

**Walking-Working Surfaces and Fall Protection Guideline**

Date: 2/15/2021

EMUDPS-EHS-P024

Revision: 0

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Number: 1 of 12**I. PURPOSE**

The purpose of this guideline is to help protect Eastern Michigan University's employees, students and visitors when on walking-working surfaces, including elevated work platforms and rooftops. This program is designed to comply with [MIOSHA General Industry Safety and Health Standard Part 2 Walking-Working Surfaces](#) and [MIOSHA Construction Safety and Health Standard Part 45 Fall Protection](#) when engaged in work activities exposing them to falls when working four (4) feet or more above a lower level. This guideline establishes the minimum requirements and familiarizes workers and those working on behalf of EMU of the proper handling, guarding and awareness of the many possible hazards affiliated with walking and working surfaces.

**II. SCOPE AND APPLICATION**

This guideline applies to all Eastern Michigan University (EMU) workers and those employees working on behalf of EMU exposed to slips, trips or falls through unguarded floors and wall openings or holes and falls from elevated work platforms and roofs.

**III. DEFINITIONS**

**Anchorage** - A secure point of attachment for lifelines, lanyards or deceleration devices.

**Body harness** - Straps that may be secured about the worker in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system.

**Connector** - A device used to connect parts of the personal fall arrest system and positioning device systems together. Devices such as carabineers, or components of the system such as a buckle or D-ring sewn into a body belt or body harness, or a snap-hook spliced or sewn to a lanyard or self-retracting lanyard.

**Designated area** - A distinct portion of a walking-working surface delineated by a warning line in which workers may perform work without additional fall protection.

**Fall restraint system** – A system having the capacity to withstand at least 3,000 pounds of force or twice the maximum expected force needed to restrain the worker from exposure to a fall hazard. It restrains the worker by using a fixed-length lanyard and a body harness, where the lanyard prevents the worker from reaching the edge of the fall hazard. The system is comprised of a body harness or belt and lanyard along with an anchorage, connectors and other necessary equipment.

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**Floor opening** - An opening measuring 12 inches or more in its least dimension, in any floor, platform, pavement or yard through which persons may fall; such as a hatchway, stair or ladder opening, pit, or large manhole.

**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 worker's 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.

**Guardrail system** - A barrier erected along an unprotected or exposed side, edge or other area of a walking-working surface to prevent workers from falling to a lower level.

**Handrail** - A rail used to provide workers with a handhold for support.

**Lanyard** - A rope, suitable for supporting one person. One end is fastened to a safety belt or harness and the other end is secured to a substantial object or a safety line.

**Lifeline** - A component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

**Lower levels** – A surface or area to which a worker could fall. Such surfaces or areas include, but are not limited to, ground levels, floors, roofs, ramps, runways, excavations, pits, tanks, materials, water, equipment and similar surfaces and structures or portions thereof.

**Midrail** – A rail installed at a height midway between the top edge of the guardrail system and the walking working surface. Midrails must be capable of withstanding 150 pounds of pressure from any direction.

**Personal fall arrest system** - A system used to arrest a worker in a fall from a walking-working surface. It consists of a body harness, anchorage and connector. The means of connection may include a lanyard, deceleration device, lifeline or a suitable combination of these.

**Platform** - A walking-working surface that is elevated above the surrounding area.

**Positioning device system** - A body belt or body harness system rigged to allow a worker to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.

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**Riser** - The upright (vertical) or inclined member of a stair that is located at the back of a stair tread or platform and connects close to the front edge of the next higher tread, platform or landing.

**Runway** - An elevated walking-working surface, such as a catwalk, a foot walk along shafting or an elevated walkway between buildings.

**Snap-hook** - A device comprised of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object. When used in personal fall arrest systems or positioning device systems, snap-hooks must be of the locking type with a self-closing, self-locking keeper that remains closed and locked until unlocked and pressed open for connection or disconnection.

**Stairs/stairway** - Risers and treads that connect one level with another and includes any landings and platforms in between those levels. Stairways include standard, spiral, alternating tread-type, and ship stairs. Ship, spiral, and alternating tread-type stairs are not considered standard stairs.

**Stair railing** - A barrier erected along the exposed or open side of stairways to prevent workers from falling to a lower level.

**Standard railing** - Consists of a top rail, intermediate rail, and posts, and has a vertical height of 42 inches nominal from the upper surface of the top rail to the floor, platform, runway or ramp level. It is a vertical barrier erected along exposed edges of a floor opening, wall opening, ramp, platform or runway to prevent people from falling.

**Toeboard** - A protective barrier preventing the fall of materials, tools and equipment to lower levels and provides protection from falls for workers.

**Unprotected sides and edges** - Any side or edge of a walking-working surface (except at entrances and other access points) where there is no wall or guardrail system to protect workers from falling to a lower level.

**Wall opening** - A gap or void 30 inches or more high and 18 inches or more wide, in a wall or partition, through which workers can fall to a lower level.

**Walking-working surface** - Any horizontal or vertical surface on or through which a worker walks, works or gains access to a work area or workplace location.

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#### **IV. RESPONSIBILITIES**

##### **A. Directors, Faculty, Forepersons, Managers, Project Managers and Supervisors**

1. Implement and manage the requirements of the Walking-Working Surfaces and Fall Protection Guideline in their areas.
2. Enforce compliance with this guideline.
3. Promptly investigate and report to Risk Management and Environmental Health and Safety (EHS) all incidents and accidents.
4. Ensure workers are able to recognize potential fall hazards based on this guideline.
5. Notify EHS of the need for fall protection training, including when a new worker is assigned and when there is reason to suspect a previously trained worker does not have the understanding required to work safely from elevated surfaces.
6. Ensure workers attend all required training. Periodically evaluate the effectiveness of the training as it applies to the work their affected workers perform and provide EHS with their conclusions and recommendations.
7. Contact EHS for technical support when questions arise regarding compliance and safety procedures.
8. Ensure the proper safety equipment is supplied to the affected workers where needed, such as fall arrest systems, guardrail systems, toe-boards, stanchions and supports for designated areas, etc.
9. Provide workers access to this guideline.
10. Ensure workplaces are safe to conduct the work the affected workers are expected to perform.
11. Notify the Project Manager and/or EHS if contractors are observed working in an unsafe manner.

##### **B. Employees and Contractors Working on Behalf of EMU Must:**

1. Comply with the requirements of this guideline.
2. Notify their supervisor when questions arise regarding these procedures, the need for fall prevention equipment and difficulties complying with these requirements.
3. Report all accidents and near miss incidents to your supervisor or EHS.

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4. Inspect the personal fall arrest systems to be used for signs of damage and deterioration prior to each use.
5. Receive appropriate training on:
  - a. The hazards associated with the Walking-working Surfaces.
  - b. Fall protection equipment they may need on their work assignment.
  - c. The proper procedures for working around these hazards.
6. Use the appropriate required personal protective equipment.

### **C. Environmental Health and Safety (EHS)**

1. Coordinates general training of University workers on walking-working surfaces and fall protection.
2. Assists Departments with Walking-Working Surfaces and Fall Protection Guideline compliance.
3. Conducts periodic inspections for compliance with this guideline.
4. Reviews and revises this guideline as necessary.

## **V. PROCEDURES**

### **A. Training Requirements**

1. Managers, Supervisors, Faculty etc. are responsible for ensuring walking-working surfaces and fall protection training is required for workers exposed to falls when working four (4) feet or more above a lower level. Training must be provided upon initial assignment to work from elevated surfaces then at least every three years; or whenever there is a change in the area or a reason to suspect a previously trained worker does not have the understanding and skill required to work safely.
2. Persons knowledgeable in fall protection must provide the training and instruction. Outside contractors competent in fall protection may provide training, under the following conditions:
  - a. The requirements of this section are satisfied.
  - b. EHS is provided a copy of the training outline.
  - c. EHS reviews the materials PRIOR to the training session.
3. Training must include the following:
  - a. The nature of the fall hazards in the work area and how to recognize and minimize them;
  - b. The correct procedures for installing, inspecting, operating, maintaining, and disassembling the personal fall protection systems that the worker uses;

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- c. The use and operation of guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, controlled access zones and other protection to be used;
  - d. The correct use of personal fall protection systems and equipment including, but not limited to, proper hook-up, anchoring, and tie-off techniques, and equipment handling, storage and inspection requirements and the limitations of the equipment;
  - e. The proper use of any tools and equipment such as ladders, safety net systems, portable guardrails, mobile ladder stands and mobile platforms.
  - f. The requirements of [MIOSHA General Industry Safety and Health Standard Part 2. Walking-Working Surfaces](#) and [MIOSHA Construction Safety and Health Standard Part 45. Fall Protection](#).
4. Training documentation must include the worker's name, EMU identification number, department and date of training along with the identity of the qualified trainer.
  5. Training records must be retained and readily available.

## **B. General Requirements**

1. All walking-working surfaces must be kept clean, dry, sanitary and orderly.
2. Every floor, workplace and passageway must be kept free from protruding nails, splinters, holes or loose boards.
3. Walking and working surfaces must have the strength and integrity to support workers and their equipment.
4. Covers and/or guardrails must be provided to protect personnel from the hazards of open pits, tanks, vats, ditches, etc.
5. The floor or roof of a building must not be overloaded with materials and/or equipment exceeding the approved load limits. Elevated storage and other platforms must be marked with the load bearing weight.
6. All permanent aisles and passageways must be clearly marked, have adequate space for passage of both moving equipment and workers, have safe clearances at all turns, doors and passageways and must not be obstructed by physical barriers or stored materials.

## **C. Fall Hazards**

1. Supervisors must ensure each worker on a walking-working surface with an unprotected side or edge that is 4 feet or more above a lower level is protected from falling by one or more of the following:
  - a. Guardrail systems;
  - b. Safety net systems; or

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- c. Personal fall protection systems, such as personal fall arrest, travel restraint, or positioning systems.
2. Workers must be protected from falling through holes (including skylights) that are 4 feet or more above a lower level by one or more of the following:
  - a. Covers;
  - b. Guardrail systems;
  - c. Travel restraint systems; or
  - d. Personal fall arrest systems.
  - e. Workers are to be protected from falling into a stairway floor hole, ladder-way hole, hatchway and hinged floor hole cover by means of a (fixed or removable) guardrail system.
3. When an opening is not covered or blocked from access, a person must be assigned to constantly monitor the opening until the cover is replaced.
4. Covers must be sound, solid, not easily opened and cannot project more than one inch above the floor or surface level. All hinges, handles, bolts and other parts must set flush with the floor or cover surface.
5. Barricades designed to prevent someone from falling into an opening must be visually noticeable and cannot have additional openings that create additional fall hazards.
6. Floor surfaces surrounding an opening must be free of clutter and slippery materials.

#### **D. Stairways**

1. Handrails must be provided on at least one side of closed stairways, preferably on the right side descending.
2. Adequate headroom of seven (7) ft. must be maintained above stair tread.
3. Stairway platforms must not be less than the width of a stairway and must be a minimum of thirty (30) inches in length measured in the direction of travel.
4. Stairs must be installed at angles to the horizontal of between thirty (30) and fifty (50) degrees.
5. Stairways must have a minimum width of twenty-two (22) inches between vertical barriers.
6. Each stair can support at least five (5) times the normal anticipated live load but never less than a concentrated load of 1000 pounds applied at any point.
7. Standard stair railings and handrails must be provided on stairs with four (4) or more risers.

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8. Standard railings, including top rails, mid-rails, and toe-boards must be provided on the open sides of all exposed stairways and stair platforms.
9. Stairs must be free of clutter and treads must be reasonably slip resistant.

#### **E. Other Working Surfaces – Dockboards (Bridge Plates)**

1. Portable and powered dock-boards must be of sufficient strength to carry the maximum intended load imposed on them.
2. Portable dockboards must be secured in position by anchoring them in place or using equipment or devices that prevent dockboard slippage during use.
3. Handholds or other effective means must be provided on portable dockboards to permit safe handling.
4. Ensure wheel chocks or sand shoes are used to prevent the transport vehicle (truck, trailer, semitrailer) on which a dockboard is placed, from moving while workers are on the dockboard.

#### **F. Fall Protection Systems**

1. Supervisors must ensure all fall protection systems and falling object protection required are installed and comply with the other fall protection requirements before any worker begins work necessitating fall or falling object protection.
2. Workers performing work from walking-working surfaces that are four (4) ft. or higher above a lower level must be protected from falls by passive fall protection systems (guardrails or parapet walls) when feasible. If guardrail systems are infeasible, alternative fall protection, designated areas, or personal fall protection equipment must be used. This includes rooftop work for all tradesmen and service workers.

#### **G. Guardrail Systems**

1. The top edge height of top rails must be 42+/- 3 inches (39" – 45") above the walking-working level.
2. Mid-rails must be installed at a height midway between the top edge of the guardrail system and the walking-working level.
  - a. Mid-rails, screens, mesh, intermediate vertical members, solid panels, or equivalent intermediate members are installed between the walking-working surface and the top edge of the guardrail system as follows when there is not a wall or parapet that is at least 21 inches (53 cm) high:
  - b. Screens and mesh extend from the walking-working surface to the top rail and along the entire opening between top rail supports;



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- c. Intermediate vertical members (such as balusters) are installed no more than 19 inches (48 cm) apart; and
  - d. Intermediate members (such as additional mid-rails and architectural panels) are installed so that the openings are not more than 19 inches (48 cm) wide.
3. Guardrail systems must be capable of withstanding, without failure, a force of at least 200 pounds in any direction.
4. Guardrail systems must be smooth surfaced to protect workers from injury, such as punctures or lacerations and to prevent catching or snagging on clothing.
5. Guardrail systems used on ramps and runways must be erected along each unprotected side or edge.
6. Toe-boards must be four (4) inches in height from its top edge to the level of the walking-working surface.
7. Toe-boards must be securely fastened in place and with not more than ¼ - inch clearance above the walking-working surface level.
8. Where materials are piled to a height that a standard toe-board does not provide protection, paneling from floor to intermediate rail or to top rail must be provided.

## **H. Designated Areas**

1. When designated areas are used, the supervisor must ensure:
  - a. Workers remain within the designated area while work operations are underway; and
  - b. The perimeter of the designated area is delineated with a warning line consisting of a rope, wire, tape or chain that meets the requirements.
2. The supervisor must ensure each warning line:
  - a. Has a minimum breaking strength of 200 pounds;
  - b. Is installed so its lowest point, including sag, is not less than 34 inches and not more than 39 inches above the walking-working surface;
  - c. Is supported in such a manner that pulling on one section of the line will not result in slack being taken up in adjacent sections causing the line to fall below the limits specified;
  - d. Is clearly visible from a distance of 25 feet away and anywhere within the designated area;
  - e. Is erected as close to the work area as the task permits and is erected not less than 6 feet from the roof edge for work that is both temporary and infrequent, or not less than 15 feet for other work.

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## **I. Personal Fall Arrest Systems:**

Means a system used to arrest a worker in a fall from a walking-working surface. It consists of a body harness, anchorage and connector. The means of connection may include a lanyard, deceleration device, lifeline or a suitable combination of these.

1. Personal fall arrest systems must limit the maximum arresting force on a worker to 1,800 pounds.
2. Systems must bring a worker to a complete stop and limit maximum deceleration distance a worker travels to 3.5 feet.
3. Systems must have sufficient strength to withstand twice the potential impact energy of a worker free falling a distance of six feet or the free fall distance permitted by the system, whichever is less.
4. Systems must be rigged in such a way that a worker will not free fall more than six feet nor contact any lower level.
5. Sustain the worker within the system/strap configuration without making contact with the worker's neck and chin area.
6. All arrest system components must meet specific testing criteria listed in [29 CFR 1910.140](#).

## **J. Equipment Anchorage, Tie-Off and Use**

Anchoring the fall arrest system is critical. The selection of the anchoring point should be made carefully. When the worker is uncertain about the anchoring point he/she is expected to consult with a supervisor or EHS. Equipment anchorage, tie-off and use must meet the following conditions:

1. Anchoring points must be permanent fixed objects.
2. Anchors, to which personal fall arrest equipment is attached, must be capable of supporting at least 5,000 pounds for each attached worker.
3. When tying off, the worker must tie off at such a location where there are no obstacles in the potential path of a fall.
4. The worker must follow the anchoring tie off and equipment tie off procedures that are specified by the fall arrest system manufacturer PRIOR to getting into a position where he/she could fall.

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## K. Equipment Care and Inspection

1. Follow the manufacturer's instructions and training protocols for equipment maintenance, cleaning and storage.
2. Prior to each use, personal fall arrest systems must be inspected for mildew, wear, damage and other deterioration.
3. Immediately remove any defective fall arrest system components and notify your supervisor.

## L. Rescue After a Fall

Prompt rescue must be provided in the event of a fall or workers must be able to rescue themselves.

1. When personal fall arrest equipment will be used, workers must develop a rescue plan before work begins. Note: [ANSI Z359-2007](#) Fall Protection Standard recommends contact be made with a worker within six minutes after a fall.
2. Rescue plans should be determined following the fall protection rescue hierarchy:
  - a. Self-rescue;
  - b. Assisted rescue;
  - c. Professional rescue.
3. Workers must work in teams of two or more, when personal fall arrest systems are used to ensure prompt rescue in the event of a fall.
4. Should a fall occur:
  - a. The person needing rescue can delay suspension trauma by flexing or pumping the leg muscles or using safety step devices to provide leg support and enhance blood circulation until rescue is provided.
  - b. The rescuer can provide emotional support during self-rescue and use a ladder or man-lift to provide assisted rescue.
  - c. If the worker was injured during the fall, contact local emergency services by dialing 911 and do not attempt to move or rescue the worker.
5. Any worker involved in a fall must be seen by a health care provider and complete an [incident report](#).

## VI. REFERENCES

- [MIOSHA – Part 2 General Industry Safety and Health Standard Part 2. Walking-Working Surfaces](#)
- [MIOSHA – Part 45 Construction Safety and Health Standard Part 45. Fall Protection](#)
- [Emory University Environmental Health and Safety Office Research Administration](#)

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**VII. HISTORY**

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