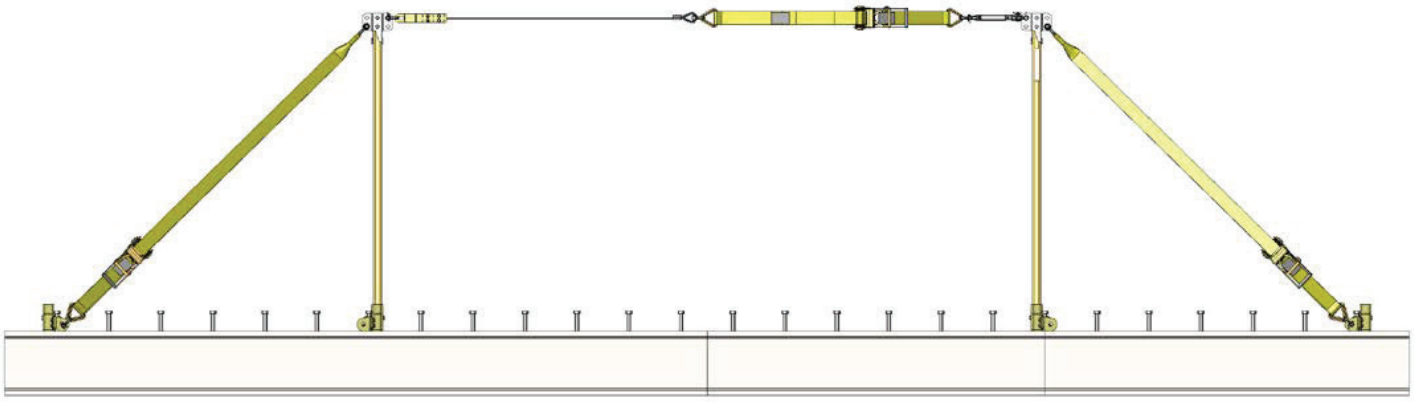
FALL SAFE®

USER INSTRUCTIONS FOR
SKYLINE™ HORIZONTAL LIFELINE SYSTEM
MODULAR STUD / REBAR STUD LIFELINE SYSTEM USING THE SKYLINE™ PORTABLE HORIZONTAL LIFELINE SYSTEM

Model # 6262

US Patent #6,338,399, #6,581,725 and #6,779,630



SureWerx®

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IMPORTANT INSTRUCTIONS!

These instructions must be kept on file and available for the users reference at **all** times. The users must read and full understand these instructions or have the instructions explained in detail before using this equipment. **Failure to observe these instructions could result in serious injury or death.**

Prior to use, all workers must be trained in the proper use of all systems and equipment.

A Training and Instruction review should be repeated at regular intervals.

A rescue plan must be prepared; the workers must be trained in its use, and rescue equipment must be on hand prior to any use of this horizontal lifeline system.

Any questions regarding these instructions should be directed to:

Manufacturer's Name and Address

Fall Safe®
Canada labels
SureWerx, 49 Schooner St.
Coquitlam, BC V3K 0B3

USA labels
SureWerx USA Inc.
Elgin, IL USA 60123

IMPORTANT OSHA REGULATIONS COVERING THE USE OF HORIZONTAL LIFELINE SYSTEMS

OSHA 1910.66 Subpart M – 1926.502 (d)(8):

Horizontal Lifelines shall be designed, installed, and used under the supervision of a qualified person as part of a complete fall arrest system, which maintains a safety factor of at least two.

OSHA 1910.66 (b):

"Qualified Person" means one with a recognized degree or professional certificate and extensive knowledge and experience in the subject field who is capable of design, analysis, evaluation, and specifications in the subject work, project, or product.

OSHA 1910.66 (b):

"Competent Person" means a person who is capable of identifying hazardous or dangerous conditions in the personal fall arrest system or any component thereof, as well as in their application and use with related equipment

OSHA 1910.66:

Personal fall arrest systems shall be rigged such that an employee can neither free-fall more than 6- ft. nor contact any lower surface.

OSHA 1910.66 (n):

The sag in the lifeline should be minimized to prevent the connecting piece of equipment (self-retracting lanyard or other appropriate personal fall arrest device) from sliding down the lifeline to a position which creates a swing hazard during a fall arrest.

OSHA Standards, Interpretations and Compliance Letters, 02/09/1995-Criteria for personal fall arrest systems:

The free-fall distance is limited to 6 feet. The deceleration distance must not exceed 42 inches; lifeline elongation is not included in deceleration distance; and the total fall distance is unregulated except that the employee cannot make contact with a lower level...The safety factor of two should be applied based on the anticipated maximum arrest force, not the fall energy.

COMPONENT SPECIFICATION

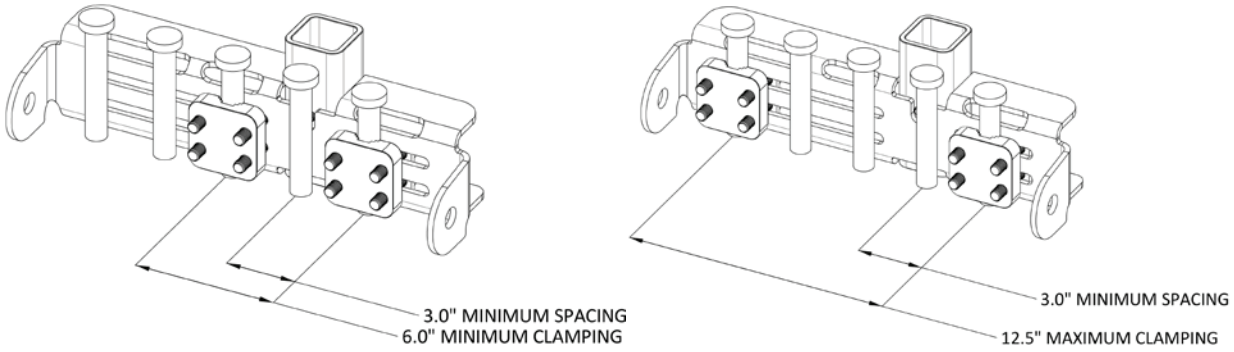
Modular Stud Stanchion Receiver Bracket

Model number: 6262-1

Material: Base Bracket: steel, Zn plated
Shear Stud Grip Plate, steel, Zn plated
Misc. hardware, steel, Zn plated

Stud Sizing	Shear Stud	Rebar Stud
Stud Diameter	3/4" - 1-1/4"	#6 (3/4") - #11 (1-3/8")
Stud Length	≥ 3 - 1/2"	≥ 4"

Stud Spacing:



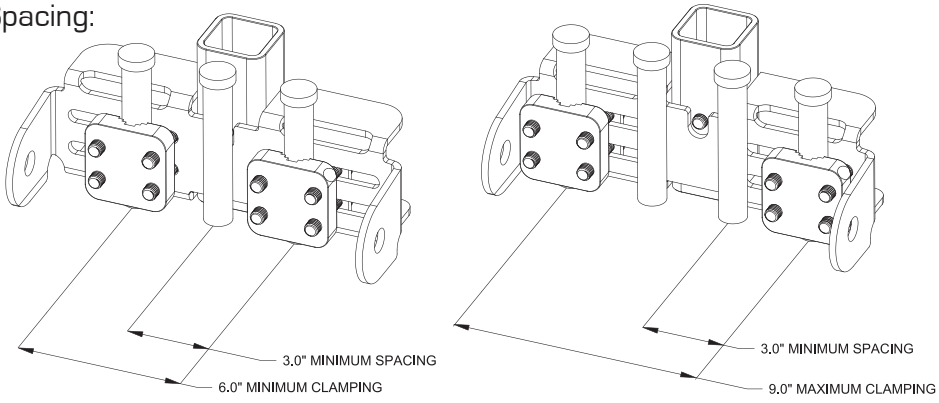
Narrow Body Modular Stud Stanchion Receiver Bracket

Model number: 6263-1

Material: Base Bracket: steel, Zn plated
Shear Stud Grip Plate, steel, Zn plated
Misc. hardware, steel, Zn plated

Stud Sizing	Shear Stud	Rebar Stud
Stud Diameter	3/4" - 1-1/4"	#6 (3/4") - #11 (1-3/8")
Stud Length	≥ 3 - 1/2"	≥ 4"

Stud Spacing:

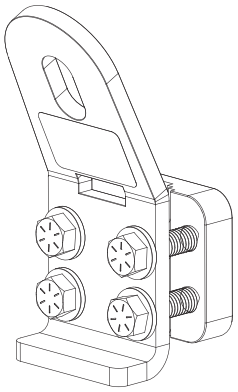


Modular Stud Tie-Back Bracket

Model number: 6202-1

Material: Base Bracket: steel, Zn plated
Shear Stud Grip Plate, steel, Zn plated
Misc. hardware, steel, Zn plated

Stud Sizing	Shear Stud	Rebar Stud
Stud Diameter	3/4" - 1-1/4"	#6 (3/4") - #11 (1-3/8")
Stud Length	≥ 3 - 1/2"	≥ 4"



Engineering design note:
The 6262-1, 6263-1 and 6202-1 clamp brackets have been tested down to #4 rebar, and can be used as such with field verification of system perameters and rebar strength.

SYSTEM DESCRIPTION

The Modular Stud HLL System is designed for use as a portable horizontal lifeline system capable of attaching to welded Nelson Shear Studs (or other manufacturer's equivalent) and rebar studs to provide anchorage points for horizontal lifelines using stanchions and tie-back lines. The Base Bracket and Tie- Back Brackets use compression plates coupled with bolts to allow for the quick attachment under the heads of welded shear studs and on rebar studs. Once the brackets are in place, the stanchions for the Skyline™ Horizontal Lifeline can be installed and secured into place using the appropriate tie-back cables attached to additional Base Brackets or alternate Tie-Back Brackets. Once the end stanchions have been secured, the Skyline™ Horizontal Lifeline can be attached and tensioned for use.

The system, in general, is designed for use by up to 4 persons at the same time, and can span distances up to 200 ft. However, span length and number of persons on the system determine input energy (and therefore, final line tension) and not all combinations of span lengths and number of workers are possible. The user must consult the manufacturer for exact system parameters for each installation, or in the event that the system is moved. System parameters are provided in the form of computer generated anticipated line tension and Minimum Required Clearance (MRC) data that is traceable to actual test results for each system installation.

The computer generated designs are prepared from verifiable test data and include a 2 ft. safety factor for Minimum Required Clearance, and a 2 to 1 Safety Factor over the minimum cable breaking strength for maximum allowable line tension.

This system design is predicated on the use of a full-body harness for the worker, double-action, single-locking snap hooks to attach to the lifeline, and a shock absorbing vertical lifeline or self-retracting lanyard (SRL) with 900 lb. maximum arrest force. Non-shock absorbing lanyards and retractables that do not have "slip-clutch" type internal shock absorbers that will exceed 900-lb. MAF during fall arrest are NOT allowed for use as vertical lifelines on this system. Any attachment to the horizontal lifeline must transfer fall arrest forces to the body through the dorsal d-ring of the full body harness only. Harness side and chest d-rings are not allowable lanyard connection points.

All Skyline™ HLL systems are supplied with an integral shock absorber in the line and no system may be used without one. The four main functions of the shock absorber are:

1. It adds energy capacity to the system to increase the safety of short horizontal lifelines.
2. It creates mechanical hysterisis (friction) in the system to absorb rebound energy.
3. It decreases low sag angle amplification by controllably elongating the horizontal lifeline during a fall.
4. It allows the cable to be tuned (or pre-loaded to a higher initial line tension) to force the cable to absorb energy at a higher rate.

The shock absorber has a built in spring-loaded tensioner that indicates when the proper pre-tension has been achieved. Normally the pre-tension is set at 1000-lb. but may be changed for specifically designed applications.

When a system is installed, the pre-tension must be set according to the installation instructions. Not all systems are perfectly rigid; therefore, pre-tension may change over time. Prior to each use, the worker must check the pre-tension of the system and adjust it accordingly. When the pre-tension of a system is closely controlled, the fall distance and final line tension are easily predictable. Knowing that the pre- tension of a horizontal lifeline is set correctly is of utmost importance to the predictability and safety of the system.

ANCHORAGE POINTS

The strength of horizontal lifeline anchorage points must be at least two times the anticipated line tension. This strength must be certified by a qualified person and must be verifiable by either calculation or testing. Anchorage connectors must be selected carefully. Eyebolts should not be used if they will be loaded at an angle to their axis, unless the loads fall within design parameters for such use. Weld-on lugs and rebar studs should not be less than ½ inch in width and should not be made of steel with less than 50,000-PSI yield strength. The proper stress areas and weld areas must be calculated to assure proper safety. If in question, consult Reliance Industries Engineering for proper design requirements.

HORIZONTAL LIFELINE SYSTEM COMPONENTS

The typical Nelson Shear Stud / Rebar Stud Horizontal Lifeline System consists of the following standard approved and compatible components:

- Typical Method; 4 ea. Model 6262-1 or 6263-1 Base Brackets (2 ea. for Stanchion receivers, 2 ea. as Tie-back Brackets)
- Alternate Method; 2 ea. Model 6262-1 or 6263-1 Base Stanchion Brackets, 4 ea. Model 6202-1 Tie- Back Brackets
- 2 ea. End/Bypass Stanchions (Model 6151 for 60-in. tall, Model 6178 for 72-in., Model 6163 for 84- in.)
- 2 ea. Model 6122-1 Ratchet Assembly, 2-in.
- 2 ea. Model 6127-1 Ratchet Strap Assembly, 2-in. by 15-ft. long (60-in. & 72-in. End Stanchions)
- 2 ea. Model 6127-1-24 Ratchet Strap Assembly, 2-in. by 24-ft. long (84-in. End Stanchion)
- 2 ea. Model 6066-1 Stainless Steel Bow Shackle, 5/8-in.
- 4 ea. Model 6062-1 Stainless Steel Bow Shackle, ½-in.
- 1 ea. Model 6310-1 Portable Skyline Horizontal Lifeline Kit containing the following items:
- 1 ea. Model 6000 Skyline™ Shock Absorber (stainless steel)
- 1 ea. Model 6050 In-line Cable Clamp (plated steel)
- 4 ea. Model 6062 ½" bow shackles (stainless steel)
- 1 ea. Model 6090 3-in. Ratchet Assembly (polyester sling webbing)
- 1 ea. Model 6092 3-in. x 10-ft. long Ratchet Strap Assembly (polyester sling webbing))

To complete the Skyline™ Horizontal Lifeline System a Reliance Industries wire rope assembly must be used. The wire rope assemblies are available in galvanized or stainless steel and are constructed of 3/8" 7x19 XIPS wire rope. **NOTE:** Only Reliance Industries wire rope assemblies may be used with the Skyline™ Horizontal Lifeline; failure to use a Reliance Industries wire rope assembly could result in injury or death.

- 1 ea. Model 6070-length of cable; 3/8" – 7x19 galvanized wire rope or
- 1 ea. Model 6072-length of cable; 3/8" – 7x19 stainless steel wire rope

The above list represents the bare minimum equipment required to complete a Skyline™ Horizontal Lifeline capable of being installed to Nelson style shear studs, and as such, may not contain all of the components required to complete a system suitable for a particular worksite geometry. The actual selection of components and options for the design of a horizontal lifeline system should only be performed by a Qualified Person, or a state registered Professional Engineer who is experienced in the design and use of safety systems.

The Skyline™ Horizontal Lifeline system is designed for use with the approved, above listed components only. Substitutions or replacements with non-approved components will endanger the system integrity and may affect the safety and reliability of the total system. Please contact Fall Safe at (303) 424-8650 with questions concerning the suitability of any component for an application BEFORE its use.

PERSONAL FALL ARREST EQUIPMENT USED WITH HORIZONTAL LIFELINES

It is of utmost importance in the design of horizontal lifelines to be able to predict the vertical fall arrest forces that will be imposed on a lifeline during a fall. Normally the lifeline will elongate under increasing tension until the horizontal lifeline imposes a 900-lbf. vertical force on the shock absorbing lanyard and then the lanyard will begin to rip out (or extend in the case of a SRL) until all of the fall energy has been absorbed. For multiple persons this force increases as a multiple of 900-lbs. The shock-absorbing lanyard, therefore, is vital in predicting and limiting horizontal lifeline tension. Only shock absorbing lanyards (or SRLs) with 900 lb. maximum arrest force are allowed for use with this system.

Care should also be used in selecting harnesses for use with horizontal lifeline systems. Due to the HLL sag height, additional distance required for clearance when using horizontal lifeline systems is often the limiting factor in determining whether a HLL system can be used for a particular application. Harnesses with sewn down back pads can limit as much as 1 ft. of back pad slippage during fall arrest, giving additional clearance for safety. If the system will be used where a worker could encounter a head first free-fall, a non-secured back pad can slide down the webbing to the small of the back, allowing the worker to fall out of the harness through the top by allowing the harness straps to slip over the shoulders. For this reason, we recommend the use of full body, crossover or pullover type harness with sewn down or slip resistant back pads for all installations.

INSTALLATION LAYOUT CONSIDERATIONS

Most HLL installations consist of either single-span or multi-span systems. Single-span systems consist of two end anchorages with a single HLL lifeline attached between them. Multi-span systems consist of two end anchorages and multiple intermediate (bypass) supports through which the cable passes, but to which it is not attached. Normally the bypasses consist of a structure that will allow a lanyard snap to pass through without allowing the cable to become disconnected. Input energy into an HLL system during fall arrest is usually determined by span length. The longer the span, the farther a person will fall during fall arrest and therefore, the greater the input energy. The more people that fall on a system at one time, the greater the falling weight and this also increases the input energy. In order to limit input energy into a system, one must limit the number of persons on a system and also limit the span length. On the other hand, the cable, having the greatest energy capacity (or ability to absorb energy) of all the components of a system due to its ability to strain under stress, must be long in order to absorb the greatest amount of energy. Therefore, the safest way to rig and assemble a horizontal lifeline system is to use the longest cable length possible with bypass supports located to reduce sub-span length to as short as possible. Only minimum required clearance limits (MRC) should be used to determine maximum allowable line length.

INSTALLATION

Installation of horizontal lifeline systems should be done under the supervision of a Qualified Person trained in their function and use. Use only parts that have been qualified as compatible components by Reliance Industries. Install the system only as specified in the system parameter documents prepared by the computer program system. Ensure that the minimum anchorage strength is at least 2 times the anticipated load called out in the system parameter documents. Have the anchorages certified by a qualified person and keep documentation on hand. HLL calculations for minimum required clearance (MRC) are measured below the walking/working surface and assume that the horizontal lifeline is at least 5 ft. above the walking/working surface (unless otherwise specified) in order to limit free-fall to 6 ft. or less as required by OSHA. Always install lifelines horizontally where all end anchorages and bypass supports are at the same elevation. Always install the system per the system parameter documents and NEVER change span length, sub-span length, or number of people allowed on the system once the system is designed and certified. Remember, horizontal lifeline dynamics change with any changes to span length, or number of people allowed on the system. Any changes require a new design, and MUST be approved by a qualified person.

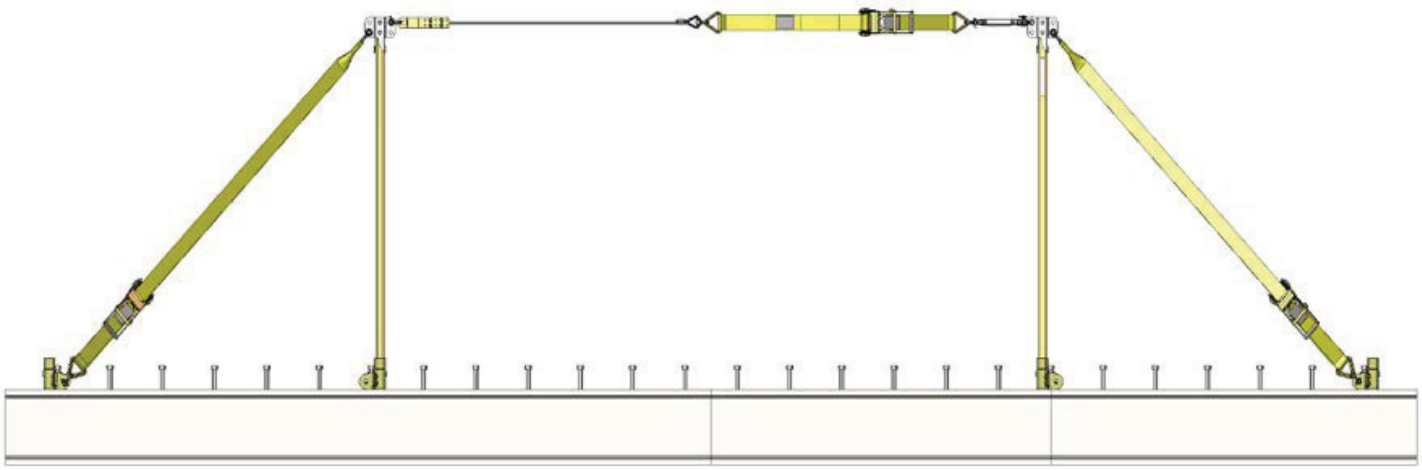


Fig. 1a Typical Shear Stud HLL System Layout

(Note: This layout shows the components needed for the most typical layout of the Nelson Shear Stud Horizontal Lifeline System. Contact Reliance Industries with questions concerning equipment requirements for a particular application.)

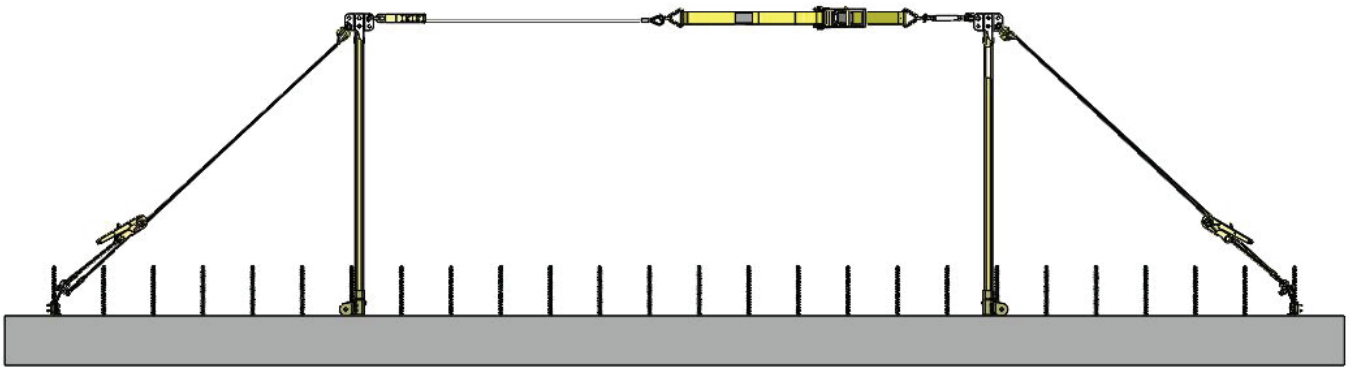
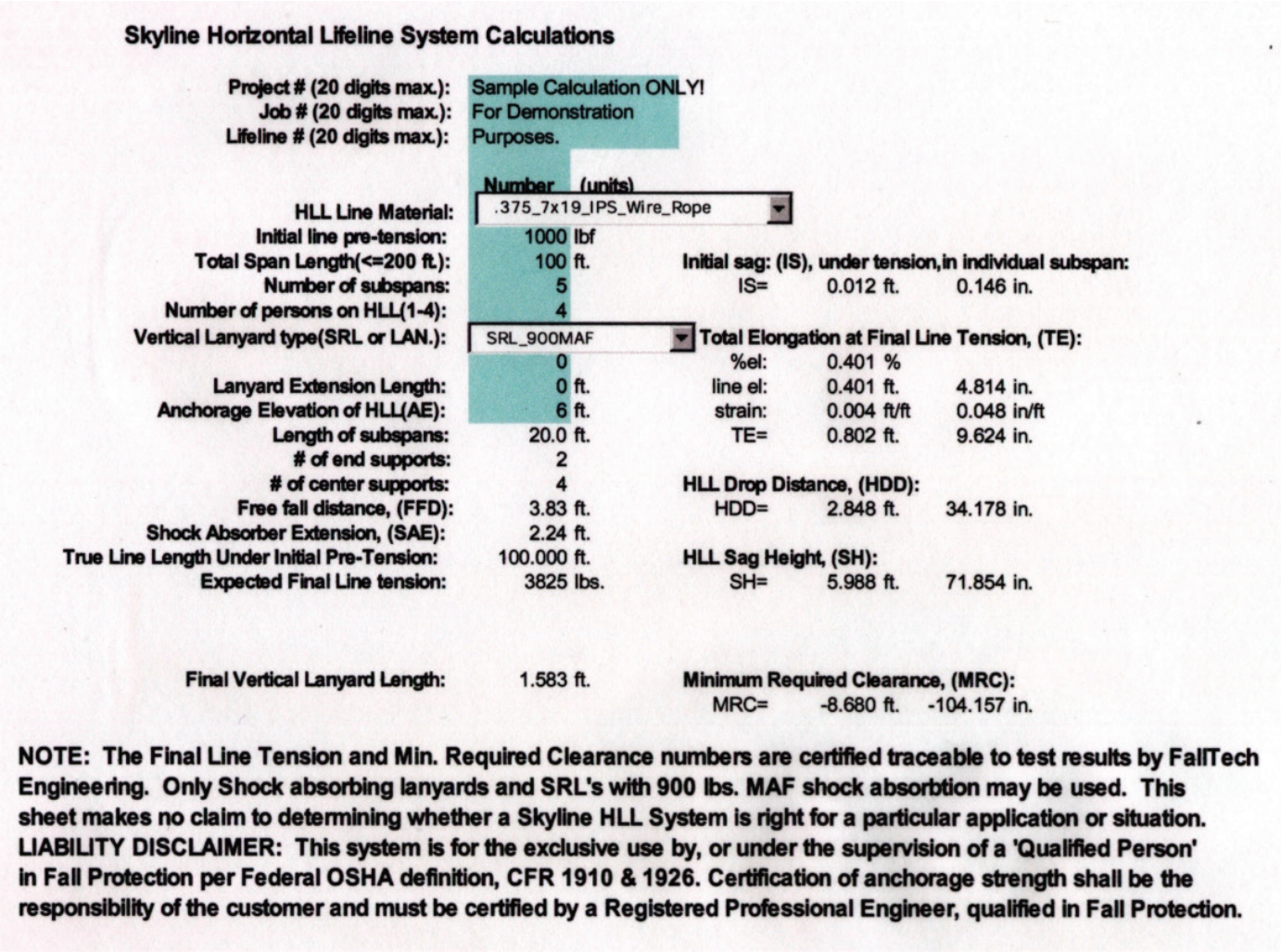


Fig. 1b Typical Rebar Stud with Alternate 6202-1 Tie-Back HLL System Layout

(Note: This layout shows the components needed for the most typical layout of the Rebar Stud Horizontal Lifeline System. Contact Reliance Industries with questions concerning equipment requirements for a particular application.)



Skyline Horizontal Lifeline System Calculations

Project # (20 digits max.):	Sample Calculation ONLY!				
Job # (20 digits max.):	For Demonstration				
Lifeline # (20 digits max.):	Purposes.				
	Number	(units)			
HLL Line Material:	.375_7x19_IPS_Wire_Rope				
Initial line pre-tension:	1000	lbf			
Total Span Length(<=200 ft.):	100	ft.	Initial sag: (IS), under tension,in individual subspan:		
Number of subspans:	5		IS=	0.012 ft.	0.146 in.
Number of persons on HLL(1-4):	4				
Vertical Lanyard type(SRL or LAN.):	SRL_900MAF		Total Elongation at Final Line Tension, (TE):		
	0		%el:	0.401 %	
Lanyard Extension Length:	0	ft.	line el:	0.401 ft.	4.814 in.
Anchorage Elevation of HLL(AE):	6	ft.	strain:	0.004 ft/ft	0.048 in/ft
Length of subspans:	20.0	ft.	TE=	0.802 ft.	9.624 in.
# of end supports:	2				
# of center supports:	4		HLL Drop Distance, (HDD):		
Free fall distance, (FFD):	3.83	ft.	HDD=	2.848 ft.	34.178 in.
Shock Absorber Extension, (SAE):	2.24	ft.			
True Line Length Under Initial Pre-Tension:	100.000	ft.	HLL Sag Height, (SH):		
Expected Final Line tension:	3825	lbs.	SH=	5.988 ft.	71.854 in.
Final Vertical Lanyard Length:	1.583	ft.	Minimum Required Clearance, (MRC):		
			MRC=	-8.680 ft.	-104.157 in.

NOTE: The Final Line Tension and Min. Required Clearance numbers are certified traceable to test results by FallTech Engineering. Only Shock absorbing lanyards and SRL's with 900 lbs. MAF shock absorbtion may be used. This sheet makes no claim to determining whether a Skyline HLL System is right for a particular application or situation. LIABILITY DISCLAIMER: This system is for the exclusive use by, or under the supervision of a 'Qualified Person' in Fall Protection per Federal OSHA definition, CFR 1910 & 1926. Certification of anchorage strength shall be the responsibility of the customer and must be certified by a Registered Professional Engineer, qualified in Fall Protection.

Fig. 2 Example Computer Generated System Parameter Document

HLL INSTALLATION PROCEDURES

WARNING: Approved fall protection must be worn during Skyline™ lifeline installation at all times. Do not use the horizontal lifeline or its anchorages as personal fall protection anchorages until the system has been completely installed, inspected, and approved for use by a Qualified Person. **DO NOT** use the lug of the Modular Stud Stanchion Receiver Bracket as an attachment point for a personal fall arrest system until AFTER the bracket has been properly and fully installed. Do not connect directly to the lug, a ½- or 5/8-in. bow shackle must be secured to the lug, and the snaphook or carabiner of the personal fall arrest system can then be attached to the bow shackle.
CAUTION: DO NOT use an Impact Style driver to pre-tighten or torque the grip plate bolts. Only a clutch type drill/driver at torque setting 12 or less can be used to pre-tighten the grip plate bolts. Use of an Impact Style driver to pre-tighten or torque the grip plate bolts, may damage the bolts and prevent the ability to properly torque the grip plate bolt without deforming the Modular Stud Stanchion Receiver Bracket frame.

Typical Installation:
1. Installation of the Skyline™ horizontal lifeline begins with the placement of the Modular Stud Base Tie-back Brackets. Verify using the "Component Specifications" on page 5 of this manual that the correct size of bracket and plate are being used for the shear/rebar studs present. **Note: Rebar studs must be Grade 40 or Grade 60 rebar and must be embedded at least 4 feet into concrete and tied or bent to prevent pullout.**
2. The Base Brackets that will be used as tieback plates should be attached to shear/rebar studs that are located at the end of the beam where the lifeline is to be installed. Loosen the 4 bolts that secure each of the bracket's two grip plates (depending on the spacing of the shear/rebar stud, all of the bolts from a grip plate may have to be removed) and slide the bracket down the shear/rebar stud to rest against to top of the beam. Make sure that the holes where the tieback cables will attach are pointed towards the far end of the beam where the other end of the lifeline cable will be installed (see Fig. 3). Verify that the bracket is resting firmly against the top surface of the beam; there should be no gap present below the bottom edge of the bracket. Slide the bracket back and forth until the tie-back anchor lugs are approximately centered on the beam surface. Tighten the grip plate bolts fully to firmly press the bracket against the shear studs. Torque the bolts to a between 70- and 80-ft-lb. The tieback bracket is now installed.

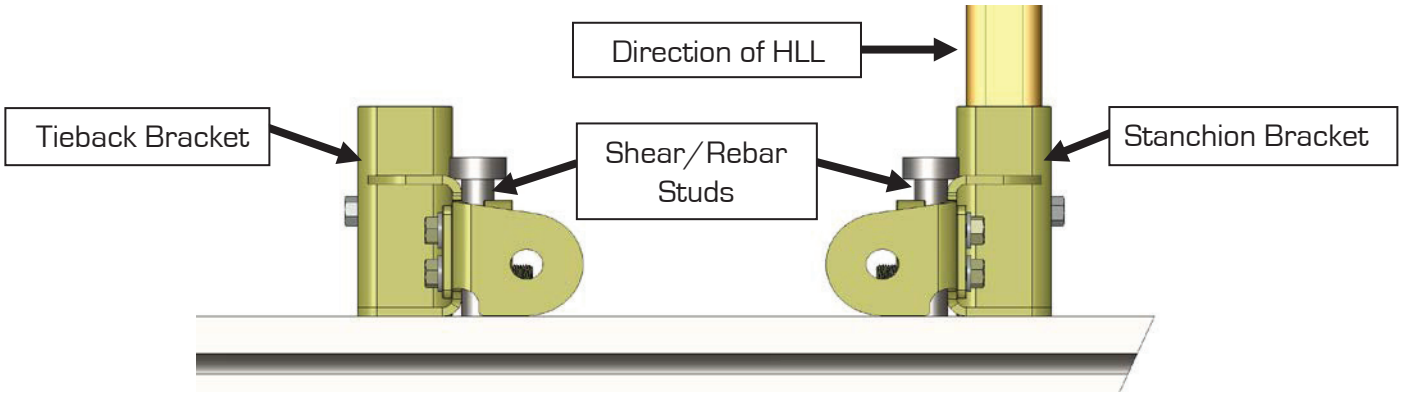


Fig. 3 Position of Brackets Relative to Shear/Rebar Studs

3. Loosen the bolts and grip plates from the Modular Stud Stanchion Bracket. Measure the height of the end stanchion that will be used in the system. The Stanchion Receiver Bracket is installed based on the height of the end stanchion. For a 5-ft. tall end stanchion, the bracket must be attached to shear/rebar studs that are a minimum of 60-in. away from the studs that the tieback plate is secured to; for a 6-ft. stanchion the minimum distance is 72-in.; for a 7-ft. stanchion the distance is 84-in. Rest the bracket against the correct row of shear studs. The holes of the Stanchion bracket should be pointing towards the tieback bracket.
4. Insert the bolts back into the bracket and into the grip plate capturing a shear/rebar stud. The bracket may have to be slid back and forth slightly to ensure that it is possible to capture 2 shear/rebar studs with the grip plate. Verify that the bracket is resting firmly against the top surface of the beam; there should be no gap present below the bottom edge of the bracket. Tighten the bolts fully to firmly press the bracket and the grip plate against the shear/rebar studs. Torque the bolts to between 70- and 80-ft-lb. The Nelson Shear Stud Bracket is now installed and secured.
5. Once a bracket has been secured in place, it is possible to connect to it using a bow shackle as an attachment point for a shock-absorbing lanyard to provide temporary fall protection during the installation of the rest of the fall protection equipment. Attach a 1/2- or 5/8-in. bow shackle through the hole in the Anchorage Lug. Secure in place with the nut and lock ring. The Personal Fall Arrest Anchorage Lug is now ready to use as an attachment point for an approved personal fall arrest device. **WARNING:** Because the anchor lug/attachment point is located right at foot level exposing the worker to a potential 12-ft. free-fall, extreme caution must be used in selecting a personal fall arrest device. Only shock-absorbing lanyards that are approved for use in 12-ft. free-falls may be used. Only one person may be attached to the anchor/bow shackle at one time. Do not connect directly to the anchor lug with a snaphook or carabiner; the gate could become side-loaded creating the possibility of roll-out. Connect only to the bow shackle attached to the anchor lug. See Fig. 4.

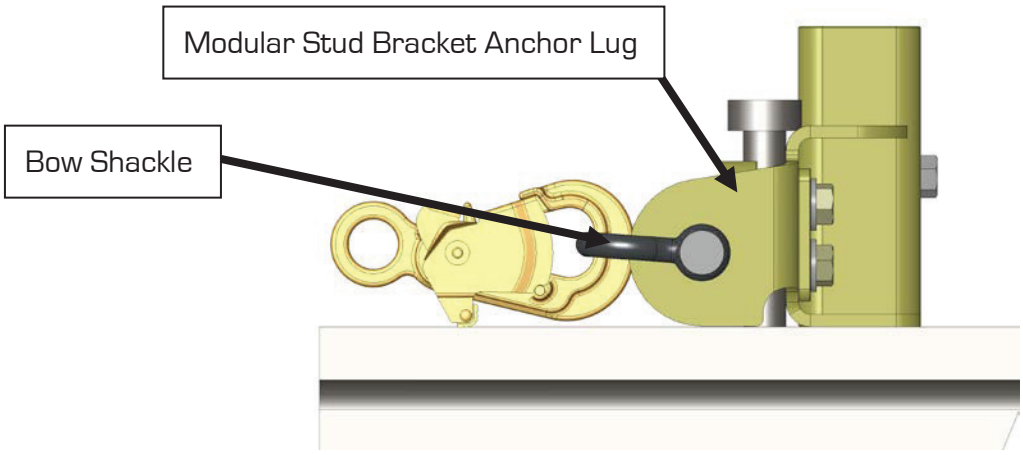


Fig. 4 Acceptable Method to Attach to the Personal Fall Arrest Anchorage Lug

6. Insert the End Stanchion into the stanchion receiver tube of the Modular Stud Bracket. Verify that the anchor lug at the top of the stanchion is pointing towards in the direction the horizontal lifeline will be going. Secure in place using the supplied bolt. **NOTE:** Once the end stanchion is bolted in place, it is possible to use it as a temporary attachment point for a single persons' shock absorbing lanyard by

inserting a bow shackle into the TOP hole of the anchor lug, and then connecting the lanyard snaphook to the bow shackle. DO NOT connect a snaphook directly into the hole of the stanchion lug.
7. Attach a 5/8-in. bow shackle into the bottom hole of the stanchion anchor lug closest to the tieback plate. Secure in place using the nut and lock ring.
8. Using a ½-in. bow shackle, attach the triangular d-ring of one of the 2-in. Ratchet Assemblies to one of the lugs of the Tie-back bracket. Re-attach the nut and lock ring.
9. Using a ½-in. bow shackle, attach the triangular d-ring of one of the 2-in. by 15-ft. long (24-ft. long if using 84" Stanchion) Ratchet Strap Assemblies to the remaining lug of the Tie-back bracket. Re-attach the nut and lock ring.
10. Pass the end of the ratchet strap through the 5/8-in. bow shackle attached to the stanchion in Step 7, then bring it downward towards the Ratchet Assembly (see Fig. 5). Insert the strap into the Ratchet mandrel and begin tightening the strap using the ratchet handle (see Fig. 6). Continue tightening only until the stanchion is pulled vertical or leaning very slightly towards the Tie-back plate, it should not be so tight as to bend or bow the stanchion. Verify that the ratchet strap makes at least one full revolution on the ratchet mandrel. If it does not, the strap must be fully loosened, some webbing pulled from the mandrel to give more slack into the webbing and then retightened. Continue this adjustment process until the webbing makes at least one full revolution on the ratchet mandrel so that the Tie-back strap can reach maximum strength. Any surplus ratchet webbing should be bundled up and secured to prevent it from becoming a trip hazard. See Fig. 7 for a diagram of the finished Tie-back webbing arrangement.



Fig. 5 Stanchion Top with Bow Shackle and Tie-back Strap



Fig. 6 Tie-back Bracket with Ratchet and Ratchet Straps Attached (6262-1 Shown)



Fig. 7 Completed End Stanchion with Tie-back Strap Installed (6262-1 Shown)

11. Verify that all bracket grip plate bolts are tight and have been torqued to between 70- and 80 ft-lb.
NOTE: The Ratchet Tensioner of the tie-back cable assembly MUST be placed so that the angle formed by the surface of the bridge beam and the tie-back strap is 45° OR MORE when measured from the vertical. This means that the Ratchet Tensioner MUST be attached to a stud bracket that is located a distance away from the Receiver which is AT LEAST as far away as the Stanchion is tall.
12. Repeat Steps 2 through 11 for the installation of the hardware for the opposite end of the lifeline.
13. If your particular Modular Stud System layout requires Bypass Stanchions, repeat Steps 3 through 6 to install the Modular Stud Bracket at the appropriate location. Once the bracket is installed and secured into place, the Bypass Stanchion may be inserted into the Modular Stud Stanchion Bracket and bolted into place.
14. Re-inspect all fasteners and bow shackles to insure that the nuts are firmly in place and properly captured by lock ring where appropriate, and that the Tie-back Straps are properly tensioned. The Stanchions are now ready for the installation of the Skyline™ Horizontal Lifeline.
15. To begin the installation of the lifeline lay the cable on a flat surface near where the lifeline will be installed (at ground level, or next to the beam where the stanchions have been installed) and remove all bends. Inspect cable for crush spots, broken wires, weld strikes, or any other deformity that may affect the integrity of the cable. Damaged cables must be removed from service immediately.
16. Position the eye end of the wire rope so that it is about 7-ft. (see Figure 8) away from the location of one of the anchor lugs on an End Stanchion.

Alternate 6202-1 Tie-Back Installation:

1. Installation of the alternate Skyline™ horizontal lifeline begins with the placement of the Modular Stud Tie-back Brackets. Verify using the "Component Specifications" on page 5 of this manual that the correct size of bracket and plate are being used for the shear/rebar studs present. Note: Rebar studs must be Grade 40 or Grade 60 rebar and must be embedded at least 4 feet into concrete and tied or bent to prevent pullout.
2. The Tie-Back Brackets should be attached to outermost shear/rebar studs that are located at the end of the beam where the lifeline is to be installed. Loosen the 4 bolts that secure the bracket's grip plate, on both of the tie-back brackets and slide the tie-back bracket's down the shear/rebar stud to rest against the top of the beam. Make sure that the formed tabs where the tieback cables will attach are pointed towards the far end of the beam where the other end of the lifeline cable will be installed (see Fig. 8). Verify that the bracket is resting firmly against the top surface of the beam; there should be no gap present below the bottom edge of the bracket. Tighten the grip plate bolts fully to firmly press the bracket against the shear studs. Torque the bolts to between 70- and 80-ft-lb. The tieback bracket's is now installed.

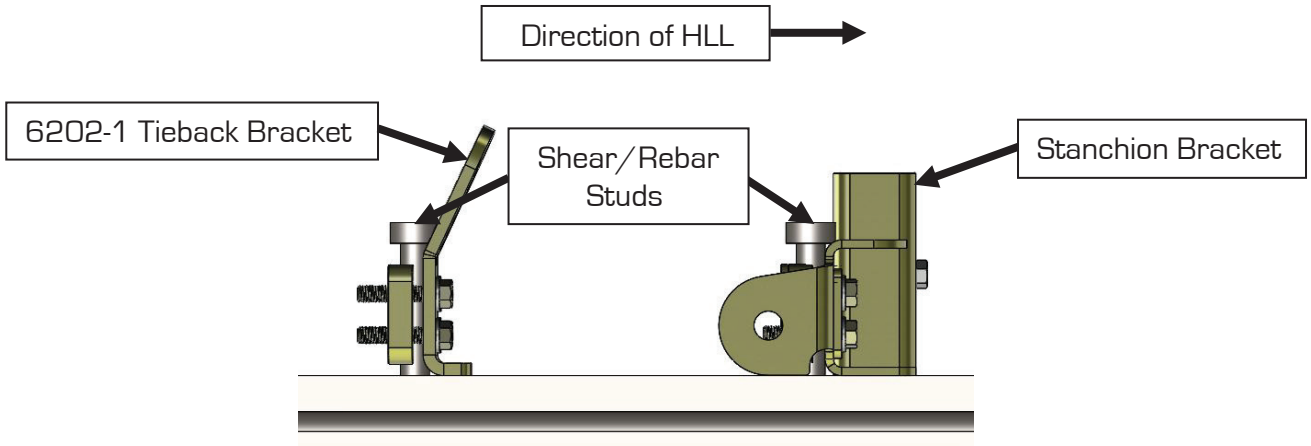


Fig. 8 Position of Brackets Relative to Shear/Rebar Studs

3. Loosen the bolts and grip plates from the Modular Stud Stanchion Bracket. Measure the height of the end stanchion that will be used in the system. The Stanchion Receiver Bracket is installed based on the height of the end stanchion. For a 5-ft. tall end stanchion, the bracket must be attached to shear/rebar studs that are a minimum of 60-in. away from the studs that the tieback plate is secured to; for a 6-ft. stanchion the minimum distance is 72-in.; for a 7-ft. stanchion the distance is 84-in. Rest the bracket against the correct row of shear studs. The holes of the Stanchion bracket should be pointing towards the tieback bracket.
4. Insert the bolts back into the bracket and into the grip plate capturing a shear/rebar stud. The bracket may have to be slid back and forth slightly to ensure that it is possible to capture 2 shear/rebar studs with the grip plate. Verify that the bracket is resting firmly against the top surface of the beam; there should be no gap present below the bottom edge of the bracket. Tighten the bolts fully to firmly press the bracket and the grip plate against the shear/rebar studs. Torque the nuts to between 70- and 80-ft-lb. The Modular Stud Bracket is now installed and secured.

5. Once a bracket has been secured in place, it is possible to connect to it using a bow shackle as an attachment point for a shock-absorbing lanyard to provide temporary fall protection during the installation of the rest of the fall protection equipment. Attach a 1/2- or 5/8-in. bow shackle through the hole in the Anchorage Lug. Secure in place with the nut and lock ring. The Personal Fall Arrest Anchorage Lug is now ready to use as an attachment point for an approved personal fall arrest device. WARNING: Because the anchor lug/attachment point is located right at foot level exposing the worker to a potential 12-ft. free-fall, extreme caution must be used in selecting a personal fall arrest device. Only shock-absorbing lanyards that are approved for use in 12-ft. free-falls may be used. Only one person may be attached to the anchor/bow shackle at one time. Do not connect directly to the anchor lug with a snaphook or carabiner; the gate could become side-loaded creating the possibility of roll-out. Connect only to the bow shackle attached to the anchor lug. See Fig. 9.

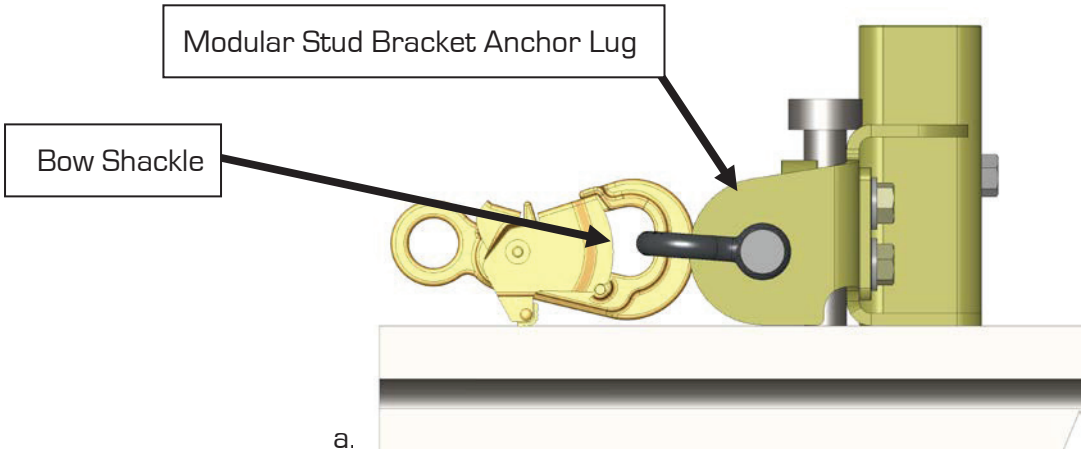


Fig. 9 Acceptable Method to Attach to the Personal Fall Arrest Anchorage Lug

6. Insert the End Stanchion into the stanchion receiver tube of the Modular Stud Bracket. Verify that the anchor lug at the top of the stanchion is pointing towards in the direction the horizontal lifeline will be going. Secure in place using the supplied bolt. NOTE: Once the end stanchion is bolted in place, it is possible to use it as a temporary attachment point for a single persons' shock absorbing lanyard by inserting a bow shackle into the TOP hole of the anchor lug, and then connecting the lanyard snaphook to the bow shackle. DO NOT connect a snaphook directly into the hole of the stanchion lug.
7. Attach a 5/8-in. bow shackle into the bottom hole of the stanchion anchor lug closest to the tieback brackets. Secure in place using the nut and lock ring.
8. Using a ½-in. bow shackle, attach the triangular d-ring of one of the 2-in. Ratchet Assemblies to the first of the Tie-back brackets. Re-attach the nut and lock ring.
9. Using a ½-in. bow shackle, attach the triangular d-ring of one of the 2-in. by 15-ft. long (24-ft. long if using 84" Stanchion) Ratchet Strap Assemblies to the second of the Tie-back brackets. Re-attach the nut and lock ring.

10. Pass the end of the ratchet strap through the 5/8-in. bow shackle attached to the stanchion in Step 7, then bring it downward towards the Ratchet Assembly (see Fig. 10). Insert the strap into the Ratchet mandrel and begin tightening the strap using the ratchet handle (see Fig. 11). Continue tightening only until the stanchion is pulled vertical or leaning very slightly towards the Tie-back brackets, it should not be so tight as to bend or bow the stanchion. Verify that the ratchet strap makes at least one full revolution on the ratchet mandrel. If it does not, the strap must be fully loosened, some webbing pulled from the mandrel to give more slack into the webbing and then retightened. Continue this adjustment process until the webbing makes at least one full revolution on the ratchet mandrel so that the Tie-back strap can reach maximum strength. Any surplus ratchet webbing should be bundled up and secured to prevent it from becoming a trip hazard. See Fig. 12 for a diagram of the finished Tie-back webbing arrangement.

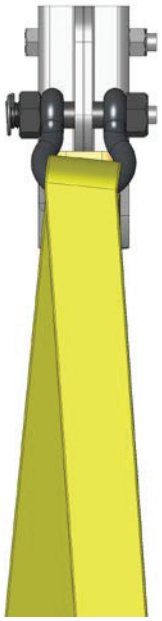


Fig. 10 Stanchion top with Bow Shackle and Tie-Back Strap

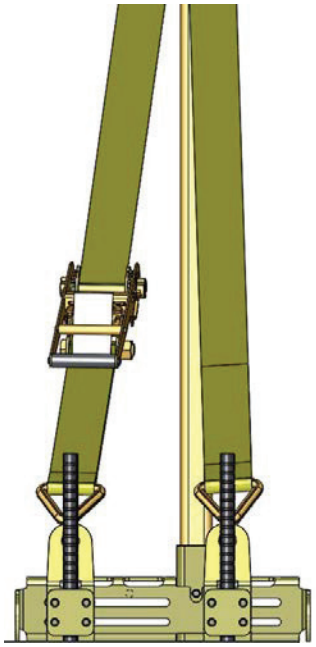


Fig. 11 Tie-Back Brackets with Ratchet and Ratchet Straps Attached (6262-1 Shown)

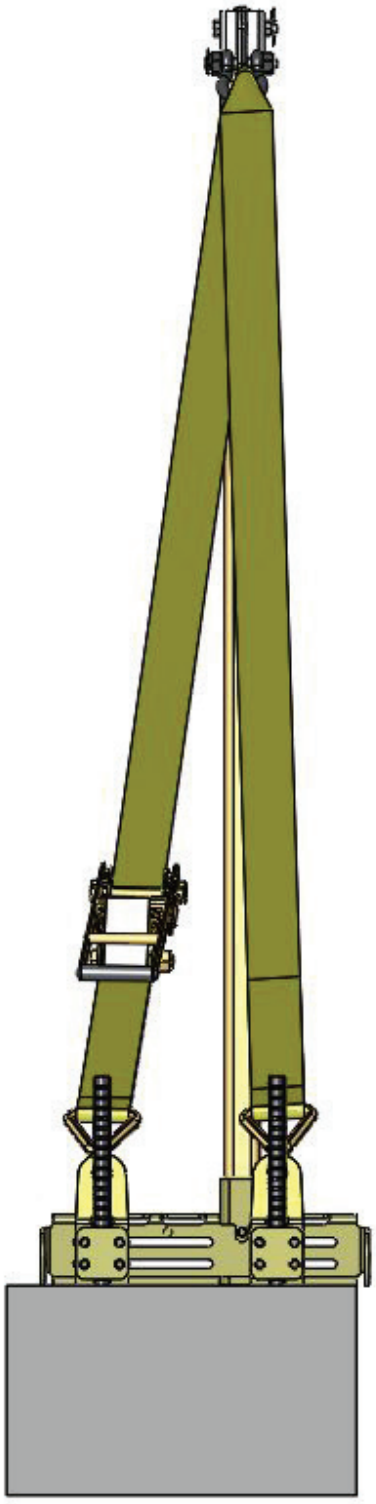


Fig. 12 Completed Alternate End Stanchion with Tie-back Strap Installed (6262-1 Shown)

11. Verify that all bracket grip plate bolts are tight and have been torqued to between 70- and 80 ft-lb.
NOTE: The Ratchet Tensioner of the tie-back cable assembly MUST be placed so that the angle formed by the surface of the bridge beam and the tie-back strap is 45° OR MORE when measured from the vertical. This means that the Ratchet Tensioner MUST be attached to a stud bracket that is located a distance away from the Receiver which is AT LEAST as far away as the Stanchion is tall.
12. Repeat Steps 2 through 11 for the installation of the hardware for the opposite end of the lifeline.
13. If your particular Modular Stud System layout requires Bypass Stanchions, repeat Steps 3 through 6 to install the Modular Stud Bracket at the appropriate location. Once the bracket is installed and secured into place, the Bypass Stanchion may be inserted into the Modular Stud Stanchion Bracket and bolted into place.
14. Re-inspect all fasteners and bow shackles to insure that the nuts are firmly in place and properly captured by lock ring where appropriate, and that the Tie-back Straps are properly tensioned. The Stanchions are now ready for the installation of the Skyline™ Horizontal Lifeline.
15. To begin the installation of the lifeline lay the cable on a flat surface near where the lifeline will be installed (at ground level, or next to the beam where the stanchions have been installed) and remove all bends. Inspect cable for crush spots, broken wires, weld strikes, or any other deformity that may affect the integrity of the cable. Damaged cables must be removed from service immediately.
16. Position the eye end of the wire rope so that it is about 7-ft. (see Figure 13) away from the location of one of the anchor lugs on an End Stanchion.

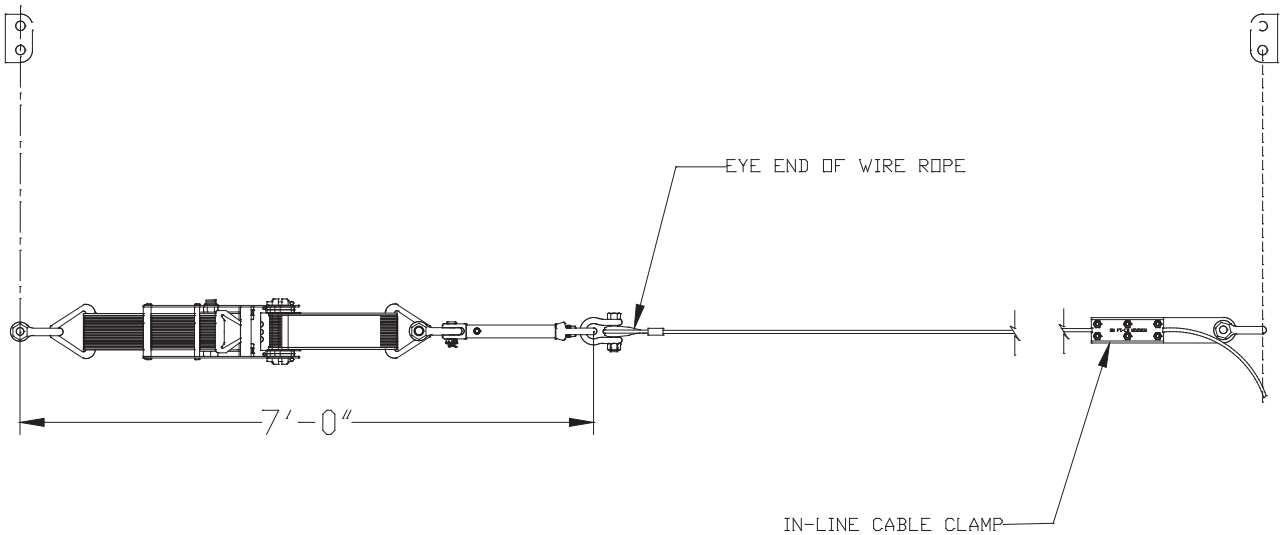


Fig. 13 Skyline™ Horizontal Lifeline Layout

17. Locate the spot on the wire rope on the other end (opposite of the eye end) where it would attach directly to the second End Stanchion's lug. Mark this location.
18. Remove the 6 bolts and lock washers from the top plate of the In-line cable clamp. Set the top plate aside.
19. On the mark you have measured off, place the wire rope into the grooved lower plate of the In-line cable clamp. Insure that the end of the cable clamp with the hole in it is placed towards the free end of the wire rope.

20. Twist the wire rope and press down into the grooves of the clamp. The wire rope may have to be twisted and untwisted for it to align properly.
21. Place the top plate onto the lower plate, and begin tightening the bolts. Tighten the top plate EVENLY to 35 ft-lb. For more detailed information on using the In-Line Cable Clamp, please refer to the "In-Line Cable Clamp Instruction Manual".
22. Remove the bolt from one ½-in. bow shackle. Pass the shackle end through the slotted hole of the In-line Cable Clamp. Raise the bow shackle to the top hole of the End Stanchion where the horizontal lifeline is to be installed and secure in place with the bolt. Tighten the nut and secure in place with the lock ring.
23. Insert a ½-in. bow shackle through the eye of the wire rope and bolt into place through the eye of the Skyline™ Shock Absorber. Secure the bolt with the nut and replace the lock ring.
24. Attach one ½-in. bow shackle through the triangular d-ring of the 3-in. by 10-ft. long Ratchet Strap, and connect it to the top hole of the End Stanchion where the horizontal lifeline is to be installed and secure in place with the bolt. Tighten the bow shackle nut and secure with the lock ring.
25. Remove the clevis pin of the Skyline™ Shock Absorber and insert a ½-in. bow shackle into the clevis. Replace the clevis pin and lock ring.
26. Using the ½-in. bow shackle just installed to the shock absorber, connect it to the triangular d-ring of the 3-in. Ratchet load binder. Secure with the nut and lock ring.
27. Begin lifting the horizontal lifeline cable assembly to its intended position (see Figure 14). If Bypass Stanchions are being used, the cable must be placed through the center of the bypass fittings before the cable is properly tensioned. Pass the free end of the ratchet strap into the slot of the ratchet. Pull the free end of the ratchet strap to help remove slack from the lifeline cable.

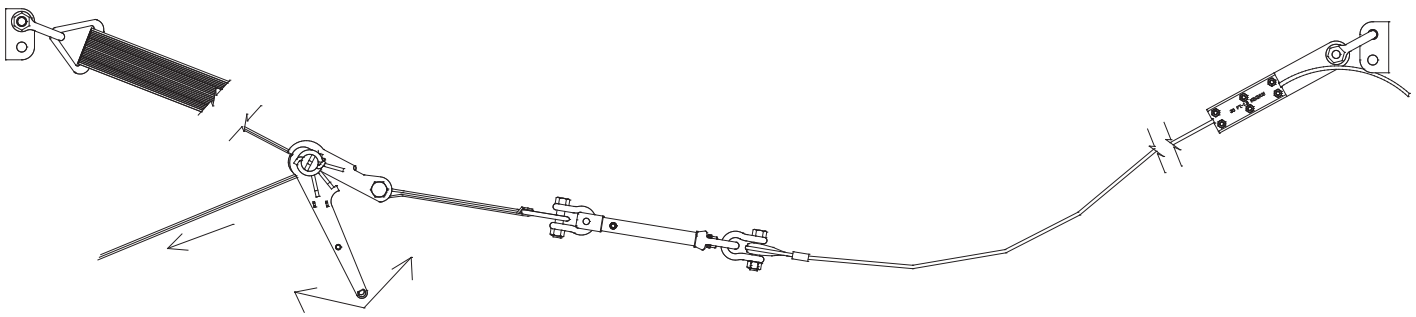


Fig. 14 Tensioning the Horizontal Lifeline

28. While holding the ratchet strap tight, begin tensioning the lifeline, using the ratchet handle.
29. Tighten the ratchet load binder until the line tension just releases the load-indicating washer of the Shock Absorber to spin free. This washer is located just under the eye of the Shock Absorber (see Figure 15). A freely spinning washer indicates that the cable has been pre-tensioned to 1000 lbf.

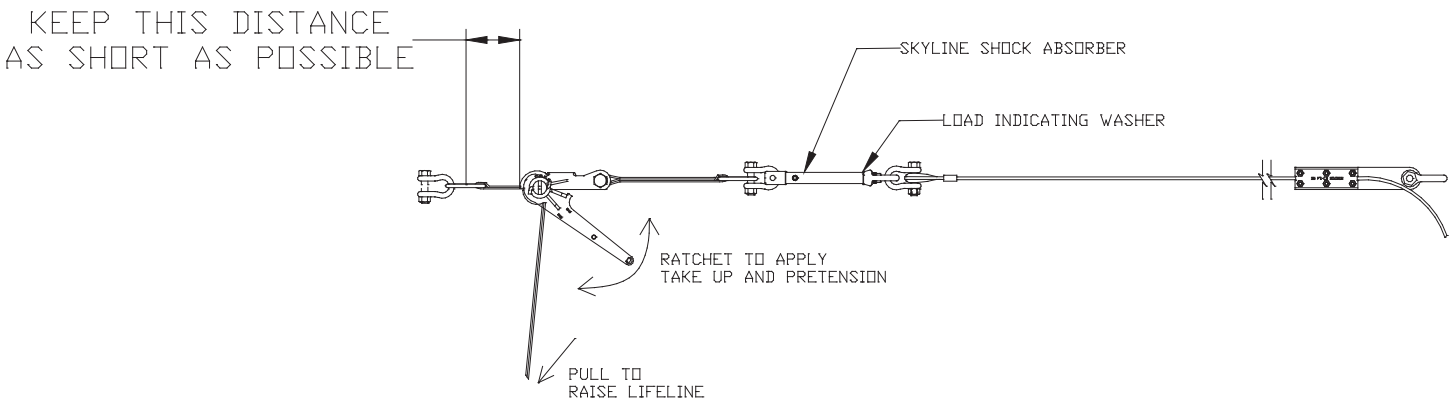


Fig. 15 Shock Absorber Load Indicating Washer

30. Check that the webbing of the ratchet strap has made at least one complete revolution on its mandrel before the correct line tension has been reached. If it has not made a full revolution, release the tension, let 3- to 4-in. of the ratchet strap to slip back out of the load binder and retighten. The strap should now make at least one full revolution before the lifeline is properly tensioned. At least one full revolution is necessary for the tensioner to overcome the maximum load without slipping. Excess webbing may be wrapped around the load binder or bundled and secured to prevent the surplus from forming a tripping hazard.
31. Inspect the installation for any defects, such as missing parts, damage, proper anchorage strengths and configuration, proper pre-tensioning, proper cable alignment, proper elevation, defective or non-compatible components. **DO NOT** authorize system use if any defects or discrepancies are found. Check system installation parameters with system installation parameter documents to assure that the correct installation has been performed.
32. Once the system passes all checks by the competent person, the system may be approved for use, and labeled with a permanent identification tag referencing the following information:
    a. Identification number that will tie the lifeline to the correct computer generated design documents that identify the original design parameters.
    b. Date of installation.
    c. Total authorized span length and sub-span length.
    d. Total number of people allowed on the system at one time.
    e. The minimum required clearance (MRC) below the walking/working surface.
    f. The anticipated maximum line tension.
    g. The required cable pre-tension (normally 1000-lbs.)
33. A separate tag should also be added indicating date of last inspection by the competent person.

INSTALLING A CONTINUOUS RUN OF MULTIPLE LIFELINES

The above procedure describes the method for installing a single horizontal lifeline. It is also possible to install a continuous run of multiple horizontal lifelines that share common end stanchions provided they are installed in a generally straight line with one another (see Figure 16). For end stanchions located in the center of the lifeline run (where a lifeline will be attached on both sides of the stanchion), the horizontal lifelines should be attached to the top holes of the end stanchion. A single tie-back strap is then attached to the bottom hole of the stanchion. These tie-back straps are secured to the Shear/Rebar Studs in the same manner as outlined above, making sure that the bracket is both properly sized for the stud that it will attach to and that it is attaching to a Shear/Rebar Stud that allows for the correct minimum distance between the Modular Stud Stanchion Bracket and the Tie-back Bracket as appropriate for the height of stanchion being used (60-in. minimum spacing for a 5-ft. tall stanchion, 72-in. for a 6-ft. stanchion, and 84-in. for a 7-ft. stanchion). These tie-back straps should be evenly tensioned to ensure that the stanchion is kept vertical. Only an end stanchion that has a horizontal lifeline attached to both sides is allowed to have a single tie-back. Should one of the lifelines be removed from one of these central lifelines, a second tie-back must immediately be attached to the stanchion on the side opposite the lifeline BEFORE the lifeline may be used. Please contact Fall Safe at (303) 424-8650 with any questions concerning the arrangement or installation of horizontal lifeline equipment.

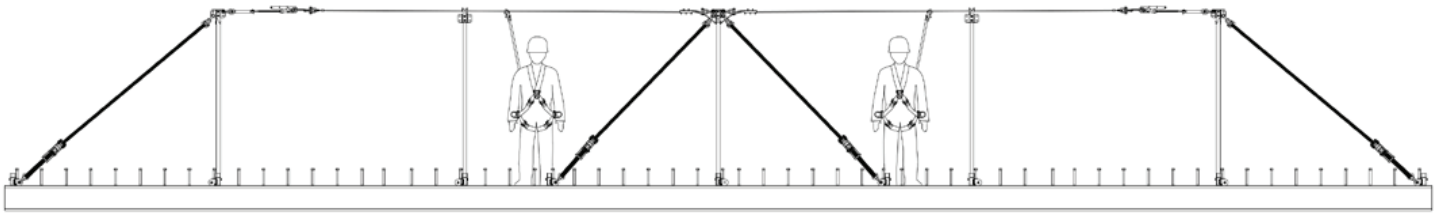


Fig. 16 Typical Layout of a Multiple Lifeline System

TRAINING

It is the responsibility of the employer to train all workers prior to using this system (per OSHA 1926.503 (a)(1)). The employer shall provide a training program for each employee who might be exposed to fall hazards. The program shall enable each employee to recognize the hazards of falling and shall train each employee in the procedures to be followed in order to minimize these hazards.
The employer shall assure that, as necessary, each employee has been trained by a competent person qualified in the following areas:
a. OSHA regulations governing the use of horizontal lifelines.
b. Ability to recognize potential fall and workplace hazards.
c. Method of inspection of safety equipment.
d. Rescue procedures.
e. Installation and removal techniques.

PLANNING FOR RESCUE

Prior to system use, a rescue plan must be prepared, the workers must be trained in its use, and the rescue equipment must be on hand to implement it in case of a fall.
Typical rescue plans include (but are not limited to) the following items:

1. List of equipment that must be readily accessible in the event of an emergency and the names of those workers certified to use or operate that equipment.
2. Emergency contact phone numbers (ambulance, hospital, fire department...) and a means to contact them (cell phone, emergency radio).
3. List of employees on the site, and the specific tasks they will perform to effect the rescue.

The equipment that will be used to aid in the rescue of any worker must be attached to structural anchorages independent of those used for the horizontal lifeline system. During installation of horizontal lifeline anchorages, tie-off and equipment attachment hardpoints should be attached, and also clearly marked in such a manner as to provide a means to rescue a worker in any position along the lifeline system.

INSPECTION

Prior to each use, the worker must inspect the system for any physical damage, wear, corrosion, or malfunctioning parts. Check the shock absorber for deployment by looking to see if the black slide bearing under the shock absorber eye is exposed. Once the shock absorber is deployed, its energy capacity is used up, and it cannot be reset. If the shock absorber deploys, the entire system has seen a fall arrest load and must be removed from service until it is inspected by a competent person who either replaces or repairs and re-certifies the components for use on the system. Once deployed, shock absorbers are not re-usable, and must be replaced. If an inspection reveals a problem or unsafe condition, remove the entire system from service until it can be re-certified by a competent person.

The worker, who must also check the pre-tension prior to each use, must inspect all system components. A formal inspection must be carried out a minimum of once each year, and be formally documented and kept on file with the system parameter documents.

SERVICING

A qualified person trained in the inspection and servicing of system components must carry out servicing of this system. The company's safety officer should maintain a record log of all servicing and inspection dates. The system and all components must be withdrawn from service if subjected to fall arrest forces. Those components may be returned to service only after being certified by a qualified person. Only original Fall Safe equipment and replacement parts are approved for use in this system. Contact Fall Safe with questions and when in need of assistance.

WARNINGS AND LIMITATIONS

Proper care should always be taken to visually scan the work area prior to use. Remove any obstruction, debris, and other materials from, and beneath the work area that could cause injuries or interfere with the operation of this system. Be cautious of swing fall hazards if working horizontally to the side of the lifeline. Always use the shortest lanyard length possible to connect to the lifeline. Be aware of the movements of others on the lifeline at the same time, knowing that if they fall, the sudden motion in the lifeline could pull others off balance. When working at a fixed area, tie off to other suitable overhead anchorages if they exist, allowing the lifeline to be occupied by fewer people.

Users should be familiar with pertinent regulations governing the use of this system and its components. Only trained and competent personnel should install and supervise the use of this system.

Do not exceed manufacturers' recommended span length or maximum number of people on the same lifeline as listed on either the tag attached to the specific horizontal lifeline system, or in the lifeline parameter data sheets.

Do not use these components with any other horizontal lifeline material. Only 3/8-in. – 7x19 IPS or stainless steel wire rope is allowed, due to its high-energy capacity.

Use only Fall Safe supplied or qualified compatible components.

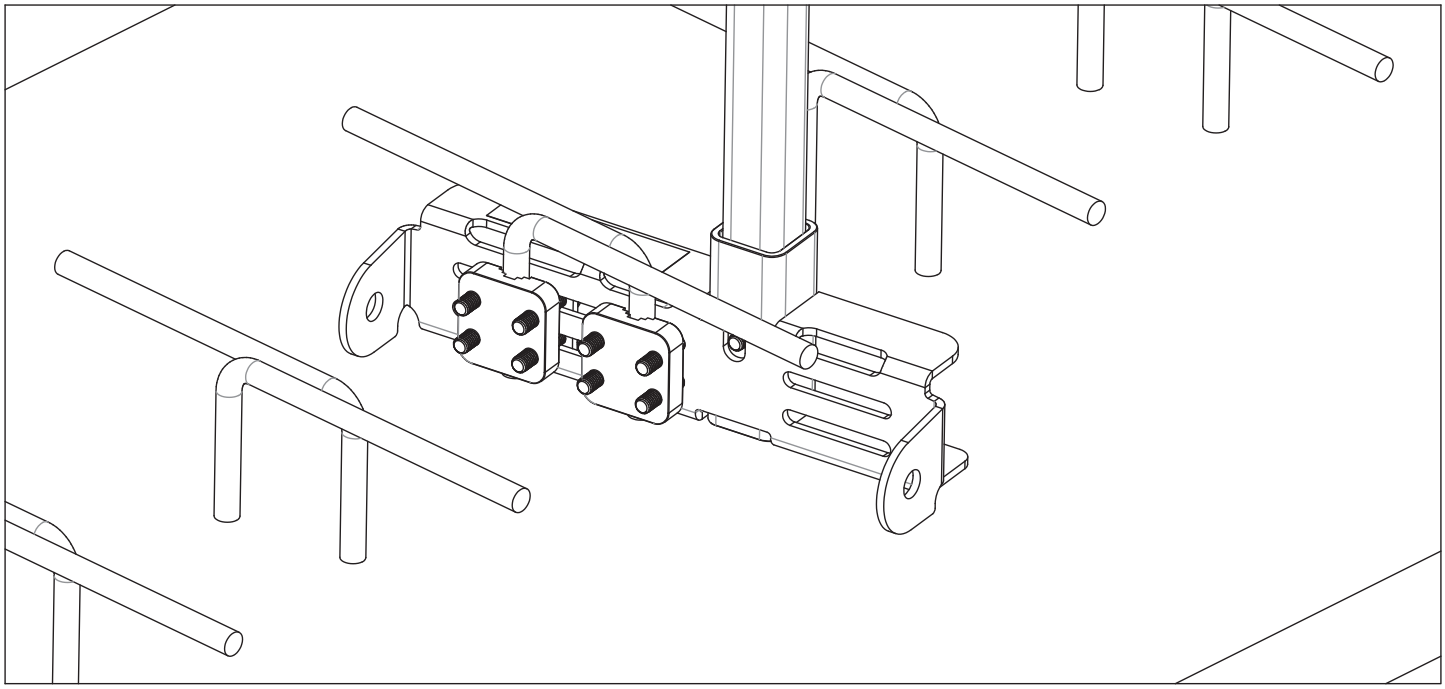
If you have any questions regarding the correct installation or use of this product DO NOT USE.
Call Fall Safe at Ph. (303) 424-8650 or Fax (303) 424-8670.

OPTIONAL MOUNTING METHODS FOR USE WITH 6262-1 OR 6263-1 MODULAR STUD/REBAR STANCHION RECEIVER, & 6202-1 STUD/REBAR TIE-BACK BRACKET

The 6262-1 or 6263-1 Modular Stud/Rebar Bracket and 6202-1 Stud/Rebar Tie-Back Bracket can be used on "L" Rebar with the following guidelines.

- The Minimum "L" Rebar size is #5, Grade 40 or 60 with minimum 4' embed with end tied or bent to prevent pullout.
- The Minimum Height under the "L" Rebar is 4-1/8".
- The Minimum "L" Rebar Spacing is 3".
- Reposition the Short Side Grip Plate, to the Long Side of the bracket. Keep one of the Grip Plates as close to the Stanchion Receiver tube as possible.
- Position Tie-Back Brackets on separate "L" Rebar rows.

Typical "L" Rebar 6262-1 Modular Stud/Rebar Bracket Installation Diagram



Typical “L” Rebar 6202-1 Stud/Rebar Tie-Back Brackets Installation Diagram

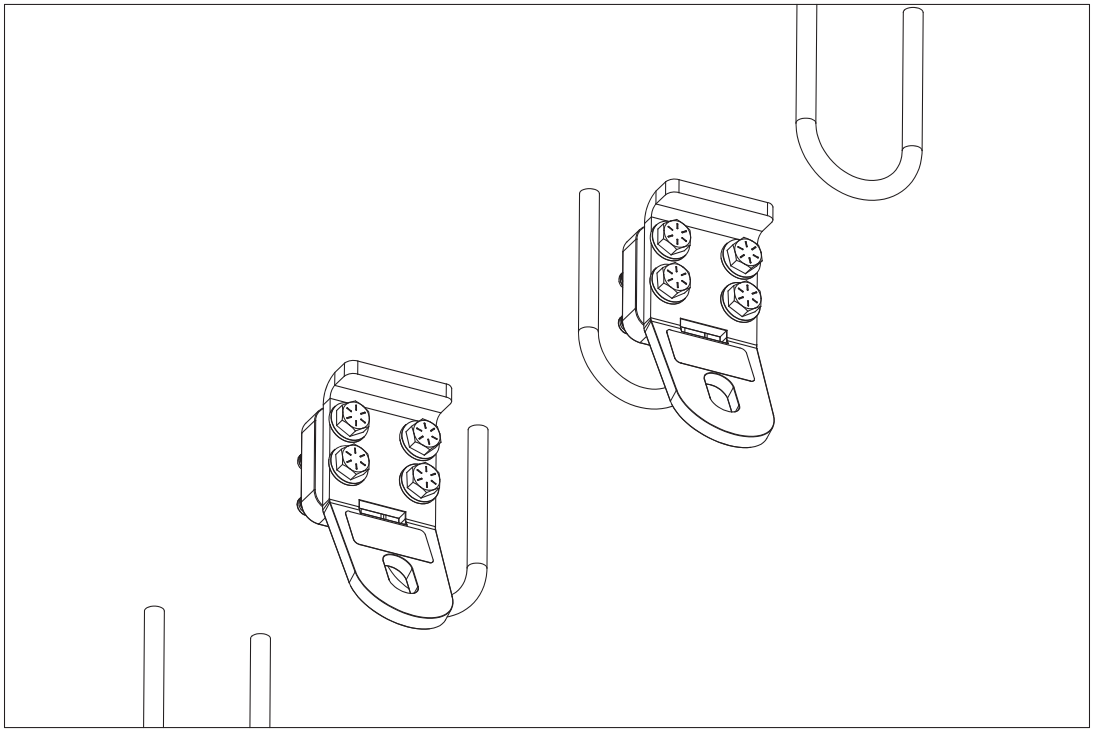


The 6262-1 or 6263-1 Modular Stud/Rebar Bracket and 6202-1 Stud/Rebar Tie-Back Bracket can be used on “Looped” Rebar with the following guidelines.

- The Minimum “Looped” Rebar size is #4, Grade 40 or 60 with minimum 4’ embed with end tied or bent to prevent pullout.
- The Minimum Height under the “Looped” Rebar is 5”.
- The Minimum “Looped” Rebar Spacing is 3”.
- Reposition the Short Side Grip Plate, to the Long Side of the bracket. Keep one of the Grip Plates as close to the Stanchion Receiver tube as possible.
- Position Tie-Back Brackets on separate “Looped” Rebar rows.

Typical “Looped” Rebar 6262-1 Modular Stud/Rebar Bracket Installation Diagram

Typical “Looped” Rebar 6202-1 Stud/Rebar Tie-Back Brackets Installation Diagram



Caution: Contractor/Project Engineer must follow Installation Instructions and guidelines in accordance with M_6262 Modular Stud Manual.

INSPECTION LOG FOR HLL SYSTEMS

Company: _____ Location:_____ Date:_____

Job Site: _____ HLL Log No.: _____ System No.: _____

Is this system used as described in the HLL Log No. _____ to conform to design document criteria?_____

Describe non-conforming conditions in the boxes below:

Inspection Criteria	Missing Parts	Labels Readable	Corrosion	Deformed Parts	Cracked Parts/ Broken wires	Excessive Loading
HLL Identity Tag?						
HLL Shock Absorber Label?						
HLL Shock Absorber?						
3-in. Ratchet and Ratchet Strap?						
End fittings?(In-line clamp, etc.)						
Shackles?						
Wire Rope?						
Tie-back Straps?						
Tie-back Ratchet Tensioners?						
Modular Stud Stanchion Receivers?						
Modular Stud Tie-back Brackets?						

Is Shock Absorber pre-tension set correctly _____

Has a Rescue Plan been prepared?_____

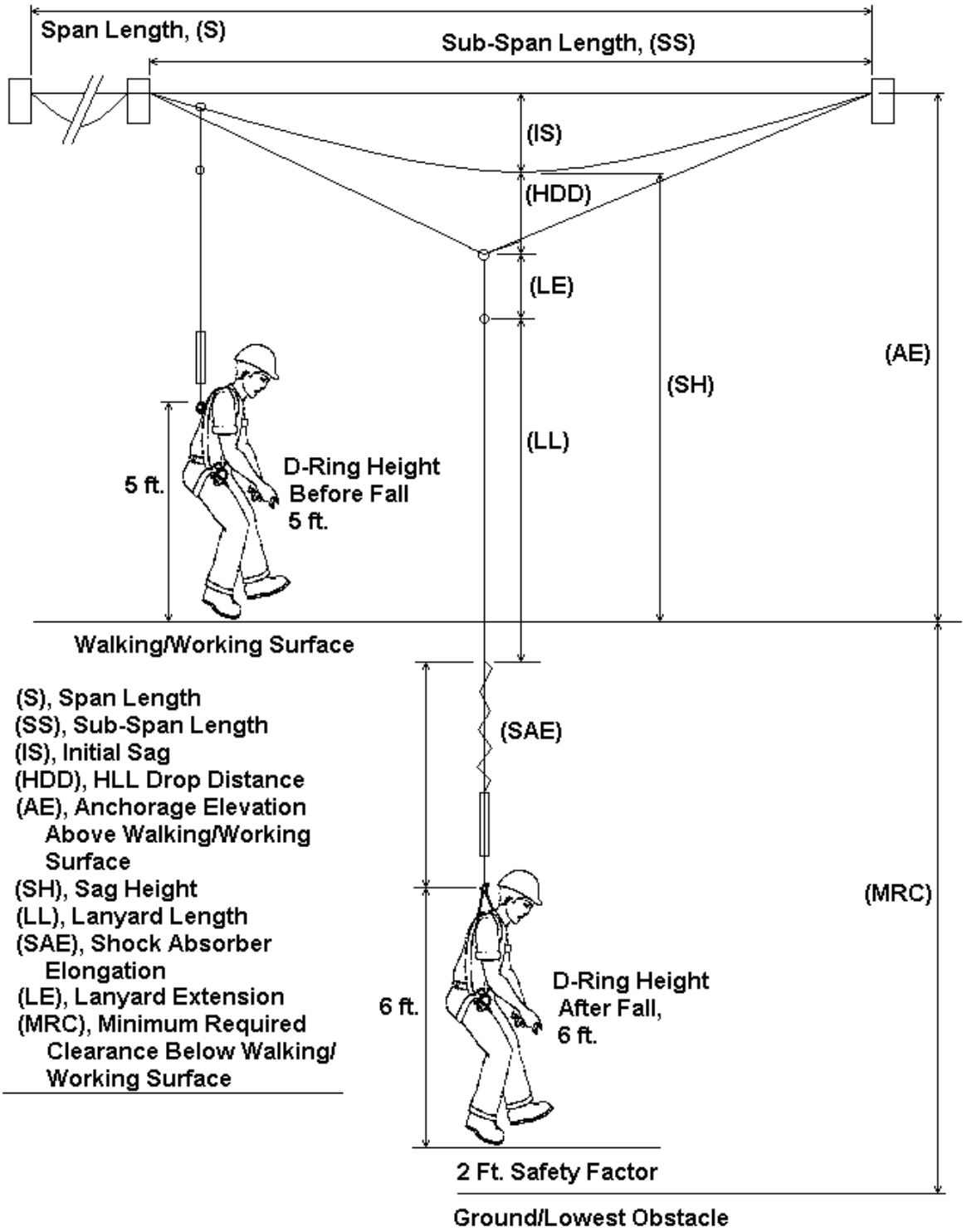
Is Rescue Equipment on hand?_____

Have workers been trained in the Rescue Procedures and been given a copy of the Rescue Plan? _____

_____

Coquitlam, BC V3K 0B3 | Elgin, IL USA 60123
Ph. 1-800-323-7402

SKYLINE™ HORIZONTAL LIFELINE DIAGRAM





FALL SAFE®
Ph. 1-800-323-7402

Canada labels
SureWerx, 49 Schooner St.
Coquitlam, BC V3K 0B3

USA labels
SureWerx USA Inc.
Elgin, IL USA 60123