



County of Henrico
Department of Emergency
Management &
Workplace Safety

Verification	Originator	Revised	Issued
Initials	EMWS	EMWS	EMWS
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Safety Manual

Chapter 15 Fall Protection—Fall Arrest Systems

Area of Application:	County of Henrico General Government & Schools
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001	09/15/2017 Fall Protection Program template added.
002	07/28/2022 Aligned EMWS titles and terminology. Non-substantive changes.
003	07/27/2023 Minor grammatical (non-substantive) changes.

Purpose:

This chapter, in conjunction with the written Fall Protection Program template, will assist affected County of Henrico Departments comply with the Occupational Safety and Health Administration and Virginia Occupational Safety and Health program (OSHA /VOSH) Standards 29 CFR 1926 Subpart M (Fall Protection in Construction) and 29 CFR 1910.28-30 (Fall Protection in General Industry).

Scope:

This chapter applies to all County of Henrico employees and contractors working at County work sites where fall hazards are present. The written Fall Protection Program template is available on the County of Henrico web page on the Employee Portal under “safety”. This chapter outlines the requirements of the Fall Protection standard for employees covered by it, as well as awareness for county employees not covered by the standard. Note: The template may be modified to meet the needs of each department. If assistance is needed, contact the Department of Emergency Management & Workplace Safety (EMWS) at 804-501-5162.

Program Administration:

With guidance from EMWS, each affected Department will establish specific procedures to identify the hazards covered by these standards that are specific to its operation. Departmental policy will outline how the requirements of this chapter and the OSHA /VOSH standards will be met.

Responsibilities:

- A. The Department of EMWS will:
 1. Help affected departments comply with all applicable federal and state regulations and standards.
 2. Provide technical guidance to ensure training has been completed and is kept up to date.
 3. Be authorized to halt any unsafe work practice that is not in compliance with this chapter or any applicable OSHA /VOSH standard(s).
- B. Departments are:
 1. Responsible for ensuring a safe work environment for affected personnel by providing the appropriate Personal Protective Equipment, fall protection system(s), and task-specific training so that assigned work will be performed as safely as possible.



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2. Responsible for identifying existing, or potential, fall hazards. Employees designated for working at elevated heights shall receive appropriate training by a competent person.
- C. Supervisors will:
 1. Identify fall hazards and provide the appropriate fall protection when performing work covered by the OSHA /VOSH standards.
 2. Appoint a competent person to oversee the work. OSHA /VOSH defines a competent person as:
 - a. a person who can identify existing and foreseeable hazards at the work site, and who can identify conditions which are hazardous or dangerous to employees, and;
 - b. one who has the ability and authority to take prompt corrective action to eliminate any hazards.
- D. Employees are:
 1. Responsible for completing and understanding the required training so they can perform all assigned tasks safely. Employees will don appropriate fall protection as directed by the supervisor or competent person. Employees will comply with all procedures covered by the applicable OSHA /VOSH Fall Protection Standards and this chapter.
 2. Responsible for the care, use and inspection of fall protection equipment.
 3. Expected to report all unsafe conditions to the supervisor, or competent person.

Procedures:

All work performed from, or on, elevated surfaces to include roofs, building ledges, mobile lifts, scaffolds and other platforms, shall comply with this chapter, and the County of Henrico Fall Protection Program.

The Fall Protection Program:

- A. General
 1. An employee must be protected from falling when working on a surface that has an unprotected side or edge which is 4 feet (General Industry) and 6 feet (Construction) above the working surface, or when working from aerial lifts or other elevated work platforms.
 2. In each of these cases, the fall hazards must be evaluated to determine the preferred method to protect the employee. The following hierarchy of protection, in order of preference, shall be:
 - a. Eliminate the fall hazard by working at ground level.
 - b. Use a passive fall protection system such as guard rails.
 - c. Use a fall restraint that prevents a person from reaching a fall hazard.
 - d. Utilize fall arrest equipment to stop an employee in free-fall before he/she hits a surface.
 - e. Administrative controls that use procedures to signal or warn a worker that he/she is approaching a fall hazard.
- B. Training (29 CFR 1926.503)
 1. Employees who may be exposed to fall hazards shall be trained to recognize hazards and know how to minimize them. A competent person will provide initial and subsequent training.
 2. The competent person(s) shall train employees to:
 - a. Understand the nature of fall hazards in the work area;



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- b. Erect, maintain, disassemble and inspect fall protection systems being used in the work area correctly;
 - c. Understand guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, controlled access zones, and other protection the differences between them, and when to select a certain system;
 - d. Understanding the role of employees in fall protection safety.
 - e. Additional training required by affected County departments must address how to initiate a rescue for an employee who has fallen, such as calling 9-1-1, and/or providing First Aid/CPR, and:
 - f. An overview of the OSHA /VOSH fall protection standards (general industry and construction), how the standards differences between the standards, and when specific standards apply.
3. Department Heads, or their designees, shall maintain fall protection training records for each employee. The employee's name, date(s) of training, topics covered, and signature of the person who conducted the training shall be recorded. Periodic refresher training is required. If a new, or different, fall protection system has been implemented, or if an employee has been observed to work in an unsafe manner, that employee shall be retrained immediately. If that is not feasible, that employee shall be prohibited from performing tasks where a wearable fall protection system is required by the Standard.

C. Fall Protection Systems

One of the following fall protection systems shall be in place whenever an employee is exposed to a general industry fall hazard of four feet or more, or a construction fall hazard six feet or more.

1. Guardrail systems

- a. Guardrails are the preferred method for eliminating fall hazards, but guardrails may not be feasible for every situation.
- b. Guardrails are required when the fall from the surface's edge is a distance greater than 4 feet. Excavations greater than four feet in depth are included. Guardrail systems shall meet the following:
 - i. The top rail is 42 inches, +/- 3 inches above the walking/working level.
 - ii. A mid-rail is equally between the top rail and the walking/working level.
 - iii. The working level is the work surface. An employee working on a stepladder may create a work surface well above the walking surface.
 - iv. Both top and mid-rails should be constructed of materials at least one-quarter inch in thickness or diameter. If wire rope is used for top rails, it needs to be flagged with a high-visibility material at least every 4 feet and can have no more than 3" of deflection.
 - v. The top rail must withstand a force of 200 pounds when applied in any downward or outward direction.
 - vi. The midrail must withstand a force of 150 pounds when applied in any downward or outward direction.



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- vii. Toeboards are required for guardrails on elevated walking or working platforms where employees working below may be struck by falling objects. Toeboards must be four inches in height and must be securely fastened.
 - viii. Guardrail surfaces shall be smooth to prevent punctures, lacerations, or snagging.
 - ix. Top rail edges shall not overhang terminal posts, except when such overhang does not present a hazard.
 - x. When an object, or materials, must be hoisted, a chain fence, gate or temporary guardrails must be erected so that workers cannot fall into any opening.
2. Loading docks
- a. Loading docks and other walking edges greater than 4 feet above ground level (48 inches) must be guarded.
 - b. The guardrail may have removable sections to provide access for loading, but rails must remain in place when access is not required.
3. Skylights
- a. Skylights are considered openings when workers are present on the roof. For temporary protection, guardrails capable of supporting no less than 200 pounds shall be erected around the skylight until the work is completed. For permanent protection, skylight screens are available for installation. Skylight screens prevent a person from falling through a skylight, especially one that has become weak and brittle from years of exposure to sunlight.
 - b. Skylights capable of supporting 200 pounds that are at least 42 inches above the roof level do not require additional guarding.
4. Fall Arrest Systems
- a. County employees required to wear fall protection shall use the “Buddy System”, or an attendant or supervisor will be available for the duration of the work to render assistance if needed.
 - b. Fall arrest systems have three components:
 - i. Body Wear: a full-body harness—nothing else is acceptable.
 - ii. Connecting Device: shock-absorbing lanyard, fall limiter, self-retracting lifeline, etc.
 - iii. Anchorage/Anchorage Connector: how the connecting device couples with the anchorage. Examples are: D-bolt, hook anchor, tripod, davit, beam anchor, cross-arm strap, etc.
 - c. All fall arrest systems must meet the requirements of ANSI Z359 1-1992. Fall protection equipment requirements are as follows:
- D. Body Wear
- 1. A full body harness is required. The use of body belts is prohibited.
 - 2. When the anchorage point is a D-ring used for fall arrest, it shall be positioned at the center of the employee’s back. The free fall shall not exceed 12 feet. The dorsal D-ring attachment is also suitable for restraint, rescue and retrieval (such as from a permit-required Confined Space).
 - 3. A Sternal D-ring attachment may be used in fall arrest if the free fall does not exceed 2 feet.



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4. Employees must always tie off at or above the D-ring of the harness except when using lanyards 3 feet or less in length.
 5. Harnesses or lanyards that have been subject to an impact load shall be destroyed.
 6. Load testing shall not be performed on fall protection equipment.
- E. Connecting devices: This device can be a rope or web lanyard, rope grab or retractable lifeline.
1. Only locking snaphooks shall be used.
 2. Horizontal lifelines will be designed for, and used for, their intended purpose.
 3. Lanyards and vertical lifelines need a minimum breaking strength of 5,000 pounds.
 4. The length of a single lanyard shall not exceed four feet.
 5. The use of steel lanyards is prohibited.
 6. No lanyard shall not be clipped back to itself (e.g. around an anchor point) unless specifically designed to do so.
 7. If vertical lifelines are used, each employee shall be attached to a separate lifeline.
 8. Lifelines shall be protected against abrasion or cutting.

F. Anchorage

The anchor point is the most critical component of the fall arrest system. Buildings may have existing structures (e.g., steel beams) that may be used for anchorage. Other locations and assignments may require the installation of a temporary or permanent anchor. As a minimum, the following criteria must be considered for each type of anchor point:

1. Structure must be fixed and capable of withstanding a 5000-lb. static load.
2. Structure/anchor must be easily accessible to avoid fall hazards during hook up.
3. Direct tie-off around sharp-edged structures can reduce breaking strength by 70% therefore; chafing pads or abrasion resistant straps must be used near or with sharp-edged structures to prevent lanyards or lifelines from being cut or damaged.
4. Structures used as anchor points must be at the worker's shoulder level or higher to limit free fall to 4 feet or less and prevent contact with any lower level (except when using a self-retracting lifeline or 3-foot lanyard).
5. Choose structures for anchor points that will prevent a free fall swing hazard. A "pendulum" like swing can result when a worker moves horizontally away from a fixed anchor point and falls. The swing's arc produces as much energy as a vertical free fall. Swinging into a wall, tree, or other object often results in serious injuries. Raising the anchor point's height can reduce the angle of the arc and the force of the swing. Horizontal lifelines can maintain the overhead anchor point and will restrict the vertical fall. A qualified person must design a horizontal lifeline.

G. Permanent Anchor Requirements

In addition to the criteria listed in Section F above, the following shall be considered:

1. Environmental factors and incompatible materials can degrade exposed anchors.
2. Ensure the compatibility of permanent anchors with employee's fall arrest system.
3. Schedule an annual re-certification of permanent anchors in a preventive maintenance program.
4. Label permanent anchors.



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5. If roof anchors have been subjected to fall arrest forces, they must not be used again until a qualified person has re-certified them.
- H. Reusable Temporary Anchors
1. Reusable temporary anchors shall be installed and used as per the manufacturer's installation instructions.
 2. Roof anchors shall be compatible with employee's fall arrest equipment.
 3. Roof anchors shall be removed from service at the completion of the job and shall be inspected by a competent person prior to reuse as per the manufacturer's instructions.
 4. Temporary roof anchors subjected to fall arrest forces must be removed from service and disposed of immediately.
- I. Complete system
1. Ideally, an employee should not free fall greater than 3 feet, or have any chance of contacting a lower level.
 2. To ensure this, add the height of the worker, the lanyard length and an elongation length of 5.5 feet. Using this formula, a six-foot worker would require a tie-off point at least 15.5 feet above the next lower level.
 3. A fall arrest system subjected to impact shall be removed from service immediately.
 4. Fall arrest systems shall be inspected prior to each use. Any damaged or deteriorated components shall be replaced or removed from use.
 5. Attaching fall arrest systems to guardrails, hoists, heavy equipment, or any feature not intended to be an anchor point, is prohibited.
- J. Aerial Lifts and Self Powered Work Platforms
1. Any employee who will be operating an aerial lift or other powered work platform shall be trained by a competent person prior to initial use. This training shall include inspection of the equipment, regardless of model or type.
 2. An employee shall wear a body harness with a shock-absorbing lanyard (not to exceed 3 feet in length). A harness shall also be worn when working on an elevated work platform. (The exceptions are scissor lifts and telescoping lifts that move vertically so long as the work platform has a guardrail system to prevent falls).
 3. The anchor point(s) shall be those installed by the lift or platform manufacturer.
 4. Attaching lanyards to nearby light or utility poles, or other structures or equipment while working on a lift or powered platform is prohibited.
 5. Moving an aerial lift while the boom is in an elevated position and the operator is on the work platform is prohibited.
- K. Inspection
1. The affected employee shall inspect his/her fall arrest system prior to each use.
 2. A competent person shall inspect fall arrest systems before initial use, and at least weekly thereafter. Inspections shall be documented, and records shall be retained for one calendar year.
 3. Visual inspections of fall arrest systems shall follow the manufacturer's recommendations.
 4. Damaged fall arrest components shall be removed from service immediately.



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5. See page 12 of the Fall Protection Program template for a pre-work fall protection checklist. Completed checklists must be maintained by affected Departments for one calendar year.

L. Warning Line Systems and Controlled Access Zones

Warning line systems and work in controlled access zones must be developed in accordance with OSHA /VOSH regulation 1926.502. An EMWS representative shall approve the use of warning line systems and controlled access zones prior to implementation.

M. Monitoring System

1. When no other system is feasible, a safety-monitoring system shall be implemented and used so long as that does not create a greater hazard.
2. The monitoring system must be developed in accordance with OSHA /VOSH standard 1926.502. The system shall be approved by an EMWS representative before any County employees are exposed to fall hazards.

Disclaimer:

Although every effort has been made to ensure this Chapter addresses all applicable regulations, it is the responsibility of each department to maintain compliance.