

Aluminum Beam Gang

Adaptable Form Support



Aluminum Beam Gang is an adaptable wall forming system, utilizing components from several Symons by Dayton Superior concrete forming systems. With two beam sizes, two waler sizes, and two capacities of ties, a wide variety of beam spacings and tie patterns can be accommodated.



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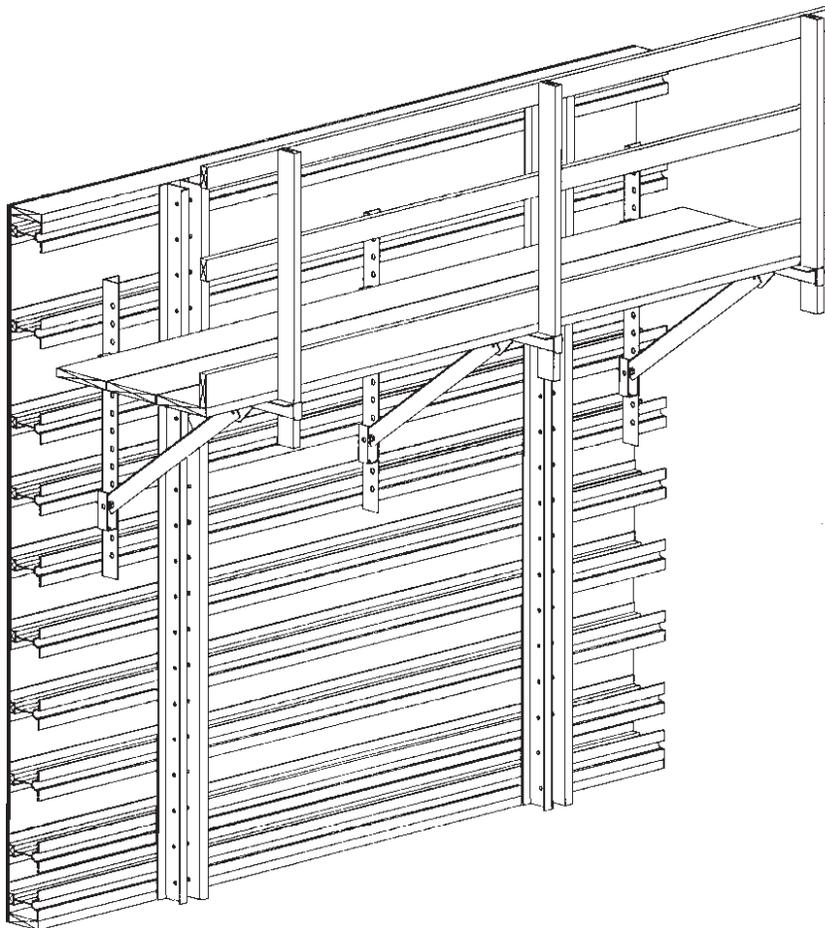
I. INTRODUCTION

The Symons Aluminum Beam Gang Form is a composite wall forming system, utilizing components from other Symons systems. At the heart of this system are Symons Aluminum Beams, or Aluminum Joists, which have a very high strength-to-weight ratio. The Aluminum Beams (or Joists) are fastened to Versiform® Steel Walers by means of our unique Beam Attachment Clamps. A suitable plywood is attached to the resulting rigid, compact, and lightweight lattice; thus, becoming the basic gang form.

A unique feature of the Aluminum Beam Gang Form is the Transition Bracket. This bracket allows the Alu-

minum Beam Gang Form to mate with components of other Symons wall forming systems. The proven versatility of Steel-Ply® and Versiform accessories can thus be utilized with the Aluminum Beam Gang Form, to achieve a wide range of forming conditions, such as corners, pilasters, bulkheads, core walls, curved walls, and other configurations.

Since Symons has two aluminum beam sizes, two waler sizes, and two capacities of ties available for use on the Aluminum Beam Gang Form, a wide variety of beam spacings and tie patterns can be utilized. The Symons Form Designer is available to help with the selection of the components that will best fulfill the requirements of the particular job conditions.



II. COMPONENTS

A brief description and the use of each component of the Symons Aluminum Gang Form is listed below, along with applicable illustrations.

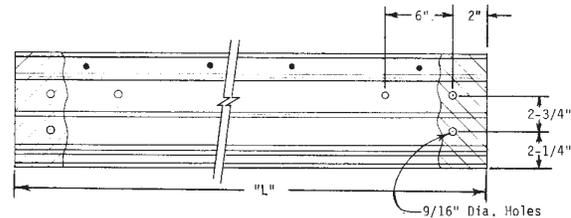
A. PLYWOOD

Plywood selection is the beginning point of all aluminum beam gang design considerations. Pour pressure and the vertical spacing of the horizontal aluminum beams are controlled by the plywood that is selected for use on the gang form. To best utilize the strength of the Symons Aluminum Beam or Aluminum Joist, Symons recommends the use of $\frac{3}{4}$ inch plywood. The six commonly used types of plywood (listed in order of increasing strength) are Plyform, Class I; B Matte Formguard; A Matte Formguard; Regular Formguard; Premium Formguard and All Finnish Birch. The number of reuses is also a consideration in the selection of the plywood. The list of plywood below is also in order of increasing number of reuses.

Using the above types of plywood with Symons Aluminum Beams at 12 inches center-to-center, produces a working range of pour pressures from 735 pounds per square foot to 1500 pounds per square foot. Decreasing the vertical spacing of the Symons Aluminum Beams will increase the pour pressure range; while increasing the vertical spacing of the aluminum beams will decrease the pour pressure range. See table below.

B. ALUMINUM BEAM

Symons Aluminum Beams come in wide range of lengths - from four feet to 30 feet, in increments of two feet - and with a section height of $7\frac{1}{4}$ inches (the same height as dressed 2 x 8 lumber). Extruded from high-performance aluminum alloy, these aluminum beams have 5-inch wide flanges to provide maximum stability, and support for the plywood. A nominal 2 x 2 nailer strip is provided in the top flange for plywood attachment. The nailer strip is flush with the top flange so that the entire flange supports the plywood. The bottom flange has a channel formed in it to accommodate the Aluminum Beam Clamp. The Symons Aluminum Beam weighs only 4.6 pounds per lineal foot, including nailer strip.



ALUMINUM BEAM II

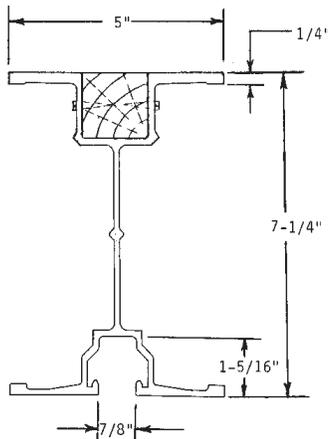
ALUMINUM GANG FORM SYSTEM ENGINEERING DATA PLYWOOD SUPPORT

PLYWOOD--TYPE AND THICKNESS WITH FACE GAIN PERPENDICULAR TO ALUMINUM BEAMS OR JOISTS	TOTAL ALLOWABLE PRESSURE (PSF)* DEFL. LIMITED TO L/360 SYMONS ALUMINUM BEAMS OR JOISTS SPACED O.C.			
	4' X 8' OR 4' X 10' SHEETS	8"	12"	16"
3/4" Plyform Class I**	1,650	735	370	
3/4" B Matte Formguard**	1,430	885	445	
3/4" A Matte Formguard**	2,065	1,000	475	
3/4" Regular Formguard**	1,430	855	445	
3/4" All Finnish Birch	3,360	1,500	840	

*Data based on new plywood, first use.

** Information source: Simpson Timber Company (Formguard is a registered trademark of Simpson Timber Company).

The Aluminum Beam serves as a horizontal load-gathering member in the Symons Aluminum Beam Gang Form. Plywood is attached to the top-flange side of the aluminum beam to provide the form face of the gang; while on the bottom-flange side, Versiform® Walers are attached for vertical load gathering.

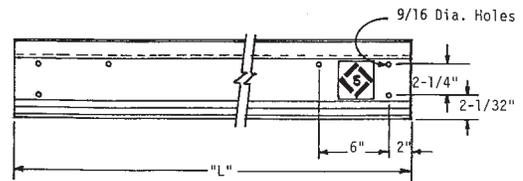


STANDARD LENGTHS

"L"	Prod. Code	Weight	End Color
4' - 0"	36804	18.4 lbs.	Dark Blue
6' - 0"	36806	27.6 lbs.	Medium Brown
8' - 0"	36808	36.8 lbs.	Red
10' - 0"	36810	46.0 lbs.	Avocado Green
12' - 0"	36812	55.2 lbs.	Tan
14' - 0"	36814	64.4 lbs.	Yellow
16' - 0"	36816	73.6 lbs.	Dark Grey
18' - 0"	36818	82.8 lbs.	Gloss Black
20' - 0"	36820	92.0 lbs.	Gold
22' - 0"	36822	101.2 lbs.	Light Blue
24' - 0"	36824	110.4 lbs.	Gloss White
26' - 0"	36826	119.6 lbs.	Orange
28' - 0"	36828	128.8 lbs.	Bright Green
30' - 0"	36830	138.0 lbs.	Light Yellow

C. ALUMINUM JOIST

The Symons Aluminum Joist is extruded from the same high-performance aluminum alloy as the Symons Aluminum Beam. The Aluminum Joist, with its competitive section height of 6½ inches, and flange width of 4 inches, offers a lighter weight alternative (3.6 pounds per lineal foot, including nailer) to the Symons Aluminum Beam. The same 2 x 2 nailer is used in the top flange, while the bottom flange channel accepts the same aluminum beam clamping system. These aluminum joists are available in lengths of 5 feet to 21 feet, in 2-foot increments.

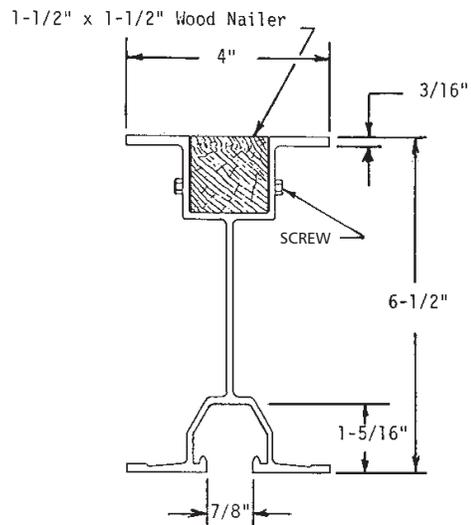


ALUMINUM JOIST

The Aluminum Joist is used as a horizontal load-gathering member in the system, as is the beam.

Standard Lengths

"L"	Prod. Code	Weight	End Label P.C.
5'	36941	18.00	99105
7'	36942	25.20	99107
9'	36043	32.40	99109
11'	36944	39.60	99111
13'	36945	46.80	99113
15'	36946	54.00	99115
17'	36947	61.20	99117
19'	36048	68.40	99119
21'	36949	75.60	99121



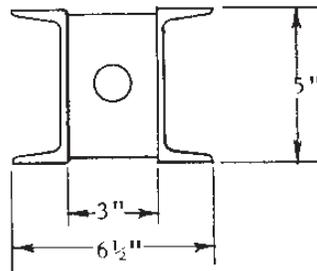
D. WALERS

Two sizes of steel walers from the Versiform system are available for use in Aluminum Beam Gang Form System, double 5-inch channel, and 8-inch double channel. These are used as load-gathering vertical walers, and have a variety of accessories attached to them.

The 5-inch Versiform Waler consists of a pair of 5", 6.7 plf, channels. A 3-inch wide space between channels is formed by gusset plates. This space provides an opening through which ties can be placed. Holes, 11/16-inch in diameter, are punched in the webs of both channels, along the center line at 6-inch intervals. These holes serve to facilitate the attachment of the waler to the gang; and, to attach accessories to the waler. The 5-inch waler is available in lengths of 4, 6, 8, 10, 12, and 16 feet.

Size	Product Code	Wt. (lbs.)
4' - 0"	33350	55.8
8' - 0"	33351	110.48
10' - 0"	33352	137.12
12' - 0"	33362	165.16
16' - 0"	33353	218.44

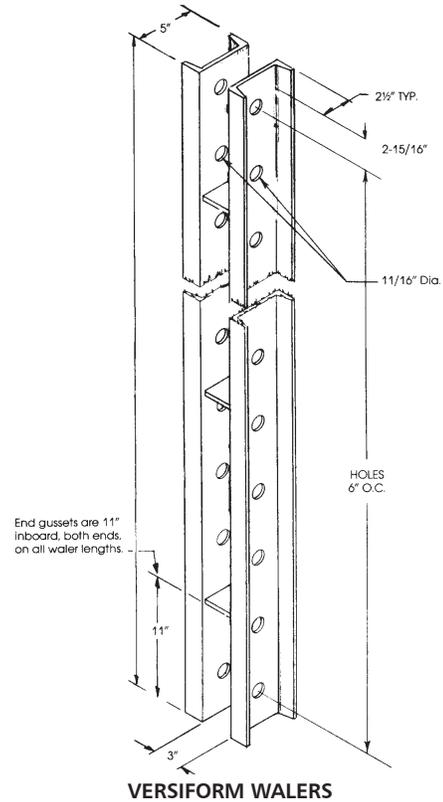
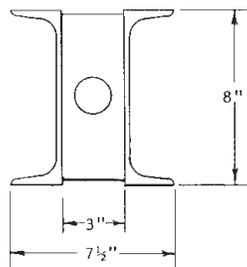
5" CHANNEL WALERS (PAIR)



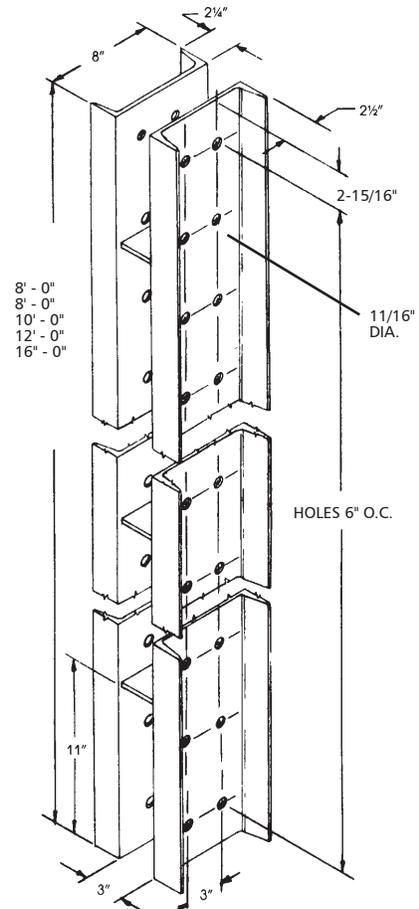
The 8-inch Versiform Waler, consisting of a pair of 8", 11.5 plf channels, is constructed in a manner similar to the 5-inch waler. However, instead of a single row of holes along the center line of the web, the 8-inch waler has a double row of holes. The 8-inch waler is available in lengths of 4, 8, 10, 12 and 16 feet.

Size	Product Code	Wt. (lbs.)
4' - 0"	33545	91
8' - 0"	33546	184
10' - 0"	33547	230
12' - 0"	33548	276
16' - 0"	33549	368

8" CHANNEL WALERS (PAIR)



VERSIFORM WALERS



E. TIES

Currently, two types of ties to be used with the 5-inch waler, both having an ultimate load rating of 50,000 pounds. There is one type tie available for use with 8-inch walers; it has an ultimate load rating of 96,000 pounds. All of these ties utilize contour threads to provide fast installation; and, to reduce the effect of accumulations of dirt and concrete. A brief description of each follows:

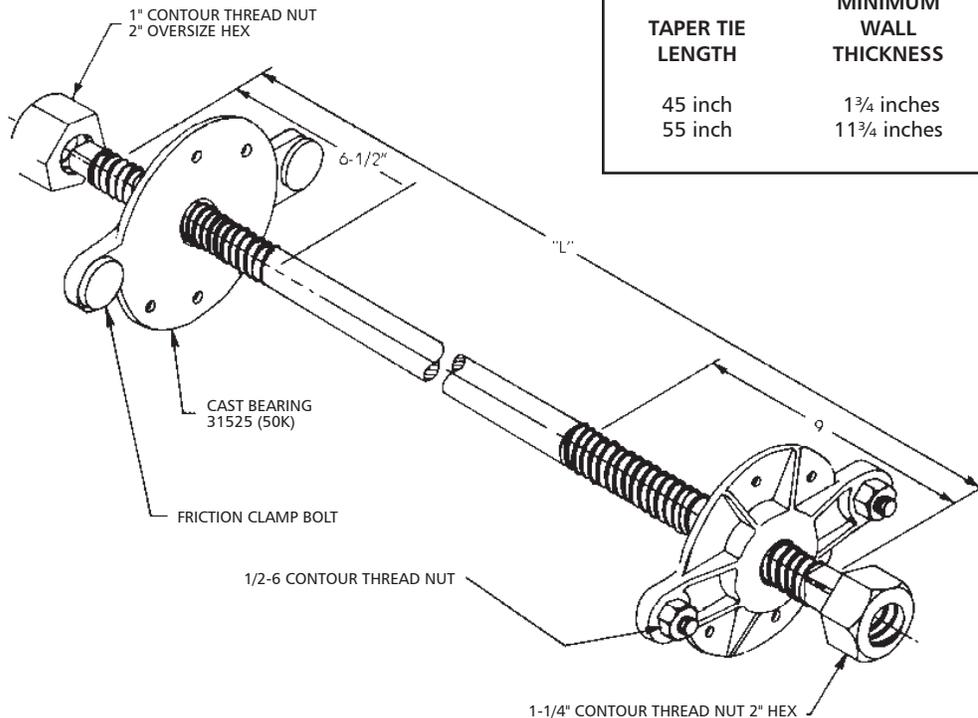
CAUTION: The terms 50K and 96K used in this publication reflect the ultimate capacity. An appropriate safety factor must be used to determine a safe working load. In accordance with the standard established by the American Concrete Institute "Recommended Practice for Concrete Formwork (ACI 347R-88)," in effect at the time of printing, all walls must be formed with a minimum safety factor of 2-to-1.

The 50K Taper Tie comes in two basic lengths, 45 inches and 55 inches, for use with the Aluminum Beam Gang Form System when using 5-inch Versiform® walers. The Taper Tie has a diameter of 1 ¼ inch on the large end, while the small end has a diameter of 1 inch. The large end of the Taper Tie has 9 inches of thread, and the small end has 6 ½ inches of thread. One end of the tie has two flats that are 1-inch long on each side of the tie. This flat length is not included in the tie length.

The Taper Tie utilizes a 1 ¼ inch nut with a 2-inch hex and heavy-duty Cast Bearing Washer on the large end; and, on the small end, a 1-inch nut with a 2-inch hex with a heavy-duty Cast Bearing Washer to transfer the load from the walers to the tie. Cast Bearing Washers can be attached to the walers with two ½-inch Friction Bolts and nuts inserted through the ears on the Cast Bearing Washer. The large, round head of the Friction Bolt goes behind the flange of the waler; when the bolt and nut are tightened, the bearing washer is clamped to the waler. Thus, the Cast Bearing Washer can be left in place between uses.

The following table is to select the length of Taper Tie to use for a particular wall thickness:

WALL THICKNESS TABLE		
TAPER TIE LENGTH	MINIMUM WALL THICKNESS	MAXIMUM WALL THICKNESS
45 inch	1¾ inches	14½ inches
55 inch	11¾ inches	24¼ inches



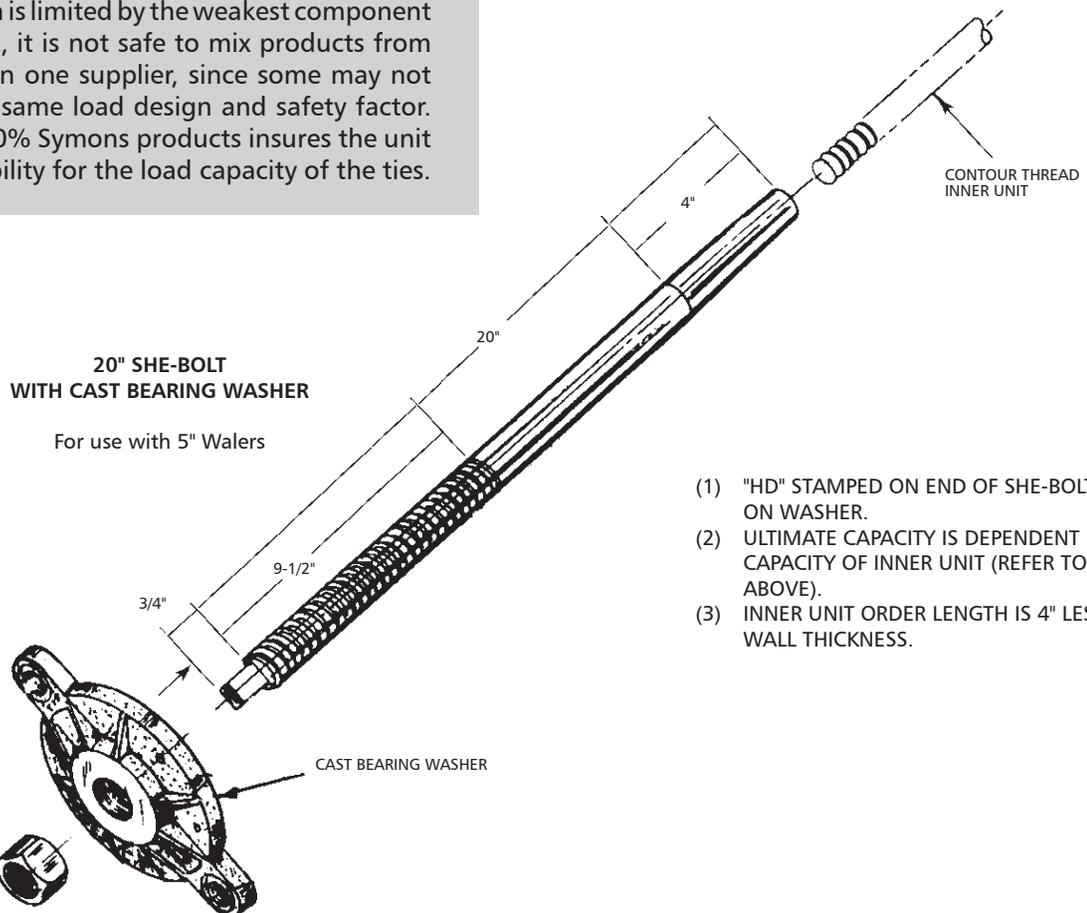
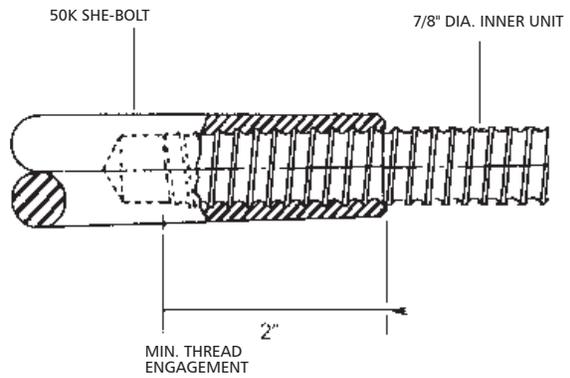
**TAPER TIE
WITH CAST BEARING WASHER
For use with 5" Walers**

(Increase wall thickness by 1½ inches when using Aluminum Joists.) The Symons 50K She-Bolt is 20 inches long, 1¼ inches in diameter, with an ultimate capacity of 50,000 pounds. It is available from Symons for use on the Aluminum Beam Gang Form System with 5-inch walers. It uses the same Cast Bearing Washer and 1¼ inch hex nut that is used with the 50K Taper Tie to transfer the load from the waler to the tie. The 50K She Bolt utilizes a 7/8-inch diameter inner unit, that remains behind in the concrete, to tie opposing gang forms together. The inner unit length is equal to the wall thickness, minus 4 inches. Therefore, any wall thickness can be achieved with the She-Bolt tie system by merely selecting the proper length of inner units.

NOTE: If job conditions require the use of She-Bolt ties with an Aluminum Beam Gang Form System that utilizes 8-inch Versiform Walers, the contractor will have to purchase an appropriate She-Bolt with a length of 24 inches.

CAUTION: The ultimate capacity of the She-Bolt tie system depends upon the ultimate capacity of the inner units. Inner units from Symons have an ultimate capacity of 50,000 pounds. All inner units from other sources must have the capacity verified. See CAUTION note, previous page.

Because the overall load-carrying capacity of the tie system is limited by the weakest component in the set, it is not safe to mix products from more than one supplier, since some may not have the same load design and safety factor. Using 100% Symons products insures the unit responsibility for the load capacity of the ties.

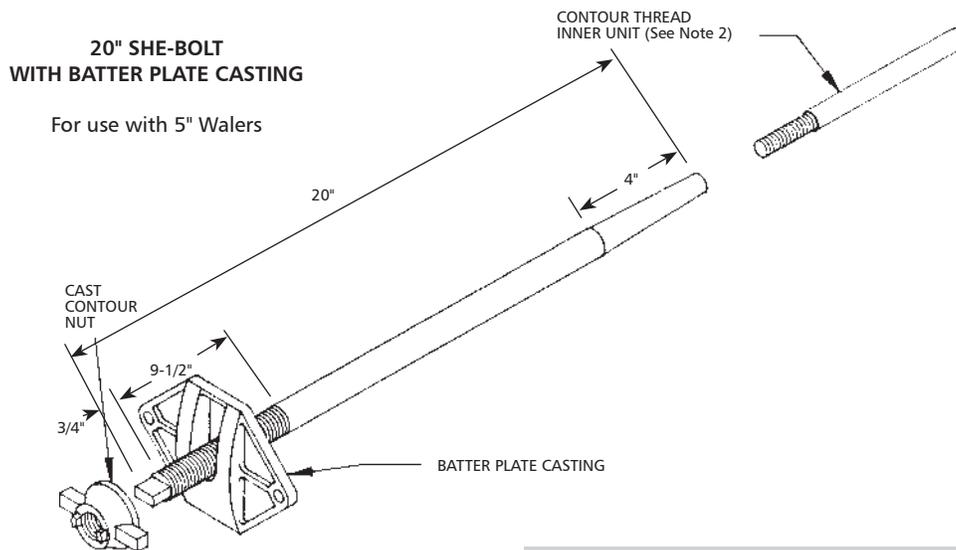


- (1) "HD" STAMPED ON END OF SHE-BOLT AND ON WASHER.
- (2) ULTIMATE CAPACITY IS DEPENDENT UPON CAPACITY OF INNER UNIT (REFER TO TEXT ABOVE).
- (3) INNER UNIT ORDER LENGTH IS 4" LESS THAN WALL THICKNESS.

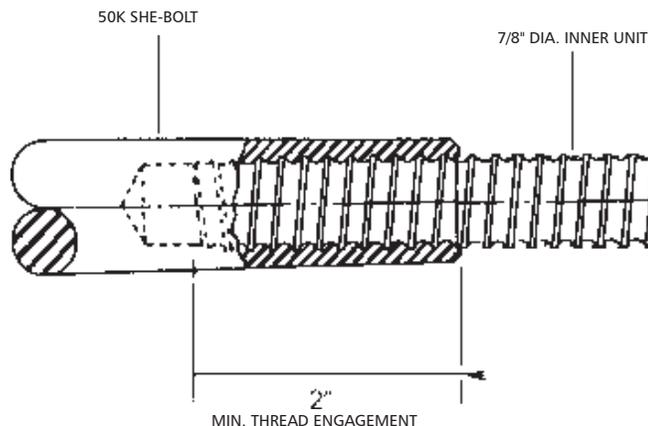
When forming battered walls with the Aluminum Beam Gang Form System, it is necessary to use She-Bolts or Taper Ties with Batter Plate Castings and Cast Contour Nuts. The Batter Plate Casting attaches to the waler with Friction Clamp Bolts, just like the Cast Bearing Washer. A flat surface is provided on one side to bear against the waler, while the opposing face is convex. The Cast Contour Nut has a concave surface matching that on the Batter Plate Casting to provide adequate bearing capacity of the nut and plate. Use one Batter Plate Casting, if one side of the wall is battered, for batter up to and including 4 in 12. If the batter exceeds 4 in 12, use batter plates on each side of the tie. On walls that have both sides battered, use Batter Plate Castings, with each side limited to a 4 in 12 batter.

NOTE: Freshly placed concrete behaves as a liquid. The pressure exerted acts at right angles to the form faces. In all battered walls, the horizontal component of concrete pressure is accompanied by a component acting upward against the horizontal projection of the form. This force is called uplift. If not adequately counteracted, the entire form will float out of position.

It is the responsibility of the user to calculate and/or verify the uplift force and to take appropriate counter actions.



Safe load of all Batter Plate Castings is 25,000 lbs. at 2:1 safety factor.



- (1) "HD" STAMPED ON END OF SHE-BOLT AND ON WASHER.
- (2) ULTIMATE CAPACITY IS DEPENDENT UPON CAPACITY OF INNER UNIT (REFER TO TEXT ABOVE).
- (3) INNER UNIT ORDER LENGTH IS 4" LESS THAN WALL THICKNESS.

The Symons 96K Taper Tie is normally used with 8-inch Versiform walers. It is available in four lengths; 50, 60, 70 and 80 inches, and is suitable for use with the Aluminum Beam Gang Form System. The larger end of the Taper Tie is 1½ inches in diameter, and has 8¼ inches of contour thread; while the smaller end has 6¾ inches of contour thread, and a diameter of 1¼ inches. A reduced size square, with a length of 1 inch, is formed on the large end of the tie. The small end has a round under-cut of 1 inch in length. These reduced end conditions are not included in the length of the Taper Tie.

The 96K Taper Tie utilizes a 7/8" x 7" x 5" flat washer, and a hex nut, to transfer the load from the waler to the tie. A 1½ inch contour threaded 2¾ inch hex nut is used on the large end of the tie; and, a 1¼ inch contour-threaded 2¾ inch oversized hex nut is used on the small end. The flat washer can be attached to the waler with a 12" J-Strongback rod and nut.

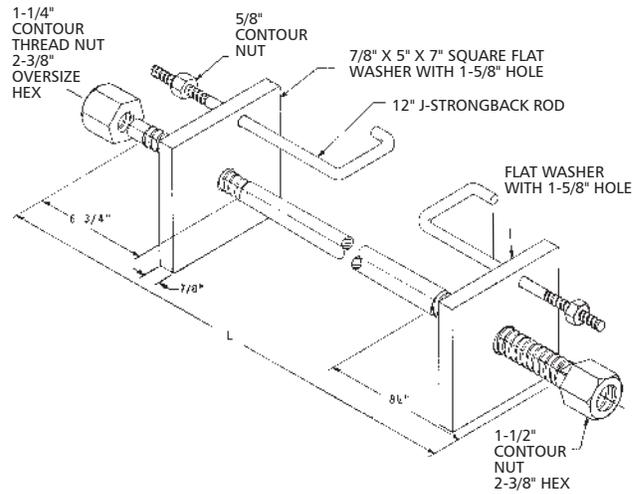
The following table may be used to select the tie length required for a particular application:

WALL THICKNESS TABLE		
TAPER TIE LENGTH	MINIMUM WALL THICKNESS	MAXIMUM WALL THICKNESS
50 inches	1 inch	12¼ inches
60 inches	11 inches	22¼ inches
70 inches	21 inches	32¼ inches
80 inches	31 inches	42¼ inches

(Increase wall thickness by 1½ inches when using Aluminum Joists.)

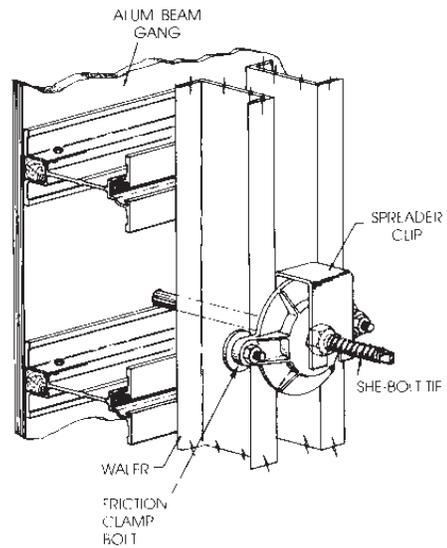
E. SPREADER CLIP

A Spreader Clip is available for use with 50K ties to maintain desired wall thickness. The Spreader Clip is a steel bar, bent into the shape of a "U". At the open end of the "U", each leg has a half circle cut out that will fit over the tie. To use the Spreader Clip, one leg of the "U" is placed behind the Cast Bearing Washer, in between the waler, and the other leg is positioned in front of the hex nut. Gravity holds the Spreader Clip in place, since the Cast Bearing Washer is attached to the waler, the "U" shaped Spreader Clip effectively prevents any movement of the gang form in relation to the hex nut. If both sides of the form are secured to the tie with Spreader Clips, the gangs will maintain proper wall thickness.



96 K TAPER TIE & HARDWARE FOR 8" WALERS

CAUTION: The "96K" denotes 96 kip, or 96,000 lbs. ultimate strength, which provides a SAFE LOAD of 48,000 lbs. at 2:1 safety factor.



See drawing of Aluminum Beam Gang on Page 1

F. BEAM ATTACHMENT CLAMP

The Symons Beam Attachment Clamp utilizes a standard 1/2" x 1 1/2" NC bolt, with a special rectangular nut, to securely clamp the Aluminum Beams to the steel walers. At the heart of the assembly, is the aluminum beam clip, itself. One edge clamp has a lip which curls over a raised-edged flange. The opposing edge has serrations to clamp flat flanges. The serrated side is used to clamp the beam to Versiform walers. Both edges of the clamp have a flat surface, to bear against the flange of the waler, to prevent its rotation.

To use the beam attachment clamp, insert the 1/2" bolt through the hole in the clamp, with the serrations toward the threaded end of the bolt. Screw the nut on the bolt a few turns, with the grooved side of the nut facing the head of the bolt. To make connection, simply insert the clamp anywhere in the slot of the aluminum beam, slide the lip over the flange of the waler, and tighten the bolt with a wrench.

G. PANEL WALER CONNECTOR

To provide a positive shear connection between the waler and the aluminum beam, a Panel Waler Connector (PWC) is required on each waler.

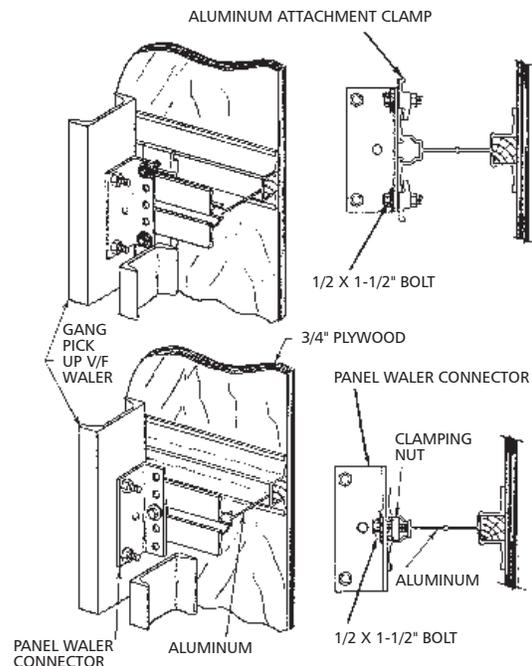
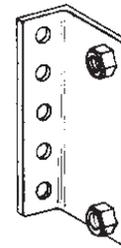
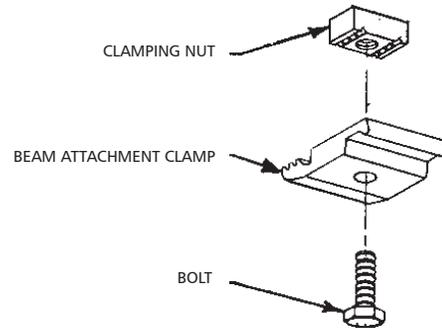
CAUTION: Any waler used to lift gang must have two Panel Waler Connectors.

Two methods of attachment of the PWC to the waler and aluminum beam can be used. The first method requires that the PWC be bolted to the waler with two 5/8" Fit-Up Bolts, so that the PWC is centered over the aluminum beam, and has the other leg of the angle bearing against the aluminum. Use the 1/2" bolt, the aluminum beam clip, and a 1/2" NC hex nut to clamp each flange of the aluminum beam, as shown in the illustration. With the bolts and clips in open view, this method is easier and faster to install than the following method.

The second method requires that a PWC be bolted to the waler, as in the first method. With the PWC centered over the aluminum beam, the center hole should be in the center of the aluminum. Attachment of the aluminum beam to the PWC is accomplished using the 1/2" bolt and the clamping nut from the aluminum beam clip assembly. The bolt should be placed through the proper hole in the PWC, and the clamping nut installed before bolting the PWC to the waler. The PWC is placed

in position with the clamping nut inserted into the slot on the bottom of the aluminum beam. Then the PWC is bolted to the waler, and the clamping bolt and nut are tightened.

CAUTION: This second method must be used if the aluminum joist is used as a waler, rather than the aluminum beam.



H. TRANSITION BRACKET AND EXTENSION PLATE

Transition Brackets are installed at the ends of Gang Form Aluminum Beams to facilitate Fit-Up Bolt connection to Versiform panels, filler angles, all inside corners, outside corners, and Versiform-Steel-Ply Transition Panels. Steel-Ply panels can be connected directly to the Transition Bracket by using Transition Bolts; however, the Steel-Ply form must be overlaid with 3/4" plywood.

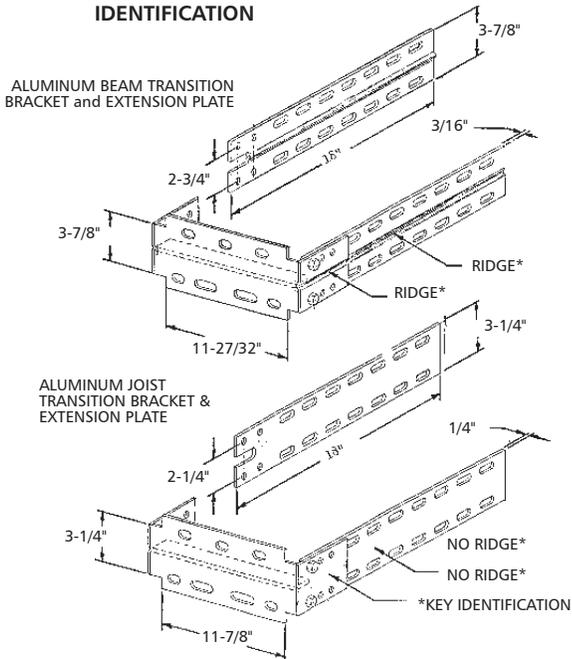
Transition Brackets and compatible Extension Plates are available for both the Aluminum Beam and the Aluminum Joist. The accompanying illustration shows dimensional differences, and key identification features.

Two 1/2" x 1-1/2" bolts and nuts are required to attach the Transition Bracket to the Aluminum Beam, or to the Extension Plate. Three of these bolts are required to bolt the Extension Plate to the Aluminum Beam.

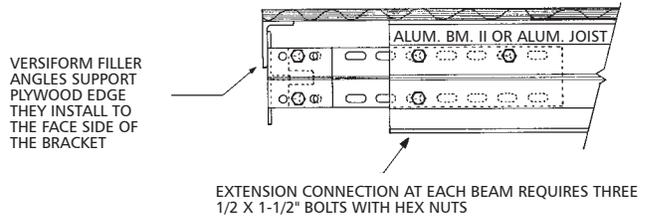
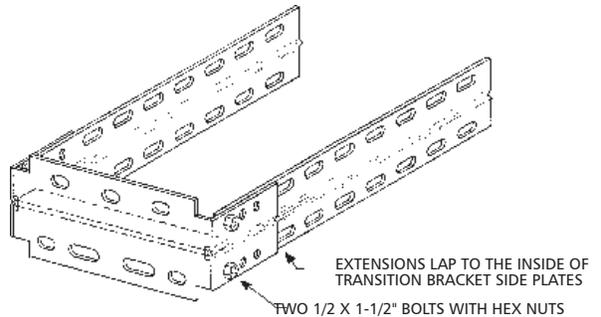
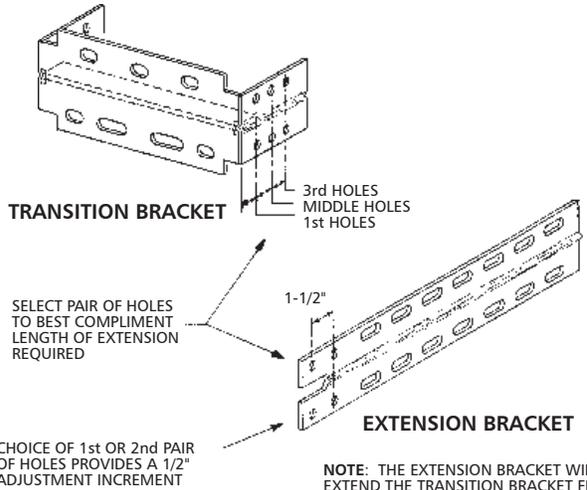
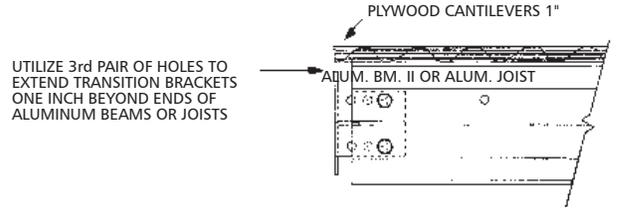
CAUTION: When bolting the Extension Plate to the Transition Bracket, always lap the Extensions to the inside of the Transition Bracket to insure proper Aluminum Beam spacing.

Versiform Filler Angles installed to the face side of the bracket, to support the plywood, are required whenever using Extension Plates. See the accompanying illustrations for more detail.

TRANSITION BRACKET IDENTIFICATION



TRANSITION BRACKET EXTENSIONS (FOR ALUM. BEAM II OR ALUM. JOIST)



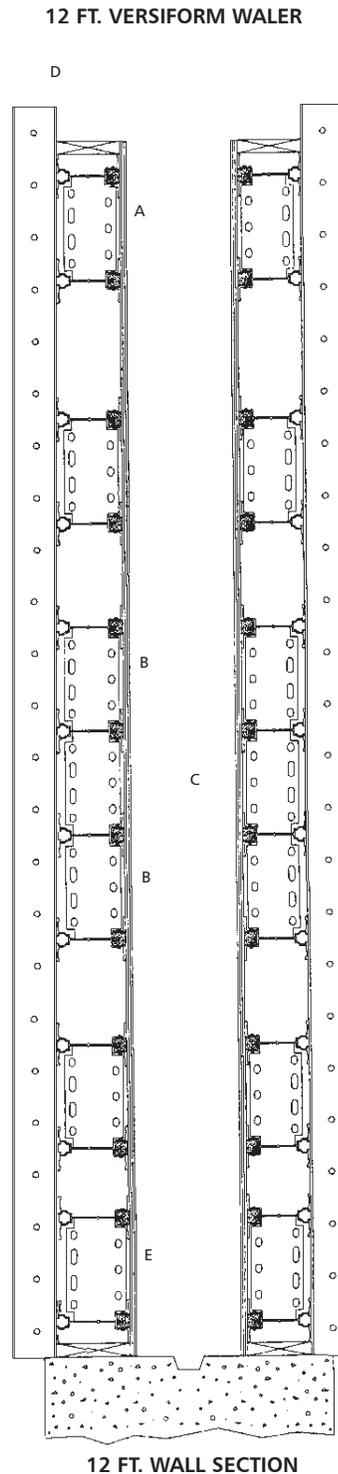
CAUTION: Draw all nuts up tight by using a boxend or socket wrench with a handle length of at least 10 inches.

Do not support loads from adjoining forms through the Transition Bracket/Extension Plate connection.

III. USE OF TRANSITION BRACKET WITH GANG FORM

The following guideline shows the correct use of the Transition Bracket with varying Aluminum Beam Gang Form conditions:

1. The top Transition Bracket secures a pair of aluminum beams that are each 4" above one-foot-increment elevations; therefore, the four-slot side of the bracket must position toward the the plywood, for Fit-Up Bolt slot alignment with Versiform.
2. Transition Brackets install with the three-slot side toward the plywood, when the beams are at one-foot-increment elevations.
3. When required, Transition Brackets can be installed consecutively between beams. Application example: to facilitate optimum Fit-Up Bolt connections to stacked Triple Hinged Corners; or, for bracket connection to an odd-number beam.
4. Top 2 x 8 lumber rail protects top beam form over-splash. When installed, as shown, with rail flush with top of plywood, the rail should be supported with blocking. The rail can be installed against the top beam, and secured in place with Rail Clasps, as shown below for the bottom rail.
5. A protective 2 x 8 bottom rail positions the first beam at a four-inch elevation. The Transition Bracket then determines elevation for the second beam. Since the bottom beam installs at four inches, and the second at 1 foot, plus 4 inches, the four-slot side of the Transition Bracket must be toward the plywood, for Fit-Up Bolt connections to Versiform.



CAUTION: For the clarity of this illustration, braces, ties, walkways, etc., are not shown.

A. WALER LIFTING SLEEVE

The Waler Lifting Sleeve is a $2^{15}/16$ inch long cylinder that fits into the waler slot. A $5/8$ " x 6 inch bolt is inserted through the holes in the waler web through the sleeve and two nuts installed on the bolt to secure the sleeve in place. The capacity of the Waler Lifting Sleeve is 2000 pounds.

When waler lengths are flush with the gang form height, the lifting sleeve installs at the upper last hole location. When waler length extends above the form height, the sleeve installs in the first waler hole below the form height. This is to ensure that angular pull by the shackle lines will be adjacent to the beam waler attachment clips.

Each lift point waler must have two Panel Waler Connectors installed to resist slippage due to weight of the gang. It is recommended that all walers have 2 panel waler connectors when the possibility exists of lifting from other walers. One or both Panel Waler Connectors on each pick-point waler should secure to beams that are attached to the plywood sheets at bottom of gang.

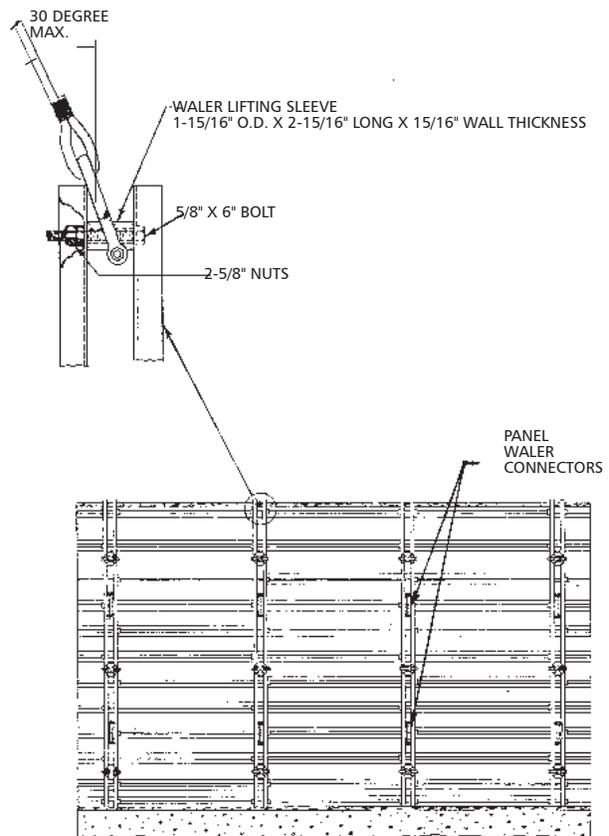
CAUTION: Adhere to the following safety requirements when lifting Symons Aluminum Beam Gang Forms:

1. Use only Symons Waler Lifting Sleeves as the attachment points for crane rigging. Proper spacing is essential.
2. The safe load rating of the lifting sleeve is 2,000 pounds. The number of lifting sleeves required shall be determined by the contractor, based on the weight of the gang to be lifted, including all attachments.
3. The contractor is responsible for designing the rigging so that any one lifting sleeve is not overloaded. Spreader beams are recommended for all but simple two-point lifts.
4. The lifting angle at any pick point must not be greater than 30 degrees to vertical (see illustration at right).
5. A minimum of two tag lines are required for each gang, to control movement during lifting and setting.

DO NOT ALLOW PERSONNEL ON, OR DIRECTLY UNDER, ANY GANG FORM WHILE IT IS BEING MOVED, OR IS SUSPENDED IN THE AIR.

6. Brace, anchor or otherwise secure gang prior to releasing lifting mechanism.

7. Do not attempt to break gang form loose from the concrete by pulling back through the Waler Lifting Sleeve, as severe damage and weakening may occur to the gang. The Waler Lifting Sleeve is designed solely for lifting in the vertical direction.



B. WALKWAY BRACKETS

A work platform, supported by Walkway Brackets, is the recommended method of providing safe access for working on the forms, when pouring concrete and installing or stripping wall ties. The work platform should be erected in accordance with applicable industry regulations, and be equipped with guardrails, midrails, and toeboards along all open sides and ends.

CAUTION: Do not use Walkway Brackets to support cantilevered concrete soffit forms, or for temporary storage of construction equipment or material, such as bundles of rebar. They are for use solely as support for a work platform.

Two 5/8" x 2" Fit-Up Bolts are required to attach the Versiform Walkway Bracket to the waler. The bracket is placed between the two channels of the waler, as shown, and bolts are inserted in the holes, and tightened. The capacity of the Walkway Brackets is 750 pounds each; however, they should not be spaced at more than 8 feet, center-to-center.

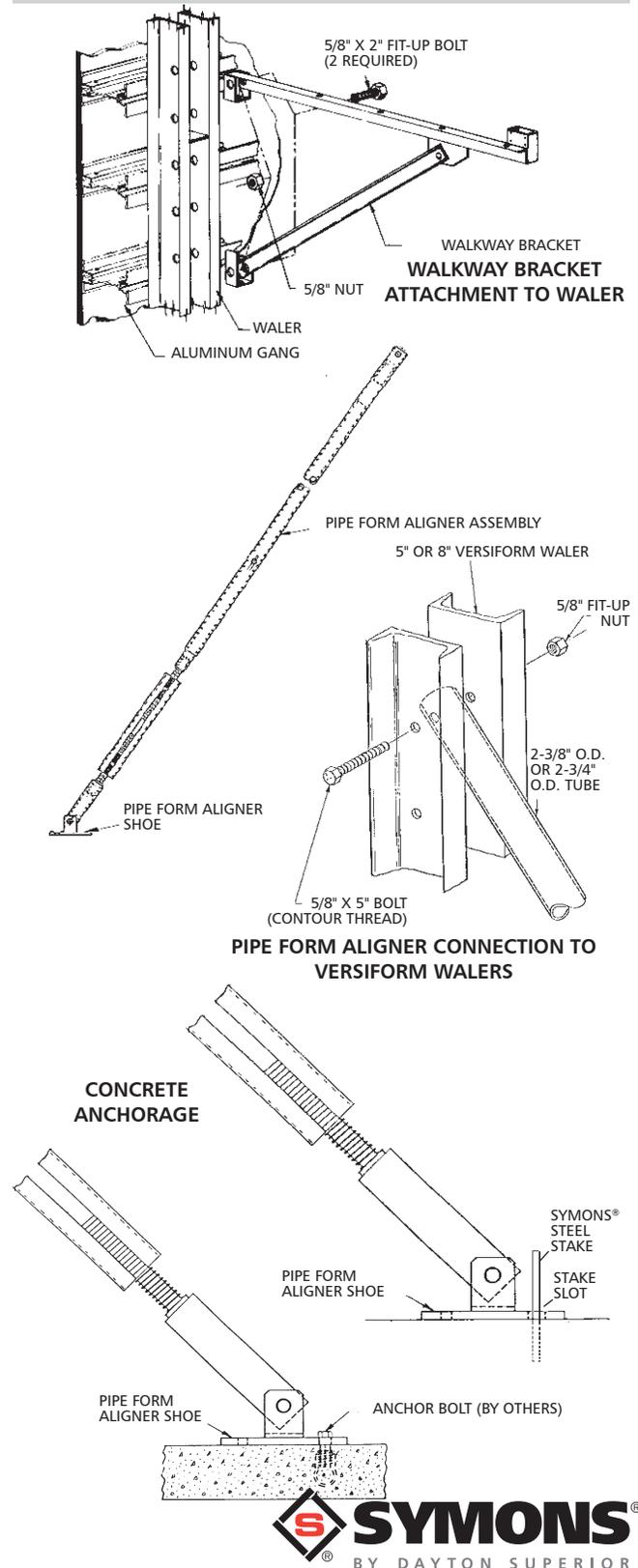
The Occupational Safety and Health Administration provides specific requirements for work platforms and access walkways and ladders. In addition, the Scaffolding, Shoring and Forming Institute provides guidance in safe erection of these structures. Strict compliance with these standards will go a long way toward helping reduce, not only your own lost productivity due to job site accidents, but the industry's accident record, as a whole.

C. FORM ALIGNER

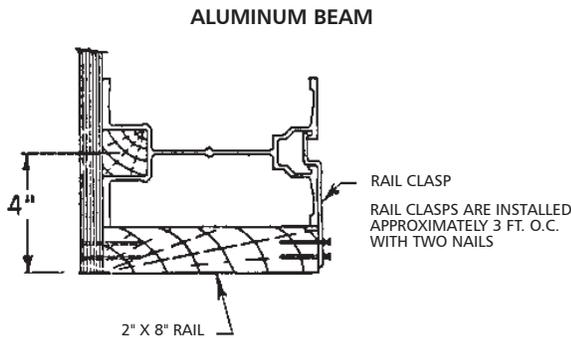
CAUTION: Symons Pipe Form Aligners are intended to position forms straight and plumb, and are not intended to resist any lateral loads that may be applied to the forming system. It is the contractors responsibility to adequately brace forms to support all lateral loads associated with wind, eccentric loads, etc. The materials, quantities, location, and methods of attachment and anchorage of the bracing design should be based on job-site conditions, and applicable industry standards.

To use the Symons Pipe Form Aligners with the Aluminum Beam Gang Form System, merely place one end of the Pipe Form Aligner between the channels, and secure in place with a 5/8" x 5" Fit-Up Bolt with nut. Install a Pipe Form Aligner Shoe on the other end of the Pipe Form Aligner, and anchor it in place. The Pipe Form

NOTE: LUMBER PLACEMENT ON WALKWAY BRACKETS IS NOT ILLUSTRATED, BECAUSE ITS USE IS REGULATED BY THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION. PLEASE REFER TO OSHA REQUIREMENTS FOR FITTING LUMBER.



Aligner Shoe can be anchored to the ground with a Symons Steel Stake, driven into the ground through the rectangular slot in the shoe. To anchor to concrete, use a concrete insert, and bolt through the hole. The adjustment range of the Pipe Form Aligner, when used with the Aluminum Beam Gang, is from 13'-1" to 19'-7".

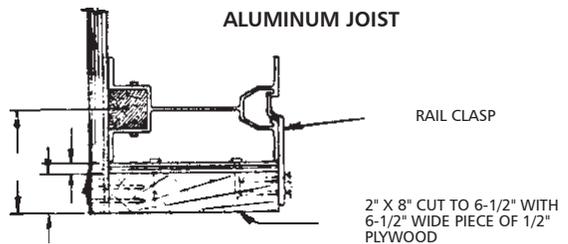


NOTE: 4 INCH DIMENSION MUST BE MAINTAINED

D. Rail Clasp

The Rail Clasp is a pre-bent sheet metal strip used to support the back side of the bottom 2 x 8 lumber rail. To install the Rail Clasp, insert the bent end of the clasp into the bottom slot of the aluminum beam, while holding the clasp parallel to the rail. Rotate the clasp downward, and secure to the 2 x 8 with two nails through the holes in the Rail Clasp. The other side of the 2 x 8 rail is fastened to the plywood with nails, as required. Locate the Rail Clasp at approximate 3-foot centers.

When using the Rail Clasp with the Aluminum Joist, the 2 x 8 rail must be ripped to 6½", and a 6½" strip of ½" plywood must be attached to the top of the 2" x 6½" rail, to properly locate the bottom beam.



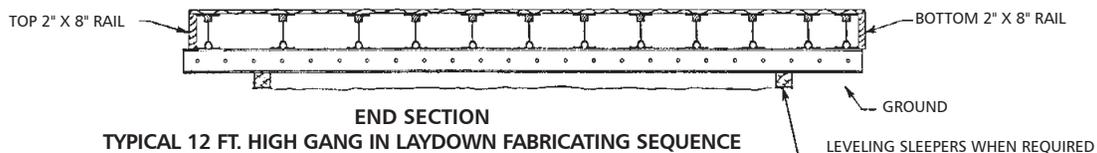
IV. GANG ASSEMBLY

A. SITE SELECTION AND PREPARATION

The first step for gang assembly is to select a site on which to assemble the gang. The site should be selected before the equipment for the gang arrives, and should meet the following requirements:

1. The site should be within the reach of the crane, so that the finished gang can be lifted to its first position, or gang storage area, to wait for its first use.
2. The site should be reasonably flat and level.
3. Since the components of the Aluminum Beam Gang Form System are assembled one at a time by hand, there must be room at one side of the assembly area to store the components. The components should be segregated by type and size, and there should be easy access to each stack of components.

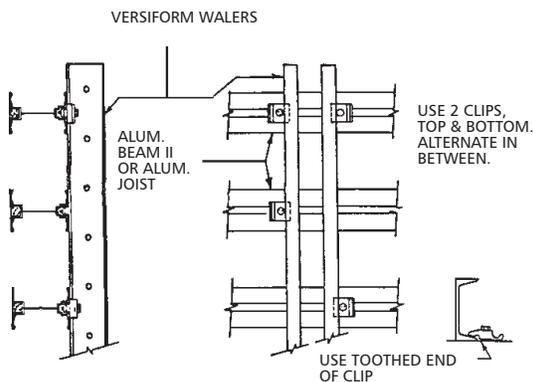
The second step is to prepare the site for gang assembly. Leveled lumber sleepers should be laid out. The center-to-center spacing of the sleepers should be less than the gang height. Since it is easier to work at waist height, it may be preferable to build an open-centered gang assembly table on the assembly site. This table should be between 3 and 4 feet in height. An edge piece (2 x 4 flat) at the bottom of the table to align the waler is very helpful. Also, an edge piece on one side of the table, exactly perpendicular to bottom, about 6 inches high when using 8 inch walers, can be used to align the aluminum beams. Once the table is built, or the sleepers are in place, actual gang assembly can begin.



B. GANG ASSEMBLY PROCEDURE

The following gang assembly procedure is generalized and should work using either a table, or using sleepers on the ground. The table has built-in alignment features; when using sleepers, all alignment will have to be accomplished using string lines. Before using the following procedure, it is suggested that the section on components be reviewed.

1. Place the walers on the table at appropriate center lines. Align the bottom ends of the walers and block them in place.
2. If you are using Transition Brackets, go to Step 3. Place the bottom aluminum beam on the walers, at its proper location. Position one end of the beam against the table edge, or alignment string. Make sure that the beam is perpendicular to the walers and on its center line, and clamp to each waler with two Aluminum Beam Clips. Use two gage bars to space the next beam. Place it in position, and align the end, as before. Clamp this beam to each waler with one beam clip. Install each beam, in turn, in the manner described above, being careful not to knock the preceding beam out of alignment. Alternate the beam clips, from side to side, on the walers. The top beam requires two clips at each waler location. Omit the beam clips at the locations requiring the use of the Panel Waler Connector (see Panel Waler Connector in the component section of this guide). Be sure that all beams have the nailer strip facing upward, before installing them.



3. When using the Transition Brackets, with or without extensions, two methods of installation are recommended: when using extensions, it is suggested that you assemble the bracket and extension together, before attachment to the beam, as described in the following steps. Both methods require that the Transition Bracket be installed to the aluminum beams before clamping the beams to the walers.

In normal applications using the Transition Bracket, the bracket is placed in every other space, between beams. Place two bottom beams in position on the walers, with the nailer strip facing upward. Install the Transition Bracket to the aluminum beams, leaving the bolts only finger tight. Align the Transition Bracket with the table edge-piece, or a string line, maintaining the alignment of the bottom beam. Then clamp bottom beam in place, and tighten the Transition Bracket bolts. The second beam should be in alignment, and can be clamped into place. Install the next pair of beams in a similar manner, using the basic guidelines of item 2 above. On gangs that have Transition Brackets at both ends, leave the second Transition Bracket bolts finger tight, until all Aluminum Beams are secured in place. When all beams are secured to the walers, align the Transition Brackets with string line, being sure to maintain the proper gang length. Then tighten bracket bolts.

Some applications utilizing Transition Brackets require the brackets to be placed in every space between the beams. Place all of the beams on the walers in their approximate position. Install the Transition Bracket on the aluminum beams, leaving the bolts finger-tight. Align the brackets to table edge or a string line, while keeping the bottom beam in position and alignment. Clamp into place, and tighten bracket bolts. Check alignment of the rest of the beams and secure to walers, using the clamping procedure in step 2. After beams are all clamped in place, align the brackets on the other end of the gang with a string line. Keep the proper gang length, and tighten the bracket bolts.

4. Place the 2 x 8 lumber bottom rail in position, and secure it to the aluminum beam with the Rail Clasp.
5. Place the 2 x 8 lumber top rail in position. One of two locations may be selected: see Rail Clasp in the component section of this Application Guide.
6. Lay out the plywood sheeting material, and check for squareness and dimension. Fasten the plywood to the nailer strip of each beam, using 2" bugle head drywall screws, or a 2" ring shank underlayment nail. It is recommended that a chalk line be used, to insure that the fastener hits in the center of the nailer strip. The fasteners should be spaced at approximate 6" centers.

7. At this time, tie holes should only be placed in the gang if absolute accuracy can be assured. Otherwise, wait until gangs are positioned for first pour to drill tie holes. Much care and detail should be exercised to insure that opposite-hand gangs, and their opposing tie holes, will match. To minimize plywood delamination, it is always best to drill the tie from the face side of the gang.
8. Install the Waler Lifting Sleeves at the walers from which the gang is to be lifted, following the procedure listed in the component section of this guide under Waler Lifting Sleeve.
9. Attach crane rigging, and lift gang from the table and move it to its first pour position.
10. The Walkway Brackets, Cast Bearing Washers, and other accessories, are typically mounted after the gang is set in its first pour position. If this presents a problem for the contractor, the gang can be laid face down, and the accessories assembled while still on the ground.

The above guidelines are general in nature, and can be merged or otherwise adjusted for particular job conditions.

C. GANG PLACEMENT

A simple four-step procedure is used to set the aluminum beam gang in place. In each of the steps listed below, refer to the component section of this guide for the proper use of any component mentioned.

The first step is to attach the rigging to the first gang to be positioned (usually this will be the gang on the side of the wall where the bracing is to be used). Be sure to attach the rigging to the Waler Lifting Sleeve. Raise the gang, and swing it into place. Once the gang is raised to the vertical position, it should be kept in that vertical position, until the gang is to be dismantled. This avoids repeating the flexing that raising from horizontal to vertical imposes on the gang. This flexing tends to loosen the connections of the gang members.

After the gang is positioned, block it into position and anchor the wall bracing. Plumb the gang with the braces, and remove the crane rigging.

CAUTION: Never remove the rigging from the gang until it is properly anchored and braced into position.

It is the contractor's responsibility to adequately brace gangs resting on soil, footings or slabs. Second, and subsequent lift gangs must be secured as described and illustrated on page 21.

Next, attach the crane rigging to the gang that goes opposite the first gang set. Raise the gang, and swing it into position, opposite the first gang. Be sure to set the gang at the proper distance from the first gang, to produce a wall with the desired wall thickness. Also, be sure that the ends of the gang are in alignment with the first gang, and that the tie holes are opposite one another.

The final step is to secure the second gang to the first, using the ties. See the component section of this application guide for installation of the ties. After the gang is secured with ties, remove the rigging from the gang.

The above procedure can be used for single-lift and multiple-lift gang forming conditions. The main difference between single-lift forming and multiple-lift forming is the landing surface. On single-lift forming, or the first lift of a multiple-lift condition, the landing surface is usually a relative large, flat, continuous surface, while on the upper lifts of a multiple-lift system, the landing surface is two or more, very small surfaces with little, or no access provided by some support device. For more information, see the Multiple-Lift Forming section of this guide.

IV. FORMING DETAILS

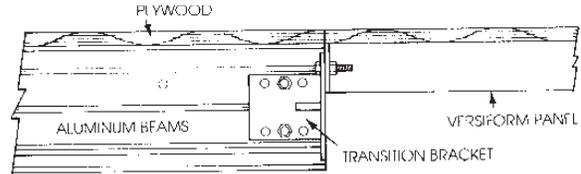
This section offers some solutions to some forming conditions that occur regularly in the field. Most of these solutions utilize the unique Transition Bracket that Symons has developed for the Aluminum Beam Gang Form System. This bracket allows time-proven accessories from other Symons systems to be used to solve these forming conditions. When Transition Brackets are required in the following forming details, it will be assumed that the brackets are in place in accordance with the installation instructions for the Transition Brackets in the component section of this guide.

CAUTION: If within the same pour, forming conditions warrant the joining of job-built forms, or a different Symons system, to the Aluminum Gang System, the concrete pressure must not exceed the lowest of the allowable pressures of the different systems.

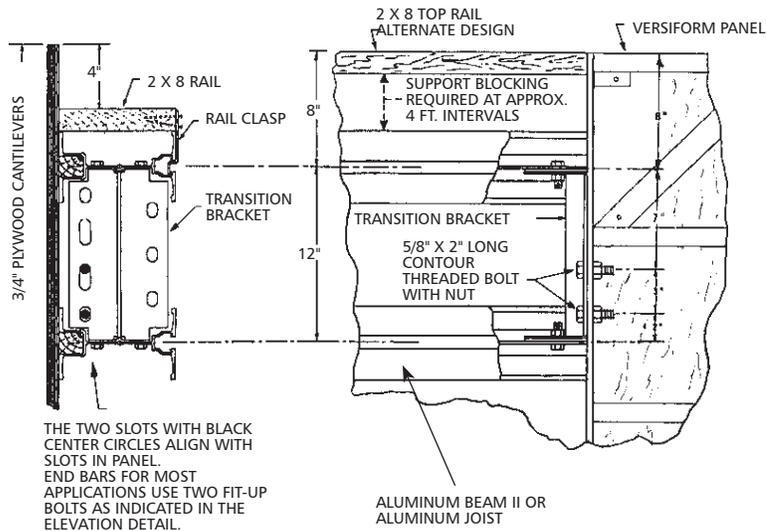
A. VERSIFORM MATE-UP

Versiform panels can be attached directly to the Transition Bracket, using 2⁵/₈" x 2" Fit-Up Bolts, with nuts at each bracket. The combination of the Versiform and aluminum beam gangs provides a smooth transition that provides an architectural finish without any additional plywood facing.

When the Transition Bracket is at a foot increment elevation, the side of the bracket with three slots is toward the plywood-side of the gang. Install the Fit-Up Bolts in the top and bottom slots on this side of the bracket (three-slot side), and attach the Versiform panel. The panel face will be in alignment with the face of the plywood on the aluminum beam gang. If the bracket is at an elevation that is four inches above the one-foot increment the side of the bracket with four slots is toward the plywood side of the gang. The Fit-Up Bolts are installed in the bottom two slots on this side of the bracket (four-slot side). Alignment will be as before.

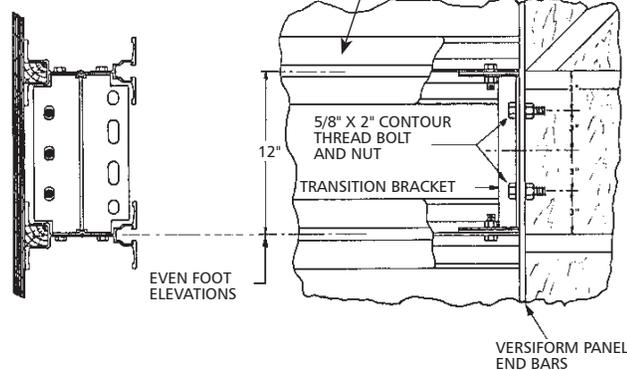


ALUMINUM BEAMS NOT AT EVEN FOOT INCREMENT ELEVATIONS. INSTALL TRANSITION BRACKETS WITH 4 SLOTS ADJACENT TO GANG FACE PLYWOOD.



THE TWO SLOTS WITH BLACK CENTER CIRCLES ALIGN WITH SLOTS IN PANEL. END BARS FOR MOST APPLICATIONS USE TWO FIT-UP BOLTS AS INDICATED IN THE ELEVATION DETAIL.

THE THREE SLOTS WITH BLACK CENTER CIRCLES ALIGN WITH SLOTS IN PANEL END BARS. FOR MOST APPLICATIONS USE TWO FIT-UP BOLTS AS INDICATED IN THE ELEVATION DETAIL.



B. STEEL-PLY MATE-UP

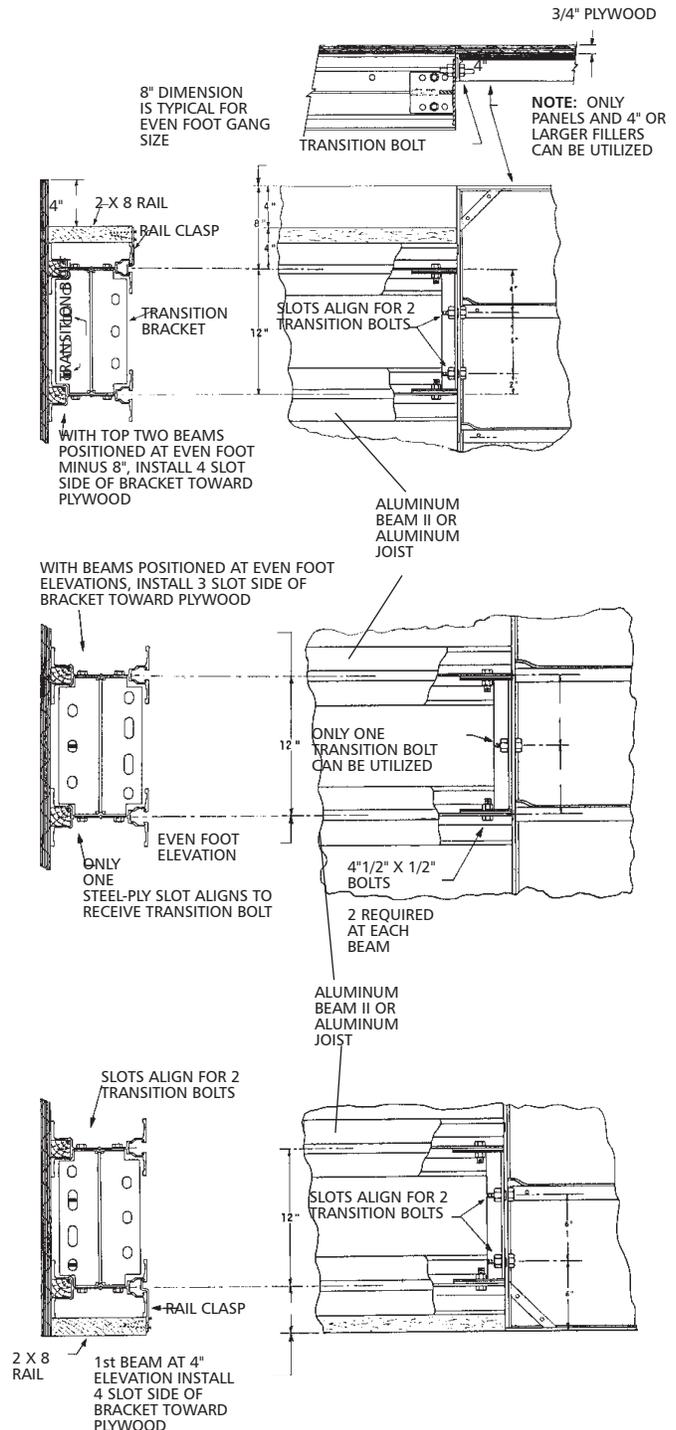
Transition Bolts connect the Steel-Ply panel or filler side rail directly to the Transition Bracket. However, the face of the Steel-Ply panel or filler is set back from the gang face by $\frac{3}{4}$ ". To correct this condition, the Steel-Ply panel for filler is faced with the same $\frac{3}{4}$ " plywood used on the aluminum beams. This combination will then produce a smooth architectural finish.

The Steel-Ply-to-Versiform Transition Bolt is designed to properly align and connect the Steel-Ply side rails to the Versiform side rails or end plates. The shank of the bolt has two shoulders to achieve proper alignment of the unlike-size-and-shape connecting slots. Transition Bolts must always be inserted from the Steel-Ply side of the connection. A standard $\frac{5}{8}$ " contour threaded Fit-Up Nut is installed on the Transition Bolt to complete the connection.

When the Transition Bracket is at a one-foot increment elevation, the side of the bracket with three slots is on the plywood side of the gang. Install the Transition Bolts from the Steel-Ply side of the connection, into the top and bottom slots on this side (three-slot side). The face of the Steel-Ply panel will be set back $\frac{3}{4}$ " from the face of the gang, and must have plywood facing applied to it. If the bracket is at an elevation that is four inches above the one-foot increment elevation, the side of the bracket with four slots is toward the plywood side of the gang. The Transition Bolts are installed so that they are in the bottom two slots on this side (four-slot side). As before, the Steel-Ply will be back-set from the gang face, and will require facing with plywood.

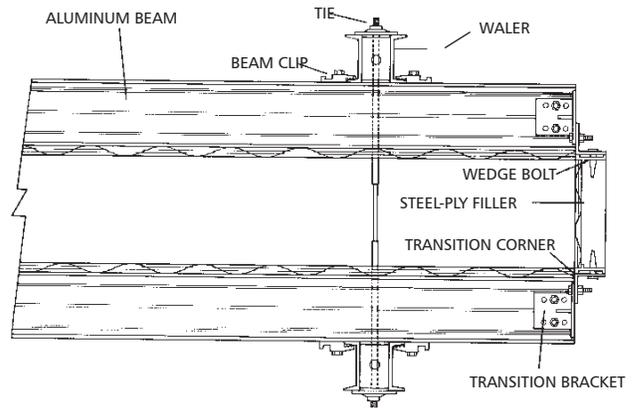
TRANSITION BRACKET CONNECTION TO STEEL-PLY (FOR ALUMINUM BEAM II OR ALUMINUM JOIST)

TRANSITION BOLTS CONNECT STEEL-PLY PANEL OR FILLER SIDE RAILS VIA THE BRACKETS AND THE VERSIFORM SLOTS. THE GANG FACE $\frac{3}{4}$ " PLYWOOD MUST THEN OVERLAY THE STEEL-PLY PANEL.



C. BULKHEAD

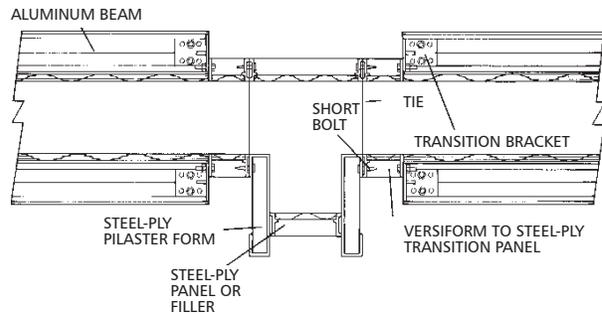
Bulkheads can be easily installed on Aluminum Beam Gang Forms. The major components of the bulkhead are Versiform-to-Steel-Ply outside Transition Corner Angles and Steel-Ply fillers. To assemble the bulkhead, first bolt the Transition Corner Angles to the Transition Brackets already installed on the gang — be sure to use the Versiform side of the angle, and the bolt pattern described in the Versiform side of the angle, and the bolt pattern described in the Versiform mate-up section of the application guide. Then, simply attach Steel-Ply Fillers of the proper length to the two Transition Corners with Wedge Bolts. If rebar penetrates the bulkhead, two Steel-Ply Filler Angles and a job-built filler may be used in place of the Steel-Ply fillers. Another alternative is to use Versiform outside corners and Filler Angles to construct the bulkhead.



CAUTION: Whenever installing a bulkhead or a bullnose to Transition Brackets, be careful not to exceed the lateral load capacity of the bracket. Lateral loads are any loads that act parallel to the axis of the aluminum beams of the gang. The maximum lateral load allowed on the Transition Bracket is 1200 pounds per bracket.

D. PILASTER

The Versiform-to-Steel-Ply Transition Panel can be utilized to allow the Aluminum Beam Gang Form System to be mated with Steel-Ply panels, fillers and corners. When attached in this fashion, the Steel-Ply Forms do not require plywood facing, since the Transition Panel provides proper alignment of Steel-Ply and Versiform, and the Transition Bracket provides proper alignment of Versiform and Aluminum Beam Gang Forms. Thus, the complete flexibility of the Steel-Ply System can be used with the Aluminum Beam Gang Form System to form pilasters.

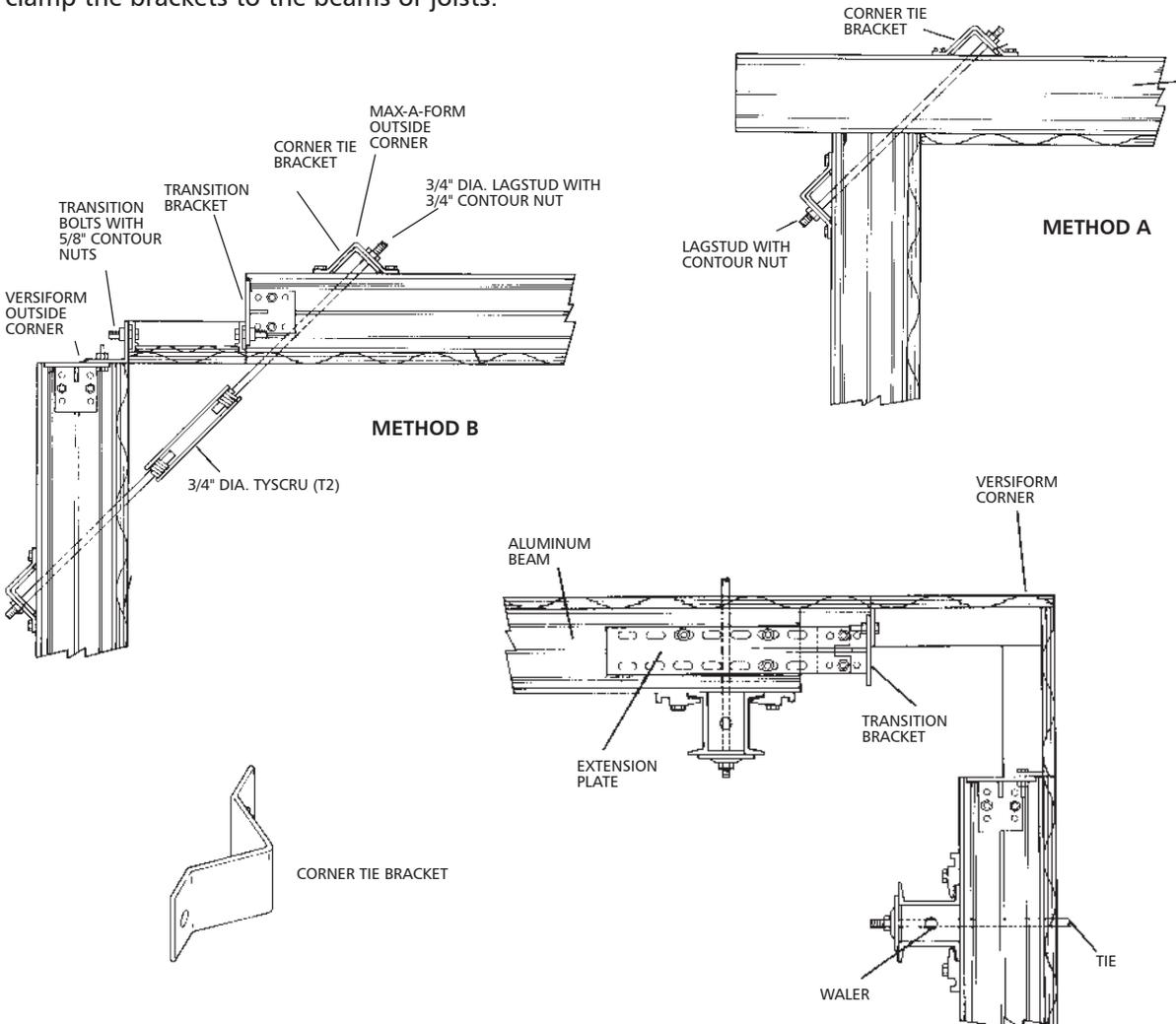


Bolt the Transition Panel to the Transition Brackets, using the bolting procedure outlined in the Versiform mate-up. Attach the Steel-Ply fillers or pilaster forms, as required, to the Transition Panel with Wedge Bolts (the pilaster form required the use of short wedge bolts). As with any Steel-Ply forming application, all joints, including the joint between the Transition Panel and the Steel-Ply, must be secured to the opposite joint with any of the standard Steel-Ply ties. For more information about these applications, refer to the Steel-Ply Application Guide.

E. OUTSIDE CORNERS

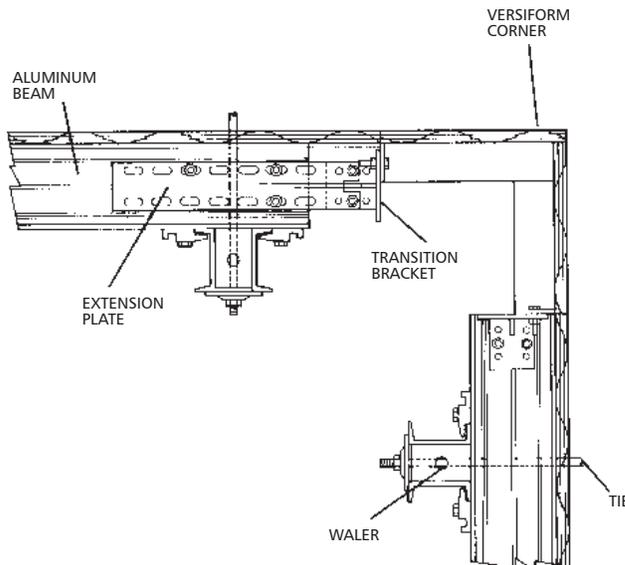
In forming outside corners using aluminum beam gangs, the distance between a corner and the end walers on adjoining gangs is usually 3 ft. or more. Therefore, diagonal ties must be installed to support beam end loads adjacent to the corner. Two corner tie methods are illustrated: Method "A" facilitates diagonal tie installation outside of the concrete; and, in method "B" the ties pass through the concrete. Method "A" works well for narrow to medium wall thicknesses, and method "B" is best for medium to thick walls. In both methods, the Max-A-Form® Outside Corner controls the size and type of tie utilized.

The Max-A-Form Outside Corner functions as a vertical anchor waler for the diagonal tie. The outside corner must be secured to each beam or joist with a Corner Tie Bracket to resist the lateral loading of the corner tie. Two 1/2" x 1 1/2" bolts and two clamping nuts are used to clamp the brackets to the beams or joists.



F. INSIDE CORNERS

Versiform Inside Corners can be utilized with the Aluminum Beam Gang Form System. The corners are bolted to the Transition Bracket with the same bolt pattern used to bolt Versiform panels to the bracket. Extension Plates may be used on either, or both, sides of the corner. When using the extensions, a Versiform Filler Angle must be installed facing the Transition Bracket, between the corner and the bracket. The Filler Angle is secured with the same bolts that secure the corner to the bracket. The Filler Angle is required to support the edge of the plywood gang facing, since there is no support for the plywood extending past the end of the Aluminum Beam. Select Versiform rigid inside corners for most applications. However, when a single gang is to be placed between two corners, stripping is facilitated if one of the corners is a Versiform Stripping Corner.



G. MULTIPLE-LIFT FORMING SUPPORT

An Adjustable Shear Wall Bracket is used to support Aluminum Beam Gang Forms in multiple-lift forming situations. The Adjustable Shear Wall Bracket elevation-adjustment range is $2\frac{3}{8}$ " or from $3\frac{1}{2}$ " to $5\frac{7}{8}$ " at dimension "A". See Illustration: dimension "B" is never less than dimension "A", and is usually greater, so as to include a desired amount of previous-pour overlap.

IMPORTANT INSTALLATION INSTRUCTIONS

1. Anchor bolt insert: $\frac{3}{4}$ " 10 NC by 3" long.
2. Attach insert to form face, utilizing the adapter plug.
3. Anchor bolt: $\frac{3}{4}$ " 10 NC by 3" long, zinc plated, with extended-length threads necessary to fully engage the insert.
4. The Adjustable Shear Wall Bracket safe load rating, when mounted as prescribed, in 2000 psi concrete is: 3000 pounds @ 3:1 safety factor. A sufficient number of brackets must be installed to adequately support the weight of each gang.

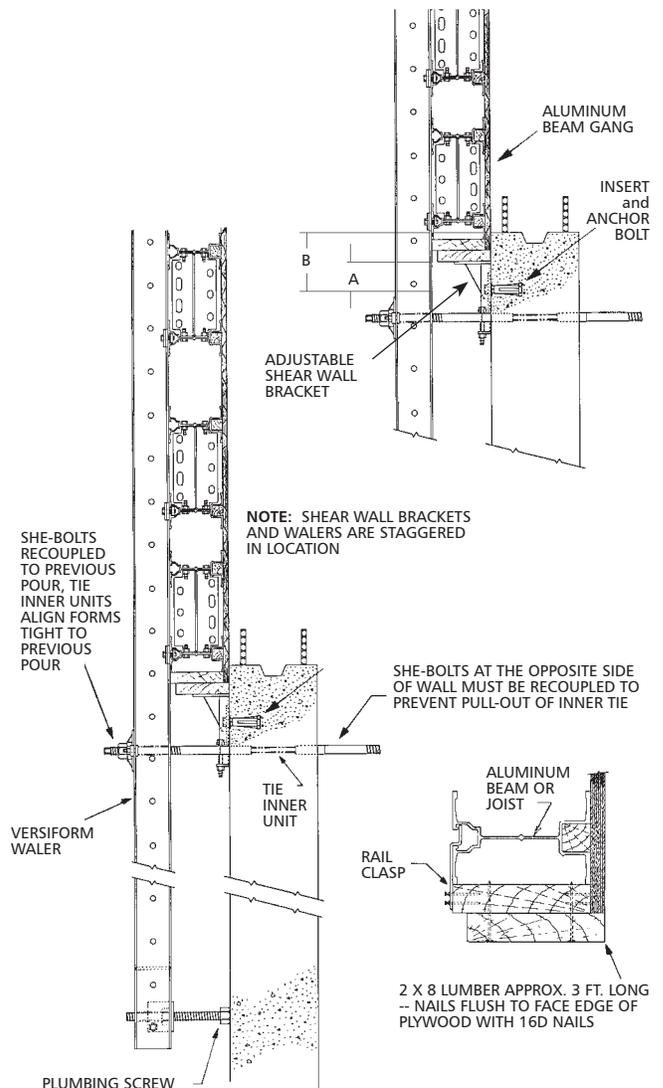
5. CAUTION: Do not remove or disrupt anchorage capacity of the Shear Wall Brackets, until the supported forms have been stripped away, and all load on the brackets removed.

To alleviate premature scuffing and crushing damage at the Adjustable Shear Wall Bracket support locations, the bottom rail and exposed plywood thickness must be reinforced as follows: short lengths of 2 x 8 lumber (approx. 3 ft. long) should be nailed to the underside of the bottom rail, but positioned flush to the face of the plywood.

Extended walers and plumbing screws can be used to plumb gang forms on multiple lift applications. However, the following instructions should be observed:

1. The Adjustable Shear Wall Brackets and Walers are at staggered locations.
2. She-Bolts and Taper Ties can be reinstalled in previous pour to align the forms tight to the concrete, provided that the following are observed:

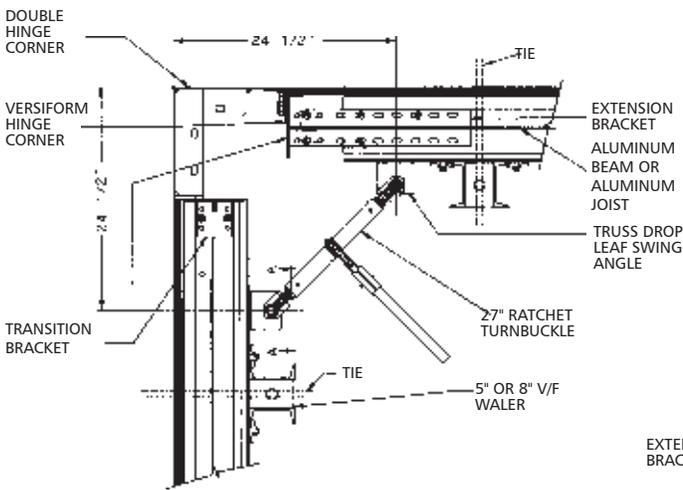
- a. Reinstalled ties may be subject to heavy crow-bar-action tension loading, due to wind loads on the cantilevered form face or back. Therefore, full tie capacity must be reinstated.
- b. Reinstalled Taper Ties that will be loaded at the large-diameter end only, must be secured at the small-diameter end with the nut and plate washer bearing on blocking, in lieu of an opposing wall form.
- c. She-Bolts at the opposite-side wall must be recoupled to prevent pull-out of inner tie.
- d. She-Bolts or Taper Ties, reinstalled at the top of previous pour, should only be utilized to pull and hold forms in tight, to accomplish good horizontal concrete-joint alignment, and should not be subjected to shear loads, such as supporting the weight of the gang forms.



H. CORE WALL INSIDE CORNER

Core walls are easily formed with the Symons Aluminum Beam Gang Form System, by utilizing Symons' exclusive Versiform Triple Hinged Corner. The Triple Hinged Corner is bolted to the Transition Bracket, using the method outlined in the Versiform mate-up instructions, above. The Triple Hinged Corner has two side rails hinged together and folded over one another. The bolts in the holes that are at 12" increments of elevation, secure only the outer side rail to the brackets, and must remain in place at all times. Therefore, it is recommended that these bolts be double-nutted. The bolts in all other bolt-hole locations secure both side rails to the bracket, and must be removed to actuate the triple hinge action of the corner.

As with inside corners, Extension Plates may be used with the Transition Bracket on either or both sides of the Triple Hinged Corner. A Versiform Filler Angle must be installed, facing the Transition Bracket, between the Triple Hinged Corner and the Transition Bracket, to support the edge of the gang-facing plywood, when using extension plates. The bolts securing the corner also secure the Filler Angle.



27" RATCHET APPLICATION

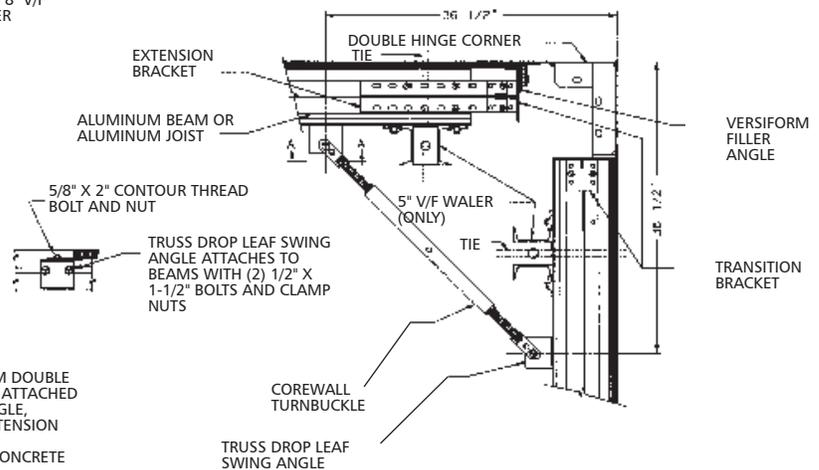
- NOTE:**
1. HINGE END OF VERSIFORM DOUBLE HINGE CORNER MUST BE ATTACHED TO VERSIFORM FILLER ANGLE, TRANSITION BRACKET, EXTENSION BRACKET ASSEMBLY.
 2. MAXIMUM ALLOWABLE CONCRETE PRESSURE = 1200 PSF

To provide an attachment point for the Core Wall Turnbuckle, a Truss Drop Leaf Swing Angle is secured to an aluminum beam or joist with a 1 1/2"x1/2" bolt and clamping nut. The turnbuckle is attached to the swing angle with a 5/8" Fit-Up Bolt and nut. Two turnbuckles are required at each corner on all gangs with heights up to 12 feet. For gangs higher than 12 feet, additional turnbuckles will be required.

The following stripping procedure is used for inside core walls:

1. Initiate release of the core-form gang - remove the Fit-Up Bolts that lock the hinge action at each Double Hinge Corner, side-rail connection. Precaution should be taken to assure that only the specific Fit-Up Bolts gripping the Double Hinge Corner rigid side rail are removed. Do not remove bolts at the slot locations.
2. Contract turnbuckles until each Double Hinge Corner folds to a rigid, fully contracted position. Each gang face moves 4" back from the concrete, and the corners move inward 2" from each concrete wall face.
3. Attach a sling-line hook to each lifting waler on the long opposite gangs of the core form. Be sure to use a Waler Lifting Sleeve.

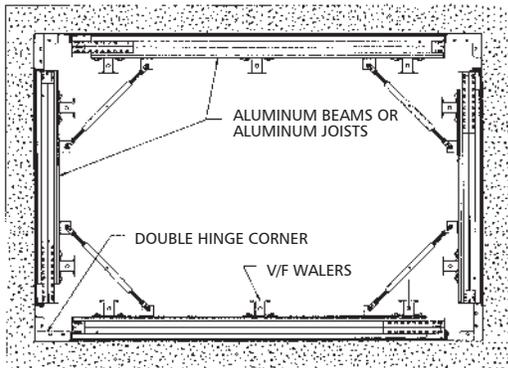
- NOTE:**
1. HINGE END OF VERSIFORM DOUBLE HINGE CORNER MUST BE ATTACHED TO VERSIFORM FILLER ANGLE, TRANSITION BRACKET EXTENSION BRACKET ASSEMBLY
 2. MAXIMUM ALLOWABLE CONCRETE PRESSURE = 1,200 PSF



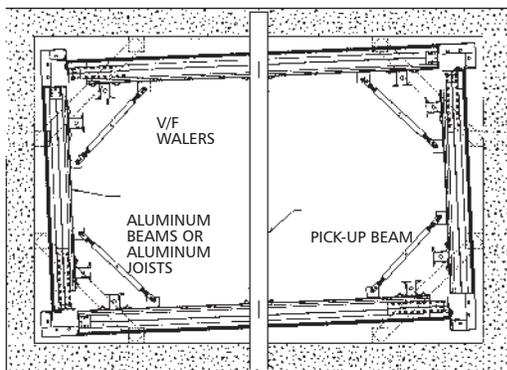
COREWALL TURNBUCKLE APPLICATION

Sling lines should not angle inward between opposite wall gang-lifting walers. Resulting inward pull will damage the corner hinge and the form will rock. Therefore, it is necessary that a pick-up beam, provided by the contractor, be used to pick up the core form.

CAUTION: All rigging is the responsibility of others.



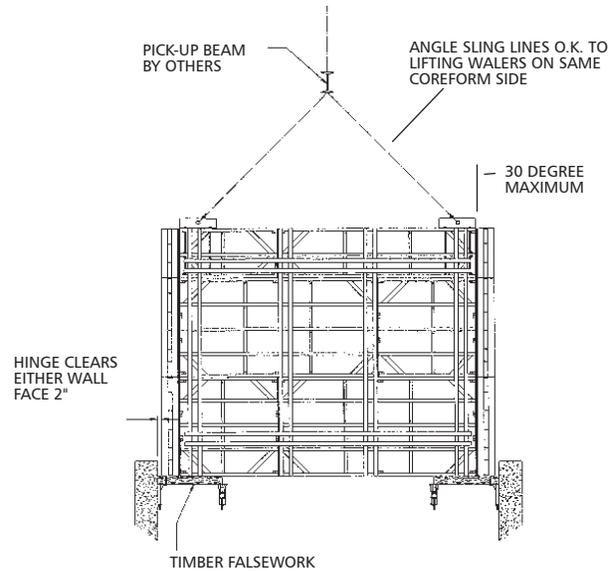
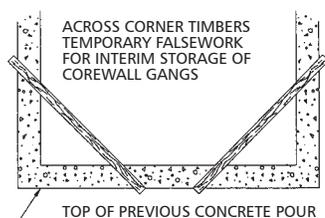
COREWALL IN POUR POSITION



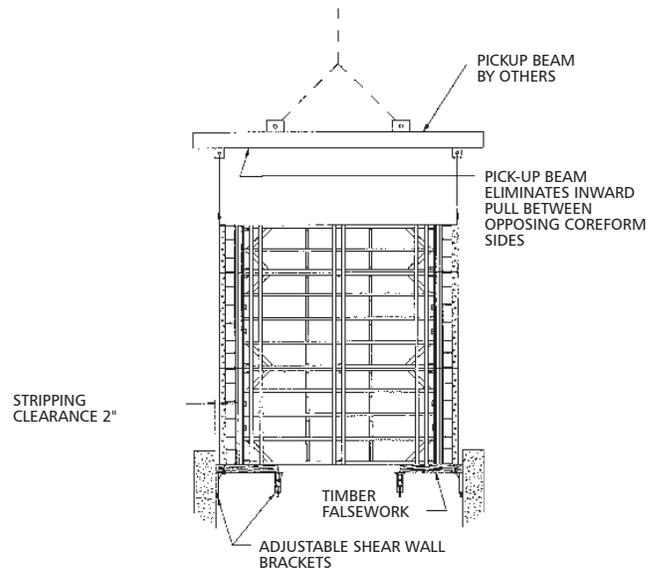
COREWALL IN STRIPPED POSITION

- Lift the "rigid box" core form to approximately one foot above previous pour. Place 4 x 4's (or heavier timber, as required) across the corners, at the top of the core wall concrete. Each end of the timber should bear on the wall, 2½ to 3½ feet out from the corner. Set the core form on the temporary falsework.

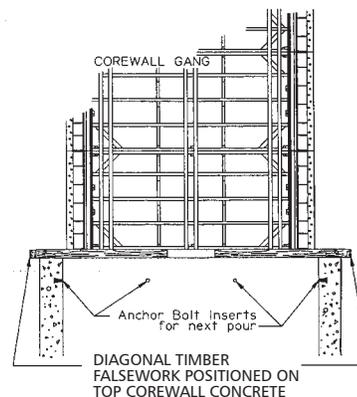
With the core form sitting in this, out of the way, yet close at hand, storage place, the Shear Wall Brackets for the new position can be installed, inserts attached, and the form cleaned and oiled.



DOUBLE HINGED CORNERS IN FOLDED POSITION
Section A-A



DOUBLE HINGED CORNERS IN FOLDED POSITION
Section B-B



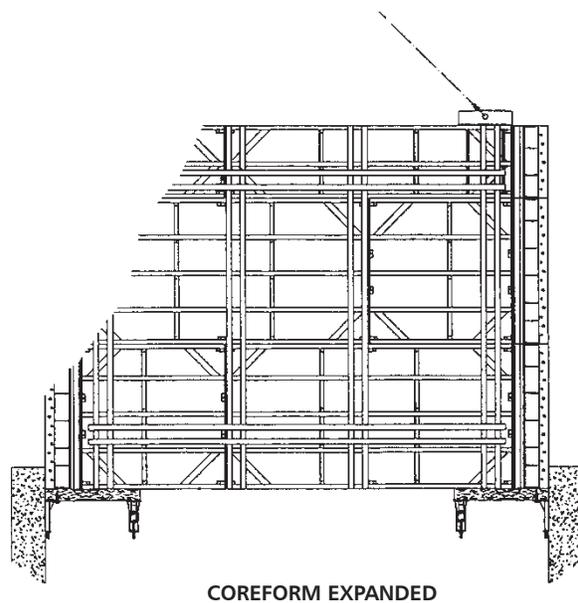
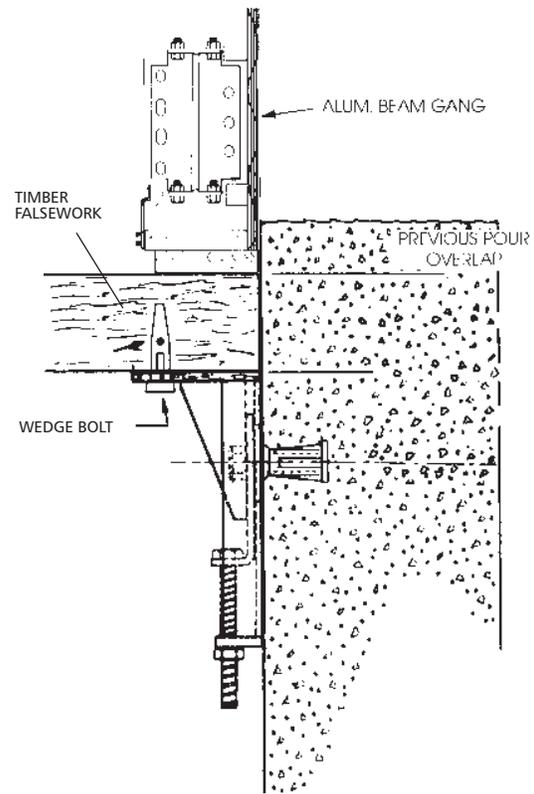
5. Install the appropriate-sized timber falsework on the Adjustable Shear Wall Brackets. The elevation adjustment range of the brackets is $2\frac{3}{8}$ " as indicated in the illustration. The criteria for positioning the Anchor Bolt inserts at the appropriate elevation should include a median "A" dimension of $4\frac{1}{2}$ " for optimum bracket adjustability.
6. Have the crane lift the core form enough to permit removal of temporary falsework from across the corners of the core wall. Then lower core form onto the Adjustable Shear Wall Brackets and support falsework installed for the next pour. Remove the crane rigging from the core form.

CAUTION: The timber falsework is an essential component to the functional support of the Aluminum Beam Gang Form System core form. Since core form walls move inward 6", the timber provides a stable extension platform to the 5 x 5" head plate of the Adjustable Shear Wall Bracket.

7. Expand core form back to pour position by turning Core Wall Turnbuckle Braces outward until each Double Hinged Corner returns to exactly 180 degrees. Then reinstall Fit-Up Bolts to lock out hinge action.

CAUTION: It is vital alignment between the Double Hinged Corner and the adjoining form faces not be forcibly bent toward the wall thickness. When this condition is permitted to exist, it wedge-locks the stripping hinge action at the corners. This problem will always result form misalignment or dimensional errors occurring elsewhere in, either the inside, or outside, core form. Such as:

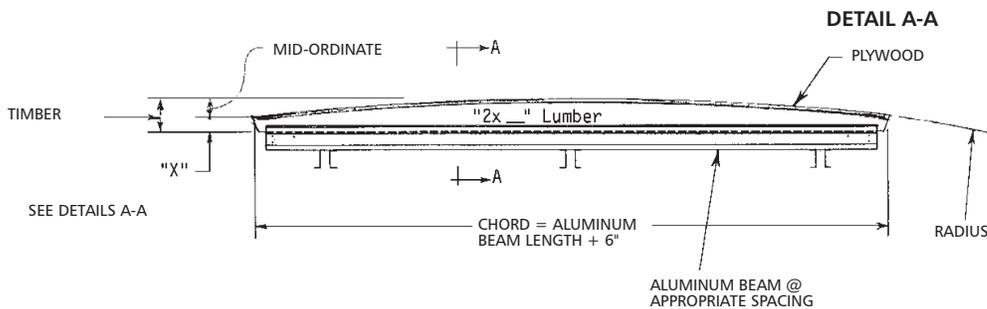
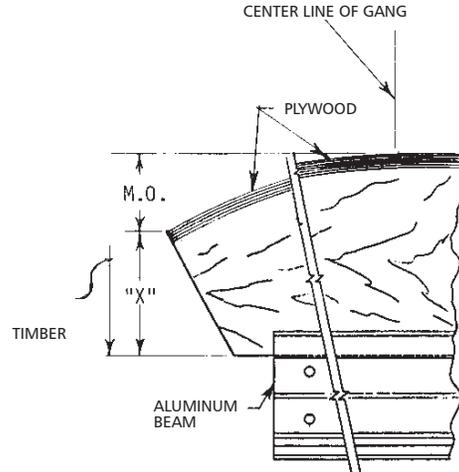
- A. The inside core form wall length, plus wall thickness, does not add up to the outside core form size.
- B. Taper Ties or She-Bolts may draw forms to undersized wall thickness.
- C. The outside core form may not have adequate horizontal strongbacking to stay aligned between outside corners and adjoining wall ties.



I. CURVED WALL FORMING

The Aluminum Beam Gang Form System can be utilized to form curved walls. An appropriate sized "2-by", with one edge cut to the proper radius, is installed in place of the 2x2 nailer in the beam. The gang is limited in length to one beam length, and assembled just as any other Aluminum Beam Gang would be. To select lumber size and beam length, proceed as follows:

1. Assume a beam length, usually 12 to 24 feet.



ALUMINUM GANG FORM SYSTEM CURVED WALL GANG
(FOR ALUM. BEAM OR ALUM. JOIST)

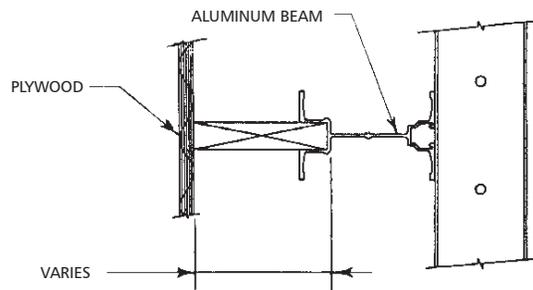
2. Use the following formula to determine the mid-ordinate:

$$\text{M.O.} = R - \frac{1}{2} \text{ square root of } (4 \times R^2 - C^2)$$

where $R =$ radius of curve in inches

$C =$ Chord - Beam length in inches, plus 6"

3. Add 1 inch to the mid-ordinate, and compare this dimension to the depth of "2-by" lumber available for use. Select the first "2-by" that has a depth greater than the required dimension. Allow about 1/2" extra for cutting purposes. If the dimension determined above is unsatisfactory, repeat the process using a longer or shorter beam, depending on the way the dimension needs to be adjusted.
4. Add the total depth of plywood, lumber, beam, waler, and washer, to determine the tie required. This depth may not permit use of standard Taper Ties or She-Bolt Ties.
5. After installing radius member in beam so that it extends 3 inches past end of beam, trim the end to a radial to avoid interference with adjacent gangs if used.



SECTION A-A

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Safety Information

	<p style="text-align: center;">⚠ WARNING</p> <p style="text-align: center;">Improper Use of Concrete Accessories Can Cause Severe Injury or Death</p> <p>Read, understand and follow the information and instructions in this publication before using any of the Dayton Superior concrete accessories displayed herein. When in doubt about the proper use or installation of any Dayton Superior concrete accessory, immediately contact the nearest Dayton Superior Service Center or Technical Service Department for clarification. See back cover for your nearest location.</p>
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Dayton Superior products are intended for use by trained, qualified and experienced workmen only. Misuse or lack of supervision and/or inspection can contribute to serious accidents or deaths. Any application other than those shown in this publication should be carefully tested before use.

The user of Dayton Superior products must evaluate the product application, determine the safe working load and control all field conditions to prevent applications of loads in excess of a product's safe working load. Safety factors shown in this publication are approximate minimum values. The data used to develop safe working loads for products displayed in this publication are a combination of actual testing and/or other industry sources. Recommended safe working loads given for the products in this publication must never be exceeded.

Worn Working Parts

For safety, concrete accessories must be properly used and maintained. Concrete accessories shown in this publication may be subject to wear, overloading, corrosion, deformation, intentional alteration and other factors that may affect the device's performance. All reusable accessories must be inspected regularly by the user to determine if they may be used at the rated safe working load or should be removed from service. The frequency of inspections depends upon factors such as (but not limited to) the amount of use, period of service and environment. It is the responsibility of the user to schedule accessory hardware inspections for wear and remove the hardware from service when wear is noted.

Shop or Field Modification

Welding can compromise a product's safe working load value and cause hazardous situations. Knowledge of materials, heat treating and welding procedures is necessary for proper welding. Consult a local welding supply dealer for assistance in determining required welding procedures.

Since Dayton Superior cannot control workmanship or conditions in which modifications are done, Dayton Superior cannot be responsible for any product altered in the field.

Interchangeability

Many concrete accessory products that Dayton Superior manufactures are designed as part of a system. Dayton Superior strongly discourages efforts to interchange products supplied by other manufacturers with components supplied by Dayton Superior. When used properly, and in accordance with published instructions, Dayton Superior products have proven to be among the best designed and safest in the industry. Used improperly or with incompatible components supplied by other manufacturers, Dayton Superior products or systems may be rendered unsafe.

Installation

WARNING

1. Dayton Superior Corporation products shall be installed and used only as indicated on the Dayton Superior Corporation installation guidelines and training materials.
2. Dayton Superior Corporation products must never be used for a purpose other than the purpose for which they were designed or in a manner that exceeds specific load ratings.
3. All instructions are to be completely followed to ensure proper and safe installation and performance.
4. Any improper misuse, misapplication, installation, or other failure to follow Dayton Superior Corporation's instruction may cause product malfunction, property damage, serious bodily injury and death.

THE CUSTOMER IS RESPONSIBLE FOR THE FOLLOWING:

1. Conformance to all governing codes
2. Use of appropriate industry standard hardware
3. The integrity of structures to which the products are attached, including their capability to safely accept the loads imposed, as evaluated by a qualified engineer.

SAFETY INSTRUCTIONS:

All governing codes and regulations and those required by the job site must be observed. Always use appropriate safety equipment

Design Changes

Dayton Superior reserves the right to change product designs, rated loads and product dimensions at any time without prior notice.

Note: See Safety Notes and Safety Factor Information.