



Department of the Air Force  
HQ AEDC (AFMC)  
Arnold AFB, TN 37389

## Safety, Health, and Environmental Standard

---

**Title:** FALL PROTECTION  
**Standard No.:** F6  
**Effective Date:** 07/03/2014  
**Releasability:** There are no releasability restrictions on this publication.

The provisions and requirements of this standard are mandatory for use by all personnel engaged in work tasks necessary to fulfill the AEDC mission. Please contact your safety, industrial health and/or environmental representative for clarification or questions regarding this standard.

Approved:

Contractor/ATA Director  
Safety, Health, and Environmental

Air Force Functional Chief

**SHE Standard F6, Fall Protection**

**Record of Review/Revision**

(Current revisions are highlighted in yellow and marked with a vertical line in the right margin.)

<b>Date/POC</b>	<b>Description</b>
09/02/15 Bidmead/Tate	Updated color coding for fall protection (Para. 4.7.3.1.3) to include FY16. Added warning to clarify Para. 4.9.1. Administrative change only; no change to process.
06/27/14 Tate	Scheduled review; administrative change only: updated Para 7.3, to read ANSI Z359.0-2007 (R 2007)
03/12/2 13	Added NFAC supplement; no other change.
02/24/12 Tate	Two-year review; clarified requirement for vertical fall protection where there is an exposure to a fall of 4 feet or more; no process change. Added AEDC/SE changes 08/15/2012 for DoD personnel; also added section to address anchorages for personnel fall arrest systems.
02/01/10 Tate	Two-year review; reformatting and administrative updates; no process change.
01/29/08 Eichel/Bidmead	Clarified requirements for vertical fall protection (paragraph 4.9.1) when working from various heights and types of elevated working surfaces (i.e., scaffolds; mobile work platforms.
05/15/07 R. Eichel	Added definition of Carabineer. Corrected minor typo paragraph 4.3.7. Removed reference to two lanyards and added requirement for dual “Y” lanyard paragraph 4.8.1 Expanded paragraph 4.8.3 to include inappropriate connections. Minor word changes paragraph 4.8.8. Deleted reference in paragraph 4.7.3.1.3 to FY05 and FY06 and added FY11 and FY12. Deleted reference to ANSI A10.14, added reference ANSI A10.11. Revisions are highlighted in yellow throughout.
05/29/06 R. Eichel	Clarified <i>free fall distance</i> and <i>horizontal lifeline system</i> definitions. Deleted requirement for annual refresher training. Added requirements for when refresher/retraining training is required. Deleted sling and rigging color codes. Eliminated “by employees” in paragraph 4.2.8. Renumbered subparagraphs in section 4.6.2. Minor formatting changes throughout.
09/30/05 R. Eichel	Reviewed: Administrative change only to update marking/color coding for fall protection inspections in paragraph 4.6.3.1.3
03/15/05 R. Eichel	Reviewed: No change required.
01/15/04 R. Eichel	Major rewrite. Added many definitions, added some additional supervisory, and employee responsibilities. Defined responsibilities of Competent Person. Added inspection and marking requirements
09/01/02	Rewrite and revised format of entire standard to the COI format.



# Safety, Health, and Environmental Standard

---

## FALL PROTECTION

### 1.0 INTRODUCTION/SCOPE/APPLICABILITY

This standard establishes general guidelines for the safety of personnel when performing work that will expose the employee to a fall from either an elevated work surface or mobile equipment.

- 1.1 Introduction – This standard describes the tasks, activities and actions required when employees are exposed to a fall while performing work at AEDC.
- 1.2 Scope – This standard shall be considered to be the Contactor-developed Fall Protection Plan, which incorporates the requirements and objectives of OSHA and ANSI and other nationally recognized national consensus standards to assure implementation at AEDC. When there are any conflicts noted between this standard and industry or national codes, standards or regulatory requirements, the operating contractor shall notify the government.
- 1.3 Applicability – This standard applies to all AEDC personnel and operations, including Air Force, Navy, US Army Corps of Engineers, and contractors (including sub-contractors) at the Tennessee location and operations conducted by AEDC personnel outside the confines of Arnold AFB. For sub-contractor personnel, training requirements are established and provided by their management.

DoD personnel exposed to a fall hazard as part of their normal duties will meet the fall protection requirements of AFI 91-203. DoD personnel exposed to a fall hazard while visiting will follow the base operating contractor fall protection guidance and will be supervised at all times.

Fall protection requirements for outside contractors will be established and included in the project contract requirements and must be reviewed and accepted by the letting agency's safety office prior to the start of the project. Workplace-specific fall protection requirements shall be included in the outside contractor's safety plan.

- 1.4 Applicability to outside/subcontractor projects – Each subcontractor working at AEDC shall maintain its own Fall Protection Program to include designation of fall protection competent persons, documented training and inspection, as well as proper use, storage, maintenance, and removal from service of fall protection equipment.

### 2.0 BASIC HAZARDS/HUMAN FACTORS

Falls from elevated work areas, resulting in serious injury or death, can and do occur. Therefore, fall protection (arrest, restraint or positioning) equipment must be properly selected, inspected, used, and maintained. Severe injury can also result if the equipment is not used as specified by the manufacturer and this standard. This standard applies to the use of fall arrest, restraint or positioning equipment such as full body harnesses, lanyards, chest harnesses, body belts, self-retracting lifelines (SRL), horizontal and vertical lifelines, ladder climbing devices, and safety nets. Boatswain's chairs are covered in Safety Standard D10, Scaffolds. Additionally, this standard prescribes that each employee who must use personal fall protective equipment be trained in the proper application, wear, inspection, and maintenance of the equipment.

### 3.0 DEFINITIONS

Anchorage – A secure point of attachment for lifelines, lanyards or deceleration devices (SRL).

Anchorage Connector – A component or subsystem with means specifically intended for coupling the Personal Fall Arrest System (PFAS) to an anchorage.

Authorized Person – A person approved or assigned by the employer to perform a specific type of duty or duties or to be at a specific location or locations at the jobsite.

Base Operating Contractor – A long-term contractor directly accountable to the Air Force for the AEDC mission.

Body Belt (NOT AUTHORIZED FOR USE at AEDC except by qualified linemen) – A body support component comprised of a strap with means for securing it about the waist and for attaching it to other components or subsystems. A body belt is sometimes referred to as a waist belt or safety belt. Can only be used as a restraint or positioning device, not for fall arrest.

Carabiner – A connector component generally comprised of a trapezoidal or oval shaped body with a normally closed gate or similar arrangement which may be opened to permit the body to receive an object and, when released, automatically closes to retain the object. Carabiners are generally one of three types:

- a. Self-locking (REQUIRED at AEDC) – with a self-closing, self-locking gate which remains closed and locked until intentionally unlocked and opened for connection or disconnection. Sometimes referred to as a double-action snaphook, one that requires two separate actions to open or close.
- b. Non-locking (NOT ALLOWED FOR USE at AEDC) – with a self-closing gate which remains closed, but not locked, until intentionally opened by the user for connection or disconnection.
- c. Manual-locking (NOT ALLOWED FOR USE at AEDC) – with a self-closing gate which remains closed, but not locked (unless purposely locked by the user) until intentionally opened by the user for connection or disconnection.

Competent Person – A person who is capable of identifying existing and predictable hazards in the area of fall protection or elevated working surroundings, and who has authority and authorization to take prompt corrective measures to eliminate such hazards.

D-Ring – device affixed to the body support for means of fastening lanyards, life lines and SRLs.

Fall Arrest Attachment – A connector element affixed to the body support, center of the back, (usually a D-ring) which is specifically designated for attaching the rest of the system and which reacts to dynamic fall arrest and post-fall suspension forces.

Fall Arrestor – A device, such as a rope grab, which travels on a lifeline and will automatically engage the lifeline and lock so as to arrest an accidental fall of a person.

Fall Restraint System – A fall protection system that prevents the user from falling any distance. The system is comprised of either a body belt or body harness, along with an anchorage, connectors and other necessary equipment. Other components typically include a lanyard, and may also include a lifeline, SRL and other devices.

Free Fall – The act of falling before the personal fall arrest system begins to react by applying force to arrest the fall.

Free Fall Distance – The vertical displacement of the fall arrest attachment between onset of the fall and just before the system begins to react by applying force to arrest the fall. This distance excludes deceleration distance, but includes any fall arrestor activation distance before fall arrest forces occur.

Full Body Harness – A component with a design of straps which is fastened about a person in a manner so as to contain the torso and distribute the fall arrest forces over at least the upper thighs, pelvis, chest and shoulders with means for attaching it to other components or subsystems. Some harnesses come equipped with various “D-rings” whose use is based on their location: Center back, general fall protection (arrest) or restraint; Front, used with climbing devices; Side, positioning/restraint devices only, NOT to be used as fall protection; Shoulder, rescue line attachment.

Horizontal Lifeline – A component of a horizontal lifeline system, which consists of a flexible line with connectors or other coupling means at both ends for securing it horizontally between two anchorages or anchorage points.

Horizontal Lifeline System – An assembly, including the necessary connectors, comprised of a horizontal lifeline component and, optionally, of: an energy absorber component or, a lifeline tensioner component, or both. This subsystem is normally attached at each end to an anchorage connector and may also contain one or more intermediate anchorages. The end anchorages have the same elevation.

In-Service Loading – Impact loading where fall/restraint equipment is subjected to the impact of a free-falling worker's body or other major impact force.

Ladder-Climbing Device – A device, other than a cage or well, designed to eliminate or reduce the possibility of accidental falls off ladders and that may incorporate such features as life belts, friction brakes, and sliding attachments.

Lanyard – A component consisting of a flexible line of rope, wire rope, or strap which generally has a connector at each end for connecting the body support (harness) to a fall arrestor, energy absorber, anchorage connector or anchorage. Lanyards perform a tethering function, which restricts movement and can arrest a fall.

Lifeline – A component consisting of a flexible line for connection to an anchorage or anchorage connector at one end to hang vertically (vertical lifeline), or for connection to anchorages or anchorage connectors at both ends to span horizontally (horizontal lifeline).

Outside Contractor/Subcontractor – An organization employed by the Operating Contractor or the Air Force to do construction, maintenance, repair or other work at AEDC. This term includes those who may be subcontracted by an outside contractor for specific portions of a project. Also referred to as the construction contractor.

Personal Fall Arrest System (PFAS) – An assembly of components and subsystems used to arrest a person in a fall from a working height. A system must always include a full body harness and connecting means between the harness and an anchorage or anchorage connector. Such connecting means may consist of a lanyard, energy absorber, fall arrestor, lifeline, self-retracting lanyard or suitable combinations of these.

Positioning Device System – A fall protection system that consists of a body belt or body harness rigged to allow an employee to be supported (positioned) on an elevated, vertical surface, such as a wall or column and work with both hands free while leaning. A fall is allowed but is limited to no more than 2 feet.

Restraint Line – A line from a fixed anchorage to which an employee is secured in such a way as to prevent the employee from reaching an identified fall hazard.

Retrieval System – Equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

Rope-Grabbing Device – A fall-arrest device that is attached to an independent, vertical lifeline. It provides fall protection for workers on swinging scaffolds or at places where frequent elevation change is necessary and where a lanyard cannot be attached to permanent structures.

Safety Net – A fall protection net that is stretched horizontally beneath a work surface and is used where other forms of fall/restraint devices are impractical.

Self-Retracting Lifeline/Lanyard (SRL) – A deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under minimal tension during normal employee movement and which, after onset of a fall, automatically locks the drum and arrests the fall, normally within 2 feet or less. The line has a means for attachment to the fall arrest attachment on the body harness.

Shock Absorber (Deceleration Device) – A component whose primary function is to dissipate energy and limit deceleration forces, which the system imposes on the body during fall arrest.

Shock Absorbing Lanyard – A lanyard connected to, either permanently or through connectors, a shock absorber.

Single-Pass Buckle – A buckle that maintains its position on the webbing by means of a single pass of the webbing over the fixed center bar.

Snaphook – A connector comprised of a hook-shaped body with a normally closed gate or similar arrangement which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object. Snaphooks are generally one of three types:

- a. Self-locking (REQUIRED at AEDC) – with a self-closing, self-locking gate which remains closed and locked until intentionally unlocked and opened for connection or disconnection. Sometimes referred to as a double-action snaphook, one that requires two separate actions to open or close.
- b. Non-locking (NOT ALLOWED FOR USE at AEDC) – with a self-closing gate which remains closed, but not locked, until intentionally opened by the user for connection or disconnection.
- c. Manual-locking (NOT ALLOWED FOR USE at AEDC) – with a self-closing gate which remains closed, but not locked (unless purposely locked by the user) until intentionally opened by the user for connection or disconnection.

Total Fall Distance – The maximum vertical distance between the person's fall arrest attachment at the onset of a fall and after the fall is arrested, including free fall distance and deceleration distance.

**4.0 REQUIREMENTS/RESPONSIBILITIES****4.1 Organizational/Maintenance Area Director Shall**

Designate in writing a primary and alternate fall protection competent person who, by way of training and/or experience, are knowledgeable of applicable standards, have authority to take appropriate actions, and to perform required initial and in-depth inspections of fall protection equipment.

**4.2 Management Shall**

Ensure fall hazards have been identified; interim control measures are in place (if required) and permanent correctives actions taken.

**4.3 Supervisors Shall**

4.3.1 Coordinate with contractor Safety to review requirements for/of fall protection equipment before ordering the equipment to assure equipment will meet all required needs.

4.3.2 Assure all fall protection equipment being used by employees is entered into the Safety Recall Program.

4.3.3 Provide specifications to buyers for purchase of new equipment.

4.3.4 Ensure personnel assigned to use fall protection equipment have received initial training prior to use and refresher/retraining training as required.

4.3.5 Monitor operations to ensure personnel use the appropriate fall protection equipment for the assigned task.

**NOTE:** When a requirement of this standard cannot be met, due to location, lack of overhead tie off point, infeasibility, etc., contact Operating Contractor Safety for assistance. The safety representative will work with the area craft supervisor to determine the safest approach to accomplish the work.

4.3.6 Provide adequate storage for fall protection equipment.

4.3.7 Randomly inspect equipment for serviceability and remove from service any defective, unserviceable equipment and assure that it is turned in to the competent person for final disposition.

4.3.8 Assure equipment identified as defective is turned in to the competent person for final disposition.

**4.4 Employees Shall**

4.4.1 Inspect fall protection equipment for serviceability prior to each use.

4.4.2 Tag and remove from service all defective, unserviceable or in-service loaded equipment to prevent further usage and turn it into the supervisor for final disposition.

4.4.3 Ensure equipment is properly stored.

4.4.4 Attend initial training prior to use of fall protective equipment and refresher/retraining training when directed.

4.4.5 Implement practices taught in training classes during equipment use.

4.4.6 Follow manufacturer's recommendations for proper use, adjustment and cleaning of fall protection equipment.

4.4.7 Use fall protection whenever exposed to a recognized fall hazard.

**4.5 Contractor Safety Shall**

4.5.1 Provide organizations support in identification and recommendations for control of fall hazards.

4.5.2 Serve as a consultant to the competent person in all fall protection matters. Assist in evaluation and research for fall protection concerns whenever requested.

4.5.3 Provide initial and refresher/retraining training on the proper application, wear, inspection, and maintenance of fall protection equipment. Refresher/retraining is required when previous training is rendered obsolete due to: changes in the activity/workplace, changes in the fall protection equipment/system, or upon a demonstrated improper use or misunderstanding of fall protection systems.

4.5.4 Approve purchase of fall protection equipment.

4.5.5 Provide assistance in the selection of equipment, anchorage, placement of lifelines, etc.

4.5.6 Audit fall protection usage during inspections and walkthroughs.

4.5.7 Notify AEDC/SE any time DoD personnel are or will be exposed to a fall hazard during a visit or inspection.

**4.6 Designated Fall Protection Competent Person(s) Shall**

- 4.6.1 Serves as the point of contact for fall protection issues.
- 4.6.2 Administer the program and record-keeping functions.  
**NOTE:** Maintain complete and accurate records (recall inspection database) of all equipment and inspection dates/results.
- 4.6.3 Complete an initial inspection of all new fall protection equipment, mark and enter equipment into recall inspection database.
- 4.6.4 Complete a thorough in-depth documented inspection of all known fall protection equipment at least annually.  
**NOTE 1:** A semi-annual is preferred for high use items.  
**NOTE 2:** Remove from service any piece of equipment found to be defective or sub-standard; assure it is either repaired or destroyed. If equipment is destroyed assure that it is removed from the recall inspection database.
- 4.6.5 Record and forward the findings of the in-depth inspection to the organization having custody of the equipment.
- 4.6.6 Confer with the contractor Safety and Health on any unique or extra hazardous fall protection concerns.

**4.7 Inspections and Storage****4.7.1 Initial inspection.**

- 4.7.1.1 Performed by a designated competent person.
- 4.7.1.2 Performed before the equipment is issued for use.
- 4.7.1.3 Assigned a unique in-house identification number and entered into a recall inspection database.
  - 4.7.1.3.1 On harnesses, the identification number shall be etched or stamped on the base of the center backs' metal "D" ring and where possible on the center back "D" ring's webbing alignment/cross over support (usually a form of hard rubber or soft plastic). Additionally, the identification number shall be marked on the manufacturer's label when a space is provided or on one of the fabric/webbing back straps, near where the strap goes through the center "D" ring, in permanent ink marker which is water resistant and quick-drying (ex. Sanford Sharpie, Avery Dennison Marks-A-Lot), preferably in black.
  - 4.7.1.3.2 On lanyards with shock absorbers, the identification number shall be etched or stamped on the side of the snap hook attached to the shock absorbing end and, when of the webbed type, in permanent ink marker preferably in black, on the webbing or, when provided on the manufacture's label.
  - 4.7.1.3.3 On lanyards without shock absorbers, the identification number shall be etched or stamped on the side of at least one of the metal snap hooks and, when of the webbed type, in permanent ink marker preferably in black, on the webbing or, when provided on the manufacture's label.
  - 4.7.1.3.4 On SRLs, the identification number shall be etched or stamped on the housing and snap hook(s).
  - 4.7.1.3.5 On all other fall protection equipment such as rope grabs, carabineers, safety climb devices, rebar hooks, etc. the identification number shall be etched or stamped on one side.
- 4.7.1.4 Equipment shall be color coded as described in section 4.7.3.1.3 below.
- 4.7.1.5 Equipment is inspected to assure equipment is in usable/serviceable condition.

**4.7.2 Pre-use, User inspection**

- 4.7.2.1 Performed by the employee/user prior to its use.
- 4.7.2.2 Inspections shall consist of an evaluation of the following areas:
  1. Harnesses: Stitching, rivets, buckles, "D-rings", rust and abrasion, burns, cuts, and tears.
  2. Lanyards and lifelines: Frayed/broken strands, burns, cuts, tears, snap hooks, connectors, and corrosion.
  3. Equipment found to be defective shall be removed from service immediately and tagged with Form GC-82, Safety Information Tag as defective. Items removed from service will be returned to the supervisor who will turn them in to the contractor inspecting authority (competent person) for repair, destruction or replacement. If equipment is destroyed, the competent person for the organization shall remove it from the recall inspection database.

**4.7.3 Annual Inspection.**

4.7.3.1 Competent person(s) shall annually conduct a thorough, documented, in-depth inspection of fall protection equipment.

4.7.3.1.1 In-depth inspections shall be documented using either a manual or computer-generated recall inspection database.

4.7.3.1.2 The competent person shall utilize the specific fall protection equipment manufacturer's inspection instruction to perform the in-depth inspection, or at a minimum for harnesses and lanyards utilize the items outlined in Section 4.7.2.

4.7.3.1.3 Fall protection equipment which has satisfactorily completed the in-depth or initial inspection shall be clearly identified. Operating Contractor fall protection equipment is marked/color-coded with wire ties in accordance to the following schedule:

<b>FY15</b>	<b>RED</b>
<b>FY16</b>	<b>ORANGE</b>
<b>FY17</b>	<b>BLUE</b>
<b>FY18</b>	<b>GREEN</b>
<b>FY19</b>	<b>RED</b>

4.7.3.1.4 The paint or marking material should be confined to D-rings or snap hooks. Care should be taken not to allow paint or other marking material to come in contact with fabric of any structural component or to cover any equipment feature/component vital to inspection or performance this would include stitching, grommets, adjusting mechanisms, labels, etc.

**NOTE:** Some types of fall protection equipment such as SRL require periodic recertification by the manufacturer at scheduled intervals. The competent person must be familiar with these requirements and have a documented recertification performed as required.

**4.7.4 Storage:**

Fall protection equipment shall be stored in a clean dry location away from exposure to abrasive or cutting tools, equipment or materials, excessive heat, UV, and chemicals.

**4.8 Use - Full Body Harnesses, SRLs and Lanyards**

4.8.1 An approved full body harness and a shock absorbing lanyard or an SRL, shall be used as protection against falls to a lower level when guardrails or other approved fall prevention means cannot be utilized.

**NOTE:** When standard 6-foot shock absorbing lanyards are tied off at heights of less than 18 feet, care must be taken to ensure that the person will not strike the ground if a fall should occur.

4.8.2 Full body harnesses may also be used for raising, lowering, retrieving, tethering, and slope protection so long as the proper connection point(s) of the harness is/are used.

4.8.3 Lanyards used for fall arrest must be of the shock absorbing type and must be attached to an anchorage, at or above the worker's center back fall arrest attachment "D" ring, to allow a vertical free fall of no greater than six (6) feet, measured from the point of attachment vertically downward. It takes an additional three feet of fall for the rip-out stitching to completely unravel after it is acted upon.

Proper connection of the lanyard connectors is critical to safe use of lanyards. Only use self-locking type snap hooks and carabiners. Only use connectors that are suitable to each application. Ensure all connections are compatible in size, shape and strength. Do not use equipment that is not compatible. Ensure all connections are fully closed and locked. See illustration below for inappropriate connections

(A) To a D-ring which another connector is attached.

(B) In a manner that would result in a load on the gate.

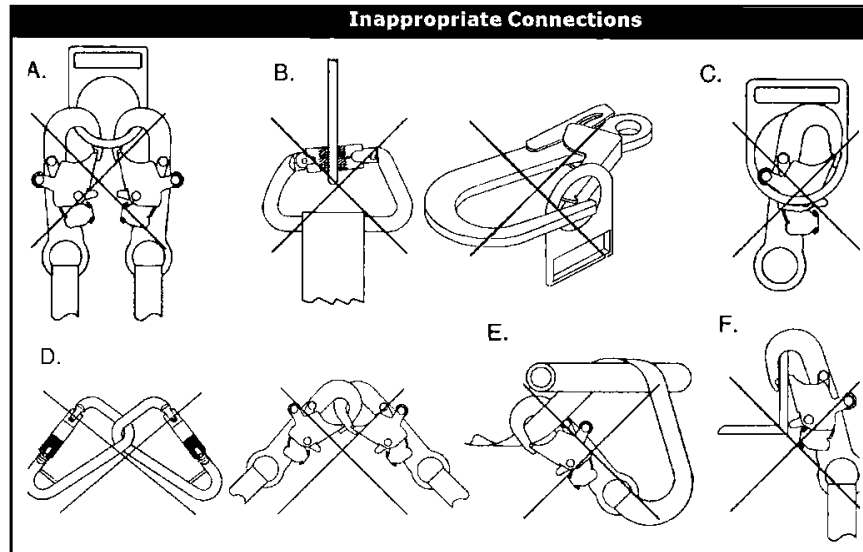
(C) In a false engagement, where features that protrude from the snap hook or carabiner catch on the anchor and without visual confirmation seems to be fully engaged to the anchor point.

(D) To each other.

(E) Directly to webbing or rope lanyard tie-back (unless the manufacturer's instructions for both the lanyard and connector specifically allows such a connection).

(F) To any object which is shaped or dimensioned such that the snap hook or carabiner will not close and lock, or that roll-out could occur.





- 4.8.4 If a fall is to be allowed and shock-absorbing lanyards are in use, lanyards must be secured to fixed-anchor points, drop-lines, lifelines or structural members capable of supporting a minimum dead weight of 5,000 pounds per person.
- 4.8.5 If a lanyard is being used as a restraint device and a fall is not allowed or limited to 2 feet or less, then the tie off point must be capable of withstanding 2 times the anticipated load.
- 4.8.6 If a fall is to be allowed and an SRL is being used the SRL must be secured to an anchor point capable of supporting a minimum dead weight of 3,000 pounds or two times the anticipated load.
- 4.8.7 Lanyards used in tethering (restraint) must be shorter than the width of ledges.
- 4.8.8 A body harness and a dual “Y” lanyard will be used to ensure 100-percent fall protection when transitioning from one elevated work level to another.
- NOTE:** All lanyards used for fall arrest must be equipped with shock absorbers and double-locking snap hooks.
- 4.8.9 Full body harnesses must be worn snugly at all times while in use.

#### 4.9 Vertical Fall Protection

- 4.9.1 Vertical fall protection must be provided where there is an exposure to a fall of 4 feet or more, (portable ladders excluded) when no other form of fall prevention, such as working platforms with guardrails, handrails, or toe-boards; as described in this section, is present. Fall protection shall be used on scaffolding when the drop is more than 10 feet. Fall protection shall be used at all times when working from an elevated mobile work platform such as a JLG, Scissor Lift, or Bucket Truck.

**WARNING:** Severe injuries can occur from falls less than four feet. When the task involves employee exposure to a fall below regulatory limits (e.g when floor panels are removed, at construction sites, during test cell build-ups, and similar temporary walking/working surface configuration changes) the hazard should be assessed and appropriate safeguards determined during the Job Safety Analysis (JSA) process.

- 4.9.2 Vertical lines for harnesses must be capable of supporting a minimum dead weight of 5,000 pounds.

#### 4.10 Self Retracting Lifelines

SRLs may be used as part of a fall arrest system; however, the worker must work directly beneath (within 15 degrees) the SRL or on slopes where swing injury potential is minimal. This device must be able to stop a fall instantly when rope speed exceeds five feet per second (5 ft/sec).

#### 4.11 Rope-Grabbing Devices

Rope-grabbing devices may be used for fall arrest on swinging scaffolds or similar work situations where frequent elevation change is necessary. This device must be attached to a full body harness and shock-absorbing lanyard.

#### 4.12 Climbing Devices

- 4.12.1 Ladder-climbing devices consisting either of the rail/pipe type or the cable type may be used on fixed ladders over 24 feet in unbroken length in lieu of cage protection and landing platforms. See AEDC SHE Standard D9
- 4.12.2 Rail-type devices are preferable on tall, straight, fixed ladders such as crane towers and exhaust stacks; however, customized curved sections are available from manufacturers.
- 4.12.3 Cable-type devices are preferable on lower, fixed ladders, such as underground shaft ladders or on ladders having curved sections.
- 4.12.4 Climbing devices must be worn with full body harnesses designed by the manufacturer for the devices or other compatible devices.
- 4.12.5 Inspection of climbing devices is the same as specified for full body harness and lanyards as mentioned in Section 4.7.2.

#### 4.13 Safety Nets

In some work situations where the use of ladders, scaffolds, catch platforms, temporary floors, safety lines, or safety belt/harnesses is impractical, safety nets must be provided at working heights more than 25 feet from ground or water surfaces.

#### 4.14 Procurement

- 4.14.1 Fall/restraint equipment may be procured through Supply, Customer Services.
- 4.14.2 When ordering fall protection equipment attention must be paid to the type and functional capabilities of the equipment being ordered. Single-use harnesses do not need to be ordered when multi-use harnesses are available at nearly the same cost. See examples below for proper use:



- 4.14.3 Some manufactures of SRLs require their SRLs to be sent back to the factory annually or every two years for inspection and re-certification. Typically there is a substantial cost associated with this service that needs to be factored in when making purchase comparisons. SRLs with no manufacturer’s recertification requirement are preferable over ones that require one.

#### 4.15 Limitations of use

- 4.15.1 A harness with a single “D-ring” located at the center of the back can only be used for fall arrest and possibly rescue, depending on how the “D-ring” and webbing is positioned. A harness with “D-rings” center back and at waist level can be used for fall arrest, restraint, positioning and rescue. Anticipated harness use and their limitations need to be considered when ordering the equipment.
- 4.15.2 Most currently manufactured, off-the-shelf, fall protection equipment has a 310-pound limitation placed on it by its manufacturer. Selection of equipment must carefully consider any weight limitations placed on the fall protection equipment before it is ordered or used.
- 4.15.3 A standard 6-foot shock absorber equipped lanyard will not normally work as a positioning lanyard due to the limitation of a maximum 2 feet fall placed on positioning/restraint equipment.

- 4.15.4 To safeguard employees, fall protection equipment subjected to fall forces, shall be immediately removed from service and either be destroyed and replaced or recertified by the manufacturer.

#### **4.16 Anchorages for Personnel Fall Arrest Systems (PFAS)**

- 4.16.1 Anchorages selected for PFAS shall have a strength capable of sustaining static loads applied in the directions permitted by the systems of at least 5000 pounds non-certified anchorages or two times the maximum arresting force for certified anchorages.
- 4.16.2 All components and sub-components of the selected fall protection system shall be compatible with the anchorage connector.
- 4.16.3 Fall arrest components shall be located as high as practicable above an authorized person to minimize the free fall and the total fall distance, and to prevent contact with an obstruction or the lower level.
- 4.16.4 The maximum angle from the point of attachment of the anchorage connector to the user shall be in accordance with manufacturer's recommendations for swing falls. The anchorage connector shall be located in such a way to minimize the pendulum-like motion during a fall.
- 4.16.5 Accessibility, location, and ease of connecting (tying off) shall be taken into consideration when planning and selecting anchorages.

### **5.0 TRAINING**

Initial training shall be required and shall be provided to Operating Contractor personnel who are exposed to falls involved with the various tasks they will perform and will be required to complete an annual refresher.

### **6.0 INSPECTION/AUDITS**

The Operating Contractor Safety and Health Group may conduct inspections of work activities as directed by contractor management.

### **7.0 REFERENCES**

#### **7.1 AEDC Safety, Health and Environmental (SHE) Standards**

SHE Standard D10, Scaffolds

SHE Standard D9, Portable and Fixed Ladders

#### **7.2 Air Force Publications**

AFOSH 91-501, Air Force Occupational Safety and Health Standard

TO 00-25-245, Testing and Inspection Procedures: Personnel Safety and Rescue Equipment

#### **7.3 ANSI Standards**

A10.11-1989(R 1998), Personnel and Debris Nets for Construction and Demolition Operation.

Z359.0-2007 (R 2007), Safety Requirements for Personal Fall Arrests Systems, Subsystems and Components

#### **7.4 OSHA Standards**

29 CFR 1926 Subpart M, Fall Protection

29 CFR 1926.28, Personal Protective Equipment

29 CFR 1926.104, Safety Belts, Lifelines, and Lanyards

29 CFR 1926.105, Safety Nets

29 CFR 1926.106, Working over or Near Water

29 CFR 1926.451, Scaffolds

29 CFR 1926.1053, Ladders

29 CFR 1910.23, Guarding floor and wall openings and holes

9 CFR 1910.27, Fixed Ladders

29 CFR 1910.132, Walking and Working Surfaces; Personal Protective Equipment (Fall Protection Systems)

### **8.0 SUPPLEMENT**

NFAC A321-0801-XSP F6 Fall Protection

# A321-0801-XSP F6 Fall Protection Supplement

This supplement has been approved for the NFAC Site.

**Review:** This supplement will be reviewed and updated using the same cycle as the AEDC Safety Standard F6 "Fall Protection".

**References:** AEDC Safety Standard F6 – Fall Protection at the AEDC NFAC Site. NASA Ames Procedural Requirements APR 1700.1 Chapter 40 "Fall Protection Program".

**Scope:**

This supplement describes the tasks, activities and actions required when employees are exposed to a fall while performing work at NFAC.

This supplement applies to all NFAC personnel, customers and vendors.

**NFAC Worksite Application:**

NFAC will follow the local NASA Ames Procedural Requirements APR 1700.1 Chapter 40 "Fall Protection Program". NASA additional requirement for fall protection is to use ANSI Z359.2 "Managed Fall Protection Program".

I. NFAC Site Management shall:

1. Ensure that the supplement is followed.

II. NFAC Supervisors and Test Directors shall:

1. Ensure supplement is followed
2. Ensure that all customers and staff are trained and utilized the fall protection equipment properly

III. NFAC Safety Engineer shall:

1. Assesses, monitor and generates Fall Protection Plans for non-routine task
2. Maintains Competent Fall Protection Training (every 2 years)
3. Conducts required yearly inspection of staff's and general inventory of fall protection gears/systems
4. Comply with the AEDC Safety Recall Program.
5. Remove unserviceable fall protection equipment immediately.

IV. NFAC Staff

1. Will follow all fall protection requirements when working above 4 ft
2. Maintain their Fall Protection Training (every 2 years) either with NASA Code Q Training or NFAC Safety Engineer (Fall Protection Competent Trainer)
3. Shall inspect harness and related equipment prior to use.