

*Foreman's
Reference Guide*

**Suggested
Fall Protection -**

**Rooftop Work
Area Protocol**



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Table of Contents

Introduction	2
Referenced OSHA Regulations/Standards	2
Fall Protection Systems	3
Fall Restraint Systems	4
Fall Arrest Systems	5
Warning Line Systems	5
Safety Monitoring Systems	7
Applicable Definitions	8
Summary	12

Introduction

This is a reference publication designed to provide NATE member companies with certain guidelines for fall protection on rooftop work areas.

The information in this guide is intended to provide a generic, non-exhaustive overview of the common work-related activities for most rooftop work areas.

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Referenced OSHA Regulations/Standard

- 29 CFR 1926.500 -
SCOPE, APPLICATION, AND DEFINITIONS
- 29 CFR 1926.501 –
DUTY TO HAVE FALL PROTECTION
- 29 CFR 1926.502 –
FALL PROTECTION SYSTEMS CRITERIA
AND PRACTICES

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Fall Protection - Rooftop Work Areas

The first goal of any fall protection program is to identify fall hazards, minimize exposure to those hazards, and determine which equipment will best safeguard the individual working on that system.

Fall Protection Systems

“Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge which is 6 feet (1.8m) or more above a lower level shall be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems.” (OSHA 1926.501 – Duty to Have Fall Protection)

“Unprotected sides and edges.” Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge which is 6 feet (1.8 m) or more above a lower level shall be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems.

Each employee on walking/working surfaces shall be protected from falling through holes (including skylights) more than 6 feet (1.8 m) above lower levels, by personal fall arrest systems, covers, or guardrail systems erected around such holes.

Each employee on a walking/working surface shall be protected from tripping in or stepping into or through holes (including skylights) by covers.

Each employee on a walking/working surface shall be protected from objects falling through holes (including skylights) by covers.

“Roofing work on low-slope roofs.” Except as otherwise provided in paragraph (b) of this section, each employee engaged

in roofing activities on low-slope roofs, with unprotected sides and edges 6 feet (1.8 m) or more above lower levels shall be protected from falling by guardrail systems, safety net systems, personal fall arrest systems, or a combination of warning line system and guardrail system, warning line system and safety net system, or warning line system and personal fall arrest system, or warning line system and safety monitoring system. Or, on roofs 50-feet (15.25 m) or less in width, the use of a safety monitoring system alone is permitted.

“Steep roofs.” Each employee on a steep roof with unprotected sides and edges 6 feet (1.8 m) or more above lower levels shall be protected from falling by guardrail systems with toeboards, safety net systems, or personal fall arrest systems.

There are two types of fall protection systems: fall restraint and fall arrest. Fall arrest systems minimize the chances of injury should a fall occur and fall restraint prevents a worker from approaching a fall hazard.

Fall Restraint Systems

A fall restraint system prevents a worker from approaching a fall hazard.

Example: If an employee is working near a leading edge on a rooftop, the fall restraint system will not allow him to physically go any farther than that leading edge. (If the leading edge were 6 feet from the anchor point the lanyard would be 6 feet or less).

With a properly constructed fall restraint system, a worker will not be in danger of a free fall should he slip, trip, etc. The fall restraint system free fall potential must be **ZERO FEET**.

A properly designed fall restraint system will always be the safest choice when working on rooftops.

There are however situations when a worker cannot be restricted from the potential fall hazard, therefore a properly designed fall arrest system must be utilized.

Fall Arrest Systems

A fall arrest system is made up of a series of components that function together to prevent a worker from free falling to a lower level. This system can be either temporary or permanent and is selected based upon the type of job, and hazards involved while performing the job.

The fall arrest system must have the following components:

1. An anchor system, which should be engineered.
2. Connecting means to limit the distance and/or reduce the impact force of a free fall. (Example: Adjustable 6 ft. positioning lanyard, or 3 ft. shock absorbing lanyard).
3. Body support to be used will always be an OSHA /ANSI approved full body harness. (Body belts will not be used for fall arrest or fall restraint).

Warning Line Systems

Warning line systems are an acceptable alternative to fall restraint or fall arrest systems.

The following provisions must be adhered to:

- The warning line shall be erected around all sides of the roof work area.

- When mechanical equipment is not being used, the warning line shall be erected not less than 6 feet (1.8m) from the roof edge.
- When mechanical equipment is being used, the warning line shall be erected not less than 6 feet (1.8m) from the roof edge which is parallel to the direction of mechanical equipment operation, and not less than 10 feet (3.1m) from the roof edge which is perpendicular to the direction of mechanical equipment operation.
- Points of access, material handling, storage areas and hoisting areas shall be connected to the work area by an access path formed by two warning lines.
- When the path to a point of access is not in use, a rope, wire, or chain, or other barricade, equivalent in strength and height to the warning line, shall be placed across the path at the point where the path intersects the warning line erected around the work area, or the path shall be offset such that a person cannot walk directly into the work area.
- Warning lines shall consist of ropes, wires, or chains and supporting stanchions.
- Rope, wire or chain shall be flagged at not more than 6 foot (1.8m) intervals with high-visibility material.
- The rope, wire or chain shall be rigged and supported in such a way that its lowest point is not less than 34 inches from the walking/working surface and its highest point is not more than 39 inches from the walking/working surface.
- Stanchions shall be capable of resisting, without tipping over, a force of at least 16 pounds applied horizontally against the stanchion, 30 inches above the walking/

working surface, perpendicular to the warning line and in the direction of the floor, roof or platform edge.

- No employee shall be allowed in the area between a roof edge and a warning line.

Safety Monitoring Systems

Safety monitoring systems and their use shall comply with the following provisions:

- The employer shall designate a competent person to monitor the safety of other employees and the employer shall ensure that the safety monitor complies with the following requirements:
 - The safety monitor shall be competent to recognize fall hazards;
 - The safety monitor shall warn the employee when it appears that the employee is unaware of a fall hazard or is acting in an unsafe manner;
 - The safety monitor shall be on the same walking/working surface and within visual sighting distance of the employee being monitored;
 - The safety monitor shall be close enough to communicate orally with the employee; and
 - The safety monitor shall not have other responsibilities which could take the monitor's attention from the monitoring function.
- Mechanical equipment shall not be used or stored in areas where safety monitoring systems are being used to

monitor employees engaged in roofing operations on low-slope roofs.

- No employee, other than an employee engaged in roofing work [on low-sloped roofs] or an employee covered by a fall protection plan, shall be allowed in an area where an employee is being protected by a safety monitoring system.

Applicable Definitions

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

“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.

“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).

“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.

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

“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.

“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.

“Low-slope roof” means a roof having a slope less than or equal to 4 in 12 (vertical to horizontal).

“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, or portions thereof.

“Personal fall arrest system” 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.

“Roof” means the exterior surface on the top of a building. This does not include floors or formwork which, because a

building has not been completed, temporarily become the top surface of a building.

“Safety-monitoring system” means a safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.

“Steep roof” means a roof having a slope greater than 4 in 12 (vertical to horizontal).

“Toeboard” means a low protective barrier that will prevent the fall of materials and equipment to lower levels and provide protection from falls for personnel.

“Unprotected sides and edges” means any side or edge (except at entrances to points of access) of a walking/working surface, e.g., floor, roof, ramp, or runway where there is no wall or guardrail system at least 39 inches (1.0 m) high.

“Walking/working surface” means any surface, whether horizontal or vertical on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, formwork and concrete reinforcing steel but not including ladders, vehicles, or trailers, on which employees must be located in order to perform their job duties.

“Warning line system” means a barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge, and which designates an area in which roofing work may take place without the use of guardrail, body belt, or safety net systems to protect employees in the area.

“Work area” means that portion of a walking/working surface where job duties are being performed.

Summary

Every rooftop job will be different and the fall protection system utilized will be as well. Types of systems are as follows:

- Warning Line Systems
- Safety Monitoring Systems
- Fall Restraint Systems
- Fall Arrest Systems

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