



Reducing Falls During Residential Construction: Roof Repair

Residential roof repair requires workers to operate on existing, largely intact roofs. These roofs are rarely designed with fall protection in mind, so roofers making repairs must plan ahead and take steps to reduce the risk of falls. This fact sheet describes several fall protection methods that contractors can incorporate into roof repair jobs so that roofers can work safely.

Risks During Roof Repair

Roofers typically work at heights that put them at risk for falls. Workers making roof repairs face the same hazards, but they can be at increased risk if the roof shows signs of lost integrity or if they are uncertain how to use fall protection on a roof that is already weatherproofed. The employer shall provide a training program for each worker who might be exposed to fall hazards. The program shall enable each worker to recognize the hazards of falling and shall train each worker in the procedures to be followed in order to minimize these hazards. For fall protection training requirements, refer to 29 CFR 1926.503. In all cases, employers must evaluate the hazards and take measures to reduce the risk of falls. For patching and repair jobs, roofers have several options, including scaffolding, aerial lifts and various types of conventional fall protection. The best choice depends on where the repair is needed and on the type of building.

How to Reduce Risk

Structural Integrity

Employers must determine the structural integrity of the roof and take all necessary precautions to protect the workers before repairs begin. If workers notice signs of structural deterioration (e.g., dry rot) as old weatherproofing is removed, a competent person should evaluate the area.

At the Roof's Edge

Access from stable platforms: When the damaged section of roof is along an edge, a roofer can work from a scaffold or aerial lift. Regardless of the condition of the roof, this equipment provides safe, stable work platforms from which the worker can reach the area to be repaired.

Lifts: Depending on the building layout and the tasks involved, lifts (e.g., scissor, aerial) may be an option for roofing work near the edge. Lifts provide stable, elevated platforms from which workers can operate safely. For small tasks, aerial lifts might be more efficient than installing scaffolds. Plus, aerial lifts are a practical way to get to a customized height above or below the roof level. Care must be taken when loading material. Do not overload the lift. For more information on the safe operation of aerial and scissor lifts, refer to 29 CFR 1926.453, Aerial Lifts and 29 CFR 1926.452(w), Mobile Scaffolds.

Scaffolds: When properly constructed and used, external scaffolds can provide suitable protection for roof repairs along the edge of the roof. Pumpjack scaffolds offer a secure platform from which to work and can be raised and lowered for specific tasks, such as working from underneath the eaves. Guardrails installed along the open side of the scaffold provide fall protection. For other requirements for scaffolds, refer to 29 CFR 1926 Subpart L-Scaffolds.

Working Higher Up on the Roof

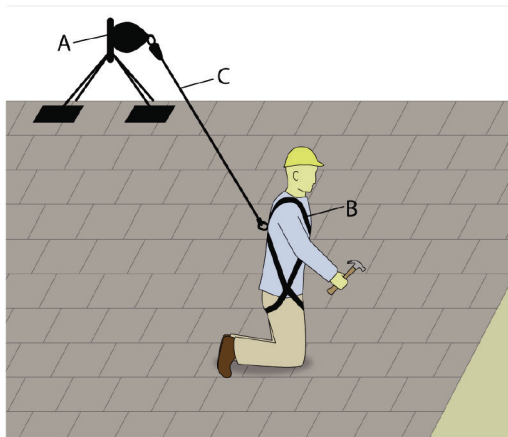
Scaffolds: When working farther up on the roof and beyond arm's reach, scaffolds can still provide fall protection if they are properly constructed. The top rail may have to extend higher than 45 inches above the roof surface to adequately protect workers from falls. For other requirements on how to build a secure scaffold, refer to the 29 CFR 1926 Subpart L – Scaffolds.

Personal Fall Arrest System (PFAS): A PFAS is another tool available to roofers during repair jobs. In fact, a PFAS is usually the system of choice for most roofers. A breakdown in any of these parts could be disastrous for a worker.

Personal Fall Arrest System (PFAS)

A PFAS is designed to safely stop a fall before the worker strikes a lower level. It includes three major components:

- A. An anchorage to which the other components of the PFAS are rigged.
- B. A full body harness worn by the worker.
- C. A connector, such as a lanyard or lifeline, linking the harness to the anchorage. A rip-stitch lanyard, or deceleration device, is typically a part of the system.



For more information on the requirements for a PFAS, refer to 29 CFR 1926.502(d).

Remember that for fall arrest systems, workers must use full-body harnesses. Body belts can cause serious injury during a fall and so OSHA prohibits their use as part of fall arrest systems.

Installing, Finding and Using Anchors

Unlike other roofing jobs, patching and repair involves otherwise intact roofs. Selecting a location to install an anchor is a critical step in avoiding a fatal fall. An anchor gives the worker a secure point to tie off the lifeline for a fall arrest system. Most of the time, existing residential roofs will not have permanent anchors available for use as fall protection. However, a qualified person should survey the roof to confirm that this is the case. An anchor for a fall arrest system must meet the 5,000-pound strength requirement or maintain a safety factor of at least two (twice the impact load) under supervision of a qualified person [29 CFR 1926.502(d)(15)].

Identifying existing anchors: Inspect the ridge cap and last rows of shingles for permanently installed anchors. This activity should be performed from ground level. If present, these may be fastened to the top chord or other frame part during construction. Anchors could also have been installed with the original roof, using a lowprofile style sometimes painted to match the roof color (making it less obvious from the ground).

When available, existing anchors might be effective points for a worker to tie off. Before using them as tie-off points, have a qualified person inspect them to make sure they can support

the weight of a falling worker. The qualified person should make sure that the anchor is solid, unbent, and well-fixed into the wood frame below. See 29 CFR 1926 Subpart M, Appendix C, for guidance about testing anchorage points.

Existing anchors are rare, but they may become more common as builders embrace practices that “design out” safety hazards. In its *Prevention Through Design* program, the National Institute for Occupational Safety and Health (NIOSH) promotes construction practices that minimize risks to workers early in the design process.



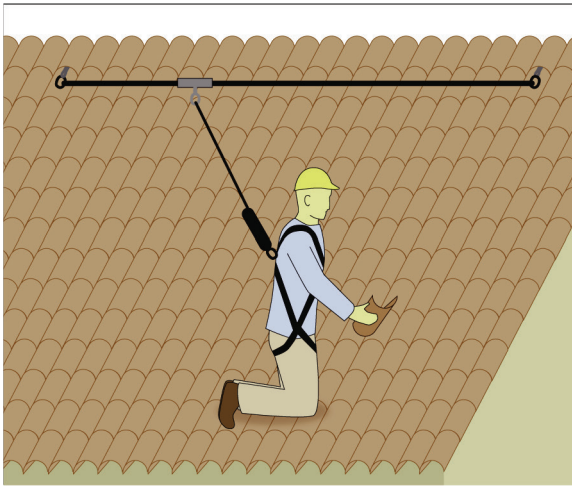
Retrofit with anchors: If the roof was not fitted with permanent anchors, employers can install them as the first phase of the job. This retrofit process should be planned so that the roof remains intact and does not leak after the job is completed. It will likely be necessary to replace an additional shingle or reset a couple shingles or tiles. *If attaching a new anchor, roofers must fix it to the truss or rafter structure underneath. Roof sheathing does not provide enough support by itself.*

Always follow the manufacturer's instructions, or consult a professional engineer, for proper installation. Here are some anchor options that could be used, depending on the roof design:

- **Peak anchor:** At the apex of the roof, peak anchors are typically solid, unmoving pieces secured to the trusses underneath.
- **Permanent D-rings:** Inexpensive D-ring anchors attached to the truss frame that can be removed after the job is done, or left permanently on the roof.

Consider the anchor location: Depending on the roof design, some roofers choose the peak of the roof, directly over a truss. There, it will be above the worker and it will be easy to replace a small section of the ridge cap if the anchor is removed when the job is complete. Always follow the anchor manufacturer's installation instructions. See 29 CFR 1926 Subpart M, Fall Protection, for more information and additional requirements for anchor installation and use.

Add anchor points: Depending on the size of the repair job and the number of workers who need to be on the roof, it might be necessary to install more than one anchor. An engineered horizontal lifeline is another way to increase the area in which a worker is protected. The system should be installed following the manufacturer's instructions or under the supervision of a qualified person.



Leave anchors in place: Where practical, consider leaving roof anchors in place. It will make the current job simpler and reduce the burden for roofers in the future.

Safe Roof Repair – Important Steps

- Before beginning the job, focus on identifying fall protection needs.
- Guard against falls through skylights or other roof openings. Use a guardrail system, PFAS or protective cover that will support two times the weight of a worker.
- If necessary to protect workers below from falling debris, set up a work zone while roofers remove old roofing materials from the repair area.
- Workers should be careful of air hoses and power cords for nail guns and other electrical equipment. If a worker steps on one, hoses and cords can slip underfoot and lead to falls.
- Remember to place any removed shingles or replacement tiles in a safe location. If unsecured, these materials can visually blend in against the roof and create a dangerous trip hazard.
- New materials staged on the roof should be placed so that they are safe and secure.

Written Fall Protection Plans

If the employer does not use ladders, scaffolds, or aerial lifts, and can demonstrate that it is not feasible or would create a greater hazard to use conventional fall protection equipment (guardrails, safety nets, or PFAS) when working at heights of 6 feet or greater, the employer must develop a written site-specific fall protection plan in accord with 29 CFR 1926.502(k). The plan must be prepared by a qualified person as defined by 29 CFR 1926.32(m). This person could be the owner, the supervisor, or a worker who has extensive knowledge, training and experience with fall protection and is able to solve problems relating to fall protection. States with OSHA-approved State Plans may have additional requirements for written fall protection plans.

The site-specific fall protection plan must document at each location why the use of conventional fall protection equipment is not feasible or will create a greater hazard. The plan must also describe the alternative methods that the employer will use so that workers are protected from falls. Workers and their supervisors must be trained on the proper use of those other fall protection methods.

Conventional fall protection equipment can reduce or eliminate the chances of a fatal fall. Written sitespecific fall protection plans ensure that protection continues, even when conventional fall protection methods are determined to not be feasible.

OSHA Standard:
29 CFR 1926 Subpart M – Fall Protection

Available online at
www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10922.

OSHA Residential Fall Protection Web Page:
www.osha.gov/doc/topics/residentialprotection/index.html.

OSHA Compliance Guidance:
Compliance Guidance for Residential Construction – STD 03-11-002 (dated 12/16/2010)

Available online at
www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=DIRECTIVES&p_id=4755.

State Plan Guidance: States with OSHA-approved state plans may have additional requirements for Residential Roofing. For more information on these requirements, please visit:
www.osha.gov/dcsp/osp/statestandards.html.

Help for Employers: OSHA's On-site Consultation Program offers free and confidential advice to small and medium-sized businesses in all states across the country, with priority given to high-hazard worksites. On-site Consultation services are separate from enforcement and do not result in penalties or citations. Consultants from state agencies or universities work with employers to identify workplace hazards, provide advice on compliance with OSHA standards and assist in establishing injury and illness prevention programs. To locate the OSHA Consultation Program nearest you, call 1-800-321-OSHA (6742) or visit www.osha.gov/dcsp/smallbusiness/index.html.

Almost every OSHA area office has a Compliance Assistance Specialist to assist employers in complying with OSHA standards. To find the Compliance Assistance Specialist nearest you, call 1-800-321-OSHA (6742) or visit:
www.osha.gov/html/RAmap.html.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

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