



Instructions

Step 1 – Layout from Corner

Establish outside edge of wall by snapping a chalk line. (See Figure 1A) Keep in mind that the SPIDER TIE Concrete Wall system provides either an 8" or 6" thick concrete wall depending on the system you are using. Measure in 8" or 6" and snap an additional Interior wall line to establish your inside corners. From your inside corner mark, measure 3" for your first SPIDER TIE stack. (See Figure 1b) Proceed with recommended layout (See Chart). Continue that layout for the length of the wall finishing with the last SPIDER TIE stack 3" from end of the wall. If the end of the wall is a corner then measure back 3" from that inside corner for your last SPIDER TIE stack.

Layout from Intersections

Starting from the interior perimeter line (or inside of wall) you are intersecting from, measure 3" for your first starter tie followed by the recommended layout. Always finish your layout 3" from an end of wall, inside corner or intersection.

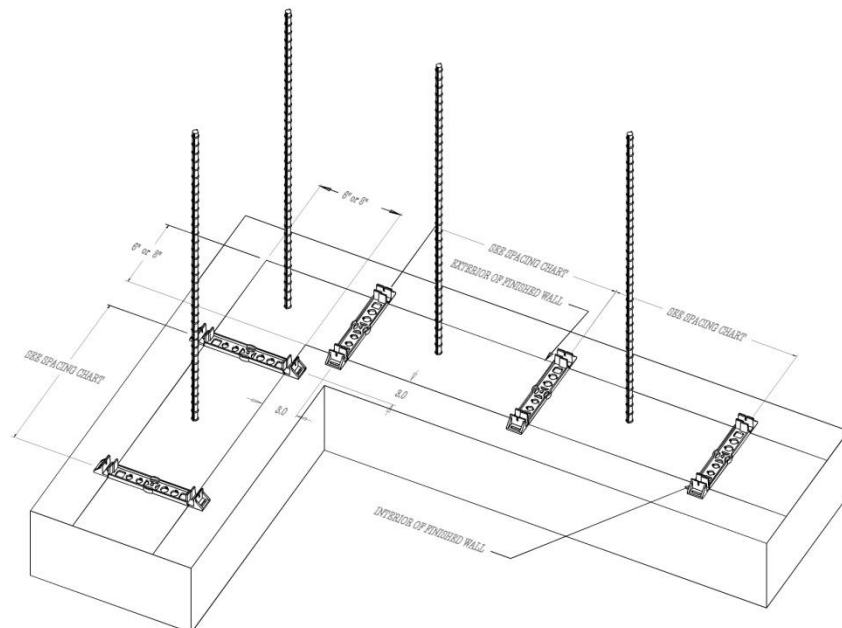
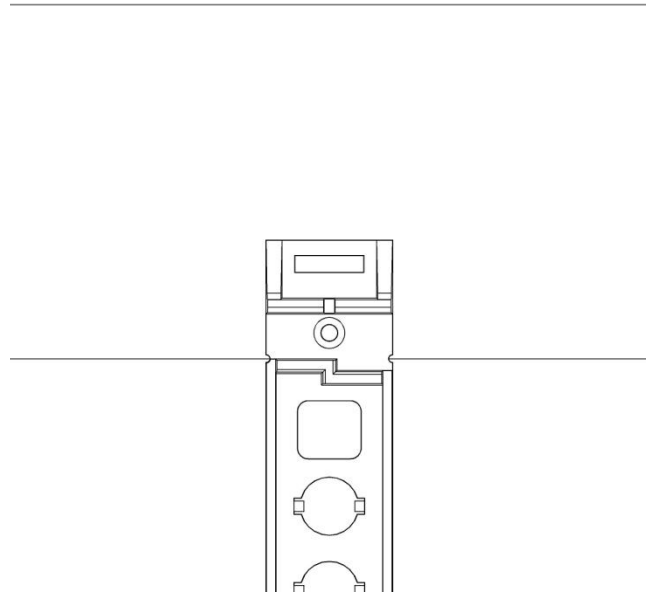


Figure 1A

Step 2 – Placement of Starter Tie

Near both ends along the side of the Starter Tie, you will see a notch. (See Figure 2A) align notch of Starter Tie on your outside perimeter chalk line. This notch represents outside of finish concrete wall. At the same time center all Starter Ties on layout marks. (See Figure 1A) Place a 1 ½" concrete nail in the center hole of the Starter Tie and nail to concrete footing. If an additional nail is needed you may again place a 1 1/2" concrete nail anywhere along the interior portion of the Starter Tie to secure properly. Be sure to keep all Starter Ties perpendicular to chalk line. This will make it easier when it comes time to place plywood panels.

Figure 2

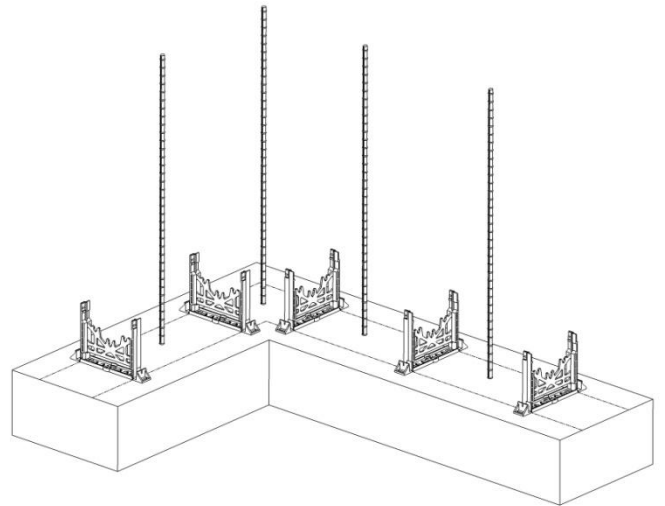


Step 3 – Placement of First Course of SPIDER TIES

Snap one SPIDER TIE into each Starter Tie. Then place your first course of required rebar*. Your first course of rebar will sit approximately 2" off of the footing (See Figure 4)

*Depending on local code you may need to elevate your first course of rebar by tying it off to your vertical bars at the desired height.

Figure 3



NOTE: 'Always consult your structural engineer before starting. Structural Engineer should determine the recommended sizing and spacing of rebar. Spider Tie assumes no responsibility for any structural design and or failure of concrete wall do to inadequate reinforcement

Step 4 – Building SPIDER TIE Stacks

Depending on the spacing of your horizontal rebar, pre-assemble the appropriate number of SPIDER TIES together to achieve the desired spacing. For example: Each SPIDER TIE represents 6" of vertical spacing. If your rebar spacing is 24" apart, you would pre snap four SPIDER TIES together. If your horizontal spacing is 18" apart, you would pre snap three pieces together and so on.* Connect your pre assembled sections to the first course of SPIDER TIES followed with your next course of rebar. Repeat until you reach your finished wall height. Do not exceed 4' in height until you have fully attached your first level of plywood**. After fully attaching the first 4' level of plywood you may continue building your SPIDER TIE stacks to the desired level or until you have reached 8' in height**.

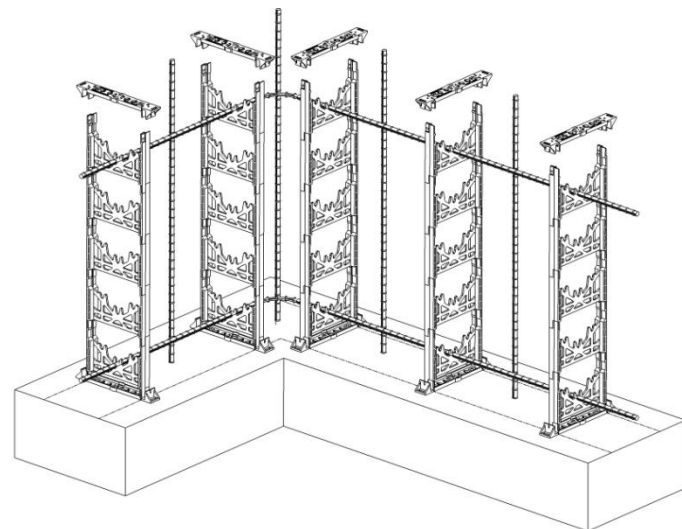


Figure 4

Again fully attach the next row of plywood before continuing on. (For walls exceeding 4' in height see recommended suggestions for additional support) You may stop your stack of SPIDER TIE within 5" from the top of your wall.

*Any dimension between the six inch intervals you will need to fasten horizontal bars to your vertical bars for the desired height.

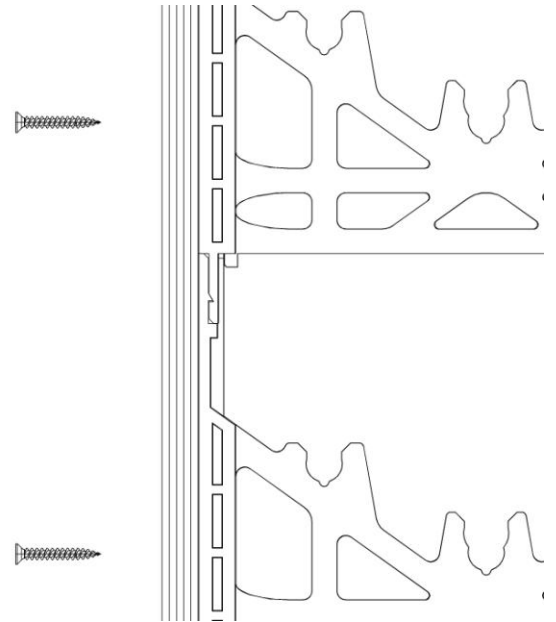
** The alignment tool is designed to be used in 4' intervals. If you are not using the alignment tool you should still fasten all plywood in 4' intervals to insure proper attachment.

Step 5 – Plywood Placement

To achieve maximum support from your SPIDER TIE SYSTEM, it is very important to fasten screws in the right location. Notice that the screw flange is thicker near the lower section of the SPIDER TIE. Fastening the screws there will give you twice the holding power. (See figure 5A for screw locations). The easiest way to achieve this consistently is using the SPIDER TIE Alignment tool (See Figure 5B). This tool holds the SPIDER TIE stack securely while locating the optimum screw locations. Using a #10 x 1 ¼" round washer head coarse thread screw, set the torque control on your drill so as not to over tighten the screw causing it to strip the screw flange (The best type of cordless drill to use is an "impact driver") . Keep in mind the key to maintaining optimum support is the threads ability to grip the SPIDER TIE screw flange. Screw 1 screw into each Spider Tie. Do this on both sides of your forms.

"Snugging"
needed.

Figure 5A



the screw to the plywood panel is all that is

Caution: Do not skip or omit any screw locations. Double check all screw placements before concrete placement. Make sure there are no gaps between your SPIDER TIE stacks and the plywood.

It is recommended that your butt joints do not land on a SPIDER TIE stack. All butt joints should land in between stacks. Bridge all joints with an additional 6" wide piece of scrap plywood. Place a vertical row of screws 6" on center on each side of joint (see figure 5C)

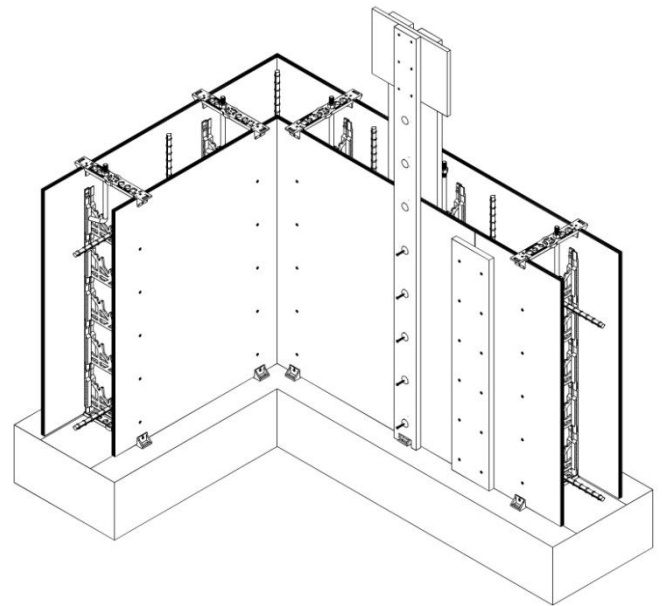


Figure 5B

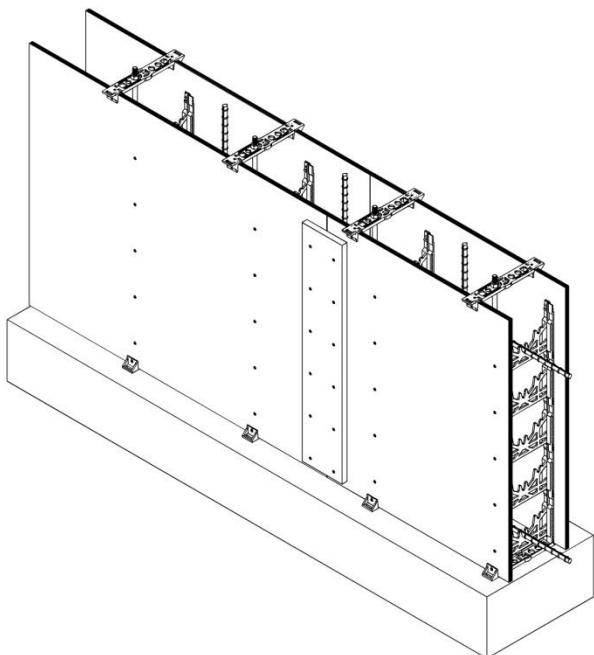


Figure 5C

Step 6 – Finish Ties

Place Starter Ties upside down onto the top edge of your plywood panels. These will temporarily serve as your finish ties. Place them approximately 2' apart. (See Figure 5B) On the 8" starter tie you will notice a pair of 5/8" diameter holes and a pair of 1/2" diameter holes. These holes may be used for anchor bolt placement (See Figure 6). For the 8" walls the outer holes are center line placement for 2 x 4 plates and the inner holes are center line placement for 2 x 6 plates. For the 6" walls both holes are center line of a 2X4. You will achieve perfect placement for anchor bolts every time. Secure all finish ties with screws. You may reuse these starter ties on your next project.

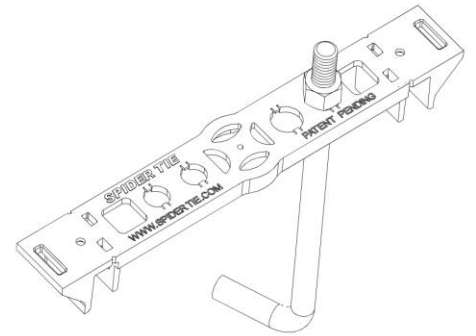


Figure 6

Step 7 – Supporting Details

Outside Corners: The easiest way to provide support for outside corners is to run one of the panels long. Attach a 2x4 to both intersecting panels using a min. of 2 1/2" deck screws at 6" o.c. (See Figure 7A)

Another way to support an outside corner is to wrap the corner with 2 – 2x4's using a min. of 2 1/2" deck screw at 6 o.c. (See Figure 7B)

Inside Corners: No additional support is needed up to 3' in height. For any corners taller than 3', invert the outside corner detail found in Figure 7B and fasten to inside corner.

End Walls & Jumps: Measure the width from outside to outside of forms, cut a piece of plywood at least 3" wider. Attach a 2x4 securely to each edge and fasten to end of form using a min. of 2 1/2" deck screw at 6" o.c. (See Figure 7C)

Supports: Fasten 2 – 2x4's together and secure to the face of the upper section of form to ensure a straight wall. (See Figure 7B) Provide bracing with 2x4 to keep top of wall straight and secure during concrete placement.

(For walls over 4' or in height additional bracing will be required to keep the forms straight and plumb. see manufacture for a recommended suggestion of additional support.)

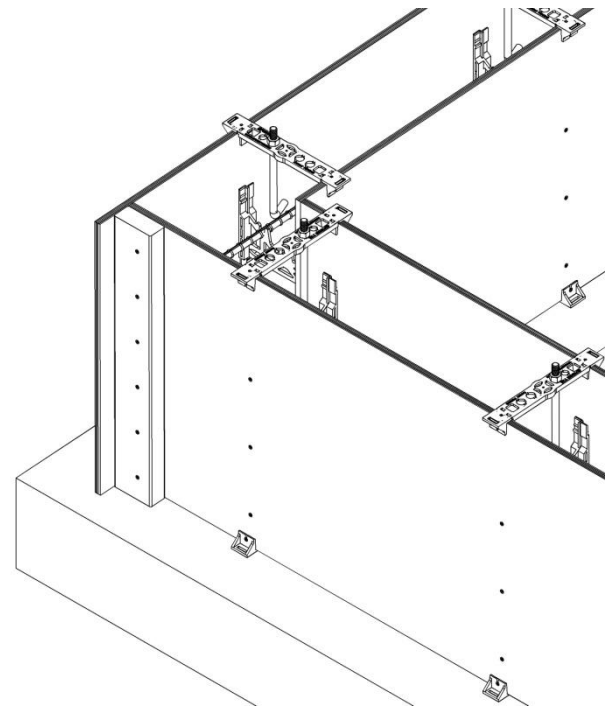


Figure 7A

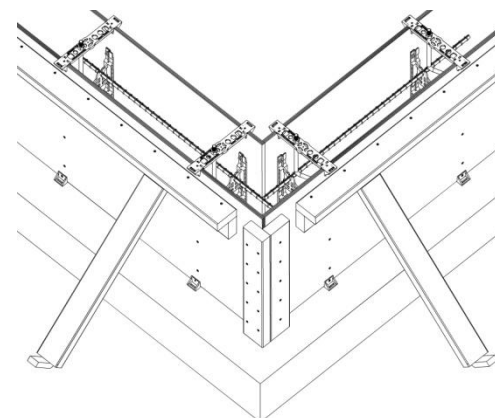


Figure 7B

Whalers: Recommend for walls for 3' or higher or if you are using a boom pump to place concrete*. The simplest form of whaler is a "lag whaler". (See Figure 7D) Using a 5/16 x 15" screw** simply pass the lag whaler screw all the way through the 2x4 whaler on one side of the form through to the 2x4 whaler on the other side of the form. Be careful not to over tighten. This may cause a pinching to the forms. Place your lag whaler screw approximately 3' - 4' on center.

These lag whaler screws may be used in problem areas that may occur during the pour due to defective plywood or improper support. Place a 2x4 block approximately 16" long on both sides of the wall. Using a low rpm ½ drill motor, screw the lag whaler screw through both sides of the forms and slowly cinch the forms back to the proper spacing.

Caution: Be sure to remove these lag whaler screws as soon as possible (wait no longer than 3 hours) from concrete wall. They should easily back out while concrete is still green. Failure to remove these screws within the recommended time period may complicate form removal.

*Boom pumps add increased pressure to forms because the concrete is falling from such great heights. We recommend that you reduce the last section of hose to a 2 ½" line and pour a pea gravel or chip mix. Some batch plants call this a 50/50 mix. This is done so as not to clog the 2 ½" line.

**The screws are available through SPIDER TIE and may be purchased on line or by calling (435) 752-3950.

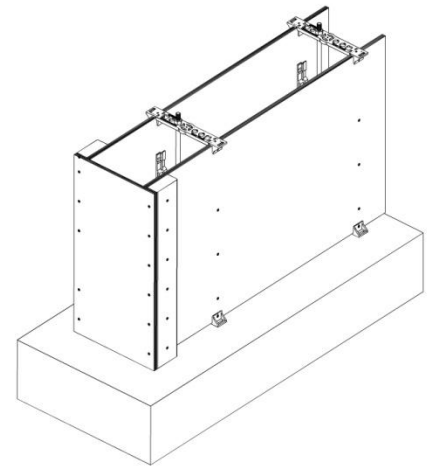


Figure 7C

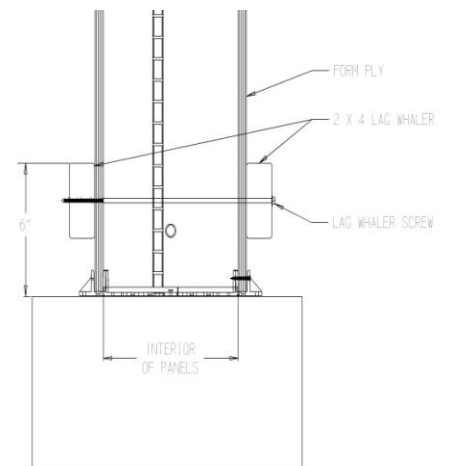


Figure 7D

Step8–Covering Exposed SPIDERTIES

This process is much like taping a drywall joint. Using a self adhesive fiberglass mesh tape, apply evenly over the length of exposed screw flange. Thoroughly coat mesh tape using an E.I.F.S. Basecoat product*. This will provide a bridge over the SPIDER TIES providing a surface that you may plaster over or apply water proofing to. Allow base coat to dry thoroughly before applying any additional coatings.

*Dryvit, Parex, Synergy, and Finestone are just some of the companies that you may find this product.

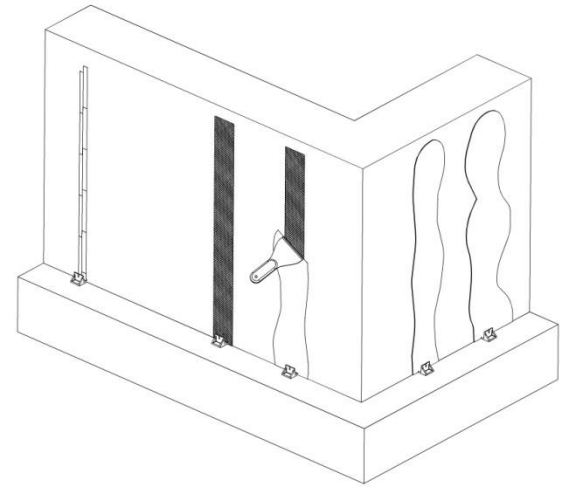


Figure 8

Quantity Chart

Wall Height

Ply Thickness	1'	1'6"	2'	2'6"	3'	3'6"	4'
7/16	1@ 24" o.c.	2@ 24" o.c.	3@ 18" o.c.	4@ 18" o.c.	5@ 16" o.c.	6@ 12" o.c.	7@ 12" o.c.
1/2	1@ 24" o.c.	2@ 24" o.c.	3@ 18" o.c.	4@ 18" o.c.	5@ 16" o.c.	6@ 12" o.c.	7@ 12" o.c.
9/16	1@ 24" o.c.	2@ 24" o.c.	3@ 24" o.c.	4@ 18" o.c.	5@ 18" o.c.	6@ 16" o.c.	7@ 16" o.c.
5/8	1@ 24" o.c.	2@ 24" o.c.	3@ 24" o.c.	4@ 18" o.c.	5@ 18" o.c.	6@ 16" o.c.	7@ 16" o.c.
11/16	1@ 24" o.c.	2@ 24" o.c.	3@ 24" o.c.	4@ 24" o.c.	5@ 24" o.c.	6@ 24" o.c.	7@ 24" o.c.
3/4	1@ 24" o.c.	2@ 24" o.c.	3@ 24" o.c.	4@ 24" o.c.	5@ 24" o.c.	6@ 24" o.c.	7@ 24" o.c.

Concrete Placement

There are several traditional methods of concrete placement that can be used with the SPIDER TIE System.

- ▶ Concrete Pump (different types of pumps: Grout Pump or also known as a Line Pump, Boom Pump)
- ▶ Crane and Bucket
- ▶ Conveyor Belt
- ▶ Direct Off Truck Chute

Practice in the field has shown that often the easiest method for placing concrete is with a concrete pump. When using a concrete “Boom” pump, it is recommended to introduce a reducer (2 ½”-3”) into the hose length, and also to attach double 90° elbow where the flexible hose meets the steel tube. Both attachments will reduce the velocity of the concrete as it is dropped into the forms.

When placing concrete in the SPIDER TIE form system, it is recommended to utilize a 2½”–3” flexible hose for ease of concrete placement.

The speed of concrete placement has many variables that must be considered prior to initiating the filling of the SPIDER TIE form cavity. For example; the linear length of wall, temperature, consistency of concrete mix, height of wall, thickness and type of plywood, and cement content.

Furthermore, the placement rate will vary with the method being utilized to fill the forms. Concrete pour rates shall not exceed the following limitations as set out by the standards of the American Concrete Institute. Pour rates in the following table reflect a 2:1 safety factor as suggested by the ACI. The rates assume a normal density (150pcf[2400kg/m³] or less).

Temperature °F (°C)	Feet/Hour(mm/hour)
40°(°4)	2.2(670mm)
50°(°10)	2.75(840mm)
60°(°15)	3.03(920)
70°(°21)	3.85(1170mm)
80°(°27)	4.41340mm)
90°(°32)	4.95(1510mm)

Concrete placement should begin by placing concrete below the window and door openings such that when the remainder of the wall is filled, a void is not created below the opening. Following placement below the openings, the installer should move to the top of the wall and begin placing concrete in other remainder of the walls starting beside a window opening or not closer that 2’(600mm) to a corner and working around the building in lifts. The lift height is not to exceed 3 feet (1m). (e.g. – For a 9 foot wall, you would pour continuously by moving around the building 3 times, pouring concrete in 3 foot high lifts each time. Be sure that the previous lift has begun to set up and the hydraulic pressure is no long present)

During concrete placement, the installer is directed to monitor the alignment of the wall relative to the string line installed prior to concrete placement. Regular monitoring will make the job of final alignment much simpler following concrete placement. Regular monitoring will make the job of final alignment much simpler following concrete placement.

Concrete Specifications

To ensure that the proper concrete mix is being used, consult your local building department and/or engineer of record for permissible concrete compressive strengths.

Concrete which is to be placed in SPIDER TIE forms must incorporate the following:

1. Maximum aggregate size is $\frac{3}{4}$ " (20mm). However, with the addition of reinforcing steel, the working space within the form unit is limited and a large aggregate will require greater care to ensure proper placement.
2. The recommended aggregate size when using the 6" (160mm) forms is $\frac{3}{8}$ " (20mm), or $\frac{1}{2}$ " (13mm), depending on quantity of reinforcing to be placed in the wall.
3. The recommended aggregate size when using the 8" (200mm) form is $\frac{3}{4}$ " (20mm), or $\frac{1}{2}$ " (13mm).
4. A slump of 5 $\frac{1}{2}$ "–6 $\frac{1}{2}$ " (124–150mm) is desirable. However, increased workability of the concrete mix is achievable so long as the water to cement ratio is not affected. Consult your concrete supplier.

The following considerations represent good building practice and should be adhered to with any concrete work and can be utilized or set aside at the sole discretions of the designer:

1. The contractor must ensure that the concrete producer is providing a product which meets the requirement of the local building code and/or that specified in site specific design.
2. Minimum compressive strength of the concrete shall be as required by code or specification with the compressive strength being measured at 28 days unless otherwise specified.
3. The water / cement ration must be less than 0.60.
4. Use type 10 (type 1 in USA) normal Portland Cement unless otherwise specified. Supplementary cementing materials can be incorporated into the mix design. The contractor must insist that the concrete producers supply proof that the final concrete quality will not be altered if the producer replaces portions of the Portland cement with supplementary cementing materials. Concrete mixtures utilizing supplementary cementing materials may increase form pressure and have a lower strength rating.
5. Concrete admixture can be used for special applications, under strict compliance with the engineers' specifications.

Consolidation of Concrete

Each layer of concrete must be properly consolidated to ensure the reinforcing bars and webs are properly embedded, and also to eliminate honey-combing. Each successive lift must be properly consolidated with the previous lift to ensure that no cold joints occur. The most critical issue affecting the amount of consolidation that is required is the slump of the concrete mix being placed. A low slump concrete wall will require additional work to properly consolidate the concrete.

Improperly consolidated concrete can result in: water leakage through the wall due to voids in the concrete; insufficient wall strength due to lack of concrete; and other indications of sub-standard work.

Consolidation of concrete can be accomplished in several different ways.

- ▶ Hand Rodding
- ▶ Internal Vibration
- ▶ External Vibration

CONSOLIDATION MUST ALWAYS BE ACCOMPLISHED IN LIFTS AND NOT AN ENTIRE WALL AT ONE TIME. THE MAXIMUM RECOMMENDED DIAMETER FOR A VIBRATOR IS 1" (25 MM) OR LESS AND MAXIMUM HORSE POWER RATING OF 1 HP.

EXPERIENCE HAS SHOWN THAT LARGER SIZED VIBRATORS CAN GET CAUGHT IN THE WEBS AND REINFORCING BARS, AND ALSO CREATE UNWANTED ADDITIONAL FORM PRESSURE LEADING TO THE INCREASED POTENTIAL OF FAILURE OF THE FORMS.

There are many internal vibrators on the market. The installer must determine the vibrator that has the best balance of frequency and amplitude for his practice in the field.

Care should be taken when using concrete vibrators to use proper consolidation technique that will consolidate from the bottom of the form towards the tops. The objective of consolidation is to remove entrapped air inside the wall, in the freshly poured concrete. The technique to do this is to insert the head of the vibrator "fast-in" to the bottom of the wall and remove it "slow-out". Pulling the vibrator up slowly helps move the entrapped air up to the surface. In ideal conditions, pull out the vibrator at a rate of 3" per second and always keep the vibrator moving.

Many smaller construction projects do not have internal vibrators on site. For these sites, it is necessary to provide an alternative method of consolidating the concrete. Hand rodding can be used as an effective method of consolidation. As the form is being filled, hand rodding should provide effective manipulation of the concrete such that proper rebar embedment is achieved.

Another method for consolidation is external application of an activity that will effectively accomplish the same result of embedding reinforcing and filling any voids.

Completion of Concrete Placement

If the SPIDER TIE System is to be continued for further stage of construction, it is recommended that the initial placement not be finished at the top of the wall. Leaving the concrete rough and unfinished will provide a better bond between successive lifts.

Reinforcement required to bridge cold joints may be specified by shop drawings or by local codes. When the wall continues for further stages, it is also recommended to leave the concrete approximately 8" (400 mm) from the top of the wall so that the top half of the web is exposed above the concrete. This will allow the installer to tie down the first course of the next stage of construction if necessary.

When the wall will not be continued for further stages of construction, the concrete will need to be finished at the top of the wall to provide a relatively smooth surface. Typically, the wall will have a wood plate installed in conjunction with anchor bolts to provide attachment for floor joists, or roof trusses / rafters. Anchor bolts can be placed following finishing of the wall according to local building codes requirements for anchorage. Before the fresh concrete has begun to cure, the walls should be rechecked for plumb and then necessary adjustments made.

Above Grade Walls

The installation of SPIDER TIE System above grade is essentially the same as for below grade applications. However, due to different loading conditions, the reinforcing patterns and the form size may be somewhat different. Above grade walls will likely contain more windows and door openings than below grade walls or foundation walls.

The design of above grade wall is also subject to seismic loads, wind loads, snow loads and super imposed loads from the roof and additional floors, etc.

Care should be taken to identify and address the load conditions that have an impact on the wall design. They are influenced from size, wall heights and the reinforcing design in the wall, around all the openings and under point load locations such as: beams; girder trusses, etc.

In most cases, the form size for above grade walls may be smaller than the below grade forms. This means a transition in form size and this may be accommodated in the floor intersection detail.

Note: All openings greater than 2' (610 mm) in width will require additional reinforcing at the sides, below and over the opening.

***REFER TO LOCAL BUILDING CODES FOR REGULATIONS OF REINFORCING ABOVE GRADE.**

****CHECK WITH LOCAL BUILDING CODES FOR ANCHORAGE OR DESIGN REQUIREMENTS CONNECTING THE TOP OF THE WALLS TO THE ROOF SYSTEM. A VARIATION OF ANCHORS AND STRAPS WILL BE REQUIRED TO BE INSERTED INTO THE CONCRETE.**

Additional Notes:

OSB is not a recommended form ply.

If you have any additional comments or questions, please contact our main office:

Phone: (435) 764-2255 Fax: (435) 755-2961 Email: greg@spidertie.com Website: www.spidertie.com

Placement Checklist

The following checklist is supplied by SPIDER TIE to assist the installer to complete a number of post-placement checks and procedures prior to leaving the project job site. SPIDER TIE encourages the installer to exercise its use on each installation.

DATE: _____ **FOREMAN:** _____ **JOB:** _____

- Is wall straight?
- Has concrete been properly consolidated?
- Have all tight areas such as joist/beam pockets, vents and windows been consolidated?
- Has wall been check for level and plumb?
- Has wall been checked for line?
- Have anchor bolts been placed?
- Has concrete been cleaned from alignment/scaffold system?
- Has concrete been cleaned off slab/footing?
- Have tools been cleaned?
- Have walls been re-checked for straight and level and plumb?

This listing is not meant to cover all aspects of review that an installer might complete to have successful SPIDER TIE Wall System installation. Because SPIDER TIE has no control over installation, workmanship, accessory materials or conditions, or application, no responsibility or expressed warranty, either as to merchantability or fit ness for the particular purpose is made as to the performance or results of an installation using the SPIDER TIE Concrete Wall Forming System.

IF THE WALLS ARE TO BE BACK FILLED PRIOR TO THE FIRST FLOOR BEING INSTALLED, THE CONTRACTOR MUST ENSURE THAT ADEQUATE BRACING IS FURNISHED TO WITHSTAND THE PRESSURE OF THE BACKFILL ON THE WALL.

Pre-Placement Checklist

The following check list is supplied by SPIDER TIE to assist the installer prior to placing concrete in the SPIDER TIE Wall System. SPIDER TIE encourages the installer to exercise its use on each SPIDER TIE installation.

- Has all form support been installed?
- Were elevation changes properly handled?
- Are walls according to layout?
- Is alignment/scaffold system installed properly?
- Are scaffold planks secured?
- Are all openings installed?
- Has reinforcing been placed around all openings?
- Have anchor bolts or nails been provided for buck anchorage?
- Have bucks been secured to the wall?
- Are all service penetrations installed?
- Have all SPIDER TIES been checked for proper screw placement?
- Have all corner forms been secured?
- If lag whalers are being used, have they been properly installed?
- Have beam pockets been provided?
- Has floor system anchorage been installed?
- Is reinforcing in place as specified?
- Is wall straight?
- Are all "finish ties" secure and placed at a maximum 24" o.c.?
- Is tool available for consolidation on site? (vibrator, hand rod etc.)
- Are strapping and screw guns available in case of a blowout?
- Has proper strength concrete been ordered per code or engineer?
- If placing direct from chute, is there room for truck to maneuver?

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