# THE UNIVERSITY OF TEXAS AT AUSTIN

# UTILITIES AND ENERGY MANAGEMENT

# WALKING AND WORKING SURFACES PROGRAM

**September 2007**

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# 1.0 INTRODUCTION

## 1.1 Application

This policy applies to all University of Texas at Austin Utilities and Energy Management Department (UT Utilities) personnel and those contractors that enter UT Utilities facilities, including the Power Plant and Chilling Station facilities. Visitor and guests of Utilities must abide by the same policies unless approval of the Director of Utilities has been given to do otherwise. Contractors, visitors and quests that enter any restricted work area must first go through safety orientation from the Department.

Utilities' Walking and Working Surfaces Program adopts performance expectations discussed in OSHA 29 CFR Part 1926 Safety and Health Regulations for Construction, Subpart M Fall Protection. The OSHA standards for walking and working surfaces apply to virtually all permanent places of employment.

The general slip and trip precautions in this program are applicable to all Utilities activities. The fall protection systems requirements are applicable whenever there are unprotected sides, floor holes and floor openings. The scaffold, ladder and aerial lifts precautions are applicable whenever working from these devices.

## 1.2 Purpose

This program provides safety precautions to reduce slips and trips, as well as precautions and protection systems to reduce fall hazards. The use of this program will minimize the potential for employee injury and death by ensuring that the workplace remains free of slip and trip hazards and that falls from walking and working surfaces are prevented.

## 1.3 General

Slips, trips, and falls constitute the majority of general industry accidents. They cause 15% of all accidental deaths. There are many situations within Utilities that can cause slips, trips, and falls, such as ice, wet spots, grease, polished floors, loose flooring or carpeting, uneven walking surfaces, clutter, electrical cords, open desk drawers and filing cabinets, and damaged ladder steps. The controls needed to prevent these hazards are usually obvious, but too often ignored, such as keeping work areas, walkways and stairs well lit and clear of scrap and debris; coiling up extension cords, lines, and hoses when not in use; keeping electrical and other wires out of the way; wearing lug soles in icy weather; clearing parking lots, stairs, and walkways in snowy weather; and using salt/sand as needed.

## 1.4 OSHA Standards

Utilities' Walking and Working Surfaces Program adopts performance expectations discussed in OSHA 29 CFR Part 1910 Safety and Health Regulations for General Industry, Subpart D Walking-Working Surfaces. The OSHA standards for walking and working surfaces apply to virtually all permanent places of employment.

## 1.5 Management Responsibilities

It is management's responsibility to provide a safe workplace for the employees of Utilities, with the realization that employees are ultimately responsible for their own personal safety.

Management is held accountable for promoting safety on and off the job, providing a safe work environment in which hazards are controlled when elimination of those hazards is not feasible, and for the implementation of systems and techniques designed to prevent incidents from occurring.

## 1.6 Employee Responsibilities

Employees are responsible for their own safety and that of their coworkers. Employees must comply with their section's safety requirements and those of other Utility sections they may enter, as well as any other occupational safety and health standards, rules, regulations, and orders that are applicable and practical. Each employee must wear or use prescribed protective equipment while working. Employees are responsible for reporting hazardous conditions and dangers to their supervisor. They must also report any job-related injury or illness to the University and seek treatment promptly. They have a responsibility to work in the manner required by the Department. Employees have the right to refuse unsafe work. Violations of Utilities policy and these standards may be cause for job-related disciplinary action.

# 2.0 DEFINITIONS

**Aerial Lift** - Vehicle-mounted aerial devices used to elevate personnel to job sites above ground, including (1) Extensible boom platforms; (2) aerial ladders; (3) articulating boom platforms; (4) vertical towers; (5) a combination of any of the above. These devices are powered or manually operated.

**Barricade** - An obstruction to deter the passage of persons or vehicles. Acceptable barricading materials can include:

- High visibility tape, colored plastic chain or yellow rope ½" diameter or larger,
- Rubber plastic traffic cones,
- Sawhorses (with flashing lights at nighttime, and
- Metal or wood guard rails.

**Fall Arrest System** – A system consisting of lifelines, lanyards and deceleration devices attached to an anchorage and connected to a body-belt or body harness, which is intended to prevent falling to ground from an elevated walking or working surface.

**Fixed Industrial Ladder** – Ladders used for routine access between levels. Such ladders must be designed to carry five times the normal anticipated load, be a minimum of 22 inches wide, be installed at 30 to 50 degree angles and shall have a minimum of 7 feet overhead clearance.

**Floor Hole** – An opening in the floor, platform, grating or pavement that measures less than 12 inches, but more than 1 inch; and through which materials, but not people, may fall.

**Floor Opening** – An opening in the floor, platform or pavement that measures 12 inches or more, and through which persons may fall.

**Guardrail** - A fixed railing consisting of a top rail, intermediate rail, and posts, sufficiently tall and strong enough to prevent falling from an elevated walking or working surface.

**Ladder** – A structure typically of wood, metal, or fiberglass, commonly consisting of two side rails between which a series of bars or rungs are set at suitable distances, forming a means of climbing up or down. Ladders can be either fixed, meaning permanently attached to a structure, building, or equipment, or portable, meaning it can readily be moved or carried. Portable ladders can be either of the self-supporting (or foldout) or non-self supporting (leaning) types.

**Platform** – Platforms are any elevated surface designed or used primarily as a walking or working surface, and any other elevated surfaces upon which employees are required or allowed to walk or work while performing assigned tasks on a predictable and regular basis. A predictable and regular basis is at least once every 2 weeks or for a total of 4 man-hours or more during any 4-week period.

**Safety Net** - A large strong net designed to catch and safely decelerate a falling person.

**Standard Railing** – Consists of a top rail, mid-rail and posts. The height from the upper surface of the top rail to the floor level is 42 inches. Mid-rail height is on-half as high as the top rail (21 inches).

**Standard Toeboard** – Blocks an opening along the base/floor of stairs or other walking or working surface where materials or body parts might otherwise inadvertently fall through. It should be 4 inches high, with not more than ¼ inch clearance above the floor.

**Wall Opening** – An opening in a wall or partition that is at least 30 inches high and 18 inches wide, and through which persons may fall.

# 3.0 GENERAL SLIP, TRIP AND FALL PRECAUTIONS

All offices, work stations, work areas, passageways, tunnels, storerooms, restrooms and service rooms shall be well, lit, kept free of slip, trip and fall hazards. Specific good practices are listed below;

- For electrical cords - Secure electrical wiring that runs across the floor with yellow tape or low-profile beveled edge conduit.

- For entryways - Use recessed absorbent “walk-off” matting to control migration of soil and liquid hazards at all interior doorways that lead to the outside. Inspect and clean regularly.

- For hoses – ensure that hoses are not left in walkways or work areas, and that they are stored properly when not in use.

- For footwear – When working in slippery areas, employees are encouraged to wear slip-resistant footwear or protective overshoes, which are maintained in good condition.

- For inspections – It is every employee’s responsibility to routinely perform the following inspections and report any deficiencies or concerns to the supervisor:

    - Entryways, walkways and stairways should be routinely inspected for slip, trip and fall hazards.
    - Walkway surfaces should be inspected for hazards such as: holes, chips, cracks, elevations, steep slopes or slippery deposits.
    - Carpeting should be inspected for fraying edges, rips and tears.
    - Mats should be inspected for buckling, curling or material defects.

- For lighting - Illumination shall be sufficient to perform work tasks safety, at all times. Employees discovering lighting deficiencies will report them to the supervisor for correction.

- For physical hazards - Mark all physical hazards, including inclines, drop-offs, and temporary walkways using yellow slip resistant tape or paint.

- For protrusions – The ends of unguarded protrusions, such as steel reinforcing bars (rebars), should be guarded with caps or bent so exposed ends are no longer upright.

- For signage - Post caution signs for all potentially hazardous entryways, walkways and stairways.

- For spill hazards - Spills of non-hazardous materials will be cleaned up immediately by the employee responsible for the spill or reported immediately to Housekeeping. If the spill cannot be removed immediately, then warning signs or barricades sufficient to warn personnel will be installed.

- For trip hazards - Floors, working places and passageways should be kept free of protruding nails, splinters, holes, and loose boards or tiles.

- For walking surfaces - The floor of every workroom shall be maintained in a clean and, so far as possible, a dry condition. Where wet processes are used, drainage shall be maintained and false floors, platforms, mats or other dry standing places will be provided where practicable.

- For work areas - All employees are responsible for maintaining their immediate work areas in a clean and orderly manner and for notifying Housekeeping of conditions beyond their control. Any areas left unattended for any period of time must be made safe for passersby, which can include removal of slip and trip hazards, and placement of barricades and warning signs for fall, physical and chemical hazards. Barricades should have tags or signs attached that indicate the hazards for which the barricades were installed to protect against.

# 4.0 FALL PREVENTION AND PROTECTION SYSTEMS

Elevated work sites will occasionally have unprotected sides and edges, wall openings, or floor holes. If these sides and openings are not protected, injuries from falls or falling objects may result, ranging from sprains and concussions to death.

Floor holes and openings shall be covered or guarded as soon as they are created or discovered. Floor opening covers shall be constructed to effectively support two times the weight of employees, equipment, and materials that may be imposed on the cover at any one time.

When the distance to the floor below is 4 feet or more, standard railings should be erected along exposed edges of a floor opening, wall opening, ramp, platform, or runway to prevent people from falling.

When persons can pass below or there is moving machinery or equipment that can be damaged from falling objects, toeboards should be erected along exposed edges of a floor opening, wall opening, platform, runway, or ramp to prevent falls of material. Areas below the work area should be marked off to prevent persons or moving machinery or equipment from passing below the overhead work.

In general, it is better to use fall prevention systems, such as railings, than fall protection systems, such as safety nets or fall arrest devices, because they provide more positive safety means.

Industrial ladders should be installed to access places of work where operations necessitate regular travel between levels.

Where workers are exposed to vertical drops of 6 feet or more, fall protection should be provided in one of these three ways before work begins:

- Placing guardrails around the hazard area
- Deploying safety nets
- Providing personal fall arrest systems for each employee

Many times the nature and location of the work will dictate the form that fall protection takes.

## 4.1 Guardrail Systems

Guardrail systems shall be erected at unprotected edges, ramps, runways, or holes. When a guardrail system is used, it must comply with the following provisions:

- Top edge height of top rails, or equivalent guardrail system members, must be between 39 and 45 inches above the walking/working level, except when conditions warrant otherwise and all other criteria are met (e.g., when employees are using stilts, the top edge height of the top rail must be increased by an amount equal the height of the stilts).
- Mid-rails, screens, mesh, intermediate vertical members, or equivalent intermediate structures, must be installed between the top edge and the walking/working surface when there is no wall or other structure at least 21 inches high.
    - Mid-rails must be midway between the top edge of the guardrail system and the walking/working level.
    - Screens and mesh must extend from the top rail to the walking/working level, and along the entire opening between rail supports.
    - Intermediate members (such as balasters) between posts must be no more than 19 inches apart.
    - Other structural members (such as additional mid-rails or architectural panels) must be installed so as to leave no openings wider than 19 inches.
- Guardrail systems must be capable of withstanding at least 200 pounds of force applied within 2 inches of the top edge, in any direction and at any point along the edge, and without causing the top edge of the guardrail to deflect downward to a height less than 39 inches above the walking/working level.
- Midrails, screens, mesh, intermediate vertical members, and solid panels shall be erected in accordance with the OSHA Fall Protection Standard.
    - Mid-rails, screens, mesh, and other intermediate members must be capable of withstanding at least 150 pounds of force applied in any direction at any point along the mid-rail or other member.
- Guardrail systems must not have rough or jagged surfaces that would cause punctures, lacerations, or snagged clothing.
- Top rails and midrails must not cause a projection hazard by overhanging the terminal posts. Top rails shall be:
    - At least ¼ inch in diameter (steel or plastic banding is unacceptable);
    - Flagged every six (6) feet or less with a high visibility material if wire rope is used;
    - Inspected frequently to ensure strength and stability;
    - Forty-two (42) inches (plus or minus three (3) inches) above the walking/working level; and
    - Adjusted to accommodate the height of stilts, if they are in use.
- Gates or removable guardrail sections shall be placed across openings of hoisting areas or holes when they are not in use to prevent access.

## 4.2 Safety Net Systems

When a safety net system is used it must comply with the following provisions:

- Safety nets must be installed as close as practicable under the surface on which employees are working, but in no case more than 30 feet below.
- When nets are used on bridges, the potential fall area must be unobstructed.
- Safety nets must extend outward from the outermost projection of the work surface as follows:

| Drop distance from working level to safety net below | Distance safety net must extend from the edge of the working surface |
|---|---|
| Up to 5 feet | 8 feet |
| 5 to 10 feet | 10 feet |
| More than 10 feet | 13 feet |

- Safety nets must be installed with sufficient clearance to prevent contact with the surface or structures under them when subjected to an impact force equal to the drop test described below.
- Safety nets and their installations must be capable of absorbing an impact force equal to the drop test described below.
- Safety nets and safety net installations must be drop-tested at the jobsite:
    - After initial installation and before being used.
    - Whenever relocated.
    - After major repair.
    - At 6-month intervals if left in one place.
- The drop test consists of a 400 pound bag of sand 28-32 inches in diameter dropped into the net from the highest surface at which employees are exposed to fall hazards, but not from less than 42 inches above that level.
- When it can demonstrates that it is unreasonable to perform the drop-test described above, a third party designated competent person shall certify that the net and net installation have sufficient clearance and impact absorption by preparing a certification record prior to the net being used as a fall protection system. The certification must include:
    - Identification of the net and net installation.
    - Date that it was determined that the net and net installation were in compliance.
    - Signature of the person making the determination and certification.
- The most recent certification record for each net and net installation must be available at the jobsite for inspection.
- Safety nets must be inspected for wear, damage, and other deterioration at least once a week, and after any occurrence which could affect the integrity of the system.

- Defective nets shall not be used, and defective components must be removed from service.
- Objects which have fallen into the safety net, such as scrap pieces, equipment, and tools, must be removed as soon as possible from the net and at least before the next work shift.
- Maximum mesh size must not exceed 6 inches by 6 inches. All mesh crossings must be secured to prevent enlargement of the mesh opening, which must be no longer than 6 inches, measured center-to-center.
- Each safety net, or section thereof, must have a border rope for webbing with a minimum breaking strength of 5,000 pounds.
- Connections between safety net panels must be as strong as integral net components, and must not be spaced more than 6 inches apart.

## 4.3 Personal Fall Arrest Systems

A personal fall arrest system is another option of protection for workers who are exposed to vertical drops of 6 feet or more.

- A fall restraint system with continuous attachment shall be used be personnel in work areas not protected by guardrails or safety nets. Personal fall arrest systems must be designed to:
    - Limit maximum arresting force to 1,800 pounds.
    - Prevent the employee from free falling more than 6 feet or contacting any lower level.
    - Bring an employee to a complete stop and limit maximum deceleration distance to 3½ feet.
    - Have sufficient strength to withstand twice the potential impact energy of a worker free falling a distance of 6 feet, or the free fall distance permitted by the system, whichever is less.
- Systems and components should be removed from service immediately if they have been subjected to fall impact, until inspected by a competent person and deemed undamaged and suitable for use.
- If a lanyard is greater than four feet in length, it must be used in conjunction with an ANSI approved shock absorber.
- When personnel are working with ladders and the work requires extending the center of the body outside of the ladder side rails, a fall restraint device must be used.
- Personnel working from or riding in.
- In the event of a fall, employees should be promptly rescued.
- Systems should be inspected before each use for wear, damage, and other deterioration, and defective components should be removed from service.
- Harnesses and lanyards shall be inspected by a competent inspector when new and every year thereafter. The date of each inspection shall be recorded on an inspection tag and permanently attached.

- Harnesses and lanyards have a maximum life of five years. They may remain in use longer than five years only if passing inspection by the manufacturer.
- Fall arrest systems shall not be attached to guardrail systems or hoists.
- When used at hoist areas, the fall arrest systems shall be rigged to allow movement of the worker only as far as the edge of the walking/working surface.
- If a lanyard made of synthetic fibers is subject to contact with hot surfaces, such as uninsulated steam lines, valves or hot furnace stacks, an temporary insulated cover must be used, either on the lanyard or the hot surface.

## 4.4 Covers

When covers are used to protect against falls into holes or excavated areas, the covers shall meet the following requirements:

1. All covers shall be secured to prevent accidental displacement.
2. Covers shall be color-coded or bear the markings “HOLE” or “COVER”. Covers that are a potential trip hazard shall be painted yellow or a conspicuous color to indicate the hazard.
3. Covers located in roadways shall be able to support twice the axle load of the largest vehicle that might cross them.
4. Covers shall be able to support twice the weight of employees, equipment, and materials that might cross them. Supports, structural steel, etc. that are used to support the cover shall be rated for at least the cover rating or the system shall be derated to the maximum load that support system is designed to support.

# 5.0 SCAFFOLDS

Working with heavy equipment and building materials on the limited space of a scaffold is difficult. Without fall protection or safe access, it becomes hazardous. Falls from improperly constructed scaffolds can result in injuries ranging from sprains to death.

To minimize hazards from using scaffolds, the following procedures shall be followed:

- All scaffolds must be constructed according to the manufacturer's instructions.
- Use at least one of the following for scaffolds more than 10 feet above a lower level:
    - Install guardrail systems along all open sides and ends of platforms. (See Guardrail Systems section above for guardrail requirements.)
    - Use personal fall arrest systems. (See Personal Fall Arrest Systems section above for personal fall arrest requirements.)
- Safe access must be provided to scaffold platforms.
- All work levels of a scaffold, if practical, must be fully planked. Fall protection is required if working from an incomplete scaffold.
- In erecting or dismantling tubular or panel scaffolds, the erectors will tie off to a tubular member. If the erector, is on the top level of a scaffold, then that person is allowed to work without an attached lanyard when there is nothing adjacent to the scaffold that a lanyard can be properly anchored to at a higher level, or at the same level, to provide fall protection. This does not apply to suspended scaffolds.
- Rolling platforms shall be utilized according to the manufacturer’s recommendations, not altered in any way and not ridden while being moved.
- Scaffolds should be inspected before each use.
- All tools, trash, etc. shall be removed before dismantling scaffolds.
- Rolling tower scaffolds must be free of personnel, material and equipment before being moved. Caster brakes on rolling tower scaffolds must be locked while in use.
- All scaffolds that will have tarps, coverings or windscreens shall be assessed by a competent person for wind loading prior to construction.
- Gate openings will include toe board protection. Gates shall open to the inside.

Climbing the structural cross-braces of a scaffold is unsafe, and specifically forbidden by federal standards. However, OSHA permits direct access from another scaffold, structure, or personnel hoist. Direct access to or from another surface shall only be used when the scaffold is not more than 14 inches horizontally and 24 inches vertically from the other surface.

If such access is not possible, portable ladders, hook-on ladders, attachable ladders, stair towers, stairway-type ladders, ramps, walkways, or built-in ladders must be used, under the following regulations:

Hook-on and attachable ladders must:

- Be positioned so as not to tip the scaffold.
- Be specifically designed for the type of scaffold with which they are used.
- Have their lowest rung no more than 24 inches above the level on which the scaffold is supported.
- Have rest platforms at 35-foot maximum intervals, when used on a supported scaffold more than 35 feet high.
- Have a maximum rung length of 11½ inches, and a maximum space between rungs of 16¾ inches.

Stairway-type ladders must:

- Be positioned so as not to tip the scaffold.
- Have their bottom step no more than 24 inches above the level on which the scaffold is supported.
- Have rest platforms at 12-foot maximum intervals.
- Have a minimum step width of 16 inches, except that mobile stairway-type ladders shall have a minimum step width of 11½ inches.
- Have slip-resistant treads on all steps and landings.

Stair towers must:

- Have their bottom step no more than 24 inches above the level on which the scaffold is supported.
- Have a stair-rail, consisting of a top-rail and a mid-rail, on each side.
- Have a top-rail for each stair-rail that is also be capable of serving as a handrail, unless a separate handrail is provided.
- Be designed and constructed to prevent punctures, lacerations, snagged clothing, and projection from stair-rails and handrails.
- Be designed and constructed with handrails, and top-rails used as handrails, at least 3 inches from other objects.
- Be designed and constructed with stair-rails be less than 28 inches nor more than 37 inches from the surface of the tread.
- Be at least 18 inches wide between stair-rails, and have a landing platform at least 18 inches wide by at least 18 inches long at each level.
- Have slip-resistant surfaces on all treads and landings.
- Be installed between 40 degrees and 60 degrees from the horizontal.
- Have uniform riser height, within ¼ inch, for each flight of stairs, except for the top and bottom steps of the entire system.
- Have uniform tread depth, within ¼ inch, for each flight of stairs.

Built-in scaffold ladders must:

- Be specifically designed and constructed for use as ladder rungs.
- Have a rung length of at least 8 inches.

- Not be used as work platforms when rungs are less than 11½ inches, unless each employee uses fall protection or a positioning device [29 CFR 1926.502(e)].
- Be uniformly spaced within each frame section.
- Have rest platforms at 35-foot maximum intervals on all supported scaffolds more than 35 feet high.
- Have a maximum space between rungs of 16¾ inches.

Steps and rungs of ladders and stairways must line up vertically with each other between rest platforms.

Ramps and walkways must:

- Have guardrails which comply with [29 CFR 1926.502(b)] 1926 Subpart M if more than 6 feet above lower levels.
- Be sloped no more than 1 vertical to 3 horizontal degrees (20 degrees above the horizontal).
- Have cleats, not more than 14 inches apart, securely fastened to the planks for footing if the slope is more than 1 vertical to 8 horizontal.

# 6.0 LADDERS

All ladders pose a fall hazard if proper precautions are not taken. Falls from ladders can cause injuries ranging from sprains to death.

Note: Substituting other items for ladders to gain elevation, such as stacked books or bricks, overturned buckets, chairs and tables, can be especially hazardous and is forbidden.

To ensure the safe use of all ladders, the following general precautions should be used:

- Both hands must be used when climbing or descending a ladder.
- The ladder should always be faced when climbing or descending.
- Before each use, inspect ladders for cracked or broken parts, such as rungs, steps, side rails, feet and locking components.
- Do not apply more weight on the ladder than it is designed to support.
- When two or more ladders are used to reach a work area, they must be offset with a landing or platform between the ladders.

Due to the potential for very long falls, all fixed ladders over 20 feet in length must have a cage or well.

Portable ladders pose a fall hazard if they are not safely positioned. When an employee is on a portable ladder, it may move and slip from its supports. An employee can also lose his balance while getting on or off an unsteady ladder. To minimize these hazards, the following additional precautions should be taken when using a portable ladder;

- Ladders must be placed with a secure footing or lashed or held in position.
- When used to gain access to a roof or other area, the ladder shall extend at least 3 feet above the point of support.
- The top and top step of a stepladder shall not be used as a step.
- The top of a stepladder shall not be used as a seat.
- Metal ladders should never be used near electrical power lines.
- Ladders may not be used in the horizontal position as work platforms.
- Make sure that the weight on the ladder will not cause it to slip off its support.
- Ladders shall be non-conductive, industrial strength and capacity rated for a minimum of 250 pounds.
- Stepladders over 10 feet must be tied off at the top or held by another worker if side supports are not provided.
- Stepladders must not be used as straight ladders.
- Straight and extension ladders must be tied off within three rungs of the top. Ladders must be held by another person while being tied off.
- Extension ladders shall have one of the lower rungs of the upper section tied to the adjacent rung of the lower section when in use.

- Straight and extension ladders shall be placed at such an angle that the base is one-fourth of the working length of the ladder out from the top support (e.g. 5 feet out for 20 feet up, or 1 rung out for each 4 rungs up).
- The maximum length for straight and extension ladders is 24 feet.
- Ladders with aluminum components should be used around areas that contain sodium hydroxide (NaOH).
- Because metal ladders will easily conduct electricity, they must never be used for work on or near exposed electrical conductors.

Only ladders that comply with OSHA design standards [29 CFR 1926.1053(a)(1)] should be used. Individual rungs or steps used for access or egress, embedded in the walls of risers or the conical top sections of manholes shall be safe, well constructed and installed in accordance with good engineering practices. Specifically, individual rungs or steps shall be uniformly spaced from 12 inches to 16 1/2 inches. Rungs or steps in manholes must be designed to prevent the foot from sliding off the end. Rungs shall be repaired or replaced if corroded.

# 7.0 AERIAL LIFTS

OSHA's requirements for aerial lifts are codified in 29 CFR 1926.453. Aerial lifts must be designed and constructed in compliance with American National Standards for "Vehicle Mounted Elevating and Rotating Work Platforms," ANSI A92.2-1969.

According to the U.S. Bureau of Labor Statistics about 26 construction workers (8% are industrial painters) die each year from using aerial lifts. Approximately 70% involve boom-supported lifts, such as bucket trucks and cherry pickers. Half of the falls from boom lifts involve being ejected from the bucket after being struck by vehicles, cranes, or crane loads, or by falling objects, or when a lift suddenly jerks. Two-thirds of the deaths from collapses/tip-overs of boom lifts occurred when the bucket cable or boom broke or the bucket fell; almost one-third are due to tip-overs. Over one-third of the electrocutions involved an overhead power line contacting the lift boom or bucket. In most of the caught in/between deaths, a worker was caught between the bucket edge and objects such as roof joists or beams while repositioning the bucket.

Specific requirements for the safe operation of aerial lifts are:

- Only authorized persons shall operate an aerial lift. Authorized persons must be trained by a qualified person on:
    - Any electrical, fall, and falling-object hazards.
    - Procedures for dealing with hazards.
    - How to operate the lift correctly (including maximum intended load and load capacity). The user must demonstrate that he knows how to use the lift.
    - Manufacturer requirements.
- Aerial lifts shall be inspected daily and lift controls shall be tested each day prior to use to determine that such controls are in safe working condition.
- Site preparation shall be considered (i.e. surface integrity, power line clearance, etc.) prior to use.
- Chains or doors on the lift platform shall always be closed.
- Users must stand on the floor of the bucket or lift platform and should not climb on or lean over guardrails or ride on bumpers.
- When working near traffic, post work-zone warnings, like cones and signs.
- Aerial ladders, of ladder trucks and tower trucks, shall be secured in the lower traveling position by the locking device on top of the truck cab, and the manually operated device at the base of the ladder before the truck is moved on roadways.
- Personnel working from or riding in any aerial lift device shall wear a fall restraint system with the lanyard attached to the boom or basket.
- Belting off to an adjacent pole, structure, or equipment while working from an aerial lift is not permitted.
- Boom and basket load limits specified by the manufacturer shall not be exceeded.

- The brakes shall be set and, when outriggers are used, they shall be positioned on pads or a solid surface. Wheel chocks shall be installed before using an aerial lift on an incline, as long as they can be safely installed.
- An aerial lift truck shall not be moved when the boom is elevated in a working position with men in the basket, except for equipment which is specifically designed for this type of operation.
- Articulating boom and extensible boom platforms, primarily designed as personnel carriers, shall have both platform (upper) and lower controls. Upper controls shall be in or beside the platform within easy reach of the operator. Lower controls shall provide for overriding the upper controls. Controls shall be plainly marked as to their function. Lower level controls shall not be operated unless permission has been obtained from the employee in the lift, except in case of emergency.
- Always check clearances and position of personnel prior to any operation of the lift functions and outrigger placement.
- Always be aware of power line clearances. Exercise a minimum 10-foot clearance on any lift not specifically designed for power line work.

Platform to structure transfers at elevated positions are discouraged. If a platform to structure transfer is necessary, the power switch must be in the “off” position, so that the lift control panel is disabled and the basket cannot be moved. Entry and exit should be through the gate and personnel must be tied off with two lanyards, to both the platform and the structure.

Scissor lifts, including those with platforms that extend beyond the equipment's wheelbase, do not meet the definition of aerial lifts. Scissor lifts do meet the definition of a scaffold and must comply with the specific requirements for mobile scaffolds. In addition, scissor lift operators must visually confirm adequate clearance prior to lifting to the up position and scissor lifts shall not be moved when in the up position.

# 8.0 EXCAVATIONS

Fall protection will be provided to employees working at the edge of an excavation that is six (6) feet or deeper. Employees in these areas are required to use the fall protection systems as designated in this program.

In addition, excavations that are six (6) feet or deeper shall be protected by guardrail systems, fences, barricades, or covers. Walkways that allow employees to cross over an excavation that is six (6) feet or deeper shall be equipped with guardrails.