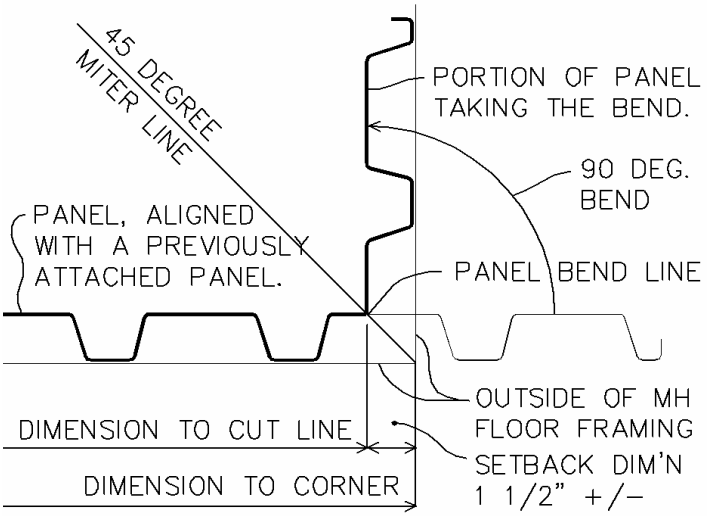
A consideration for hanging panels is to make sure that they go in the correct plane for any covering that may go over them. If siding continues on down over the panels, will it be flush with or behind the home siding. Do the panels need to recess somewhat? In general, where the panels are getting architecturally covered, a "high" spot is much more of a problem than a "low" spot.

Cutting Corners:

The panels do not typically get entirely cut at building corners, they literally wrap around at corners. This wrap or bend is made possible by making intermittent saw kerfs (cuts) along the vertical bend line, and by cutting out that portion of the top channel and slitting the bent-tab at the bottom, making the bending possible. The saw kerfing is best done with the carbide-toothed blade such as the one we use.[4] Friction blades can be used, but they do some damage to the galvanizing (and any panel coating). In any case, the vertical cuts are about 50% intermittent. That is,

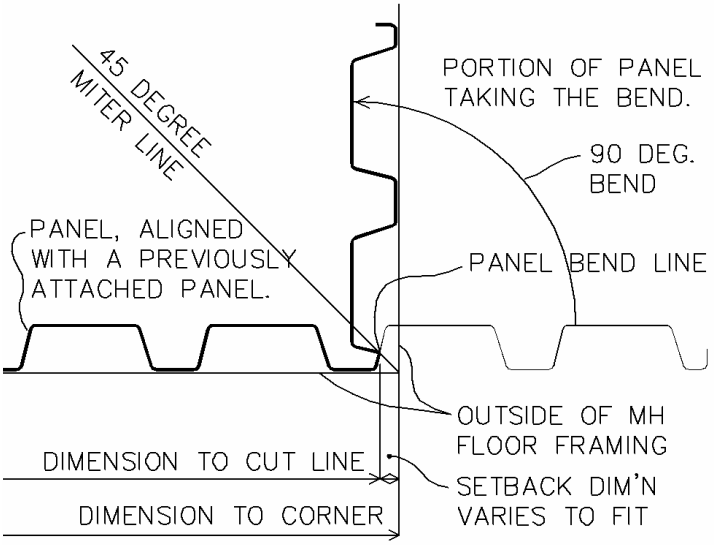
one usually cuts about 4" to 6", and then leaves 4" to 6", and so on. Tall panels with a bend near one edge will need more kerfing and less material left, because the bending is more difficult.

There is some technique to determining where a corner cut/bend line needs to be made, except at the first-hung panel, because of course the corrugation pattern does not always cooperate by making an outer rib end up at a corner. If a rib (outer projection) ends up at a building corner, the measurement to make cuts on that panel is the same as what measures on the building. However, if the panel corrugations end up with anything but the face of an outer rib at the building corner, than a correction must be made to the building measurement similar to that of cutting a length of mitered trim according the attached diagrams. Generally the outside corner cuts want to be slightly short (1/8") rather than long.



CASE 1: MITER LINE AT PANEL BACK

For inside corners ("return" corners), everything is the opposite. Cut lines falling on interior corrugations will be 1½" longer, etc, and these corner cuts want to be slightly long rather than short. The same idea always applies, in that the imaginary miter line determines where to cut the panel surface, for 45-degree turns the 22.5-degree miter line is applied, etc.



CASE 2: MITER LINE AT SIDE OF RIB

Cutting thin steel with a carbide-toothed steel-cutting saw[1] can be scary. Unsupported free edges can get caught up with a tooth, resulting in sudden saw kickbacks, flying shrapnel, and twisted-up sheet metal. Start and end cuts at material edges slowly, and provide support directly at the material being cut. Never cut into pieces that are too small. Keep hands away from the cutting area. Always wear approved eye, face, and ear protection! Please see the footnote on these saw blades.

ESTABLISHING THE BEND LINE REQUIRES THOUGHT

Vents:

You must provide venting adequate for safety if you have gas piped under the home! The most common method for venting the crawl-space is where we provide you with a vent opening liner that attaches to a corresponding panel that has no top (For more info see Ventilation under Ordering Panels above). Keep in mind that you can vent any way that you like, such as cutting vent openings into the panels. Suggested vent locations would be indicated on a panel layout diagram provided. If your panels are essentially all the same length, we typically do not provide a suggested layout, but you can always request one.

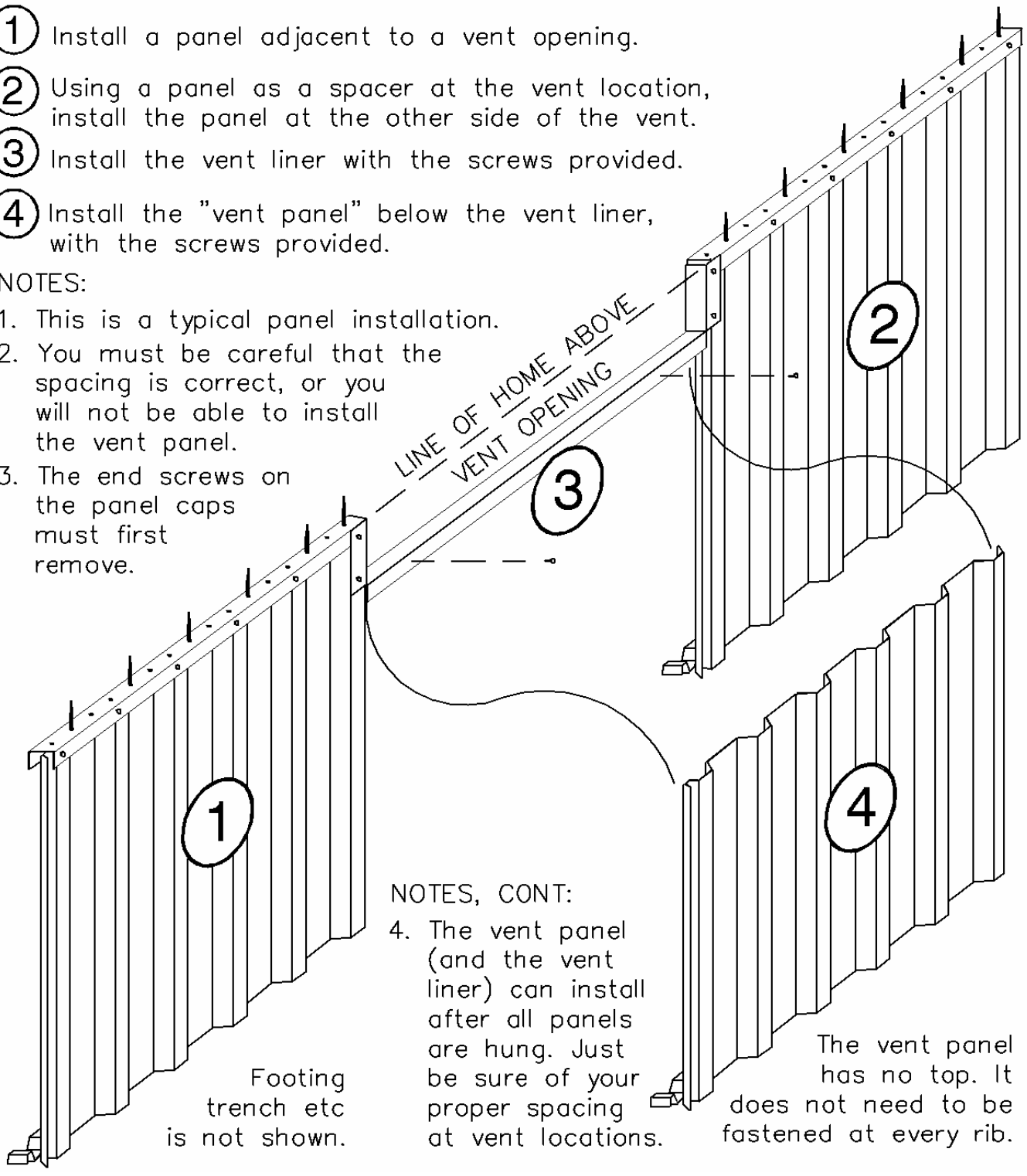
In any case, where a vent location is determined, go ahead and hang typical panels right up to it. Then use a panel as a spacer to locate and hang a typical panel on the other side of the vent panel. Then install the vent opening liner to both of the adjacent panels (SDST screws are typically provided with the vent liners). The liner provides a means to hang the "vent" panel. This vent installation diagram is really one choice on the vent installation sequence (It is actually easier to attach the vent liner to the vent panel first).

VENT INSTALLATION SEQUENCE

1. Install a panel adjacent to a vent opening.
2. Using a panel as a spacer at the vent location, install the panel at the other side of the vent.
3. Install the vent liner with the screws provided.
4. Install the "vent panel" below the vent liner, with the screws provided.

NOTES:

1. This is a typical panel installation.
2. You must be careful that the spacing is correct, or you will not be able to install the vent panel.
3. The end screws on the panel caps must first remove.



The choices for screening and trimming the vent opening are up to the installer. Often, a strip of Hardie Plank is used to trim out the entire foundation attachment, and rectangular openings are cut into that trim-strip at the vents. Then, ¼" mesh hardware cloth is sandwiched between it and the foundation. High quality solid-aluminum gutter screens, 6" x 36" are available from Home Depot for under $2. These are highly recommended, as they should never have to be replaced. Some prefer to make up window screens to fit in the vent openings.

Access Openings:

The easiest access opening is created by simply substituting any panel with a “sill panel”. A sill panel is a standard-width panel that is only 12” or 16” or so high. It is cast into the footing like other panels, but it leaves an opening above it, with the top of it becoming a sill for the opening. The sill panel is held in place with spring clamps or similar at the top, and usually the rebar at the bottom, at least until the construction adhesive sets up. The door at this access can be solid (of panel material) or open frame with a screened opening providing more ventilation if required. Frame doors are more easily pinned in place rather than hinged. Use the trim at the top with a 2x block at the inside as “keepers”, with pins at the bottom that go into the sill panel top. Leave vertical clearance at the top, for removal of the door.

If vertical clearance is tight for the foundation, you can always leave out a panel altogether at the access location, and just form up a little concrete curb as required at the bottom when you do the footing concrete. This opening can be the place where you finish the panel hanging, and allow for some flexibility in the horizontal dimension of the opening according to how the panel layout finishes out.

When an access opening is required where the foundation is mostly backfilled, a structural popout (with an opening lid) may be required so that both backfilling and access are possible. For this, we will supply 3 extra panels making a 3’x 3’ popout. It is located at an opening in the foundation that must be less that 3’ and more than 2’ wide. These panels are positioned with stakes and/or dobies. I like to attach light steel shelf brackets at the popout corners for supporting it squarely. Don’t forget to order these panels, and specify a shorter length if that works better for you. These panels do not have to be in as deep of a footing. If the foundation is tall enough, I prefer to use panels 4” shorter than the adjacent typical ones and make the entire 3’ square area a shallow slab/footing. The tops can be lower than the foundation panels. Build in a sloped “ramp” on two sides of the popout for drainage of the lid. These triangle shapes can be essentially screened openings if more ventilation is required.

Calling for Inspection:

Most building jurisdictions of course require an inspection before the footing concrete can be placed. With the Anchorpanel method it is possible to inspect the trenching, reinforcing, panel hanging, and underfloor supports and crossover connections all in one inspection. Some inspectors may not inspect underfloor issues if panels are in the way. You may have to leave a few panels out for the inspection, or even call for an earlier inspection for underfloor issues, if you do not have a cooperative inspector.

Coating Panels:

For the panels that are supplied galvanized but not pre-coated, it is necessary that a coating be applied in the field by the panel installer before any soil backfill is applied to the panels. A cementitious-panel covering can replace this coating requirement – please call us for details. Henry’s Driveway Sealer #132 and #532, are very good choices for a protective coating (6/07: Unfortunately Home Depot apparently is now discontinuing these and Lowe’s carries another brand that we have not yet tested), but they have a very strong odor which many people object to (it eventually goes away). Henry’s #307 Fibered Asphalt Emulsion is also a good protection, but is not as tough as the others, and so should always be sprayed in two coats. A site-blended cementitous textured coating is also acceptable, if the panel surface is prepared first. If you want to use this, please ask us about this before your panels ship from our factory, because some preparation compound is required. We have instructions this below.

Panel coating can be applied before or after placing concrete in the trench (cement coat must be after). It is better to apply coating after panel joints are caulked. The least expensive way to go is to use a drywall texture gun (the large hopper-sprayer that splatters thick stuff, like drywall mud) with an air compressor. These guns are very inexpensive (usually under $30) at Harbor Freight Tools. You will need a roll of 18” wide masking paper to protect the house siding, etc, or any surfaces that can’t have tar coating.

Set air pressure to about 35 psi. Spray a very heavy coat that covers all panel surfaces thoroughly. Move vertically about a foot away from the panels, emphasizing panel recesses, aiming at 45 degrees from each direction into the recesses. Ribs generally get covered fine anyway. Ribs at joints often need a quick additional pass. Double check to make sure you have 100% coverage below grade. It is important to recheck this before backfilling, and go over any locations where the coating may be compromised. Above grade it is best to coat any portion of panels that will

remain unclad with another material. If you want the panels painted, they need to be coated first, as latex paints do not stick very well to the galvanized surface. A primer would then be necessary under the finish paint to prevent any bleed through of the tar.

Placing Concrete:

Concrete placement is the most intense part of the project, especially if it is hot and you are shorthanded. Of course you want to place all of the concrete from the outside, and this means that the concrete must get under the panel bottoms and come up enough on the inside to adequately embed the panels (see "Anchorpanel Perimeter Installation" illustration above). And this means that you want to pump the concrete with grout hose (2½" dia), and this means that you should use 1/2" maximum or 3/8" minimum rock, 6-sack mix, concrete. A plasticizer is strongly recommended, and is totally necessary for hot days and first jobs. I always use it because it makes concrete placement much easier and allows more working time. It is possible to vibrate the concrete into place, rather than pump it, explained further below.

The easiest method is to begin pumping the concrete into the trench with the hose stuffed under a panel until there is enough concrete in that area of the trench (when a man on the inside hollers that there is enough concrete, and then spreads it around appropriately), then pull out the hose and pump at the outside half of the trench. Then go inside right next to that area, then outside, and so on. If you don't get the inside first, then you never will, without somehow transporting concrete under the house, which is what you are trying to avoid. This is one reason why you need that 5" clearance at the panel bottoms. The concrete should be placed at about the same level inside and out, at least until it sets up, so any imbalance does not splay the panels out of plumb.

As you are placing concrete, you want to keep the panels as plumb as you can. Practice and experience help with this. Before you get very far down the line, you want to check them with that magnetic torpedo level (that you got just for this job). Bend a hook onto a 4' length of rebar so that you can push *and* pull panels from the outside. The longer you put off checking panels for plumb, the harder it is to plumb them. The next day it is really hard to plumb them! The plumbness of the panels is really an aesthetic issue, structurally it matters little. So, there is a real difference whether a foundation is to remain visible or get backfilled. The most important situation to be careful about plumbing the panels is where they will be getting clad with another architectural surface. Avoid leaving high spots in the panel surface. If a part of the panels is not going plumb, a vibrator can get it to move if all else fails.

Alternatively, concrete can be placed as a regular ¾" rock mix, and by a large hose or even by chute, and as the concrete is placed on the outside, it is vibrated in to the inside. Even though a few installers do it this way, I do not recommend it, as it is very unforgiving. Once the ¾" rock concrete is vibrated and a portion of the panels is out of plumb, it can be very, very difficult to fix. Placing concrete by chute right next to the panels is a lot of extra work and very messy. Plasticizer is essential for this method.

Grading and Finishing:

After the panel coating has dried, panels can backfill up to 3' for HUD-code homes and 2'-6" max for all other buildings. Grades must slope away from the foundation per local codes, typically 2% over 5'. Soil must be kept 6" from the home and any untreated wood, and 8" away if required for FHA lender compliance. Any backfill must drain water away from the foundation to avoid any hydrostatic pressure and moisture problems. If the crawl-space is lower than exterior grades where ground water is an issue, then a crawl-space design with a sump and a pump would be required, per local design requirements.

Footnotes:

1. We use a 7 ¼" diameter carbide-toothed saw made for cutting steel without making the rough edges that a friction-blade does. CUTTING WITH THIS TYPE OF SAW IS EXTREMELY DANGEROUS AND MUST BE DONE ONLY BY EXPERIENCED PERSONNEL. SHARP AND HOT FRAGMENTS OF STEEL FLY OUT IN MANY DIRECTIONS. CUTTING UNSUPPORTED PORTIONS OF THIN STEEL CAN RESULT IN SUDDEN UNCONTROLLED KICKBACKS, AND DAMAGE ANYTHING NEAR THE MATERIAL BEING CUT. THESE SAWBLADES CAN LOSE TEETH AT ANY TIME DURING USE. ALWAYS WEAR OSHA-APPROVED EYE, FACE, AND EAR PROTECTION.

Panel Cement Coat Process

This is a low-cost protective coating that gives a stucco finish directly to the panels.

Materials:
Portland Cement, Type I-II, preferably not plastic cement
#30 sand and #60 sand
Concrete Bonder ("Glue"), such as Borden's brand or "Acryl 60"
Water
Cleaning Etch or Phosphoric Acid (to prepare the panels for cementitious coating)
Concrete Sealer (required where frost/thaw cycles exist)

You will typically require 1 sack of each size sand and 1 sack of cement and at least 1 gallon of glue for each 200 square feet of panel to be coated (A typical double-wide home fdn requires at least 2 of each item, so get 3 min)

Tools:
Air compressor, etc
Hand-Pressure Sprayer (The kind used for weed control, etc)
Hopper Gun (typically used for drywall texture)
Wheelbarrow
Hoe and Shovel
5 gallon buckets
Large paddle mixer
A few Mixing Pails
Masking tape and paper (for the house)

Preparation Note: The foundation panels must first be prepared for adhesion with either an alkaline or phosphoric-acid cleaner/etch, applied according to the manufacturer's instructions (as for paint preparation). This requires a thorough rinsing of the panels. For more information on this, feel free to call us – preferably before ordering panels.

For the cement coating process, first mix equal parts of dry ingredients: Portland Cement, #30 Sand, and #60 Sand; Place half bags of each in a wheelbarrow. Mix with a hoe.

In 5 gallon bucket mix in water and glue with a large paddle mixer. Glue amount is at the rate of a gallon (at least) per each sack of cement. Mix must be stiff enough to hang on vert surfaces, but just wet enough to go through hopper-gun ok. About like a slurpee. Will likely have to add more dry mix after adding glue, to make it stiff enough.

Set air pressure to about 35 psi, and using the largest or next-to-largest orifice of the hopper gun. Spray a heavy coat that covers all panel surfaces thoroughly. Move vertically only emphasizing panel recesses, aiming at 45 degrees from each direction into the recesses. Ribs generally get covered fine anyway. Ribs at joints often need a quick additional pass. For a more uniform and rougher texture, spray a second coat that is very light and consistent (quick movements), sprayed after the first has dried. First coat must cover panels thoroughly. It is best to start the first coat on the shady side. The second coat is always recommended in that it makes subsequent (next day…) touch-up possible, as touch-up always looks like the second coat – it never matches a first coat.

Be sure that the panel bottoms get coated in a way that does not allow water to trap against them. Use extra cement coat as required to avoid pockets at the bottom.

If in a frost climate, apply a concrete sealer to the cement coat after curing, according to the manufacturer's instructions, to avoid potential freeze-thaw breakdown over the seasons. Sealer is recommended in all locations for an improved appearance of the cement coat.