

Personal Fall Protection Systems Fact Sheet

HS04-027C (12-21)

Falls are among the most common causes of serious work-related injuries and deaths in America.¹ In 2020, the [U.S. Bureau of Labor Statistics](#) reported 805 deaths and nearly 257,000 injuries as a result of job-related falls, slips, and trips.^{2,3} Of those, more than one-third of the injured employees missed more than 31 days of work.⁴



The [Occupational Safety and Health Administration](#) (OSHA) requires employers to set up the workplace to prevent employees from falling off of overhead platforms, elevated workstations, and into holes in floors and walls. It is an employer's responsibility to provide fall protection to employees working at elevations at or above:

- **4 feet in general industry;**
- **5 feet in shipyards;**
- **6 feet in the construction industry; and**
- **8 feet in longshoring and offshore operations.**

OSHA also requires that employers provide fall protection when employees are working over dangerous equipment and machinery -- such as a vat of acid or a conveyor belt -- regardless of the fall distance.⁵

What are personal fall arrest systems (PFAS)?

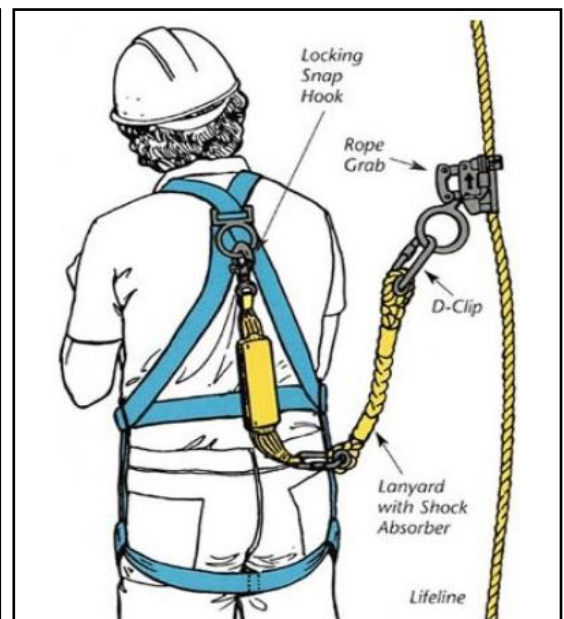
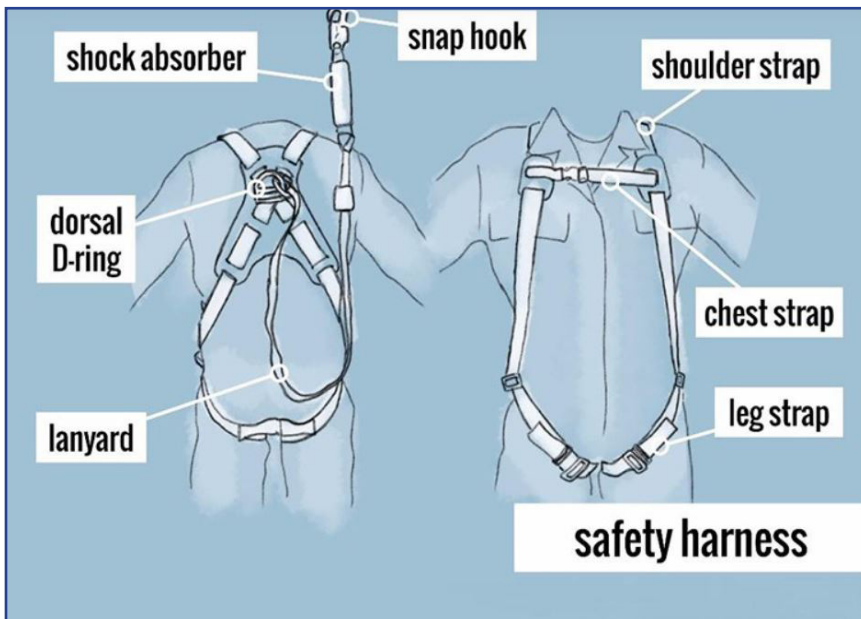
There is an important difference between **fall arrest** and **fall restraint** safety systems. **A fall arrest system stops someone in the**

process of a fall, while a fall restraint system keeps a person from reaching the edge where a fall might occur.⁶

A PFAS is used to arrest an employee's fall from a working level. It consists of an anchorage or a series of anchor points, connectors, a harness, a lanyard, and possibly a [deceleration device](#), lifeline, or some combination of all of these. Some jobs -- such as climbing a ladder on a communications tower -- may require employees to wear two lanyards: one at the point the employee is moving toward and the other at the point where he or she is moving from. By not disconnecting the previous point until the new point is hooked, employees are ensured constant fall protection.

Full Body Harness

A full-body harness is required as part of a PFAS. Safety harnesses distribute the impact of a fall through the thighs and buttocks. Safety belts (waist belts) are no longer permitted for use as PFAS equipment in construction and general industries, only as a positioning device.⁷ In a fall, safety belts can cause serious damage to the spleen, pancreas, and other internal organs.⁸



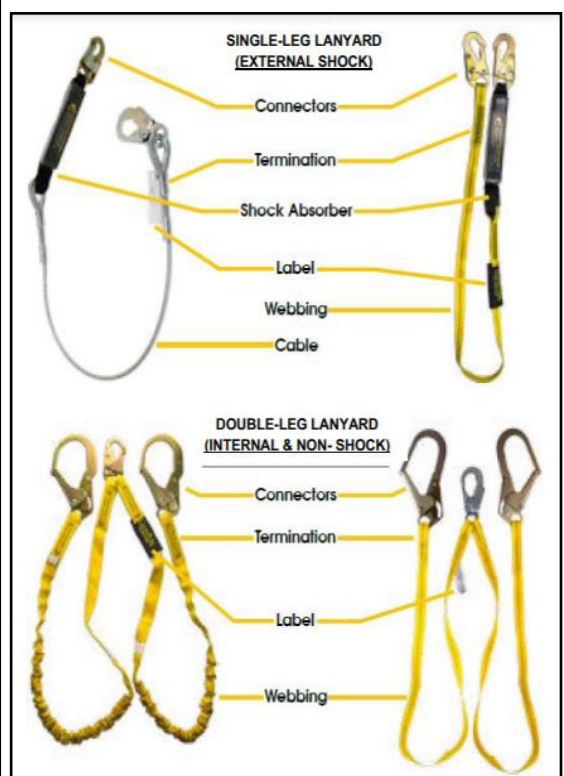
Lanyards⁹

A lanyard connects the harness directly to an anchorage or horizontal lifeline. They should be either rope or synthetic web straps manufactured for that sole purpose. Lanyards with a deceleration device, such as a [rope grab](#), should be a minimum of one-half-inch diameter nylon rope or equivalent with a 5,000-pound breaking strength.¹⁰ Shock absorbers on lanyards are not mandatory but are strongly recommended.^{11,12}

Anchorage

According to [OSHA regulation](#), anchor points must be “capable of supporting at least 5,000 pounds...per employee attached; or designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall protection system that maintains a safety factor of at least two...”¹³ (meaning capable of supporting twice the impact load – the force delivered -- of a falling employee).¹⁴

Always follow the anchor manufacturer’s instructions or consult a qualified person when installing anchors to ensure they are strong enough to hold the sudden force of a falling worker.





Deceleration Devices and Rope Grabs

A deceleration device is any mechanism, such as a rope grab, rip-stitch lanyard, specially woven lanyard, tearing or deforming lanyard, or automatic self-retracting lifeline, which serves to scatter a large amount of energy during a fall arrest.¹⁵ A mechanical rope grab is used to attach lanyards to vertical lifelines. Most rope grabs employ a device that locks on the lifeline when the lanyard is sharply tugged or pulled.¹⁶ Rope grabs must be installed in the right direction. Most rope grabs are marked with an arrow to show the correct position.

Shock Absorbers

Shock absorbers are always strongly recommended, especially when using wire rope lifelines. Shock absorbers can reduce fall-arrest loads by as much as 50%.¹⁷

Some shock absorbers are built into the lanyard. Most are made of webbing material with tear-away stitching designed to gradually absorb a fall-arrest load. The tear-away type also indicates that a fall arrest has occurred,

and the system should be replaced. This results in better quality control for field equipment. Any fall arrest component involved in a fall should be taken out of service to prevent reuse.

Lifelines¹⁸

Because people can fall horizontally – on the level they are working – or vertically – between two different levels -- fall arrest protection needs to be handled in different ways. Therefore, there are specific requirements for each type of fall as defined by OSHA and the [American National Standards Institute \(ANSI\) Z359.0](https://www.nsis.org/standards/ansi-z359.0).

- **Vertical lifelines** must be capable of sustaining a 5,000-pound load used by only one worker at a time. It must be long enough to reach the ground or a safe landing level above ground. In addition, it must be knotted at the bottom to prevent the grab rope from sliding off the end anchored to a fixed support. The anchor must

also be capable of sustaining a 5,000-pound load.

- **Horizontal lifelines**, when engineered as part of a PFAS, are a way to increase the area where an employee can safely work. These lifelines should be installed following the manufacturer's instructions and under the supervision of a qualified person. They must be designed to maintain a safety factor of at least two (twice the impact load). For requirements for horizontal lifelines, refer to OSHA's 29 Code of Federal Regulations (CFR) [1926.502\(d\)\(8\)](#).



Care and Maintenance

To ensure maximum protection from a safety harness – as with all personal protective equipment (PPE) – employees must inspect it, maintain it, and wear it. While fall protection harnesses are not designed for comfort, they save lives.

Before each use, employees should inspect the harness according to the manufacturer's guidelines to ensure there are no defects. They should look for any:

- frays, cuts, or damage;
- burns from welding spatter or sparks;
- worn or missing grommets;
- damage or distortion to buckles;
- distortion or sharp edges on buckle rollers;
- breaks, cracks, or rough edges on D-rings; and
- cracks and burns on rivets.

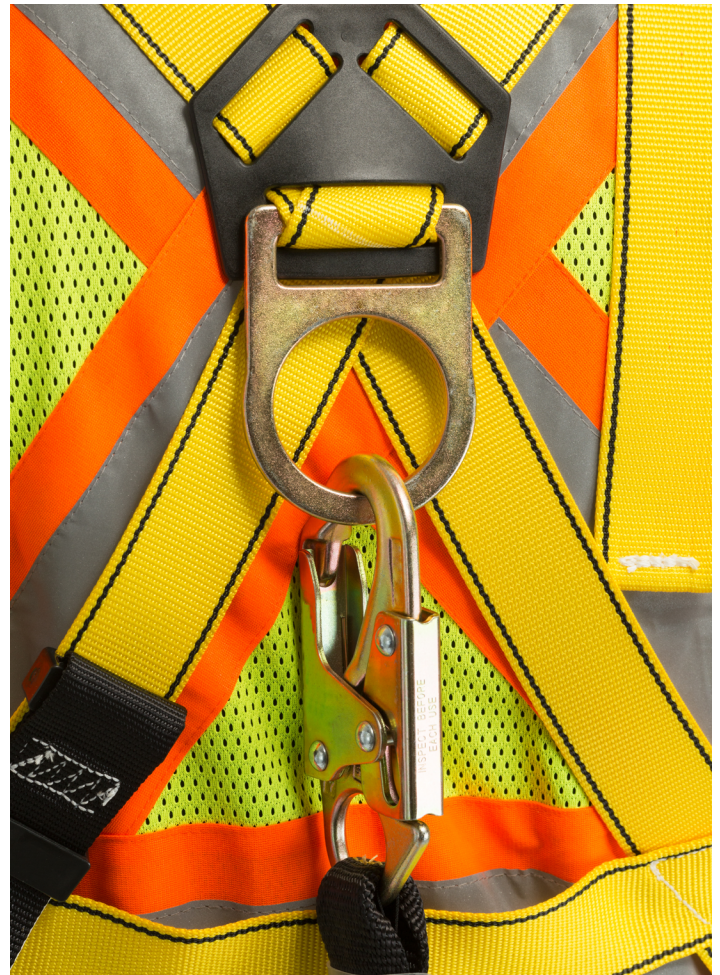
As with all other portions of the device,

lanyards should be inspected end-to-end before each use. Look for:

- burns and for worn, broken, or cut fibers;
- distortion, cracks, corrosion, or pitted surfaces on the snap hook and eye sections of the connectors; and
- proper seating and tension in all latches.
- If any part of the system fails inspection, remove it from service immediately.

Proper care of a PFAS can prolong the life of the unit and increase its safety performance.

- Do not allow acids, caustics, or other corrosive materials to come in contact with fall protection devices, lanyards, or lifelines.
- Avoid dropping devices on the ground.
- Keep devices away from sharp tools or objects.
- Do not cut or punch extra holes in the device, which can weaken it and void the manufacturer's warranty.
- Never use gasoline or other drying solvents on any harness.
- Avoid using products that contain ingredients such as Neatsfoot oil, which may degrade the stitching. Instead, lightly coat leather products with leather conditioner such as saddle soap. For fabric harnesses, use only the special dressing recommended by the manufacturer.
- Store all harnesses in separate, dry compartments or hang them up to prevent damage.
- Proper storage after use can be as important as cleaning the equipment



of dirt or contaminants. Keep storage areas clean, dry, and free of exposure to fumes or corrosive elements.

With proper use, inspection, care, and maintenance, a PFAS can keep employees safe and injury-free.

Safety training instructors at the Texas Department of Insurance, Division of Workers' Compensation (DWC) are available to provide customized employee fall protection training. Instructors are available at safetytraining@tdi.texas.gov or 800-252-7031, option 2.

This publication was produced in cooperation with DWC; OSHA; the Latino Worker Resource Center; and other authoritative sources. For more information on fall protection, download or stream any of DWC's [free safety publications](#) or [workplace safety videos](#).

References

- ¹ Occupational Safety and Health Administration, "Fall Protection," Website. <https://www.osha.gov/fall-protection>. Accessed January 25, 2022.
- ² U.S. Bureau of Labor Statistics, "National Census of Fatal Occupational Injuries in 2020." Website. <https://www.bls.gov/news.release/pdf/cfoi.pdf>. Accessed February 2, 2022.
- ³ U.S. Bureau of Labor Statistics, Occupational Injuries/Illnesses and Fatal Injuries Profiles, Number of nonfatal occupational injuries and illnesses involving days away from work by selected worker and case characteristics and even or exposure, All U.S., all ownerships, 2020. Website Database. <https://data.bls.gov/gqt/InitialPage>. Accessed February 2, 2022.
- ⁴ U.S. Bureau of Labor Statistics, Occupational Injuries/Illnesses and Fatal Injuries Profiles, Number of nonfatal occupational injuries and illnesses involving days away from work by selected worker and case characteristics and even or exposure, All U.S., all ownerships, 2020. Website Database. <https://data.bls.gov/gqt/InitialPage>. Accessed February 2, 2022.
- ⁵ Occupational Safety and Health Administration, "Fall Protection," Website. <https://www.osha.gov/fall-protection>. Accessed January 25, 2022.
- ⁶ Simplified Safety, "What are the Key Differences Between a Fall Arrest and Fall Restraint System?" Web Blog. <https://simplifiedsafety.com/blog/differences-between-fall-arrest-and-fall-restraint/>. Accessed January 26, 2022.
- ⁷ Occupational Safety and Health Administration, "Fall Protection Part 2 of 2." PowerPoint Presentation. Web. https://www.osha.gov/sites/default/files/2018-11/fy14_sh-26315-sh4_FallPreventionEnglishPart2of2.pptx. Accessed January 25, 2022.
- ⁸ Occupational Safety and Health Administration, "Fall Protection Part 2 of 2." PowerPoint Presentation. Web. https://www.osha.gov/sites/default/files/2018-11/fy14_sh-26315-sh4_FallPreventionEnglishPart2of2.pptx. Accessed January 25, 2022.
- ⁹ Occupational Safety and Health Administration, "Fall Protection Part 2 of 2." PowerPoint Presentation. Web. https://www.osha.gov/sites/default/files/2018-11/fy14_sh-26315-sh4_FallPreventionEnglishPart2of2.pptx. Accessed January 25, 2022.
- ¹⁰ Occupational Safety and Health Administration, "Fall Protection Part 2 of 2." PowerPoint Presentation. Web. https://www.osha.gov/sites/default/files/2018-11/fy14_sh-26315-sh4_FallPreventionEnglishPart2of2.pptx. Accessed January 25, 2022.
- ¹¹ Occupational Safety and Health Administration, "Fall Protection Part 2 of 2." PowerPoint Presentation. Web. https://www.osha.gov/sites/default/files/2018-11/fy14_sh-26315-sh4_FallPreventionEnglishPart2of2.pptx. Accessed January 25, 2022.
- ¹² Occupational Safety and Health Administration, Standard Interpretations: Shock absorbing lanyards are not mandatory. Webpage. <https://www.osha.gov/laws-regs/standardinterpretations/1998-06-03>. Accessed February 2, 2022.
- ¹³ Occupational Safety and Health Administration Standard 1910.140. Website. <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.140>, Accessed January 27, 2022.
- ¹⁴ Huntington, D., March 01, 2018. "Do You Really Need a 5,000-Pound Anchor Point to Satisfy OSHA?" Occupational Health & Safety. Webpage. <https://ohsonline.com/Articles/2018/03/01/Do-You-Really-Need-5000Pound-Anchor-Point.aspx#:~:text=If%20we%20look%20at%20the,huge%20difference%20from%205%2C000%20pounds>. Accessed January 27, 2022.
- ¹⁵ Occupational Safety and Health Administration Standard 1915.151. Website. <https://www.osha.gov/laws-regs/regulations/standardnumber/1915/1915.151>. Accessed January 27, 2022.
- ¹⁶ Occupational Safety and Health Administration, "Fall Protection Part 2 of 2." PowerPoint Presentation. Web. https://www.osha.gov/sites/default/files/2018-11/fy14_sh-26315-sh4_FallPreventionEnglishPart2of2.pptx. Accessed January 25, 2022.
- ¹⁷ Occupational Safety and Health Administration, "Fall Protection Part 2 of 2." PowerPoint Presentation. Web. https://www.osha.gov/sites/default/files/2018-11/fy14_sh-26315-sh4_FallPreventionEnglishPart2of2.pptx. Accessed January 25, 2022.
- ¹⁸ Occupational Safety and Health Administration, "Fall Protection Part 2 of 2." PowerPoint Presentation. Web. https://www.osha.gov/sites/default/files/2018-11/fy14_sh-26315-sh4_FallPreventionEnglishPart2of2.pptx. Accessed January 25, 2022.



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1-800-252-7031, Option 2

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