

Appendix A

Fall Protection Comparison Between OSHA Standards and EM 385-1-1

Requirement	29 CFR 1910 General Industry Standard	USACE EM 385-1-1 Safety and Health Requirements Manual (2008) Section 21	29 CFR 1926 Construction Standard
Threshold Height Fall Protection is required	<ul style="list-style-type: none"> Above 4 feet 	<ul style="list-style-type: none"> Contractors - Above 6 feet USACE Personnel – Above 4 ft 	<ul style="list-style-type: none"> Above 6 feet
Development of Fall Protection Program	<ul style="list-style-type: none"> Not addressed 	<ul style="list-style-type: none"> Contractors having personnel working at heights, exposed to fall hazards and using fall protection equipment shall develop a site specific Fall Protection and Prevention Plan (FP&PP) and submit it to GDA for acceptance as part of APP. USACE-Owned Facilities having personnel working at heights are required to develop a written Fall Protection program and a site specific FP&PP. Each USACE-Owned facility shall conduct a Fall Hazard Survey and prepare survey Report at exiting buildings or structures. 	<ul style="list-style-type: none"> Not addressed

Requirement	29 CFR 1910 General Industry Standard	USACE EM 385-1-1 Safety and Health Requirements Manual (2008) Section 21	29 CFR 1926 Construction Standard
Hierarchy of Controls for Fall hazards	<ul style="list-style-type: none"> • Not addressed 	<ul style="list-style-type: none"> • Elimination • Prevention • Work Platforms • Personal Protective Systems and Equipment • Administrative Controls 	<ul style="list-style-type: none"> • Not addressed
Guardrails Constructed from wood, structural steel, pipe or steel cable	<ul style="list-style-type: none"> • Consists of top and mid rails, posts, and toe boards • Top edge of railing shall be <u>42 + 3/- inches</u> high and withstands a force of <u>200 lbs.</u> • Mid rails half way between top railing and walking/working level and shall withstand a force of <u>150 lbs.</u> • Posts spaced no more than <u>8 feet</u> apart. • Toeboards shall be <u>3 ½ inches</u> high and shall withstand a force of <u>50 lbs.</u> 	<ul style="list-style-type: none"> • Consists of top, mid rails, posts, and toe boards. • Top rail shall have a vertical height of <u>42 +/- 3 inches</u> and withstands a force of <u>200 lbs.</u> • Mid rails half way between top rail and staging, working platform, or runway and shall withstand a force of <u>150 lbs.</u> • Posts spaced no more than <u>8 feet</u> apart. • Toeboards shall be <u>3 ½ inches</u> high and shall withstand a force of <u>50 lbs.</u> 	<ul style="list-style-type: none"> • Consists of top and mid rails, posts, and toe boards • Top edge of railing shall be <u>42 +/- 3 inches</u> high and withstands a force of <u>200 lbs.</u> • Mid rails half way between top railing and walking/working level. • Posts spaced no more than <u>8 feet</u> apart. • Toeboards shall be <u>3 ½ inches</u> high and shall withstand a force of <u>50 lbs.</u>

Requirement	29 CFR 1910 General Industry Standard	USACE EM 385-1-1 Safety and Health Requirements Manual (2008) Section 21	29 CFR 1926 Construction Standard
Work Platforms	Railing is required when working \geq 4 feet above the ground level.	<ul style="list-style-type: none"> • Fall protection required above 6 feet. • Scaffolds shall be equipped w/guardrail or other fall protection system. • For workers erecting and dismantling scaffolds, if it is not feasible to provide fall protection, an evaluation shall be conducted by the competent person detailing rationale why fall protection is not feasible shall be submitted to GDA for acceptance as part of AHA. • Suspended scaffolds require railing and vertical lifeline. • Scissors lifts require railing. If the scissor lift is equipped w/anchorage a restraint system with short lanyard shall be used. 	<ul style="list-style-type: none"> • When working \geq 6 feet above solid surface, platforms must be equipped with a standard guardrail or other fall protection system. • Suspended scaffolds require railing and vertical lifeline. • Scissors lifts require railing.

Requirement	29 CFR 1910 General Industry Standard	USACE EM 385-1-1 Safety and Health Requirements Manual (2008) Section 21	29 CFR 1926 Construction Standard
Covers	<ul style="list-style-type: none"> • Covers shall be capable of supporting without failure the maximum intended load of employees, equipment and material combined or 250 lbs whichever is greater. • Provide hinged floor opening cover of standard strength and construction equipped with guardrail or permanently attached. 	<ul style="list-style-type: none"> • Install covers on any hole 2 inches or more in its least dimension. • Shall be capable of supporting without failure, at least twice the weight of worker, equipment and material combined. • Shall be secured and color coded when installed. 	<ul style="list-style-type: none"> • Install on any hole 2 inches or more in its least dimension in walking working surfaces. • Shall be capable of supporting, without failure, at least twice the weight of employees, equipment, and materials that may be imposed on the cover at one time. No stipulation for removal.

Requirement	29 CFR 1910 General Industry Standard	USACE EM 385-1-1 Safety and Health Requirements Manual (2008) Section 21	29 CFR 1926 Construction Standard
Safety Net Systems	<ul style="list-style-type: none"> • Presently not addressed in 29 CFR 1910. • Addressed only in OSHA 29 CFR 1910 Notices of Proposed Rulemaking of 1990. • Similar requirement to 29 CFR 1926, Subpart M. 	<ul style="list-style-type: none"> • Shall be installed as close as practicable under the walking, working surfaces, but not lower than 25 feet. • Maximum size of mesh opening shall not exceed 36 square inches and no longer than 6 inches on any side. • Minimum breaking strength of outer rope or webbing shall be 5,000 lbs. • Shall be tested immediately after installation with a 400 lbs sandbag dropped from a height at least 42 inches above the walking and working surfaces. • Inspection: immediately after installation, weekly thereafter and following any repair or alteration. Inspection shall be documented. • Specifies limits for safety net extension below the unprotected side or edge 	<ul style="list-style-type: none"> • Shall be installed as close as practicable under the walking, working surfaces, but not lower than 30 feet. • Minimum braking strength of outer rope or webbing shall be 5,000 lbs. • Maximum size of mesh opening shall not exceed 36 square inches and no longer than 6 inches on any side. • Shall be tested immediately after installation with a 400 lbs san bag dropped from a height at least 42 inches above the walking, working surfaces. • Specific limits for safety net extension below the unprotected side or edge.

Requirement	29 CFR 1910 General Industry Standard	USACE EM 385-1-1 Safety and Health Requirements Manual (2008) Section 21	29 CFR 1926 Construction Standard
Personal Fall Arrest System (PFAS) Requirements	<p>For walking/working surfaces, PFAS requirements are addressed in OSHA 29 CFR 1910 Notices of Proposed Rulemaking of 1990.</p> <ul style="list-style-type: none"> • Maximum free fall distance of 6 feet. • Maximum arresting force of 1,800 lbs. • Shall stop the fall with a deceleration distance of less than 42 inches. • Prevent a person from contacting lower level or object. • Body belts are not authorized. 	<ul style="list-style-type: none"> • Maximum free fall distance of 6 feet. • Maximum arresting force of 1,800 lbs. • Shall stop the fall with a deceleration distance of less than 42 inches. • Prevent a person from contacting lower level or object. • Body belts are not authorized. 	<ul style="list-style-type: none"> • Maximum free fall distance of 6 feet. • Maximum arresting force of 1,800 lbs. • Shall stop the fall with a deceleration distance of less than 42 inches. • Prevent a person from contacting lower level or object. • Body belts are not authorized.

Requirement	29 CFR 1910 General Industry Standard	USACE EM 385-1-1 Safety and Health Requirements Manual (2008) Section 21	29 CFR 1926 Construction Standard
Fall Protection Equipment Selection Criteria	<ul style="list-style-type: none"> Employers should obtain comprehensive instructions from the suppliers. 	<ul style="list-style-type: none"> Selection of equipment shall be based on type of work; work environment, weight, size and shape of the worker, type and position/location of anchorage and length of lanyard. Use only equipment meeting ANSI Z359.1 Standard. Any equipment meeting ANSI A10.14 shall not be used. Frontal D-ring attachment point located at the sternum can be used for fall arrest provided the free fall distance is less than 2 feet and maximum arrest force does not exceed 900 lbs. Only the qualified person for fall protection can make the determination of increasing the free fall distance more than 6 feet. 	<ul style="list-style-type: none"> The type of fall arrest system selected should match the particular work situation and any free fall distance should be kept to a minimum. Consideration should be given to a particular work environment.

Requirement	29 CFR 1910 General Industry Standard	USACE EM 385-1-1 Safety and Health Requirements Manual (2008) Section 21	29 CFR 1926 Construction Standard
Definition of Qualified Person	Qualified Person means one with a <u>recognized degree</u> or professional certificate and extensive knowledge and experience in the subject field who is capable of design, analysis, evaluation and specifications in the subject work, project, or product.	Qualified Person for Fall Protection (see Appendix Q): A person with a recognized degree or professional certificate and with extensive knowledge, training, and experience in the fall protection and rescue field who is capable of designing, analyzing, evaluating and specifying fall protection and rescue systems .	Qualified: means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.
Definition of Competent Person	Competent Person: Means a person who is capable of identifying hazardous or dangerous conditions in the personal fall arrest system or any component thereof, as well as in their application and use with related equipment.	Competent Person for Fall Protection (see Appendix Q): A person designated in writing by the employer to be responsible for the immediate supervision, implementation and monitoring of the fall protection program, who through training, knowledge and experience in fall protection and rescue systems and equipment, is capable of identifying, evaluating and addressing existing and potential fall hazards and, who has the authority to take prompt corrective measures with regard to such hazards.	Competent Person: Means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Requirement	29 CFR 1910 General Industry Standard	USACE EM 385-1-1 Safety and Health Requirements Manual (2008) Section 21	29 CFR 1926 Construction Standard
Fall Arrest Anchorages	<ul style="list-style-type: none"> Capable of supporting at least 5,000 lbs per employee attached or shall be designed, installed and used as part of a complete fall arrest system which maintains a safety factor of at least 2, under the supervision of a qualified person. 	<ul style="list-style-type: none"> Capable of supporting at least 5,000 lbs per worker attached or designed by a Qualified Person for Fall Protection for twice the maximum arrest force on the body. Snaphooks and Carabiners manufactured per ANSI Z359.1. 	<ul style="list-style-type: none"> Anchorage shall be capable of supporting at least 5,000 lbs per employee attached, or shall be designed, installed and used as part of a complete fall arrest system which maintains a safety factor of least 2 and under the supervision of qualified person.
Training	<ul style="list-style-type: none"> States that fall protection training is required. 	<ul style="list-style-type: none"> Workers exposed to fall hazards from heights and using fall protection equipment shall be trained by competent person for fall protection who is qualified in delivering FP training. Retraining shall also be provided as necessary. Employer shall verify worker training by a written certification record including name of worker, date of training and signatures of trainer and trainee. 	<ul style="list-style-type: none"> States that fall protection training is required.

Requirement	29 CFR 1910 General Industry Standard	USACE EM 385-1-1 Safety and Health Requirements Manual (2008) Section 21	29 CFR 1926 Construction Standard
Horizontal Lifeline	<ul style="list-style-type: none"> Shall be designed and installed as part of a complete fall arrest system which maintains a safety factor of at least 2 under the supervision of a qualified person. 	<ul style="list-style-type: none"> HLL shall be installed and used under the supervision of Qualified Person for Fall Protection only, as part of a complete fall arrest system that maintains a safety factor of at least two. 	<ul style="list-style-type: none"> Designed, installed, and used under the supervision of a qualified person and used as part of a complete personal fall arrest system that maintains a safety factor of at least two.
Positioning System Requirement	<ul style="list-style-type: none"> Not addressed in 29 CFR1910. Addressed only in the OSHA Proposed Rulemaking of 1990. The Requirements are similar to 29 CFR 1926, Subpart M. 	<ul style="list-style-type: none"> Be rigged such that a worker cannot free fall more than 2 feet. Secured to an anchorage capable of supporting at least twice the potential impact load of a worker's fall or 3,000 lbs whichever is greater. In addition to positioning system, requires the use of a separate system that provides back-up. 	<ul style="list-style-type: none"> Shall be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or 3,000 lbs whichever is grater. Shall be rigged such that an employee cannot free fall more than 2 feet.

Requirement	29 CFR 1910 General Industry Standard	USACE EM 385-1-1 Safety and Health Requirements Manual (2008) Section 21	29 CFR 1926 Construction Standard
Restraint Anchorages	<ul style="list-style-type: none"> • Anchorage strength is not specified in 29 CFR 1910 Standard • Anchorage strength of 3,000 lbs, specified in OSHA Proposed Rulemaking of 1990. 	<ul style="list-style-type: none"> • Anchorage strength requirement shall be 3,000 lbs or designed by a Qualified Person for Fall Protection for two times the foreseeable force. • Restraint system shall be used only on sloped surfaces equal or less than 18.4 degrees (4:12 slope). 	<ul style="list-style-type: none"> • Anchorages shall have the capacity to withstand at least 3,000 lbs of force or twice the maximum expected force. (*)
Inspection, storage, care, and maintenance of FP equipment	<ul style="list-style-type: none"> • Fall protection equipment shall be inspected prior to each use; employer should obtain comprehensive instructions from the supplier method of inspection, use cleaning and storage. 	<ul style="list-style-type: none"> • Equipment shall be inspected by the end user prior to each use. • A Competent person for Fall Protection shall inspect the equipment at least once semi-annually and whenever equipment is subjected to a fall or impacted. • Competent person's inspection shall be documented. 	<ul style="list-style-type: none"> • Personal fall arrest system shall be inspected prior to each use for wear, damage and other deteriorations.

Requirement	29 CFR 1910 General Industry Standard	USACE EM 385-1-1 Safety and Health Requirements Manual (2008) Section 21	29 CFR 1926 Construction Standard
Ladder Climbing Devices (LCD) Requirements	<ul style="list-style-type: none"> • Installed on fixed ladders more than 20 feet in length. • LCD shall meet the design requirements of the ladders which they serve. 	<ul style="list-style-type: none"> • Installed on fixed ladders more than 20 feet in length. • Anchorage strength 3000 lbs • Free fall distance shall not exceed 2 feet. • Length of connector between D-ring and LCD shall be 9 inches. • 100% transition at top of ladder. • Do not install LCD on ladders having $\frac{3}{4}$ inch rungs unless they are designed to withstand fall forces. 	<ul style="list-style-type: none"> • Installed on fixed ladders more than 24 feet in length. • Capable of withstanding a drop test of 500 lbs. • Free fall distance shall not exceed 2 feet. • Length of connector between D-ring and LCD shall be 9 inches.

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Rescue procedures	<ul style="list-style-type: none"> The employer shall provide for prompt rescue of employees in the event of a fall or shall assure the self-rescue capability of employees. 	<ul style="list-style-type: none"> Requirement to provide prompt rescue to all fallen workers. A rescue plan shall be prepared and maintained. Personnel conducting rescue shall be trained. Anchorage for self-rescue and assisted-rescue shall be identified and selected. Anchorage selected for rescue shall be capable of withstanding static loads of <u>3,000 lbs or 5 times the applied loads</u> as designed by qualified person for fall protection. Buddy system (Safety person or spotter) is required. If other methods of rescue are planned (Fire Department) it shall be indicated in the rescue plan. 	<ul style="list-style-type: none"> The employer shall provide for prompt rescue of employees in the event of a fall or shall ensure that employees can rescue themselves.

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Warning Line system	<ul style="list-style-type: none"> • Not addressed 	<ul style="list-style-type: none"> • Consists of wire rope or chains 34-39 inches high. • Tensile strength of the line shall be min 500 lbs. • Stanchions shall be capable of withstanding a force of 16 lbs applied horizontally 30 inches from the walking working surfaces. • For roofing work, the line shall be erected 6 feet away from the edge. For other trades (equipment) the line shall be 15 feet away from the edge. 	<ul style="list-style-type: none"> • Consists of wire rope or chains 34-39 inches high. • Tensile strength of the line shall be min 500 lbs. • Stanchions shall be capable of withstanding a force of 16 lbs applied horizontally 30 inches from the walking working surfaces. • For roofing work, the line shall be erected 6 feet away from the edge. For other trades the line shall be 15 feet away from the edge.
Controlled Access Zones	<ul style="list-style-type: none"> • Not addressed in 29 CFR 1910. 	<ul style="list-style-type: none"> • Prohibited as a fall protection method. 	<ul style="list-style-type: none"> • Allowed by Subpart M.
Monitoring system	<ul style="list-style-type: none"> • Not addressed. 	<ul style="list-style-type: none"> • Prohibited as a fall protection system. May be used with other fall protection method 	<ul style="list-style-type: none"> • Allowed per Subpart M.

(*) As per OSHA Interpretation Letter