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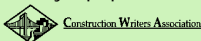
Protection Update

is the newsletter for the ISEA Partnership for Worker Protection program. It is intended for anyone who specifies, purchases or uses personal protective equipment, and those who regulate it. *Protection Update* is published every two months and distributed without charge, and also is available on ISEA's website — www.saftequipment.org.

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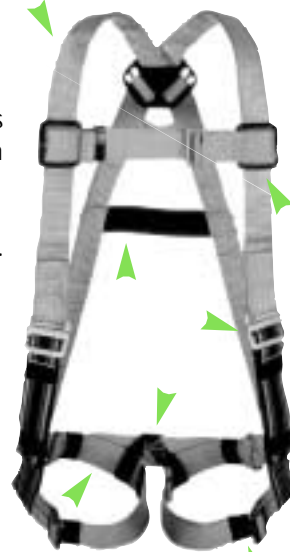
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Selecting a Full-body Fall-protection Harness

By Douglas Mercier
Daloz Fall Protection

(Editor's Note: The following is the first of a two-part series on fall-protection harnesses. In part two, which will appear in the next *Protection Update*, Mr. Mercier will discuss harness inspection and maintenance.)

What makes one worker wear the proper fall-protection equipment, and use it in the correct manner while another may not? On one hand, workers must receive the proper training on adjusting, inspecting and maintaining the equipment. On the other hand, no matter how thorough the training, a worker might leave the equipment behind if it isn't comfortable.



"Our workers like a comfortable harness," said a director of construction safety operations at a company in North America. "They'll wear a harness if it's comfortable."

Most safety directors also agree that any fall-protection equipment that is difficult to don and hard to adjust has less chance of being used. Before purchasing any fall protection equipment, buyers should note that harnesses are not all the same. Everything from harness construction to strap placement can be compared and contrasted. All of these elements do make a difference in the comfort and safety the harness offers the user. Harness buyers and users should also remember that harnesses do not last forever, and must be inspected for signs of wear and replaced when necessary. ▶4

Selecting Other Components of Personal Fall-arrest Systems

By Scott Paul
DBI/SALA

(Editor's Note: The following is the first of a two-part series. In part two, which will appear in the next *Protection Update*, Mr. Paul will address the question: Can fall protection be made less cumbersome?)

Personal fall arrest systems (PFAS) consist of three elements: a full-body harness, designed specifically by work-place application; a shock-absorbing lanyard or self-retracting lifeline engineered to take the strain out of a fall; and an anchorage connector guaranteeing the

most secure base connection possible.

Arguably the most fundamental component of any PFAS is the full-body harness. A good quality, well-designed harness should retain its shape when taken off to avoid tangling and snagging. It should be comfortable to wear throughout the workday and offer adjustability across the chest, shoulders and leg straps. Additional options such as belts and seat slings can provide additional support, but are a matter of personal preference.

More importantly, the best harnesses will effectively spread the impact forces of a fall to the areas of the body best able to take the strain. Body belts were worn in the days before harnesses. During a fall wearing just a ▶6

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body belt, the impact forces went straight to the spine or midsection. Today's harness designs channel those forces to the fatty tissues of the thighs and buttocks as well as to areas of the body like the chest and shoulders.

An important feature when choosing a harness is the functionality and location of the D-Ring. The D-Ring is the main connection point of any harness. A front D-Ring attached to the chest strap is critical for safe connection to a ladder-climbing safety mechanism such as a fixed cable or rail system. A back D-Ring, used for connection to a lanyard or self-retracting lifeline, will keep you in an upright position in the case of a fall. Side D-Rings are generally used for restraint and work positioning.

A note of caution for wearers of harness-

es made of stretch fabric: take into account the stretch of the harness in calculating your fall distance and wear the harness snug enough so that the chest strap will not catch under your chin in case of a fall.

The Remaining Components You Will Need

Selecting the remaining components of the personal fall arrest system — lanyards, self-retracting lifelines, horizontal lifelines and anchorage systems — depends very much on the nature of the work and location. But first, it is critical to understand the potential fall distance and clearance. When your anchorage point is located at or higher than your D-Ring, your fall distance will be that of your lanyard plus the activated portion of the lanyard's shock. If your anchorage point is lower than your D-Ring you must add to your fall distance the additional distance from your D-Ring to the lower anchorage point. A special shock-absorbing lanyard is available for this application.

Shock-absorbing lanyards have become the modern standard in fall protection. Manufactured from tough webbing with a tensile strength anywhere between 5,750 and 9,800 pounds, they guarantee performance. The best shock-absorbing lanyards will reduce the arresting forces on a worker during a fall to approximately 900 pounds, which is half the maximum allowance regulated by OSHA standards. Lowering the arresting forces means less impact to the workers body. As with harnesses, Kevlar® webbing for flame resistance is a must for welding applications; some models feature self-locking snap hooks that can easily be connected to the D-Ring or anchorage point without having to remove welding gloves.

Standard shock-absorbing lanyards will reduce the arresting forces to 900 pounds when a worker falls six feet or less. This is the case when the worker is connected to an anchor overhead. Specialized shock-absorbing lanyards are available to arrest falls and still meet OSHA standards when the workers are connected to anchorage points at their feet. Connecting at your feet will increase the fall distance to up to 12 feet.

Fall Protection Safety Checklist

Work situation: Where are you working and what are the physical challenges and limitations of that space? What are the major risks involved? Do you need free fall protection or restraint?

Mobility: How will you get to your work area? Will greater mobility be an issue? For areas that can only be accessed by ladder, do you have the appropriate harness connector and lifeline. Will a self-retracting lifeline work best for you?

Scale of project: Are you working two stories up or 22? The scale of a project will govern the size of lanyard or lifeline you need. Smaller scale projects may require less heavy-duty lifelines and give you the option to use lightweight models that increase mobility and reduce fatigue on the job.

Overhead Connection: Where is your best anchorage point? Will you be able to attach a lanyard or lifeline to an overhead beam, or will you need a beam anchor?

Equipment Check: Have you checked all of your equipment prior to each use, making sure that lanyards and harnesses are not damaged and lifeline indicators are intact? If you suspect equipment is damaged, replace it immediately.

And always ask for assistance from fall protection experts. If you cannot find a system or do not understand the existing systems, contact a fall protection manufacturer. Their engineers will design systems that meet your needs. (By Scott Paul, DBI/SALA)



Self-retracting Lifelines (SRLs)

Self-retracting lifelines are popular alternatives to lanyards. Extending and retracting automatically, SRLs are neatly encased in protective housing and provide the best mobility without the chance of added tripping, snagging or dragging hazards to already high-risk work environments.

Selecting the best self-retracting lifeline for the job depends on where your work is located. If you're working in a plant maintenance situation, typically a 30-50 foot model will cover all of your needs. On oil-rigs, a maximum length 175-foot model is best. This can be anchored at the top of the rig and allow you maximum mobility to go about your work.

Always monitor clearance for the self-retracting lifeline to avoid snagging and potential damage. Better models come with an impact indicator, showing whether the SRL has suffered an impact from a fall. In addition, some self-retracting lifelines are sealed to protect critical fall protection elements from harsh environments.

Anchorage Connectors

Anchorage connectors have come a long way since the early days when workers would often wrap their lanyards around a beam and go about their business. The constant movement would cause abrasion, creating pinch points in the lanyard and wear that could go unnoticed.

Today the most popular and widely used connector is the D-Ring connector, which bolts or welds easily to any beam. The tie-off adapter is a close second and provides a 5,000-pound-minimum tensile strength

webbing connection that wraps around an overhead beam. It is important when locating a connector that it is at your back D-Ring level or higher. Having the anchorage point at this level will limit your fall distance and the forces that will be applied to your body in the event of a fall.

Often there is no overhead anchorage point. If this is the case and you must connect to an anchorage point at your feet, there are a couple of anchorage options. A girder grip is one possibility, which features a pivoting wing-bar that provides the girder lock on steel beams from 0.25 to 1.25 inches thick. A fixed-beam anchor can also be quickly installed. Featuring a dual beam grip, this model easily adjusts to fit larger beams. For complete mobility, there are also sliding beam anchors, which work equally effectively at your feet or overhead.

Horizontal Lifelines

If you're working in building construction without flooring or in areas with limited anchorages available, the horizontal lifeline system is a solution. Usually lightweight, they can be transported quickly, and easily set up at different areas of a construction project or at new work sites. Horizontal lifelines vary in design, but a classic model will offer two anchors that connect easily to any given beam. Once attached, you simply run a cable between the anchors and hook up your lanyard to the cable. All these systems offer great versatility and are ideal for bridge construction and repair jobs, plant maintenance and steel frame construction. ●

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