

Fall Prevention & Protection in Roofing Webinar Q&A with the NRCA and OSHA

The following questions were submitted during the CPWR webinar Fall Prevention & Protection in the Roofing Industry, which can be viewed on-demand at <https://youtu.be/Rhurdh4h7vU>.

- 1. We know ladders are used for egress and for gaining access to different areas etc. and of course to “work from.” But I’m having problems understanding the requirements for working from a ladder. Specifically I’d like to know if you can stand on a ladder and work. So you’re over 6 feet high, you’re on a ladder standing, and let’s say drilling a hole or doing some wiring- do additional fall protection measures need to be taken? Should they? This never seems to get much coverage. Many of my workers always say OSHA says you can work from a ladder. I would say that doesn’t necessarily mean you’re being safe.**

OSHA: Neither the ladder standard (29 CFR 1926, subpart X) nor the fall protection standard (29 CFR 1926, subpart M) requires fall protection for workers while working on portable ladders.

<https://www.osha.gov/laws-regs/standardinterpretations/2000-01-13>

- 2. What guidance is there for small businesses - chimney sweeps, housepainters, gutter cleaners, etc.?**

OSHA: Resources for small businesses include:

- 29 CFR 1926
- 29 CFR 1910
- The OSHA Safety and Health Topics, Fall Protection Program - <https://www.osha.gov/SLTC/fallprotection/standards.html>
- Fall Prevention/Protection Publications - <https://www.osha.gov/pls/publications/publication.athruz?pType=Industry&pID=402>

- 3. How does a safety manager/supervisor on a roof measure the slope of a roof? It may be easy to determine during the construction, but what about roofs for buildings that have been in existence for quite a while?**

NRCA: Slope indicators can be purchased online from a variety of sources.

- 4. So what is the correct way or better way to climb a ladder, on the rung or on the siderail?**

NRCA: This is an important question and one that necessitates consideration from a couple of vantage points. The following issues are of concern: rungs use; siderail use; body balance while ascending/descending; proper use of terms (three points and two points of contact) during training; and the need for research on the aforementioned items. Our videos show that the body is balanced best when ascending or descending while using the rungs IF the climber is alternating use of left hand-right foot and right hand-left foot (this is two points of contact). However, our videos also show that body balance is maintained using both hands sliding up the siderails while ascending or descending (this is three points of contact). So, this creates a training conundrum with the conventional wisdom of “maintaining three-points of contact”.

Does this mean that OSHA and others suggest only using the siderails? We don't think so. However, such language can present a logic gap for those being trained because, as we show in our video, when attempting use of the rungs with three-points of contact, it is a very deliberate, awkward and unintuitive climb. NRCA believes that both methods of climbing (side rails and rungs) have their place depending on many factors, for example, cleanliness and use; however, each method requires proper use of these terms for training clarity. The concept of which method is safer, however, needs research.

5. What does the manufacturer say about side rail climbing?

NRCA: Werner (Keller) Ladder says, "Maintain a firm grip." Louisville Ladder says, "Keep your hands free when climbing." Michigan Ladder says, "Maintain a firm grip, use both hands in climbing." The ANSI standards on ladders state that a firm grip must be used when climbing or descending a ladder.

6. For low slope roofs.....safety monitoring for 50 ft or narrower. If you have a 300 ft wide but work area for that specific job is marked off less than 50ft. Use this?

NRCA: Under federal rules, the safety monitor may not be used alone in this situation. However, warning lines may be set up to demarcate a work area not encompassing the entire roof with lines on all sides of an area. Workers then are able to work inside that flagged area without other fall protection except for protection around holes and skylights.

7. What was the rule again for when a warning line needs to be 10' from the edge instead of 6?

NRCA: Warning lines must be set up 6 feet from the roof edge when no mechanical equipment is being used and 10 feet from the roof edge perpendicular to the movement of mechanical equipment and 6 feet from the roof edge parallel to the movement of mechanical equipment. So, the flags need to be an additional 4 feet in from the edge (4+6=10) when equipment like torch wagons, felt layers or gravel sweepers are moving toward or away from an edge.

8. When persons are working near an edge on a step ladder, how far away from the edge do they have to be according to the OSHA regulations?

OSHA: OSHA fall protection requirements for ladders are covered in 29 CFR 1926 Subpart X, Stairways and Ladders. OSHA does not provide a specific distance of how far a worker can perform a task from the edge on a step ladder. Also see OSHA Fact Sheet- "*Reducing Falls in Construction: Safe Use of Stepladders*" - <https://www.osha.gov/Publications/OSHA3662.pdf>, for safety tips.

CPWR: Additional precautions may be needed if you are subject to a fall.

9. Are you suggesting that we ALWAYS call 911 even if the worker does not get injured? What if they are rescued within minutes, meaning less than 3- minutes?

NRCA: Any incident in which a worker has fallen and been arrested by the personal fall arrest system requires medical attention to determine if the worker has suffered any physical consequences that may not be apparent to non-medical professionals.

10. Please explain the use of SRL's on scissors lifts that do not have a certified anchor. I see companies wanting their employees to tie off to handrails that are not rated.

OSHA: There are no current requirements by OSHA standards (1926.451 or §1926.452(w)), requiring personnel to be tied off or to wear a fall protection devices when working on scissor lifts with properly maintained guardrails.

<https://www.osha.gov/laws-regs/standardinterpretations/2005-11-29-0>

<https://www.osha.gov/laws-regs/standardinterpretations/2000-08-01-0>

11. How prevalent is the theory of Prevention Through Design or Design for Construction Safety (DfCS) in fall protection considerations?

See NRCA Safety Design Task Force document attached at the end of this document.

12. How can a worker determine if anchor can support at least 5,000-lbs. if it's not marked as such?

NRCA: OSHA requires personal fall arrest systems to be designed, installed and used under the supervision of a qualified person...a qualified person in this regard is someone with a recognized degree, certificate, professional standing or extensive knowledge training and experience who has successfully demonstrated the ability to solve problems related to fall protection anchor strength.

13. With steep slope anchors, such as the one pictured on the slide, how do workers ensure the point they drive the anchor into is appropriate? What is the selection process like prior to securing the anchor?

NRCA: A qualified person must follow manufacturer's instructions as to locating and fastening the anchor since that is how the strength of the anchor has been determined in their testing.

14. What part of the roof, specifically, is most commonly chosen as an anchor point?

NRCA: Generally, the anchor point should be a structural component such as a ridge beam, rafter or truss component. It is important that the anchor be set into the structure with the proper type and quantity of fasteners. (Under the supervision of a qualified person)

15. I've handled a couple of accident cases where workers fell while disengaging from one line and before hooking onto another SRL (e.g., getting off a ladder) or before getting on one. Any tips?

NRCA: The use of a double leg lanyard or other similar equipment that ensures a secondary connection prior to detaching the other line should offer greater protection.

16. Would a scaffold or built platform be considered a lower level?

OSHA: Yes. OSHA's definition of a Lower level 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.

17. With the statistics with ladders being so alarmingly high, does the speaker think protective helmets should be worn when working off ladders or using ladders? I have started wearing a Kask hard hat. Although it has a secured chin strap it is still only class 1.

NRCA: A hard hat ordinarily would provide limited protection from some hazards but following manufacturer's and OSHA's rules for ladder use should be a primary method of minimizing ladder fall risks if an alternative access method, like an interior stairway, is not available.

18. I know language has been a barrier and contributed in incidents/accidents. How are employers contributing with their employees in resolving this issue? Is every employer entitled to have someone that speaks same language labormen do?

OSHA: The employer's duty under the construction standards to train and instruct employees in how to comply with OSHA standards and to avoid hazards in the work environment necessarily means that employers must present information in a manner that employees are able to understand - <https://www.osha.gov/laws-regs/standardinterpretations/2010-07-26>.

19. There are a lot of buildings not using netting around the floors to prevent struck by hazards; should this be a requirement since this is a real issue in high wind conditions? Some contractors are proactive and already using this netting on job sites.

OSHA: Several OSHA Standards have requirements for dropped object protection. Debris netting is just one form of protection.

Examples:

[1910.28\(c\) - Protection from falling objects.](#)

[1926.451\(h\) - Falling object protection.](#)

[1926.501\(c\) - Protection from falling objects.](#)

[1926.759 - Falling object protection.](#)

20. In 1996 Ironworkers had a fatality rate of 85/100000, while roofers had a fatality rate of 31/100000. In 2018, Ironworkers were down to 24/100000, while roofers have gone up to more than 51/100000. To what do you attribute these changes?

NRCA: More detailed information regarding the specifics of every fall fatality is critical to perform a useful analysis of why falls occur and what can be done to prevent them.

21. What is OSHA's definition of residential construction?

From STD 03-11-002: <https://www.osha.gov/enforcement/directives/std-03-11-002> - For purposes of determining the applicability of section 1926.501(b)(13), the term "residential construction" is interpreted as covering construction work that satisfies the following two elements: (1) the end-use of the structure being built must be as a home, i.e., a dwelling; and (2) the structure being built must be constructed using traditional wood frame construction materials and methods. The limited use of structural steel in a predominantly wood-framed home, such as a steel I-beam to help support wood framing, does not disqualify a structure from being considered residential construction.

Building Design Elements for Enhanced Fall Protection for Construction and Maintenance Personnel: An NRCA Perspective

INTRODUCTION AND BACKGROUND

According to the U.S. Bureau of Labor Statistics, 969 construction workers were killed on the job during 2008 in the private construction industry in the U.S. Three hundred thirty two of those fatalities, nearly 35 percent, involved workers who were killed in falls. Of those 332 fatalities, 98 fell from a roof and 64 fell from ladders. Another 52 deadly falls were from scaffolds and staging. Every year, falls also produce a large number of crippling injuries.

In addition, direct costs of workplace falls are estimated by the Liberty Mutual Workplace Safety Index to be over \$11 billion per year in the U.S. with indirect costs related to the falls much more difficult to determine but likely as significant. Also significant is the fact buildings' interiors are mandated by codes to protect building occupants from falls from balconies, walkways and stairwells in buildings. Design of life-safety requirements currently stops below the roof level, and rooftops ordinarily are designed as "unoccupied" spaces. However, it is the more responsible design approach to treat a rooftop as space that will have frequent worker and public presence. This will be even more critical as vegetative roof systems, rooftop photovoltaic systems, decorative lighting and other emerging rooftop technologies place workers on rooftops throughout a building's life and formerly restricted-access areas are opened to additional maintenance personnel and public traffic.

To address these issues, NRCA created this document to elevate the level of safety and improve the standard of care for construction and maintenance personnel *during* the construction process and make rooftops safer for people who maintain roof systems, roof-mounted equipment and exterior walls *after* a construction project is complete. It is NRCA's hope that a collaborative effort among industry stakeholders can develop ways to reduce roofing-related injuries and deaths.

NRCA RECOMMENDATIONS

The following items are desirable when designing structures to provide fall-prevention measures. NRCA realizes not all recommendations can be implemented on existing structures but should be designed into new construction projects. The items listed provide the safest possible environment for construction and maintenance personnel. NRCA's goal is to partner with the National Institute for Occupational Safety and Health (NIOSH) and other agencies and organizations to

further safety-in-design initiatives and save lives by discussion and implementation of these recommendations.

Design and installation of parapet walls, permanent guardrails and fixed anchor points require professional engineering tailored to the specific installation. Regular inspection and maintenance of fall-protection components must be incorporated into the overall design and implementation process.

Perimeter Fall Protection

Parapet walls—Corresponding to the Occupational Safety and Health Administration’s (OSHA’s) definition of an “unprotected side or edge” in 29 CFR 1926.500(b), NRCA recommends design and installation of parapet walls at a minimum of 39 inches above a *finished* roof surface at all outside roof perimeters or edges. Parapets for public access areas may require additional structural or design elements under the applicable building code.

Guardrails—NRCA recommends fixed, permanent guardrails with midrails where no parapet wall exists or the structural design or aesthetics do not allow installation of parapet walls. Guardrails may be attached to a building’s exterior walls or the interior structure if feasible. Guardrails for worker protection should be a minimum of 39 inches above the finished roof surface and include midrails.



Permanent guardrail and parapet protecting rooftop terrace

Fixed anchor points for fall-protection devices—Where aesthetics are paramount and parapet walls or guardrails are not desirable, engineered, fixed (permanently anchored to the facility structure or structural roof deck) anchor points should be installed to provide a readily available fixed anchor for personal fall-protection equipment. These systems typically are installed at the time of installation of the structural components affording a protective system for roof deck installation, roofing work, HVAC installation and other work. Careful consideration must be given to anchor locations to allow convenient worker tie-off for complete rooftop fall-protection coverage.



Assorted fall protection anchors designed for permanent installations

Roof Access

Interior roof access—Penthouse access is preferred with permanent stairs and door access onto a roof at a location at least 10 feet from roof edges or skylights. The door should be oriented to direct access away from roof edges. Another access preference is a fixed interior ladder with an inclined design, similar to ships ladders, or an OSHA-compliant safety cage on vertical fixed ladders 12 feet tall or higher. Interior ladders should have adjacent rope and pulley assemblies to provide safe means to get tools and equipment from the floor to a roof. Interior roof hatchway and doorway areas should be illuminated to provide sufficient light to operate locks and latches.

Roof hatches—NRCA recommends roof hatch installation a minimum of 10 feet from a roof perimeter. Hatch orientation should direct traffic away from a roof edge or perimeter. Hatches equipped with inclined or ships ladders are preferred over fixed vertical access ladders. Interior roof hatchway areas should be illuminated to provide sufficient light to operate locks and latches.



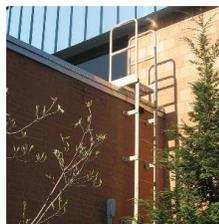
Ships ladder access to roof hatch

Guardrails at roof hatches—NRCA recommends fixed, permanent guardrails adjacent to roof access hatches to provide stable hand-hold to access roofs.



Roof hatches with permanent guardrails

Exterior access—An external steel staircase is the preferred means of access if interior access by penthouse, hatch or other means is not available. Exterior fixed ladders should have an OSHA-compliant safety cage that must meet or exceed OSHA regulations where ladders are 12 feet tall or higher. Ladders should have solid platforms at their highest points, handrails and rungs on both sides of parapet walls where applicable. The bottom rung of ladders should be no greater than 18 inches above a finished roof surface. Ladders should be securely anchored to elevation and/or parapet walls. Exterior access ladders also should be a minimum of 10 feet from adjacent roof edges or perimeters to provide a safe access environment.



Exterior staircase and fixed ladders for roof access

Roof Skylights

Grates at skylights—NRCA recommends a minimum 6- by 6-inch metal grid welded into the structural framing is recommended for skylight openings. Such a grid should be capable of supporting twice the maximum intended load to provide fall prevention before and after a skylight is installed and also may serve a dual purpose as a component of burglar protection for the building. If large skylights are present or an interior grate is not desirable, exterior metal grates or structural glass panels for the skylight in combination with fixed anchor points adjacent to skylight curbs is recommended.



Exterior and interior skylight fall protection

Steep-slope Fall Protection

Fixed anchor points in steep-slope assemblies—Engineered, fixed (permanently anchored to a facility structure) anchor points should be installed near the ridge of steep-slope roof systems to provide a readily available fixed anchor for personal fall-protection equipment. If steep-slope roof systems are installed at mansards, fixed anchor points should be installed on the adjacent low-slope roof system and anchored permanently to the structure or structural roof deck. NRCA also recommends permanent, fixed anchor points around chimneys for maintenance purposes.



Fall protection anchors designed for permanent steep-slope installations

Roof Hoist Conditions

Permanent equipment hoist. When materials and equipment are frequently hoisted to a roof surface for maintenance, service or repair work, a permanent equipment hoist with guardrail and gate is recommended. Such a system may include engineered, fixed (permanently anchored to a facility structure) hoist supports; fixed guardrails with an inside-swinging gate; and a permanent, engineered fixed anchor point for attaching personal fall-arrest system for personnel working at hoists.



Integrated guardrails for permanent equipment hoist

Flashings for all the recommended items (where applicable) can be found in the construction details in the current NRCA Roofing Manual.

Requirements for many fall-protection systems and components can be found in OSHA Construction Industry Regulations, 29 CFR 1926.500-503 and ANSI/ASSE Z359.1-2007 Fall Protection Code.

CONCLUSION

There are many initiatives in the construction industry to improve safety for construction and maintenance personnel. Design in new construction is the responsibility of architects and engineers. The responsibility for design in roof system restoration and replacement projects may fall on the aforementioned entities but also on building owners, roof consultants or roofing contractors. Obviously, all these partners in the construction industry are stakeholders in designing for safety.

During a building's life cycle, many other entities may use the roof for maintaining mechanical equipment, inspections, modifications, etc., and each employer remains responsible for providing fall protection for his or her workers. Implementation of these recommendations will benefit all workers on rooftops, not just professional roofing contractors and their employees.

Roofing contractors bear the responsibility to provide personal protective equipment and appropriate training to their personnel for fall prevention, but the U.S. construction industry now needs to improve its standards similar to those of the Temporary or Mobile Construction Site Directive, 1992, which the European Commission, the European Union's executive body, enacted. The directive places responsibility for construction safety on designers and building owners, as well as contractors.