



Fall Protection in Construction

Scope

This document provides information about OSHA requirements and criteria to protect employees who are exposed to fall hazards in construction workplaces covered under 29 CFR part 1926, Subpart M, Fall Protection. Fall protection is required when a worker involved in conveyance work is exposed to a fall hazard 6 feet (1.8 m) or more above a lower level.

There are three feasible ways of controlling fall hazards for the conveyance industry during construction. Elimination of the fall hazard should be considered first. The use of a guardrail system should be considered second, and the use of a Personal Fall Arrest System (PFAS) or a Fall Restraint System should be considered last.

Section 1: Training

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. See OSHA 29 CFR 1926.503, Training Requirements.

Section 2: Definitions

Anchorage means a secure point of attachment for lifelines, lanyards or deceleration devices.

Barricade means an obstruction to deter the passage of any persons or vehicles.

Body belt (safety belt) means a strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration device.

Body harness means straps which may be secured about the employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system.

Buckle means any device for holding the body belt or body harness closed around the employee's body.

Competent person means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them, per 29 CFR 1926.32(f).

Connector means a device which is used to couple (connect) parts of the personal fall arrest system and positioning device systems together. It may be an independent component of the system, such as a carabiner, or it may be an integral component of part of the system (such as a buckle or D-ring sewn into a body belt or body harness, or a snap-hook spliced or sewn to a lanyard or self-retracting lanyard).

Construction work for purposes of this section, "Construction work" means work for construction, alteration, and/or repair, including painting and decorating, per 29 CFR 1926.32(g).

D-ring means a connector used: 1910.140(b)

- (i) In a harness as an integral attachment element or fall arrest attachment;
- (ii) In a lanyard, energy absorber, lifeline, or anchorage connector as an integral connector; or
- (iii) In a positioning or travel restraint system as an attachment element.

Deceleration device means any mechanism, such as a rope grab, rip-stitch lanyard, specially woven lanyard, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest.

Deceleration distance means the additional vertical distance a falling employee travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration

device begins to operate. It is measured as the distance between the location of an employee's body belt or body harness attachment point at the moment of activation (at the onset of fall arrest forces) of the deceleration device during a fall, and the location of that attachment point after the employee comes to a full stop.

Equivalent means alternative designs, materials, or methods to protect against a hazard which the employer can demonstrate will provide an equal or greater degree of safety for employees than the methods, materials or designs specified in the standard.

Failure means load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.

Fall hazard means when work takes place near an opening that is at least 12 in. x 12 in. (305 mm x 305 mm) and is more than 6 feet (1.8 m) above a lower level. Additionally, when working over dangerous equipment and machinery, regardless of the fall distance.

Fall restraint system means a fall protection system designed to prevent a worker from reaching a fall hazard. The system is comprised of either a body belt or body harness, an anchorage, connectors, and other components that limit the worker's travel distance.

False Car means a temporary movable hoistway working platform, generally assembled on the jobsite by the elevator constructors for the purpose of installing elevator equipment. This conveyance will have manual safeties, and its suspension means are temporary.

Free fall means the act of falling before a personal fall arrest system begins to apply force to arrest the fall.

Free fall distance means the vertical displacement of the fall arrest attachment point on the employee's body belt or body harness between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance, and lifeline/lanyard elongation, but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.

Guardrail system means a barrier erected to prevent employees from falling to lower levels.

Hoist means a manual or power-operated mechanical device to raise or lower a suspended scaffold, per 29 CFR 1926.450(b).

Hole means a gap or void 2 inches (5.1 cm) or more in its least dimension, in a floor, roof, or other walking/working surface.

Infeasible means that it is impossible to perform the construction work using a conventional fall protection system (i.e., guardrail system, safety net system, or personal fall arrest system) or that it is technologically impossible to use any one of these systems to provide fall protection.

Lanyard means a flexible line of rope, wire rope, or strap which generally has a connector at each end for connecting the body belt or body harness to a deceleration device, lifeline, or anchorage.

Leading edge means the edge of a floor, roof, or formwork for a floor or other walking/working surface (such as the deck) which changes location as additional floor, roof, decking, or formwork sections are placed, formed, or constructed. A leading edge is considered to be an "unprotected side and edge" during periods when it is not actively and continuously under construction.

Lifeline means a component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

Lower levels means those areas or surfaces to which an employee can fall. Such areas or surfaces include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits, tanks, material, water, equipment, structures, hoistway floors, or portions thereof.

Opening means a gap or void 30 inches (76 cm) or more in height and 18 inches (48 cm) or more width, in a wall or partition, through which employees can fall to a lower level.

Open sides and edges means the edges of a platform that are more than 12 inches (30 cm) away horizontally from a sturdy, continuous, vertical surface (such as a building wall) or a sturdy, continuous horizontal surface (such as a floor), or a point of access. Exception: For plastering and lathing operations the horizontal threshold distance is 18 inches (46 cm).

Personal fall arrest system (PFAS) means a system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, a body belt or body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these. As of January 1, 1998, the use of a body belt for fall arrest is prohibited.

Positioning system (work-positioning system) means a system of equipment and connectors that, when used with a body harness or body belt, allows an employee to be supported on an elevated vertical surface, such as a wall or windowsill, and work with both hands free. Positioning systems also are called “positioning system devices” and “work-positioning equipment.”

Platform means a work surface elevated above lower levels. Platforms can be constructed using individual wood planks, fabricated planks, fabricated decks, and fabricated platforms, per 29 CFR 1926.450(b).

Prompt means at once or without delay.

Qualified means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter, the work, or the project, per 29 CFR 1926.32.

Rope grab means a deceleration device which travels on a lifeline and automatically, by friction, engages the lifeline and locks so as to arrest the fall of an employee. A rope grab usually employs the principle of inertial locking, cam/level locking, or both.

Self-rescue Actions and techniques taken by an individual in an arrested fall to get themselves to safety unassisted. This action is planned in advance and can be accomplished by mechanically aided means or specific self-rescue equipment, per 29 CFR 1926.502(d)(20).

Self-retracting lifeline/lanyard (SRL/P) means a deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.

Snap-hook means a connector comprised of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object. Snap-hooks are generally one of two types:

1. The locking type with a self-closing, self-locking keeper which remains closed and locked until unlocked and pressed open for connection or disconnection; or
2. The non-locking type with a self-closing keeper which remains closed until pressed open for connection or disconnection. As of January 1, 1998, the use of a non-locking snaphook as part of personal fall arrest systems and positioning device systems is prohibited.

Suspension scaffold means one or more platforms suspended by ropes or other non-rigid means from an overhead structure(s).

Suspension trauma means a form of ill health that results when an individual is suspended in a relatively immobile position for an extended period of time. See OSHA Safety and Health Information Bulletin on Suspension Trauma/Orthostatic Intolerance ([SHIB 03-24-2004](#)); incorporated below.

Suspension Trauma Relief System means a system designed to be installed on an existing full body harness to provide relief from suspension trauma until rescue can be implemented.

Travel restraint system means a combination of an anchorage, anchorage connector, lanyard (or other means of connection), and body support that an employer uses to eliminate the possibility of an employee going over the edge of a walking-working surface.

Walking-working surface means any horizontal or vertical surface on or through which an employee walks, works, or gains access to a work area or workplace location.

Working platform means a permanent elevator car sling and platform used for the purpose of installing elevator equipment. This conveyance will require the installation of governor actuated safeties and permanent or temporary suspension means. Before hoisting or roping of a platform, the governor shall be installed and roped to the safety releasing arm and tested to ensure that the safety is operational.

Section 3: Guardrail Systems General

OSHA compliant guardrail systems for car tops, open hoistways, escalator wellways and all other conveyances shall have a top rail 42 in. $\pm$ 3 in. (1067 mm $\pm$ 76 mm) high, with a mid-rail 21 in. (533

mm) high at centerline and toeboards. Toeboards shall be 3-1/2 in. (90 mm) high. Guardrail systems shall be capable of withstanding, without failure, a force of at least 200 pounds (890N) applied within 2 inches (5.1 cm) of the top edge, in any outward or downward direction at any point along the top edge of the top rail.

- a. Install OSHA compliant removable guardrail systems with toeboards at the entry into all elevator hoistways or escalator wellways (although typically done by the General Contractor, inspect worksite to ensure complete), after either rough or finished floors are in place.
- b. Install warning signs to prevent guardrail removal. It is also recommended that a sign indicate "Caution: Workers in Hoistway."
- c. After hoistways are enclosed, and before permanent car doors are installed, openings shall be protected by removable guardrail systems (including toeboards).
- d. If it is necessary to remove the guardrails to perform a job, a Personal Fall Arrest System must be used when a fall hazard is present. After the job, be sure to replace the guardrails before leaving the area.
- e. Wire-rope guardrail systems are prohibited for guarding hoistways while employees are involved in elevator-related work.
- f. If guardrails are not properly maintained in place, notify your Superintendent/Manager and the General Contractor immediately.
- g. On new installation, modernization, or major repair jobs where the general public is present, solid barricades at least 8 ft (2.4 m) high shall fully enclose the work areas, open hoistways and escalator wellways when feasible. They shall be properly secured to avoid unauthorized access.
- h. All cartops, false cars, and working platforms/surfaces on conveyances shall be equipped with a guardrail system if required by code or OSHA. Never climb over or stand on guardrails. Be aware of pinch hazards and the risk of being caught between a guardrail and hoistway equipment.

Section 4: Personal Fall-Arrest System

- a. Only company-approved lifelines, shock-absorbing lanyards, D-rings, self-retracting lanyards, rope-grabs, and body harnesses shall be used.
- b. Effective January 1, 1998, body belts are not acceptable as part of a personal fall arrest system. Note: The use of a body belt (Restraining Device) in a positioning device system is acceptable and is regulated under paragraph (e) of section. [1926.502]
- c. All fall protection components shall be compatible with the PFAS being utilized.
- d. Lifelines shall be protected against being cut or abraded. Only OSHA compliant lifelines shall be used.
- e. Lifelines shall be installed before working in the hoistway/wellway and shall run the full length of the hoistway/wellway and be so arranged to permit tying off before entering the hoistway/wellway.
- f. PFAS shall be approved by a competent person prior to use.
- g. Only one worker is permitted on a vertical lifeline, and that lifeline shall have a breaking strength greater than 5000 lbs. (2268 kg) after it has been attached to the anchorage point.
- h. Anchorage used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms.
- i. The anchorage must be capable of supporting at least 5,000 pounds (22.2 kN) per employee attached.
- j. Other anchorages must be approved by professional engineers.
- k. Shock-absorbing lanyards shall be anchored to the lifeline and shall be above shoulder height so that any fall shall not exceed 6 ft (1.8 m). When determining fall heights, be sure to use proper fall clearance distances. Lanyards shall be connected to a vertical lifeline by means of a rope grab; the lanyard shall not be attached directly to the lifeline.
- l. A Self Retracting Lanyard (SRL) may be used as long as it is used per manufacturer instructions and compatible with the rest of the PFAS, and proper training is received.

- m. A Suspension Trauma Relief System (STRS) shall be provided, and proper training shall be given in its use.
- n. Lifelines, SRL, harnesses and shock-absorbing lanyards subjected to impact loading shall be immediately removed from service. They shall be eliminated and destroyed for employee safeguarding.
- o. Tying to the hoist line is prohibited.
- p. Replace personal fall protection equipment at intervals recommended by the manufacturer.
- q. Before using a body harness, shock-absorbing lanyard, lifeline, STRS or SRL, the employee shall inspect the equipment carefully for signs of wear and/or damage.

Section 5: Inspection and Maintenance Checklist

To maintain service life and high performance, personal fall arrest systems shall be inspected by the user before each use. This section contains information on the means of maintaining and inspecting equipment. However, always follow the manufacturer's instructions on inspection and care of equipment. Remove and replace the personal fall arrest system if any defective conditions are found. Synthetic web slings of polyester and nylon shall not be subject to temperatures in excess of 180 °F (82.2 °C), keep this in mind when storing your PFAS.

- a. Webbing. Grasp the webbing with your hands 6 in. (150 mm) to 8 in. (200 mm) apart. Bend the webbing in an inverted "U". The resulting surface tension makes damaged fibers or cuts easier to see. Follow this procedure the entire length of the webbing, inspecting both sides of each strap. Look for frayed edges, broken fibers, pulled stitches, cuts, burns and chemical damage.
- b. D-Rings/Back Pads. Check D-rings for distortion, cracks, breaks, and rough or sharp edges. The D-ring should pivot freely. D-ring back pads should also be inspected for damage.
- c. Attachment of Buckles. Attachments of buckles and D-rings should be given special attention. Note any unusual wear, frayed, or cut fibers or distortion of the buckles or D-rings.
- d. Tongue/Grommets. The tongue receives heavy wear from repeated buckling and unbuckling. Inspect for loose, distorted, or broken grommets. Webbing shall not have additional punched holes.
- e. Tongue Buckle. Buckle tongues shall be free of distortion in shape and motion. They should overlap the buckle frame and move freely back and forth in their socket. The roller shall turn freely on the frame. Check for distortion, sharp edges, or grip failure.
- f. Friction and Mating Buckles. Inspect the buckle for distortion. Outer bars and center bars must be straight. Pay special attention to corners and attachment points of the center bar.
- g. Suspension Trauma Relief System (STRS). During normal inspection, include the following components: external pockets, choking loops, snap connectors, and deployment loops.
- h. All Lanyards, including self-retracting lifelines/lanyards and all of its components shall be inspected as described above.
- i. Lifelines shall be protected against being cut or abraded. The protection of the lifeline along with the anchor point should be checked regularly.
- j. Rescue equipment, as with any other PPE or PFAS, shall be cared for as prescribed by company policy and manufacturer's instructions.

Section 6: Visual Indications of Damage to Webbing and Rope

The following indications refer to nylon and polyester webbing:

- a. Heat. In excessive heat, webbing becomes brittle and has a shriveled brownish appearance. Fibers will break when flexed.
- b. Chemical. Changes in color usually appear as a brownish smear or smudge. Transverse cracks appear across the webbing when bent over a mandrel tightly. Chemical damage may also lead to a loss of elasticity.
- c. Molten Metal or Flame. Webbing strands fuse together. Hard shiny spots appear. The webbing may have a hard and brittle feel.
- d. Paint and Solvents. Paint that penetrates and dries restricts movement of fibers. Drying agents and solvents in some paints cause chemical damage.

Section 7: Rescue

- a. §1926.502(d)(20) requires the employer to provide for prompt rescue of employees in the event of a fall or assure that employees are able to rescue themselves. Two sources of guidance to develop a standard rescue plan can be found in ANSI/ASSE Z359.2-2017 Section 4.6 and 4.7, and OSHA 1926 Subpart M, Appendix C II (f).
- b. If jobsite conditions require a deviation from the standard rescue plan, a competent person shall perform a JHA and make the necessary additions/changes to the rescue plan.

Through the Alliance between OSHA's 10 Regional Offices and the Elevator Contractors of America (ECA), Elevator Industry Work Preservation Fund (EIWPF), International Union of Elevator Constructors (IUEC), National Association of Elevator Contractors (NAEC), National Elevator Industry Educational Program (NEIEP), and National Elevator Industry Inc. (NEII), collectively known as The Elevator Industry Safety Partners, developed this Industry Specific Best Practice for informational purposes only. It does not necessarily reflect the official views of OSHA or the U.S. Department of Labor. July 2026

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U.S Department of Labor
Occupational Safety and Health Administration
Directorate of Science, Technology and Medicine
Office of Science and Technology Assessment

Suspension Trauma/ Orthostatic Intolerance

Safety and Health Information Bulletin

SHIB 03-24-2004, updated 2011

Purpose

This Safety and Health Information Bulletin provides

employees and employers with important information about the hazards of orthostatic intolerance and suspension trauma when using fall arrest systems. This bulletin:

- describes the signs and symptoms of orthostatic intolerance;
- discusses how orthostatic intolerance can occur while workers are suspended following a fall; and
- outlines recommendations for preventing orthostatic intolerance, as well as recommendations for worker training and rescue.



This Safety and Health Information Bulletin is **not** a standard or regulation, and it creates no new legal obligations. The Bulletin is advisory in nature, informational in content, and is intended to assist employers in providing a safe and healthful workplace. The Occupational Safety and Health Act requires employers to comply with hazard-specific safety and health standards. In addition, pursuant to Section 5(a)(1), the General Duty Clause of the OSHA Act, employers must provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm. Employers can be cited for violating the General Duty Clause if there is a recognized hazard and they do not take reasonable steps to prevent or abate the hazard. However, failure to implement any recommendations in this bulletin, is not, in itself, a violation of the General Duty Clause. Citations can only be based on standards, regulations, and the General Duty Clause.

A well-known example of orthostatic intolerance is that of a soldier who faints while standing at attention for long period of time. The moment the soldier loses consciousness, he or she collapses into a horizontal position. With the legs, heart, and brain on the same level, blood is returned to the heart. Assuming no injuries are caused during the collapse, the individual will quickly regain consciousness, and recovery is likely to be rapid.

Venous pooling typically occurs in the legs due to the force of gravity and a lack of movement. Some venous pooling occurs naturally when a person is standing. In the veins, blood normally is moved back to the heart through one-way valves using the normal muscular action associated with limb movement. If the legs are immobile, then these “muscle pumps” do not operate effectively, and blood can accumulate. Since veins can expand, a large volume of blood may accumulate in the veins.

Background

Orthostatic intolerance may be defined as “the development of symptoms such as light-headedness, palpitations, tremulousness, poor concentration, fatigue, nausea, dizziness, headache, sweating, weakness and occasionally fainting during upright standing” [1,2]. While in a sedentary position, blood can accumulate in the veins, which is commonly called “venous pooling,” and cause orthostatic intolerance [3]. Orthostatic intolerance also can occur when an individual moves suddenly after being sedentary for a long time. For example, a person may experience orthostatic intolerance when they stand up quickly after sitting still for a long time.

An accumulation of blood in the legs reduces the amount of blood in circulation. The body reacts to this reduction by speeding up the heart rate and in an attempt to maintain sufficient blood flow to the brain. If the blood supply is significantly reduced, this reaction will not be effective.

The body will abruptly slow the heart rate and blood pressure will diminish in the arteries. During severe venous pooling, the reduction in quantity and/or quality (oxygen content) of blood flowing to the brain causes fainting. This reduction also can have an effect on other vital organs, such as the kidneys [3].

The kidneys are very sensitive to blood oxygen, and renal failure can occur with excessive venous pooling. If these conditions continue, they potentially may be fatal [3].



Description of Hazard

Orthostatic intolerance may be experienced by workers using fall arrest systems. Following a fall, a worker may remain suspended in a harness. The sustained immobility may lead to a state of unconsciousness. Depending on the length of time the suspended worker is unconscious/immobile and the level of venous pooling, the resulting orthostatic intolerance may lead to death. While not common, such fatalities often are referred to as “**harness- induced pathology**” or “**suspension trauma.**”

Signs & symptoms that may be observed in an individual who is approaching orthostatic intolerance:

Faintness	Nausea Dizziness
Breathlessness	Unusually Low Heart Rate
Sweating Paleness	Unusually Low Blood Pressure
Hot Flashes Increased Heart Rate	“Greying” or Loss of Vision

References: Seddon, Paul. Harness Suspension: review and evaluation of existing information. Health and Safety Executive. Research Report 451/2002. 104 pp.

Sheehan, Alan. Suspension Trauma. Training handout.

Factors that can affect the degree of risk of suspension trauma:

Inability to move legs	Hypothermia
Pain	Shock
Injuries during fall	Cardiovascular disease
Fatigue	Respiratory disease
Dehydration	Blood loss

References: Seddon, Paul. Harness Suspension: review and evaluation of existing information. Health and Safety Executive. Research Report 451/2002. 104 pp.

Sheehan, Alan. Suspension Trauma. Training handout

Unconscious/immobile workers suspended in their harness will not be able to move their legs and will not fall into a horizontal position, as they would if they fainted while standing. During the static upright position, venous pooling is likely to occur and cause orthostatic intolerance, especially if the suspended worker is left in place for some time.

Venous pooling and orthostatic intolerance can be exacerbated by other circumstances related to the fall. For example, shock or the experience of the event that caused the fall, other injuries, the fit/positioning of the harness, the environmental conditions, and the worker’s psychological state all may increase the onset and severity of the pooling and orthostatic intolerance [3,5]. Unless the worker is rescued promptly using established safe procedures, venous pooling and orthostatic intolerance could result in serious or fatal injury, as the brain, kidneys, and other organs are deprived of oxygen [3].

Recommended rescue procedures are outlined below in the **Conclusions and Recommendations** section.

Conclusions and Recommendations

Prolonged suspension from fall arrest systems can cause orthostatic intolerance, which, in turn, can result in serious physical injury, or potentially, death. Research indicates that suspension in a fall arrest device can result in unconsciousness, followed by

death, in less than 30 minutes [4]. To reduce the risk associated with prolonged suspension in fall arrest systems, employers should implement plans to prevent prolonged suspension in fall protection devices. The plan should include procedures for: preventing prolonged suspension, identifying orthostatic intolerance signs and symptoms, and performing rescue and treatment as quickly as possible.

OSHA recommends the following general practices/considerations:

- Rescue suspended workers as quickly as possible.
- Be aware that suspended workers are at risk of orthostatic intolerance and suspension trauma.
- Be aware of signs and symptoms of orthostatic intolerance.
- Be aware that orthostatic intolerance is potentially life threatening. Suspended workers with head injuries or who are unconscious are particularly at risk.
- Be aware of factors that can increase the risk of suspension trauma.

Training

OSHA requires employers to train workers to use fall arrest systems and other personal protective equipment correctly while performing their jobs, in accordance with standards 29 CFR 1910.132 (Personal Protective Equipment) 29 CFR 1915.159 (Personal Fall Arrest Systems) and 29 CFR 1926.503 (Training Requirements for Fall Protection).

Workers who wear fall arrest devices while working, and those who may perform rescue activities, should also be trained in:

- How to ascertain whether their personal protective equipment is properly fitted and worn, so that it performs as intended; How orthostatic intolerance/suspension trauma may occur;
- The factors that may increase a worker's risk;

- How to recognize the signs and symptoms identified in this bulletin; and
- The appropriate rescue procedures and methods to diminish risk while suspended.

Rescue Procedures

Under 29 CFR 1926.502 (d) (Fall Protection Systems Criteria and Practices), OSHA requires that employers provide for "prompt rescue of employees in the event of a fall or shall assure that employees are able to rescue themselves." This should include identifying rescue procedures that address the potential for orthostatic intolerance and suspension trauma. Rescue procedures also should address how the rescued worker will be handled to avoid any post-rescue injuries.

Rescue procedures should include the following contingency based actions:

- If self-rescue is impossible, or if rescue cannot be performed promptly, the worker should be trained to "pump" his/her legs frequently to activate the muscles and reduce the risk of venous pooling. Footholds can be used to alleviate pressure, delay symptoms, and provide support for "muscle pumping."
- Continuous monitoring of the suspended worker for signs and symptoms of orthostatic intolerance and suspension trauma.
- Ensuring that a worker receives standard trauma resuscitation¹ once rescued.
- If the worker is unconscious, keeping the worker's air passages open and obtain first aid.
- Monitoring the worker after rescue, and ensuring that the



worker is evaluated by a health-care professional. The worker should be hospitalized when appropriate. Possible delayed effects, such as kidney failure, which is not unusual in these cases, are difficult to assess on the scene.

References

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3. Seddon, Paul. Harness Suspension: Review and evaluation of existing information. Health and Safety Executive. Research Report 451/2002. 104 pp.
4. Sheehan, Alan. Suspension Trauma. Training handout.
5. Weems, Bill and Bishop, Phil. Will Your Safety Harness Kill You? *Occupational Health & Safety*. 72(3): 86-88, 90, March, 2003.

¹ National Association of Emergency Medical Technicians (NAEMT). Provider Textbook section in: **PHTLS Basic and Advanced Prehospital Trauma Life Support Fifth Edition** St. Louis, MO: Mosby; 2003: Section 1. Summary available at: <http://phtls.org/datafiles/PHTLS%205ed%20Compendium.pdf>