

# BEAMGUARD SAFETY POST™ INSTRUCTIONS

## READ THESE WARNINGS BEFORE USING THE BEAMGUARD SAFETY POST™!

1. Before use of this system, read and understand all instructions, warnings, cautions and notes marked on the equipment and contained in these instructions.
2. Although we use standard safety equipment, this Beamguard Safety Post™ is designed and tested as a system. Use of components that have not been designed and/or tested for use with this system can be dangerous and lead to injury or death. Contact Guardian if you are unsure about using an equivalent product.
3. You may attach personal fall protection equipment directly to a Beamguard™. Do not climb above the base of the Beamguard™ when using the top as an anchor point. Do not allow a hook to bind on the post - if using a double lock hook, use a carabiner or other intermediate connector to insure the hook on the lanyard cannot be side loaded. Only one person is allowed to tie off directly to a post. Only use lanyards or retractables that provide shock absorbency and deliver less than 1400 lbs. of force when tying off directly to a post.
4. Treat the safety post with respect. Your life is on the line! Use care when moving, shipping, or storing Beamguard™. Do not hammer on the device, except to strike the wing nuts. Although they are durable and made of steel, they must withstand tremendous force during a fall. Kinks, bends, or dents in the tube or cracks or breaks in the welds or steel plates can affect the way the system works. If damaged from rough handling - remove from service and return to Guardian for inspection or replacement.
5. Any fall protection equipment that is involved in a personnel fall incident or is struck by a weight shall be removed from service immediately and discarded or returned to Guardian for inspection.
6. Failure to install, use, and/or remove Beamguard™ equipment in a safe manner by skilled and trained craftsmen can result in serious injury or death. Until the Beamguard™ system is properly installed, use alternate fall protection means. Ask your supervisor for proper training.
7. Beamguard™ allows for stanchion spacing™ up to 60'. The Beamguard™ is designed for up to two workers weighing no more than 310 each, per section. Workers must wear a

# Guardian Fall Protection, Inc.

6305 S 231st St., Kent, WA 98032

800-466-6385

253-854-5877

Guardian full body harness, or equivalent, and shock absorbing lanyard designed to reduce fall forces to 900 lbs. or less.

8. It is critical to tighten the Guardian Quick Rod™ flange hooks. Those hooks hold the posts onto the beam. Each shift, shake the posts to insure they are still snug. Strike the wing nut with a tool to snug up. Do not hammer excessively. The bolts on the underside should be tight to take up any space between the top of the base plate and the top flange. NOTE: Replace underside mounting bolts if visibly worn.
9. Use 3/8" wire rope supplied or specified by Guardian, or equivalent. It is critical to properly torque all nuts on wire rope clamps to prevent the cable from slipping. See wire rope clamp manufacturers' information or information in this guide. Slippage of the cable clamps may result in system failure!
10. The Beamguard™ and cable are single use items. If involved in arresting a fall or if the system is struck with a weight (or a load), the units involved should be taken out of service and replaced. Contact Guardian @ 1-800-466-6385 for assistance.
11. The side safety cables are not slings, and are not intended for use other than on the side of Beamguard™. If used for any other purpose they should be removed from further service in the Beamguard™ systems.
12. The Beamguard™ stops a fall by stretching of the cable, deflection and bending of the shock absorbing posts, and extension of the personal shock absorbing lanyard or retracting lanyard. The test weight sagged the cable between 7' and 13' feet on a 10' to 60' system, respectively. This results in a total fall distance of as much as 14½' below the beam or work level the worker falls from. (Our tests are run with a test weight to simulate a 310 lb. worker. The fall distance of a worker that weighs less will be substantially less.) Test your system with a sand bag (220 lbs.) or other weight if in doubt. Use of a shorter lanyard, a retracting lanyard, or closer spacing of the posts (including intermediate posts) greatly reduces the fall distance. Do not tighten the cables to shorten the fall. This increases the forces in the system.
13. The Guardian Beamguard™ was tested on rigidly supported 8 ½" wide W16 x 58 and 10" wide W27 x 84 beams. The standard Beamguard™ assembly is designed to fit on top flanges of 4" to about 13½". Longer Quick Rods are available for larger flanges and deeper bases and longer flange hooks are available for thicker flanges as well. Use on beams that are smaller or on unsupported steel members could have different results. Some deformation to the building structure or steel is possible when a fall occurs. Guardian is not responsible for the stability or quality of the structure that the Beamguard™ is mounted on, or for consequential damages to the structure due to effects of the fall.
14. This device does not guarantee your safety; Guardian does not guarantee that no injury will occur if a person falls while working with this unit. Use of this device is only expected to reduce the likelihood of serious injury and limit the fall distance if a fall occurs. Other means should be considered to limit the likelihood of a fall as well.

15. Once a worker has fallen, the employer must have a plan and a method to rescue him, and give treatment for any injury he may have sustained in the fall.
16. The horizontal lifeline assemblies are designed to be connected to and disconnected from the post only at the safety shackles. If cable is disassembled, or parts are missing, call Guardian for replacements.
17. Do not use Guardian equipment until you have been trained and fully understand the device, its labels, and these instructions. Call Guardian if labels are missing or unreadable. Call Guardian with any questions regarding the safe installation, use, or removal of Guardian Safety Equipment, or if additional instructions are needed. Spanish translation or assistance with other languages is available.
18. **DANGER** - Horizontal lifeline position is important to the operation of the post. A turnbuckle will be provided upon request and may be used to aid in final adjustment of the cable. But, it is not intended to be used to fully tighten the cable. **DO NOT JUDGE TENSION BY EYE!** Measure the sag in the cable at the mid point with a rule! **DO NOT** tighten the cable too much! Sag in the cable allows the cable to stretch, and the falling weight produces a better "sling angle" when the cable tightens, and reduces the forces on the safety posts.
19. **DANGER** - Do not over tighten the cable. The cable must be 3/8" 7 x 19 Galvanized Air Craft Cable, as supplied by Guardian or equal. Use of 3 (three) forged wire rope clips, or equivalent, is recommended to develop the termination/connections. Use thimbles in eye loops. Cables must have sag. Tightening the cable increases the force during a fall! The following table gives minimum sag for various spacing of posts. Increased sag in cable will result in increased total fall distance.
20. If a distance between posts is in between the steps on the chart enclosed, use the higher sag distance. (For instance if the posts are spaced at 24 feet use the sag distance for 30' post spacing).

**MINIMUM SAG REQUIRED AND ANTICIPATED TOTAL FALL DISTANCE  
 BASED ON 2 WORKERS BETWEEN POSTS**

BEAMGUARD POST SPACING	MINIMUM INITIAL SAG	MAXIMUM TOTAL ADDITIONAL SAG (below the top flange) of center point of cable at rest after fall.*	SHOCK ABSORBER OPENED	TOP FLANGE DISTANCE FROM GROUND
60'	12"	9.5'	<12"	21.5'
50'	11"	8.5'	<12"	20.5'
40'	10"	7.5'	<16"	19.9'
30'	8"	6.5'	<20"	19.3'
20'	6"	5.5'	<21"	18.4'
10'	6"	4.5'	<21"	17.4'

\* 220 steel weight representing a 310 lb. Human - maximum test.  
 (Lighter persons will sag the cable less)

\*\* Note: in no case did a Guardian shock absorbing lanyard open fully. In our opinion it is reasonable to assume that in an actual fall, no elongation of a shock absorber greater than the distance shown would be expected.

**End of Warnings -  
 Instructions begin on the next  
 page (5).**

## INSTRUCTIONS FOR ERECTING A BEAMGUARD SAFETY POST SYSTEM™

1. Measure the distance in which you wish to have your Beamguard™ Safety Posts spaced to. (Although this is a matter of preference, if using these on a beam during erection of a structure it is recommended that there be about 2 feet between the Beamguard™ and the end of the beam. This allows the connector to sit outside of the post and make the connection of the next beam and the intersecting beam or joist. Also this allows about 4 feet between posts so a worker can easily transfer from one to another with two lanyards - insuring 100% fall protection. (Note: turnbuckles, if used, may make the travel distance between posts a bit longer especially if the cables with the turnbuckles are both oriented so the turnbuckles end up at the same end on two adjacent posts).
2. Adjust the length of the cable to be within 6" of that distance. (1' if using a turnbuckle.)
3. If using a turnbuckle, open the turnbuckle fully leaving at least three threads showing inside the barrel. NOTE: DO NOT open the turnbuckle too far, threads must show on both sides of the barrel at all times. See note below - turnbuckles are not supplied with basic system and are optional.
4. Attach cable to the eye on the top of the Beamguard™ using a safety shackle, and tighten the shackle nut. Pin the shackle nut using a cotter pin, spring pin, or hitch key.
5. Install the safety post on one end of the beam by slipping the base plate over the top flange and pushing it all the way on so that the back of the base plate rests against the outer edge of the top flange; tighten the bolts on the underside of the base plate first by hand.
6. Thread one flange hook onto the end of the Guardian QuickRod™. Insure that the back end is threaded onto the rod so that at least three threads show outside of the nut. Insert the QuickRod™ into the pipe sleeve on the top of the base plate. Pull the QuickRod™ through the pipe sleeve until the hook is fully engaged on the opposite flange; spin the wing nut on the end of the rod that is protruding out the back of the Beamguard™ pipe sleeve. Spin the wing nut up and strike it with a tool to tighten the bolt. Both QuickRod™ assemblies should be tightened.
7. Tighten the bolts on the underside of the Beamguard™ base plate with a wrench. It is not necessary to over tighten these bolts.
8. Attach the side safety cables to this end. The safety cable has two eyes. One has a sliding sleeve. This is the bottom eye. Put the bottom eye around the wing nut and up underneath the outside QuickRod™ tube. Using a locking safety shackle attach the top eye of the side safety cable to the outside hole in the top plate of the Beamguard™. Slide

the sliding sleeve on the bottom eye down about half way to close the bottom eye slightly.

9. At the opposite end of the beam set the Beamguard™ on the flange approximately 2 feet closer than its final resting point towards the first Beamguard™. Attach the cable using the safety shackle and pin the safety shackle as before.
10. Slide the Beamguard™ along the top flange until the cable has the required sag as shown in the charts in these instructions. Tighten the bottom flange bolts by hand. Note: (The posts are 42" tall. Therefore, if the sag ultimately required is 6", then the center of the cable will be 36" off of the top flange at this point).

If using a turnbuckle leave approximately 3 inches of sag more than required by the charts in these instructions. Note: The posts are 42" tall. Therefore, if the sag ultimately required is 6", the center of the cable will be approximately 33" off of the top flange at this point.

11. Once again, tighten the bottom nuts finger tight. Install the threaded flange hook onto the QuickRod™ and insert through the pipe sleeves on top of the Beamguard™ base. Thread on the wing nuts and tighten each hook bolt by striking the wing nut with a tool (such as a hammer or your wrench).
12. Tighten the bolts on the bottom of the Beamguard™ using a wrench. It is not necessary to over tighten these bolts.
13. Attach the side safety cables to this end. The safety cable has two eyes. One has a sliding sleeve. This is the bottom eye. Put the bottom eye around the wing nut and up underneath the outside QuickRod™ tube. Using a locking safety shackle attach the top eye of the side safety cable to the outside hole in the top plate of the Beamguard™. Slide the sliding sleeve on the bottom eye down about half way to close the bottom eye slightly.
14. Check the sag in the cable at the center point between the two posts it should be at least as much as is shown in the charts in these instructions.
  - A. If using a turnbuckle, the worker must measure the sag in the cable with a rule (see chart in instructions) while another worker turns the turnbuckle until the sag is the amount specified in the chart.
  - B. Using a turnbuckle is optional. We suggest that most ironworkers and other tradesmen using these systems would rather transition at the post to the next post in line without having to stop sliding their hook away from the post due to the obstruction that turnbuckles present. Another disadvantage of the turnbuckle includes the potential for a worker over-tightening the cable. This, plus the added cost and maintenance of the turnbuckles, outweigh any benefit gained in having the turnbuckle, such as in making the final sag adjustments, we feel, and most customers surveyed to date agree. We offer turnbuckles for those that prefer them.

**WARNING: DO NOT OVER TIGHTEN THE CABLE**

**The cable sag is important to allow stretch of the cable and to reduce the**

**force on the safety posts. \*\*\*\*\***

15. You are now ready to hook a safety lanyard to the horizontal cable and use it for fall arrest. Each user should be wearing an approved safety harness and a safety lanyard not greater than 6' long with shock absorbing features that reduce inline forces to less than 900 pounds. **INSURE THAT THE BEAM IS PROPERLY SECURED TO THE BUILDING TO WITHSTAND THE FORCES OF THE FALL. THE BEAM WILL TEND TO ROTATE SLIGHTLY DURING A FALL.**

## **ADDITIONAL INFORMATION**

1. When installing a continuance system (such as three posts over 120' with the second post serving as an intermediate) first install the first section and adjust it and then each subsequent section thereafter. If using a Guardian Pass-Thru™ attachment on the top of the intermediate(s), check the sag in the longest section to meet or exceed the chart. See instructions.
2. **NOTE:** When installing Beamguards™ on beams during conventional steel erection we recommend that you keep the Beamguard™ about 2 feet back from the end of the beam to allow a connector to sit down on the beam and make up connections at the intersection. When transitioning from section to section, use a second lanyard to hook off to the next Beamguard™ section before removing the first lanyard from the previous section.
3. See chart enclosed for torque values of wire rope nuts as specified by the wire rope clamp.
4. See enclosed drawings which portray a post system fully assembled (with an optional turnbuckle) and other attachment graphics.
5. When using a longer cable than is necessary, reduce the length of the cable by loosening the wire rope nuts and sliding the cable around the thimble and through the wire rope clips. Store spare cable by coiling it and hanging it on the end near the Beamguard™ post. Always check the torque of the wire rope nuts and insure that the clamps are tight.

# PASS-THRU™ Attachment for BEAMGUARD™ INSTRUCTIONS

General Information: Many erectors would prefer to have a long run of a continuous cable for tie off. Typical would be a bridge project. Many erectors will erect Beamguards™ on individual beams or girders as they are flown into place, and then later will want to take some of the posts out and allow longer distances between posts and use a continuous cable. Typical would be the girder lines of a large warehouse project. The use of an optional Pass-Thru™ attachment allows the conversion of any Beamguard™ to an intermediate post, and allows a cable to pass by the post without terminating the cable. Then a worker may walk to the post while tied off to the cable, easily move this lanyard hook through the Pass-Thru™ “horns” and keep on walking, while never having to disconnect, and never having to use his second lanyard to maintain 100% fall protection.

## Instructions and Warnings

1. Install Pass-Thru™ on any Beamguard™ Post except one that is at the end of a run of cable.
2. Post spacing is maximum of 60 feet, whether an end post or an intermediate post.

**Warning:** Depending on height off the ground of the walking surface - closer spacing may be necessary if steel is less than 20 feet high.

3. Intermediate posts do not need to have a side safety cable. If an intermediate post is later converted back to an end post - by removal of the Pass-Thru™ device and terminating a horizontal cable at the top - then you must use a side safety cable on the outer side.
4. Using the two bolts provided with the Pass-Thru™ (3/8" x 1 1/2" w/2 washers and nylon jamb nut), attach the device to the top of the post. The bent plate at the bottom of the Pass-Thru™ attachment nests exactly on top of the bent plate at the top of the Beamguard™ post. Tighten the bolts snug tight with a wrench.
5. This post is now considered an intermediate post and may **NOT** be used as an end post or an anchorage. (Note the two holes on top are filled with the bolts, and therefore there is no longer any place to terminate a cable or attach a lanyard.)

**! WARNING !**  
**NEVER, UNDER ANY CIRCUMSTANCES, ATTACH A LANYARD,**  
**OR A CABLE END TO THE CURLED OPPOSING “HORNS”**  
**ON THE TOP OF THE PASS-THRU™ ATTACHMENT.**

6. After the intermediate posts are set up, and two end posts are ready, attach the cable end



to one end post in the usual manner, pass the cable through the “horns” of the Pass-Thru™ attachment devices, and continue on this way until reaching the next end post. Attach the far end in the usual manner to the top of the end Beamguard™.

7. Measure the sag distance, according to the chart, in between ONE set of posts. If the spacing is different, measure between the two posts which make up the longest span. (For instance, if you have 5 posts in a line and the first 3 are spaced at 20 feet and the last two are spaced at 30 feet, measure between posts number 4 and 5 that are spaced at 30 feet.)
8. To measure the sag, push down on the cable between two posts. The cable will become rigid or taut between the remaining posts and nearly horizontal. Measure the sag from the horizontal under your hand where pressure downwards is being applied. If the sag distance is greater than the chart, you may tighten the cable. If it is less than the chart, you **MUST** loosen the cable. If you have plenty of clearance below, it is permissible to have more than the prescribed sag. In fact, more sag allows for greater shock absorbency and lower fall forces on the system.
9. Any number of intermediate posts and Pass-Thrus™ can be used in a line. However, we recommend not more than 300 feet because it will be very difficult to manage more wire rope, and will be quite difficult to get the rope adjusted to have minimum sag.

For instance, if you have 10 “bays” (11 posts spaced 30 feet apart with the middle 9 posts having Pass-Thru™ attachments), you will likely have sag in every bay. If you have 2 or 3 inches in every bay, all the sag will be accumulated at one point during a fall. This is permissible as long as you add the extra amount of pre-sag to the chart, found in the Beamguard™ instructions, to the total fall distance. You can tell how much extra sag you will likely have by pushing down in one bay, as described in 8 above, until the other bays are taut.

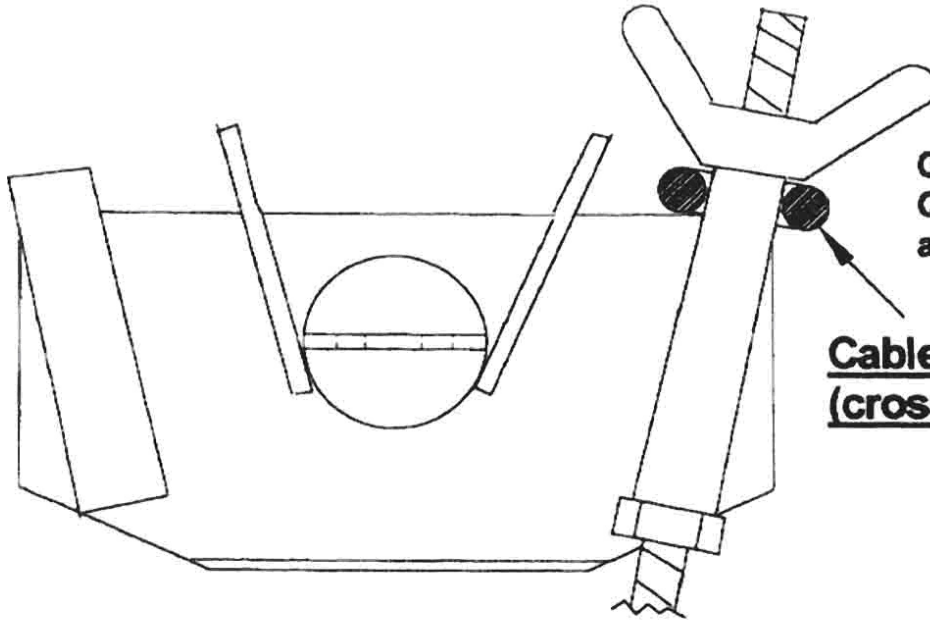
10. This system has been tested for two persons falling at one time between two posts. Never allow more than two persons between two posts. In theory, if one or two persons fell along the end of a long system where there were workers at the other end on the same cable but between two distant posts, it is reasonable to assume that they could not fall at the same time. Therefore, they could be on the same cable, but not between the same two posts as the other persons. Each employer and user must make this assessment for himself asking “How many persons can fall at once on the system?” If the employer chooses to have others on a system who cannot fall at the same time, it must be noted that alternate forms of fall arrest must be available to all the users. Once a fall has occurred, other person(s) on the system should immediately begin using another fall protection system and then get off the elevated surface until the person(s) that fell has been rescued, and the stressed parts of the system have been replaced after a full inspection. Once the new system has been approved for use by the competent person, the new installation can be used for fall protection again.
11. Even though the intermediate posts do not see much strain during a fall (the forces “Pass-Thru” to the end posts), it is important to have the entire system inspected after a fall to

assure there is no damage to any part of the system. Any part that is stressed should be replaced or sent to Guardian Fall Protection for inspection and replacement.

12. Read the full instructions and warnings that come with the Beamguard™ or in addition to these instructions and warnings. Read all labels. If labels are missing or unreadable, call for replacements. Call 1-800-466-6385 for information and questions. This is a free call.

© 2001 - Patent US 6,173,809 B1 - Other Patents Pending

**TOP VIEW**  
**Safety Cable Hookup**



**NOTICE:**

**Do NOT crimp cable**  
**between the end of the**  
**tube and the wing nut**

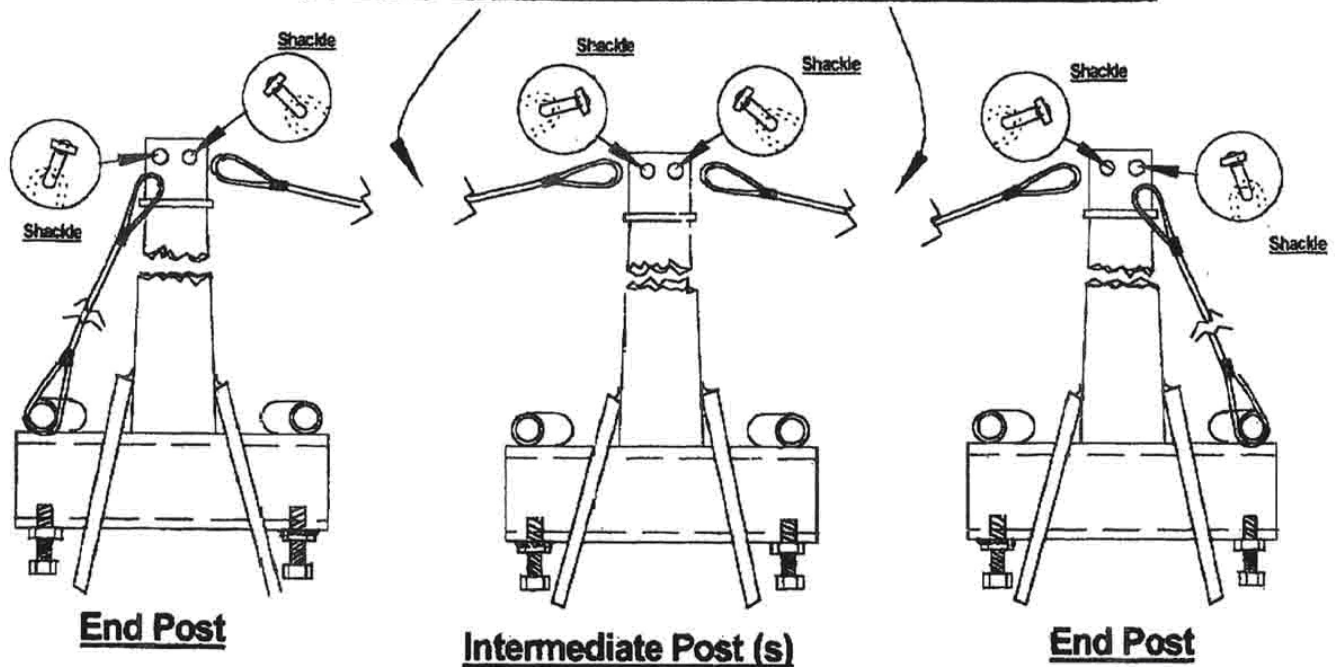
**Cable eye fits around**  
**QUICK ROD tube extension**  
**and behind wing nut.**

**Cable location**  
**(cross section)**

**NOTE: Read Instructions & Warnings**

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Title <b>BEAMGUARD</b> © <b>SAFETY CABLE DETAIL</b>				<b>A-1</b>	
Drawn By <b>LBC</b>	Reviewed By	Date <b>1-7-99</b>	By	Date	Drawn

**Check Instructions for sag and spacing requirements**

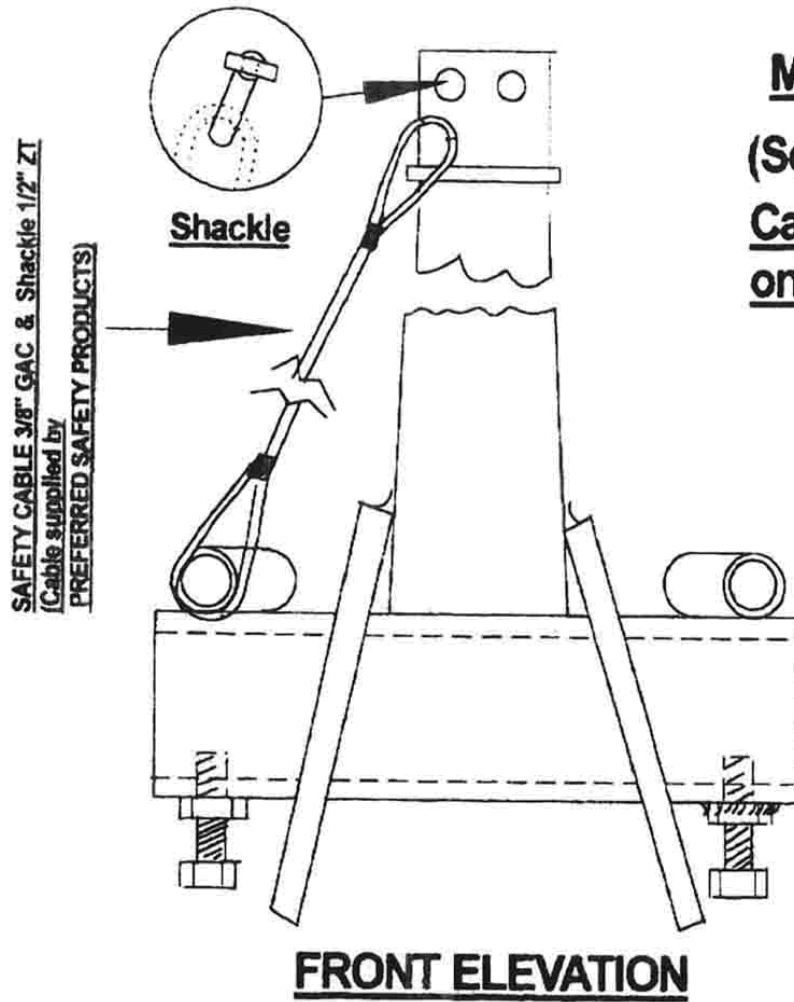


**TYPICAL: SETUP WITH SAFETY CABLES ON END POSTS**

**NOTES:**

1. Intermediate BEAMGUARD posts may use PASSTHRU top instead of shackle assembly
2. Read Instructions & Warnings

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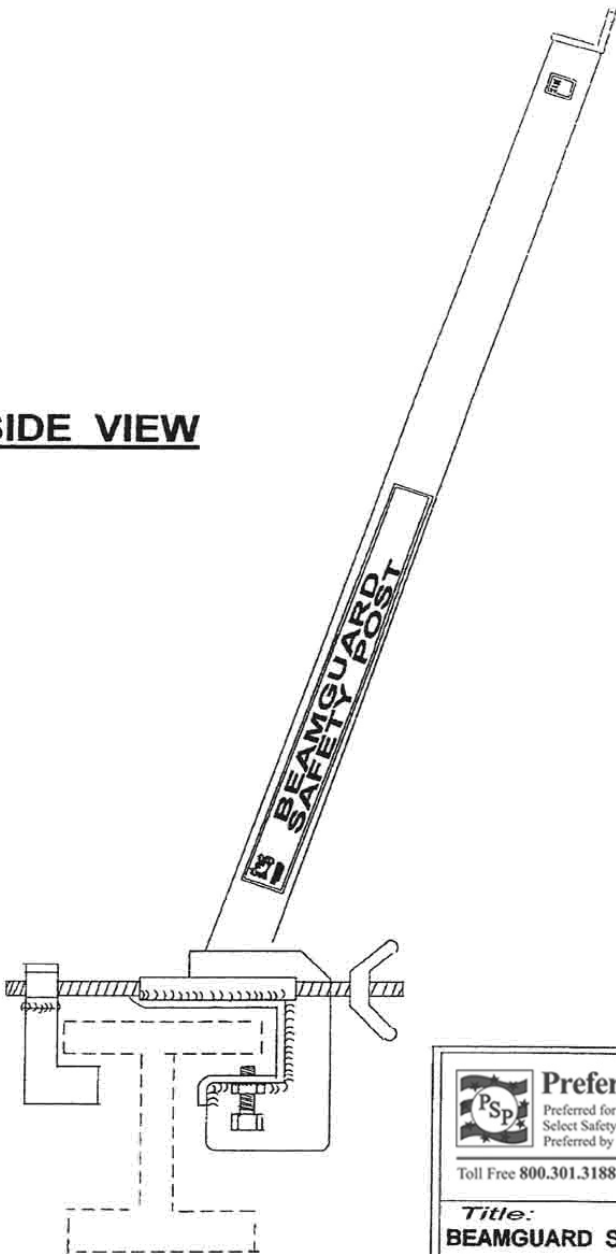



**Mandatory Cable hookup**  
**(See A-1 for bottom detail)**  
**Cable required exterior side**  
**on EACH END post**

**Note:**  
**Read Instructions and Warnings**

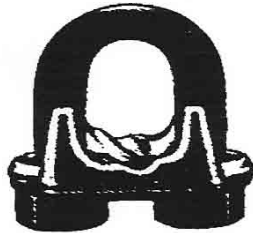
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Drawn By:	Reviewed By:	Date:			
<b>LBC</b>		<b>1-7-99</b>			
Revised:	By:	Date:	By:	Date:	Series:

**SIDE VIEW**



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<b>Title:</b> BEAMGUARD SAFETY POST™ ASSEMBLY ON BEAM-SIDE VIEW					<b>A - 2</b> <b>2</b>
<b>Drawn By:</b> LBC	<b>Reviewed By:</b>	<b>Date:</b> 5-15-96			
<b>Revised:</b>	<b>By:</b>	<b>Date:</b>	<b>By:</b>	<b>Date:</b>	
					<b>Series:</b> MA - M

**CROSBY CLIPS  
WARNINGS AND APPLICATION  
INSTRUCTIONS**



**G -450  
(Red-U-Bolt)**

<b>!!</b>	<b>!!</b>	<b>WARNING</b>
<ul style="list-style-type: none"> <li>• Failure to read, understand, and follow these instructions may cause death or serious injury.</li> <li>• Read and understand these instructions before using clips.</li> <li>• Match the same size clip to the same size wire rope.</li> <li>• Prepare wire rope end termination only as instructed.</li> <li>• Do not use with plastic coated wire rope.</li> <li>• Apply first load to test the assembly. This load should be of equal or greater weight than loads expected in use. Next, check and retighten nuts to recommended torques (see Table 1, this page).</li> </ul>		

Efficiency ratings for wire rope end terminations are based upon the catalog breaking strength of wire rope. The efficiency rating of a properly prepared loop or thimble - eye termination for clip sizes 1/8" through 7/8" is 80%, and for sizes 1" through 3-1/2" is 90%.

The number of clips shown (see Table 1) is based upon using RRL or RLL wire rope, 6x19 or 6x37 Class, FC or IWRC; IPS or XIP. If Seale construction or similar large outer wire type construction in the 6 x 19 Class is to be used for sizes 1 inch and larger, add one additional clip. If a pulley (sheave) is used for turning back the wire rope, add one additional clip.

The number of clips shown also applies to rotation-resistant RRL wire rope, 8x19 Class, IPS, XIP, sizes 1-1/2 inch and smaller; and to rotation-resistant RRL wire rope, 19x7 Class, IPS, XIP, sizes 1-3/4 inch and smaller.

For other classes of wire rope not mentioned above, we recommend contacting Crosby Engineering at the address or telephone number on the back cover to ensure the desired efficiency rating.

For elevator, personnel hoist, and scaffold applications, refer to ANSI a17.1 and ANSI A10.4. These standards do not recommend U-Bolt style wire rope clip terminations. The style wire rope termination used for any application is the obligation of the user.

For OSHA (Construction) applications, see OSHA 1926.251.

1. Refer to Table I in following these instructions. Turn back specified amount of rope from thimble or loop. Apply first clip one base width from dead end of rope. Apply U-Bolt over dead end of wire rope - live end rests in saddle (Never saddle a dead horse!). Tighten nuts evenly, alternate from one nut to the other until reaching the recommended torque.



2. When two clips are required, apply the second clip as near the loop or thimble as possible. Tighten nuts evenly, alternating until reaching the recommended torque. When more than two clips are required, apply the second clip as near the loop or thimble as possible, turn nuts on second clip firmly, but do not tighten. Proceed to Step 3.



3. When three or more clips are required, space additional clips equally between first two - take up rope slack - tighten nuts on each U-Bolt evenly, alternating from one nut to the other until reaching recommended torque.



**4. IMPORTANT**  
Apply first load to test the assembly. This load should be of equal or greater weight than loads expected in use. Next, check and retighten nuts to recommended torque. In accordance with good rigging and maintenance practices, the wire rope end termination should be inspected periodically for wear, abuse, and general adequacy.

Clip Size (Inches)	Rope Size (Inches)	Minimum No. Of Clips	Amount of Rope to Turn Back in inches	*Torque in Ft. Lbs.
1/8	1/8	2	3-1/4	4.5
3/16	3/16	2	3-3/4	7.5
1/4	1/4	2	4-3/4	15
5/16	5/16	2	5-1/4	30
3/8	3/8	2	6-1/2	45
7/16	7/16	2	7	65
1/2	1/2	3	11-1/2	65
9/16	9/16	3	12	95
5/8	5/8	3	12	95
3/4	3/4	4	18	130
7/8	7/8	4	19	225
1	1	5	26	225
1-1/8	1-1/8	6	34	225
1-1/4	1-1/4	7	44	360
1-3/8	1-3/8	7	44	360
1-1/2	1-1/2	8	54	360
1-5/8	1-5/8	8	58	430
1-3/4	1-3/4	8	61	590
2	2	8	71	750
2-1/4	2-1/4	8	73	750
2-1/2	2-1/2	9	84	750
2-3/4	2-3/4	10	100	750
3	3	10	106	1200
3-1/2	3-1/2	12	149	1200

**If a pulley (sheave) is used for turning back the wire rope, add one additional clip.**

If a greater number of clips are used than shown in the table, the amount of turnback should be increased proportionately

\*The tightening torque values shown are based upon the threads being clean, dry, and free of lubrication.

## NOTES