THE BREHMER AGENCY

Fall Protection

"Keys" to Remember

A pair of keys in the pocket of someone in a fall arrest system can cause serious injury or death in a fall situation. When a worker falls, the keys can puncture the upper thigh area of the worker and potentially sever the femoral artery of that employee. The same goes for screw drivers, etc. Bottom line, employees should empty front pockets whenever wearing a fall arrest harness.

This publication is intended to provide an overview of the construction fall protection standard. It is not implied or intended to provide a guide that ensures 100% compliance with all provisions of the OSHA regulations. To ensure 100% compliance with all OSHA regulations, consult the OSHA construction standard. (29 CFR 1926)

So Many Standards, So Little Time

There are several different regulations in the construction and general industry standards regarding fall protection. Each one is different in terms of height requirements given certain criteria. Following is a quick reference on the differences:

General Industry Standard

The general industry standard requires fall protection whenever exposed to a fall hazard of 4' or greater.

General Construction Standard

The construction standard requires fall protection whenever an employee is exposed to a fall hazard of 6' or greater.

Scaffolding Standard

Fall protection is required whenever an employee is exposed to a fall hazard of 10' or greater.

Steel Erection

Steel erectors are required to use fall protection when exposed to a fall hazard of 15' or greater if they are not engaged in connecting activities. Connectors are required to wear a fall arrest system when exposed to a hazard of 15' or greater, but are not compelled to actually tie off until they are 26' or greater in height from a lower level. Scary isn't it…..

Flagging, Flagging and More Flagging

Cable guardrails on structures are becoming very common. This is because of the speed in which they can be erected and their incredible strength. All too often though, a critical detail is overlooked when installing cable guardrails.

OSHA requires that highly visible flagging be installed on the cable guardrails every 5 feet. This is often accomplished by tying caution tape on the cable. Most of the time, caution tape is either ripped off or slides on the cable due to wind. Remember to inspect all guardrail systems daily to identify any safety deficiencies and to replace any missing flagging.

Also, remember that OSHA does not permit the use of cable guardrail less than 1/4" in diameter. Cable this small is hard to see and cause severe lacerations to employees unlucky enough to fall upon it. It essentially acts like a cheese cutter.

Fall Arrest System Components

Anchor

The anchor point is a critical component of a safe fall arrest system. The anchor is the point at which the fall arrest system is connected to a secure structure. All anchors are required to support at least 5000 lbs per person without failing. An anchor point that has two workers tied off to it must be capable of supporting 10,000 lbs without failing and so on.

A variety of different anchors are on the market that permit tying off to various structures such as pipe, concrete/masonry walls, steel I-beams, steel decking, wood structures, etc. Remember though that anything the anchor is attached to must be capable of supporting at least 5000 lbs. per person without failing as well. Tying off to a rated anchor point which is attached to a weak structure would not provide sufficient protection in the event of a fall situation.

Roof Mounted Anchor Point

Concrete Wall Anchor Point

Lanyards and Vertical Lifelines

Lanyards and vertical lifelines are the link between a rated anchor point and the personal fall arrest harness worn by a worker. Lanyards and lifelines must be capable of supporting at least 5000 lbs. for each person. If two workers are attached to a vertical lifeline, it must be able to support at least 10,000 lbs without failing and so on. There are a variety of lanyards on the market including self retracting, shock absorbing and restraint lanyards.

Retractable lanyards work like a seatbelt in a vehicle. The lanyard uncoils as the worker moves around the anchor point. In the event of a fall, a brake in the device locks preventing additional lanyard from unwinding. OSHA requires that all self-retracting lanyards that limit free fall to 2' or less have a tensile strength of at least 3000lbs. Self-retracting lanyards or lifelines that do not limit a free fall to 2' or less must have a tensile strength of at least 5000 lbs per person. These units must be removed from service and recertified by the manufacturer if exposed to the stress of a fall.

Shock Absorbing Lanyards are designed to tear and extend in length during a fall situation. The tearing thread slows the rate of descent and the corresponding stress on the worker. When fully expanded, the lanyard must limit the free fall distance of a worker to no more than 6'. Even though thread is tearing on the lanyard during a fall, it is designed to retain at least 5000 lb tensile strength, so the tearing thread will not cause the lanyard to fail. These are single use items. They are to be cut up and disposed of if exposed to the stress of a fall.

Restraint Lanyards are lanyards that do not tear in a fall situation and do not self-retract. These lanyards do not give in a fall situation, therefore they do not reduce stress to workers as do shock absorbing lanyards and retractable lanyards. These are single use items. They are to be cut up and disposed of if exposed to the stress of a fall. These lanyards offer the least protection to employees and therefore are not recommended in the field.

Carpenter Anchor Point

Self-Retracting Lanyard

Shock Absorbing Lanyard

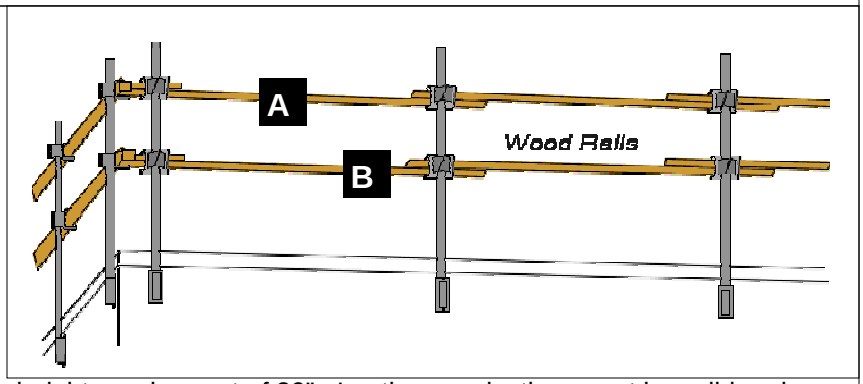
Personal Fall Arrest Harness

The harness is the portion of a fall arrest system worn by employees. They come in a variety of styles and sizes to fit the physique of the employee and work being performed. They must be adjusted properly to be effective. A properly adjusted harness should permit the employee to crouch down without cutting off circulation, but not hang off of the employee when standing up. All buckles and fasteners on the harness must be connected, especially the chest strap. Failing to connect all buckles and fasteners can result in an employee falling out of their harness in a fall situation. Harnesses are single use items and must be cut up and disposed of if exposed to the stress of a fall.

Typical Fall Arrest Harness

Anatomy Of A Properly Constructed Guardrail System

A



Top-rails must be 42" +/- 3" from the working surface to the top of the rail. At no time should the rail extend above 45" or below 39". Rails must be constructed so that it can withstand a downward or outward load of at least 200 lbs without failing. If steel cable is used instead of steel or wood, it must be greater than 1/4" in diameter and be flagged with highly visible material every 5 feet. All guardrails should be constructed so that the rails cannot be pushed and deflected lower than the minimum height requirement of 39". In other words, they must be solid and secure.

B

Midrails must be approximately 21" from the working surface. Midrails must be able to sustain any downward or outward load of at least 150 lbs without failing. If steel cable is used instead of steel or wood, it must be greater than 1/4" in diameter and be flagged with highly visible material every 5 feet.

Safety Net Systems…..
Often More Work Than They Are Worth

This is by far the least common type of fall protection on construction sites, but they are used on occasion. Safety net systems do not prevent falls as do fall arrest and guard rail systems. They are positioned under the fall hazard to catch any employees who are unfortunate enough to fall from the work zone.

Safety nets are wrought with problems that make them unfeasible for most situations. For example, the area underneath the nets must be free of any equipment or debris. In a fall situation, the nets stretch dramatically. If there are structures or equipment under the net, the employee may come into contact with them as the net stretches.

Additionally, the nets often trap debris from the construction project which needs to be removed at the end of every shift.

Finally, safety nets are very expensive and need to be inspected & tested frequently. The inspection and testing takes valuable time which costs significant money in the end. They have their place, but are not common. Consult 29 CFR1926.502 for specific regulation and installation requirements.

There are head injury hazards all over the place on construction job sites. All employees should wear an approved hard hat at all times when on construction sites. Your head is too valuable to take for granted. Protect Yourself At All Times!!

I've Fallen & I Can't Get Up!!

Something to think about when designing a fall protection system that requires use of fall arrest systems….. How will we retrieve employees who fall??

Companies are required to have a plan to retrieve employees who have been saved by a fall arrest system. The rescue needs to occur quickly. There have been fatalities from employees who were saved from a fall, but not retrieved quickly enough. Harnesses effect circulation of employees negatively. Therefore, the quicker they are retrieved, the less likely any further injury will occur.

Beware of Hardware Stores!!

All components of a fall arrest system are designed and manufactured to withstand the stress of a worker falling. Most carabineers and snap hooks from hardware stores do not meet the minimum strength requirements set forth by OSHA. Therefore, their use in the field in a fall arrest system will result in almost certain serious injury or death in a fall situation. Purchase only equipment designed and manufactured to OSHA standards for your workers.

The Competent Person…. It's not an easy job!!

As is the case with several OSHA construction standards, the Fall Protection standard requires that employers have a competent person on sites at all times. The competent person for fall protection has a thorough knowledge of fall protection and has the authority to stop work in the event that an unsafe situation is identified.

The Competent Person will monitor the job site to ensure that all employees are wearing appropriate fall protection. This includes making sure that proper anchor points are used, harnesses are being worn properly and fall arrest systems are free of any recognizable safety deficiencies.

The Competent Person will also perform a walk through of the job site daily or as conditions change to ensure that all guardrail systems are constructed in compliance with OSHA regulations. This inspection will also include making sure guardrails meet OSHA strength requirements, cable guardrails are flagged appropriately and finally that all unprotected fall hazards of greater than 6' be properly guarded.

This job requires a great deal of concentration and dedication. After all, the lives of every worker on that job rest to a certain extent in this individuals hands. Make sure your Competent Person is adequately trained and is suited to handle this responsibility. Failing to place the proper individual in this position can result in serious consequences including OSHA citations or even worse, serious personal injury. It is definitely NOT AN EASY JOB!!

Fall Arrest Inspection & Storage

What you don't know can hurt you??

Fall Arrest Systems are designed to prevent an employee from a free fall that could result in serious injury or death. Components leave the manufacturer in perfect condition and ready to protect your workers. Unfortunately, like all work cloths and Personal Protective Equipment, they get used and abused in the field. Daily use and exposure to the environment can result in a defect in the device that would prevent it from adequately protecting workers in a fall situation. This is why OSHA regulations and all manufacturers require daily visual inspection of all components of a personal fall arrest system.

The inspection should consist of a trained worker, generally the wearer, visually inspecting every portion of the fall arrest system. Items to be looked for include the following:

- Damaged or missing hardware
- Any tears, burns, cuts or other damage in the webbing of the harness
- Any distortion or wear on any snap hooks or other connectors caused by daily use
- Any indication that the lanyard has been involved in a fall situation (i.e. shock absorbing lanyard extended)
- Grease or other chemicals on webbing that could reduce its strength
- Any indication that the harness has been involved in a fall situation (warning indicator exposed)
- Anchor points are adequately secured as intended by the anchor manufacturer

If any safety deficiencies are identified, the equipment is not to be used. It shall be either cut up and disposed of or tagged as unsafe and returned to the main office. **Under no circumstances shall equipment be used if it is defective in any fashion as it may not adequately protect workers in a fall situation.**

Storage

All fall arrest components should be stored in a cool, dry environment and out of direct sunlight. Care should be taken to prevent dirt and chemicals from soaking into the webbing of the lanyards and harnesses as it can lead to premature breakdown of the material and subsequent failure in a fall situation.