(2) Tools and work equipment attached to the Rope Access Technician or rope access systems must not impair the function of the main or back-up systems.

(3) Sheath all sharp tools when not in use.

(4) Take measures to prevent tools and work equipment from being dropped or from falling. Tether tools whenever possible or independently suspend them.

**23-9. Figures and Tables.**
Not Applicable.

**23-10. Checklists and Forms.**
Not Applicable.

## Chapter 24
## Safe Access

**24-1. References.**

a. ANSI/ASSP A10.4, Safety Requirements for Personnel Hoists and Employee Elevators on Construction and Demolition Sites (https://webstore.ansi.org) (24-1.a)

b. ANSI A10.22, Safety Requirements for Rope-Guided and Non-Guided Hoists (https://webstore.ansi.org) (24-1.b)

c. ANSI/ALI A14 Series (https://webstore.ansi.org) (24-1.c)

d. ASME A17, Safety Code for Elevators and Escalators (https://webstore.ansi.org) (24-1.d)

e. 29 CFR 1910 Subpart D, Walking-Working Surfaces (https://www.govinfo.gov/content/pkg/CFR-2020-title29-vol5/pdf/CFR-2020-title29-vol5-part1910-subpartD.pdf) (24-1.e)

f. 29 CFR 1926.552, Material Hoists, Personnel Hoists, and Elevators (https://www.govinfo.gov/content/pkg/CFR-2020-title29-vol8/pdf/CFR-2020-title29-vol8-sec1926-552.pdf) (24-1.f)

g. 29 CFR 1926 Subpart X, Stairways and Ladders (https://www.govinfo.gov/content/pkg/CFR-2020-title29-vol8/pdf/CFR-2020-title29-vol8-part1926-subpartX.pdf) (24-1.g)

**24-2. Definitions.**

a. Competent Person (CP). See paragraphs 1-2 or 2-2, as applicable. (24-2.a)

b. Guardrail System. A rail system erected along unprotected or exposed sides, edges, or other areas of a walking-working surface to prevent persons from falling to a lower level. The system consists of a toprail, midrail, and their supports. (24-2.b)

c. Handrail. A rail used to provide persons with a handhold for support. (24-2.c)

d. Hole. Any gap or open space in a floor, roof, horizontal walking-working surface, or similar surface that measures at least 2 inches (5.1 cm) in its least dimension. (24-2.d)

e. Ladder. A device incorporating or employing steps, rungs, or cleats on which a person may step or ascend or descend. (24-2.e)

f. Ladder, Articulated. A portable ladder with one or more pairs of locking hinges which allows the ladder to be set up in several configurations (for example, single or extension ladder, with or without a stand-off, stepladder, trestle ladder, scaffold, worktable). (24-2.f)

g. Ladder, Double-Cleated. A ladder, similar to a single cleat ladder, but with a center rail, which allows simultaneous two-way traffic for employees ascending or descending. (24-2.g)

h. Ladder, Extension. A non-self-supporting portable ladder that consists of two or more sections, traveling guides or brackets, or the equivalent, and is adjustable in length. (24-2.h)

i. Ladder, Fixed. A ladder that cannot be readily moved or carried because it is an integral part of a building or structure. (24-2.i)

j. Ladder, Job-Made. A ladder fabricated by employees, typically at the construction site, and is not commercially manufactured. (24-2.j)

k. Ladder, Platform. A self-supporting portable ladder of fixed size with a platform provided at the intended highest standing point. (24-2.k)

l. Ladder, Portable. A ladder that can readily be moved or carried. It usually consists of side rails joined at intervals by steps, rungs, cleats, or rear braces. (24-2.l)

m. Ladder, Single Cleat. A ladder consisting of a pair of side rails connected together by cleats, rungs, or steps. (24-2.m)

n. Ladder, Single Rail. A portable ladder with rungs, cleats, or steps mounted on a single rail instead of the typical two rails. (24-2.n)

o. Ladder, Step Stool. A self-supporting, foldable, portable ladder, non-adjustable in length, 32 inches (81.3 cm) or less in height, with flat steps and without a pail shelf. It is designed to be climbed on the ladder top cap as well as all steps. (24-2.o)

p. Opening. Any gap or open space in a wall, partition, vertical walking-working surface, or similar surface that is at least 30 inches (76.2 cm) high and at least 18 inches (45.7 cm) wide, through which an employee can fall to a lower level. (24-2.p)

q. Qualified Person (QP). See paragraphs 1-2 or 2-2, as applicable. (24-2.q)

r. Ramp. Any inclined walking-working surface used to access another level. (24-2.r)

s. Registered Professional Engineer (RPE). See paragraphs 1-2 or 2-2, as applicable. (24-2.s)

t. Runway. A personnel passageway elevated above the surrounding floor or ground level, such as a foot walk along shafting or a walkway between scaffolds. (24-2.t)

u. Three Points of Contact. When either both hands and one foot, or both feet and one hand are always in contact with the climbing device. Required when ascending or descending ladders. (24-2.u)

v. Toe-board. A vertical barrier at floor level erected along exposed edges of a floor opening, wall opening, platform, runway, or ramp to prevent materials from falling. (24-2.v)

w. Trestle. A braced framework of timbers, piles, or steel work for carrying a walkway, road, or railroad over a depression. (24-2.w)

x. Unprotected Sides and Edges. Any side or edge, except at entrances to points of access, of a walking-working surface (for example, floor, roof, ramp, runway) where there is no wall, guardrail system, or stair rail system to protect persons from falling to a lower level. (24-2.x)

**24-3. Personnel Required Qualification/Training.**
Not Applicable.

**24-4. Roles and Responsibilities.**
If correction or repair to a means of access involved the structural integrity, a QP or CP must perform or supervise the correction or repair.

**24-5. Inspection Requirements.**

a. Accessways. Inspect means of access daily to ensure they provide safe access and are free of hazards, obstructions, and do not impede or restrict travel of personnel. (24-5.a)

b. Ladders. Inspect ladders according to the manufacturer's instructions. Inspect for visible defects prior to placing into service, before each use, and after any occurrence that could affect their safe use. Immediately tag broken or damaged ladders with "DO NOT USE", or with similar wording, and withdraw them from service until restored to a condition meeting their original design. (24-5.b)

c. Personnel Hoists and Elevators. Inspect personnel hoists and elevators according to the manufacturer's instructions and the applicable ANSI, ASME, and OSHA Standards (that is, ASME A17, ANSI A10.4, 29 CFR 1926.552, ANSI A10.22). (24-5.c)

**24-6. Activity Hazard Analysis (AHA) Requirements.**
Develop AHAs according to paragraphs 1-6 or 2-6, as applicable. During construction activities 20 feet (6.1 m) or more in height, address alternatives to the use of stairways in an AHA and submit them to the USACE supervisor for approval or KO or COR for acceptance.

**24-7. Minimum Plan Requirements.**
Not Applicable.

**24-8. General Requirements.**

a. General Accessway Requirements. (24-8.a)

(1) Provide a safe means of access to all work areas. Where danger exists of persons falling through floor, roof, wall openings, or holes, or from means of access (for example, platforms, runways, ramps, stairs, ladders) protect persons as detailed in this chapter or through use of fall protection. (See chapter 21)

(2) Where there is a break of 19 inches (48.3 cm) or more in a means of access, provide a stairway, ladder, ramp, runway, or personnel hoist.

(3) At entrance points to a means of access, use a self-closing gate or offset to prevent persons from walking directly into the opening.

(4) For additional means of access requirements, refer to chapter 19 for access on vessels and chapter 22 for access on work platforms and scaffolding.

(5) Do not use means of access constructed of metal for electrical work or where the potential exists to contact electrical conductors. Do not use portable or conductive ladders near energized lines or equipment.

(6) Inspect means of access daily.

(a) Keep means of access clean, clear, and free from hazards (for example, sharp or protruding objects, spills, ice) to allow free passage of workers.

(b) If work is performed in an area that free passage is restricted, provide another means of access (see para 24-5.a).

(c) Remove or conspicuously mark all obstructions or projections into a means of access. Cover obstructions or projections that are sharp, pointed, or that may cause lacerations, contusions, or abrasions with protective material.

(d) Where means of access are slippery, apply abrasive material to assure safe footing.

(e) Correct or repair hazardous conditions on means of access, to include physical hazards or damaged or weakened components before persons use the means of access. If the hazard cannot be eliminated or repair cannot be made immediately, guard the hazard to prevent persons from using the means of access until correction or repair is made. If correction or repair involves the structural integrity of the means of access, a QP or CP must perform or supervise the correction or repair.

(7) Design means of access to support the maximum intended load. Do not load above the design load or beyond the manufacturer's rated capacity.

(8) Determine the width of means of access by the purpose for which they are built and make them wide enough to provide safe passage for materials and movement of personnel. The width, except for ladders, must not be less than 18 inches (45.7 cm).

(9) Means of access must have overhead protection equal to 2 inches (5.1 cm) solid planking whenever work is performed over them, or if personnel are exposed to hazards from falling objects.

b. Safe Roof Access. (24-8.b)

(1) Provide level and guarded platforms at all roof landing areas.

(2) Crawling Boards.

(a) Crawling boards must at least 10 inches (25.4 cm) wide and 1 inch (2.5 cm) thick and have cleats 1 inch x 1.5 inches (2.5 cm x 3.8 cm).

(b) Cleats must be equal in length to the width of the board and spaced at equal intervals not to exceed 24 inches (61 cm).

(c) Drive nails through the boards and clinch them on the underside. Screws may be used in lieu of nails.

(d) When used with roof construction repairs, or maintenance, secure crawling boards and extend them from the ridge pole to the eaves.

(e) String a firmly fasted lifeline of at least three-quarter (¾) inch (2 cm) diameter rope, or equivalent, beside each crawling board for use as a handhold.

(3) Access Paths. Erect access paths as follows:

(a) Connect points of access, material handling areas, and storage areas to the work area by a clear access path formed by two warning lines according to chapter 21.

(b) When the path to a point of access is not being used, do one of the following:

(b-1) 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.

(b-2) Offset the path so that a person cannot walk directly into the work area.

c. General Ladder Requirements. See also chapter 22. This paragraph does not apply to ladders used in emergency operations (that is, firefighting, rescue, tactical law enforcement) or those designed into or as an integral part of machines or equipment. (24-8.c)

(1) Construct, install, use, maintain, and store ladders according to the manufacturer's instructions and ANSI/ASC A14 series standards, as applicable.

(a) Label ladders according to the applicable ANSI/ASC A14 series standards. The load ratings must be clearly and legibly marked on all ladders.

(b) Ladders should be safely secured when not in use.

(2) Inspect ladders according to paragraph 24-5.b. Ensure ladders are smooth surfaced to prevent injury to a worker from punctures or lacerations and to prevent snagging of clothing.

(3) Do not coat ladders with any opaque covering, except those applied by the manufacturer and for identification or warning labels according to the applicable ANSI/ASC A14 series standard.

(4) Do not use single-rail ladders.

(5) Three-legged ladders may be used for specific tasks, if approved by the USACE supervisor or accepted by the KO or COR.

(6) Install and use all ladder accessories according to the manufacturer's instructions. Accessories include, but are not limited to, ladder levelers, ladder stabilizers or stand-off devices, and ladder straps or hooks.

(7) Construct job-made wooden ladders according to ANSI/ASC A14.4.

(8) Provide fixed ladders with fall protection according to chapter 21.

(9) Articulated ladders are allowed if they meet ANSI/ASC A14.2.

d. Portable Ladders. In addition to the requirements of paragraph 24-8.c, portable ladders must also meet the following: (24-8.d)

(1) All portable ladders must be long enough and placed so that workers will not have to lean out beyond the ladder's side rails and assume a hazardous position.

(2) When portable ladders are used as a means of access, they must extend at least 3 feet (0.9 m) above the upper landing surface.

(a) When a 3 feet (0.9 m) extension above the upper landing surface is not possible, provide a grasping device (for example, grab rail) to assist workers in mounting and dismounting the ladder.

(b) In no case may the length of the ladder be such that ladder deflection under a load would, by itself, cause the ladder to slip from its support.

(3) The length of single ladders or individual sections of ladders must not exceed 30 feet (9.1 m).

(4) Two-section extension ladders must not exceed 48 feet (14.6 m) in length.

(5) Multi-section extension ladders (that is, over two-sections) must not exceed 60 feet (18.3 m) in length.

(6) The length of stepladders must not exceed 20 feet (6.1 m) in length.

(7) When splicing of side rails is required to obtain the required length, the resulting side rail must be at least equal in strength to a one-piece side rail made of the same material.

(8) Portable ladders must have slip-resistant feet.

(9) The rungs and steps of portable metal ladders must be corrugated, knurled, dimpled, coated with skid-resistant materials, or otherwise treated to minimize slipping.

(10) On each stepladder, ensure a metal spreader bar or locking device is provided to hold the front and back sections in an open position.

e. Set-up of Ladders. (24-8.e)

(1) Do not place ladders in passageways, doorways, drives, or any locations where they may be displaced by any other work, unless they are protected by barriers or guards or are secured to prevent accidental displacement.

(2) Portable ladders must be used at such a pitch that the horizontal distance from the working length (that is, top support to the foot of the ladder) will not be greater than ¼ of the vertical distance between these points.

(3) Wooden job-made ladders with spliced rail, must be used at an angle such that the horizontal distance is ⅛ of the working length (that is, top support to the foot of the ladder) of the ladder.

(4) Ladders must be secured by top, bottom, and intermediate fastenings, as necessary, to hold them rigidly in place and to support the loads that will be imposed upon them. Examples where securing may be required include, but are not limited to, use on slippery or unstable surfaces or in areas where they may be displaced by other activities or traffic.

(5) Set the steps or rungs of all ladders to provide at least 7 inches (17.8 cm) toe space from the inside edge of the rungs to the nearest interference.

(6) The top of a non-self-supporting ladder must be placed with the two rails supported equally unless the ladder is equipped with a single support attachment.

(7) Step-across distance. The step-across distance from the nearest edge of the ladder to the nearest edge of equipment or structure must not be more than 12 inches (30.5 cm) or less than 2.5 inches (6.4 cm).

(8) Do not place ladders on boxes, barrels, or other unstable bases to obtain additional height.

f. Use of ladders. (24-8.f)

(1) Restrict ladder use to the purpose for which the ladder was designed.

(2) Keep three points of contact at all times when ascending or descending ladders.

(3) Do not move, shift, or extend a ladder while occupied.

(4) Do not load ladders beyond the maximum intended load for which they were designed and tested, or beyond the manufacturer's rated capacity (includes the worker and all the tools and supplies carried).

(5) No more than one person at a time may climb a ladder between the same set of rails unless designed to support more than one person.

(6) Portable ladders do not require fall protection when used as a means of access. However, only light work for short period of time may be performed on portable ladders, and only as approved by the USACE supervisor or accepted by the KO or COR. No work requiring lifting of heavy materials or substantial exertion may be done from ladders.

(7) When ladders are the only means of access to or from a working area for 25 or more workers, or when a ladder is to serve simultaneous two-way traffic, use double-cleated ladders or two or more separate ladders.

(8) Do not use the top cap or top step of a ladder as a step or seat unless it has been designed to be used as such by the manufacturer (for example, platform ladders).

(9) Ensure latches are in place before climbing an extension ladder.

(10) Keep loose tools off the steps and top platform.

(11) Do not make modifications to manufactured ladders to adapt the ladder to specific or special use, unless the alteration is approved by an RPE. Modified ladders must meet the applicable ANSI/ASC A14 series standard.

g. Floor, Wall, and Roof Holes and Openings. (24-8.g)

(1) Guard all floor, roof openings, or holes into which a person can accidentally walk or fall through either by a guardrail system with toe-boards along all exposed sides or by a load-bearing cover. When the cover is not in place, protect the opening or hole by a removable guardrail system or other fall protection system, or provide an attendant when the guarding system has been removed. (See chapter 21)

(2) Cover all floor and roof holes through which equipment, materials, or debris can fall.

(3) When exposed to vehicles or equipment, design conduits, trenches, and manhole covers and their supports to carry a truck rear axle load of two times the maximum anticipated load.

(4) Guard every hatchway and chute floor opening with a hinged floor opening cover. Barricade the opening with railings so there is only one exposed side. Provide the exposed side with either a swinging gate or an offset so that no one is able to walk into the opening. When operating conditions require the feeding of material into a hatchway or chute opening, provide protection to prevent a person from falling through the opening.

(5) Protect wall openings 30 inches (76.2 cm) or more in height and 18 inches (45.7 cm) or more in width from which a fall could occur with a standard guardrail or equivalent. Provide a toe-board where the bottom of the wall opening, regardless of width, is less than 4 inches (10.2 cm) above the working surface. (See chapter 21)

(6) An extension platform outside a wall opening onto which materials can be hoisted for handling must have a standard guardrail according to chapter 21. However, one side of the extension platform may have removable railings to facilitate handling materials if appropriate fall protection is used. (See chapter 21)

(7) Provide roof openings and holes with covers, guardrail systems, or warning line systems on all exposed sides.

*Note.* Skylights located in floors or roofs are considered floor or roof holes or openings.

(a) Immediately cut out roofing material (for example, roofing membrane, insulation, felts), that cover or partly cover openings or holes. Do not leave a hole or opening unattended unless covered according to chapter 21.

(b) Do not stand or walk on skylights.

(c) Guard non-load bearing skylights with a load-bearing skylight screen, cover, or raining system along all exposed sides.

h. Stairways. (24-8.h)

(1) On all structures 20 feet (6.1 m) or more in height, provide stairways during construction. Address alternatives to the use of stairways in an AHA according to paragraph 24-6.

(2) Use temporary stairways to provide access to the work level when permanent stairways are not installed concurrently with the construction of each floor. Temporary stairways must have landings not less than 30 inches (76.2 cm) in the direction of travel and extend at least 22 inches (55.8 cm) in width at every 12 feet (3.7 m) or less of vertical rise.

(3) Install stairs between $30^{o}$ and $50^{o}$ from horizontal.

(4) Risers must be of uniform height and treads of uniform depth within each flight of stairs. Stairway systems must not have any variations of more than one-quarter (¼) inch (0.6 cm) in any riser height or tread depth.

(5) When metal pan landings or metal pan treads are used, secure them in place and fill them with concrete, wood, or other material to at least the top of each pan.

(6) Nail wooden treads in place.

(7) Handrails.

(a) Handrails must provide adequately shaped and dimensioned handhold that allows for anyone grasping it to avoid falling.

(b) The height of handrails may not be more than 38 inches (96.5 cm) nor less than 30 inches (76.2 cm) from the upper surface of the handrail to surface of tread, in line with face of riser or to surface of the ramp. Existing installations do not need to be modified if they met the building code that was in effect at the time the facility was built.

(c) Provide all handrails and railings with a minimum clearance of 2¼ inches (5.7 cm) between the handrail or railing and any other object.

(8) Standard Stair Railings. Install standard stair railings around all stair wells.

(a) The height of stair rails must be 42 inches +/- 3 inches (106.7 cm +/- 7.6 cm) from the upper surface of the toprail to surface of the tread in line with face of the riser at forward edge of tread. Existing installations need not be modified.

(b) Provide midrails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members between the toprail and the stairway steps.

(c) Locate midrails at a height midway between the top edge of the stairway system and the stairway steps.

(d) Screens or mesh, when used, must extend from the toprail to the stairway steps and along the entire opening between rail supports.

(e) Intermediate vertical members in between posts (for example, balusters), when used, may not be more than 19 inches (48.3 cm) apart.

(f) Install other structural members, when used, in such a manner so that there are no openings in the stair rail system that are more than 19 inches (48.3 cm).

(g) The toprails of stair rail systems must be capable of withstanding, without failure, a force of at least 200 pounds (0.9 kN) applied in any downward or outward direction within 2 inches (5.1 cm) of any point along the top edge of the rail.

(9) Every flight of stairs with four or more risers or rising more than 30 inches (76.2 cm) must have standard stair railings or standard handrails.

(a) On stairways less than 44 inches (111.8 cm) wide with both sides enclosed, install at least one standard handrail, preferably on the right descending side.

(b) On stairways less than 44 inches (111.8 cm) wide with one side open, install at least one standard stair railing on the open side.

(c) On stairways less than 44 inches (111.8 cm) wide with both sides open, install one standard stair railing on each side.

(d) On stairways more than 44 inches (111.8 cm) wide, but less than 88 inches (223.5 cm) wide, install one standard handrail on each enclosed side and one standard stair railing installed on each open side.

(e) On stairways more than 88 inches (223.5 cm) wide, install one standard handrail on each enclosed side, one standard stair railing on each exposed side, and a standard handrail in the middle of the stairway.

(10) Turn the ends of handrails and stair rails into the supporting wall or partition or otherwise arrange them so they do not constitute a projection hazard.

(11) Stair rail systems and handrails must be smooth surfaced to prevent injury, such as punctures and lacerations, and to prevent snagging of clothing and equipment.

(12) Doors or gates opening onto a stairway must have a platform and the swinging of the door may not reduce the width of the platform to less than 22 inches (55.9 cm) if installed after January 17, 2017, or 20 inches (50.8 cm) if installed prior.

(13) Do not install spiral stairways, except for special limited usage and secondary access where it is not practical to provide a conventional stairway. Provide, use, and maintain spiral stairways according to the manufacturer's instructions.

(14) Maintain three points of contact at all times when ascending or descending spiral stairs, ship stairs, or alternating tread stairs.

i. Ramps, Runways, and Trestles. (24-8.i)

(1) Ramps, runways, and platforms must be as flat as conditions will permit. Apply traverse cleats to the working surface where the slope exceeds 1 foot:5 feet (0.3 m:1.5 m).

(2) Provide vehicle ramps, trestles, and bridges on which foot traffic is permitted with a walkway and guardrail located outside the roadway. Provide the roadway