

SureBuilt

Concrete Forms & Accessories



SurePly™ Application Guide



System Features

Rugged Frame

With nearly 45% more weld contact than others, SurePly side rails, end rails and crossmembers hold up better, with far less repair, than other brands.

2" Crossmembers

Full 2" crossmembers provide 45% more plywood contact area compared to the 1-3/8" crossmember of other brands. More support reduces "pillowing" for a better finish.

Load-rated 1,000 psf System

The form, tie and hardware capacities are designed to provide an optimal strength-to-weight ratio and 1,000 psf forming system.

More Dado Slots

Four more dado slots along each side rail provides alternate tie and hardware locations - particularly valuable when stacking or "stepping" forms.

Powder Coating

The smooth, extra tough, baked-on SurePly form finish is more durable than the ordinary dip-tank painting common with other brands.

Color Options

Forms are available in a choice of 12 standard colors, which is ideal for company branding and/or identifying rental fleets. Custom colors on request.

Long-lasting Birch Plywood

All standard SurePly panels and fillers include 1/2" Birch plywood. This hardwood species and 9-ply design with 220/220 overlay provides a long-lasting form face.

Panel and Filler Sizes

Form layouts are quickly planned and assembled using the standard panel and filler sizes. Setting, stepping and stacking forms is more productive.



Introduction

This application guide contains basic form setting techniques for the SurePly handset system. SureBuilt recommends that all concrete forming professionals comply with the applicable industry standards and safe practices established by the American Concrete Institute (ACI), American National Standards Institute (ANSI), Occupational Safety and Health Administration (OSHA), and the Scaffolding, Shoring and Forming Institute (SSFI). SureBuilt also recommends the use of complete personal protection equipment (PPE), including: gloves, safety shoes and safety glasses when handling, erecting and dismantling forms.

General Safety Guidelines

1. All form components and/or hardware must be kept clean, and if appropriate, lubricated to insure proper performance and to allow for proper inspection.
2. All form components must be inspected regularly for damage or excessive wear. Equipment found to be in these conditions must be replaced immediately and **not** re-used.
3. Field repair of modular formwork components (other than plywood repairs) must not be undertaken without consulting a SureBuilt representative.
4. The forming layout must be prepared or approved by a person qualified to analyze the loads and stresses which are created during the construction process. The layout must be at the jobsite.
5. Forming installation and concrete placement must comply with safe practices and with the requirements of the law and governmental regulations, codes and ordinances

Standard Form Dimensions

Panels: 24" (wide) x 3', 4', 5', 6', 8', 9', 10' (height)

Fillers: 4" to 22" (wide) in 2" increments x 3', 4', 5', 6', 8', 9', 10' (height)

Steel Fillers: 1", 1-1/2", 2" (wide) x 3', 4', 5', 6', 8', 9', 10' (height)

Inside Corners: 6"x6" & 4"x4" (size) x 3', 4', 5', 6', 8', 9', 10' (height)

Outside Corners: 3', 4', 5', 6', 8', 9', 10' (height)

Filler Angles: 3', 4', 5', 6', 8', 9', 10' (height)

Pilaster Forms: 3', 4', 5', 6', 8', 9', 10' (height)

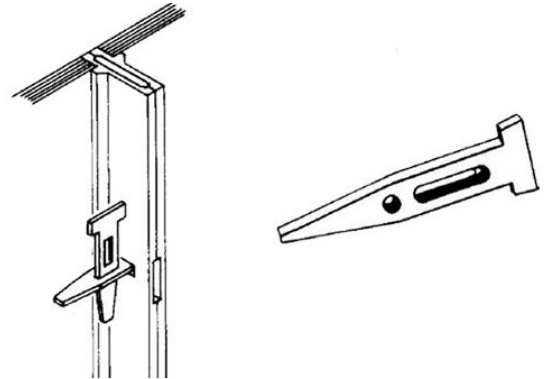
Inside & Outside Bay Corners: 3', 4', 5', 6', 8', 9', 10' (height)

Hinge Corners: 3', 4', 5', 6', 8', 9', 10' (height)

Connecting Hardware

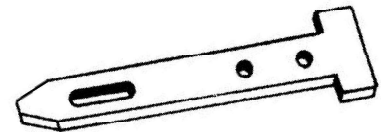
Wedge Bolt

Wedge Bolts are the most common hardware item used to make connections while using the SurePly System. Two Wedge Bolts make up a set and may be used in both vertical and horizontal slots. One Wedge Bolt passes through the side rail slot and the other is dropped in the rectangular slot of the first Wedge Bolt, then hammered tight. Wedge Bolt connections should be tight, but it is not necessary to over-tighten. Doing so cause damage the forms or hardware, making stripping difficult.



Long Bolt

The Long Bolt is similar in design to the standard Wedge Bolt. Its application differs only in that it allows for a smaller steel filler to be placed between two panels. The added length of the Long Bolt allows it to pass from one form through the filler and through the adjacent form with adequate room to lock the bolt in place by use of a regular Wedge Bolt.



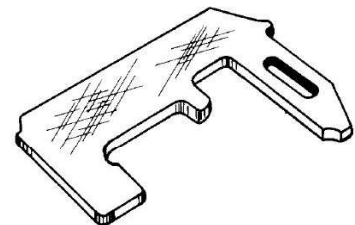
Base Tie Bolt

Base Tie Bolts are used with Base Ties. The bolt holds the tie in place. The tie spans two opposing forms and the enclosed wall thickness at the base of the form to maintain the proper wall dimension.



Gang Form Bolt

The Gang Form Bolt is also made of high-strength, heat-treated steel. Its purpose is to convert a hand-set system to a gang form system utilizing a HD Gang Loop Tie with a longer gang form end.



“S” Wedge

The “S” Wedge is a multi-purpose wedge used to secure Ply-Lag ends or other similarly slotted hardware items to the steel side rails.



Form Ties

Form ties are used to space and secure modular concrete forms, such as SurePly panels and fillers. Most ties are made using round steel wire. One exception is the X-Flat Tie, which is made using flattened steel that has gone through a rolling mill. The standard types of ties used with handset/modular forms are typically available in standard and heavy duty load ratings. Optional neoprene waterseals and plastic cones are common additions to form ties.

Loop Tie		
Type	Wire Size	SWL *
Standard Loop	.225	2,250 lbs
Heavy Duty Loop	.243	3,000 lbs

* Safe Working Load based on 2:1 safety factor.

Gang Loop Tie		
Type	Wire Size	SWL *
Standard Gang Loop	.225	2,250 lbs
Heavy Duty Gang Loop	.243	3,000 lbs

* Safe Working Load based on 2:1 safety factor.

X-Flat Tie	
Type	SWL *
Standard X-Flat	3,000 lbs
Heavy Duty X-Flat	3,500 lbs

* Safe Working Load based on 2:1 safety factor.

Base Tie		
Type	Wire Size	SWL *
Standard Base	.225	1,500 lbs

* Safe Working Load based on 2:1 safety factor.

Neoprene Waterseal

A waterseal is an optional add-on for form ties that are made using steel wire. It prevents the transmission of moisture/water down the length of the tie, which causes the steel to rust and the corrosion to become visible on the surface of the concrete.



Loop Ties are used with Wedge Bolts on modular form panels. Each tie is fabricated with medium carbon wire and electrically welded. Each side of the tie has a 2-1/8" end and 1" breakback. Optional 1"x1" plastic cones, neoprene washer or special breakback.



Gang Loop Ties are used with Gangform Bolts on modular form panels. Each tie has a 4-15/16" end and 1" breakback. The longer end allows breakback before stripping. Optional 1"x1" plastic cones, neoprene washer or special breakback available.



The X-Flat Tie is used with Wedge Bolts on modular form panels. The X-Flat Tie is commonly used on residential and commercial projects in forming situations that do not require a 1" breakback. The standard breakback of the X-Flat Tie is 1/4".



Base Ties are used with Base Tie Bolts along the siderail of forms laying horizontally or when butting forms against an existing concrete wall.



Combination Form Ties

Combination ties are not standard components of the SurePly system, but are required in forming situations that use a combination of forming methods. Handset systems may be used in combination with job-built plywood forms that use Snap Ties and Jahn-style Clamps (not compatible with Wedge Bolts).

HD Loop / HD Gang Loop Tie

Standard 1" break back. One end with standard loop tie specifications and the other with gang form loop tie specifications



Snap Tie / HD Loop Tie

Standard 1" break back. For forming situations that require a combination of handset SurePly forms and job-built plywood forms.



Snap Tie / HD Gang Loop Tie

Standard 1" break back. For forming situations that require a combination of handset SurePly forms and job-built plywood forms.



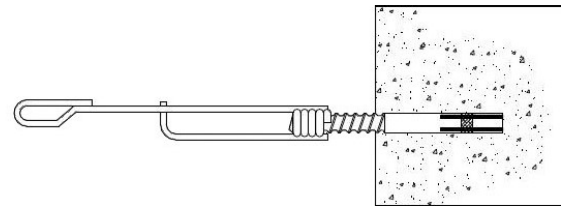
Threaded Loop Tie

Standard 1" break back (loop end). Threaded ties are available for handset and gang forming applications.



Coil Tie / HD Loop Tie

This tie is used to tie a SurePly form to an existing structure. In the example shown here, Coil Rod is inserted into a Drop-In Coil Anchor. The Coil end of the tie is threaded on to the rod.



Neoprene Waterseal

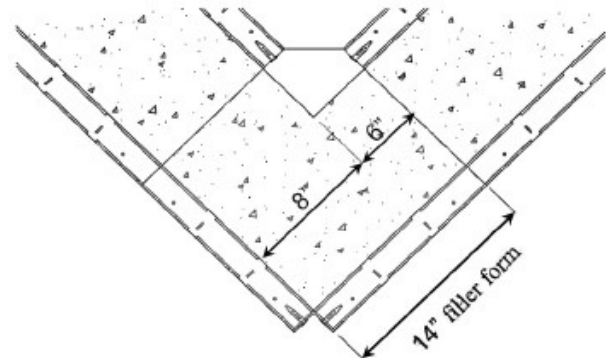
A waterseal is an optional add-on for form ties that are made using steel wire. It prevents the transmission of moisture/water down the length of the tie, which causes the steel to rust and the corrosion to become visible on the surface of the concrete.



Corners

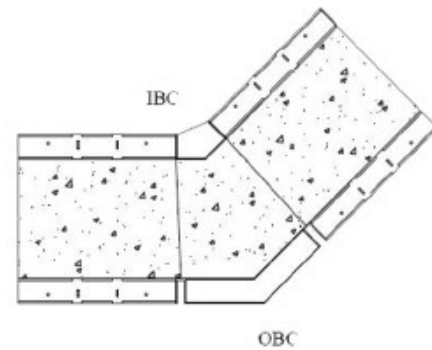
Inside Corners

Inside Corners are 6"x6" shapes attached to forms with Wedge Bolts. These Wedge Bolts are placed at the same elevation as the ties. To avoid hardware interference, insert the Wedge Bolt from the Outside Corner toward the form. This way the perpendicular Wedge Bolt can bear on the cross member and the adjacent Wedge Bolt has clearance.



Outside Corners

Outside Corners are steel angles attached to forms with Wedge Bolts. These Wedge Bolts are placed at the same elevation as the ties. To avoid hardware interference, insert the Wedge Bolt from the Outside Corner toward the form. This way the perpendicular Wedge Bolt can bear on the cross member and the adjacent Wedge Bolt has clearance.

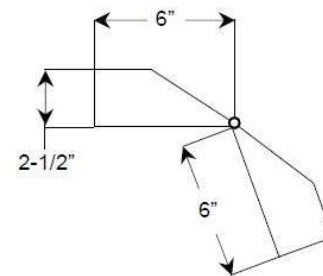


Bay Corners

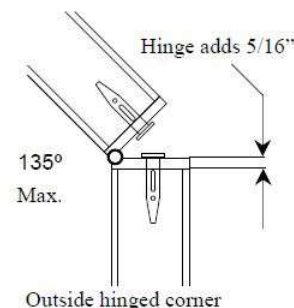
There are two types of Inside Bay and Outside Bay Corners. Both are all metal faced fixed 135° corners. The Inside Bay Corner has a 3"x3" face dimension and the Outside Bay Corner is 7"x7". By using these corners, with panels and/or fillers, most 45° corners can be formed. The width of wall is the determining factor for the form combination required.

Hinged Corners

The Inside Hinge Corner is used to form inside corners that have a minimum angle of 45°. It's face dimension is 6"x6". The Inside Hinge Corner can also be used as the outside corner if needed. The Outside Hinge Corner is used to form outside corners from 5° minimum to 135° maximum, without interference.



Hinges should always be braced and/or blocked into their final position. They should never be used for column applications.



Fillers

Fillers

Filler sizes are available in all even increments from 4" to 22". Filler panels are manufactured with the same materials used to make standard 24" wide panels.

Steel Fillers (1", 1-1/2", 2")

Steel fillers come in 1", 1-1/2", and 2" widths with tie slots located at 12" centers. They are connected to opposing forms with Long Bolts.

Long Bolts are punched with (2) 1/4" holes. These holes are designed to accept a 16d nails, 20d nails, or tie end to shorten the Long Bolt to accommodate a 1" or 1-1/2" Steel Filler. Steel Fillers with 2" widths connect with a Wedge Bolt and Long Bolt.

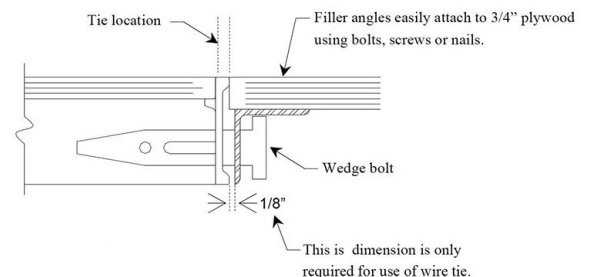
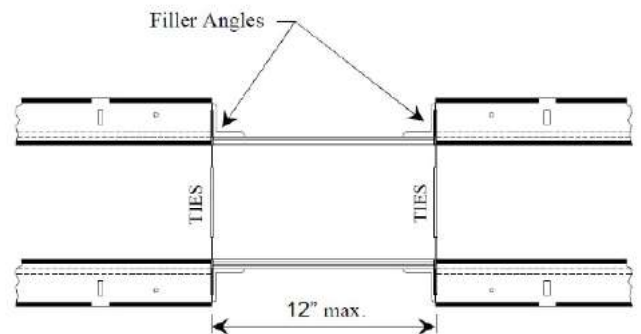
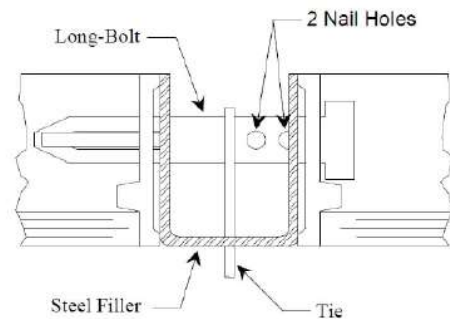
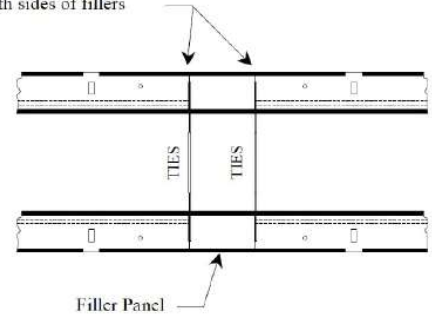
Filler Angles

Filler Angles are used to make up odd dimensions in a forming layout. Filler dimensions can range from 3" to 12" (maximum). Filler angles attach to side rails with standard Wedge Bolts. The 3/4" plywood filler strip can be attached to the Filler Angles using screws or nails.

Ties should be located along both sides of the filler. Flat Ties are preferred for this situation, but a HD Loop Tie can be used by leaving a small gap between the Filler Angle and adjoining panel.

Filler Angles and 3/4" plywood can also be an effective method for forming around protruding objects, including conduit, pipe and rebar. This eliminates damage to standard panels.

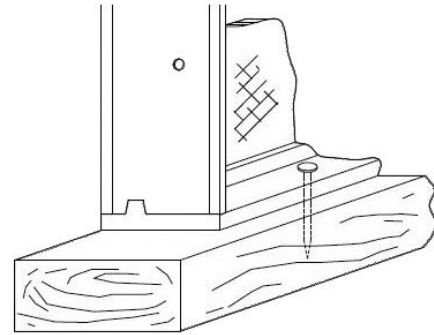
Ties are used on both sides of fillers



Basic Form Setting

Setting Panels

SurePly Forms can be set directly on a concrete surface or on a lumber sill plate anchored to existing concrete. The use of sill plates is recommended because it provides a flat surface onto which forms may be set and anchored. Panels should be nailed flush to the sill plate edge, with at least one nail per panel being utilized. Each form should be secured in a position flush with the sill plate edge, utilizing the nail holes found on the bottom rail of each form.

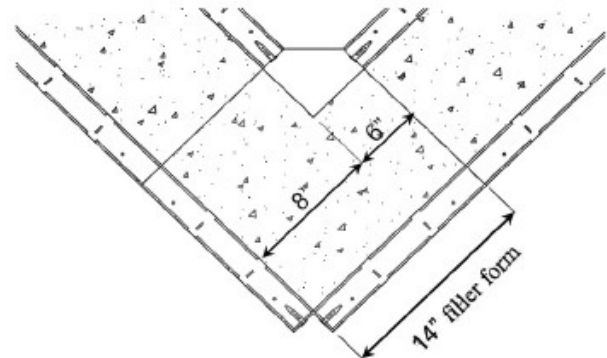
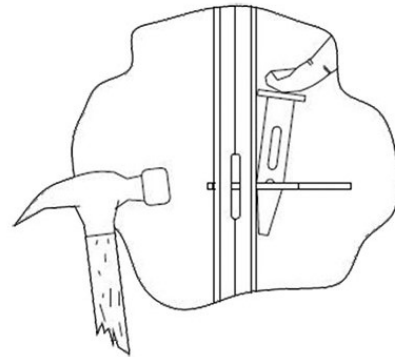


If the project requires a slight increase in pour height, use two pieces of lumber to build the sill plate. For example, if the forming situation requires a 16'-3" wall, and your forms measure 16', the use of double sill plates would achieve the desired height (assuming 2"x4" lumber is used). This method is more effective than nailing lumber across the top of the forms.

Begin Panel Placement

Panel placement typically begins at an Inside Corner location. Using the dimension of the inside corner face and concrete wall thickness, the filler width can be calculated

Connect additional panels and ties, remembering to level and plumb as you go. Horizontal walers and HD Turnbuckle form aligners should be installed as soon as a sufficient number of panels has been erected.

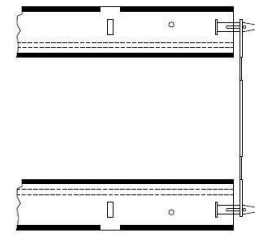


Example: 6"x6" Inside Corner plus wall thickness of 8" equals 14" filler.

Basic Form Setting

Step 1

First, determine the appropriate tie spacing for the forming situation. Next, insert Wedge Bolts through the horizontal slots of the panel at each tie location. Insert each one so that the “pointed” end faces away from the center of the form.



Step 2

Next, slide form ties over the ends of each Wedge Bolt pair. Each pair of horizontal Wedge Bolts should be at the same elevation, parallel with the ground. Fully slide the ties over each of the bolts found on opposing wall.

Step 3

Choose one side of the wall to work on prior to maneuvering the opposing form into position. Take panel “A” and line up the slots with the Wedge Bolts.

Step 4

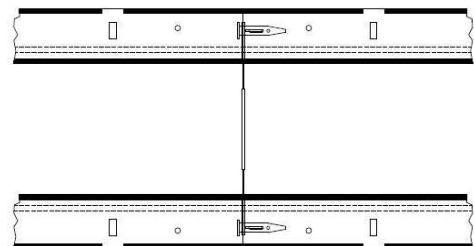
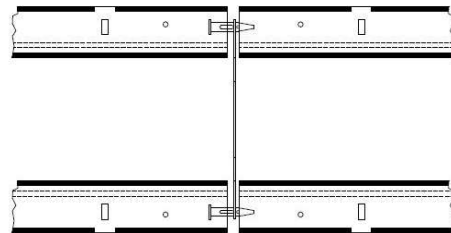
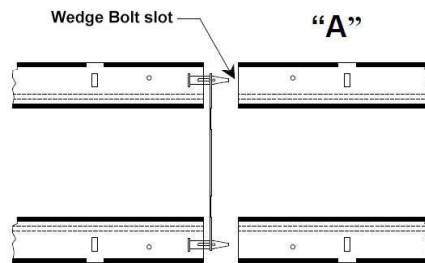
As you move panel “A” in to position, be sure the ties are positioned up against the steel side rail, sitting in the dado slot. Sandwich the ties and Wedge Bolts between panels by sliding each form over.

Step 5

Once the side rails of two panels are against one another, drop the tightening Wedge Bolts vertically in to the slots on the horizontal bolts. Gently strike the top of the vertical bolt with hammer until the connection is firmly in place. Do not use excessive force to hammer down on the hardware. Continue panel placement.

Step 6

After a multiple panels have been set in place on each side of the wall, the next step is to attach alignment walers. Also, install strongbacks and alignment bracing as required. In addition, begin nailing the forms to the sill, utilizing the two nail holes on the bottom rail of each form.



Basic Form Setting

Wall Intersections

SurePly offers two standard sizes of Inside Corners 6"x6" and 4"x4". Whether you have an intersecting t-wall or a pilaster, the following will work for both situations. If the perpendicular wall is 12" or less, one panel or filler will be on the back side of the intersecting wall.

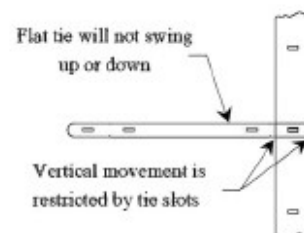
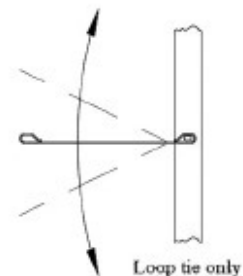
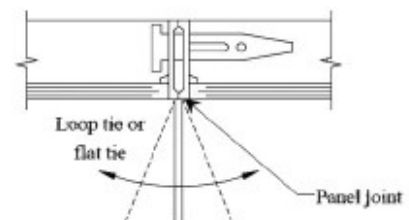
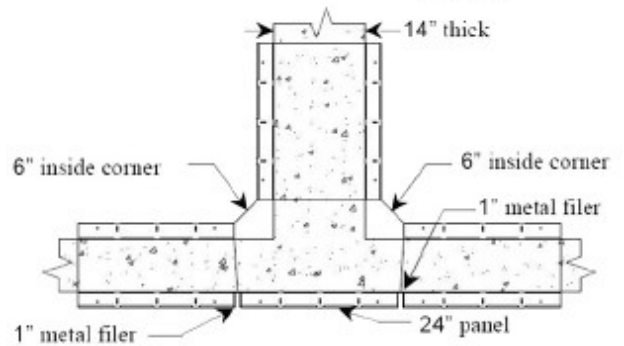
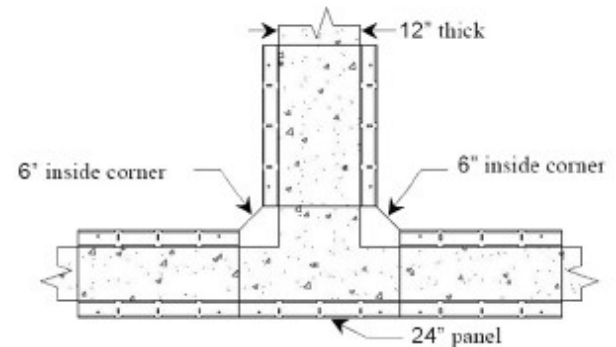
If the perpendicular wall is 14" to 16", you can still form this without any added bracing. This can be done by using a panel with a Steel Filler on both sides of the form. In doing so, you may need to refer to the tie offset section above.

If the perpendicular wall thickness is greater than 16" there are a couple of options. The first option is to use a pre-bent tie on both ends of the back panel. The second option is to use two fillers on the back side of the intersecting wall. The joint of the two fillers should be roughly centered on the intersecting wall and waled and/or braced as needed.

Tie Offsets

While designing the layout of the concrete formwork, there are situations where form joints don't line up with those on the opposite side of the wall. Situations like these can be handled by pulling the tie at an angle to the opposite form joint. The tie can have a 1" horizontal offset for an 8" wall and 2" for 16" wall. The offset to wall thickness ratio must not exceed 1:8. Exceeding this ratio will void the integrity of the tie.

Ties can also have a vertical offset. The same rule applies to the horizontal offset. The ratio of the offset to the wall thickness is 1:8. Exceeding this ratio will void the integrity of the tie.



Basic Form Setting

Form Stripping

Usually form stripping begins once all connecting hardware has been removed. It is easier to begin at a relief point such as an outside corner, metal filer or filler angle connection.

HD Gang Loop Ties are also easy to remove. Remove the Gang Form Bolt, then twist the tie loop and remove the stub.

Remove HD Gang Loop Ties starting at lowest level and work your way upwards. This insures that the form is always supported while workers are on or near the gang form.

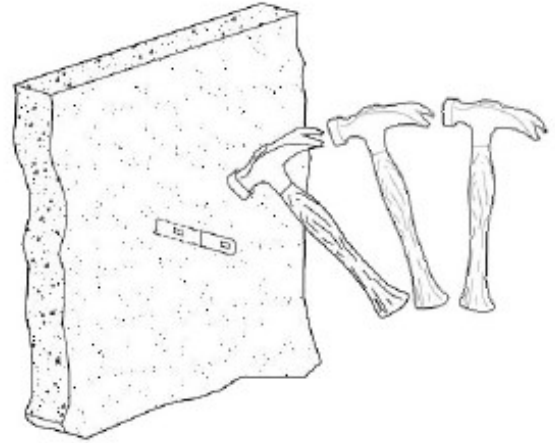


Figure 1. On X-Flat Tie, strike on the edge to break off tie end.

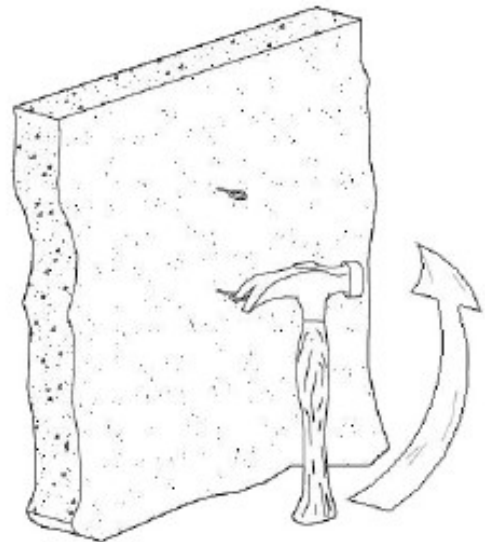


Figure 2. To break loop ties simply twist the loop 3/4 of a turn until the end breaks off.

Pilasters

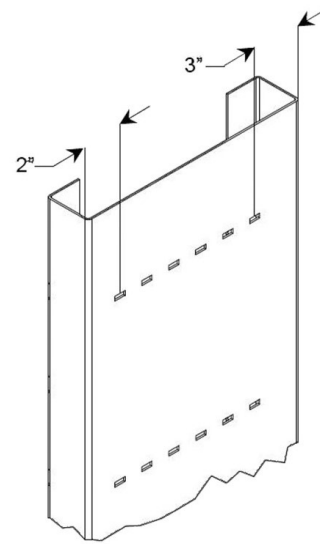
Pilaster Form

Pilaster Forms are all metal forms that are adjustable from 1" to 12" in even and odd increments. The face of the Pilaster Form is punched with slots for the perpendicular panel or filler attachment.

The dimension from the end of the Pilaster Form to the first available slot is 2". The dimensions increase in even increment, such as 2", 4", 6", etc.

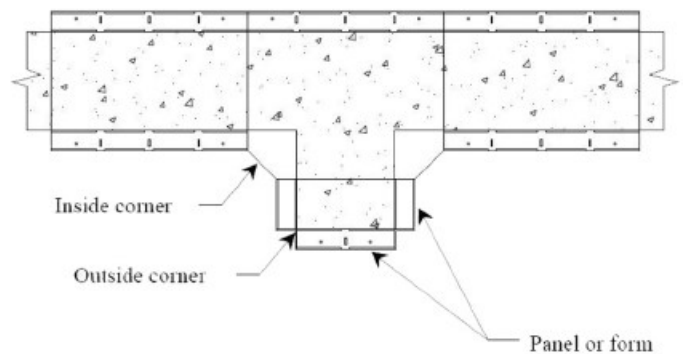
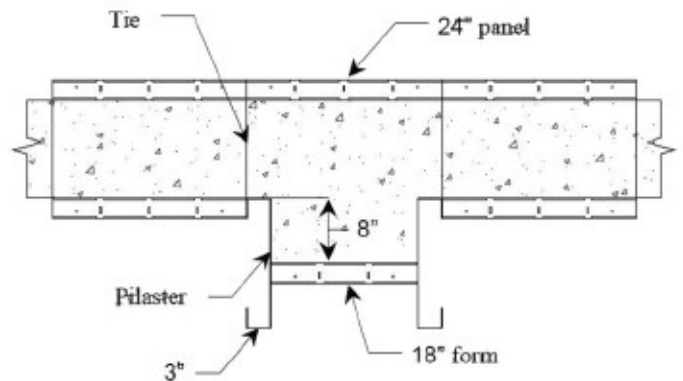
However, if an odd dimension is required simply flip the Pilaster Form. The dimension from the face of this side and the first slot location is 3". These dimensions increase in odd increments, such as 3", 5", 7", etc.

While designing the form layout, it's important to remember the pilaster edge dimension is 3". In order to figure out the size of the form for the back of the pilaster you add the face of the pilaster plus 3".



Pilaster with Panels and/or Fillers

Pilasters can also be formed using standard fillers and/or panels with 6" and/or 4" inside corners. This method of forming pilasters is much like that of intersecting walls. Refer to that section if needed to determine filler sizes and tie layouts.



Walers

Walers

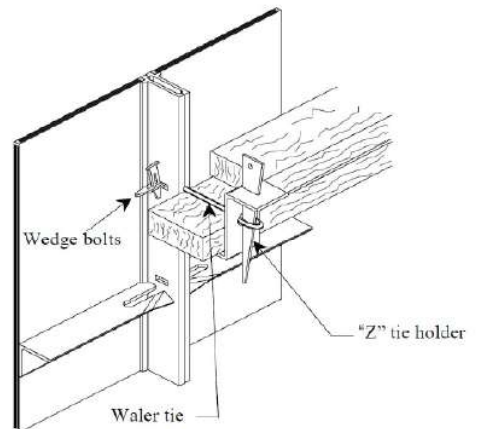
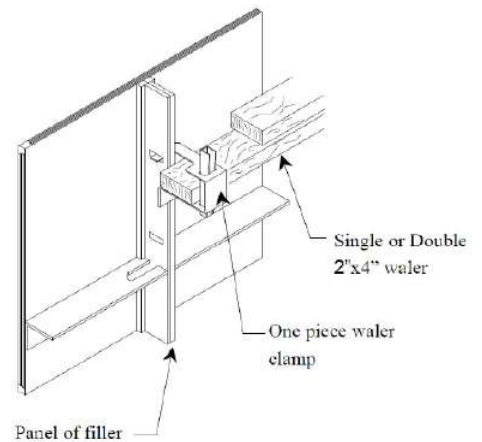
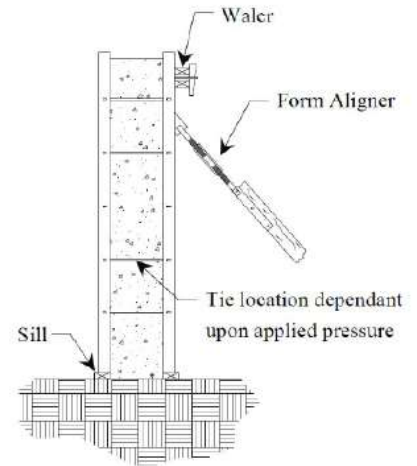
Walers function as an alignment member, keeping forms either straight, or following a predetermined radius. Generally, for walls up to 8'-0" high the walers are attached near the top, at either the 6" or 18" slot location. Once one side of wall is erected and aligned, the opposing forms are brought into alignment through the ties connected between the side rails. No waler is needed on the opposing side.

One-Piece Waler Bracket

The One-Piece Waler Bracket hooks on to any open side rail slot and can be used to attach either one 2"x4" or a double 2"x4" waler.

"Z" Tie Holder

Using a Waler Tie and Z-Tie Holder allows the erector more versatility in hardware use since the Waler Ties come in sizes for use with 2"x4" or 2"x6" lumber. By using the proper tie and Z-Tie Holder combination, lumber can be attached with Wedge Bolts.

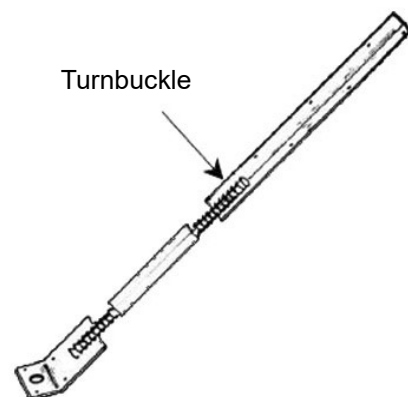
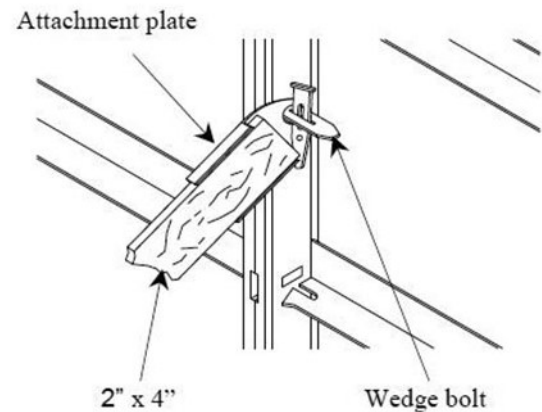
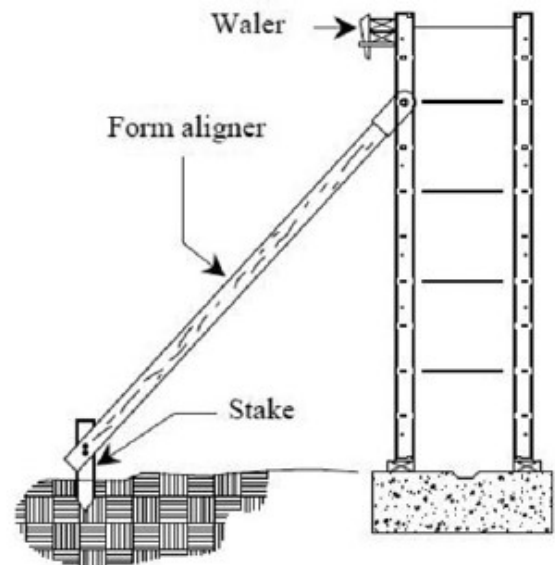


Alignment

Turnbuckles are required to position forms straight and plumb. They are never used to hold concrete pressure or any other load. Depending on forming requirements, there are several methods to align forms.

The first method is steel or wooden stake along with attachment plate and 2x4 lumber nailed together. There's no adjustment with this method of form aligning.

The second method is to use an adjustable HD Turnbuckle form aligner. Once again, an attachment plate and wood aligner are used. However, this method requires HD Turnbuckle to be nailed to the lumber. Use of an HD Turnbuckle allows the contractor to adjust a maximum of 6".

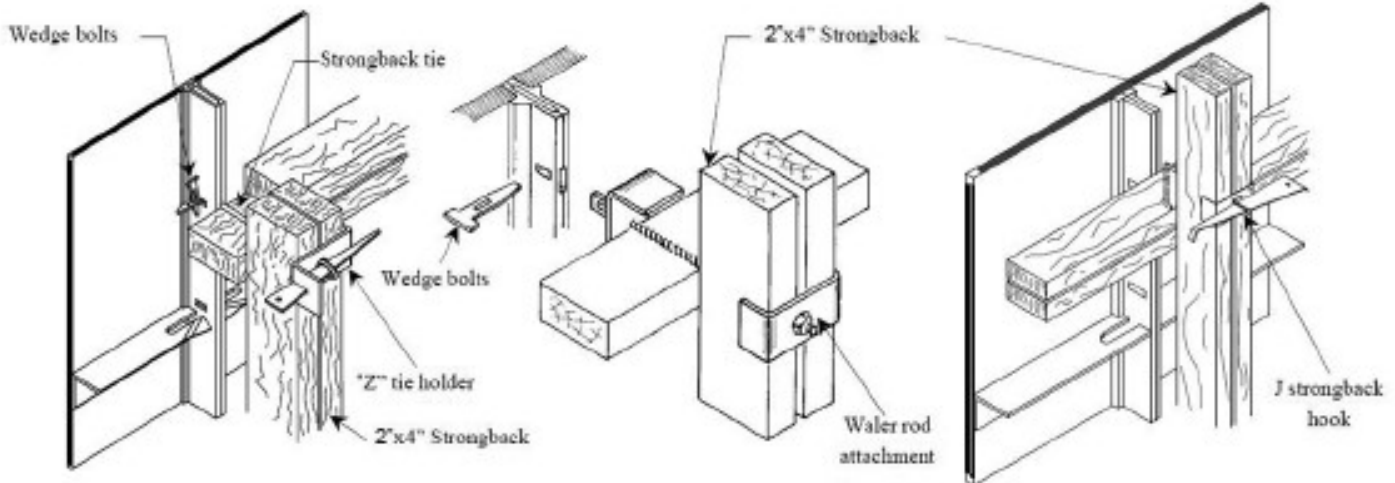
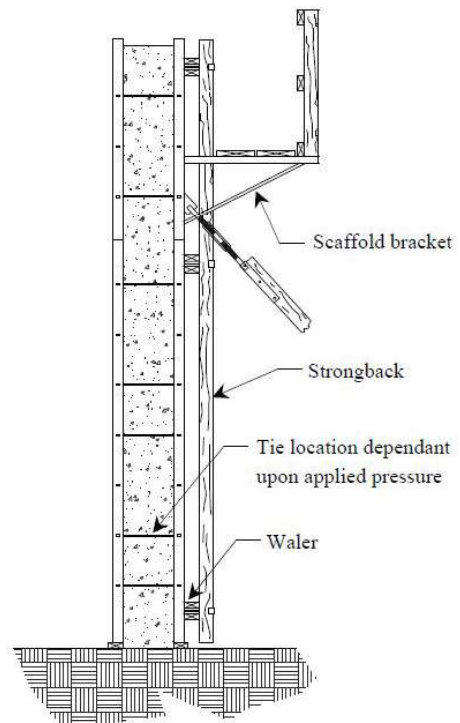


Strongbacks

Strongbacks are used to align forms vertically and typically used on tall walls where multiple forms are stacked. Strongbacks are spaced in 4'-0" increments, typically 8'-0" or 12'-0" centers.)

Strongbacks can be made using either double 2"x4" or 2"x6" lumber. The 2"x6" lumber is used on larger forming projects that require more reinforcement.

Strongbacks are attached using either Strongback Tie with Z-Tie Holder, J-Strongback Hook or Gang Waler Rod with Plate. The Strongback Ties are wedge bolted to the side rail of the form and the Z-Tie Holder is placed over the strongback and wedged through the tie loop. The J-Strongback Hook is placed over the lumber waler and wedged to the lumber strongback. The Gang Waler Rod is wedge-bolted to the side rail of the form and the Gang Waler Plate is bolted over the waler and strongback lumber.



**Z-Tie Holder -
Strongback Attachment**

**Gang Waler Rod -
Strongback Attachment**

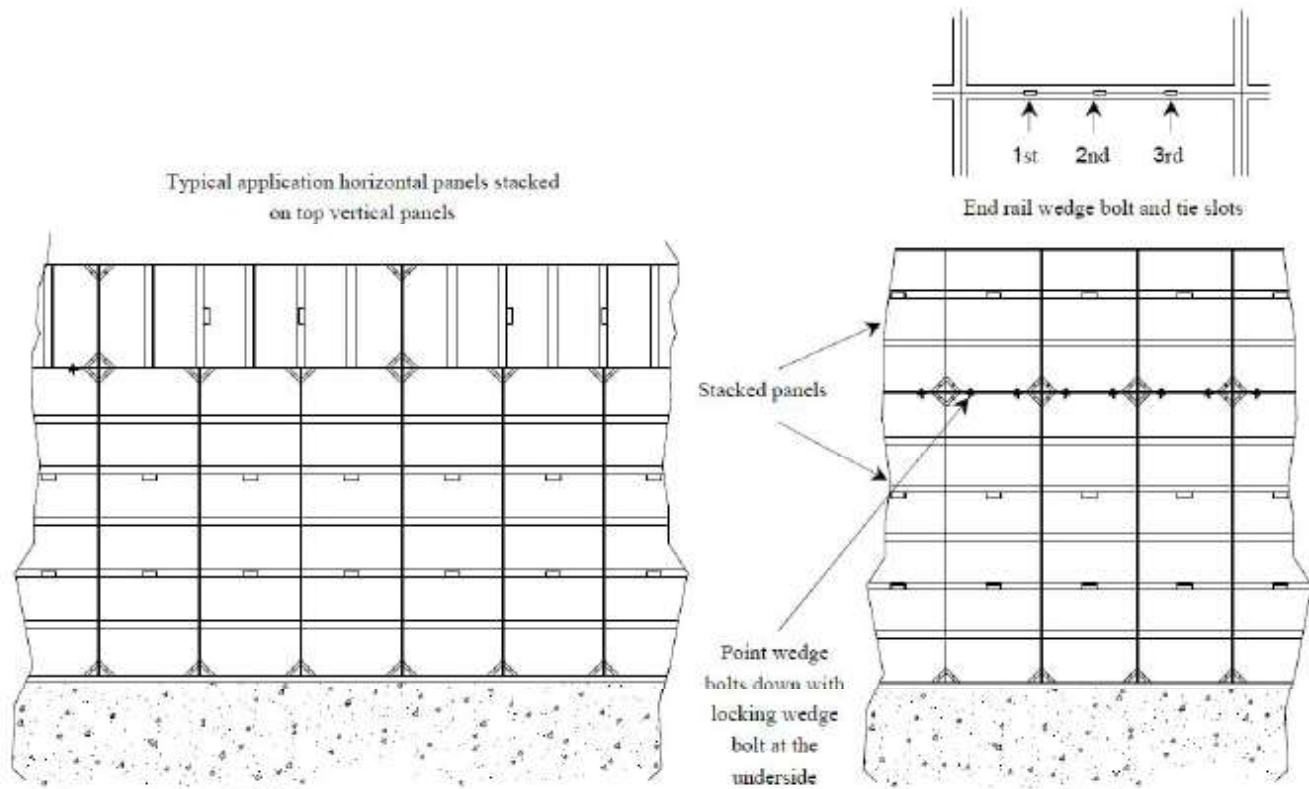
**J-Strongback Hook -
Strongback Attachment**

Stacking

When stacking forms, it's recommended to start at a corner location and work your way across. It is also recommended that the dimensions of the forms being stacked match those below. This ensures that the horizontal Wedge Bolt locations will line up.

Horizontally, use the first and third Wedge Bolt slot to make panel attachment. The center slot is generally used if a tie is required. Once the first stacked panel is connected, repeat the procedure until a sufficient wall area has been framed. The opposing wall should be framed with matching panels so that the tie hole locations match both horizontally and vertically.

To achieve a certain height, panels and/ or fillers can be turned horizontally and stacked on top of vertical panels. Attach in the same manner, remembering to leave slot locations for, walers, Scaffold Brackets and/ or miscellaneous hardware.



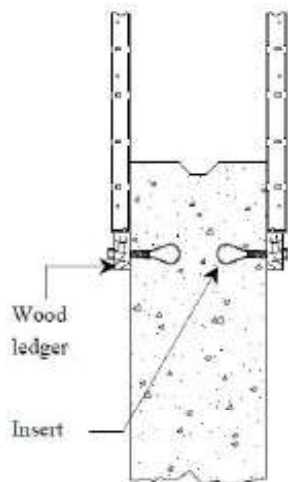
Second Lift

There are a variety of methods used to frame a second pour of higher elevation.

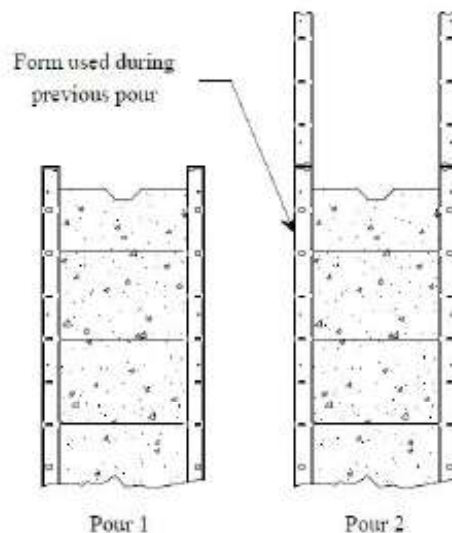
The first is to embed an anchor into the previous pour, strip the forms and attach a lumber sill or ledge to set the next level of forms on. During attachment of lumber, take care maintaining level as there is no final adjustment.

The second method is to leave the top form from first pour attached to wall. The second lift can be erected on top of this form and is fully supported by previous form and ties. Do not remove or break off ties on the top panel because they are used to support the second lift.

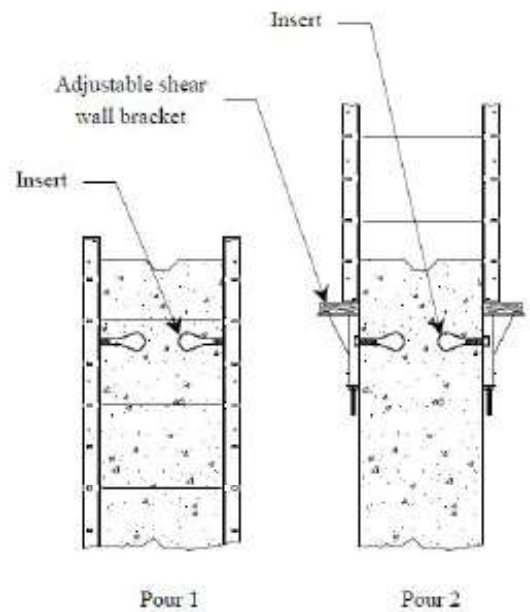
The third method is to embed an anchor into previous pour, strip forms and attach an adjustable landing bracket to wall with bolt. A lumber ledge can be placed onto brackets. This gives you both a landing ledge and leveling ability at the same time. Spacing of bracket/lumber depend on form weight and configuration.



Method #1



Method #2



Method #3

Scaffold Bracket

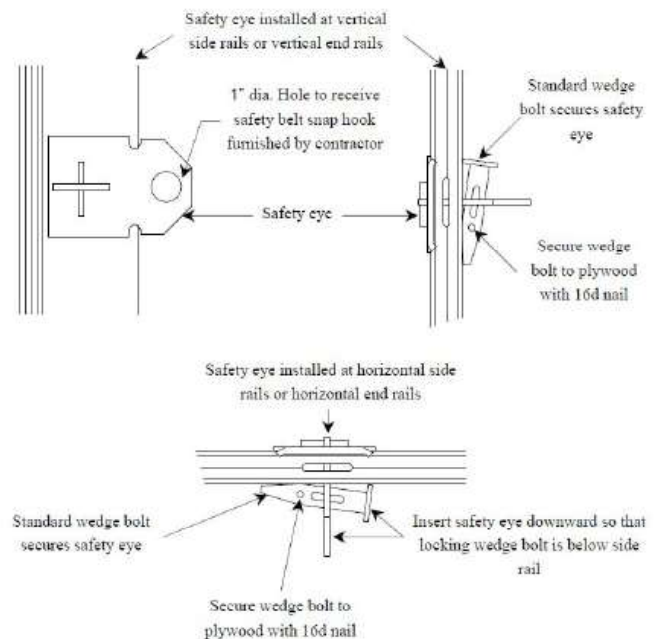
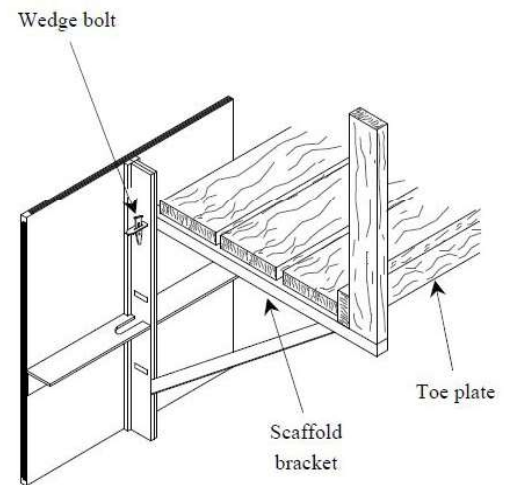
Scaffold Brackets are used in forming situations where personnel are required to work at elevated levels. This scaffold bracket is designed for worker access only and has a rating of 500 lbs. The maximum spacing is 8 ft. on center.

Scaffold Brackets should not be used to support concrete, equipment or construction materials. Each Scaffold Bracket is secured with Wedge Bolts and S-Wedges that has been attached to the bracket.

Scaffold Brackets attach to the forms only, never to ties and the S-Wedge must be used to make connection.

Safety Eye

Climbing formwork is not a recommended or approved practice, but may be necessary in some situations. The safety eye is designed to attach to the SurePly form with standard Wedge Bolts at previously set points and provide a secure hook point for attachment of safety work belts.



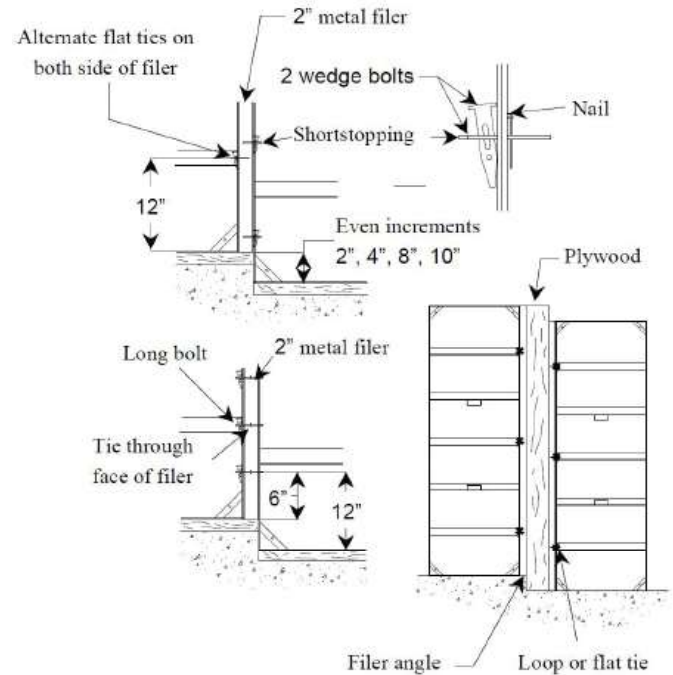
Footing

Offset Footing

Footing pads, slab edge, grade beams can all be framed with the use of footing corner brackets and stake pockets. Attaching two corner brackets using Wedge Bolts top and bottom you can make any size required in 2" increment. The stake plates are attached to top rail of form as required and the appropriate length 3/4" dowel is driven in to ground.

Step Footing

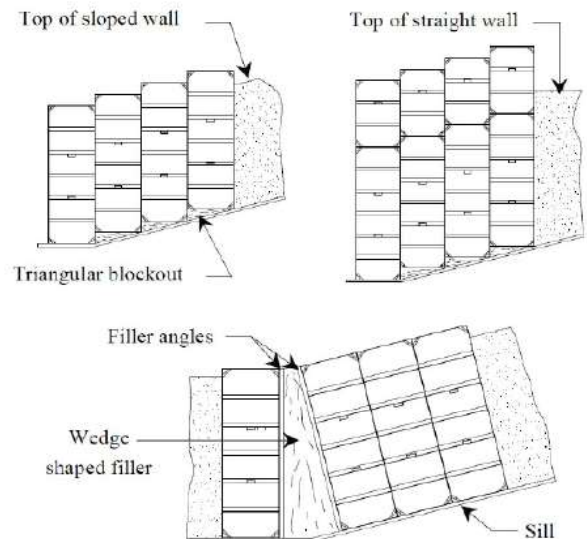
Footing steps usually occur at random locations and vary in heights. If the rise of the steps are 6" or 12" a normal panel connection with Wedge Bolts can be made. Due to scarf tie locations on panels, flat ties may have to be substituted for loop ties where they occur. If the footing drops in a dimension other than 6" or 12", a 2" Steel Filler can be used at this location since the slots are punched at 2" increments. Connections are made with Long Bolts and Wedge Bolts and tie go through the center of the Steel Filler.



Sloped Footing

Sloped footings can be attacked in a couple of ways. Forms could be stepped with a triangular blockout used to create the slope.

Another way would be to rotate the forms perpendicular to the slope. As the forms come down the slope a wedge shaped filler can be used to transition from sloped to straight.



Bulkhead

Bulkhead Forming

Bulkheads can be formed many ways. There are three we recommend. The first method, and probably the easiest, is to Wedge Bolt an Outside Corners to a filler panel. The filler panel acts as a cap for the wall. It's the same size as the wall thickness (ex. 12" wall use a 12" filler panel).

The second method is to cut 3/4" plywood to the width of the wall. Then, nail at least 2 pieces of 2"x4" lumber to the face of panels. Afterwards, compress and lock ties and brace if necessary.

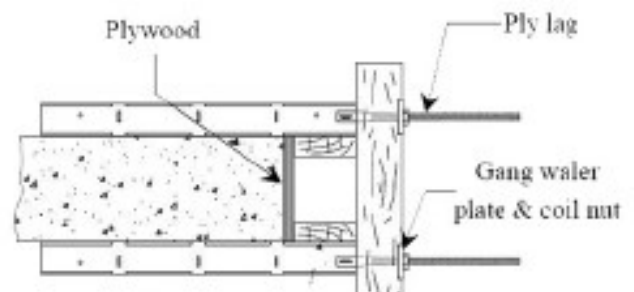
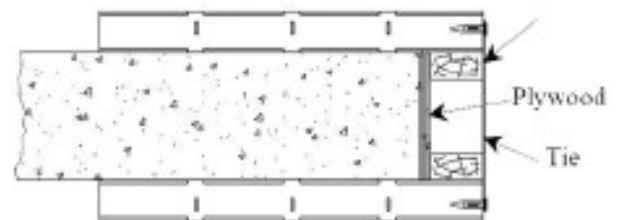
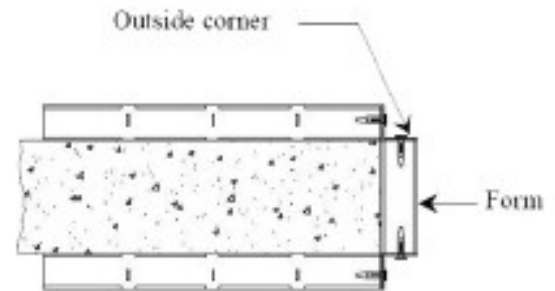
The third method involves the use of Ply-Lags and Gang Waler Plates. Cut desired width of 3/4" plywood and nail vertical 2"x4" 's perpendicular to the plywood. Insert this wall cap between forms. So, looking in plan view now you should see a piece of plywood (ex. 12" strip for 12" wall) with vertical strongbacks supporting the plywood.

Now you need some type of Waler to support the strongbacks. This could be double 2"x4" horizontal Walers. Wedge Bolt Ply-Lags perpendicular to these Walers and lock with Gang Waler Plates and 1/2" Coil Nuts. Ties can still be used to maintain wall width.

Each project is unique some bulkheads have keys, water stop, etc. As to the method you choose, remember to make a strong closure because the pressure is always constant.

Metal Rib

This leave-in-place sheet is typically used to form footings, bulkheads, grade beams, pile caps and blindside walls. The expanded metal sheets are easy to cut, lap, splice, bend and pierce, minimizing related forming costs. When concrete is placed, the ribs and mesh are embedded in the structure, providing a rough surface for subsequent concrete placement.



Column Forming

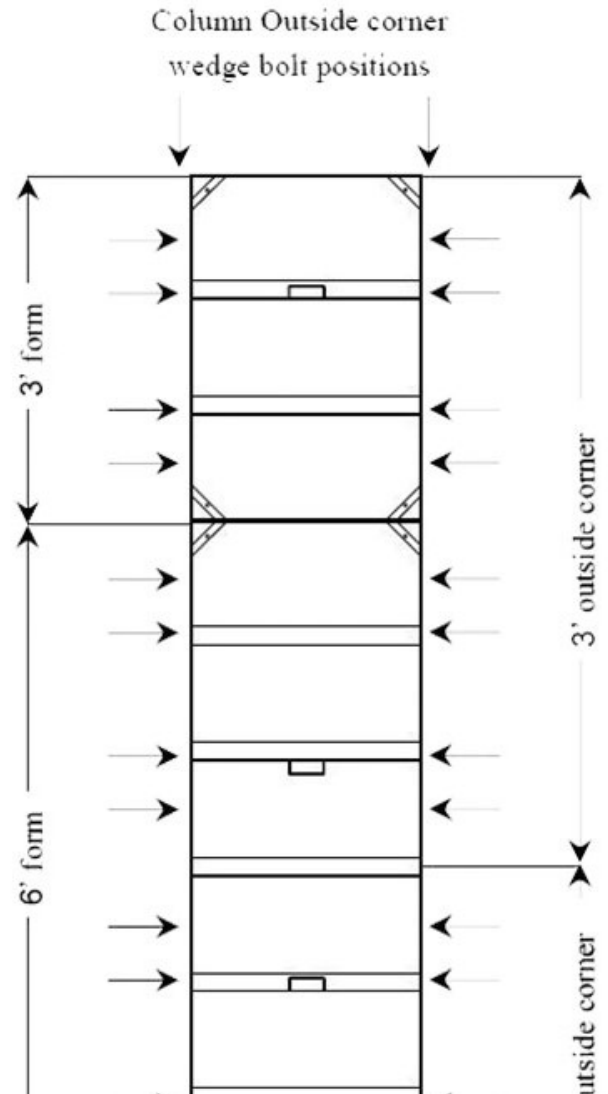
Column forming presents its own set of problems due to the rate of pour and liquid head pressures achieved.

When framing columns the outside corner angles have to be wedge bolted not only at 12" cross-member level, but also at the 6" center locations. Doing so creates a continuous connection along the Outside Corner.

To assist contractors with column forming, SureBuilt has developed both panel and filler column forms with cross-members at 6" centers for additional strength.

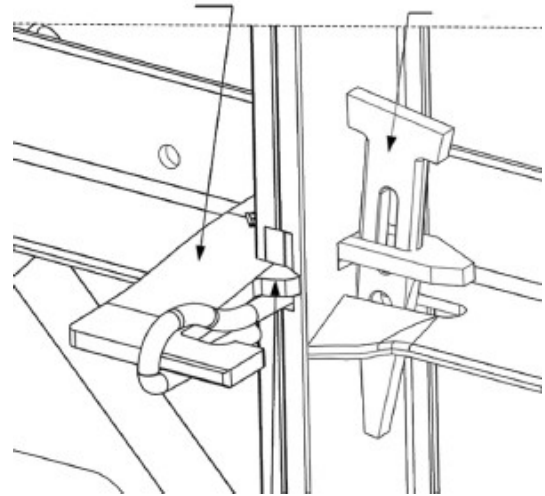
Column Hardware

Column Hinges are used to hinge forms during setting and stripping. Quick Column Hardware, used opposite the Column Hinges, allows the forms to be opened with hardware still in place. Used together, this column hardware speeds column production and increases labor productivity.



Gang Forming

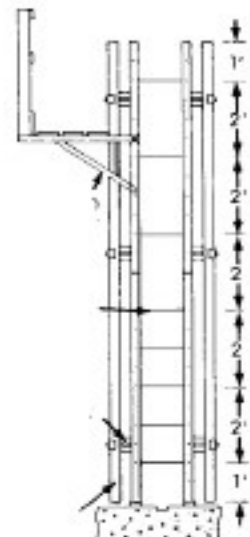
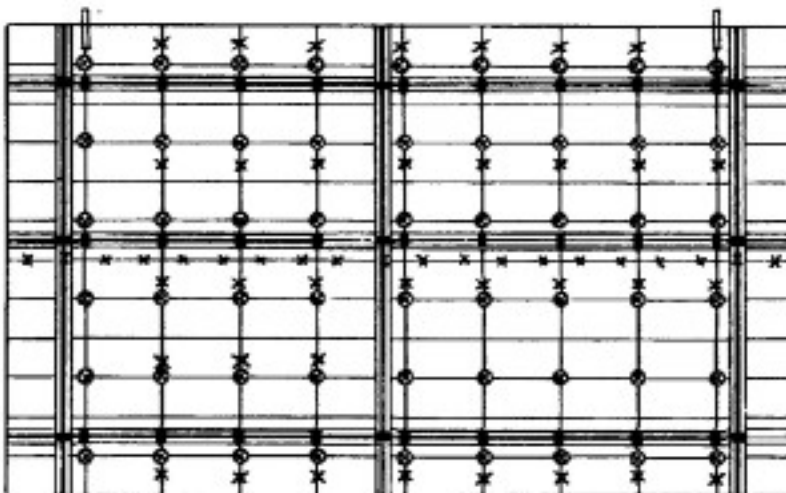
Gang forming uses the same basic hardware as hand set, but provides other advantages. Gangs are assembled on ground, crane-handled into position, reusable without disassembly, and strip as a single unit. Gangs are assembled by placing panels face down on a flat surface. The walers are laid out to fall below the horizontal joints. Wedge Bolt connections are made 6" from corner and 6" from mid-point of side rail. Assembled gangs weigh approximately 7 lbs per sq ft.



Walers and strongbacks are usually 2"x4" lumber, but 2"x6" or 2"x8" lumber is an option. The total depth between waler and strongback should not exceed 12". Since the waler and strongback are for alignment, only few are required, but they should be located as not to interfere with tie placement. The lumber is attached with Gang Waler Rods or J-Strongback Hooks.

The HD Gang Loop Tie extends past the form and connects with a Gang Form Bolt. The Gang Form Bolt is inserted through the form side rails and capture the tie loop. If the short end of tie loop faces up, insert the Gang Form Bolt from the left. If the short end of the tie loop faces down, then insert the Gang Form Bolt from the right. HD Gang Form Ties and hardware can be removed without disassembling the gang units.

- × WEDGE BOLTS TYPICAL
- ⊗ GANG FORM BOLTS
- ▬ WALER ATTACHMENTS TYPICAL
- ▬ STRONGBACK ATTACHMENTS TYPICAL

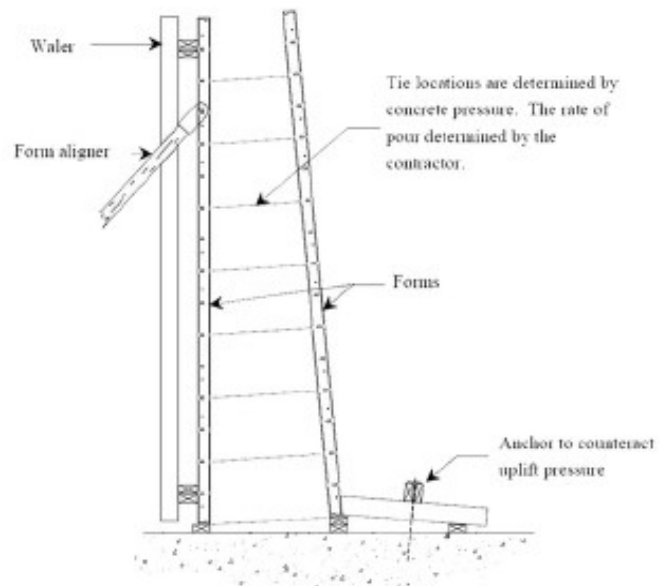


Battered Wall

Battered means one or both sides of walls lean inward. Within the industry, single batter is when one side is straight and the other is leaning in. Double batter is when both sides are leaning in.

Ties vary in length from the longest at bottom to shortest at the top. All framing is the same as normal except battered walls need to be anchored down to compensate for up lift.

Note: Wire ties may have to be bent to fit some battered walls.

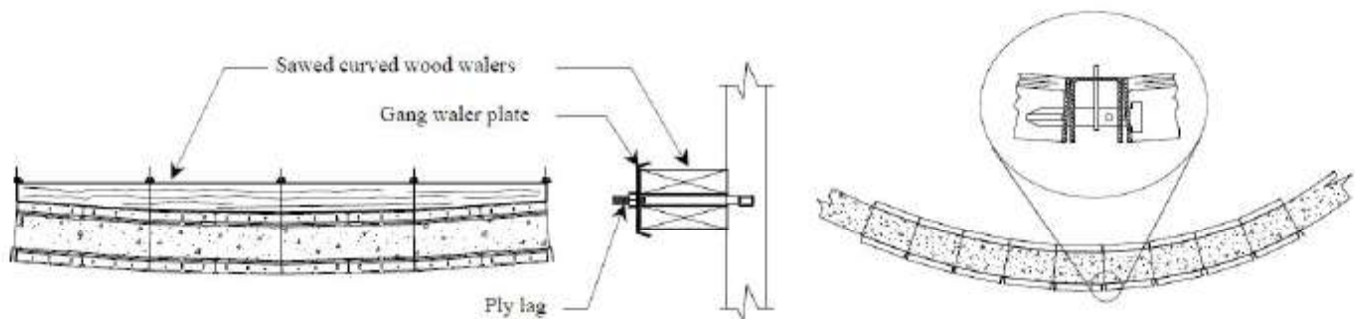


Radius Forming

SurePly can be used to form walls to most radiuses using a combination of panels, fillers and/or smaller steel fillers. The degree of offset or flat tangent, compared to the actual radius, dictates panel size for an acceptable wall finish. This is referred to as the "chord offset" and is typically 1/4" maximum.

The outside radius will be larger than the inside radius. By making up the difference at each panel, tie locations can be maintained directly opposite each other.

Radius walers can be made with lumber and attached with standard SurePly hardware. Saw cut 2"x8", 2"x10" or 2"x12" lumber can be attached with Plylags and Gang Waler Plates.



Bar Support – Wire slab bolsters and high chairs, with optional epoxy-coat, plastic-dip, plastic-tip or plate, to meet almost any slab requirement.

Bridge Deck – Overhang brackets and hangers provide an efficient deck forming solution for precast concrete or steel I-beam bridge structures.

Coil Ties – 2-Strut and 4-Strut designs, in standard and heavy-duty capacities, with optional cones, waterseal or custom combination, for job-built forming.

Dowels – Plates, sleeves, baskets and joint nosings for high-performance concrete floors.

Euro Rod – 15mm and 20mm taper ties, she-bolts, inner ties, washers and wing nuts compatible with European-brand forming systems.

Metal Rib – Leave-in-place, expanded galvanized mesh to form footings, bulkheads, grade beams, pier caps and blindside walls.

Pipe Braces – Contractor-preferred braces, with rated capacities and lengths ranging from 7'6" to 62'6", for almost any forming application.

Precast – Inserts, anchors, connectors and lifting systems for efficient precast concrete production.

Self-Riser – Integrated hydraulic system for multi-story building cores that virtually eliminates crane time.

Shoring – A conventional 12K load/leg system, with base plates, cross braces, screw jacks and U-heads, for productive deck support.

Snap Ties – Ties and brackets, with $\frac{3}{4}$ " plywood and 2x4 lumber, create a simple and effective plywood forming system.

Staybox – A pre-engineered and pre-assembled rebar keyway that simplifies forming at wall and deck intersections.

Stud Rail – A reinforced column-to-deck connection that reduces shearing, transfers load further into the slab and eliminates column capitals.

SurePly™ – An industry-recognized handset system, with more than 80 standard panel and filler sizes, for almost any forming application.

Tilt-Up – A start-to-finish system of lifting inserts, plates and hardware for tilt-up panel construction.

Walers – Double channel walers align panels, carry taper tie loads and maximize the surface area of almost any gang.