

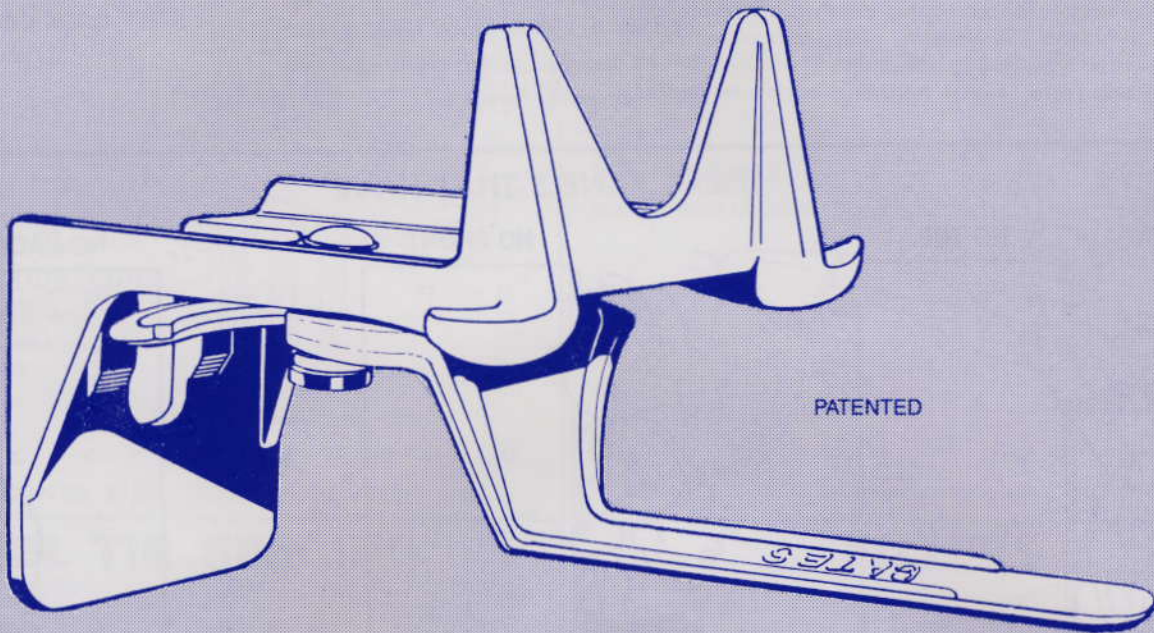
Gates

CAM-LOCK

FORMING

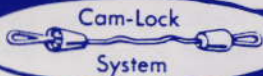
SYSTEM

Faster and better forming than ever before
from the company that invented the GATES
Single Water Cam-Lock System.



GATES Cam-Locks are designed and built to last !

USE **GATES**



Cam-Lock
System

All GATES products are quality made in America !

Gates & Sons, Inc.

300 CAM-LOCK
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UPDATED 12/93

90 SOUTH FOX STREET • DENVER, COLORADO 80223 • (303) 744-6185



ONE BRACKET — ONE TIE

The Cam Bracket accomplishes many purposes in one accessory. It is a support for normal S4S, 2x4 walers. It has dual-ears for the support of the scaffold bracket and the stiff-back cam. The forged cam finger grips the tie loop securing it firmly to the form panel. The malleable cast bracket is designed with additional strength provided for at the points of strain. The Cam Bracket may be used with either horizontal or vertical walers.



Drill $\frac{1}{8}$ " Tie Holes.

CAM-LOCK SELF-CENTERING POLY-CONE FORM TIE

The Poly-Cone tie features a high density polyethylene cone-washer with the flexibility to allow for oversized plywood and 2x4's. This cone-washer cannot absorb moisture or stick to the concrete, causing breakback problems. A smooth, uniform hole results after breakback, allowing easier grouting and faster, better finishing.



CODE NO. 076001

CAM BRACKET

Gates Cam-Lock Brackets may be used as a built-in-place forming system or attached to the plywood when used for gang forming.

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CODE NO. 077024 2x4
CODE NO. 077026 2x6

NEW STIFF-BACK CAM

USING PANELS THAT HAVE



CAM-LOCK FORMING SYSTEM

The Cam-Lock System, like other Gates Systems, still embodies the use of flexible inexpensive forming materials, S4S 2x4's or 2x6's with 4'x8'x3/4" or 2'x8'x3/4" plywood sheets. When used for built-in-place forming no ribbing or special hardware attached to the panels is necessary and the use of stiff backs and walers is cut in half. The walers may be used either vertically or horizontally, but field tests have proved the latter method to be easier and faster.

The Cam-Lock bracket holds the 2x4 waler in place by locking to the loop-end tie through caming pressure. Further rigidity of the form may be obtained through use of the Stiff Back Cam which connects to ears on the back of the Cam-Lock bracket, locking either a 2x4 or 2x6 in place with the same caming principle. This

also assures perfect alignment of the form from top to bottom and enhances the system's adaptability to extremely high, close tolerance work.

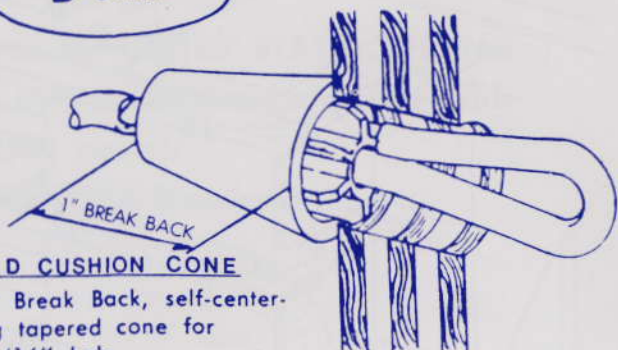
The extreme rigidity of Gates Cam-Lock System makes it adaptable to all types of construction, and this same rigidity, coupled with the Gates Scaffold Bracket, makes it especially desirable for high wall forming. Economy of the system is realized in labor costs through the simplicity of the system as well as the increased man-hour production that result from easier handling of the light weight plywood sheets. And, since only half as much dimension lumber is used, further savings are derived from lower materials cost.

Cones Available For **Gates** CAM-LOCK System

Gates

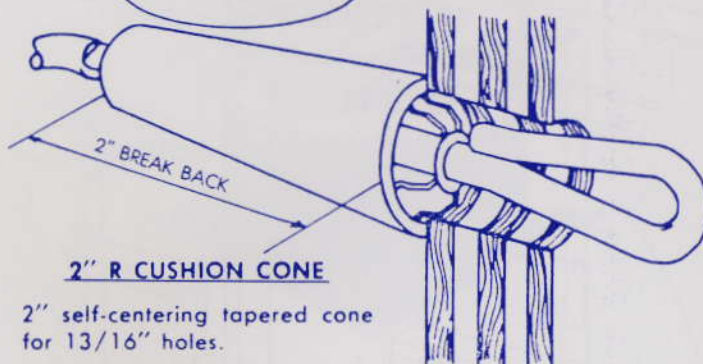
MOST POPULAR PLASTIC CONES

D CONE



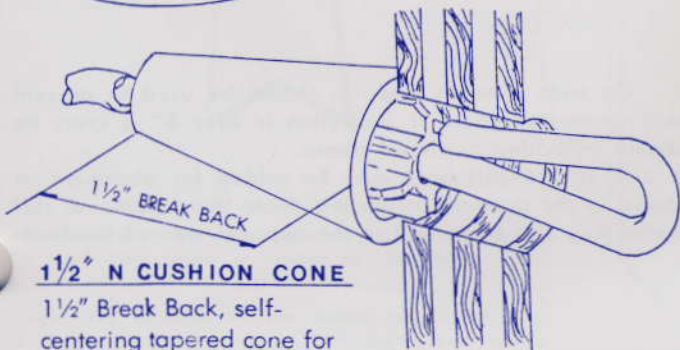
1" D CUSHION CONE
1" Break Back, self-centering tapered cone for 13/16" hole.

R CONE



2" R CUSHION CONE
2" self-centering tapered cone for 13/16" holes.

N CONE

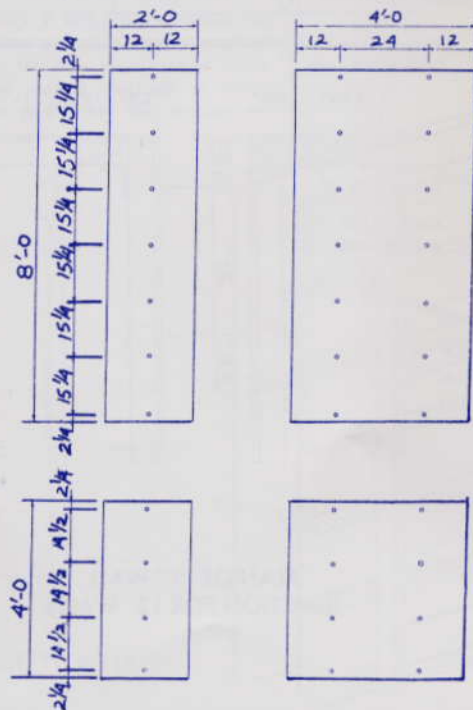


1 1/2" N CUSHION CONE
1 1/2" Break Back, self-centering tapered cone for 13/16" hole.

Gates has over 30 different cone designs to choose from for special applications.

ABOVE CONES FULL SIZE PATENTED

PANEL TIE SPACING



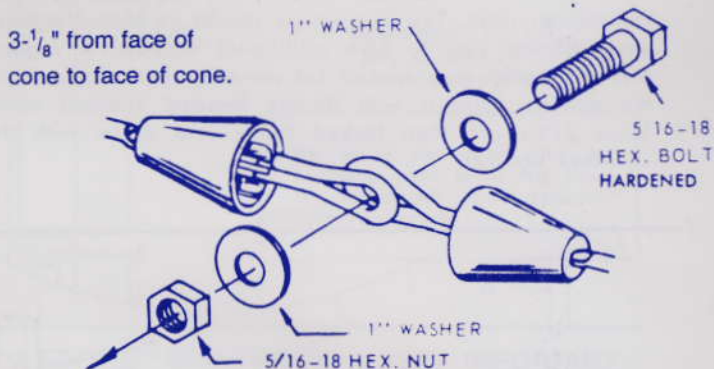
Drill 13/16" Tie Holes.

Tie Spacing For Regular Forming

GATES VERTICAL DRILL STAND

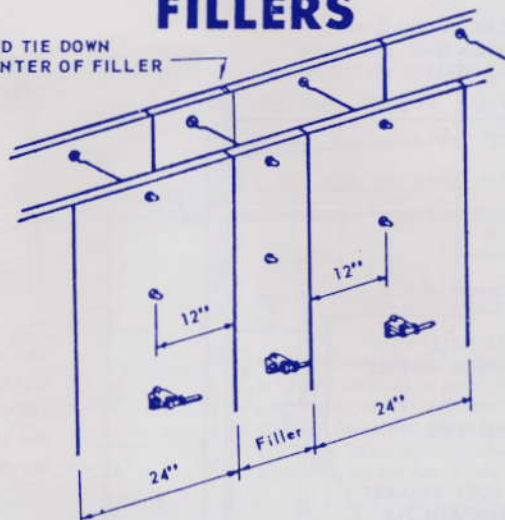
EXTENDING TIES

On special application this method of extending or attaching Ties may be used.
NOTE: Insert bolt through the tie loops and washers, then tighten securely with nut.



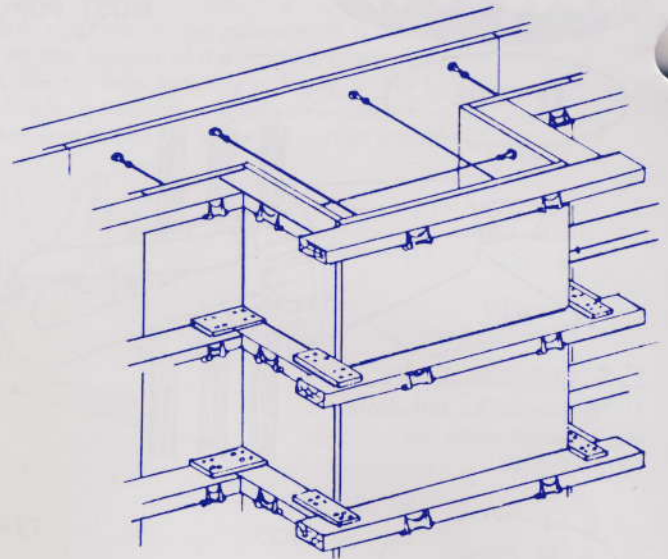
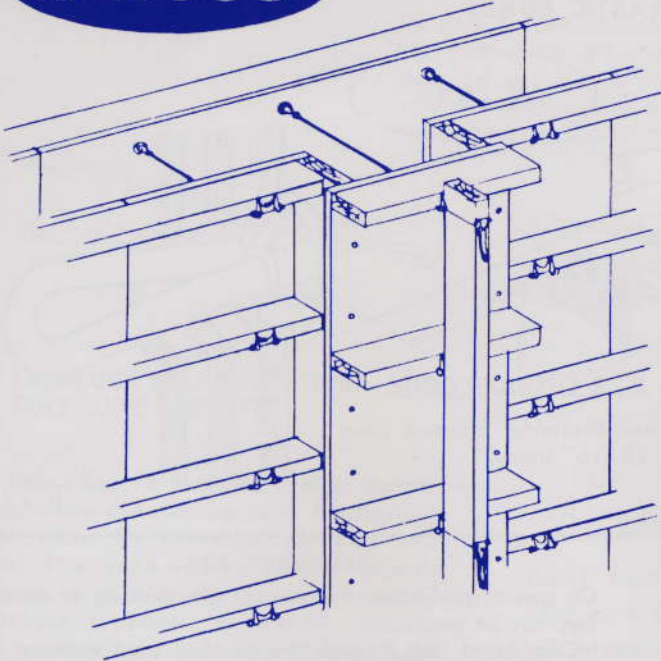
FILLERS

ADD TIE DOWN CENTER OF FILLER



Most forming jobs do not conform to a 2 ft. or 4 ft. module and as a result, filler panels must be inserted. The filler may be cut on the job from plywood or made up of sheathing. If the filler panel is more than a few inches in width, an additional row of ties in the center of that filler should be added. Tie spacing should never exceed the regular tie spacing. As an example: if tie spacing being used on regular panels is 24" from center to center, this same spacing or less, must be maintained at the filler.

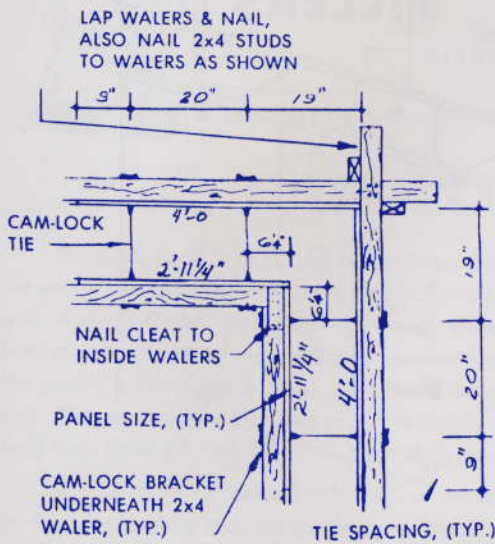
PILASTERS and CORNERS



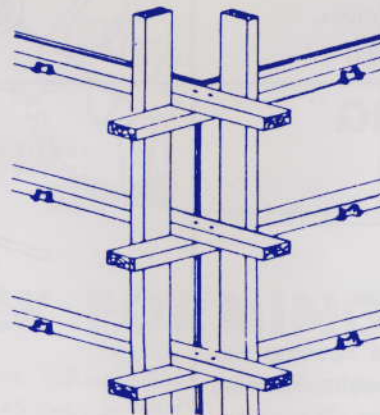
1. When a pilaster projects only a small distance from the main wall, dimension lumber may be used to form the pilaster sides. The 2x4 walers should be butted against each pilaster side to give additional support. A regular plywood panel or a special cut panel is then nailed in to the pilaster uprights with double headed scaffold nails. Short 2x4's are then locked firmly into place with the cam-lock bracket.

2. On wide pilasters two ties should be used to prevent shifting or deflection. If projection is over 8" a cross tie should be added as shown above.

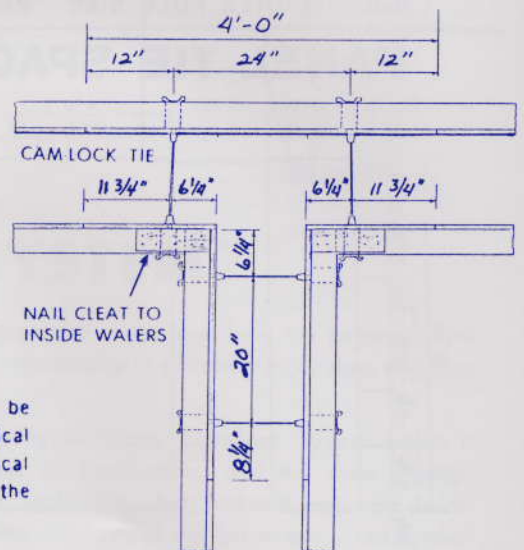
A 2x4 or 2x6 stiff back may be added for alignment as shown in the drawing at the left. Note that additional stiff backs may also be added to the opposite side of the form.



PLAN OF TYPICAL CORNER FOR 12" WALLS



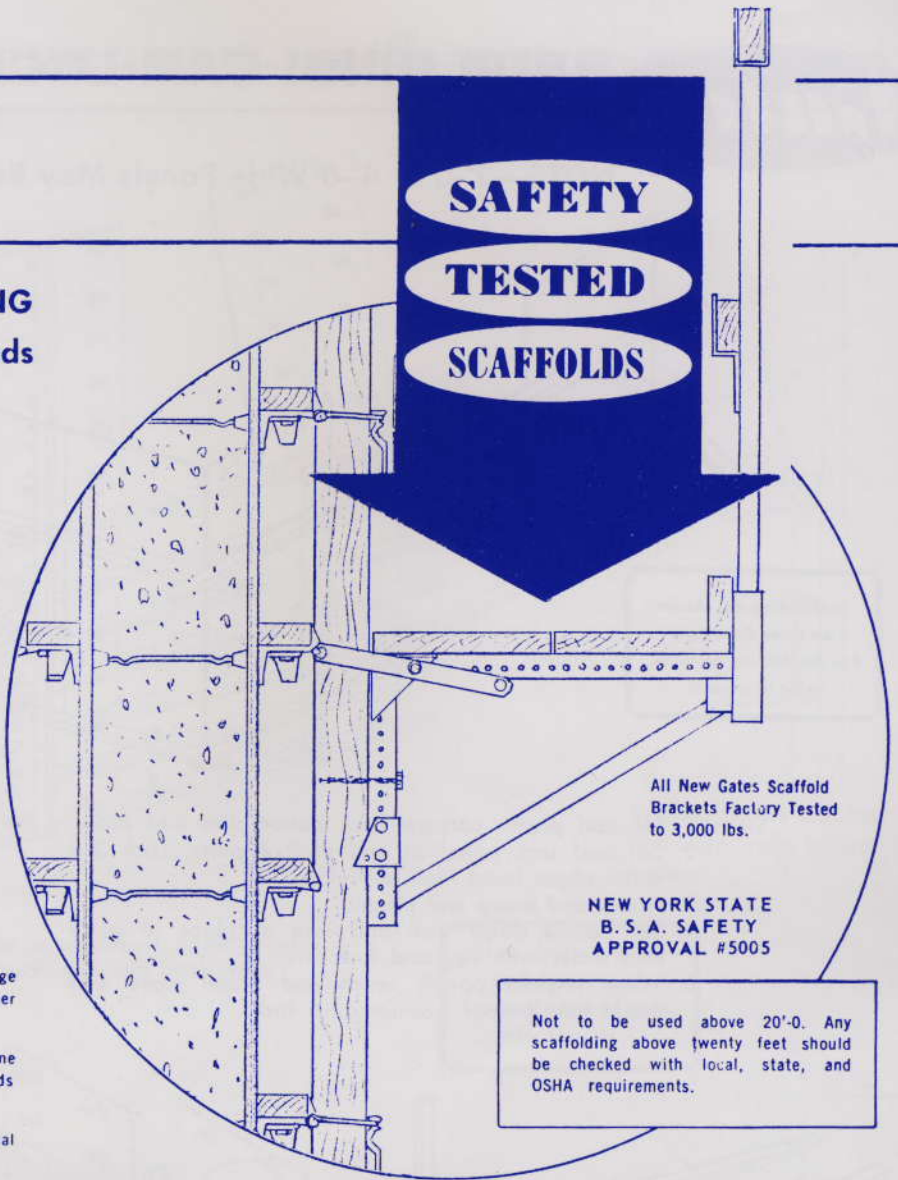
The outside corner on high walls may be locked securely by running two vertical 2x4's as shown in drawing. These vertical 2x4's should be securely nailed into the horizontal 2x4's with doublehead nails.



PLAN OF "T"-WALL JUNCTION FOR 12" WALLS

Gates

Proved by UNITED STATES TESTING CO., INC. to withstand repeated loads of 2500 pounds.
(Meets OSHA Standards.)



All New Gates Scaffold Brackets Factory Tested to 3,000 lbs.

NEW YORK STATE
B. S. A. SAFETY
APPROVAL #5005

Not to be used above 20'-0. Any scaffolding above twenty feet should be checked with local, state, and OSHA requirements.

The Gates scaffold bracket is constructed of sturdy, heavy gauge steel. Extra rigidity is obtained by spot welded corner gusset plate and tubular riveted bracing.

Hanger arms attach to the Cam Bracket ears in the same manner as the stiff back cam. Secure, firm attachment in seconds is accomplished without bolts, nuts or nails.

It is quickly adaptable for use with 2x6 stiff back by removal and repositioning of hanger arms.

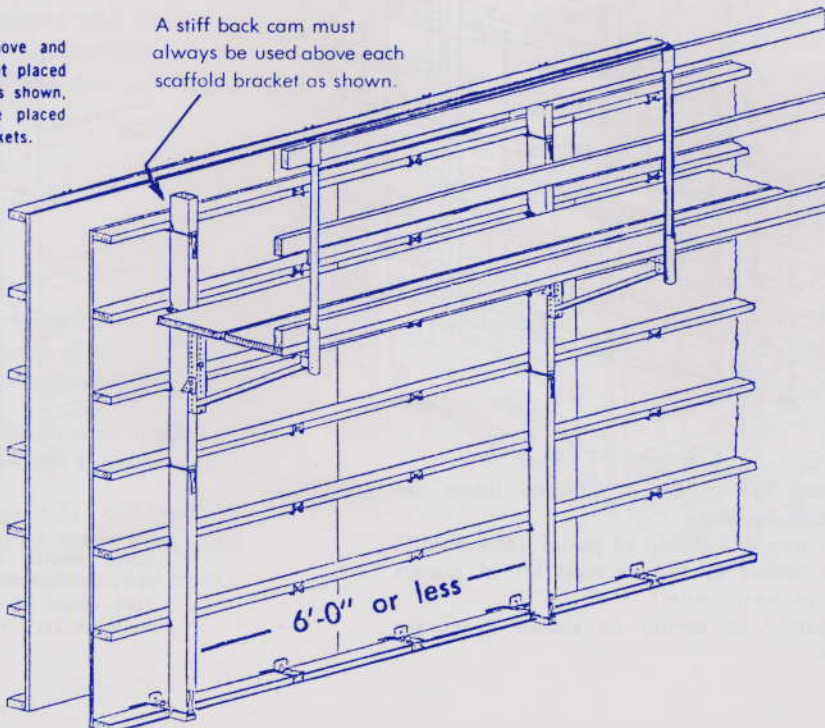
VERY IMPORTANT ~ HOW TO USE GATES SCAFFOLD BRACKETS ~ VERY IMPORTANT

Place a stiff-back cam above and below each scaffold bracket placed on the form. When used as shown, the scaffold load will be placed on several ties and brackets.

A stiff back cam must always be used above each scaffold bracket as shown.



SAFETY POST



On all walls, scaffold brackets must always be placed within 6'-0". 42" Guard Rail with toe plate, mid-rail and top rail must be used!

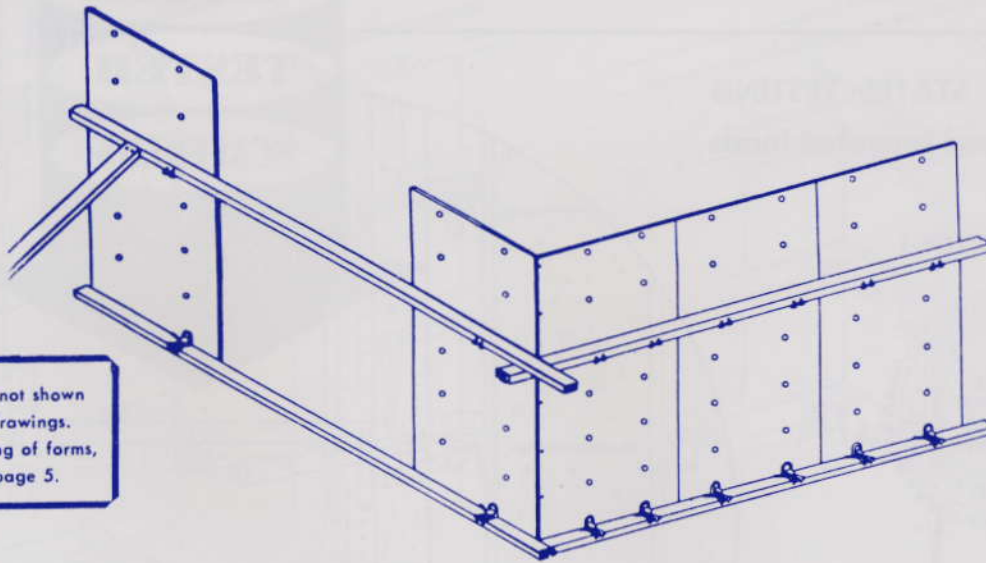
Scaffold Bracket must be attached to second Cam-Lock or lower from top of form, with at least one Stiffback Cam above and at least one below. Never attach Scaffold Bracket to the top row of ties.

All 2x4 stiff backs used to attach the Gates scaffold brackets **MUST EXTEND TO A SOLID BASE. NEVER** use short pieces of 2x4 under the scaffold brackets.



BUILDING CAM-LOCK STEP BY STEP

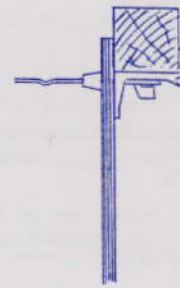
NOTE—2'-0 or 4'-0 Wide Panels May Be Used With This Method.



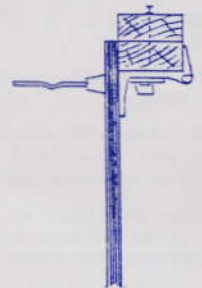
Preload panels with ties and Cam-Locks before setting.

Scaffolding not shown on these drawings. For Scaffolding of forms, refer to page 5.

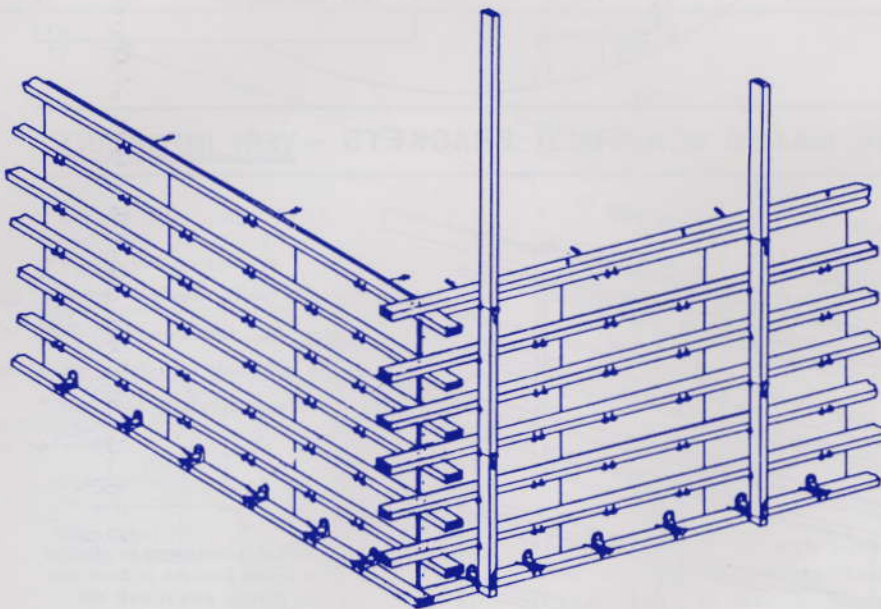
- Steps
1. Set and plumb corners—Lock bottom ties into place.
 2. Set and lock panel at end of 2x4 plate. Lock 2x4 waler about head high into place.
 3. Plumb and brace end panel.
 4. Set panels down wall and lock in place at plate and waler with ties and brackets.
 5. When regular panels reach end panel move end panel into proper position and lock.



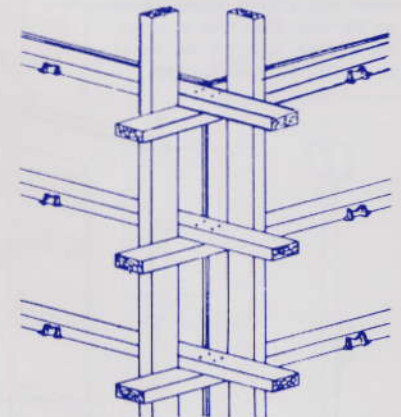
4x4 at Joint



2x4s at Joint



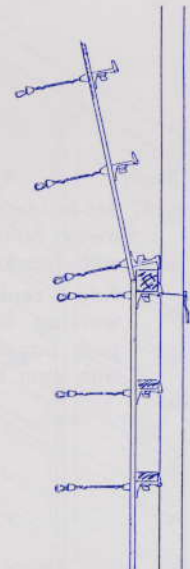
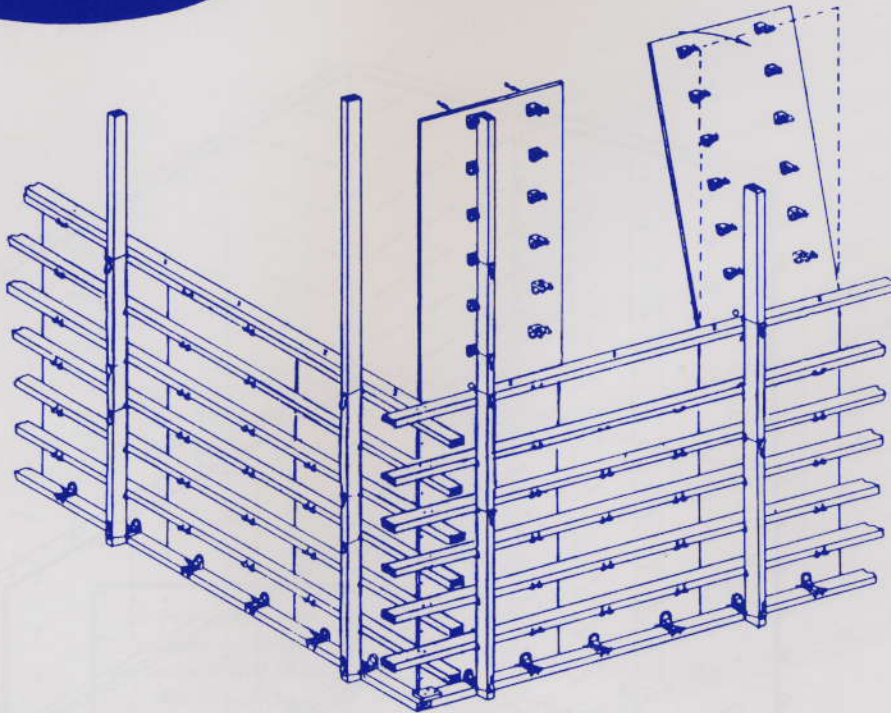
- Steps
6. Put all horizontal 2x4 walers into place, insert ties and lock with cam-brackets.
 7. Add two 2x4 or one 4x4 at top of panel. (See detail.)
 8. Add stiff-backs (either to top of next lift of panels or to midpoint of next panel).
 9. Lock 2x4's together at corner as shown in corner at right →



The outside corner on high walls may be locked securely by running two vertical 2x4's as shown in drawing. These vertical 2x4's should be securely nailed into the horizontal 2x4's with double head nails.



BUILDING CAM-LOCK STEP BY STEP



Preload panels with ties and Cam-Locks before setting.

Steps

10. Add scaffold brackets. (See page 5)
11. Insert ties and lock cam-brackets in place on all panels. Raise panels up and set into place, then lock to stiff-backs with stiff back cams. (See detail.)

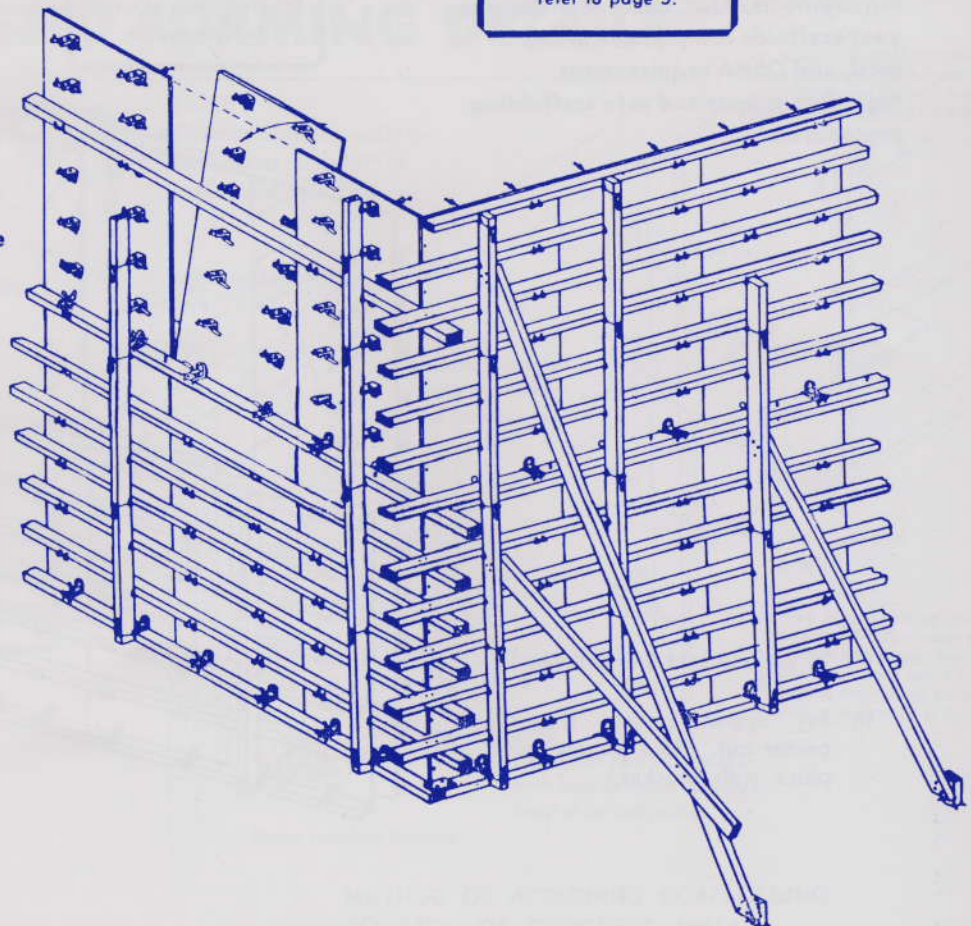
Scaffolding not shown on these drawings. For Scaffolding of forms, refer to page 5.

NOTE:

Before scaffolding your forms, check job conditions and any special requirements. Also, check to make sure your scaffolds comply with state, local, and OSHA requirements regarding proper and safe scaffolding procedures.

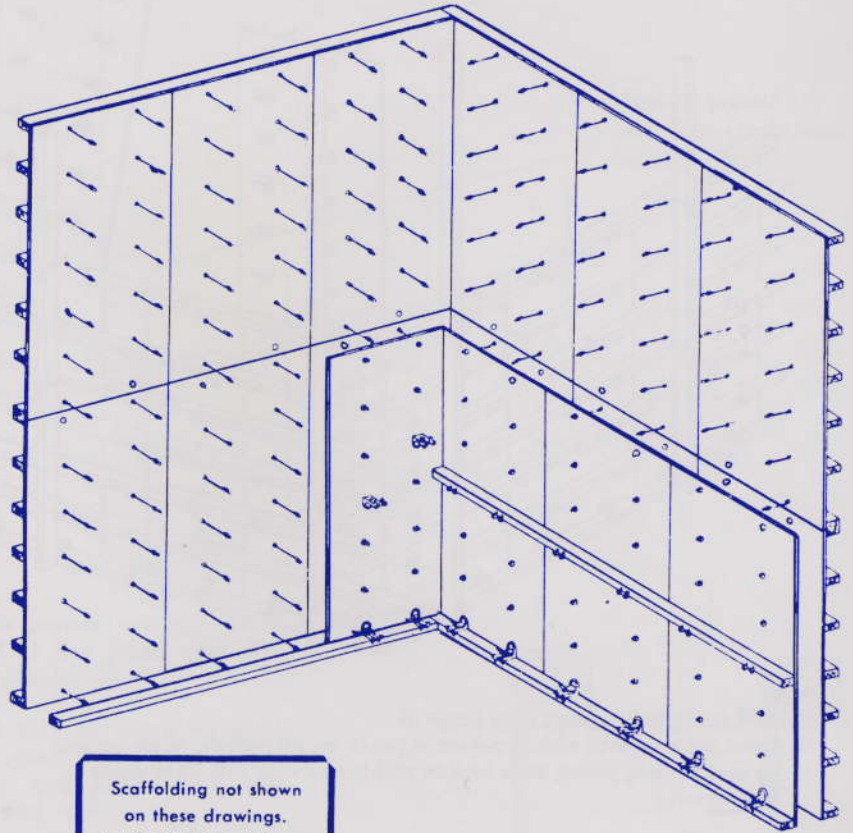
Steps

12. Add 2x4 waler and set balance of panels and put walers in place.
13. Add stiff-backs as needed then line and brace forms.
14. By keeping 2x4 stiff-backs to about midpoint of panel, 2x4 walers may be added more easily.



Steps

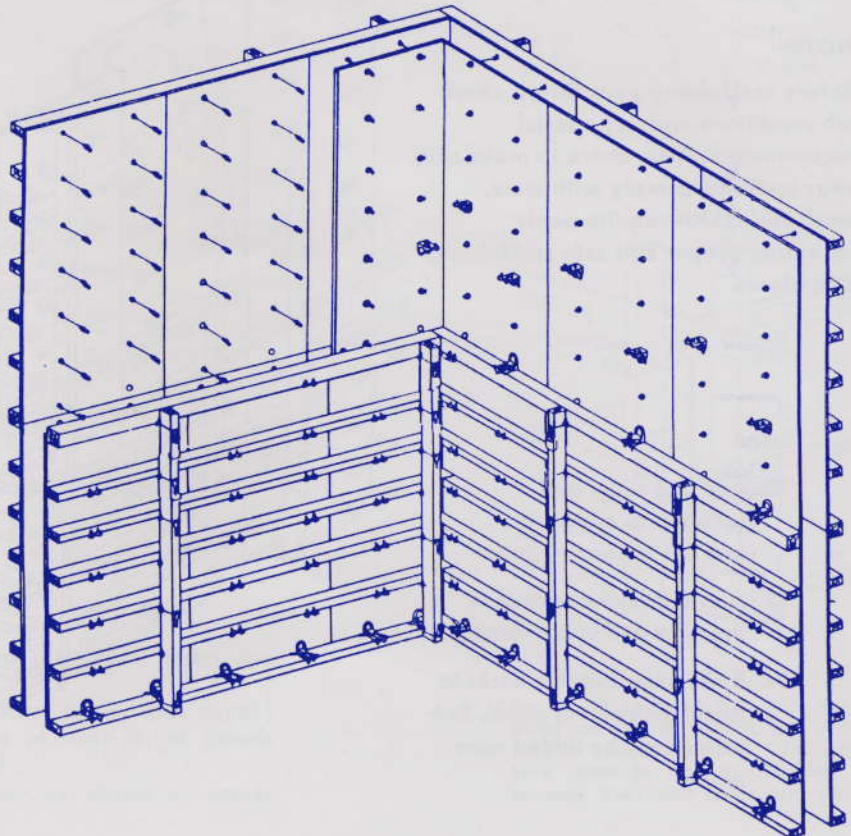
15. Set Inside corners and work away, hold panels in place with bracket.
16. Add center waler and working out from center, push panels tight and lock with cam brackets.



NOTE:

Before scaffolding your forms, check job conditions and any special requirements. Also, check to make sure your scaffolds comply with state, local, and OSHA requirements regarding proper and safe scaffolding procedures.

Scaffolding not shown on these drawings. For Scaffolding of forms, refer to page 5.

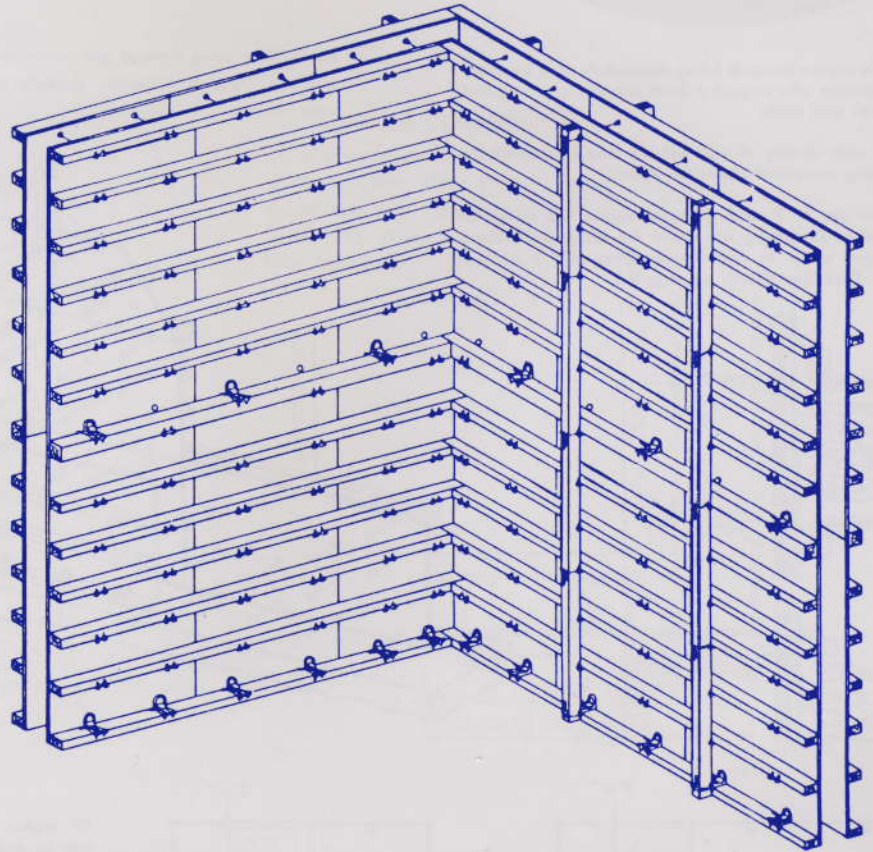


Steps

17. To use Scaffold Brackets see page 5.
18. Set upper panels from corner out. (Hold panels in place with bracket.)



BUILDING CAM-LOCK STEP BY STEP



Steps

- 19. Add remaining 2x4 Walers and Cam-Brackets.
- 20. Add Stiff-Backs as needed.

Scaffolding not shown on these drawings. For Scaffolding of forms, refer to page 5.

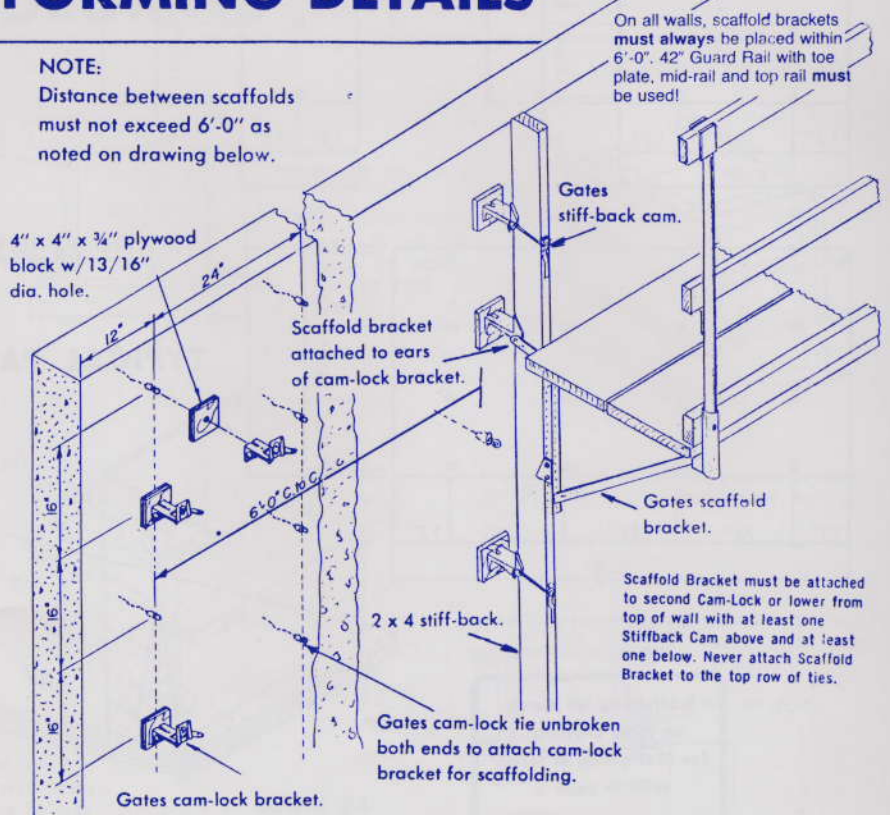
SUGGESTED FORMING DETAILS

NOTE:
Attach stiff-back to 3 brackets (brackets attached to unbroken ties) three ties must be used at each scaffold bracket location.

All 2x4 stiff backs used to attach the Gates scaffold brackets MUST EXTEND TO A SOLID BASE. NEVER use short pieces of 2x4 under the scaffold brackets.

For Scaffolding of forms, refer to page 5.

NOTE:
Distance between scaffolds must not exceed 6'-0" as noted on drawing below.



On all walls, scaffold brackets must always be placed within 6'-0". 42" Guard Rail with toe plate, mid-rail and top rail must be used!

Scaffold Bracket must be attached to second Cam-Lock or lower from top of wall with at least one Stiffback Cam above and at least one below. Never attach Scaffold Bracket to the top row of ties.

METHOD OF ATTACHING SCAFFOLDING TO FACE OF CONCRETE WALL



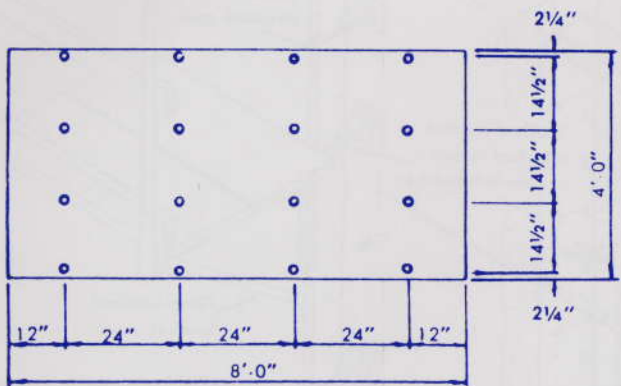
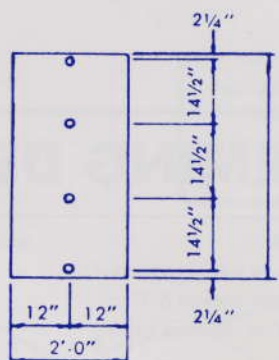
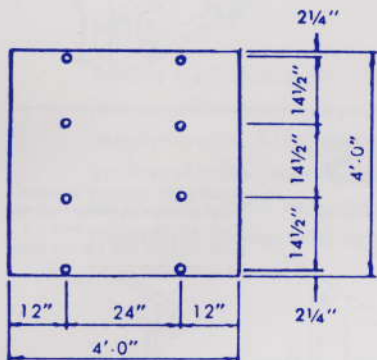
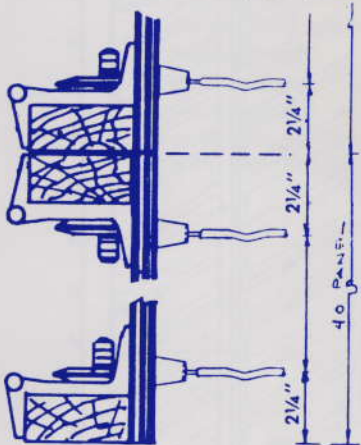
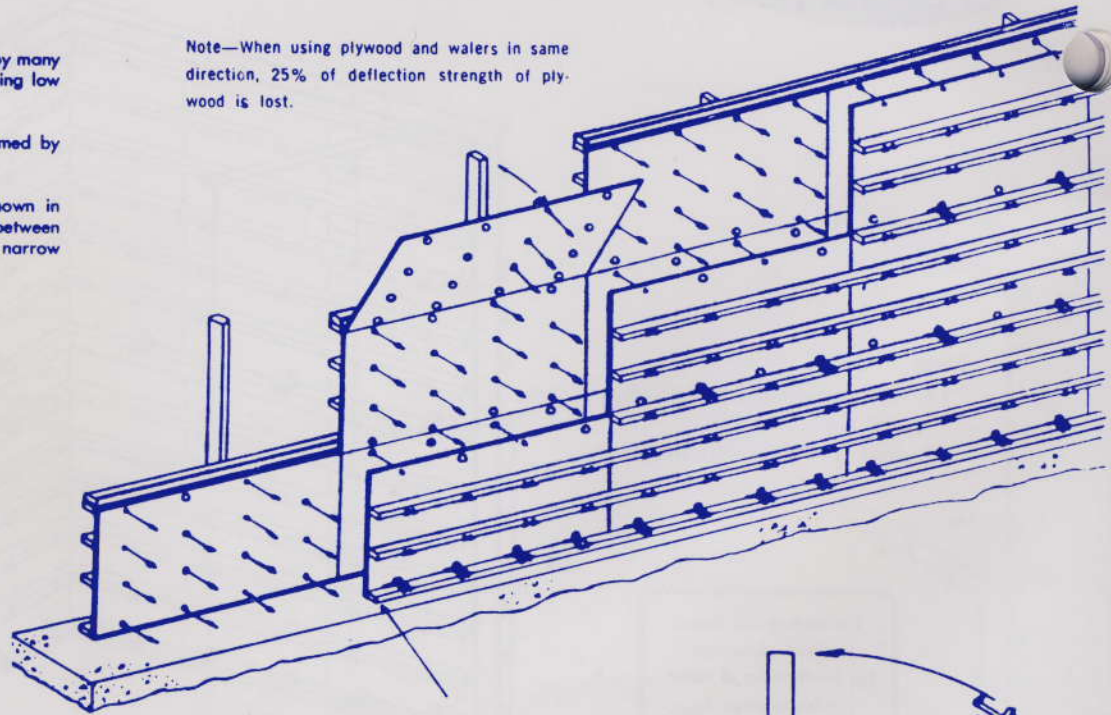
LOW or HIGH WALL PANELS

The system shown is being successfully used by many contractors who require a form capable of doing low or high wall work.

A wide variety of wall heights may be formed by stacking one panel above the other.

The use of 2' and 4' panel widths (as shown in Template Drawings) will make the distance between pilasters easier to control—requiring only a narrow filler. (See filler details on page 9.)

Note—When using plywood and walers in same direction, 25% of deflection strength of plywood is lost.



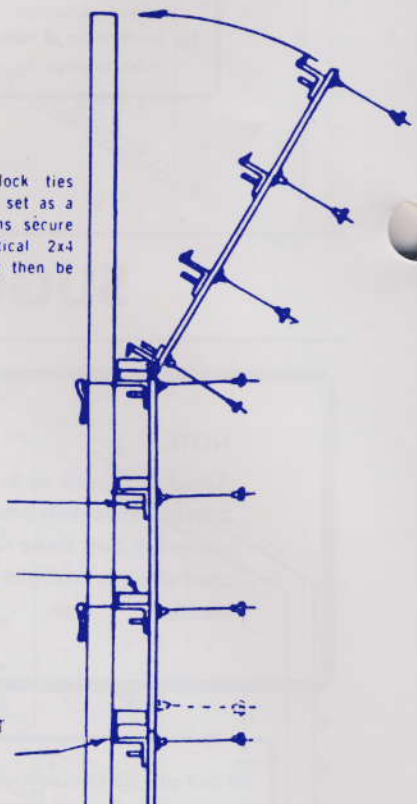
Drill 13/16" Tie Holes.

TYPICAL PANELS

CAM-LOCK BRACKET

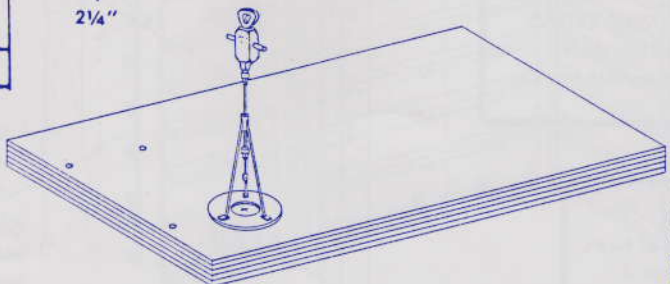
2 x 4 WALER

DOUBLE 2 x 4 WALER AT JOINT W/TIES STAGGERED



PREPARING YOUR FORMS

To speed up form manufacture several panels may be stacked and drilled at one time: The top panel may be reused each time as a template. A 13/16" high speed wood bit and drill should be used.



Scaffolding not shown on these drawings. For Scaffolding of forms, refer to page 5.

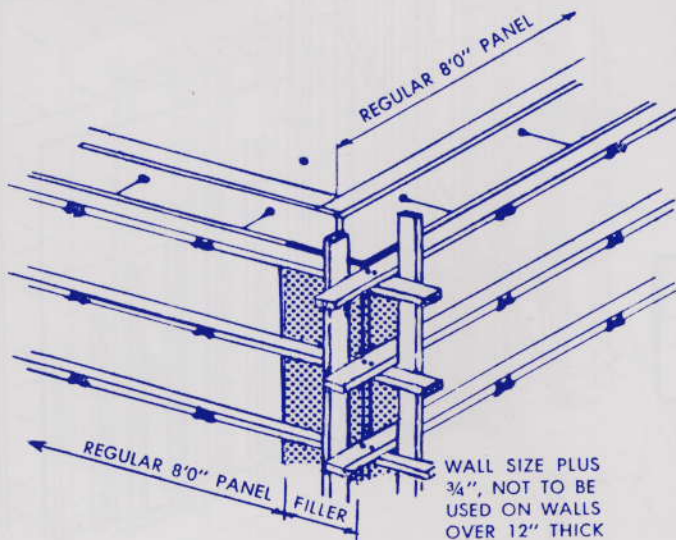
Gang drilling of plywood panels may be done with the GATES drill stand. Stack the panels neatly one directly above the other and drill. We recommend you never drill more than five or six sheets of plywood at a time.



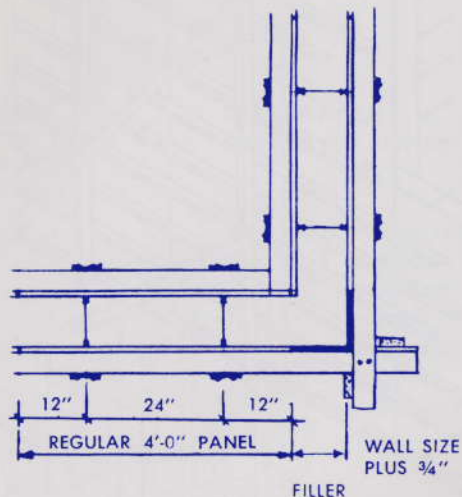
LOW WALL FORMING

OUTSIDE CORNERS

To eliminate cutting full panels at the corner, filler panels the same as wall thickness plus 3/4" for plywood thickness may be used.

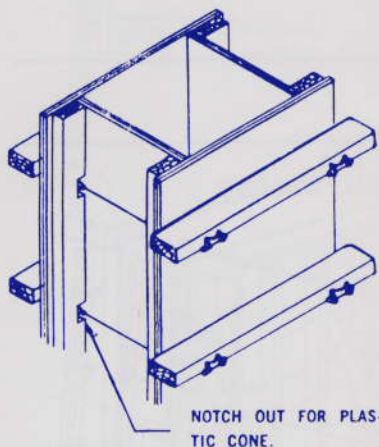


WALL SIZE PLUS 3/4", NOT TO BE USED ON WALLS OVER 12" THICK



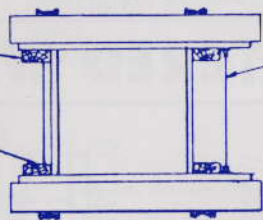
COLUMNS

DETAIL #1



2x4 NAILED TO SIDE PLYWOOD PANELS.

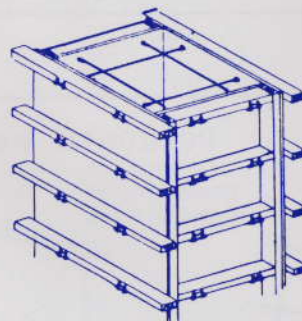
NOTCH OUT FOR PLASTIC CONE.



CAM-LOCK TIE

TIE MAY BE PLACED NEXT TO 2x4 INSTEAD OF NOTCHING FOR CONE, AS SHOWN.

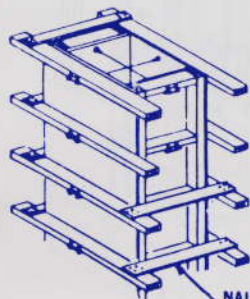
DETAIL #3



COLUMN ABOVE SHOWS FOUR ROWS OF TIES, TYPICAL FOR ALL COLUMNS OVER 30" SQ.

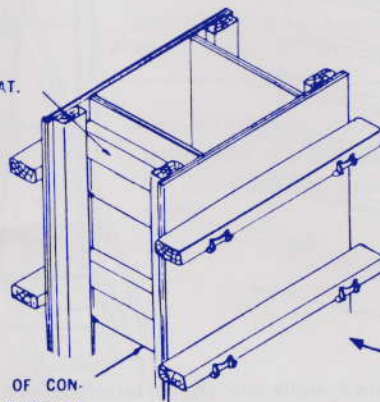
COLUMN AT LEFT SHOWS TWO ROWS OF TIES, TYPICAL FOR ALL COLUMNS UNDER 30" SQ.

DETAIL #2



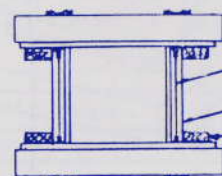
NAIL CLEAT TO WALERS; ALL CLEATS NOT SHOWN

2x4 ON FLAT.



TIE OUTSIDE OF CONCRETE IN OPEN SPACE MADE BY 2x4 ON FLAT.

DETAIL #4



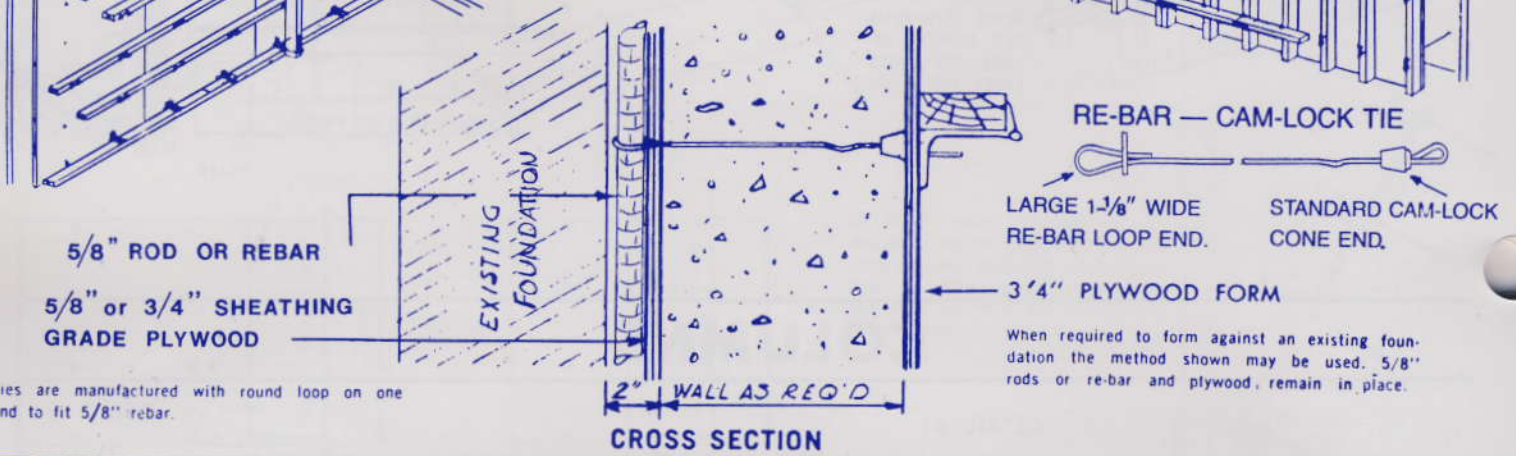
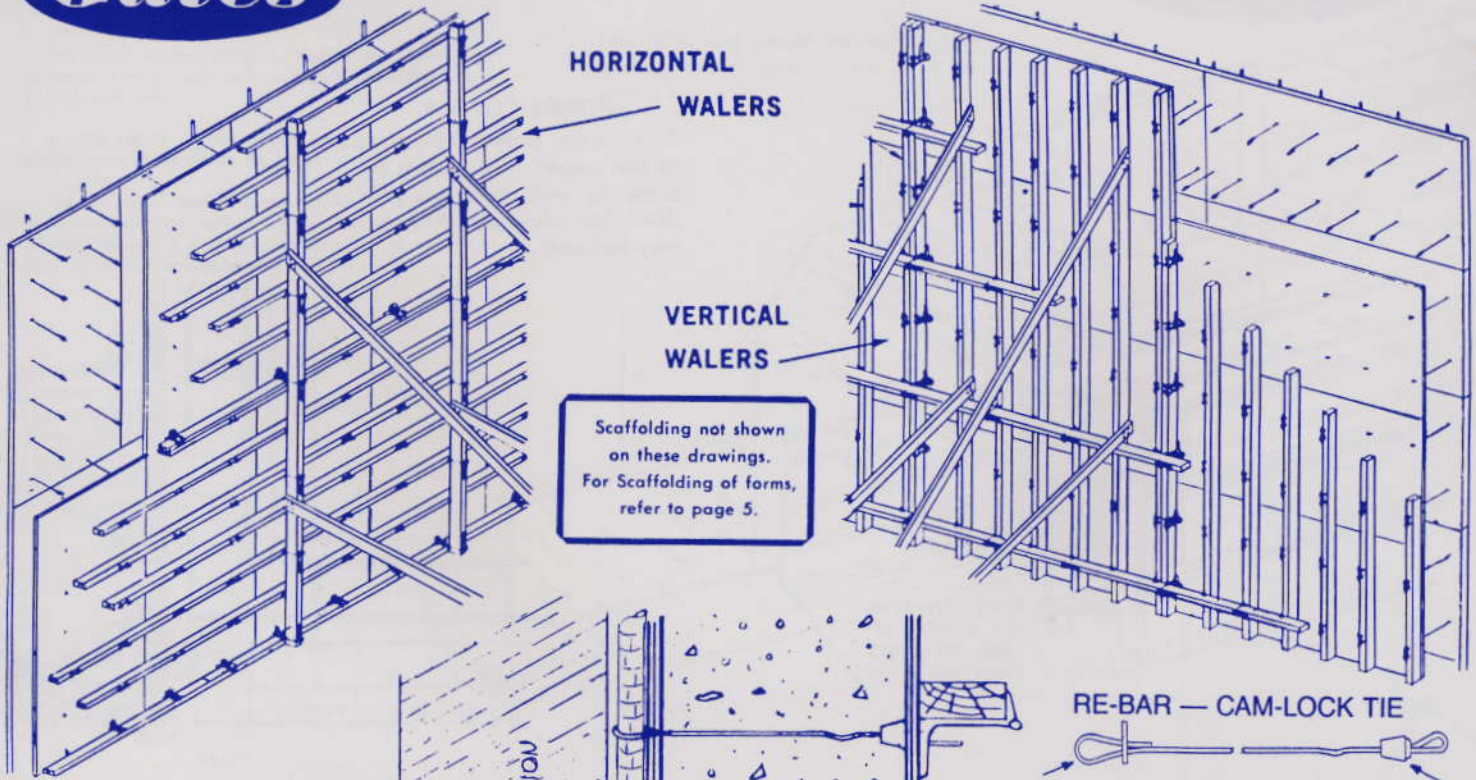
CAM-LOCK TIE BETWEEN STUD AND PLYWOOD.

2x4 ON FLAT.

2x4 STUD NAILED TO SIDE PLYWOOD PANELS.

PROPERTY LINE FORMING

THE EASY WAY

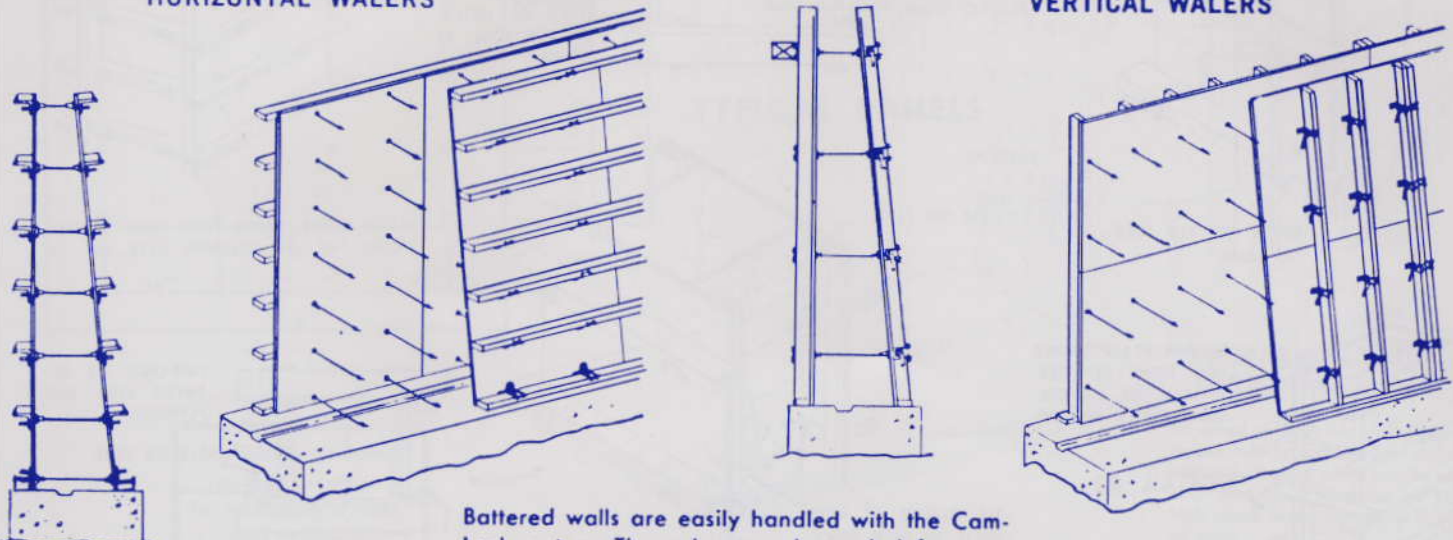


Ties are manufactured with round loop on one end to fit 5/8" rebar.

BATTERED WALLS

HORIZONTAL WALERS

VERTICAL WALERS

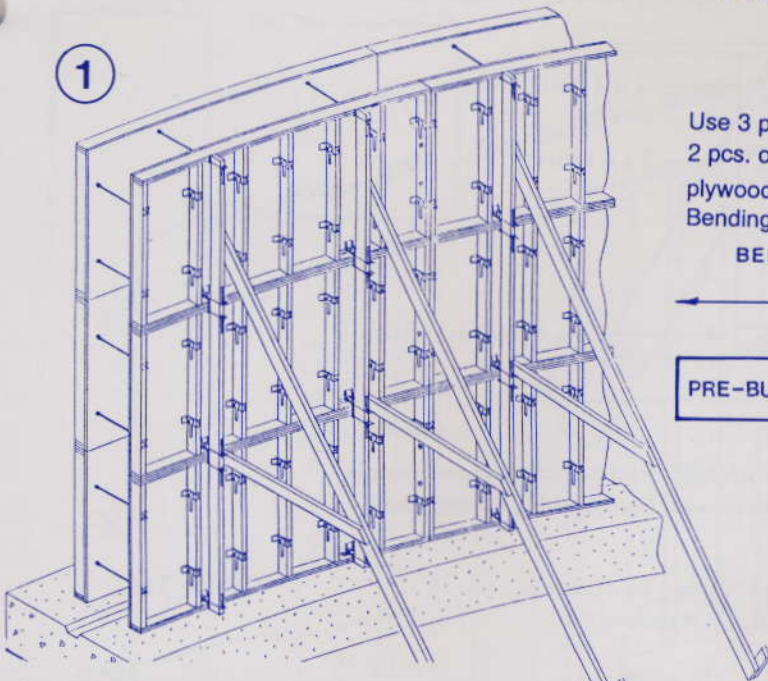


Battered walls are easily handled with the Cam-Lock system. Tie ends are color coded for easy identification on the job. Cam-Lock Form Ties can be manufactured in 1/8" size variations when required.



SUGGESTED CIRCULAR FORMING

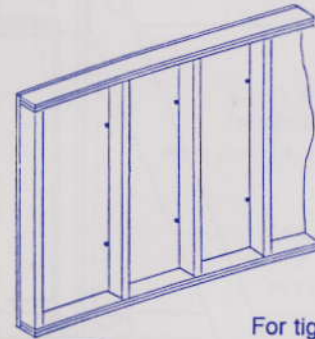
THREE SUGGESTED METHODS



1

Use 3 pcs. of 1/4" or 2 pcs. of 3/8" plywood face - See Bending Table.

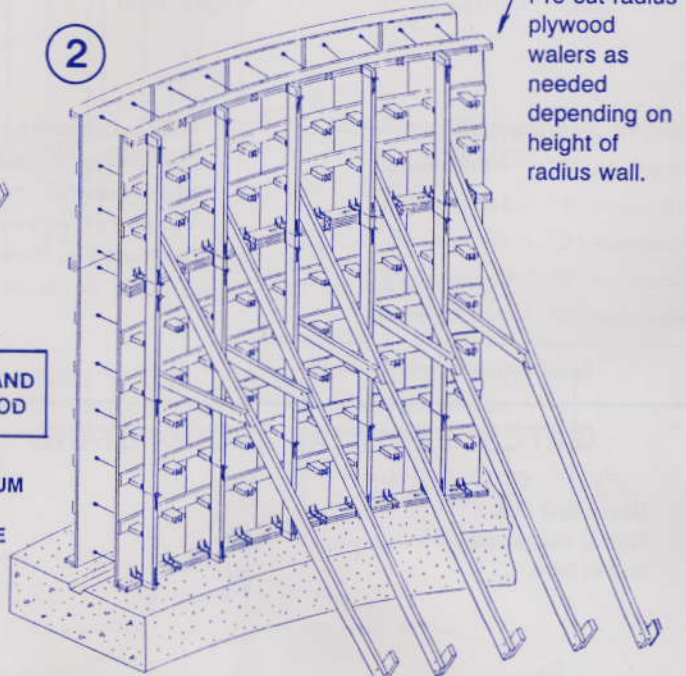
BELOW



4 x 8 Pre-built radius panels with top and bottom radius plates.

PRE-BUILT RADIUS PANELS

For tight radius concrete wall forming.



2

Pre-cut radius plywood walers as needed depending on height of radius wall.

1x4 SHEATHING AND BLOCKING METHOD

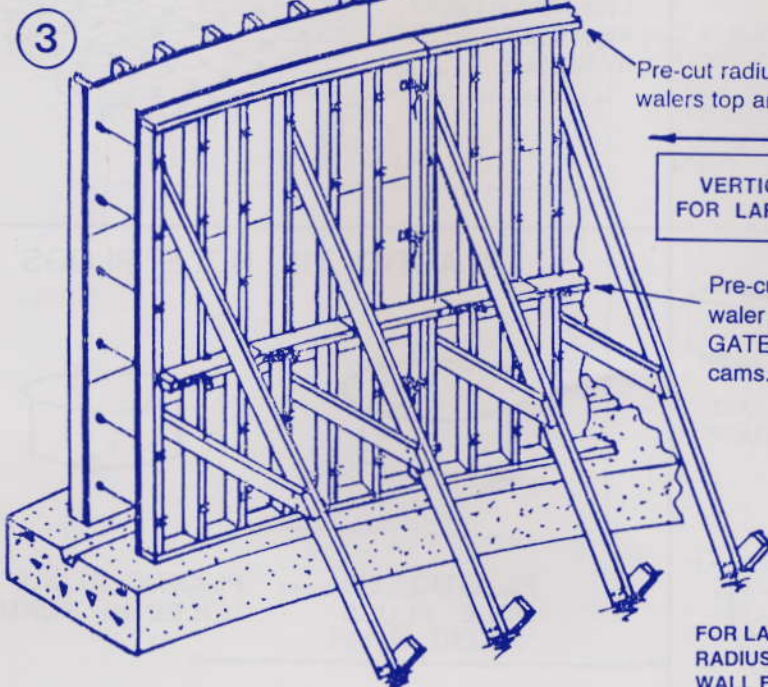
FOR MEDIUM RADIUS CONCRETE WALL FORMING

Set continuous 1x4's at Cam-Lock Brackets FOR JUST ABOVE TIE HOLES

Block at Cam-Lock Brackets



Block cut from 2x4's



3

Pre-cut radius plywood walers top and bottom

Form plywood and vertical studs

3 1/2" X 1 1/2" 2 PLY PLYWOOD RADIUS WALER

VERTICAL 2x4 METHOD FOR LARGER RADIUS WALLS

Pre-cut plywood 2 x 4 waler held in place with GATES 2 x 4 Stiff-back cams.

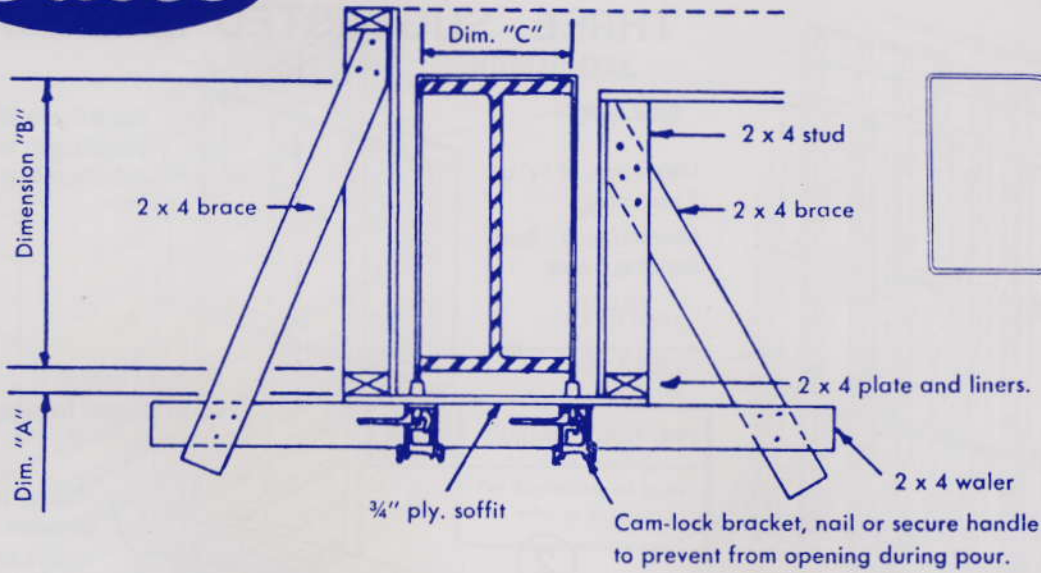
END VIEW

2 x 4 Stiff-back

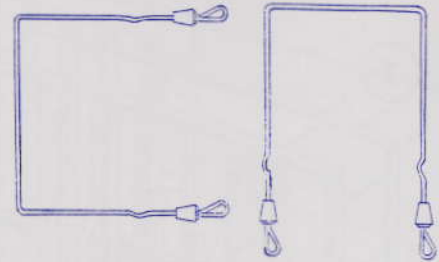
FOR LARGER RADIUS CONCRETE WALL FORMING

PLYWOOD BENDING TABLE	
20'-0" Diam	3 pieces 1/4"
30'-0" Diam	2 pieces 3/8"
40'-0" Diam	2 pieces 3/8"
50'-0" Diam	1 piece 5/8"
60'-0" Diam	1 piece 3/4"
AND LARGER	

I-BEAM TIES



I-BEAM TIES



Tie lengths are calculated as follows:

- Dimension "A" = As required.
- Dimension "B" = Beam height.
- Dimension "C" = Beam width.
- Dimension "B" = Beam height.
- Dimension "A" = As required.

NOTE: Tolerance of 1/4" may be added to dimensions "B" and "C" if desired for tie placement.
Tolerances for wire bends, etc. will be calculated by Gates.

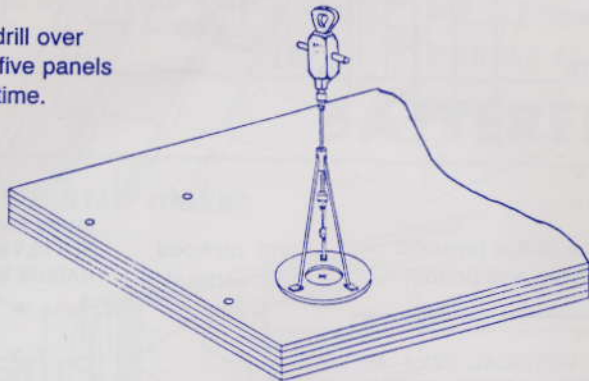
DECK TIE



Total = Tie length

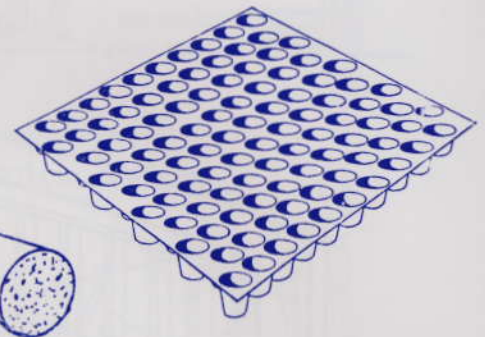
GATES VERTICAL DRILL STAND

Never drill over four or five panels at one time.

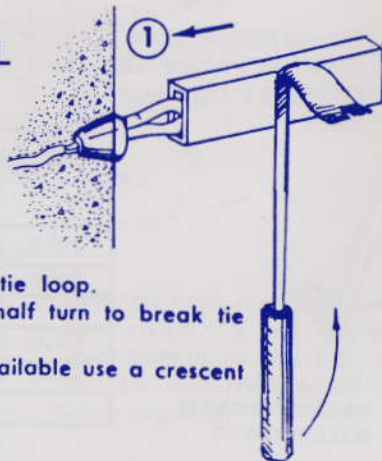


CONCRETE TIE HOLE PLUGS

GATES concrete tie hole plugs provide a fast, easy way to fill your tie holes. Flush 'D' cones for Cam-Lock come in plastic trays! OTHER SIZES AVAILABLE.



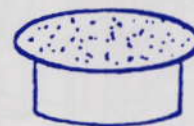
BREAK-BACK TOOL



BREAKING TIE

1. Insert Break-Back tool over tie loop.
 2. Rotate Break-Back tool one-half turn to break tie ends.
- If Gates Breaking Tool is not available use a crescent wrench or similar tool.

PLASTIC TIE HOLE PLUGS



PLASTIC TIE HOLE PLUGS



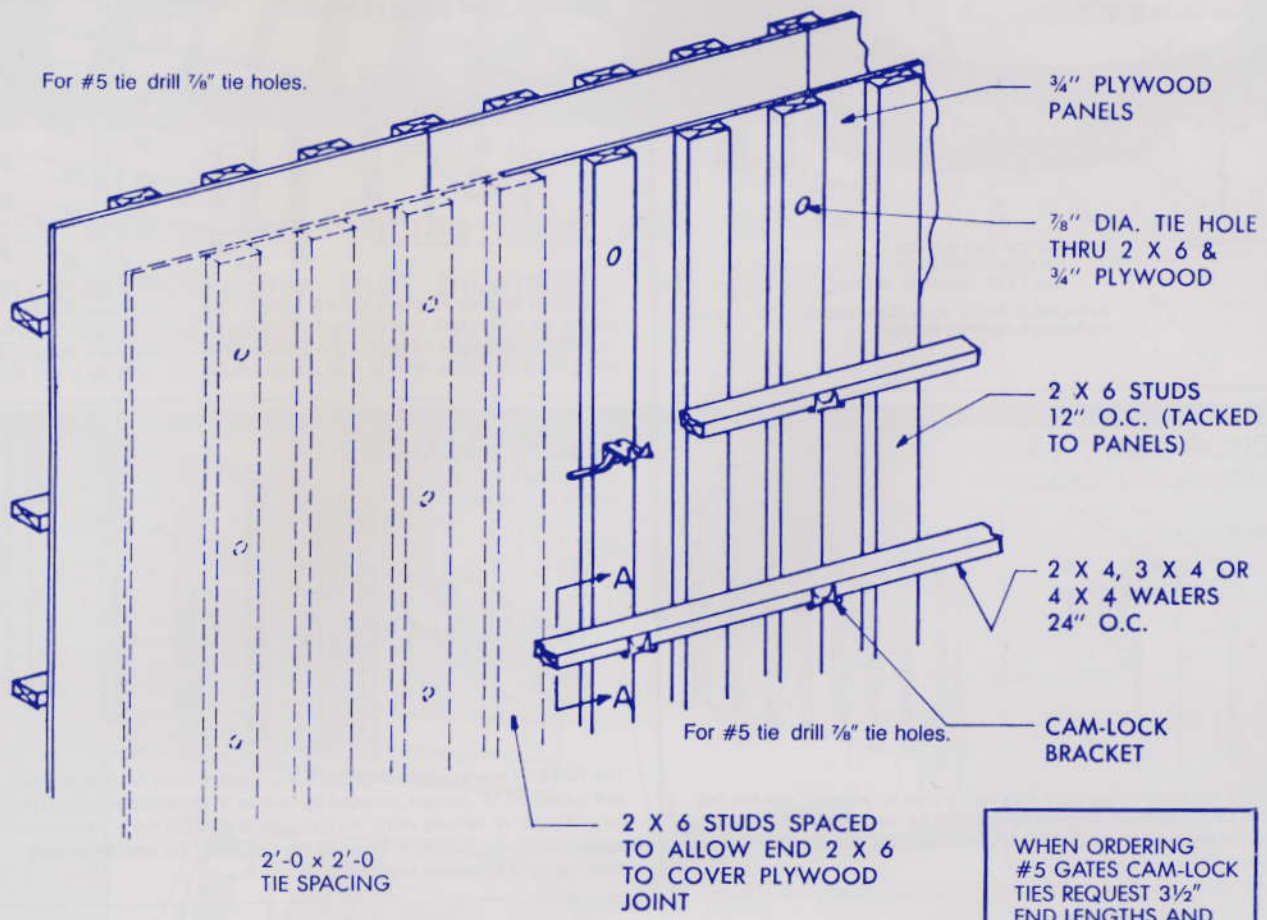
PLASTIC PLUGS FOR HOLES IN FORMS

SUGGESTED FORMING DETAILS



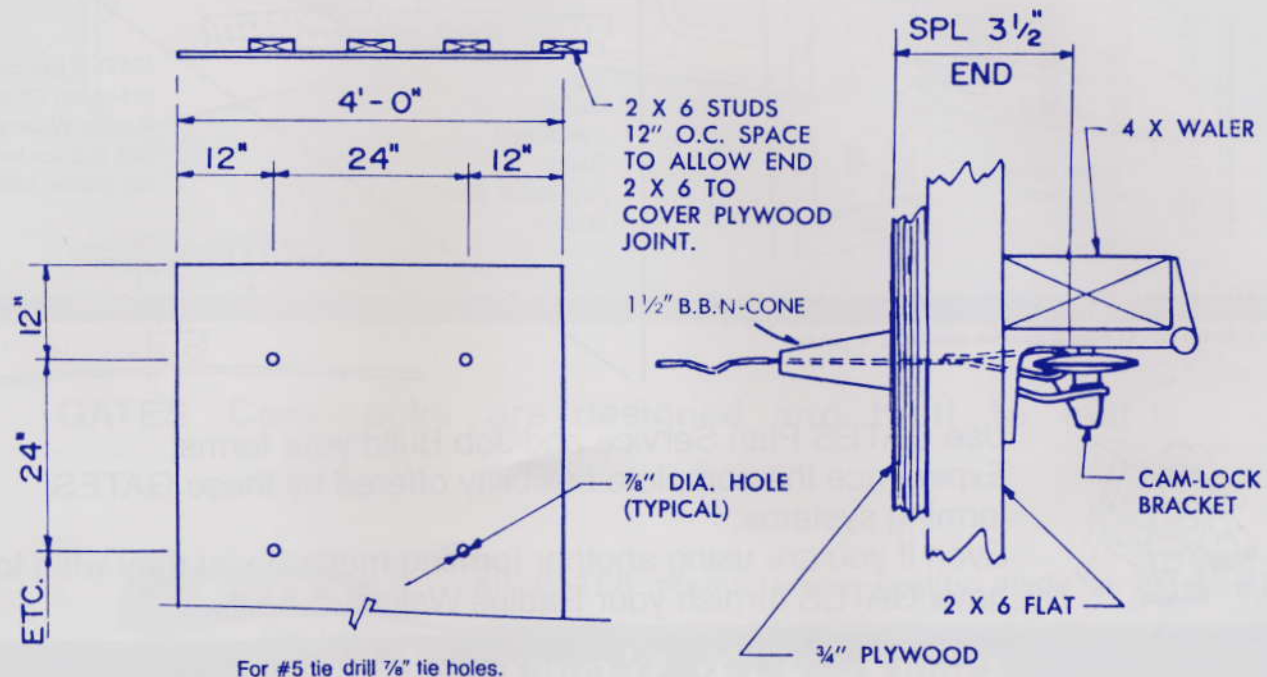
#5 CAM-LOCK FORMING

24" x 24" TIE SPACING



WHEN ORDERING #5 GATES CAM-LOCK TIES REQUEST 3 1/2" END LENGTHS AND 2 GAUGE WIRE TIE.

PICTORIAL VIEW OF FORM



PANEL DETAIL

VIEW A-A