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EHS-306, WALKING WORKING SURFACES-FALL PROTECTION PROGRAM

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1.0 Introduction

1.1 Purpose

The purpose of this program is to establish the minimum requirements and responsibilities for employees when on walking-working surfaces, including elevated work platforms, and rooftops. This program is designed to protect all employees engaged in work activities that expose them to falls when working four (4) feet or more above a lower level as prescribed in the Occupational Safety and Health Administration's (OSHA's) Walking-Working Surfaces Standard - 29 CFR 1910.21 and the 2003 Walking and Working Surfaces; Personal Protective Equipment (Fall Protection Systems) Proposed Rule.

1.2 Scope

This program applies to all Emory University students and employees - including faculty - who perform any work activities that expose them to slips, trips, or falls through unguarded floors and wall openings, floor holes, and falls from elevated work platforms and roofs.

1.3 Definitions

Anchor. A secure point of attachment for lifelines, lanyards or deceleration devices.

Body belt (safety belt). A strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration device.

Body harness. Straps which may be secured about the employee 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 which is used to couple (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 dee-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 space which has a perimeter barrier erected to warn employees when they approach an unprotected side or edge, and serves also to designate an area where work may be performed without additional fall protection.

EHSO. Environmental, Health and Safety Office

Fall restraint system. A fall protection system that prevents the user from reaching a fall hazard and/or entering into free fall. Typically, the worker is restrained by a fixed-length lanyard and a body harness or body belt, where the lanyard prevents the worker from reaching the leading edge. The system is comprised of either a body belt or body harness, along with an anchorage, connectors and other necessary equipment.

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. Floor openings occupied by elevators, dumb waiters, conveyors, machinery, or containers are excluded from this subpart.

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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 body belt or 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 to prevent employees from falling to lower levels.

Handrail. A single bar or pipe supported on brackets from a wall or partition, as on a stairway or ramp, to furnish persons with a handhold in case of tripping.

Lanyard. A flexible line of rope, wire rope, or strap which generally has a connector at each end for connecting the body belt or body harness to a deceleration device, lifeline, or anchorage.

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. Those areas or surfaces to which an employee can fall. Such areas or surfaces include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits, tanks, material, water, equipment, structures, or portions thereof.

Midrail. A rail approximately midway between the guardrail and platform, used when required, and secured to the uprights erected along the exposed sides and ends of platforms.

Personal fall arrest system. A system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, a body belt or body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these. As of January 1, 1998, the use of a body belt for fall arrest is prohibited.

Platform. A working space for persons, elevated above the surrounding floor or ground; such as a balcony or platform for the operation of machinery and equipment. Platforms may also be an extended step or landing breaking a continuous run of stairs.

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

Riser. The upright member of a step situated at the back of a lower tread and near the leading edge of the next higher tread

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

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Snap-hook. A connector 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 which remains closed and locked until unlocked and pressed open for connection or disconnection.

Stairs/stairway. A series of steps leading from one level or floor to another, or leading to platforms, pits, boiler rooms, crossovers, or around machinery, tanks, and other equipment that are used more or less continuously or routinely by employees, or only occasionally by specific individuals. A series of steps and landings having three or more risers constitutes stairs or stairway.

Stair railing. A vertical barrier erected along exposed sides of a stairway to prevent falls of persons.

Standard railing. A vertical barrier erected along exposed edges of a floor opening, wall opening, ramp, platform, or runway to prevent falls of persons.

Toeboard. A low protective barrier that will prevent the fall of materials and equipment to lower levels and provide protection from falls for personnel.

Unprotected sides and edges. Any side or edge (except at entrances to points of access) of a walking/working surface, e.g., floor, roof, ramp, or runway where there is no wall or guardrail system at least 42 inches (1.0 m) high.

Wall opening. An opening at least 30 inches high and 18 inches wide, in any wall or partition, through which persons may fall; such as a yard-arm doorway or chute opening.

Walking/working surface. Any surface, whether horizontal or vertical on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, formwork and concrete reinforcing steel but not including ladders, vehicles, or trailers, on which employees must be located in order to perform their job duties.

1.4 Responsibilities

Environmental Health and Safety Office (EHSO)

As the administrative department for the Walking/Working Surfaces – Fall Protection Program, EHSO is responsible for:

- Development, implementation, and administration of the Walking/Working Surfaces – Fall Protection Program;
- Conducting workplace risk assessments to determine the need for fall protection and assess the condition of walking/working surfaces;
- Development and implementation of fall protection training;
- Reviewing, updating, and evaluating the overall effectiveness of the Walking/Working Surfaces – Fall Protection Program;
- Providing technical support and consultation to departments of affected employees to interpret requirements and establish safe practices.

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Directors, supervisors, and managers have primary responsibility for the management and enforcement of the Walking/Working Surfaces – Fall Protection Program in their areas.

They are responsible for:

- Ensuring employees are able to recognize potential fall hazards based on this program;
- Notifying EHSO of each fall hazard that their employees may face;
- Notifying EHSO of the need for fall protection training, including when a new employee is assigned, and when there is reason to suspect a previously trained employee does not have the understanding required to safely work from elevated surfaces;
- Ensuring employees attend all required training;
- Periodically evaluating the effectiveness of the program as it applies to the work that their affected employees perform and providing EHSO with their conclusions, compliance challenges, and recommendations;
- Contacting EHSO for technical support when questions arise regarding compliance and safe procedures;
- Ensuring that proper safety equipment is supplied to their affected employees where needed, such as fall arrest systems, guardrail systems, toeboards, stanchions and supports for designated areas, etc.;
- Ensuring that all workplaces are safe to conduct the work that their affected employees are expected to perform;
- Notifying EHSO if contractors are observed working in an unsafe manner.

Employees

All employees are responsible for complying with the rules set forth by this program. They are responsible for:

- Complying with the rules set forth by this program;
- Notifying their supervisor when questions arise surrounding safe procedures, the need for fall prevention equipment, and difficulties complying with these requirements;
- Reporting all accidents and near miss incidents;
- Inspecting all personal fall arrest systems for signs of damage and deterioration prior to each use.
- Attending all required Walking/Working Surfaces – Fall Protection Training annually.

Contractors

Contractors working on campus are required to comply with 29 CFR 1926.501 and all other applicable OSHA workplace safety regulations. Contractor's safety programs shall be available for review upon request by representatives of ESHO.

1.5 Training Requirements

- EHSO is responsible for ensuring that Walking Working Surfaces – Fall Protection training is provided to Emory University employees exposed to falls when working four (4) feet or more above a lower level. Training will be provided upon initial assignment to a location that requires an employee to

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work from elevated surfaces and at least once every three years; or whenever there is reason to suspect a previously trained employee does not have the understanding and skill required to safely work from elevated surfaces.

- Training will be overseen by EHSO. Training and instruction will be provided by persons knowledgeable in all aspects of fall protection. Outside contractors that are competent in fall protection may provide training, under the following conditions:
 - The requirements of this section are satisfied;
 - EHSO is provided a copy of the training outline; and
 - EHSO approves the materials PRIOR to the training session.
- Training will include the following:
 - Instruction on using personal fall arrest equipment by the vendor supplying the equipment. Instruction will include, methods of use; limitations of the equipment; inspection and storage requirements; and proper anchoring and tie-off techniques, including determination of elongation and deceleration distance.
 - The requirements of 29 CFR 1910.21 Walking-Working Surfaces;
 - The requirements of the 2003 Walking Working Surfaces; Personal Protective Equipment (Fall Protection Systems) Proposed Rule;
 - The requirements of fall protection systems used at Emory University;
- EHSO will maintain documentation of attendance which will include the employee's name, department, and date of training.

1.6 Recordkeeping Requirements

Training records are retained by EHSO and are available through EHSO.

1.7 Program Evaluation

The written Walking/Working Surfaces – Fall Protection Program shall be re- evaluated annually and revised as necessary.

2.0 Walking Working Surfaces

2.1 General Requirements

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

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- Every floor opening or platform shall be guarded by a standard railing;
- Toeboards must be installed around floor and wall openings and where the potential exists for tools and other materials to fall on personnel working below;
- All floor and wall openings, including manholes, trapdoors, pits, ladderway floor openings, and chute openings, must be safely covered or blocked from access;
- When an opening is not covered or blocked from access, a person must be assigned for constant attendance to the opening until the cover is replaced;
- 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, or other parts must set flush with the floor or cover surface;
- Barricades that are designed to prevent someone from falling into the opening must be visually noticeable and cannot have additional openings that create additional fall hazards;
- Floor surfaces surrounding the opening shall be free of clutter and slippery material.

2.3 Fixed Industrial Stairs

- Standard stair railings and handrails shall be provided on stairs with four (4) or more risers;
- Standard railings, including top rails, midrails, and toeboards shall be provided on the open sides of all exposed stairways and stair platforms;
- Handrails shall be provided on at least one side of closed stairways, preferably on the right side descending;
- Fixed stairways must be designed and constructed to carry a load of five (5) times the normal live load anticipated at any one time and be able to safely carry a moving concentrated load of 1000 pounds;
- Fixed stairways shall have a minimum width of twenty-two (22) inches;
- Fixed stairs shall be installed at angles to the horizontal of between thirty (30) and fifty (50) degrees;
- Stairway platforms shall 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.
- Adequate headroom of seven (7) ft. must be maintained above stair tread;
- Stairs shall be free of clutter, and treads must be reasonably slip resistant.

2.4 Other Working Surfaces – Dockboards (Bridge Plates)

- Portable and powered dockboards must be of sufficient strength to carry the load imposed on them.
- Portable dockboards must be secured in position by being anchored or equipped with devices that prevent slippage during use.
- Handholds, or other effective means, shall be provided on portable dockboards to permit safe handling.
- Powered dockboards must be designed and constructed in accordance with the
- U.S. Department of Commerce publication, Commercial Standard CS202-56 (1961) "Industrial Lifts and Hinged Loading Ramps".

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3.0 Fall Protection Systems

Employees 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, i.e., guardrails or parapet walls when feasible. When the use of a guardrail system is infeasible, alternative fall protection, i.e., designated areas or personal fall protection equipment will be used. This includes maintenance work on exhaust equipment, Heating Ventilation and Air Conditioning (HVAC) systems, plumbing, etc., as well as inspections and assessments of work conducted on rooftops.

3.1 Guardrail Systems

- The top edge height of top rails must be 39- 42 inches above the walking/working level;
- Mid-rails must be installed at a height midway between the top edge of the guardrail system and the walking/working level;
- Guardrail systems must be capable of withstanding - without failure - a force of at least 200 pounds;
- Guardrail systems must be surfaced to prevent injury to an employee from punctures or lacerations, and to prevent snagging of clothing;
- Guardrail systems used on ramps and runways must be erected along each unprotected side or edge;
- Toeboards must be four (4) inches in height from its top edge to the level of the walking/ working surface;
- Toeboards must be securely fastened in place and with not more than ¼ - inch clearance above the walking/ working surface level.
- Where material is piled to such height that a standard toeboard does not provide protection, paneling from floor to intermediate rail, or to top rail must be provided.

3.2 Designated Areas

- The work must be of a temporary nature, such as maintenance of rooftop equipment;
- Designated areas must only be established on surfaces that have a slope from the horizontal of 10 degrees or less;
- Designated areas must consist of an area surrounded by a rope, wire, or chain and supporting stanchions;
- After being erected with the line attached, stanchions must be capable of resisting
 - without tipping over - a force of at least 16 pounds applied horizontally against the stanchion;
 - The line must have a minimum breaking or tensile strength of 500 pounds;
 - 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;
 - The line must be installed in such a manner that its lowest point is no less than 34 inches nor more than 39 inches from the work surface;
 - The line forming the designated area must be clearly visible from any unobstructed location within the designated area up to 25 feet away;

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- The stanchions must be erected as close to the work area as is permitted by the task;
- The perimeter of the designated area must be erected no less than six (6) feet from the unprotected side or edge; and
- Access to the designated area shall be by a clear path formed by two lines attached to stanchions.

3.3 Personal Fall Arrest Systems

Personal fall arrest systems are designed to stop a fall once it has begun. The system includes an anchorage, full body harness, lanyard, locking snap-hooks, lifeline and connector, and may include a descent control device. Body belts are not acceptable as part of a personal fall arrest system. However, the use of body belts in positioning device systems is acceptable. The manufacturer's procedures for the equipment must be followed. In addition, personal fall arrest equipment must comply with the following:

- Harnesses must be attached in the center of the back near shoulder level, above the wearer's head;
- Personal fall arrest systems must limit the maximum arresting force on an employee to 1,800 pounds;
- Systems must bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet; and
- Systems must have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of six feet, or the free fall distance permitted by the system, whichever is less.
- Systems must be rigged in such a way that an employee can neither free fall more than six feet, nor contact any lower level.

4.0 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 employee is uncertain about the anchoring point he/she is expected to consult with a supervisor or EHSO. Equipment anchorage, tie-off, and use must meet the following conditions:

- Anchoring points must be permanent fixed objects;
- Anchors, to which personal fall arrest equipment is attached, must be capable of supporting at least 5,000 pounds for each attached employee;
- When tying off, the employee must tie off at such a location where there are no obstacles in the potential path of a fall;
- The employee 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.

5.0 Equipment Care and Inspection

- Follow the manufacturer's instructions and training protocols for equipment maintenance, cleaning and storage.
- Personal fall arrest systems must be inspected prior to each use for mildew, wear, damage and other deterioration.
- Immediately remove any defective fall arrest system components.

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6.0 Rescue After a Fall

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

- When personal fall arrest equipment will be used, employees must develop a rescue plan before work begins. **Note: ANSI Z359-2007 Fall Protection Code recommends that contact be made with a worker within six minutes after a fall.**
- Rescue plans should be determined following the fall protection rescue hierarchy:
 - Self-rescue;
 - Assisted rescue;
 - Professional rescue.
- If at all possible, employees should work in teams of two or more, when personal fall arrest systems are used to ensure prompt rescue in the event of a fall. **Note: When an employee uses a fall arrest system alone, alternative methods must be implemented that will provide an equivalent response, as listed above. Alternative methods may include (but not be limited to) notifying an on-site supervisor or other competent person of the type of work being performed, referencing the work location, and providing a review of the rescue plan.**
- Should a fall occur:
 - 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.
 - The rescuer can provide emotional support during self-rescue and use a ladder or man-lift to provide assisted rescue.
 - If the employee was injured during the fall, contact local emergency services by dialing 911 and do not attempt to move or rescue the employee.
- Any employee involved in a fall must be seen by an Emory health care provider and complete an incident report.

7.0 References

- OSHA Standards on Walking Working Surfaces, Subpart D; [29 CFR 1910.21 – 30](#)
- OSHA 2010 Walking-Working Surfaces Personal Protective Equipment (Fall Protection Systems) Proposed Rule; [75 FR 28861](#)

8.0 List of Associated Documents

Fall Protection Design and Construction Guidelines