
Chapter 296-880 WAC
Unified Safety Standards for Fall Protection**Last Updated 10-1-2020**

This book contains rules for Safety Standards for Unified safety for fall protection, as adopted under the Washington Industrial Safety and Health Act of 1973 (Chapter 49.17 RCW).

The rules in this book are effective October 2020. A brief promulgation history, set within brackets at the end of this chapter, gives statutory authority, administrative order of promulgation, and date of adoption of filing.

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WAC	Page
WAC 296-880-080 Scope	1
WAC 296-880-090 Quick reference guide. Unified Fall Protection Quick Reference Guide	2
WAC 296-880-095 Definitions	4
WAC 296-880-100 Application	9
WAC 296-880-10005 General requirements.....	9
WAC 296-880-10010 Fall protection required regardless of height.....	9
WAC 296-880-10015 Training.....	9
WAC 296-880-10020 Fall protection work plan required at ten feet or more.....	10
WAC 296-880-200 Fall protection required at four feet or more	12
WAC 296-880-20005 Fall protection required at four feet or more.....	12
WAC 296-880-20010 Exemption from fall protection requirements in this section.....	14
WAC 296-880-300 Specific fall protection requirements	16
WAC 296-880-30005 Construction work.....	16
WAC 296-880-30010 Order pickers (PITS).....	17
WAC 296-880-30015 Elevating work platforms.....	18
WAC 296-880-30020 Powered platforms.....	18
WAC 296-880-30025 Window cleaning.....	19
WAC 296-880-30030 Scaffolds.....	20
WAC 296-880-30035 Cranes.....	24
WAC 296-880-30040 Telecommunication requirements that apply to wireless.....	26
WAC 296-880-30045 Ship repairing, shipbuilding and shipbreaking.....	26
WAC 296-880-30050 Longshore, stevedore, and waterfront related operations.....	27
WAC 296-880-30055 Ski area facilities and operations.....	28
WAC 296-880-400 Fall protection system specifications	30
WAC 296-880-40005 Guardrail systems.....	30
WAC 296-880-40010 Ramps, runways, and inclined walkway requirements.....	31
WAC 296-880-40015 Cover requirements—Holes and openings.....	31
WAC 296-880-40020 Personal fall arrest system requirements.....	32
WAC 296-880-40025 Personal fall restraint system requirements.....	33
WAC 296-880-40030 Positioning device system requirements.....	34
WAC 296-880-40035 Self-rescue device requirements.....	34
WAC 296-880-40040 Warning line system requirements.....	35
WAC 296-880-40045 Safety monitor system requirements.....	36
WAC 296-880-40050 Safety watch system requirements.....	37
WAC 296-880-40055 Safety net system requirements.....	37
WAC 296-880-40060 Catch platform requirements.....	38

<u>WAC</u>	<u>Page</u>
WAC 296-880-40065 Canopy requirements.....	38
WAC 296-880-40070 Roof bracket requirements.....	39
WAC 296-880-40075 Crawling board and chicken ladder requirements.....	39
WAC 296-880-40080 Roof edge materials handling and material storage requirements.....	39
WAC 296-880-500 Appendix A—Determining roof widths—Nonmandatory guidelines.	40
WAC 296-880-505 Appendix B—Calculating fall clearance distance — Nonmandatory guidelines. Calculating fall clearance distance using a shock-absorbing lanyard and D-ring anchorage connector - Nonmandatory guidelines for complying with WAC 296-880-40020	44
WAC 296-880-510 Appendix C—Test methods and additional guidelines for personal fall arrest systems—Nonmandatory guidelines.....	45

Discussion draft

WAC 296-880-080 Scope.

This chapter sets forth requirements for employers to provide and enforce the use of fall protection for employees performing activities covered under this chapter.

Discussion draft

WAC 296-880-090 Quick reference guide. Unified Fall Protection Quick Reference Guide.

General fall protection for all industries	Threshold height	WAC
Above or adjacent to dangerous equipment	Regardless of height	296-880-10010(1)
Holes into which an employee can trip, step into, or step through	Regardless of height	296-880-10010(2)
Falling into or onto impalement hazards	Regardless of height	296-880-10010(3)
When on a walking/working surface	Four feet or more	296-880-20005
Ramps, runways, and inclined walkways	Four feet or more	296-880-20005(2)
Holes where work is being performed	Four feet or more	296-880-20005(3)
Skylights	Four feet or more	296-880-20005 (3)(b)
Hatchway and chute holes	Four feet or more	296-880-20005 (3)(c)
Ladderways	Four feet or more	296-880-20005 (3)(d)
Pits and trap door holes	Four feet or more	296-880-20005 (3)(e)
Repair pits and service pits	Four feet or more	296-880-20005 (3)(f)
Manholes	Four feet or more	296-880-20005 (3)(g)
Openings	Four feet or more	296-880-20005(4)
Formwork and reinforcing work	Four feet or more	296-880-20005(5)
Steep pitch roof - Regardless of task	Four feet or more	296-880-20005(6)
Low pitch roof - Other than roofing work or constructing a leading edge	Four feet or more	296-880-20005(7)
Hazardous slopes	Four feet or more	296-880-20005(9)
Vehicles and rolling stock - If suitable anchorages cannot be provided or creates a greater hazard	Four feet or more	296-880-20005(10)
Specific requirements not addressed in WAC 296-880-200 (above)		
Construction work *See also chapter 296-155 WAC		
Roofing work on a low pitch roof	Ten Six feet	296-880-30005(1)
Constructing a leading edge	Ten Six feet	296-880-30005(1)
Engaged in the erection or placement of structural members	Ten feet	296-880-30005(1)
Engaged in excavation and trenching operations	Ten feet	296-880-30005(1)
Order pickers (PITS) *See also chapter 296-863 WAC		
Operators of order pickers	Regardless of height	296-880-30010 (1) and (2)
Elevating work platforms *See also chapter 296-869 WAC		

General fall protection for all industries	Threshold height	WAC
Vehicle mounted aerial devices	Regardless of height	296-880-30015(1)
Manually propelled and self-propelled elevating work platforms	Regardless of height if required by manufacturer	296-880-30015(2)
Boom supported elevating work platforms	Regardless of height	296-880-30015(3)
Powered platforms *See also chapter 296-870 WAC		
Working on a roof or other elevated working area	Four feet or more	296-880-30020(5)
Window cleaning *See also chapter 296-878 WAC		
Working on a roof or other elevated working area	Four feet or more	296-880-30025(1)
Scaffolds *See also chapter 296-874 WAC		
Working on a scaffold	Ten feet or more	296-880-30030(1)
Cranes - Under the scope of chapter 296-155 WAC, Part L		
For nonassembly/disassembly work	Six feet or more	296-880-30035(2)
For assembly/disassembly work	Ten feet or more	296-880-30035(3)
Towercranes - Work other than erecting, climbing, and dismantling	Six feet or more	296-880-30035 (4)(a)
Towercranes - Erecting, climbing, and dismantling work	Ten feet or more	296-880-30035 (4)(b)
Telecommunications work *See also chapter 296-32 WAC	Four feet or more	296-880-200 and 296-880-30040
Qualified electrical workers *See also chapter 296-45 WAC	Four feet or more	296-880-200
Ship repairing, shipbuilding and shipbreaking *See also chapter 296-304 WAC		
Working aloft or elsewhere at elevation	Five feet or more	296-880-30045
Longshore, stevedore and waterfront related operations *See also chapter 296-56 WAC		
Maintenance work on cranes, spouts, or similar types of equipment	Eight feet or more	296-880-30050(1)
Floor or wall openings or waterside edges, including bridges or gangway-like structures	Four feet or more	296-880-30050 (2)(a)
Ski area facilities and operations *See also chapter 296-59 WAC		
Working at unprotected elevated locations	More than ten feet Four feet or more.	296-880-30055 (1)(a)

WAC 296-880-095 Definitions.

For the purposes of this chapter the following definitions apply:

Aerial device. A vehicle-mounted device, telescoping or articulating, or both, which is used to position personnel.

Affected area. The distance away from the edge of an excavation equal to the depth of the excavation up to a maximum distance of fifteen feet. For example, an excavation ten feet deep has an affected area extending ten feet from the edge of any side of the excavation.

Anchorage. A secure point of attachment for lifelines, lanyards, or deceleration devices which is capable of withstanding the forces specified in this chapter.

Boom-supported elevating work platform. A self-propelled, integral chassis, elevating work platform with a boom-supported platform that can be positioned completely beyond the base.

Catch platform. A type of fall arrest system that consists of a platform installed within four vertical feet of the fall hazard, is at least forty-five inches wide and is equipped with a standard guardrail system on all exposed sides.

Catenary line. See “horizontal lifeline.”

Competent person. An individual knowledgeable of fall protection equipment, including the manufacturer's recommendations and instructions for the proper use, inspection, and maintenance; and who is capable of identifying existing and potential fall hazards; and who has the authority to take prompt corrective action to eliminate those hazards; and who is knowledgeable of the requirements contained in this chapter regarding the installation, use, inspection, and maintenance of fall protection equipment and systems.

Connector. A device which is used to connect parts of the personal fall arrest system and positioning device systems together. It may be an independent component of the system, such as a carabiner, or it may be an integral component of part of the system (such as a buckle or D-ring sewn into a harness, or a snap hook spliced or sewn to a lanyard or self-retracting lanyard).

Construction work. All or any part of excavation, construction, erection, alteration, repair, demolition, and dismantling of buildings and other structures and all operations in connection therewith; the excavation, construction, alteration and repair of sewers, trenches, caissons, conduits, pipe lines, roads and all operations pertaining thereto; the moving of buildings and other structures, and to the construction, alteration, repair, or removal of wharfs, docks, bridges, culverts, trestles, piers, abutments or any other construction, alteration, repair or removal work related thereto.

Deceleration device. Any mechanism, such as a rope grab, ripstitch lanyard, specifically woven lanyard, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest.

Deceleration distance. The additional vertical distance a falling employee travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration device begins to operate. It is measured as the distance between the location of an employee's full body harness attachment point at the moment of activation (at the onset of fall arrest forces) of the deceleration device during a fall, and the location of that attachment point after the employee comes to a full stop.

Dropline. A vertical lifeline secured to an upper anchorage for the purpose of attaching a lanyard or device.

Elevating work platform. A device used to position personnel, along with their necessary tools and materials, at work locations. It includes a platform and an elevating assembly. It may be vehicle-mounted or have an integral chassis for mobility and as a means of support.

Equivalent. Alternative designs, materials, or methods to protect against a hazard which the employer can demonstrate and will provide an equal or greater degree of safety for employees than the methods, materials, or designs specified in this standard.

Fall arrest system. A fall protection system that will arrest a fall from elevation. Fall arrest systems include personal fall arrest systems that are worn by the user, catch platforms, and safety nets.

Fall distance. The actual distance from the worker's support to the level where a fall would stop.

Fall protection work plan. A written planning document in which the employer identifies all areas on the job site where a fall hazard of ten feet or more exists. The plan describes the method or methods of fall protection to be used to protect employees, and includes the procedures governing the installation, use, inspection, and removal of the fall protection method or methods which are selected by the employer. See WAC 296-880-10020.

Fall restraint system. A system in which all necessary components function together to restrain/prevent an employee from falling to a lower level. Types of fall restraint systems include standard guardrail systems, personal fall restraint systems, warning line systems, or a warning line system and safety monitor.

Feasible. It is possible to perform the work using a conventional fall protection system (i.e., guardrail system, safety net system, or personal fall arrest system) or that it is technologically possible to use any one of these systems to provide fall protection.

Free fall. The act of falling before a personal fall arrest system begins to apply force to arrest the fall.

Free fall distance. The vertical displacement of the fall arrest attachment point on the employee's full body harness between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance, and lifeline/lanyard elongation, but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.

Full body harness. A configuration of connected straps that meets the requirements specified in ANSI Z359.1, that may be adjustable to distribute a fall arresting force over at least the thighs, shoulders and pelvis, with provisions for attaching a lanyard, lifeline, or deceleration devices.

Full body harness system. A full body harness and lanyard which is either attached to an anchorage meeting the requirements of this chapter; or it is attached to a horizontal or vertical lifeline which is properly secured to an anchorage(s) capable of withstanding the forces specified in this chapter.

Handrail. A rail used to provide employees with a handhold for support.

Hardware. Snap hooks, D-rings, bucklers, carabiners, adjusters, or O-rings, that are used to attach the components of a fall protection system together.

Hazardous slope. A slope from which construction work is performed where normal footing cannot be maintained without the use of devices due to the pitch of the surface, weather conditions, or surface material.

Hole. A gap or void two inches or more in its least dimension, in a floor, roof, or other surface.

Horizontal lifeline. A rail, rope, wire, or synthetic cable that is installed in a horizontal plane between two anchorages and used for attachment of a worker's lanyard or lifeline device while moving horizontally; used to control dangerous pendulum like swing falls.

Infrequent. The task or job is performed only on occasion, when needed (e.g., equipment breakdown), on an occasional basis, or at sporadic or irregular intervals.

Commented [SES(1)]: Federal Register /Vol. 81, No. 223 / Friday, November 18, 2016 /Rules and Regulations 82613
The term "infrequent," for purposes of the final rule, means that the task or job is performed only on occasion, when needed (e.g., equipment breakdown), on an occasional basis, or at sporadic or irregular intervals.
(OSHA 1910.28)

Lanyard. A flexible line of webbing, rope, or cable used to secure a positioning harness or full body harness to a lifeline or an anchorage point usually two, four, or six feet long.

Leading edge. The advancing edge of a floor, roof, or formwork which changes location as additional floor, roof, or formwork sections are placed, formed, or constructed. A leading edge is considered to be an "unprotected side or edge" during periods when it is not actively and continuously under construction.

Lifeline. A vertical line from a fixed anchorage or between two horizontal anchorages, independent of walking or working surfaces, to which a lanyard or device is secured. Lifeline as referred to in this text is one which is part of a fall protection system used as back-up safety for an elevated worker or as a restraint for workers on a flat or sloped surface.

Locking snap hook. A connecting snap hook that requires two separate forces to open the gate; one to deactivate the gatekeeper and a second to depress and open the gate which automatically closes when released; used to minimize roll out or accidental disengagement.

Low pitched roof. A roof having a slope equal to or less than four in twelve.

Maintenance. The work of keeping a building, machine, roadway, etc., in a state of good repair.

Manually propelled elevating work platform. A manually propelled, integral chassis, elevating work platform with a platform that cannot be positioned completely beyond the base.

Mechanical equipment. All motor or human propelled wheeled equipment except for wheelbarrows, mopcars, robotic thermoplastic welders, and robotic crimpers.

Opening. A gap or void thirty inches (76 cm) or more high and eighteen inches (48 cm) or more wide, in a wall or partition, through which employees can fall to a lower level.

Personal fall arrest system. A fall arrest system that is worn by the employee to arrest the employee in a fall from elevation. It consists of an anchor point, connectors, a full body harness, and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.

Personal fall restraint system. A fall restraint system that is worn by the employee to keep the employee from reaching a fall point, such as the edge of a roof or elevated work surface. It consists of an anchor point, hardware assemblies, a full body harness and may include a lanyard, restraint lines, or suitable combinations of these.

Platform. A work surface elevated above the surrounding floor or ground.

Positioning device system. A full body harness or positioning harness that is worn by an employee, and is rigged to allow an employee to be supported on an elevated vertical or inclined surface, such as a wall, pole or column and work with both hands free from the body support.

Positioning harness. A body support that meets the requirements specified in ANSI Z359.1 that encircles and closes around the waist and legs with attachment elements appropriate for positioning work.

~~Predictable and regular basis. Employee tasks which are performed either:~~

~~(a) At least once every two weeks; or~~

~~(b) Four employee hours or more during any sequential four week period. (To calculate employee hours multiply the number of employees by the number of hours during a four week period);~~

Qualified person. One who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter, the work, or the project.

Repair. To restore a building, machine, roadway, etc., to an original state after damage or decay.

Commented [SES(2): Predictable and regular could conflict and would confuse with 'infrequent and temporary'.

Restraint line. A line from a fixed anchorage or between two anchorages to which an employee is secured in such a way as to prevent the worker from falling to a lower level.

Roof. The exterior surface on the top of a building. This does not include floors or formwork which, because a building has not been completed, temporarily become the top surface of a building.

Roofing work. The hoisting, storage, application, and removal of roofing materials and equipment, including related insulation, sheet metal, and vapor barrier work, but not including the construction of the roof deck.

Rope grab. A fall arrester that is designed to move up or down a lifeline suspended from a fixed overhead or horizontal anchorage point, or lifeline, to which the full body harness is attached. In the event of a fall, the rope grab locks onto the lifeline rope through compression to arrest the fall. The use of a rope grab device is restricted for all restraint applications. See WAC 296-880-40025.

Runway. A passageway for persons, elevated above the surrounding floor or ground level, such as a footwalk along shafting or a walkway between buildings.

Safety line. See “lifeline.”

Safety monitoring system. A type of fall restraint system in which a competent person whose only job responsibility is to recognize and warn employees of their proximity to fall hazards when working between the warning line and the unprotected sides and edges, including the leading edge of a low pitch roof or other walking/working surface.

Safety net system. A type of fall arrest system, as described in WAC 296-880-40055.

~~**Safety watch system.** A fall protection system as described in WAC 296-880-40050, in which a competent person monitors one worker who is engaged in repair work or servicing equipment on low-pitch roofs only.~~

Safety watch system. A type of fall protection system in which a competent person is responsible for recognizing and warning one employee of fall hazards.

Scaffold. A temporary elevated platform, including its supporting structure and anchorage points, used for supporting employees or materials.

Self-propelled elevating work platform. A self-propelled, integral chassis, elevating work platform with a platform that cannot be positioned completely beyond the base.

Self-rescue device. A piece of equipment designed to allow a person, who is suspended in a personal fall arrest system, to independently rescue themselves after the fall by moving the device up or down until they reach a surface and are no longer suspended.

Self-retracting lifeline. A deceleration device which contains a wound line which may be slowly extracted from, or retracted onto, the device under slight tension during normal employee movement, and which after onset of a fall, automatically locks the drum and arrests the fall.

Service. To repair or provide maintenance for.

Shock absorbing lanyard. A flexible line of webbing, cable, or rope used to secure a full body harness to a lifeline or anchorage point that has an integral shock absorber.

Snap hook. See “locking snap hook.”

Standard guardrail system. A type of fall restraint system that is a vertical barrier consisting of a top rail and midrail, and toeboard when used as falling object protection for persons who may work or pass below, that is erected along all open sides or edges of a walking/working surface, ramps, platforms, or runways.

Standard strength and construction. Any construction of guardrails, handrails, covers, or other guards that meets the requirements of this chapter.

Commented [SES(3): Update definition so as not to include construction activities.

Discussion draft

Steep pitched roof. A roof having a slope greater than four in twelve.

Structural member. A support that is a constituent part of any building or structure. Structural members include columns, girders, beams, trusses, joists, and similar supporting members of a building or structure.

Suitable. That which fits, or has the qualities or qualifications to meet a given purpose, occasion, condition, function, or circumstance.

Temporary. The duration of the task the worker performs is brief or short.

Toeboard. A vertical barrier at floor level erected along all open sides or edges of a floor opening, platform, runway, ramp, or other walking/working surface to prevent materials, tools, or debris from falling onto persons passing through or working in the area below.

Unprotected sides and edges. Any open side or edge of a floor, roof, balcony/deck, platform, ramp, runway, or walking/working surface where there is no standard guardrail system, or parapet wall of solid strength and construction that is at least thirty-nine inches in vertical height.

Walking/working surface. Any surface, whether horizontal or vertical on which an employee walks, works, or gains access to a work area or workplace location. Walking/working surfaces include, but are not limited to, floors, the ground, roofs, ramps, bridges, runways, stairs, dockboards, formwork, and reinforcing steel but not including ladders.

Warning line system. A barrier erected on a walking and working surface or a low pitch roof (four in twelve or less), to warn employees that they are approaching an unprotected fall hazard(s).

Commented [SES(4): Federal Register /Vol. 81, No. 223 / Friday, November 18, 2016 /Rules and Regulations 82613 For purposes of the final rule, "temporary" means that the duration of the task the worker performs is brief or short. (OSHA 1910.28)

WAC 296-880-100 Application.

Requirements that apply to all sections of this chapter.

WAC 296-880-10005 General requirements.

- (1) The employer must ensure that all surfaces on which employees will be working or walking on are structurally sound and will support them safely prior to allowing employees to work or walk on them.
- (2) Inspection criteria.
 - (a) The employer must inspect all components (including hardware, lanyards, and positioning harnesses or full body harnesses depending on which system is used) of personal fall arrest systems, personal fall restraint systems, and positioning device systems prior to each use according to manufacturer's specifications for mildew, wear, damage, and other deterioration. The employer must remove defective components from service if their function or strength has been adversely affected.
 - (b) The employer must inspect safety nets at least once a week according to manufacturer's specifications for wear, damage, and other deterioration. The employer must also inspect safety nets after any occurrence which could affect the integrity of the safety net system. The employer must remove defective components from service. The employer must not use defective nets.
- (3) The employer must only use personal fall arrest systems, personal fall restraint systems, positioning device systems, and their components for employee protection and not to hoist materials.
- (4) The employer must plan for and provide prompt rescue of employees in the event of a fall or must assure the self-rescue capability of employees.

WAC 296-880-10010 Fall protection required regardless of height.

- (1) Regardless of height, the employer must guard open-sided floors, walkways, platforms, or runways above or adjacent to dangerous equipment, such as dip tanks and material handling equipment, and similar hazards with a standard guardrail system.
- (2) The employer must guard holes into which an employee can trip, step into, or step through by a cover of standard strength and construction or a standard guardrail system.

Note: Requirements for guarding holes at heights of four feet or more are located in WAC 296-880-20005.

- (3) Regardless of height the employer must protect employees from falling into or onto impalement hazards, such as: Reinforcing steel (rebar), exposed steel, or wood.

WAC 296-880-10015 Training.

- (1) Provide fall protection training for employees exposed to fall hazards. The employer must provide training for each employee exposed to fall hazards. The training must enable each employee to recognize the hazards of falling and procedures to be followed in order to minimize those hazards.
- (2) Each affected employee must be trained by a competent person to know at least the following:
 - (a) The nature of fall hazards in the work area;
 - (b) When fall protection is required;

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- (c) What fall protection is required;
 - (d) The correct procedures for erecting, maintaining, assembling, disassembling, and inspecting the fall protection systems to be used;
 - (e) The use and operation of fall protection systems used;
 - (f) Limitations of fall protection systems used;
 - (g) Proper care, maintenance, useful life, removal from service; and
 - (h) The requirements of this chapter.
- (3) Make sure before an employee is allowed to perform work requiring the use of fall protection that the employee can:
- (a) Demonstrate an understanding of the training specified above; and
 - (b) Demonstrate the ability to use fall protection properly.
- (4) Retrain employees who use fall protection, if necessary. Retrain an employee when the employer has reason to believe the understanding, motivation, and skills required to use fall protection has not been retained. Circumstances where retraining is required include:
- (a) Changes in the workplace that make previous training out of date;
 - (b) Changes in the types of fall protection to be used make previous training out of date; and
 - (c) Work habits or demonstrated knowledge indicate that the employee has not retained the necessary understanding, skill, or motivation to use fall protection.
- (5) Document fall protection training. Document in writing that each employee has received and understood the required training. This documentation must include:
- (a) Name of each employee;
 - (b) Date(s) of training;
 - (c) Subject(s) of the training; and
 - (d) Name or signature of the competent person who conducted the training, signature of the employer, or employer's designee.

Note: Documentation may be stored electronically as long as it is available to safety and health personnel from the department of labor and industries.

WAC 296-880-10020 Fall protection work plan required at ten feet or more.

- (1) The employer must develop and implement a written fall protection work plan including each area of the work place where the employees are assigned and where fall hazards of ten feet or more exist.
- (2) The fall protection work plan must:
 - (a) Identify all fall hazards in the work area;
 - (b) Describe the method of fall arrest or fall restraint to be provided;
 - (c) Describe the proper procedures for the assembly, maintenance, inspection, and disassembly of the fall protection system to be used;
 - (d) Describe the proper procedures for the handling, storage, and securing of tools and materials;

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- (e) Describe the method of providing overhead protection for workers who may be in, or pass through the area below the work area;
 - (f) Describe the method for prompt, safe removal of injured workers; and
 - (g) Be available on-site for inspection by the department.
- (3) Prior to permitting employees into areas where fall hazards of ten feet or more exist the employer must ensure employees are trained and instructed in the items described in subsection (2)(a) through (f) of this section.

Note: A fall protection work plan is not required where the use of a guardrail system eliminates the fall hazard.

WAC 296-880-200 Fall protection required at four feet or more.

This section sets forth requirements for the use of fall protection at four feet or more unless specifically addressed in WAC 296-880-300 of this chapter.

WAC 296-880-20005 Fall protection required at four feet or more.

The employer must ensure that fall arrest systems, fall restraint systems, or positioning device systems are provided, installed, and implemented in accordance with WAC 296-880-400 Fall protection system specifications when employees are exposed to fall hazards of four feet or more to the ground or lower level.

Commented [SES(5): Added to clarify application of sections.

- (1) Walking/working surfaces with unprotected sides or edges. Except as required in subsections (2) through (10) of this section, the employer must ensure that each employee on a walking/working surface with an unprotected side or edge four feet or more above the ground or lower level is protected by one of the following fall protection systems:
 - (a) A standard guardrail system, or the equivalent, as specified in WAC 296-880-40005, on all open sides, except where there is entrance to a ramp, stairway, or ladder. The guardrail must be provided with a standard toeboard wherever: Beneath the open sides, persons can pass, there is moving machinery, or there is equipment with which falling materials could create a hazard.
 - (i) When employees are using stilts, the height of the top rail or equivalent member of the guardrail system must be increased (or additional rails may be added) an amount equal to the height of the stilts while maintaining the strength specifications of the guardrail system.
 - (ii) Where employees are working on or from platforms or ladders above the protection of the guardrail system, the employer must either increase the height of the guardrail system (or additional rails may be added) or select and implement another fall protection system as specified in (b), (c), (d), (e), or (f) of this subsection.
 - (iii) When guardrails must be temporarily removed to perform a specific task, the area must be constantly attended by an employee until the guardrail is replaced. The only duty the employee must perform is to warn persons entering the area of the fall hazard. The employee must be protected from the fall hazard by a personal fall arrest system or personal fall restraint system.
 - (b) A personal fall restraint system;
 - (c) A personal fall arrest system;
 - (d) A safety net system;
 - (e) A catch platform; or
 - (f) A warning line system.
- (2) Guarding of ramps, runways, and inclined walkways.
 - (a) Ramps, runways, and inclined walkways that are four feet or more above the ground or lower level must be equipped with a standard guardrail system or the equivalent, as specified in WAC 296-880-40005, along each open side. Wherever tools, machine parts, or materials are likely to be used on the runway, a toeboard must also be installed on each open side to protect persons working or passing below.

- (b) Runways used exclusively for special purposes may have the guardrail on one side omitted where operating conditions necessitate such omission, provided the falling hazard is minimized by using a runway not less than eighteen inches wide.

Note: See WAC 296-880-40010 for other specific criteria for ramps, runways, and inclined walkways.

Discussion draft

- (3) Holes.
- (a) The employer must protect employees from falling into or through holes four feet or more to the ground or lower level by one of the following fall protection systems:
 - (i) A standard guardrail system, or the equivalent, as specified in WAC 296-880-40005, on all open sides, except where there is entrance to a ramp, stairway, or ladder. The guardrail must be provided with a standard toeboard wherever, beneath the open sides, persons can pass, or there is moving machinery, or there is equipment with which falling materials could create a hazard;
 - (ii) A cover, as specified in WAC 296-880-40015;
 - (iii) A warning line system erected at least fifteen feet from all unprotected sides or edges of the hole and meets the requirements of WAC 296-880-40040;
 - (iv) When the cover, guardrail system, or warning line system must be temporarily removed to perform a specific task, an employee must remain at the hole until the cover, guardrail system, or warning line system is replaced. The only duty the employee must perform is to warn persons entering the area of the fall hazard. The employee must be protected from the fall hazard by a personal fall arrest system or personal fall restraint system; or
 - (v) Personal fall arrest systems or personal fall restraint systems.
 - (b) The employer must guard skylight holes and skylights.
 - (i) Unprotected skylight holes must be guarded by covers of standard strength and construction, standard guardrail systems on all exposed sides, or employees must be protected by personal fall restraint systems, or personal fall arrest systems.
 - (ii) If the skylight has been installed and is not capable of supporting, without failure, at least twice the weight of employees, equipment, and materials that may be imposed on the skylight at any one time, the skylight must be guarded by a cover of standard strength and construction, a standard guardrail system on all sides, or employees must be protected by personal fall restraint systems, or personal fall arrest systems.
 - (c) The employer must guard hatchways and chute holes by one of the following:
 - (i) Hinged covers of standard strength and construction and a standard guardrail system with only one exposed side. When the hole is not in use, the cover must be closed or the exposed side must be guarded at both top and intermediate positions by removable standard guardrail systems; or
 - (ii) A removable standard guardrail system with toeboard on not more than two sides of the hole and fixed standard guardrail system with toeboards on all other exposed sides. The removable guardrail must be kept in a place when the hole is not in use and must be hinged or otherwise mounted so as to be conveniently replaceable.
 - (d) The employer must guard ladderways or platforms by a standard guardrail system with standard toeboards on all exposed sides, except at the entrance to a hole, with the passage through the guardrail either provided with a swinging gate or so offset that a person cannot walk directly into the hole.
 - (e) The employer must guard pits and trap door holes by covers of standard strength and construction. While the cover is not in place, the pit or trap door holes must be protected on all exposed sides by a standard guardrail system.
 - (f) The employer must guard repair pits, service pits, and assembly pits by a cover, a guardrail system, a fall restraint system or fall arrest system.

- (g) The employer must guard manholes by standard covers which need not be hinged in place. While the cover is not in place, the hole must be constantly attended or must be protected by a removable standard guardrail system.
- (4) Guarding of openings. The employer must ensure that each employee working on, at, above, or near openings (including those with chutes attached) where the outside bottom edge of the opening is four feet or more above a lower level and the inside bottom edge of the opening is less than thirty-nine inches above the working surface, are protected from falling by the use of a guardrail system, a safety net system, a personal fall arrest system, or personal fall restraint system.
- (5) Fall protection during form and reinforcing work. The employer must ensure that employees exposed to fall hazards of four feet or more while placing or tying reinforcing steel or working on the face of formwork or reinforcing steel are protected by personal fall arrest systems, positioning device systems, or safety net systems.
- (6) Fall protection on steep pitched roofs. Regardless of the work activity, the employer must ensure that employees exposed to fall hazards of four feet or more while working on a roof with a pitch greater than four in twelve use one of the following:
- Personal fall restraint system. Safety monitor systems and warning line systems are prohibited on steep pitched roofs;
 - A personal fall arrest system; or
 - A positioning device system.
- (7) Fall protection on low pitched roofs. The employer must ensure that employees exposed to fall hazards of four feet or more while engaged in work, other than roofing work or constructing a leading edge on low pitched roofs use one of the following:
- A personal fall restraint system;
 - A personal fall arrest system;
 - A positioning device system;
 - A warning line system;
 - A standard guardrail system.
- ~~(f) Safety watch system when one employee is conducting repair work or servicing equipment on a low pitch roof four feet or more above a lower level, employers are allowed to use a safety watch system in accordance with WAC 296-880-40050.~~
- (f) Safety watch system when work, other than construction work, is performed that is both infrequent and temporary, and not within six feet of the roof edge.
- EXCEPTION:**
When work, other than construction work, is performed fifteen feet or more from the roof edge, the employer is not required to provide any fall protection, provided the work is both infrequent and temporary and the employer implements and enforces a work rule prohibiting employees from going within fifteen feet of the roof edge without using fall protection in accordance with WAC 296-880-20005(7)(a) through (f).
- (8) Hazardous slopes. Employees exposed to fall of four feet or more while performing construction work on a hazardous slope must use personal fall restraint systems or positioning device systems.

Commented [SES(6): Updated so as not to include construction activities.

Commented [SES(7): Current language from OSHA 1910.28(b)(13)(iii) Considering inclusion into the standard due to concerns with safety watch.

- (9) Vehicles and rolling stock. The employer must ensure that employees exposed to fall hazards of four feet or more to the ground or lower level from vehicles or rolling stock on which employees must be located in order to perform their job duties are protected by fall arrest systems, fall restraint systems, or positioning device systems.

EXCEPTION:

Where suitable anchorages cannot be provided or when the use of fall protection creates a greater hazard, work may be performed on vehicles or rolling stock without a fall protection system.

WAC 296-880-20010 Exemption from fall protection requirements in this section.

Employees are exempt from WAC 296-880-20005 under the following conditions:

Discussion draft

- (1) During initial installation of the fall protection anchor prior to engaging in any work activity, or the disassembly of the fall protection anchor after all work activities have been completed.
- (2) When employees are inspecting, investigating, or assessing roof level conditions or work to be performed only on low pitch roofs prior to the start of any work activity or after all work activities have been completed.

This exemption does not apply on steep pitch roofs, where construction work is underway, or when fall protection systems or equipment meeting the requirements of this chapter have been installed and are available for workers to use for pre-work and post-work inspections, investigations, or assessments.

Note: Examples of activities the department recognizes as inspecting or estimating include:

- Measuring a roof to determine the amount of materials needed for a project;
- Inspecting a roof for damage without removing equipment or components; and
- Assessing the roof to determine what methods of fall protection will be provided employees.

Note: Examples the department does not recognize as inspecting or estimating under this exemption include:

- Delivering, staging or storing materials on a roof; and
- Persons estimating or inspecting on roofs that would be considered “hazardous slope” be definition.

WAC 296-880-300 Specific fall protection requirements.

This section addresses specific fall protection requirements not already addressed in WAC 296-880-200 of this chapter.

WAC 296-880-30005 Construction work.

This section applies to work activities under the scope of chapter 296-155 WAC, Safety standards for construction work, unless specifically addressed in WAC 296-880-200 of this chapter.

~~(1) The employer must ensure that a fall arrest system, fall restraint system, or positioning device system is provided, installed, and implemented in accordance with this chapter when employees are exposed to fall hazards of ten feet or more to the ground or lower level while:~~

(1) The employer must ensure that a fall arrest system, fall restraint system, or positioning device system is provided, installed, and implemented in accordance with this chapter WAC 296-880-400 Fall protection system specifications when employees are exposed to fall hazards of six feet or more to the ground or lower level while:

- (a) Engaged in roofing work on a low pitched roof;
- (b) Constructing a leading edge;

EXCEPTION:
Employees not directly involved with constructing the leading edge, or are not performing roofing work must comply with WAC 296-880-200 Fall protection required at four feet or more.

Commented [SES(8): Updated subsection to address roofing work on low pitch roof and constructing a leading edge at six feet or more.

(2) The employer must ensure that a fall arrest system, fall restraint system, or positioning device system is provided, installed, and implemented in accordance with WAC 296-880-400 Fall protection system specifications when employees are exposed to fall hazards of ten feet or more to the ground or lower level while:

- (a) Engaged in the erection or placement of structural members.

EXCEPTION:
When the erection or placement of structural members is performed on or from a floor, deck, roof, or similar surface you must comply with WAC 296-880-200 Fall protection required at four feet or more.

Commented [SES(9): New subsection for erection or placement of structural members and excavation operations at ten feet or more.

- (b) Engaged in excavation and trenching operations.
 - (i) Exceptions. Fall protection is not required at excavations when employees are:
 - (A) Directly involved with the excavation process and on the ground at the top edge of the excavation; or
 - (B) Working at an excavation site where appropriate sloping of side walls has been implemented as the excavation protective system.
 - (ii) Fall protection is required for employees standing in or working in the affected area of a trench or excavation exposed to a fall hazard of ten feet or more; and:
 - (A) The employees are not directly involved with the excavation process; or
 - (B) The employees are on the protective system or any other structure in the

excavation.

Discussion draft

Note: Persons considered directly involved in the excavation process include:

1. Foreman of the crew.
2. Signal person.
3. Employee hooking on pipe or other materials.
4. Grade person.
5. State, county, or city inspectors inspecting the excavation or trench.
6. An engineer or other professional conducting a quality-assurance inspection.

- (2) Employees are exempt from WAC 296-880-30005 under the following conditions:
- (a) During initial installation of the fall protection anchor prior to engaging in any work activity, or the disassembly of the fall protection anchor after all work activities have been completed;
 - (b) When employees are inspecting, investigating, or assessing roof level conditions or work to be performed only on low pitch roofs prior to the start of construction work or after all construction work has been completed;

This exemption does not apply on steep pitch roofs, where construction work is underway, or when fall protection systems or equipment meeting the requirements of this chapter have been installed and are available for workers to use for pre-work and post-work inspections, investigations, or assessments.

Note: Examples of activities the department recognizes as inspecting or estimating include:

- Measuring a roof to determine the amount of materials needed for a project;
- Inspecting a roof for damage without removing equipment or components; and
- Assessing the roof to determine what method of fall protection will be provided to employees.

Note: Examples the department does not recognize as inspecting or estimating under this exemption include:

- Delivering, staging, or storing materials on a roof; and
- Persons estimating or inspecting on roofs that would be considered “hazardous slope” by definition.

- (c) When employees must be located on vehicles, or rolling stock in order to perform their job duties.

WAC 296-880-30010 Order pickers (PITS).

This section applies to powered industrial trucks under the scope of chapter [296-863](#) WAC, Forklifts and other powered industrial trucks.

- (1) The employer must ensure all persons operating an order picker are protected by standard guardrails on all open sides; or
- (2) A full body harness and lanyard that are connected to a tie-off point that has been approved by the PIT manufacturer.

Additional requirements for powered industrial trucks can be found in chapter [296-863](#) WAC, Forklifts and other powered industrial trucks.

WAC 296-880-30015 Elevating work platforms.

- (1) This section applies to the following types of elevating work platforms covered under the scope of chapter [296-869](#) WAC, Elevating work platforms:
 - (a) Aerial lifts;
 - (b) Manually propelled elevating work platforms that have a platform that cannot be positioned completely beyond the base;
 - (c) Self-propelled elevating work platforms that have a platform that cannot be positioned completely beyond the base;
 - (d) Boom-supported elevating work platforms that have a boom-supported platform that can be positioned completely beyond the base.

EXEMPTION: This section does not apply to elevating work platforms used:

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|--|
| <ol style="list-style-type: none"> 1. By the fire services for combat that are covered by chapter 296-305 WAC, Safety standards for firefighters; or 2. For agriculture activities covered by chapter 296-307 WAC, Safety standards for agriculture. |
|--|
- (2) This subsection applies to vehicle mounted aerial devices. Before elevating the platform, the employer must ensure all persons on the platform wear a full body harness with a lanyard attached to either:
 - (a) The manufacturer's recommended attachment point; or
 - (b) The boom or platform if the manufacturer does not specify an attachment point.

The employee must never attach a lanyard to an adjacent pole, structure, or equipment.
 - (3) This subsection applies to manually propelled and self-propelled elevating work platforms. Before elevating the platform, the employer must ensure all persons on the platform are wearing fall protection devices and other safety gear, if required by the manufacturer of the platform.
 - (4) This subsection applies to boom supported elevating work platforms. Before elevating the platform, the employer must ensure all persons on the platform of boom-supported elevating work platforms wear a full body harness and lanyard fixed to manufacturer provided and approved attachment points.

Additional requirements for elevating work platforms can be found in chapter [296-869](#) WAC, Elevating work platforms.

WAC 296-880-30020 Powered platforms.

This section applies to permanent powered platform installations dedicated to interior or exterior building maintenance of a specific structure or group of structures under the scope of chapter [296-870](#) WAC, Powered platforms.

- (1) Building owner certifications. The employer must obtain written certification from the building owner of any building with a powered platform installation that was completed or had major modification done after July 23, 1990, that the building and equipment meets the requirements of new installations-buildings in WAC [296-870-600](#) and new installations-equipment in WAC [296-870-700](#).

Note: The building owner needs to base the certification on:

1. The field test of the installation done before it is first placed into service or following any major modification to an existing installation; and
2. All other relevant information including, but not limited to:
 - a. Test data;
 - b. Equipment specifications;
 - c. Verification by a registered professional engineer.

- (2) The employer must obtain written certification from the building owner that the installation:
 - (a) Has been inspected, tested, and maintained as required by inspection, testing, and maintenance in WAC [296-870-300](#); and
 - (b) All fall protection anchorages meet the requirements of WAC 296-880-40020.
- (3) The employer must prohibit employees from using the installation until the building owner has provided the required written certifications.
- (4) The employer must protect employees on working platforms with a personal fall arrest system that meets the requirements of WAC 296-880-40020.
- (5) The employer must ensure employees working on a roof or other elevated working surface four feet or more above a lower level are protected in accordance with WAC 296-880-200.

Additional requirements for powered platforms can be found in chapter [296-870](#) WAC, Powered platforms.

WAC 296-880-30025 Window cleaning.

This section applies to all window cleaning activities performed on the inside or outside of a building in which the window cleaner is working from a level that is located more than four feet above grade or lower level under the scope of chapter [296-878](#) WAC, Safety standards for window cleaning.

- (1) The employer must ensure employees working on a roof or other elevated working surface four feet or more above a lower level are protected in accordance with WAC 296-880-200.
- (2) The employer must ensure all workers suspended from a boatswain's chair or rope descent system use an independent fall arrest system where the fall arrest anchorage is separate from the suspension system anchorage.
- (3) The employer must ensure workers assemble and wear their personal fall arrest equipment before they approach the point of suspension.
- (4) The employer must ensure workers are connected at all times to the fall arrest system while they are suspended.
- (5) The employer must prohibit use of the following equipment for window-cleaning operations:
 - (a) Portable sills;
 - (b) Window jacks;
 - (c) Capstan devices to suspend workers; and
 - (d) Suspension or fall-arrest ropes made entirely of polypropylene that do not have a minimum breaking strength of five thousand pounds (22.2 kN).

Additional requirements for window cleaning can be found in chapter [296-878](#) WAC, Safety standards for window cleaning.

WAC 296-880-30030 Scaffolds.

This section applies to suspended and supported scaffolds under the scope of chapter [296-874](#) WAC, Scaffolds.

- (1) The employer must protect each employee on a scaffold from falling ten feet or more to a lower level, by providing either:
 - (a) A personal fall arrest system; or
 - (b) Guardrails.
- (2) The employer must ensure personal fall arrest systems are attached by a lanyard to one of the following:
 - (a) Vertical lifeline;
 - (b) Horizontal lifeline; or
 - (c) Appropriate structural member of the scaffold.

Note: Specifications for these personal fall arrest systems can be found in WAC 296-880-40020.

Note: Specifications for guardrail systems used with scaffolds can be found in subsection (8) of this section.

Note: Specifications for vertical lifelines can be found in subsection (9) of this section.

Note: Specifications for horizontal lifelines can be found in subsection (10) of this section.

- (3) Provide fall protection for persons erecting or dismantling supported scaffolds.
 - (a) The employer must have a competent person determine the feasibility of providing fall protection for persons erecting or dismantling supported scaffolds.
 - (b) The employer must provide fall protection if the installation and use of fall protection is:
 - (i) Feasible; and
 - (ii) Does not create a greater hazard.
- (4) The employer must ensure employees erecting the scaffold install the guardrail system, if required, before the scaffold is used by any other employees.
- (5) Provide fall protection if a scaffold is too far from the work face. The employer must provide a guardrail system along the front edge of the platform, or have employees use a personal fall arrest system, if the distance from the front edge of the platform to the work face is greater than:
 - (a) Eighteen inches (46 cm) for scaffolds used for plastering and lathing operations;
 - (b) Fourteen inches (36 cm) for all other scaffolds.
- (6) Provide specific types of fall protection for specific types of scaffolds.
 - (a) The employer must use a personal fall arrest system to protect employees on the following scaffolds:

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- (i) Boatswain's chair;
 - (ii) Catenary scaffold;
 - (iii) Float scaffold;
 - (iv) Ladder jack scaffold;
 - (v) Needle beam scaffold.
- (b) The employer must use a personal fall arrest system and a guardrail system to protect employees on:
- (i) Single-point adjustable suspension scaffolds; and
 - (ii) Two-point adjustable suspension scaffolds.
- (7) The employer must protect employees working on a self-contained adjustable scaffold that has the platform:
- (a) Supported by the frame structure, using a guardrail system with a minimum two-hundred pound top rail capacity;
 - (b) Suspended by ropes, using:
 - (i) A guardrail system with a minimum two-hundred pound top rail capacity; and
 - (ii) A personal fall arrest system.
- (8) The employer must protect employees on walkways located within a scaffold by using a guardrail system that meets all of the following:
- (a) Has a minimum two-hundred pound top rail capacity;
 - (b) Is installed within nine and one-half inches (24.1 cm) of the walkway; and
 - (c) Is installed along at least one side of the walkway.
- (9) Ensure vertical lifelines used with personal fall arrest systems meet these requirements:
- (a) The employer must make sure vertical lifelines are all of the following:
 - (i) Fastened to a fixed, safe point of anchorage;
 - (ii) Independent of the scaffold; and
 - (iii) Protected from sharp edges and abrasion.
- Note:** Safe points of anchorages include structural members of buildings, but do not include:

 - 1. Standpipes, vents, or other piping systems;
 - 2. Electrical conduit;
 - 3. Outrigger beams; and
 - 4. Counter weights.
- (b) The employer must ensure vertical lifelines, independent support lines, and suspension ropes are not attached to any of the following:
- (i) Each other;
 - (ii) The same point of anchorage; or
 - (iii) The same point on the scaffold.

- (c) The employer must ensure vertical lifelines, independent support lines, and suspension ropes do not use the same point of anchorage.
 - (d) The employer must ensure independent support lines and suspension ropes are not attached to a personal fall arrest system.
 - (e) The employer must ensure vertical lifelines are not used with single-point or two-point adjustable suspension scaffolds that have overhead components such as overhead protection or additional platform levels.
- (10) Ensure horizontal lifelines used with personal fall arrest systems meet these requirements:
- (a) The employer must equip single-point or two-point adjustable suspension scaffolds that use horizontal lifelines or structural members of the scaffold for fall protection with both of the following:
 - (i) Additional independent support lines that are equal in number and equivalent in strength to the suspension ropes; and
 - (ii) Automatic locking devices capable of stopping the scaffold from falling if one or both of the suspension ropes fail.
 - (b) The employer must make sure horizontal lifelines are secured to either:
 - (i) Two or more structural members of the scaffold; or
 - (ii) Looped around both the suspension ropes and independent support lines above the hoist and brake attached to the end of the scaffold.
 - (c) The employer must ensure independent support lines and suspension ropes are not:
 - (i) Attached to each other or the same point on the scaffold;
 - (ii) Attached to or use the same point of anchorage.
 - (d) The employer must ensure independent support lines and suspension ropes are not attached to either:
 - (i) A personal fall arrest system; or
 - (ii) The same point on the scaffold as a personal fall arrest system.
 - (e) The employer must ensure, if a horizontal lifeline is used where it may become a vertical lifeline, that the device used to connect a lanyard to the horizontal lifeline is capable of locking in both directions on the lifeline.
- (11) The employer must ensure independent support lines and suspension ropes are not:
- (a) Attached to each other or the same point on the scaffold;
 - (b) Attached to or use the same point of anchorage.
- (12) The employer must ensure independent support lines and suspension ropes are not attached to either:
- (a) A personal fall arrest system; or
 - (b) The same point on the scaffold as a personal fall arrest system.
- (13) The employer must ensure, if a horizontal lifeline is used where it may become a vertical lifeline, that the device used to connect a lanyard to the horizontal lifeline is capable of locking in both directions on the lifeline.
- (14) The employer must ensure guardrails, if required, are installed along all open sides and ends of platforms.

EXEMPTION:

For employees doing overhand bricklaying operations from a supported scaffold, a guardrail is not required on the side next to the wall.

- (15) The employer must ensure the height of the top rail, top edge, or the equivalent member, of supported scaffolds is:
 - (a) At least thirty-six inches (0.9 m) and not more than forty-five inches (1.2 m) above the platform surface for scaffolds manufactured or first placed in service before January 1, 2000;
 - (b) At least thirty-eight inches (0.97 m) and not more than forty-five inches (1.2 m) above the platform surface for scaffolds manufactured or first placed in service after January 1, 2000;
 - (c) The employer must ensure the height of the top rail, top edge, or the equivalent member, of suspended scaffolds that require guardrails and personal fall arrest systems, is at least thirty-six inches (0.9 m) and not more than forty-five inches (1.2 m) above the platform surface.

EXEMPTION:

When conditions warrant, the height of the top edge of the top rail may be greater than forty-five inches if the guardrail meets all other criteria of this section.

- (16) The employer must make sure the top edge of the top rail does not drop below the required height when the minimum load, shown in Table 2, Minimum Top Rail and Midrail Strength Requirements, is used.
- (17) The employer must make sure each top rail and midrail, or equivalent member, of a guardrail system is able to withstand, without failure, the force shown in Table 1, Minimum Top Rail and Midrail Strength Requirements, when the force is applied as follows:
 - (a) To the top rail in a downward or horizontal direction at any point along its top edge;
 - (b) To the midrail in a downward or horizontal direction at any point.

Note: Midrail includes screens, mesh, intermediate vertical members, solid panels, and equivalent structural members of the guardrail system.

Table 1 Minimum Top Rail and Midrail Strength Requirements

Type of Scaffold	Top Rail Capacity	Midrail Capacity
Single-point adjustable suspension scaffolds	100 pounds (445 N)	75 pounds (333 N)
Two-point adjustable suspension scaffolds		
All other scaffolds Walkways within a scaffold	200 pounds (890 N)	150 pounds (666 N)

- (18) The employer must install midrails, screens, mesh, intermediate vertical members, solid panels, or equivalent structural members as follows:
- (a) Midrails at a height approximately midway between the top edge of the guardrail system and the platform surface;
 - (b) Screens and mesh:
 - (i) From the top edge of the guardrail system to the scaffold platform; and
 - (ii) Along the entire opening between the supports.
 - (c) Intermediate members, such as balusters or additional rails, not more than nineteen inches (48 cm) apart.
- (19) The employer must make sure steel or plastic banding is not used as a top rail or midrail.
- (20) The employer must have a competent person inspect manila rope and plastic or other synthetic rope that is used as a top rail or midrail as frequently as necessary to make sure it continues to meet the strength requirements for a top rail or midrail.

Note: Crossbraces may be used as a top rail or midrail in a guardrail system if they meet the following requirements:

1. The crossing point of the two braces is between:
 - a. 20" and 30" above the work platform when used as a midrail.
 - b. 38" and 48" above the work platform when used as a top rail.
2. The end points at each upright are not more than 48" apart.

Additional requirements for scaffolds can be found in chapter [296-874](#) WAC, Scaffolds.

WAC 296-880-30035 Cranes.

This section applies to all cranes covered under the scope of chapter [296-155](#) WAC, Part L, Cranes, rigging, and personnel lifting.

- (1) Fall protection systems:
- (a) Personal fall arrest systems must conform to the criteria in WAC 296-880-40020.
 - (b) Personal fall restraint systems must conform to the criteria in WAC 296-880-40025.
 - (c) Positioning device systems must conform to the criteria in WAC 296-880-40030.
- (2) For nonassembly/disassembly work on cranes/derricks except tower cranes, the employer must provide and ensure the use of fall protection equipment for employees six feet or more above a lower level as follows:
- (a) When moving point-to-point:
 - (i) On nonlattice booms (whether horizontal or not horizontal);
 - (ii) On lattice booms that are not horizontal;
 - (iii) On horizontal lattice booms where the fall distance is ten feet or more above a lower level.
 - (b) While at a work station on any part of the crane (including the boom, of any type).

Note: If the equipment is running and the employee is at or near the draw-works, precautions should be taken to ensure the fall protection gear will not become entangled.

- (3) For assembly/disassembly work on cranes/derricks except tower cranes, the employer must provide and ensure the use of fall protection equipment for employees ten feet or more above a lower level.
- (4) Tower cranes.
 - (a) For work other than erecting, climbing, and dismantling, the employer must provide and ensure the use of fall protection equipment for employees six feet or more above a lower level.

Note: If the equipment is running and the employee is at or near the draw-works, precautions should be taken to ensure the fall protection gear will not become entangled.

- (b) For erecting, climbing, and dismantling work, the employer must provide and ensure the use of fall protection equipment for employees ten feet or more above a lower level.
- (5) Anchorage criteria applicable to all cranes.
 - (a) Anchorages used for attachment of personal fall arrest equipment must be independent of any anchorage being used to support or suspend platforms and capable of supporting at least five thousand pounds (22.2 kN) per employee attached, or must be designed, installed, and used as follows:
 - (i) As part of a complete personal fall arrest system which maintains a safety factor of at least two; and
 - (ii) Under the supervision of a qualified person.
 - (b) Positioning devices must be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or three thousand pounds (13.3 kN), whichever is greater.
 - (c) Anchorages for personal fall arrest and positioning device systems.
 - (i) Personal fall arrest systems may be anchored to any apparently substantial part of the equipment unless a competent person, from a visual inspection, without an engineering analysis, would conclude that the criteria in (a) of this subsection would not be met.
 - (ii) Positioning device systems may be anchored to any apparently substantial part of the crane unless a competent person, from a visual inspection, without an engineering analysis, would conclude that the criteria in (b) of this subsection would not be met.
 - (iii) Attachable anchor devices (portable anchor devices that are attached to the crane) must meet the anchorage criteria in (a) of this subsection for personal fall arrest systems and (b) of this subsection for positioning device systems.
 - (d) Anchorages for fall restraint systems. Fall restraint systems may be anchored to any part of the crane that is capable of withstanding twice the maximum load that an employee may impose on it during reasonably anticipated conditions of use.
 - (e) Anchoring to the load line. A personal fall arrest system is permitted to be anchored to the crane/derrick's hook (or other part of the load line) where all of the following requirements are met:

- (i) A qualified person has determined that the set-up and rated capacity of the crane/derrick (including the hook, load line, and rigging) meets or exceeds the requirements in (a) of this subsection;
 - (ii) The crane operator must be at the worksite and informed that the crane is being used for this purpose; and
 - (iii) No load is suspended from the load line when the personal fall arrest system is anchored to the crane/derrick's hook (or other part of the load line).
- (6) Training. The employer must train each employee who may be exposed to fall hazards while on, or hoisted by, cranes/derricks covered by this section in accordance with WAC 296-880-10015.

Additional requirements for cranes can be found in chapter [296-155](#) WAC, Part L, Cranes, rigging and personnel lifting.

WAC 296-880-30040 Telecommunication requirements that apply to wireless.

Requirements for telecommunications can be found in chapter [296-32](#) WAC, Safety standards for telecommunications.

WAC 296-880-30045 Ship repairing, shipbuilding and shipbreaking.

This section applies to all ship repairing, shipbuilding and shipbreaking industries and operations under the scope of chapter [296-304](#) WAC, Safety standards for ship repairing, shipbuilding and shipbreaking.

- (1) The employer must provide and ensure the use of fall protection when employees work aloft or elsewhere at elevations more than five feet above a solid surface.
- (2) Guarding of deck openings and edges.
 - (a) When employees are working in the vicinity of flush manholes and other small openings of comparable size in the deck and other working surfaces, such openings must be suitably covered or guarded to a height of not less than thirty inches, except where the use of such guards is made impracticable by the work actually in progress.
 - (b) When employees are working around open hatches not protected by coamings to a height of twenty-four inches or around other large openings, the edge of the opening must be guarded in the working area to a height of thirty-six to forty-two inches, except where the use of such guards is made impracticable by the work actually in progress.
 - (c) When employees are exposed to unguarded edges of decks, platforms, flats, and similar flat surfaces, more than five feet above a solid surface, the edges must be guarded by adequate guardrails meeting the requirements of WAC [296-304-05001](#) (9)(a) and (b), unless the nature of the work in progress or the physical conditions prohibit the use or installation of such guardrails.
 - (d) When employees are working near the unguarded edges of decks of vessels afloat, they must be protected by buoyant personal flotation devices, meeting the requirements of WAC [296-304-09017](#)(1).
 - (e) Sections of bilges from which floor plates or gratings have been removed must be guarded by guardrails except where they would interfere with work in progress. If these open sections are in a walkway at least two ten-inch planks placed side by side, or equivalent, must be laid across the opening to provide a safe walking surface.
 - (f) Gratings, walkways, and catwalks, from which sections or ladders have been removed, must be barricaded with adequate guardrails.

Additional requirements for ship repairing, shipbuilding and shipbreaking can be found in chapter [296-304](#) WAC, Safety standards for ship repairing, shipbuilding and shipbreaking.

WAC 296-880-30050 Longshore, stevedore, and waterfront related operations.

This section applies to any and all waterfront operations under the scope of chapter [296-56](#) WAC, Safety standards—Longshore, stevedore, and waterfront related operations.

- (1) The employer must ensure employees doing maintenance work on cranes, spouts or similar types of equipment, eight feet or more above the ground or surface and not in an area that is protected by any standard safeguards such as walkways with standard railings, or ladders with protective cages, wear a full body harness and lanyard which can be attached to the structure.
- (2) Guarding of edges. The employer must meet the following requirements for employee protection:
 - (a) Guardrails must be provided at locations where employees are exposed to falls of more than four feet from floor or wall openings or waterside edges, including bridges or gangway-like structures leading to pilings, vessel mooring or berthing installations.
 - (b) Guardrails are not required:
 - (i) At loading platforms and docks;
 - (ii) At waterside edges used for cargo or mooring line handling;
 - (iii) On the working sides of work platforms, skids, or similar workplaces which abut the work area; or
 - (iv) On railroad rolling stock, highway vehicles, intermodal containers, or similar equipment.
 - (c) Where guardrails are impractical due to machinery requirements or work processes, an alternate means of fall protection, such as nets, must be used.
- (3) The employer must ensure guardrails meet the following criteria:
 - (a) Guardrails must be capable of withstanding a force of at least two hundred pounds (890 N) applied in any direction at mid-span of the top rail (when used), or at the uppermost point if there is no guardrail.
 - (b) If not of solid baluster, grillwork, slatted, or similar construction, guardrails must consist of top rails and midrails. Midrails, when used, must be positioned at approximately half the height of the top rail.
 - (c) The top surface of guardrails installed before October 3, 1983, must be at least thirty-six inches (.091 m) high. Those installed after October 3, 1983, must be forty-two inches (1.07 m) high, plus or minus two inches (5.1 cm), high.
 - (d) Any nonrigid railing such as chain or wire rope must have a maximum sag, at the mid-point between posts, of not more than six inches (15.24 cm).
 - (e) Top rails must be free of sharp edges and maintained in good repair.
 - (f) Rail ends must not overhang. This does not prohibit scrollwork, boxed ends or similar nonhazardous projections.
- (4) The employer must provide toeboards when employees below could be exposed to falling objects such as tools. Toeboards must be at least three and one-half inches (8.9 cm) in height from top edge to floor level, and be capable of withstanding a force of fifty pounds (222 N) applied in any direction. Drainage clearance not in excess of one-eighth inch under toeboards is permitted.
- (5) Stair railings must be capable of withstanding a force of at least two hundred pounds (890 N) applied in any direction, and must not be more than thirty-six inches (0.91 m) nor less than thirty-

two inches (0.81 m) in height from the upper top rail surface to the tread surface in line with the leading edge of the tread. Railings and midrails must be provided at any stairway having four or more risers, as follows:

- (a) For stairways less than forty-four inches (1.12 m) wide, at least one railing; and
- (b) For stairways more than forty-four inches (1.12 m) but less than eighty-eight inches (2.24 m) wide, a stair rail or handrail on each side, and if eighty-eight or more inches wide, an additional intermediate handrail.

(6) The employer must maintain railings in good repair and free of sharp edges.

Additional requirements for longshore, stevedore and waterfront related operations can be found in chapter [296-56](#) WAC, Safety standards for longshore, stevedore and waterfront related operations.

WAC 296-880-30055 Ski area facilities and operations.

This section applies to all persons, firms, corporations, or others engaged in the operation of organized ski areas and facilities under the scope of chapter [296-59](#) WAC, Safety standards for ski area facilities and operations.

- (1) Personal protective equipment, general requirements.
 - ~~(a) Personal fall arrest systems or personal fall restraint systems must be provided and used whenever employees are working in locations which expose them to a fall hazard of more than ten feet.~~
 - (a) Personal fall arrest systems or personal fall restraint systems must be provided and used when employees are working in locations which expose them to a fall hazard of four feet or more.
 - (b) Employees will not be required to wear personal fall protection systems while riding on a standard lift chair while seated in the normal riding position.
- (2) Ski lift facilities and structures. Personal fall arrest systems or personal fall restraint systems must be used when working at unprotected elevated locations. Exception to this requirement must only be permitted for emergency rescue or emergency inspection if a personal fall arrest system is not immediately available. Required personal protective equipment must be made available as quickly as possible.
- (3) Guardrails on ski lift aerial work platforms.
 - (a) The platform must be equipped with standard height and strength guardrails where such guardrails will pass through the configuration of all lifts on which it is intended to be used.
 - (b) Where guardrails must be less than thirty-nine inches high in order to clear carriages, guidage, etc., guardrails must be as high as will clear the obstructions but never less than twelve inches high.
 - (c) If the work platform is equipped with an upper work level, the upper level platform must be equipped with a toeboard at least four inches high.
 - (d) Each platform must be equipped with a lanyard attachment ring for each permissible occupant to attach a personal fall arrest system or personal fall restraint system.
 - (e) Each lanyard attachment ring must be of such strength as to sustain five thousand four hundred pounds of static loading for each occupant permitted to be attached to a specific ring.
 - (f) Attachment rings must be permanently located as close to the center balance point of the platform as is practical.
 - (g) The rings may be movable, for instance, up and down a central suspension rod, but must not

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be completely removable.

- (4) Work platform use.

Discussion draft

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- (a) Passengers must be provided with and must use the correct personal fall arrest system or personal fall restraint system for the intended work.
 - (b) Any time a passenger's position is not protected by a standard guardrail at least thirty-nine inches high, the individual must be protected by a personal fall restraint system, which will not permit free-fall over the platform edge.
 - (c) When personnel are passengers on a work platform and their work position requires the use of a personal fall arrest or personal fall restraint system, the lanyard must be attached to the work platform, not to the haulrope or tower.

All specifications would be in accordance with WAC 296-880-400.

Additional requirements for ski area facilities and operations can be found in chapter [296-59](#) WAC, Safety standard for ski area facilities and operations.

Discussion draft

WAC 296-880-400 Fall protection system specifications.

This section applies to all fall protection systems under the scope of this chapter unless specifically addressed in WAC 296-880-300.

WAC 296-880-40005 Guardrail systems.

Guardrail systems and their use must conform to the following provisions:

- (1) A standard guardrail system must consist of top rail, intermediate rail, and posts, and must have a vertical height of thirty-nine to forty-five inches from upper surface of top rail to floor, platform, runway, or ramp level. When conditions warrant, the height of the top edge may exceed the forty-five inch height, provided the guardrail system meets all other criteria of this subsection. The intermediate rail must be of at least one-inch by six-inch stock. Other configurations may be used for the top rail when the configuration meets the requirements of (g) of this subsection. The ends of the rails must not overhang the terminal posts except where such overhang does not constitute a projection hazard.
- (2) Minimum requirements for standard guardrail systems under various types of construction are specified in the following items:
 - (a) For wood guardrails, the posts must be of at least two-inch by four-inch stock spaced not to exceed eight feet. The top rail must be of at least two-inch by four-inch stock and each length of lumber must be smooth surfaced throughout the length of the guardrail. The intermediate rail must be of at least one-inch by six-inch stock. Other configurations may be used for the top rail when the configuration meets the requirements of (g) of this subsection.
 - (b) For pipe guardrails, posts and top and intermediate rails must be at least one and one-half inches nominal OD diameter with posts spaced not more than eight feet on centers. Other configurations may be used for the top rail when the configuration meets the requirements of (g) of this subsection.
 - (c) For structural steel guardrails, posts and top and intermediate rails must be of two-inch by two-inch by three-eighths inch angles or other metal shapes of equivalent bending strength, with posts spaced not more than eight feet on centers. Other configurations may be used for the top rail when the configuration meets the requirements of (g) of this subsection.
 - (d) For wire rope guardrails, the top and intermediate rails must meet the strength factor and deflection of (g)(ii) of this subsection. The top rail must be flagged at not more than six foot intervals with high visibility material. Posts must be spaced not more than eight feet on centers. The rope must be stretched taut and must be between thirty-nine and forty-five inches in height at all points. Other configurations may be used for the top rail when the configuration meets the requirements of (h) of this subsection.
 - (e) Guardrail systems must be of such construction that the completed structure is capable of withstanding a load of at least two hundred pounds applied within two inches of the top edge, in any outward or downward direction, at any point along the top edge.
 - (f) When the two hundred pound test load specified in (e) of this subsection is applied in a downward direction, the top edge of the guardrail must not deflect to a height less than thirty-nine inches above the walking/working surface.
 - (g) Guardrails receiving heavy stresses from employees trucking or handling materials must be provided additional strength by the use of heavier stock, closer spacing of posts, bracing, or by other means.
 - (h) Other types, sizes, and arrangements of guardrail construction are acceptable, provided they meet the following conditions:

- (i) A smooth surfaced top rail at a height above floor, platform, runway, or ramp level between thirty-nine and forty-five inches;
 - (ii) When the two hundred pound (890 N) load specified in (e) of this subsection is applied in a downward direction, the top edge of the guardrail must not deflect to a height less than thirty-nine inches (1.0 m) above the walking/working surface. Guardrail system components selected and constructed in accordance with this chapter will be deemed to meet this requirement;
 - (iii) Protection between top rail and floor, platform, runway, ramp, or stair treads, equivalent at least to that afforded by a standard intermediate rail;
 - (iv) Elimination of overhang of rail ends unless such overhang does not constitute a hazard.
- (3) Toeboard specifications.
- (a) A standard toeboard must be a minimum of three and one-half inches in vertical height from the top edge to the level of the walking/working surface. Toeboards may be made of any substantial material, either solid, or with openings not over one inch in greatest dimension. Toeboards must be securely fastened in place with no more than one-quarter inch clearance above the walking/working surface.
 - (b) Where material is piled to such height that a standard toeboard does not provide protection, paneling, or screening from floor to intermediate rail or to top rail must be provided.

WAC 296-880-40010 Ramps, runways, and inclined walkway requirements.

Ramps, runways, and inclined walkways must conform to the following provisions:

- (1) Be at least eighteen inches wide; and
- (2) Not be inclined more than twenty degrees from horizontal and when inclined, they must be cleated or otherwise treated to prevent a slipping hazard on the walking surface.

Note: See WAC 296-880-20005 for guarding ramps, runways, and inclined walkways that are four feet or more above the ground or lower level.

WAC 296-880-40015 Cover requirements—Holes and openings.

Covers and their use must conform to the following provisions:

- (1) Hole covers must be of any material that meets the following strength requirements:
 - (a) Conduits, trenches, and manhole covers and their supports, when located in roadways, and vehicular aisles must be designed to carry a truck rear axle load of at least two times the maximum intended load;
 - (b) Hole covers must be capable of supporting, without failure, at least twice the weight of employees, equipment, and materials that may be imposed on the cover at any one time.
- (2) All covers must be secured when installed so as to prevent accidental displacement by wind, equipment, or employees.
- (3) All temporary covers must be color coded or they must be marked with the word "hole" or "cover" to provide warning of the hazard.
- (4) Barriers and screens used to cover openings must meet the following requirements:
 - (a) Barriers must be of such construction and mounting that, when in place at the opening, the barrier is capable of withstanding a load of at least two hundred pounds applied in any

direction (except upward), with a minimum of deflection at any point on the top rail or corresponding member.

- (b) Screens must be of such construction and mounting that they are capable of withstanding a load of at least two hundred pounds applied horizontally at any point on the near side of the screen. They may be of solid construction of either grill work with openings not more than eight inches long, or of slat work with openings not more than four inches wide with length unrestricted.

WAC 296-880-40020 Personal fall arrest system requirements.

Personal fall arrest systems and their use must conform to the following provisions:

- (1) Personal fall arrest systems:
 - (a) A full body harness must be used.
 - (b) The attachment point of the full body harness must be located in the center of the wearer's back near shoulder level, or above the wearer's head.
 - (c) Lanyards must have a minimum breaking strength of five thousand pounds (22.2 kN).
 - (d) The employer must protect all safety lines and lanyards against being cut or abraded.
 - (e) D-rings and snap hooks must be proof-tested to a minimum tensile load of thirty-six hundred pounds (16 kN) without cracking, breaking, or taking permanent deformation.
 - (f) Snap hooks must be a locking type snap hook designed and used to prevent disengagement of the snap hook by the contact of the snap hook keeper by the connected member.
 - (g) Unless the snap hook is designed for the following connections, snap hooks must not be engaged:
 - (i) Directly to the webbing, rope, or wire rope;
 - (ii) To each other;
 - (iii) To a D-ring to which another snap hook or other connector is attached;
 - (iv) To a horizontal lifeline; or
 - (v) To any object which is incompatibly shaped or dimensioned in relation to the snap hook such that unintentional disengagement could occur by the connected object being able to depress the snap hook keeper and release itself.
 - (h) Hardware must be drop forged, pressed or formed steel, or made of materials equivalent in strength.
 - (i) Hardware must have a corrosion resistant finish, and all surfaces and edges must be smooth to prevent damage to the attached full body harness or lanyard.
 - (j) All components of full body harness systems whose strength is not otherwise specified in this section must be capable of supporting a minimum fall impact load of five thousand pounds (22.2 kN) applied at the lanyard point of connection.
 - (k) Vertical lifelines (droplines) must have a minimum breaking strength of five thousand pounds (22.2 kN), except that self-retracting lifelines and lanyards which automatically limit free fall distance to two feet (.61 m) or less must have a minimum breaking strength of three thousand pounds (13.3 kN).
 - (l) When vertical lifelines (droplines) are used, not more than one employee must be attached to any one lifeline.

- (m) Horizontal lifelines must be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains a safety factor of at least two.
- (2) (a) Anchorages for full body harness systems.
- (b) Anchorages for full body harness systems must be capable of supporting (per employee):
 - (i) Three thousand pounds when used in conjunction with:
 - (A) A self-retracting lifeline that limits the maximum free fall distances to two feet or less; or
 - (B) A shock absorbing lanyard that restricts the forces on the body to nine hundred pounds or less.
 - (ii) Five thousand pounds for all other personal fall arrest system applications, or they must be designed, installed, and used:
 - (A) As part of a complete personal fall arrest system which maintains a safety factor of at least two; and
 - (B) Under the supervision of a qualified person.

Note: The system strength requirements in this section are based on a total combined weight of employee and tools of no more than three hundred ten pounds. If combined weight is more than three hundred ten pounds, appropriate allowances must be made or the system will not be in compliance. For more information on system testing, see WAC 296-880-510 Appendix C.

- (3) When stopping a fall, personal fall arrest systems must:
 - (a) Be rigged to allow a maximum free fall distance of six feet nor allow an employee to contact any lower level. A free fall may be more than six feet provided the employer can demonstrate the manufacturer designed the system to allow a free fall of more than six feet and the system has been tested to ensure a maximum arresting force of eighteen hundred pounds is not exceeded;
 - (b) Limit maximum arresting force on an employee to eighteen hundred pounds (8 kN);
 - (c) Bring an employee to a complete stop and limit maximum deceleration distance an employee travels to three and one-half feet (1.08 m); and
 - (d) Have sufficient strength to withstand twice the potential impact energy of an employee free falling a maximum distance of six feet (1.8 m).

Note: Shock absorbers that meet the requirements of ANSI Z359.1 that are used as a part of a personal fall arrest system in accordance with manufacturer's recommendations and instructions for use and installation will limit the maximum arresting forces on an employee's body to eighteen hundred pounds or less.

To calculate fall clearance distance using a shock absorbing lanyard and D-ring anchorage connector, see WAC 296-880-505 Appendix B.

WAC 296-880-40025 Personal fall restraint system requirements.

Personal fall restraint systems and their use must conform to the following provisions.

Personal fall restraint systems must be rigged to allow the movement of employees only as far as the unprotected sides and edges of the walking/working surface, and must consist of:

- (1) A full body harness must be used.
- (2) The full body harness must be attached to securely rigged restraint lines.
- (3) All hardware assemblies for full body harness must be capable of withstanding a tension loading of four thousand pounds without cracking, breaking, or taking a permanent deformation.
- (4) The employer must ensure component compatibility.
- (5) Anchorage points used for fall restraint must be capable of supporting four times the intended load.
- (6) Rope grab devices are prohibited for fall restraint applications unless they are part of a fall restraint system designed specifically for the purpose by the manufacturer, and used in strict accordance with the manufacturer's recommendations and instructions.

WAC 296-880-40030 Positioning device system requirements.

Positioning device systems and their use must conform to the following provisions:

- (1) Positioning harnesses or full body harnesses must be used.
- (2) Positioning devices must be rigged to prevent an employee from a free fall greater than two feet.
- (3) Positioning devices must be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or three thousand pounds (13.3 kN), whichever is greater.
- (4) Connectors must be drop forged, pressed or formed steel, or made of equivalent materials.
- (5) Connectors must have a corrosion-resistant finish, and all surfaces and edges must be smooth to prevent damage to interfacing parts of this system.
- (6) Connecting assemblies must have a minimum breaking strength of five thousand pounds (22.2 kN).
- (7) D-rings and snap hooks must be proof-tested to a minimum tensile load of three thousand six hundred pounds (16 kN) without cracking, breaking, or taking permanent deformation.
- (8) Snap hooks must be a locking type snap hook designed and used to prevent disengagement of the snap hook by the contact of the snap hook keeper by the connected member.
- (9) Unless the snap hook is designed for the following connections, snap hooks must not be engaged:
 - (a) Directly to webbing, rope, or wire rope;
 - (b) To each other;
 - (c) To a D-ring to which another snap hook or other connector is attached;
 - (d) To a horizontal lifeline; or
 - (e) To any object which is incompatibly shaped or dimensioned in relation to the snap hook such that unintentional disengagement could occur by the connected object being able to depress the snap hook keeper and release itself.

WAC 296-880-40035 Self-rescue device requirements.

Self-rescue devices and their use must conform to the following provisions:

- (1) Self-rescue devices are not to be used as a fall protection system.
- (2) Self-rescue devices must be used according to the manufacturer's instructions.

- (3) The use of self-rescue devices must be addressed in the fall protection work plan.

WAC 296-880-40040 Warning line system requirements.

Warning line systems and their use must conform to the following provisions:

Warning line system specifications used on roofs with a pitch of four in twelve or less for roofing work, leading edge work and on low pitched open sided surfaces for work activities other than roofing work or leading edge work. The employer must ensure the following:

- (1) Warning lines must be erected around all unprotected sides and edges of the work area.
 - (a) Warning lines used during roofing work:
 - (i) When roofing work is taking place or when mechanical equipment is not being used, the warning line must be erected not less than six feet (1.8 m) from the edge of the roof;
 - (ii) When mechanical equipment is being used, the warning line must be erected not less than six feet (1.8 m) from the roof edge which is parallel to the direction of mechanical equipment operation, and not less than ten feet (3.1 m) from the roof edge which is perpendicular to the direction of mechanical equipment operation.
 - (b) Warning lines erected for leading edge work. Warning lines must be erected to separate employees who are engaged in leading edge work (between the forward edge of the warning line and the leading edge), from other work areas on the low pitched surface. The employer must ensure:
 - (i) The warning line is erected not less than six feet nor more than twenty-five feet from the leading edge; and
 - (ii) When fall arrest systems as described in WAC 296-880-40020, or fall restraint systems as described in WAC 296-880-40025 are not used, the employer must implement a safety monitor system as described in WAC 296-880-40045 to protect employees engaged in constructing the leading edge who are working between the forward edge of the warning line and the leading edge.
 - (c) Warning lines erected on low pitched open sided surfaces for work activities other than roofing work, or leading edge work must be erected not less than fifteen feet from the unprotected sides or edges of the open sided surface.
- (2) The warning line must consist of a rope, wire, or chain and supporting stanchions erected as follows:
 - (a) The rope, wire, or chain must be flagged at not more than six foot (1.8 m) intervals with high visibility material. Highly visible caution or danger tape as described in (d) of this subsection, does not need to be flagged.
 - (b) The rope, wire, or chain must be rigged and supported in such a way that its lowest point (including sag) is no less than thirty-six inches from the surface and its highest point is no more than forty-five inches from the surface.
 - (c) After being erected, with the rope, wire or chain attached, stanchions must be capable of resisting, without tipping over, a force of at least sixteen pounds (71 N) applied horizontally against the stanchion, thirty inches (0.76 m) above the surface, perpendicular to the warning line, and in the direction of the unprotected sides or edges of the surface.
 - (d) The rope, wire, or chain must have a minimum tensile strength of five hundred pounds (2.22 kN), and after being attached to the stanchions, must be capable of supporting, without breaking, the loads applied to the stanchions. Highly visible caution or danger tape may be

used in lieu of rope, wire, or chain as long as it is at least three inches wide and three mils thick, and has a tensile strength of at least two hundred pounds.

- (e) The line must be attached at each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in adjacent sections before the stanchion tips over.
- (3) The employer must erect access paths as follows:
- (a) Points of access, materials handling areas, and storage areas must be connected to the work area by a clear access path formed by two warning lines.
 - (b) When the path to a point of access is not in use, the employer must place a rope, wire, or chain, equal in strength and height to the warning line, across the path at the point where the path intersects the warning line erected around the work area.

WAC 296-880-40045 Safety monitor system requirements.

Safety monitor systems and their use must conform to the following provisions:

- (1) A safety monitor system may be used in conjunction with a warning line system as a method of fall protection during roofing work on low pitched roofs or leading edge work on low pitched surfaces.

Note: The warning line is not required when performing roofing work on low pitched roofs less than fifty feet wide. For information on determining roof widths, see WAC 296-880-500, Appendix A, Determining roof widths.

- (2) When selected, the employer must ensure that the safety monitor system is addressed in the fall protection work plan, including the name of the safety monitor(s) and the extent of their training in both the safety monitor and warning line systems. The employer must ensure that the following requirements are met:
- (a) The safety monitor system must not be used when adverse weather conditions create additional hazards.
 - (b) Employees working outside of the warning line system, (between the forward edge of the warning line and the unprotected sides or edges of a low pitched surface), must be readily distinguishable from other members of the crew that are working inside the warning line system by wearing highly visible, distinctive, and uniform apparel.
 - (c) Employees must promptly comply with fall hazard warnings from the safety monitor.
 - (d) The employer must train a person acting in the capacity of safety monitor(s) in the function of both the safety monitor and warning line systems, and they must:
 - (i) Be a competent person as defined in WAC 296-880-095;
 - (ii) Have control authority over the work as it relates to fall protection;
 - (iii) Be instantly distinguishable over members of the work crew;
 - (iv) Perform no other duties while acting as safety monitor;
 - (v) Be positioned in relation to the workers under their protection, so as to have a clear, unobstructed view and be able to maintain normal voice communication;
 - (vi) Not supervise more than eight exposed workers at one time; and
 - (vii) Warn the employee when it appears that the employee is unaware of a fall hazard or is acting in an unsafe manner.

WAC 296-880-40050 Safety watch system requirements.

Safety watch systems and their use must conform to the following provisions:

- ~~(1) When one employee is conducting any repair work or servicing equipment on a low pitch roof, not within six feet of the edge, and where exposure to falls is infrequent (not on a predictable and regular basis), employers are allowed to use a safety watch system.~~
- (1) When one employee is conducting work, other than construction work, on a low pitch roof, not within six feet of the roof edge and when the work is both infrequent and temporary, employers are allowed to use a safety watch system.
- (2) The employer must ensure the safety watch system meets the following requirements:
 - ~~(a) There can only be two people on the roof while the safety watch system is being used: One employee acting as the safety watch and one employee engaged in the repair work or servicing equipment;~~
 - (a) There can only be two people on the roof while the safety watch system is being used: One employee acting as the safety watch and one employee engaged in the work activity;
 - ~~(b) The employee performing the repair work or service must comply promptly with fall hazard warnings from the safety watch;~~
 - (b) The employee performing the work must comply promptly with fall hazard warnings from the safety watch;
 - (c) Mechanical equipment is not used; and
 - (d) The safety watch system is not used when weather conditions create additional hazards.
- (3) The employer must ensure the employee acting as the safety watch meets all of the following:
 - (a) Is a competent person as defined in WAC 296-880-095;
 - (b) Is trained in the requirements of this section;
 - (c) Has full control over the work as it relates to fall protection;
 - (d) Has a clear, unobstructed view of the worker;
 - (e) Is able to maintain normal voice communication; and
 - (f) Performs no other duties while acting as the safety watch.

Commented [SES(11): Updated so as not to include construction activities and replace 'predictable and regular' with 'infrequent and temporary.'

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WAC 296-880-40055 Safety net system requirements.

Safety net systems and their use must conform with the following provisions:

- (1) Safety nets must be installed as close as practicable under the surface on which employees are working, but in no case more than thirty feet (9.1 m) below such level unless specifically approved in writing by the manufacturer. The potential fall area to the net must be unobstructed.
- (2) Safety nets must extend outward from the outermost projection of the work surface as follows:

Table 2

Vertical distance from working levels to horizontal plane of net	Minimum required horizontal distance of outer edge of net from the edge of the working surface
Up to 5 feet	8 feet

More than 5 feet up to 10 feet	10 feet
More than 10 feet	13 feet

- (3) The employer must install safety nets with sufficient clearance under them to prevent contact with the surface or structures below when subjected to an impact force equal to the drop test specified in subsection (5) of this section.

Discussion draft

- (4) Safety nets and their installations must be capable of absorbing an impact force equal to that produced by the drop test.
 - (a) Except as provided in subsection (6) of this section, safety nets and safety net installations must be drop-tested at the job site after initial installation and before being used as a fall protection system, whenever relocated, after major repair, and at six-month intervals if left in one place. The drop-test must consist of a four hundred pound (180 kg) bag of sand, thirty plus or minus two inches (76 plus or minus 5 cm) in diameter dropped into the net from the highest walking/working surface at which employees are exposed to fall hazards, but not from less than forty-two inches (1.1 m) above that level.
 - (b) When the employer can demonstrate that it is unreasonable to perform the drop-test required by (a) of this subsection, the employer (or a designated competent person) must certify that the net and net installation is in compliance with subsections (2) and (3) of this section by preparing a certification record prior to the net being used as a fall protection system. The certification record must include an identification of the net and net installation for which the certification record is being prepared; the date that it was determined that the identified net and net installation were in compliance with subsection (5) of this section and the signature of the person making the determination and certification. The most recent certification record for each net and net installation must be available at the job site for inspection.
- (5) The employer must inspect safety nets at a minimum of once a week for wear, damage, and other deterioration. Defective components must be removed from service. Safety nets must also be inspected after any occurrence which could affect the integrity of the safety net system.
- (6) The employer must remove materials, scrap pieces, equipment, and tools which have fallen into the safety net as soon as possible from the net and at least before the next work shift.
- (7) The maximum size of each safety net mesh opening must not exceed thirty-six square inches (230 cm²) nor be longer than six inches (15 cm) on any side, and the opening, measured center-to-center of mesh ropes or webbing, must not be longer than six inches (15 cm). All mesh crossings must be secured to prevent enlargement of the mesh opening.
- (8) Each safety net (or section of it) must have a border rope or webbing with a minimum breaking strength of five thousand pounds (22.2 kN).
- (9) Connections between safety net panels must be as strong as integral net components and must be spaced not more than six inches (15 cm) apart.

WAC 296-880-40060 Catch platform requirements.

Catch platforms and their use must comply with the following provisions:

- (1) Catch platforms must be installed within four vertical feet of the work area.
- (2) Catch platforms must be a minimum of forty-five inches wide and equipped with standard guardrails and toeboards on all open sides.
- (3) Catch platforms must meet the strength and stability requirements of supported scaffolds in chapter [296-874](#) WAC, Scaffolds.

WAC 296-880-40065 Canopy requirements.

Canopies and their use must comply with the following provision: Canopies, when used as falling object protection, must be of sufficient strength to prevent collapse and to prevent penetration by any objects which may fall onto the canopy.

WAC 296-880-40070 Roof bracket requirements.

Roof brackets and their use must comply with the following provisions: Roofing brackets are not a fall protection system.

- (1) Roofing brackets must be constructed to fit the pitch of the roof.
- (2) In addition to securing brackets using the pointed metal projections, brackets must also be secured in place by nailing. When it is impractical to nail brackets, rope supports must be used. When rope supports are used, they must consist of first grade manila of at least three-quarter inch diameter, or equivalent.

WAC 296-880-40075 Crawling board and chicken ladder requirements.

Crawling boards, chicken ladders, and their use must conform with the following provisions: Crawling boards and chicken ladders are not fall protection systems.

- (1) Crawling boards must be not less than ten inches wide and one inch thick, having cleats one by one and one-half inches:
 - (a) The cleats must be equal in length to the width of the board and spaced at equal intervals not to exceed twenty-four inches.
 - (b) Nails must be driven through and clinched on the underside.
 - (c) The crawling board must extend from the ridge pole to the eaves when used in connection with roof construction, repair, or maintenance.
- (2) Crawling boards must be secured to the roof using ridge hooks or other equivalent means.

WAC 296-880-40080 Roof edge materials handling and material storage requirements.

Roof edge materials handling areas and materials storage must conform with the following provisions:

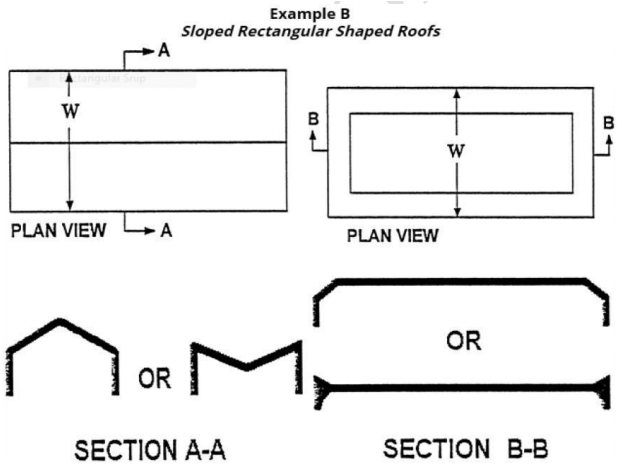
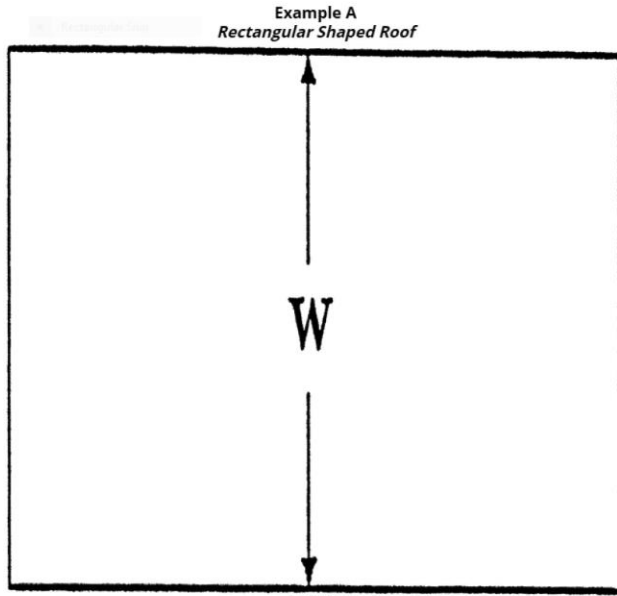
- (1) When guardrails are used at hoisting areas, a minimum of four feet of guardrail must be erected along each side of the access point through which materials are hoisted.
- (2) A chain or gate must be placed across the opening between the guardrail sections when hoisting operations are not taking place.
- (3) When guardrails are used at bitumen pipe outlet, a minimum of four feet of guardrail must be erected along each side of the pipe.
- (4) Mechanical equipment must be used or stored only in areas where employees are protected using a fall arrest system as described in WAC 296-880-40020, or a fall restraint system as described in WAC 296-880-40025. Mechanical equipment may not be used or stored where the only protection is provided by the use of a safety monitor.
- (5) The hoist must not be used as an attachment/anchorage point for fall arrest or fall restraint systems.
- (6) Materials must not be stored within six feet of a roof edge unless guardrails are erected at the roof edge. Guardrails must include a toeboard if employees could be working or passing below.

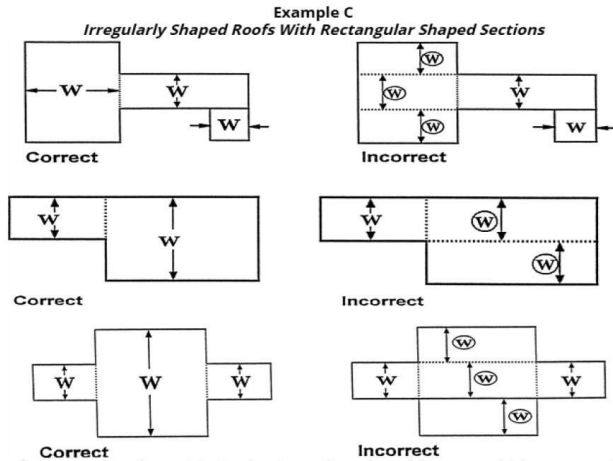
NONMANDATORY APPENDICES

**WAC 296-880-500 Appendix A—Determining roof widths—
Nonmandatory guidelines.**

Guidelines for complying with fall restraint requirements in this section.

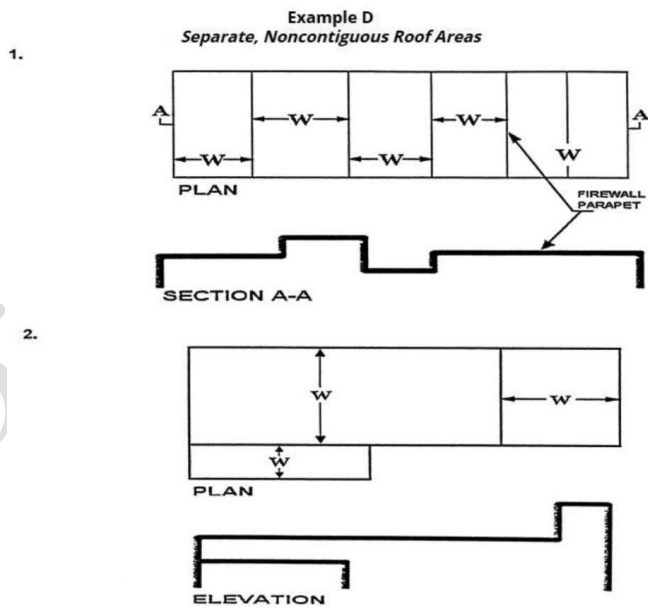
- (1) This appendix serves as a guideline to assist employers complying with the requirements of WAC 296-880-40045 which allows the use of a safety monitoring system alone as a means of providing fall protection during the performance of roofing operations on low sloped roofs fifty feet (15.25 m) or less in width. Each example in the appendix shows a roof plan or plans and indicates where each roof or roof area is to be measured to determine its width. Section views or elevation views are shown where appropriate. Some examples show “correct” and “incorrect” subdivisions of irregularly shaped roofs divided into smaller, regularly shaped areas. In all examples, the dimension selected to be the width of an area is the lesser of the two primary dimensions of the area, as viewed from above. Example A shows a simple rectangular roof. The width is the lesser of the two primary overall dimensions, which is also the case with roofs sloped toward or away from the roof center, as shown in Example B.
- (2) Many roofs are not simple rectangles. Such roofs may be broken down into subareas as shown in Example C. The process of dividing a roof area can produce many different configurations. Example C gives the general rule of using dividing lines of minimum length to minimize the size and number of the areas which are potentially less than fifty feet (15.25 m) wide. The intent is to minimize the number of roof areas where safety monitoring systems alone are sufficient protection.
- (3) Roofs which are comprised of several separate, noncontiguous roof areas, as in Example D, may be considered as a series of individual roofs. Some roofs have penthouses, additional floors, courtyard openings, or similar architectural features, Example E shows how the rule for dividing roofs into subareas is applied to such configurations. Irregular, nonrectangular roofs must be considered on an individual basis, as shown in Example F.

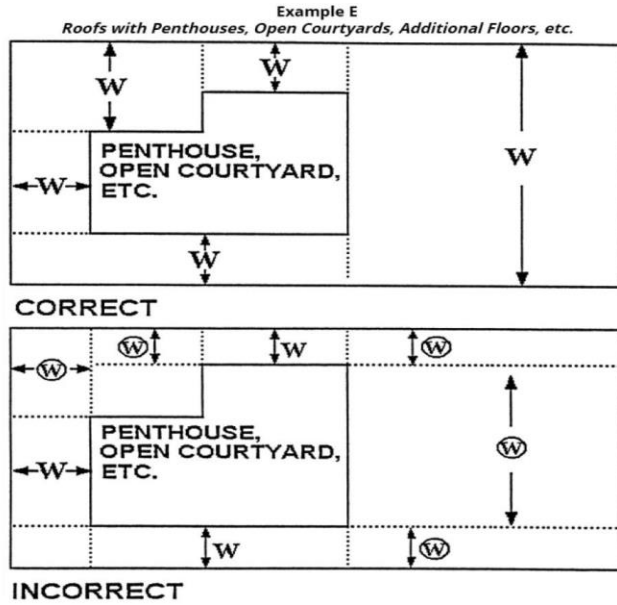




Such roofs are to be divided into subareas by using dividing lines of minimum length to minimize the size and number of the areas which are potentially less than or equal to fifty feet (15.25 m) in width, in order to limit the size of roof areas where the safety monitoring system alone can be used (WAC 296-880-40045(1)). Dotted lines are used in the examples to show the location of dividing lines.

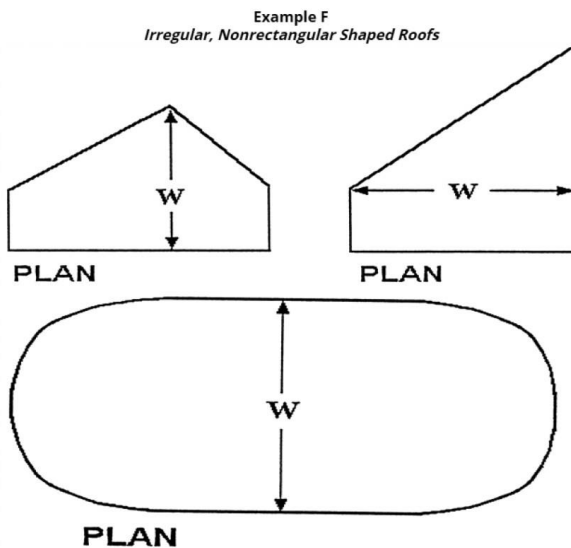
Ⓜ denotes incorrect measurements of width.





Such roofs are to be divided into subareas by using dividing lines of minimum length to minimize the size and number of the areas which are potentially less than or equal to fifty feet (15.25 m) in width in order to limit the size of roof areas where the safety monitoring system alone can be used. Dotted lines are used in the examples to show the location of dividing lines.

Ⓜ denotes incorrect measurements of width.

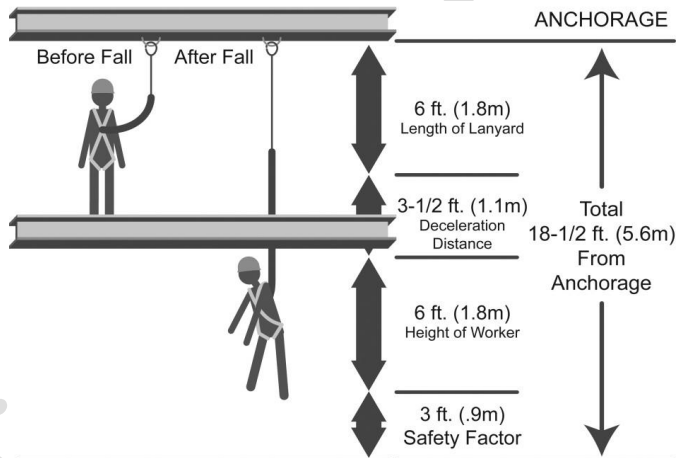


WAC 296-880-505 Appendix B—Calculating fall clearance distance—Nonmandatory guidelines. Calculating fall clearance distance using a shock-absorbing lanyard and D-ring anchorage connector - Nonmandatory guidelines for complying with WAC 296-880-40020.

Do the following to calculate the fall clearance distance using a shock-absorbing lanyard and D-ring anchorage connector:

- (1) First, add the length of the shock-absorbing lanyard (six feet) to the maximum elongation of the shock absorber during deceleration (three and one-half feet) to the average height of a worker (six feet);
- (2) Then, add a safety factor of three feet to allow for the possibility of an improperly fit full body harness, a taller than average worker and/or a miscalculation of distance.

Note: The suggested safe fall clearance distance for this example is eighteen and one-half feet.



WAC 296-880-510 Appendix C—Test methods and additional guidelines for personal fall arrest systems—Nonmandatory guidelines.

- (1) General. Subsections (2), (3), (4), and (5) of this appendix set forth test procedures which may be used to determine compliance with the requirements in WAC 296-880-40020.
- (2) General conditions for all tests.
 - (a) Lifelines, lanyards, and deceleration devices should be attached to an anchorage and connected to the body harness in the same manner as they would be when used to protect employees.
 - (b) The anchorage should be rigid, and should not have a deflection greater than .04 inches (1 mm) when a force of two thousand two hundred fifty pounds (10 kN) is applied.
 - (c) The frequency response of the load measuring instrumentation should be 120 Hz.
 - (d) The test weight used in the strength and force tests should be a rigid, metal, cylindrical or torso-shaped object with a girth of thirty-eight inches plus or minus four inches (96 cm plus or minus 10 cm).
 - (e) The lanyard or lifeline used to create the free fall distance should be supplied with the system, or in its absence, the least elastic lanyard or lifeline available to be used with the system.
 - (f) The test weight for each test should be hoisted to the required level and should be quickly released without having any appreciable motion imparted to it.
 - (g) The system's performance should be evaluated taking into account the range of environmental conditions for which it is designed to be used.
 - (h) Following the test, the system need not be capable of further operation.
- (3) Strength test.
 - (a) During the testing of all systems, a test weight of three hundred pounds plus or minus five pounds (135 kg plus or minus 2.5 kg) should be used. (See subsection (2)(d) of this appendix.)
 - (b) The test consists of dropping the test weight once. A new unused system should be used for each test.
 - (c) For lanyard systems, the lanyard length should be six feet plus or minus two inches (1.83 m plus or minus 5 cm) as measured from the fixed anchorage to the attachment on the body harness.
 - (d) For rope-grab-type deceleration systems, the length of the lifeline above the centerline of the grabbing mechanism to the lifeline's anchorage point should not exceed two feet (0.61 m).
 - (e) For lanyard systems, for systems with deceleration devices which do not automatically limit free fall distance to two feet (0.61 m) or less, and for systems with deceleration devices which have a connection distance in excess of one foot (0.3 m) (measured between the centerline of the lifeline and the attachment point to the body harness), the test weight should be rigged to free fall a distance of seven and one-half feet (2.3 m) from a point that is one and one-half feet (46 cm) above the anchorage point, to its hanging location (six feet below the anchorage). The test weight should fall without interference, obstruction, or hitting the floor or ground during the test. In some cases a nonelastic wire lanyard of sufficient length may need to be added to the system (for test purposes) to create the necessary free fall distance.

- (f) For deceleration device systems with integral lifelines or lanyards which automatically limit free fall distance to two feet (0.61 m) or less, the test weight should be rigged to free fall a distance of four feet (1.22 m).
 - (g) Any weight which detaches from the harness should constitute failure for the strength test.
- (4) Force test.
- (a) General. The test consists of dropping the respective test weight specified in (b)(i) or (c)(i) of this subsection once. A new, unused system should be used for each test.
 - (b) For lanyard systems:
 - (i) A test weight of two-hundred twenty pounds plus or minus three pounds (100 kg plus or minus 1.6 kg) should be used. (See subsection (2)(d) of this section.)
 - (ii) Lanyard length should be six feet plus or minus two inches (1.83 m plus or minus 5 cm) as measured from the fixed anchorage to the attachment on the body harness.
 - (iii) The test weight should fall free from the anchorage level to its hanging location (a total of six feet (1.83 m) free fall distance) without interference, obstruction, or hitting the floor or ground during the test.
 - (c) For all other systems:
 - (i) A test weight of two hundred and twenty pounds plus or minus three pounds (100 kg plus or minus 1.6 kg) should be used. (See subsection (2)(d) of this section.)
 - (ii) The free fall distance to be used in the test should be the maximum fall distance physically permitted by the system during normal use conditions, up to a maximum free fall distance for the test weight of six feet (1.83 m), except as follows:
 - (A) For deceleration systems which have a connection link or lanyard, the test weight should free fall a distance equal to the connection distance (measured between the centerline of the lifeline and the attachment point to the body harness).
 - (B) For deceleration device systems with integral lifelines or lanyards which automatically limit free fall distance to two feet (0.61 m) or less, the test weight should free fall a distance equal to that permitted by the system in normal use. (For example, to test a system with a self-retracting lifeline or lanyard, the test weight should be supported and the system allowed to retract the lifeline or lanyard as it would in normal use. The test weight would then be released and the force and deceleration distance measured.)
 - (d) A system fails the force test if the recorded maximum arresting force exceeds two thousand five hundred pounds (11.2 kN) when using a body harness.
 - (e) The maximum elongation and deceleration distance should be recorded during the force test.
- (5) Deceleration device tests.
- (a) General. The device should be evaluated or tested under the environmental conditions, (such as rain, ice, grease, dirt, type of lifeline, etc.), for which the device is designed.
 - (b) Rope-grab-type deceleration devices.
 - (i) Devices should be moved on a lifeline one thousand times over the same length of line a distance of not less than one foot (30.5 cm), and the mechanism should lock each time.
 - (ii) Unless the device is permanently marked to indicate the type(s) of lifeline which must be used, several types (different diameters and different materials), of lifelines should be used to test the device.

- (c) Other self-activating-type deceleration devices. The locking mechanisms of other self-activating-type deceleration devices designed for more than one arrest should lock each of one thousand times as they would in normal service.

Additional nonmandatory guidelines for personal fall arrest systems. The following information constitutes additional guidelines for use in complying with requirements for a personal fall arrest system.

- (6) Selection and use considerations. The kind of personal fall arrest system selected should match the particular work situation, and any possible free fall distance should be kept to a minimum. Consideration should be given to the particular work environment. For example, the presence of acids, dirt, moisture, oil, grease, etc., and their effect on the system, should be evaluated. Hot or cold environments may also have an adverse effect on the system. Wire rope should not be used where an electrical hazard is anticipated. As required by the standard, the employer must plan to have means available to promptly rescue an employee should a fall occur, since the suspended employee may not be able to reach a work level independently.

Where lanyards, connectors, and lifelines are subject to damage by work operations such as welding, chemical cleaning, and sandblasting, the component should be protected, or other securing systems should be used. The employer should fully evaluate the work conditions and environment (including seasonal weather changes) before selecting the appropriate personal fall protection system. Once in use, the system's effectiveness should be monitored. In some cases, a program for cleaning and maintenance of the system may be necessary.
- (7) Testing considerations. Before purchasing or putting into use a personal fall arrest system, an employer should obtain from the supplier information about the system based on its performance during testing so that the employer can know if the system meets this standard. Testing should be done using recognized test methods. Part II of this Appendix C contains test methods recognized for evaluating the performance of fall arrest systems. Not all systems may need to be individually tested; the performance of some systems may be based on data and calculations derived from testing of similar systems, provided that enough information is available to demonstrate similarity of function and design.
- (8) Component compatibility considerations. Ideally, a personal fall arrest system is designed, tested, and supplied as a complete system. However, it is common practice for lanyards, connectors, lifelines, deceleration devices, and body harnesses to be interchanged since some components wear out before others. The employer and employee should realize that not all components are interchangeable. For instance, a lanyard should not be connected between a body harness and a deceleration device of the self-retracting type since this can result in additional free fall for which the system was not designed. Any substitution or change to a personal fall arrest system should be fully evaluated or tested by a competent person to determine that it meets the standard, before the modified system is put in use.
- (9) Employee training considerations. Thorough employee training in the selection and use of personal fall arrest systems is imperative. As stated in the standard, before the equipment is used, employees must be trained in the safe use of the system. This should include the following:
 - (a) Application limits;
 - (b) Proper anchoring and tie-off techniques;
 - (c) Estimation of free fall distance, including determination of deceleration distance, and total fall distance to prevent striking a lower level;
 - (d) Methods of use; and
 - (e) Inspection and storage of the system.

Careless or improper use of the equipment can result in serious injury or death. Employers and employees should become familiar with the material in this appendix, as well as manufacturer's recommendations, before a system is used. Of uppermost importance is the reduction in strength caused by certain tie-offs (such as using knots, tying around sharp edges, etc.) and maximum permitted free fall distance. Also, to be stressed are the importance of inspections prior to use, the limitations of the equipment, and unique conditions at the worksite which may be important in determining the type of system to use.

- (10) Instruction considerations. Employers should obtain comprehensive instructions from the supplier as to the system's proper use and application, including, where applicable:
 - (a) The force measured during the sample force test;
 - (b) The maximum elongation measured for lanyards during the force test;
 - (c) The deceleration distance measured for deceleration devices during the force test;
 - (d) Caution statements on critical use limitations;
 - (e) Application limits;
 - (f) Proper hook-up, anchoring and tie-off techniques, including the proper D-ring or other attachment point to use on the body harness for fall arrest;
 - (g) Proper climbing techniques;
 - (h) Methods of inspection, use, cleaning, and storage; and
 - (i) Specific lifelines which may be used. This information should be provided to employees during training.
- (11) Inspection considerations. As stated in WAC 296-880-40020, personal fall arrest systems must be regularly inspected. Any component with any significant defect, such as cuts, tears, abrasions, mold, or undue stretching; alterations or additions which might affect its efficiency; damage due to deterioration; contact with fire, acids, or other corrosives; distorted hooks or faulty hook springs; tongues unfitted to the shoulder of buckles; loose or damaged mountings; nonfunctioning parts; or wearing or internal deterioration in the ropes must be withdrawn from service immediately, and should be tagged or marked as unusable, or destroyed.
- (12) Rescue considerations. As required by WAC 296-880-10005 when personal fall arrest systems are used, the employer must assure that employees can be promptly rescued or can rescue themselves should a fall occur. The availability of rescue personnel, ladders, or other rescue equipment should be evaluated. In some situations, equipment which allows employees to rescue themselves after the fall has been arrested may be desirable, such as devices which have descent capability.
- (13) Tie-off considerations.
 - (a) One of the most important aspects of personal fall protection systems is fully planning the system before it is put into use. Probably the most overlooked component is planning for suitable anchorage points. Such planning should ideally be done before the structure or building is constructed so that anchorage points can be incorporated during construction for use later for window cleaning or other building maintenance. If properly planned, these anchorage points may be used during construction, as well as afterwards.
 - (b) Employers and employees should at all times be aware that the strength of a personal fall arrest system is based on its being attached to an anchoring system which does not significantly reduce the strength of the system (such as a properly dimensioned eye-bolt/snap-hook anchorage). Therefore, if a means of attachment is used that will reduce the strength of the system, that component should be replaced by a stronger one, but one that will also maintain the appropriate maximum arrest force characteristics.

- (c) Tie-off using a knot in a rope lanyard or lifeline (at any location) can reduce the lifeline or lanyard strength by fifty percent or more. Therefore, a stronger lanyard or lifeline should be used to compensate for the weakening effect of the knot, or the lanyard length should be reduced (or the tie-off location raised) to minimize free fall distance, or the lanyard or lifeline should be replaced by one which has an appropriately incorporated connector to eliminate the need for a knot.
 - (d) Tie-off of a rope lanyard or lifeline around an “H” or “I” beam or similar support can reduce its strength as much as seventy percent due to the cutting action of the beam edges. Therefore, use should be made of a webbing lanyard or wire core lifeline around the beam; or the lanyard or lifeline should be protected from the edge; or free fall distance should be greatly minimized.
 - (e) Tie-off where the line passes over or around rough or sharp surfaces reduces strength drastically. Such a tie-off should be avoided or an alternative tie-off rigging should be used. Such alternatives may include use of a snap-hook/D-ring connection, wire rope tie-off, an effective padding of the surfaces, or an abrasion-resistance strap around or over the problem surface.
 - (f) Horizontal lifelines may, depending on their geometry and angle of sag, be subjected to greater loads than the impact load imposed by an attached component. When the angle of horizontal lifeline sag is less than thirty degrees, the impact force imparted to the lifeline by an attached lanyard is greatly amplified. For example, with a sag angle of fifteen degrees, the force amplification is about 2:1 and at five degrees sag, it is about 6:1. Depending on the angle of sag, and the line's elasticity, the strength of the horizontal lifeline and the anchorages to which it is attached should be increased a number of times over that of the lanyard. Extreme care should be taken in considering a horizontal lifeline for multiple tie-offs. The reason for this is that in multiple tie-offs to a horizontal lifeline, if one employee falls, the movement of the falling employee and the horizontal lifeline during arrest of the fall may cause other employees to also fall. Horizontal lifeline and anchorage strength should be increased for each additional employee to be tied-off. For these and other reasons, the design of systems using horizontal lifelines must only be done by qualified persons. Testing of installed lifelines and anchors prior to use is recommended.
 - (g) The strength of an eye-bolt is rated along the axis of the bolt and its strength is greatly reduced if the force is applied at an angle to this axis (in the direction of shear). Also, care should be exercised in selecting the proper diameter of the eye to avoid accidental disengagement of snap-hooks not designed to be compatible for the connection.
 - (h) Due to the significant reduction in the strength of the lifeline/lanyard (in some cases, as much as a seventy percent reduction), the sliding hitch knot should not be used for lifeline/lanyard connections except in emergency situations where no other available system is practical. The “one-and-one” sliding hitch knot should never be used because it is unreliable in stopping a fall. The “two-and-two,” or “three-and-three” knot (preferable), may be used in emergency situations; however, care should be taken to limit free fall distance to a minimum because of reduced lifeline/lanyard strength.
- (14) Vertical lifeline considerations. As required by the standard, each employee must have a separate lifeline when the lifeline is vertical. The reason for this is that in multiple tie-offs to a single lifeline, if one employee falls, the movement of the lifeline during the arrest of the fall may pull other employees' lanyards, causing them to fall as well.
- (15) Snap-hook considerations.
- (a) Required by this standard for all connections, locking snap-hooks incorporate a positive locking mechanism in addition to the spring loaded keeper, which will not allow the keeper to

open under moderate pressure without someone first releasing the mechanism. Such a feature, properly designed, effectively prevents roll-out from occurring.

- (b) As required by WAC 296-880-40020 the following connections must be avoided (unless properly designed locking snap-hooks are used) because they are conditions which can result in roll-out when a nonlocking snap-hook is used:
- (i) Direct connection of a snap-hook to a horizontal lifeline;
 - (ii) Two (or more) snap-hooks connected to one D-ring;
 - (iii) Two snap-hooks connected to each other;
 - (iv) A snap-hook connected back on its integral lanyard;
 - (v) A snap-hook connected to a webbing loop or webbing lanyard;
 - (vi) Improper dimensions of the D-ring, rebar, or other connection point in relation to the snap-hook dimensions which would allow the snap-hook keeper to be depressed by a turning motion of the snap-hook.
- (16) Free fall considerations. The employer and employee should at all times be aware that a system's maximum arresting force is evaluated under normal use conditions established by the manufacturer, and in no case using a free fall distance in excess of six feet (1.8 m). A few extra feet of free fall can significantly increase the arresting force on the employee, possibly to the point of causing injury. Because of this, the free fall distance should be kept at a minimum, and as required by the standard, in no case greater than six feet (1.8 m). To help assure this, the tie-off attachment point to the lifeline or anchor should be located at or above the connection point of the fall arrest equipment to harness. (Since otherwise additional free fall distance is added to the length of the connecting means (i.e., lanyard).) Attaching to the working surface will often result in a free fall greater than six feet (1.8 m). For instance, if a six foot (1.8 m) lanyard is used, the total free fall distance will be the distance from the working level to the body harness attachment point plus the six feet (1.8 m) of lanyard length. Another important consideration is that the arresting force which the fall system must withstand also goes up with greater distances of free fall, possibly exceeding the strength of the system.
- (17) Elongation and deceleration distance considerations. Other factors involved in a proper tie-off are elongation and deceleration distance. During the arresting of a fall, a lanyard will experience a length of stretching or elongation, whereas activation of a deceleration device will result in a certain stopping distance. These distances should be available with the lanyard or device's instructions and must be added to the free fall distance to arrive at the total fall distance before an employee is fully stopped. The additional stopping distance may be very significant if the lanyard or deceleration device is attached near or at the end of a long lifeline, which may itself add considerable distance due to its own elongation. As required by the standard, sufficient distance to allow for all of these factors must also be maintained between the employee and obstructions below, to prevent an injury due to impact before the system fully arrests the fall.
- In addition, a minimum of twelve feet (3.7 m) of lifeline should be allowed below the securing point of a rope-grab-type deceleration device, and the end terminated to prevent the device from sliding off the lifeline. Alternatively, the lifeline should extend to the ground or the next working level below. These measures are suggested to prevent the worker from inadvertently moving past the end of the lifeline and having the rope grab become disengaged from the lifeline.
- (18) Obstruction considerations. The location of the tie-off should also consider the hazard of obstructions in the potential fall path of the employee. Tie-offs which minimize the possibilities of exaggerated swinging should be considered.

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- (19) Other considerations. Because of the design of some personal fall arrest systems, additional considerations may be required for proper tie-off. For example, heavy deceleration devices of the self-retracting type should be secured overhead in order to avoid the weight of the device having to be supported by the employee. Also, if self-retracting equipment is connected to a horizontal lifeline, the sag in the lifeline should be minimized to prevent the device from sliding down the lifeline to a position which creates a swing hazard during fall arrest. In all cases, manufacturer's instructions should be followed.

Discussion draft

WAC 296-880-080 Scope.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-080, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-090 Quick reference guide. Unified Fall Protection Quick Reference Guide.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-090, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-095 Definitions.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-095, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-100 Application.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-100, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-10005 General requirements.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-10005, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-10010 Fall protection required regardless of height.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-10010, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-10015 Training.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-10015, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-10020 Fall protection work plan required at ten feet or more.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-10020, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-200 Fall protection required at four feet or more.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-200, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-20005 Fall protection required at four feet or more.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-20005, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-20010 Exemption from fall protection requirements in this section.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-20010, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-300 Specific fall protection requirements.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-300, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-30005 Construction work.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-30005, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-30010 Order pickers (PITS).

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-30010, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-30015 Elevating work platforms.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-30015, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-30020 Powered platforms.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-30020, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-30025 Window cleaning.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-30025, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-30030 Scaffolds.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-30030, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-30035 Cranes.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-30035, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-30040 Telecommunication requirements that apply to wireless.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-30040, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-30045 Ship repairing, shipbuilding and shipbreaking.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-30045, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-30050 Longshore, stevedore, and waterfront related operations.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-30050, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-30055 Ski area facilities and operations.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-30055, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-400 Fall protection system specifications.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-400, filed 06/02/2020, effective 10/01/2020.]

WAC 296-880-40005 Guardrail systems.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-40005, filed 06/02/2020, effective 10/01/2020.

WAC 296-880-40010 Ramps, runways, and inclined walkway requirements.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-40010, filed 06/02/2020, effective 10/01/2020.

WAC 296-880-40015 Cover requirements—Holes and openings.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-40015, filed 06/02/2020, effective 10/01/2020.

WAC 296-880-40020 Personal fall arrest system requirements.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-40020, filed 06/02/2020, effective 10/01/2020.

WAC 296-880-40025 Personal fall restraint system requirements.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-40025, filed 06/02/2020, effective 10/01/2020.

WAC 296-880-40030 Positioning device system requirements.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-40030, filed 06/02/2020, effective 10/01/2020.

WAC 296-880-40035 Self-rescue device requirements.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-40035, filed 06/02/2020, effective 10/01/2020.

WAC 296-880-40040 Warning line system requirements.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-40040, filed 06/02/2020, effective 10/01/2020.

WAC 296-880-40045 Safety monitor system requirements.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-40045, filed 06/02/2020, effective 10/01/2020.

WAC 296-880-40050 Safety watch system requirements.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-40050, filed 06/02/2020, effective 10/01/2020.

WAC 296-880-40055 Safety net system requirements.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-40055, filed 06/02/2020, effective 10/01/2020.

WAC 296-880-40060 Catch platform requirements.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-40060, filed 06/02/2020, effective 10/01/2020.

WAC 296-880-40065 Canopy requirements.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-40065, filed 06/02/2020, effective 10/01/2020.

WAC 296-880-40070 Roof bracket requirements.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-40070, filed 06/02/2020, effective 10/01/2020.

WAC 296-880-40075 Crawling board and chicken ladder requirements.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-40075, filed 06/02/2020, effective 10/01/2020.

WAC 296-880-40080 Roof edge materials handling and material storage requirements.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 20-12-091 (Order 19-05) § 296-880-40080, filed 06/02/2020, effective 10/01/2020.

WAC 296-880-500 Appendix A—Determining roof widths—Nonmandatory guidelines.

WAC 296-880-505 Appendix B—Calculating fall clearance distance—Nonmandatory guidelines. Calculating fall clearance distance using a shock-absorbing lanyard and D-ring anchorage connector - Nonmandatory guidelines for complying with WAC 296-880-40020.

WAC 296-880-510 Appendix C—Test methods and additional guidelines for personal fall arrest systems—Nonmandatory guidelines.