HBACA Builder Safety Committee

Fall Protection Safety Initiative

May 2024

Initiative & Stand Down Kit

The HBACA is excited to announce that May is Fall Protection Safety Month. All builders and trade partners are able to join in Valley wide Safety Stand Down events the week of May 6, 2024. In addition, feel free to break out the training topics throughout the month.

Distribution Network

HBACA member field employees and their trade partners. Builders are encouraged to distribute these accordingly and organize brief safety meetings/discussion sessions throughout their communities.

Elements of the Kit:

Tool Box #1: Fall Protection Requirements

Tool Box #2: Fall Distance and Swing Fall

Tool Box #3: Fall Protection Serviceability

HBACA
Home Builders Association of Central Arizona

Learn more at www.hbaca.org

HBACA Builder Safety Committee

Fall Protection Safety

Initiative & Stand Down Kit - May 2024

Suggested Discussion Materials, Action Items and Event Schedule

Fatal Four

Out of 5,486 worker fatalities in private industry in calendar year 2022, Workers in construction and extraction occupations had the second most fatalities (1,069) in 2022 compared to other occupation groups. The fatality rate for this occupation group increased from 12.3 deaths per 100,000 FTE workers in 2021 to 13.0 in 2022.

The leading causes of private sector worker deaths (excluding highway collisions) in the construction industry were falls, followed by struck by object, electrocution, and caught-in/between. These "Fatal Four" were responsible for more than half (57 %) of the construction worker deaths in 2022, BLS reports.

Eliminating the Fatal Four would save 609 workers' lives in America every year.

- Falls – 406.22 (38%)
- Struck by Object – 85.52 (8%)
- Electrocutions – 64.14 (6%)
- Caught-in/between* – 53.45 (5%)

(BLS Census 2022)

Tool Box #1: Fall protection requirements

Tool Box #2: Fall Distance and Swing fall

Tool Box #3: Fall Protection Serviceability

OSHA® FactSheet

Fall Protection in Residential Construction

The United States Department of Labor's Occupational Safety and Health Administration (OSHA) has issued a directive rescinding the Interim Fall Protection Compliance Guidelines for Residential Construction (STD 03-00-001).

Before issuance of this new directive, STD 03-00-001 allowed employers engaged in certain residential construction activities to use specified alternative methods of fall protection (e.g., slide guards or safety monitor systems) rather than the conventional fall protection (guardrails, safety nets, or personal fall arrest systems) required by the residential construction fall protection standard (29 CFR 1926.501(b)(13)). Employers could use the alternative measures described in STD 03-00-001 without first proving that the use of conventional fall protection was infeasible or created a greater hazard and without a written fall protection plan.

With the issuance of the new directive, all residential construction employers must comply with 29 CFR 1926.501(b)(13).

- Residential construction employers generally must ensure that employees working six feet or more above lower levels use guardrails, safety nets, or personal fall arrest systems. A personal fall arrest system may consist of a full body harness, a deceleration device, a lanyard, and an anchor point. (See the definition of "personal fall arrest system" in 29 CFR 1926.500.)
  - Other fall protection measures may be used to the extent allowed under other provisions of 29 CFR 1926.501(b) addressing specific types of work. For example, 1926.501(b)(10) permits the use of warning lines and safety monitoring systems during the performance of roofing work on low-sloped roofs.
  - OSHA allows the use of an effective fall restraint system in lieu of a personal fall arrest system. To be effective, a fall restraint system must be rigged to prevent a worker from reaching a fall hazard and falling over the edge. A fall restraint system may consist of a full body harness or body belt that is connected to an anchor point at the center of a roof by a lanyard of a length that will not allow a worker to physically reach the edge of the roof.
- If the employer can demonstrate that use of conventional fall protection methods is infeasible or creates a greater hazard, it must ensure that a qualified person:
  - Creates a written, site-specific fall protection plan in compliance with 29 CFR 1926.502(k); *and*
  - Documents, in that plan, the reasons why conventional fall protection systems are infeasible or why their use would create a greater hazard.

The new directive interprets "residential construction" as construction work that satisfies both of the following elements:

- The end-use of the structure being built must be as a home, i.e., a dwelling.
- 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.
  - Traditional wood frame construction materials and methods will be characterized by:
    - *Framing materials:* Wood (or equivalent cold-formed sheet metal stud) framing, not steel or concrete; wooden floor joists and roof structures.
    - *Exterior wall structure*: Wood (or equiva- lent cold-formed sheet metal stud) framing or masonry brick or block.
    - *Methods*: Traditional wood frame construction techniques.

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.

For more complete information:

OSHA® Occupational Safety and Health Administration

U.S. Department of Labor

www.osha.gov

(800) 321-OSHA

12/2010

HBACA Safety Committee May 2024 Tool Box Talk # 1

Fall Protection Requirements

1926.501(b)(1) - 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.

1926.501(b)(13) - Residential construction

Each employee engaged in residential construction activities 6 feet (1.8 m) or more above lower levels shall be protected by guardrail systems, safety net system, or personal fall arrest system unless another provision in paragraph (b) of this section provides for an alternative fall protection measure.

1926.502(a)(2)

Employers shall provide and install all fall protection systems required by this subpart for an employee, and shall comply with all other pertinent requirements of this subpart before that employee begins the work that necessitates the fall protection.

1926.502(b)(1) – Guardrail Systems

Top edge height of top rails, or equivalent guardrail system members, shall be 42 inches (1.1 m) plus or minus 3 inches (8 cm) above the walking/working level. When conditions warrant, the height of the top edge may exceed the 45-inch height, provided the guardrail system meets all other criteria of this paragraph.

1926.502(d) - Personal fall arrest systems

Personal fall arrest systems and their use shall comply with the provisions set forth below. Effective January 1, 1998, body belts are not acceptable as part of a personal fall arrest system. Note: The use of a body belt in a positioning device system is acceptable and is regulated under paragraph (e) of this section.

HBACA Safety Committee May 2024 Tool Box Talk # 1 Spanish

Requisitos de protección contra

1926.501(b)(1) - lados y bordes no protegidos

Cada empleado en una superficie de paso / (superficie horizontal y vertical) de trabajo con un lado o borde no protegido que es quedará protegido contra caídas mediante el uso de sistemas de barandas, sistemas de redes de seguridad 6 pies (1,8 m) o más por encima de un nivel inferior, o sistemas de detención de caídas.

1926.501(b)(13) - Construcción residencial

Cada empleado participa en actividades de construcción de viviendas de 6 pies (1,8 m) o más por encima de los niveles más bajos estarán protegidos por sistemas de barandas, sistema de red de seguridad, o sistema de detención de caídas a menos que otra disposición del párrafo (b) de esta sección proporciona una caída alternativa medida de protección.

1926.502(a)(2)

Los empleadores deberán proveer e instalar todos los sistemas de protección contra caídas requeridos por esta subparte para un empleado, y deberán cumplir con todos los demás requisitos pertinentes de esta subparte antes de que el empleado comience el trabajo que requiere la protección contra caídas.

1926.502(b)(1) – Los sistemas de barandas

Altura del borde superior de los largueros superiores, o los miembros del sistema de barrera de protección equivalente, se 42 pulgadas (1,1 m) más o menos 3 pulgadas (8 cm) por encima del nivel de caminar / trabajar. Cuando las condiciones lo justifican, la altura del borde superior puede exceder la altura de 45 pulgadas, siempre que el sistema de barandas cumple con todos los otros criterios de este párrafo.

1926.502(d) - sistemas de detención de caídas

Los sistemas de detención de caídas y su uso deberán cumplir con las disposiciones establecidas a continuación. A partir de enero 1 de 1998, correas para el cuerpo no son aceptables como parte de un sistema de detención de caídas. Nota: El uso de un cinturón de cuerpo en un sistema de dispositivo de posicionamiento es aceptable y está regulado en el párrafo (e) de esta sección.

HBACA Safety Committee May 2024 Tool Box Talk # 2

Fall Distance and Swing Fall Considerations

An important factor of utilization of a personal fall arrest or restrain system is the distance required to stop a fall and prevent impact with the ground or lower levels of a structure.

Freefall Distance. This is the distance the worker falls before the system beings to arrest/slow the fall. When using self-retracting lifelines, the typical free fall distance is 2 feet. An accounting for the lanyard length, location of anchorage relative to D-ring (anchorage overhead, level with or below D-ring) and potential for swing.

Harness Stretch. This is the distance a properly sized and worn harness stretches in the event of a fall. 1-foot is generally used for potential harness stretch.

Height of Worker. 6 feet is typically used.

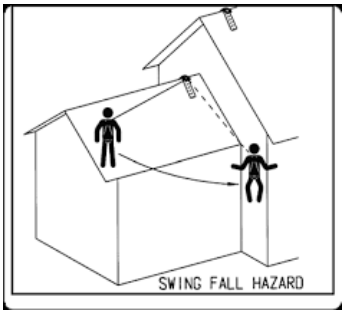
Deceleration Distance. This is the elongation of the arresting device when deployed after the Freefall Distance. Most devices have a Deceleration Distance of 3.5 feet.

Safety Factor. This is added to ensure a buffer is provided from the lower level obstruction after a fall. A 2-foot safety factor is a minimum.

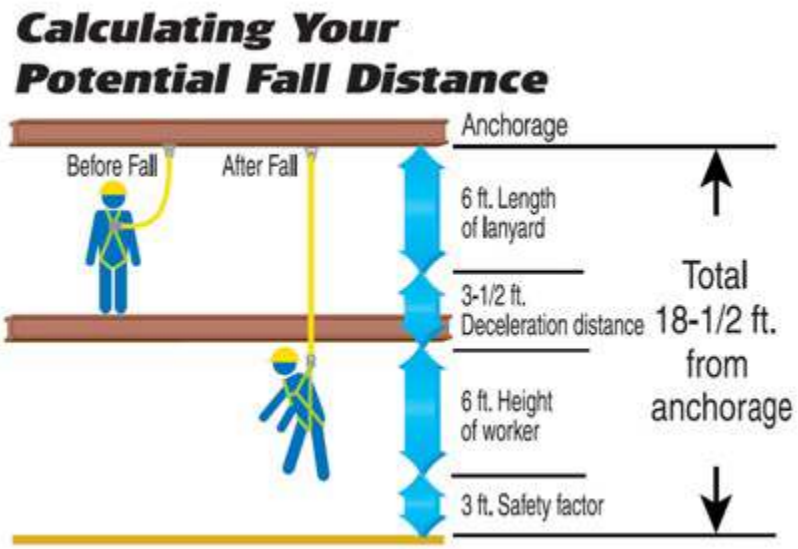
Total Fall Clearance Distance

Swing Falls

It is often seen that workers install anchor points on the roof and then go about their work whether it be roofing or framing while tied off. These workers use lifelines and self-retracting lifelines to prevent falls but at times, they forget to install additional anchorage when moving and create a new hazard.



“The swing fall hazard is created by the pendulum effect, which can swing a fallen worker into a nearby surface, such as a wall or protruding beam. In addition to calculating the total fall clearance distance before beginning work on an elevated level, it is important to evaluate the swing fall hazard at the edges where a worker might fall. A worker who falls while connected to an anchor (unless it is directly overhead) will swing back and forth like a pendulum. Workers can be seriously injured if they strike objects during a swing fall. Installing the anchorage point directly above the work area (i.e., connected to an overhead attachment point with sufficient strength) will help prevent injury” ("OSHA Technical Manual (OTM) | Section V: Chapter 4 - Fall Protection in Construction", 2020).



The above diagram is described as follows:

1. When using a six foot shock absorbing lanyard and a full-body harness, first add the length of the shock-absorbing lanyard [6 ft.] to the maximum elongation of the shock absorber during deceleration [3-1/2 ft.] to the average height of a worker [6 ft.].
2. Then, add a safety factor of 3 ft. to allow for the possibility of an improperly fit harness, a taller than average worker and/or a miscalculation of distance.
3. **The total, 18-1/2 ft., is the suggested safe fall clearance distance**, the height at which you must attach to an anchorage **to minimize the risk of contact with a lower level**.

This means that if a shock absorbing lanyard is used below 18.5 feet, the “lower level” will be struck in the event of a fall. This problem is easily solved.

HBACA Safety Committee May 2024 Tool Box Talk # 2 Spanish

Consideraciones sobre la distancia de caída y caída de oscilación

Un factor importante de utilización de un sistema personal de detención o prevención de caídas es la distancia necesaria para detener una caída y evitar el impacto con el suelo o los niveles inferiores de una estructura.

Distancia de caída libre. Esta es la distancia que el trabajador cae antes de que el sistema arreste/retrase la caída. Cuando se utilizan líneas de vida autorretráctiles, la distancia típica de caída libre es de 2 pies. Una contabilidad de la longitud del cordón, la ubicación del anclaje en relación con la argolla D (instalado en alto, a nivel o por debajo de la argolla D) y el potencial de oscilación.

Estiramiento del arnés. Esta es la distancia que un arnés de tamaño adecuado y bíen ajustado se extiende en caso de caída. 1 pie se utiliza generalmente para el posible estiramiento del arnés.

Altura del trabajador. 6 pies se utiliza típicamente.

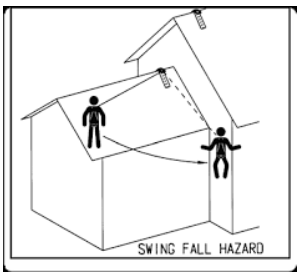
Distancia de desaceleración. Este es el alargamiento del dispositivo de detención cuando se despliega después de la distancia de caída libre. La mayoría de los dispositivos tienen una distancia de desaceleración de 3,5 pies.

Factor de seguridad. Esto se agrega para asegurarse que se proporciona un búfer de la obstrucción de nivel inferior después de una caída. Un factor de seguridad de 2 pies es un mínimo.

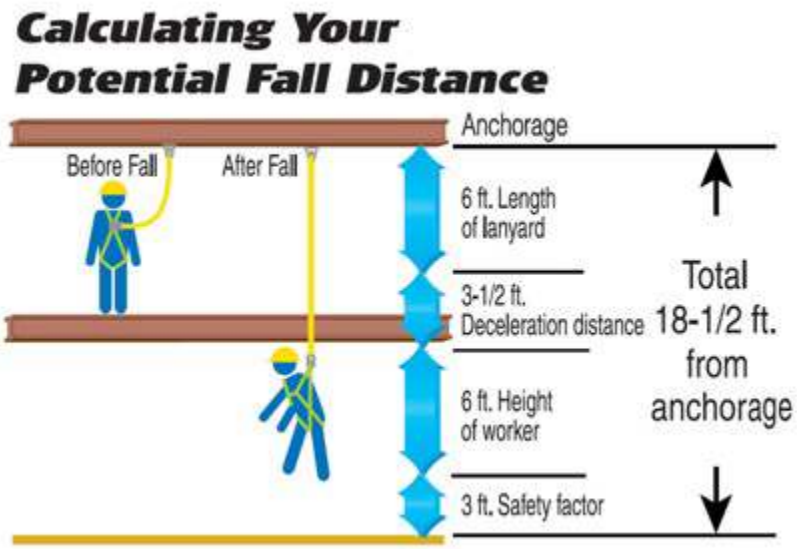
Distancia total de distancia total de caída

columpio cae

A menudo se ve que los trabajadores instalan puntos de anclaje y siguen con su trabajo, sea de techar o enmarcar. Estos trabajadores utilizan líneas de vida y líneas autoretractiles para prevenir caídas, per en veces se les olvida instalar puntos de anclaje adicionales al moverse y crean un peligro nuevo.



El riesgo de caída oscilación es creado por el efecto de péndulo, que puede pivotar a un trabajador caído en una superficie cercana, tal como una pared o una viga que sobresale. Además de calcular la distancia total de espacio libre de caída antes de comenzar a trabajar en un nivel elevado, es importante evaluar el riesgo de caída swing en los bordes donde un trabajador puede caer. Un trabajador que cae mientras está conectado a un ancla (a menos que sea directamente sobre la cabeza) se moverá hacia atrás y adelante como un péndulo. Los trabajadores pueden sufrir lesiones graves en caso de que ataquen objetos durante una caída pendular. Instalación del punto de anclaje directamente encima de la zona de trabajo (es decir, conectado a un punto de fijación de arriba con la fuerza suficiente) ayudará a prevenir lesiones.



Miller explica el diagrama anterior como sigue:

1. Cuando utilice un seis pies de amortiguadora y todo el cuerpo del arnés, primero añadir la longitud de la cuerda amortiguadora {6 pies} a la elongación màxima del amortiguador durante la desaceleración {3-1/2 pies} a la altura promedio de un trabajador {6 pies}.

2. Luego, añade un factor de seguridad de 3 pies para permitir la posibilidad de un mal ajuste arnés, un más alto que el trabajador promedio o un error de cálculo de la distancia.

3. **Total, 18-1/2 pies, es la caja sugiere la caída distancia de seguridad** la altura a la que usted debe de adjuntar a un anclaje **para minimizar el riesgo de contacto con un menor nivel** .

Esto significa que si una cuerda amortiguadora se utiliza por debajo de 18,5 pies, el "nivel inferior" se verá afectado en caso de caída. Este problema se soluciona fácilmente.

HBACA Safety Committee May 2024 Tool Box Talk # 3

Fall Protection Serviceability

Proper inspection of your personal fall arrest/restraint system can and will save your life in the event that you fall. All components of a PFAS are crucial to the function of fall protection and should be inspected before every use to ensure proper serviceability of the equipment.

Tears, cuts, frays or abrasions to any part of a body harness or safety restraint lifeline or lanyard will make them unserviceable and should be removed from service.

The body harness and lanyards should be free of oils and solvents. Substances of this nature can be corrosive and breakdown the material that comprises both harness and lanyard.

Plastic components on the harness such as dorsal Dee-ring pad and loose strap retention sleeves ar intact and free from cracks and cuts.

Stitching and fall indicators should be intact and not cut, frayed or ripped apart.

Metal components such as the Dee-ring on the harness and all double action snap hooks are free of deformities and cuts that could weaken the integrity. All double action hooks must be functional to prevent roll out of anchorage.

Self-retracting cable lifelines should be carefully inspected for frayed, split wires or bird caging that might indicate a likeliness of internal damage to the cable. Cable should also be free from rust.

The housing of a self-retracting lifeline should be intact and manufacturers labels present. If housing has external screws or bolts, ensure they are present and not loose.

Inspect cable components such as the cable thimble and wire clamp sleeve should not be bend or cracked.

Self-retracting lifeline, whether cable or other material should pull out and retract fully without hesitation or creating a slack line.

Ensure that the self-retracting lifeline locks up when the lifeline is jerked sharply.

On the double action snap hook there is a fall indicator that shows as red if a fall has occurred. Remove the lifeline if the red indicator is visible.

HBACA Safety Committee May 2024 Tool Box Talk # 3 Spanish

Una inspección adecuada de su sistema personal de detención/prevención de caídas puede y de hecho le salvará la vida en caso de que caiga. Todos los componentes de un PFAS son cruciales para la función de la protección contra caídas y deben ser inspeccionados antes de cada uso para garantizar la correcta capacidad de servicio del equipo.

Las rasgadas, cortes, deshilachados o abrasiones en cualquier parte de un arnés corporal o de una línea de vida de sujeción de seguridad o cordón los harán inservible y deben ser retirados del servicio.

El arnés del cuerpo y los cordones deben estar libres de aceites y disolventes. Sustancias de esta naturaleza pueden ser corrosivas y descomponer el material del arnés tanto como del cordón.

Componentes plásticos en el arnés como la almohadilla dorsal de la argolla D y mangas de retención de correa sueltas estan intactas y libres de grietas y cortes.

Las costuras e indicadores de caída deben estar intactos y no cortados, deshilachados o desgarrados.

Los componentes metálicos, como la argolla D del arnés y todos los ganchos de doble acción, están libres de deformidades y cortes que podrían debilitar la integridad. Todos los ganchos de doble acción deben ser funcionales para evitar el despliegue del anclaje

Los cables salvavidas autorretráctiles deben ser cuidadosamente inspeccionados en busca de cables deshilachados, divididos o deshiladura típo jaula de pájaros que puedan indicar una similitud de daño interno al cable. El cable también debe estar libre de óxido.

La carcasa de una línea de vida autorretráctil debe estar intacta y las etiquetas de los fabricantes estar presentes. Si la carcasa tiene tornillos o pernos externos, asegúrese de que estén presentes y no sueltos.

Inspeccionar los componentes del cable, como el dedal del cable y el manguito de la abrazadera de alambre, no deben doblarse ni agrietarse

Línea de vida autorretráctil, ya sea de cable u otro material debe salir y retraerse completamente sin vacilar o crear una línea holgada

Asegúrese de que el salvavidas autorretráctil se bloquee cuando el salvavidas se sacude bruscamente

El gancho de ajuste de doble acción tiene un indicador de caída que se muestra como rojo si se ha producido una caída. Retire la línea de vida si el indicador rojo está visible

OSHA 1910.29 - Fall protection systems and falling object protection - criteria and practices.

1910.29(a)(1)
Ensure each fall protection system and falling object protection, other than personal fall protection systems, that this part requires meets the requirements in this section. The employer must ensure each personal fall protection system meets the requirements in subpart I of this part; and
1910.29(a)(2)
Provide and install all fall protection systems and falling object protection this subpart requires, and comply with the other requirements in this subpart before any employee begins work that necessitates fall or falling object protection.
1910.29(b)
Guardrail systems. The employer must ensure guardrail systems meet the following requirements:

1910.29(b)(1)
The top edge height of top rails, or equivalent guardrail system members, are 42 inches (107 cm), plus or minus 3 inches (8 cm), above the walking-working surface. The top edge height may exceed 45 inches (114 cm), provided the guardrail system meets all other criteria of paragraph (b) of this section (see Figure D-11 of this section).

1910.29(b)(2)
Midrails, screens, mesh, intermediate vertical members, solid panels, or equivalent intermediate members are installed between the walking-working surface and the top edge of the guardrail system as follows when there is not a wall or parapet that is at least 21 inches (53 cm) high:
1910.29(b)(2)(i)
Midrails are installed at a height midway between the top edge of the guardrail system and the walking-working surface;
1910.29(b)(2)(ii)
Screens and mesh extend from the walking-working surface to the top rail and along the entire opening between top rail supports;
1910.29(b)(2)(iii)
Intermediate vertical members (such as balusters) are installed no more than 19 inches (48 cm) apart; and
1910.29(b)(2)(iv)
Other equivalent intermediate members (such as additional midrails and architectural panels) are installed so that the openings are not more than 19 inches (48 cm) wide.
1910.29(b)(3)
Guardrail systems are capable of withstanding, without failure, a force of at least 200 pounds (890 N) applied in a downward or outward direction within 2 inches (5 cm) of the top edge, at any point along the top rail.
1910.29(b)(4)
When the 200-pound (890-N) test load is applied in a downward direction, the top rail of the guardrail system must not deflect to a height of less than 39 inches (99 cm) above the walking-working surface.

1910.29(b)(5)
Midrails, screens, mesh, intermediate vertical members, solid panels, and other equivalent intermediate members are capable of withstanding, without failure, a force of at least 150 pounds (667 N) applied in any downward or outward direction at any point along the intermediate member.
1910.29(b)(6)
Guardrail systems are smooth-surfaced to protect employees from injury, such as punctures or lacerations, and to prevent catching or snagging of clothing.
1910.29(b)(7)
The ends of top rails and midrails do not overhang the terminal posts, except where the overhang does not pose a projection hazard for employees.
1910.29(b)(8)
Steel banding and plastic banding are not used for top rails or midrails.
1910.29(b)(9)
Top rails and midrails are at least 0.25-inches (0.6 cm) in diameter or in thickness.
1910.29(b)(10)
When guardrail systems are used at hoist areas, a removable guardrail section, consisting of a top rail and midrail, are placed across the access opening between guardrail sections when employees are not performing hoisting operations. The employer may use chains or gates instead of a removable guardrail section at hoist areas if the employer demonstrates the chains or gates provide a level of safety equivalent to guardrails.
1910.29(b)(11)
When guardrail systems are used around holes, they are installed on all unprotected sides or edges of the hole.
1910.29(b)(12)
For guardrail systems used around holes through which materials may be passed:
1910.29(b)(12)(i)
When materials are being passed through the hole, not more than two sides of the guardrail system are removed; and
1910.29(b)(12)(ii)
When materials are not being passed through the hole, the hole must be guarded by a guardrail system along all unprotected sides or edges or closed over with a cover.
1910.29(b)(13)
When guardrail systems are used around holes that serve as points of access (such as ladderways), the guardrail system opening:
1910.29(b)(13)(i)
Has a self-closing gate that slides or swings away from the hole, and is equipped with a top rail and midrail or equivalent intermediate member that meets the requirements in paragraph (b) of this section; or
1910.29(b)(13)(ii)
Is offset to prevent an employee from walking or falling into the hole;
1910.29(b)(14)
Guardrail systems on ramps and runways are installed along each unprotected side or edge.
1910.29(b)(15)
Manila or synthetic rope used for top rails or midrails are inspected as necessary to ensure that the rope continues to meet the strength requirements in paragraphs (b)(3) and (5) of this section.

Note to paragraph (b) of this section:
The criteria and practices requirements for guardrail systems on scaffolds are contained in 29 CFR part 1926, subpart L.

Figure D-11 -- Guard Rail Systems. Depicts two figures showing two types of Guard Rail Systems. The first shows the walking-working surface, posts, and mid rail for guard system. Total height measurement 42 IN (±3 IN) (107 CM ±8 CM). The second shows a different guard rail system with several more posts, Top Rail, and intermediate vertical member. Spaces between each post and intermediate vertical member is 19 IN (48 CM) MAX. Height of Guard rail is 42 IN (±3 IN) (107 CM ±8 CM).
1910.29(c)
Safety net systems. The employer must ensure each safety net system meets the requirements in 29 CFR part 1926, subpart M.

1910.29(d)
Designated areas.

1910.29(d)(1)
When the employer uses a designated area, the employer must ensure:
1910.29(d)(1)(i)
Employees remain within the designated area while work operations are underway; and
1910.29(d)(1)(ii)
The perimeter of the designated area is delineated with a warning line consisting of a rope, wire, tape, or chain that meets the requirements of paragraphs (d)(2) and (3) of this section.
1910.29(d)(2)
The employer must ensure each warning line:
1910.29(d)(2)(i)
Has a minimum breaking strength of 200 pounds (0.89 kN);
1910.29(d)(2)(ii)
Is installed so its lowest point, including sag, is not less than 34 inches (86 cm) and not more than 39 inches (99 cm) above the walking-working surface;
1910.29(d)(2)(iii)
Is supported in such a manner that pulling on one section of the line will not result in slack being taken up in adjacent sections causing the line to fall below the limits specified in paragraph (d)(2)(ii) of this section;
1910.29(d)(2)(iv)
Is clearly visible from a distance of 25 feet (7.6 m) away, and anywhere within the designated area;
1910.29(d)(2)(v)
Is erected as close to the work area as the task permits; and
1910.29(d)(2)(vi)
Is erected not less than 6 feet (1.8 m) from the roof edge for work that is both temporary and infrequent, or not less than 15 feet (4.6 m) for other work.
1910.29(d)(3)
When mobile mechanical equipment is used to perform work that is both temporary and infrequent in a designated area, the employer must ensure the warning line is erected not less than 6 feet (1.8 m) from the unprotected side or edge that is parallel to the direction in which the

mechanical equipment is operated, and not less than 10 feet (3 m) from the unprotected side or edge that is perpendicular to the direction in which the mechanical equipment is operated.
1910.29(e)
Covers. The employer must ensure each cover for a hole in a walking-working surface:

1910.29(e)(1)
Is capable of supporting without failure, at least twice the maximum intended load that may be imposed on the cover at any one time; and
1910.29(e)(2)
Is secured to prevent accidental displacement.
1910.29(f)
Handrails and stair rail systems. The employer must ensure:

1910.29(f)(1)
Height criteria.

1910.29(f)(1)(i)
Handrails are not less than 30 inches (76 cm) and not more than 38 inches (97 cm), as measured from the leading edge of the stair tread to the top surface of the handrail (see Figure D-12 of this section).
1910.29(f)(1)(ii)
The height of stair rail systems meets the following:
1910.29(f)(1)(ii)(A)
The height of stair rail systems installed before January 17, 2017 is not less than 30 inches (76 cm) from the leading edge of the stair tread to the top surface of the top rail; and
1910.29(f)(1)(ii)(B)
The height of stair rail systems installed on or after January 17, 2017 is not less than 42 inches (107 cm) from the leading edge of the stair tread to the top surface of the top rail.
1910.29(f)(1)(iii)
The top rail of a stair rail system may serve as a handrail only when:
1910.29(f)(1)(iii)(A)
The height of the stair rail system is not less than 36 inches (91 cm) and not more than 38 inches (97 cm) as measured at the leading edge of the stair tread to the top surface of the top rail (see Figure D-13 of this section); and
1910.29(f)(1)(iii)(B)
The top rail of the stair rail system meets the other handrail requirements in paragraph (f) of this section.
1910.29(f)(2)
Finger clearance. The minimum clearance between handrails and any other object is 2.25 inches (5.7 cm).

1910.29(f)(3)
Surfaces. Handrails and stair rail systems are smooth-surfaced to protect employees from injury, such as punctures or lacerations, and to prevent catching or snagging of clothing.

1910.29(f)(4)
Openings in stair rails. No opening in a stair rail system exceeds 19 inches (48 cm) at its least dimension.

1910.29(f)(5)

Handhold. Handrails have the shape and dimension necessary so that employees can grasp the handrail firmly.

1910.29(f)(6)
Projection hazards. The ends of handrails and stair rail systems do not present any projection hazards.

1910.29(f)(7)
Strength criteria. Handrails and the top rails of stair rail systems are capable of withstanding, without failure, a force of at least 200 pounds (890 N) applied in any downward or outward direction within 2 inches (5 cm) of any point along the top edge of the rail.

Figure D-13 - Combination Handrail and Stair Rail. Depicts a set of stairs and combination handrail and stair rail installed. Measurement 36 IN - 38 IN (91 CM - 97 CM) between stair and top of handrail.

Figure D-13 - Combination Handrail and Stair Rail.

1910.29(g)
Cages, wells, and platforms used with fixed ladders. The employer must ensure:

1910.29(g)(1)
Cages and wells installed on fixed ladders are designed, constructed, and maintained to permit easy access to, and egress from, the ladder that they enclose (see Figures D-14 and D-15 of this section);
1910.29(g)(2)
Cages and wells are continuous throughout the length of the fixed ladder, except for access, egress, and other transfer points;
1910.29(g)(3)
Cages and wells are designed, constructed, and maintained to contain employees in the event of a fall, and to direct them to a lower landing; and
1910.29(g)(4)
Platforms used with fixed ladders provide a horizontal surface of at least 24 inches by 30 inches (61 cm by 76 cm).

Note to paragraph (g):
Section 1910.28 establishes the requirements that employers must follow on the use of cages and wells as a means of fall protection.

Figure D-14 -- Clearances for Fixed Ladders in Wells. Depicts a well squared off. The ladder should be placed 7 IN (18 CM) Min on Center and 15 IN (38 CM) MIN from either left or right side with a total space of 27 IN-30 IN (69 CM-76 CM) for well opening

Figure D-15 -- Example of General Construction of Cages. Depicts Five diagrams. The first is Access to Landing Platform through Ladder. The second is side-step Ladder, Access lateral from Ladder. The third is Hoop and See. The fourth is the cross section of a Basket Guard Hoop showing Bar measurments. The fifth is Basked Guard Hoop showing Angle from Ladder

1910.29(h)

Outdoor advertising. This paragraph (h) applies only to employers engaged in outdoor advertising operations (see § 1910.28(b)(10)). Employers must ensure that each employee who climbs a fixed ladder without fall protection:

1910.29(h)(1)

Is physically capable, as demonstrated through observations of actual climbing activities or by a physical examination, to perform the duties that may be assigned, including climbing fixed ladders without fall protection;

1910.29(h)(2)

Has successfully completed a training or apprenticeship program that includes hands-on training on the safe climbing of ladders and is retrained as necessary to maintain the necessary skills;

1910.29(h)(3)

Has the skill to climb ladders safely, as demonstrated through formal classroom training or on-the-job training, and performance observation; and

1910.29(h)(4)

Performs climbing duties as a part of routine work activity.

1910.29(i)

Ladder safety systems. The employer must ensure:

1910.29(i)(1)

Each ladder safety system allows the employee to climb up and down using both hands and does not require that the employee continuously hold, push, or pull any part of the system while climbing;

1910.29(i)(2)

The connection between the carrier or lifeline and the point of attachment to the body harness or belt does not exceed 9 inches (23 cm);

1910.29(i)(3)

Mountings for rigid carriers are attached at each end of the carrier, with intermediate mountings spaced, as necessary, along the entire length of the carrier so the system has the strength to stop employee falls;

1910.29(i)(4)

Mountings for flexible carriers are attached at each end of the carrier and cable guides for flexible carriers are installed at least 25 feet (7.6 m) apart but not more than 40 feet (12.2 m) apart along the entire length of the carrier;

1910.29(i)(5)

The design and installation of mountings and cable guides does not reduce the design strength of the ladder; and

1910.29(i)(6)

Ladder safety systems and their support systems are capable of withstanding, without failure, a drop test consisting of an 18-inch (41-cm) drop of a 500-pound (227-kg) weight.

1910.29(j)

Personal fall protection systems. Body belts, harnesses, and other components used in personal fall arrest systems, work positioning systems, and travel restraint systems must meet the requirements of § 1910.140.

1910.29(k)
Protection from falling objects.

1910.29(k)(1)
The employers must ensure toeboards used for falling object protection:
1910.29(k)(1)(i)
Are erected along the exposed edge of the overhead walking-working surface for a length that is sufficient to protect employees below.
1910.29(k)(1)(ii)
Have a minimum vertical height of 3.5 inches (9 cm) as measured from the top edge of the toeboard to the level of the walking-working surface.
1910.29(k)(1)(iii)
Do not have more than a 0.25-inch (0.5-cm) clearance or opening above the walking-working surface.
1910.29(k)(1)(iv)
Are solid or do not have any opening that exceeds 1 inch (3 cm) at its greatest dimension.
1910.29(k)(1)(v)
Have a minimum height of 2.5 inches (6 cm) when used around vehicle repair, service, or assembly pits. Toeboards may be omitted around vehicle repair, service, or assembly pits when the employer can demonstrate that a toeboard would prevent access to a vehicle that is over the pit.
1910.29(k)(1)(vi)
Are capable of withstanding, without failure, a force of at least 50 pounds (222 N) applied in any downward or outward direction at any point along the toeboard.
1910.29(k)(2)
The employer must ensure:
1910.29(k)(2)(i)
Where tools, equipment, or materials are piled higher than the top of the toeboard, paneling or screening is installed from the toeboard to the midrail of the guardrail system and for a length that is sufficient to protect employees below. If the items are piled higher than the midrail, the employer also must install paneling or screening to the top rail and for a length that is sufficient to protect employees below; and
1910.29(k)(2)(ii)
All openings in guardrail systems are small enough to prevent objects from falling through the opening.
1910.29(k)(3)
The employer must ensure canopies used for falling object protection are strong enough to prevent collapse and to prevent penetration by falling objects.
1910.29(l)
Grab handles. The employer must ensure each grab handle:

1910.29(l)(1)
Is not less than 12 inches (30 cm) long;
1910.29(l)(2)
Is mounted to provide at least 3 inches (8 cm) of clearance from the framing or opening; and
1910.29(l)(3)
Is capable of withstanding a maximum horizontal pull-out force equal to two times the maximum intended load or 200 pounds (890 N), whichever is greater.
[81 FR 82994-82998, Nov. 18, 2016; 84 FR 68796, Dec. 17, 2019]

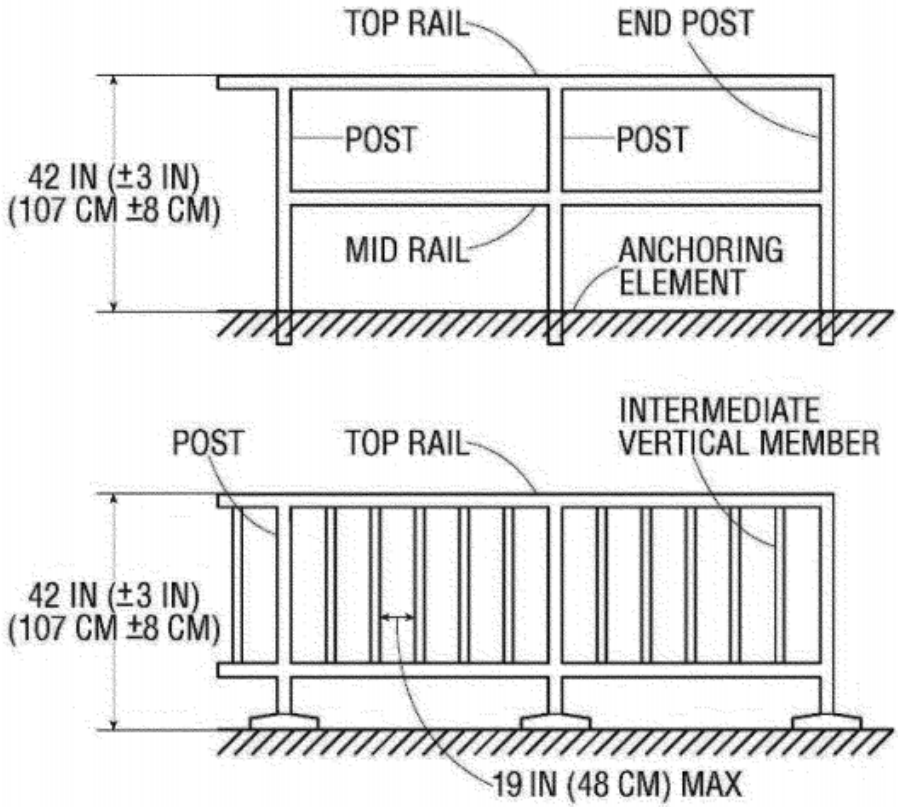


Figure D-11 Guardrail Systems

References

OSHA Technical Manual (OTM) | Section V: Chapter 4 - Fall Protection in Construction. (2020). Retrieved 11 March 2020, from https://www.osha.gov/dts/osta/otm/otm_v/otm_v_4.html#how