

GEORGIA INSTITUTE OF TECHNOLOGY
ENVIRONMENTAL HEALTH AND SAFETY
FALL PROTECTION PROCEDURE

PURPOSE

The purpose of this procedure is to specify practices and training for the safety of GEORGIA TECH employees while working on elevated surfaces and ladders. GEORGIA TECH employees who work at heights of four (4) feet or greater are required to attend training on fall protection. Additionally, those employees working on aerial platforms, scissors lifts or other elevated platform equipment must receive training on the use of such equipment.

SCOPE

This procedure applies to all GEORGIA TECH employees that perform any duties on an elevated work surface where there is a fall hazard of 4 feet or more to a lower level.

RESPONSIBILITIES

The EHS General Safety unit is responsible for providing training, conducting evaluations of elevated work areas, and assisting in the selection of the proper equipment for the task.

All supervisors must follow this procedure when they have employees that work at heights.

All employees are responsible for following the safety procedures regarding fall protection and use the personal protective equipment specified.

DEFINITIONS

Aerial lift device: Equipment such as powered platforms, vehicle-mounted elevated and rotating work platforms, extensible boom platforms, aerial ladders, articulating booms platforms, vertical towers and powered industrial truck platforms.

Anchor point: A secure point of attachment for lifelines, lanyards or deceleration (grabbing) devices.

Body harness: An interconnected set of straps that may be secured about a person in a manner that distributes the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders with a means for attaching the harness to other components of a personal fall arrest system.

Deceleration device: Any mechanism, such as a rope, grabbing device, rip stitch lanyard, specially woven lanyard or automatic self-retracting lifeline/lanyard, which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limits the energy imposed on an employee during fall arrest.

Deceleration distance: The additional vertical distance a falling person travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which a deceleration device begins to operate.

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Fixed ladder: A ladder, including an individual rung ladder, which is permanently attached to a structure, building, or equipment.

Guardrail: A barrier at least 42 inches high erected to prevent personnel from falling from working levels more than 30 inches above the floor, ground, or other working areas of a building.

Hole: A void or gap 2 inches or more in its least dimension in a floor, roof, or other walking/working surface.

Ladder: A device typically used to gain access to a different elevation consisting of two or more structural members crossed by rungs, steps, or cleats.

Lanyard: A flexible line of rope or strap that generally has a connector at each end for connecting the body harness to a deceleration device, lifeline or anchor point.

Lifeline: A component consisting of a flexible line for connection to an anchorage at one end to hang vertically or for connection to anchorages at both ends to stretch horizontally. This 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 include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits tanks, material, water, equipment, structures, or portions thereof.

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.

Positioning device system: A 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.

Personal fall arrest system: A system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, and body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.

Restraint line: A device, which is attached between the employee and an anchorage to prevent the employee from walking or falling off an elevated surface.

Roof: Exterior surface on the top of a building.

Rope grab (grabbing device): A deceleration device that travels on a lifeline and automatically, by friction, engages the lifeline and locks to arrest a fall.

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Scaffold: Any temporary elevated or suspended platform, and its supporting structures, used for supporting employees or materials or both.

Self-retracting lifeline/lanyard: A deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under minimal tension during normal movement and which, after onset of a fall, automatically locks the drum and arrests the fall.

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

Snap hook: A connector consisting 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.

Toe board: A vertical barrier at floor level erected along exposed edges of a floor openings, wall opening, platform runway, or ramp to prevent falls of materials.

Tie-Off: A procedure of connecting directly or indirectly to an anchorage point.

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 high.

Vertical Lifeline: A component consisting of a vertically hanging flexible line for connection to an anchor point at one end that serves as a means for connecting other components of a personal fall arrest system to the anchor point.

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 and, runways.

Wall Opening: A gap or void 30 inches or more high and 18 inches or more wide in a wall or partition, through which someone can fall to a lower level.

Work area: That portion of a walking/working surface where job duties are being performed.

PROCEDURE

The procedure for fall protection covers the following work situations:

- **Ladders** - fixed, free standing, temporary, or roll away type.
- **Elevating Personal Platforms** – scaffolds, aerial platforms, scissors lifts, forklift-mounted platforms, boom trucks, etc.

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- **Elevated Surfaces** – roofs (closer than 6 feet to the edge), catwalks, skylights, boilers, chillers, etc.
- **Vertical Opening** - ground level entry into excavations, trenches, holes, pits, vessels, and other confined spaces.

Fall protection is required whenever work is performed in an area 4 feet above its surroundings and can generally be provided through the use of fall protection systems including:

- **Covers** - Covers are fastened over holes in the working surface to prevent falls.
- **Guardrails** - Standard guardrails consist of a top rail, located 42 inches above the floor, and a mid-rail. Screens and mesh may be used to replace the mid-rail, so long as they extend from the top rail to the floor.
- **Personal Fall Arresting Systems** - Components of a personal fall arresting system include a body harness, lanyard, lifeline, connector, and an anchorage point capable of supporting at least 5,000 pounds.
- **Positioning Device Systems** - Positioning device systems consist of a body belt or harness rigged to allow work on a vertical surface, such as a wall, with both hands free.
- **Warning Line Systems** - Warning line systems are made up of lines or ropes installed around a work area on a roof. These act as a barrier to prevent those working on the roof from approaching its edges.

Ladders

Employees who work on ladders with a working height of 4 feet or more shall be knowledgeable of the following:

- How to inspect ladders for visible defects
- How to use ladders properly

The ladder safety inspection guide can be used as a referenced.

Employees who work on fixed ladders with a working height of 8 feet or above must have a fall arrest system attached.

Training

Fall Protection Training will be provided for all affected employees. Refresher training will be provided periodically to all employees who use a personal fall arrest system.

Employees who use personal fall arresting systems to control fall hazards in their work area shall be knowledgeable of the following:

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- The application limits of the equipment
- The proper hook-up, anchoring and tie-off techniques including determination of elongation and deceleration distance
- Methods of use, inspection, and storage of equipment

Fall Arrest System Requirements

Fall Arrest Equipment reduces the risk of injuries that can occur when a worker falls from one level to another. If engineering controls are not feasible to prevent the fall, fall arrest equipment becomes the last line of defense.

Critical components of fall arrest equipment include:

- **Body harness** - The harness must, comfortably but snugly, fit the individual. Many body harnesses are designed for "universal fit" to accommodate several individuals. "Universal fit" has limitations; the mid range "universal fit" may not adequately accommodate small frame and large frame individuals.
- **Shock Absorbing Lanyards** - Shock absorbing lanyards are required. Static rope and nylon lanyards must be replaced with an appropriate length shock-absorbing lanyard. During fall arrest the rip stitching of the shock-absorbing lanyard absorbs the shock of the fall, drastically reducing forces onto the body and preventing significant injury. Special attention must be given to the stopping distance required by the manufacturer of the lanyard.
- **Locking snap hooks** - Locking snap hooks are required. All connection hardware (e.g. - snap hooks, carabineers) must have a locking mechanism to prevent roll out from the anchor and sized appropriately to fit with the anchor.
- **Inspection of fall arrest equipment** – General Industry standard, GEORGIA TECH and Fall Arrest Equipment Manufacturers, require any defective equipment to be immediately removed from service and replaced. Defective equipment must be destroyed to prevent accidental use that could endanger someone's life. The employee will perform a visual inspection of the equipment prior to each use.
- **Harness inspection** - Defects include but are not limited to: cuts, abrasion, loose threads, tears, stretching and mold.
- **Look for deterioration**
 - Exposure to molten metal or flame from hot work will fuse nylon fibers together. There may be hard shiny spots and the nylon appears shriveled and brown. The nylon will feel brittle.
 - Exposure to harsh chemicals - change in color, appearing as a brownish smear. Nylon webbing loses elasticity.
- **Hardware inspection** - Look for cracks, pitting and any distortion in all hardware components: buckles, D-rings, snap hooks and carabineers, rivets and grommets. Belt buckle grommets get a lot of wear from opening and closing. Snap hooks must lock and close tightly; buckles must function properly.

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- **Use of fall arrest equipment**
 - Always use a secure anchor point (must hold 5,000 lb. load).
 - Connect to an anchor point at shoulder level or above. Never connect below the D-ring of the body harness.
 - Connection to anchor points must prevent a dangerous swing fall hazard or impact with any lower level in the event of a fall.
 - Connection to an anchor point must limit the fall to no greater than six feet.
 - Use chafing pads or anchor slings to prevent cutting connectors (lanyards and lifelines) on sharp edges.
 - Do not use knots on connectors (lanyards and lifelines).
 - Vertical lifelines must be synthetic (nylon) fiber.
 - Rope Grab Devices used on vertical lifelines must be secured twelve feet up from the terminal end of the vertical lifeline.
 - Terminate the end of the vertical lifeline to prevent the Rope Grab Device from slipping off.
 - Only one person can tie off to a vertical lifeline.
- **Cleaning and storage of fall arrest equipment** - Follow the equipment manufacturer's cleaning instructions. Always dry equipment naturally. Use an approved lubricant (light oil or lubricant) to oil snap hooks when dry. Store clean and dry away from direct sunlight and excessive heat.

Aerial Lift Guidelines

Work activities that are performed with an aerial lift must be in conformance with the manufacturer and the General Industry standards. Basic requirements include but are not limited to:

- Initial training is required to operate aerial lifts. A certified trainer will be responsible for training employees in the correct use and safety precautions for the specific equipment (i.e. a certified employee or equipment supplier / manufacturer).
- Articulated and extensible boom platforms must have both platform (operator controls) and lower controls.
- The operator must test the controls each day to determine that the controls are in safe working condition.
- The operator must stand firmly on the floor of the basket, and must not sit or climb on the edge of the basket or use planks, ladders or other devices for a work position.
- Body harnesses must be worn with a lanyard attached to the boom. The point of attachment must be the aerial lift's boom or work platform. Personnel cannot attach lanyards to adjacent poles, structures or equipment while they are working from the aerial lift.

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- An aerial lift may not be moved when the boom is elevated in a working position with the operator in the basket, except for equipment which is specifically designed for this type of operation.

Employees who use aerial lifts shall be knowledgeable of the following:

- The manufacturer's operating instructions
- Pre-start inspection of the Aerial lift
- Inspection of the work area for dangerous conditions such as uneven surfaces, overhead obstructions such as power lines, or other hazards
- Load capacities of the equipment
- How to safely move the equipment
- Training on how to prevent falls and use appropriate fall protection personal protective equipment
- Minimum safe approach distances to energized power lines

Scaffolds Guidelines

GEORGIA TECH employees must follow General Industry standards when working with scaffolds.

Fixed Scaffolds (Work Platforms)

The footing or anchorage for scaffolds shall be sound, rigid, and capable of carrying the maximum intended load without settling or displacement. Unstable objects such as barrels, boxes, loose brick, or concrete blocks shall not be used to support scaffolds or planks.

Scaffolds and their components shall be capable of supporting without failure at least four times the maximum intended load.

Scaffolds shall be maintained in safe condition. Scaffolds shall not be altered or moved horizontally while they are in use or occupied.

Any scaffold damaged or weakened from any cause shall be immediately repaired and shall not be used until repairs have been completed.

Scaffolds shall not be loaded in excess of the working load for which they are intended.

Guardrails not less than 2 x 4 inches or the equivalent and not less than 36 inches or more than 42 inches high, with a mid-rail, when required, of 1 x 4-inch lumber or equivalent, and toe-boards, shall be installed at all open sides on all scaffolds more than 10 feet above the ground or floor. Toe-boards shall be a minimum of 4 inches in height.

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Mobile Work Platforms

All scaffold work levels 10 feet or higher above the ground or floor shall have a standard (4-inch nominal) toe board.

All work levels 10 feet or higher above the ground or floor shall have a guardrail of 2- by 4-inch nominal or the equivalent installed no less than 36 inches or more than 42 inches high, with a mid-rail, when required, of 1- by 4-inch nominal lumber or equivalent.

A climbing ladder or stairway shall be provided for proper access and egress, and shall be affixed or built into the scaffold and so located that its use will not have a tendency to tip the scaffold. A landing platform shall be provided at intervals not to exceed 30 feet.

Employees shall not work on scaffolds during storms or high winds.

Employees shall not work on scaffolds which are covered with ice or snow, unless all ice or snow is removed and planking sanded to prevent slipping.

Tools, materials, and debris shall not be allowed to accumulate in quantities to cause a hazard.

RECORDKEEPING

The EHS General Safety unit will maintain all training records.

Documents to Reference on EHS Webpage
Access to Roof-Top Permit Form
Fall Protection Equipment Inspection Sheet
Aerial Lift Inspection Form
Ladder Inspection Guide