

**BY ORDER OF THE COMMANDER
440 AIRLIFT WING**

440TH AIRLIFT WING ISTRUCTION 91-301

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Safety

**FALL PREVENTION AIRCRAFT
ELEVATED SURFACES**

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This instruction implements Air Force Policy Directive (AFPD) 91-3, Occupational Safety and Health, with references to Air Force Occupational Safety and Health Standard (AFOSH) 91-100, Aircraft Flight Line and Ground Operations and Activities, AFOSH Standard 91-501, Personal Protective Equipment, TO 00-25-245, Operator Instruction Testing and Inspection Procedures, Personnel Safety and Rescue Equipment and 29CFR 1910.66, Appendix C, Personal Fall Arrest Systems. This instruction provides necessary information on fall protection hazards associated with maintenance performed on aircraft by maintenance and operations group personnel. This directive applies to the 440 Airlift Wing, and any individual who can fall 10 feet or more to the ground or next level from an elevated surface. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the Air Force Information Management Tool (AF IMT) 847, Recommendation for Change of Publication; route AF IMTs 847 from the field through major command (MAJCOM) publication/forms managers. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual AFMAN 33-363, *Management of Records*, and disposed of in accordance with the Air Force records Disposition Schedule (RDS) located at <https://www.my.af.mil/afirms/afirms/afirms/rims.cfm>. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 847, Recommendation for Change of Publication, directly to 440 MXG/CC, 2541 Surveyor Street, Room 101, Pope AFB NC 28308-2409.

1. Training Frequency: Personnel will receive fall protection training prior to working or performing inspections on aircraft elevated surfaces, and annually thereafter.

1.1. Retraining will be accomplished when the supervisor has reason to believe that an employee who has already been trained does not have the understanding and skill required to

perform a job safely. Circumstances where retraining is required include, but are not limited to, situations where:

1.1.1. Changes in the workplace render previous training obsolete.

1.1.2. Changes in the types of fall protection systems or equipment to be used render previous training obsolete.

1.1.3. Inadequacies in an affected employee's knowledge or use of fall protection systems or equipment indicates that the employee has not retained the requisite understanding or skill.

1.2. Training Lesson Plans: A tailored lesson plan will be used to train each individual. The training will include the following sections as a minimum:

1.2.1. Section 1: Identify all work locations requiring fall protection and the type of fall protection to be used. (i.e. in the hangar, lifeline and harness, stands and or Aircraft Designated Walkways; on the parking ramp, maintenance stands and or Aircraft Designated Walkways). The kind of personal fall arrest system selected should match the particular work situation, and any possible free fall distance should be kept to a minimum.

1.2.2. Section 2: Identify the hazards affecting personnel on elevated surfaces (i.e. slips, trips and falls, or using overhead hoists while attached to the fall arrest system).

1.2.3. Section 3: Identify situations during a task or locations where lifeline and harness cannot be used and what alternatives will be used to protect employees.

1.2.4. Section 4: Explain the methods of rescue if a person were to fall. When personal fall arrest systems are used, the supervisor must ensure that workers can be properly rescued should a fall occur. The use of the 2-man concept will be incorporated for all work accomplished above 10 feet. **NOTE:** The intent of the 2-man concept is to ensure if a person were to fall, the other person would be close enough to hear a call for help or see the fall. Notify the fire department in the event of a fall.

1.2.4.1. When personal fall arrest systems are used and or activated the individual will be rescued using a stand that allows the individual to be lifted. At no time will an individual be dropped or released from the fall protection to a stand or the ground. At no time will an individual use fall protection without one or more personnel in the area to monitor the individual using fall protection.

1.2.4.2. Stands required to remove an employee from fall protection will be available in the immediate area prior to use of a fall arrest system.

1.2.4.3. Explain and demonstrate the frequency and proper methods of inspection, storage (incorporate manufacturer's recommendations as well as AFOSH 91-501 and T.O. 00-25-245 inspection requirements).

1.2.4.4. Explain proper methods of fall protection equipment storage.

1.2.5. Section 5: Explain and demonstrate the proper techniques for connecting personal protective harness to each type of fall arrest system.

1.2.6. Section 6: Identify risk factors as they apply to the maintenance performed by the individual duty sections and measures to eliminate or mitigate mishap occurrence. The following items should be considered as minimum topics for the lesson plan:

- 1.2.6.1. Environmental conditions (e.g. rain, snow, ice, high winds).
- 1.2.6.2. Condition of surface area (e.g. wet, slippery, and dry).
 - 1.2.6.2.1. Risk Level: extremely high.
 - 1.2.6.2.2. Control Measures: “no admittance unless dry”, limit exposure training.
 - 1.2.6.2.3. Residual Risk/Decision: low, flight/section chief.
- 1.2.6.3. Duration of task.
 - 1.2.6.3.1. Risk Level: low.
 - 1.2.6.3.2. Control Measures: reduce through breaks, workforce management
 - 1.2.6.3.3. Residual Risk/Decision: low, flight/section chief
- 1.2.6.4. Equipment carried to perform the task.
 - 1.2.6.4.1. Risk Level: high.
 - 1.2.6.4.2. Control Measures: Reduce through use of stands to move equipment up on aircraft, use of multiple persons to carry.
 - 1.2.6.4.3. Residual Risk/Decision: low, flight/section chief.
- 1.2.6.5. Type of footwear utilized by the employee.
 - 1.2.6.5.1. Risk Level: low.
 - 1.2.6.5.2. Control Measures: warn of hazards of poor treads.
 - 1.2.6.5.3. Residual Risk/Decision: low, squadron CC.
- 1.2.6.6. Physical ability of the employee.
 - 1.2.6.6.1. Risk Level: low.
 - 1.2.6.6.2. Control Measures: warn of dangers of poor fitness, annual fitness testing.
 - 1.2.6.6.3. Residual Risk/Decision: low, flight/section chief.
- 1.2.6.7. Worker actions, for example, jumping from one surface to another or over-extending themselves by leaning too close to an edge.
 - 1.2.6.7.1. Risk Level: extremely high.
 - 1.2.6.7.2. Control Measures: reduce through training, warning, using proper equipment.
 - 1.2.6.7.3. Residual Risk/Decision: medium, flight/section chief.
- 1.2.6.8. Height from working level to the next lower level.
 - 1.2.6.8.1. Risk Level: high.

1.2.6.8.2. Control Measures: reduce through training, warning, using proper equipment.

1.2.6.8.3. Residual Risk/Decision: low, flight/section chief.

1.2.6.9. Operational urgency.

1.2.6.9.1. Risk Level: extremely high.

1.2.6.9.2. Control Measures: reduce through training, proper planning, warning and supervision.

1.2.6.9.3. Residual Risk/Decision: medium, squadron CC.

1.2.6.10. Will the tools and equipment required for the task create a tripping hazard (housekeeping)?

1.2.6.10.1. Risk Level: high.

1.2.6.10.2. Control Measures: reduce through training, warning.

1.2.6.10.3. Residual Risk/Decision: low, flight/section chief.

1.2.6.11. Determine the worker's vertical and horizontal movement.

1.2.6.11.1. Risk Level: medium.

1.2.6.11.2. Control Measures: reduce through training, warning.

1.2.6.11.3. Residual Risk/Decision: low, flight/section chief.

1.3. Lesson Plan Approval: the safety office and the unit-training manager will approve fall protection lesson plans initially and anytime there is a change to the lesson plans.

1.4. Documentation of Training: training will be documented on the AF IMT 55, Employee Safety & Health Record, along with annual refresher training. Tracking of training will be via an automated means (GO81).

2. General Requirements: Fall protection will be used anytime a person is required to gain entry to the top of the aircraft. The method of fall protection is dependent on the location of the task, the duration of task and the weather affecting the elevated walking working surfaces on the aircraft. Specific requirements and exceptions are listed below.

2.1. Specific Requirements: a "personal fall arrest system" will be used at all times when maintenance on aircraft surfaces is being performed within the aircraft maintenance hangars.

2.1.1. Exception 1: when personnel are walking within the aircraft designated walkway to the location where maintenance is going to be performed and slip resistant shoes are used the use of the fall arrest system is not required. Workers will use fall arrest system at point where work begins on aircraft this includes inside the aircraft designated walkway.

2.1.2. Exception 2: when working in or around an open fuel cell the nylon rope and or harness creates a secondary hazard of static electricity.

2.2. Specific Requirements: maintenance stands will be placed to provide the best fall protection for the worker when work is accomplished on aircraft elevated surfaces outside the maintenance hangars. **Exception:** certain maintenance tasks and inspections (such as

pre-flights) performed on aircraft elevated surfaces could not be realistically accomplished with a maintenance stand continuously behind the worker. In this case use the procedural controls outlined in AFOSH Standard 91-100, paragraph 8.2.5.1.3, which states: “personnel will be provided and will use appropriate fall protection”. **NOTE:** when maintenance or inspections will be performed totally within the TO-specified designated safe walkways on the surface of large frame aircraft, fall protection is not required when tasks are performed according to specified TO procedures and conditions. This method will be used only after appropriate risk management measures have been completed. In all other activities where work will be performed outside these walkways, appropriate protection will be provided to prevent falls from 10 feet.

2.3. Specific Requirements: personnel will not walk on elevated aircraft surfaces when aircraft surfaces are wet, covered with snow, frost, ice or in high wind conditions. **Exception:** if the operational needs do not allow delays for conditions to improve, mobile platforms or maintenance stands shall be used. (**Note:** personnel will use the mobile platforms or maintenance stands to stand on while performing the desired task).

2.4. Specific Requirements: the use of the overhead hoists within the maintenance hangars. Personnel will not work on the aircraft surfaces if the use of the hoist will interfere with personnel using the fall protection equipment. When the overhead hoist is used and personnel need to be on the aircraft surface at the same time, the workers on the aircraft surface will be in control of the hoisting operation. All other personnel who are not part of the operation will stay off the aircraft surface until hoist operations are complete.

2.5. Specific Requirements: when personal fall arrest systems are used, the supervisor must ensure that workers can be properly rescued should a fall occur. The two-man concept for tasks accomplished on aircraft surfaces will be used. *Supervisors will ensure technicians performing inspections, servicing and maintenance on upper wing surfaces are observed by a second technician acting as a safety observer.*

3. Fall Arrest System Equipment: all equipment purchased will meet or exceed the requirements outlined in ANSI Z359, Safety Requirements for Personal Fall Arrest Systems, Subsystems, and Components. Only commercially manufactured fall protection equipment will be used. The use of “homemade” or modified equipment is strictly prohibited.

3.1. Equipment purchased will have the manufacturer’s name, identification code and the date of manufacture stamped on the equipment or on a permanently attached tag.

3.2. Supervisors must maintain manufacturer’s performance testing information for the personal fall arrest system being used. Fall arrest systems will be certified for use annually.

3.3. It is common practice to interchange lanyards, connectors, lifelines, deceleration devices and body harnesses since some components wear out sooner than others. However, NOT all components are designed to be interchangeable. For example, a lanyard should never be substituted for the lifeline.

3.4. Ensure all fall arrest equipment is protected from exposure to acids, dirt, moisture, oil, grease or other substances that can cause deterioration of the fall arrest system’s ability to function properly.

3.5. Wire rope or rope covered wire lanyards and some plastics such as nylon will not be used where there is an electrical hazard. Lanyards that are wet, shall not be used near power lines or other locations where exposed to energized electrical sources.

3.6. Lanyards constructed of rope or synthetic materials and rope-covered lanyards will not be used by personnel performing welding or cutting operations, or in areas where sharp edges, open flames or excessive heat could present a hazard. Where lanyards, connectors and lifelines are subject to damage by work operations such as welding, chemical cleaning and sandblasting, the component should be protected or other securing systems should be used.

3.7. Lanyards will be kept as short as reasonably possible to minimize the length of a free fall. Lanyard length must never permit a vertical fall of more than 6 feet, nor contact any lower level. Lanyards will be attached to a drop line, lifeline or fixed anchorage point by means that will not reduce its required strength.

3.8. An energy (shock) absorber is a component whose primary function is to dissipate energy and limit deceleration forces that the rope system imposes on the body during fall. These devices may employ various principles such as deformation, friction, tearing of materials or breaking of stitches to accomplish energy absorption. An energy absorber will be worn by the user when attached to the cable fall arrest system. Absorber will not be used with self retracting lifelines. **Note:** Rail fall arrest system runs “nose to tail” and uses rails as the attaching points for the self retracting lifeline. Cable fall arrest runs wing tip to wing tip and uses a cable as the attaching point for the nylon rope.

3.9. Lanyards that have been subject to “impact loading” from a falling person or weight test will be removed from service and immediately tagged unserviceable.

4. Inspection Requirements: users of fall arrest systems will comply with TO 00-25-245, Operator Instruction Testing and Inspection Procedures, Personnel Safety and Rescue Equipment, and all manufacturer instructions regarding the inspection, maintenance, cleaning and storage of the equipment. The using organization will maintain copies of the manufacturer’s instructions.

4.1. All fall arrest systems will receive a thorough inspection using the criteria in the manufactures guidance and TO 00-25-245.

4.2. The user will inspect all equipment prior-to-uses. Use inspection intervals prescribed in the manufactures instructions, AFOSH 91-501 and TO 00-25-245.

4.3. Prior-to-use and recurring inspections will be documented on the AFTO IMT 244 in accordance with TO 00-20-1 or G081 version of form.

4.4. When inspection reveals defects in equipment or damage to or inadequate maintenance of equipment, the equipment will be immediately tagged as “unserviceable” and removed from service. Repairs will be made by a qualified person or company before it can be returned to service. Examples of components that must be removed from service:

4.4.1. Components with an absence of or illegible factory markings.

4.4.2. Absence of any elements affecting the equipment form, fit or function.

4.4.3. Evidence of defects in or damage to hardware elements including distorted hooks or faulty hook springs, tongues unfitted to shoulder buckles, loose or damaged mountings, non-functioning parts, racks, sharp edges, deformation, corrosion, chemical attack, excessive heating, alteration, deterioration, contact with acids or other corrosives and excessive wear.

4.4.4. Evidence of defects in or damage to straps or ropes including fraying, un-splicing, un-laying, kinking, knotting, roping, broken or pulled stitches, excessive elongation, chemical attack, excessive soiling, cuts, tears, abrasion, mold, undue stretching, alteration, needed or excessive lubrication, excessive aging, contact with fire or other corrosives, internal or external deterioration and excessive wear.

4.4.5. Alterations and additions affecting efficiency, absence of parts, or evidence of defects in, damage to or improper function of mechanical devices and connectors.

5. Maintenance and storage requirements: proper maintenance and storage of equipment will be conducted by the using organization according to the manufacturer's instructions. Unique issues, which may arise due to conditions of use, shall be addressed with the manufacturer. The manufacturer's instructions will be retained for reference.

5.1. Equipment in need of or overdue scheduled maintenance will be tagged as "unserviceable" and immediately removed from service.

5.2. Equipment will be stored in accordance with TO 00-25-245 in a manner to preclude damage from environmental factors such as heat, light, excessive moisture, oil, chemicals and their vapors or other degrading elements.

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