

ELEVATED WORK SURFACES & FALL PROTECTION

(For assistance, please contact EHS at (402) 472-4925, or visit our web site at <http://ehs.unl.edu>.)

When is fall protection needed?

This SOP provides general precautions for working at elevated heights. A fall arrest system may be required if an employee could fall from an elevated position. In general, employees must be protected from falls when working:

- At heights of six feet or more.
- On sloped roofs.
- Within six feet of the edge of flat roofs.
- On moving scaffolding, moving lifts, or buckets.
- At the edge of an excavation 6 feet (1.8 m) or more in depth when the excavation is not readily seen because of plant growth or other visual barrier.
- Above dangerous equipment.
- At any location where the supervisor believes that it would be safer to have fall protection.

What about falling objects?

Employees must be protected from falling objects that may originate from elevated working surfaces. Holes in elevated walking/working surfaces should be protected with covers to prevent people and tools or other items from falling. Covers must be of substantial construction capable of supporting twice the weight of people, materials, and equipment (including vehicles) that may be placed on it at any given time. Covers must be color coded or marked with the word "Hole" or "Cover" to provide warning of the hazard. Covers must be secured to prevent accidental displacement by wind, equipment, and people. When covers are not appropriate or applicable, toe-boards, screens, guardrails, canopies, barricaded exclusion zones at lower levels, or other means must be used to protect people from falling objects.

When toe-boards are used as falling object protection, they must be:

- Erected along the edge of the overhead walking/working surface for a distance sufficient to protect persons below.
- Capable of withstanding, without failure, a force of at least 50 pounds applied in any downward or outward direction at any point along the toe-board.
- A minimum of 3 1/2 inches in vertical height, have not more than 1/4 inch clearance above the walking/working surface, and have no openings of greater than 1 inch in greatest dimension.

Where tools, equipment, or materials are piled higher than the top edge of a toe-board, paneling or screening must be erected from the walking/working surface or toe-board to the top of a guardrail system's top rail or midrail, for a distance sufficient to protect persons below. Guardrail systems, when used as falling object protection, must have all openings small enough to prevent passage of potential falling objects.

What types of fall protection are adequate?

Usually, fall protection is provided through guardrails or personal fall arrest systems. See EHS SOP, **Personal Fall Arrest Systems**. Safety nets are also recognized by OSHA but are not used by UNL employees and therefore are not addressed in this SOP.

What general criteria are used to assess guardrail systems?

In general guardrail systems must have:

- A height of 39 to 45 inches with intermediate members no more than 19 inches apart.
- Midrails or vertical members midway between the top edge of the guardrail system and the walking/working level. If mesh is used instead it must extend the entire height.
- Adequate strength to withstand a force of at least 200 pounds applied within 2 inches of the top edge, in any outward or downward direction, at any point along the top edge.
- Surfaced as to prevent injury to an employee from punctures or lacerations, and to prevent snagging of clothing. Top rails and midrails shall be at least one-quarter inch (0.6 cm) nominal diameter or thickness to prevent cuts and lacerations.

A secured chain, gate, or removable guardrail section must be placed across the access opening between guardrail sections when used in hoisting operations and such operations are not immediately taking place.

Are there special provisions for working on low-sloped or flat roofs with unprotected sides?

If a roof is 50-feet or less in width and has a slope of 4 in 12 (vertical to horizontal), only a safety monitoring system is required. If a roof is greater than 50-feet in width, the following systems are recognized under the OSHA standards:

- Guardrail systems
- Safety net systems
- Personal fall arrest systems
- Warning line system in combination with a safety monitoring system

A "safety monitoring system" means a safety system in which a competent person is responsible for warning employees of fall hazards. OSHA defines a "competent person" as: *a person who is capable of identifying hazardous or dangerous conditions in the personal fall arrest system or any component thereof, as well as in their application and use with related equipment; and who has requisite authority to take prompt measures to*

eliminate hazards at the work site. OSHA defines a “warning line system” as “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, personal fall arrest, or safety net systems to protect employees in the area.”

What about fall protection plans?

In unusual circumstances, Fall Protection Plans can be developed and used in lieu of guardrails or personal fall arrest systems. This is usually limited to situations where use of a guardrail or personal fall arrest system is infeasible or creates more hazards than it protects against. A fall protection plan will generally incorporate one or more of the following protection measures: positioning device systems, warning line systems, controlled access zones, safety monitoring systems. Fall protection plans are subject to heavy scrutiny, must be site and job specific, are limited in application, and must be prepared by a qualified individual, among other requirements. OSHA defines a “qualified person” as *one with a recognized degree or professional certificate and extensive knowledge and experience in the subject field who is capable of design, analysis, evaluation and specifications in the subject work, project, or product, and who has requisite authority.*