



**Department of Environmental Health & Safety
Procedures**

Ladder Safety Program

March 2010



Table of Contents

- I. Introduction**
- II. Policy**
- III. Scope**
- IV. Responsibilities**
- V. Definitions**
- VI. Methods of Compliance**
 - A. Portable Ladders**
 - B. Fixed Ladders**
 - C. Stairs**
- VII. Training**
- VIII. Procedure Review and Continuous Improvement**



I. INTRODUCTION

According to the National Safety Council, falls are one of the leading causes of death in the workplace. Due to the seriousness of this fact, Drexel University has established the Ladder Safety Program. This program contains requirements for the safe and proper use of fixed ladders, including portable wooden, metal, reinforced plastic and/or fiberglass, used at Drexel.

This written program does not cover requirements for Scaffolding, Lift Safety or General Fall Protection. Please refer to additional programs developed by Drexel University regarding those topics.

II. POLICY

This procedure provides the minimum requirements to ensure that the Ladder Safety Program is successfully and consistently implemented. Those regulations applicable to Drexel University are included in this written plan; however, all regulations and standards applicable to the use and care of all ladders and stairs may not be included. It is important to review all applicable OSHA and ANSI regulations and standards prior to installing and/or using ladders.

This purpose of the Ladder Safety Program is to complement the University's Fall Protection Program by setting proper procedures that all employees must follow when working with ladders and stairs in order to prevent accidents from occurring in the worksite. Each employee will receive the appropriate training in these procedures and strictly adhere to them except when doing so would expose the employee to a greater hazard.

III. SCOPE

This procedure is designed to protect all Drexel University and Drexel University College of Medicine (DUCOM) personnel protection from hazards associated with the installment, care and use of portable as well as fixed ladders and stairs in order to ensure safety under normal conditions of use.



IV. **RESPONSIBILITIES**

A. Department of Environmental Health and Safety

- Develop and coordinate the implementation of the overall Ladder Safety Program;
- Provide training and written instructions for the installment, care and use of ladders and stairs;
- Conduct periodic inspections and evaluations to determine the continued effectiveness of the program.

B. Department Management

- Implementation of the Ladder Safety Program;
- Coordinate employee training schedules with the Department of Environmental Health and Safety; and
- Enforce the care, use and storage procedures of ladders and stairs as outlined in this program.

C. Employees

- Comply with the procedures outline within the University's Ladder Safety Program;
- Properly select, use, handle, and store ladders in accordance with the instructions and training received.
- Thoroughly inspect and maintain ladders before and after use.
- Report any hazards observed, which could compromise personal safety or the safety of others to his or her supervisor immediately.

V. **DEFINITIONS**

Cleat - a ladder crosspiece of rectangular cross section placed on edge upon which a person may step while ascending or descending a ladder.

Double-cleat ladder - a ladder similar in construction to a single-cleat ladder, but with a center rail to allow simultaneous two-way traffic for employees ascending or descending.

Extension trestle ladder - a self-supporting portable ladder, adjustable in length consisting of a trestle ladder base and a vertically adjustable extension section, with a suitable means for locking the ladders together.



Fixed-ladder - a ladder that cannot be readily moved or carried because it is an integral part of a building or structure. A side-step fixed ladder is a fixed ladder that requires a person getting off at the top to step to the side of the ladder side rails to reach the landing. A through fixed ladder is a fixed ladder that requires a person getting off at the top to step between the side rails of the ladder to reach the landing.

Handrail - a rail used to provide employees with a handhold for support.

Individual-rung/step ladders - ladders without a side rail or center rail support. Such ladders are made by mounting individual steps or rungs directly to the side or wall of the structure.

Job-made ladder - a ladder that is fabricated by employees, typically at the construction site, and is not commercially manufactured. This definition does not apply to any individual-rung/step ladders.

Ladder stand - A mobile fixed size self-supporting ladder consisting of a wide flat tread ladder in the form of stairs. The assembly may include handrails.

Maximum intended load - the total load of all employees, equipment, tools, materials, transmitted loads, and other loads anticipated to be applied to a ladder component at any one time.

Point of access - all areas used by employees for work related passage from one area or level to another. Such open areas include doorways, passageways, stairway openings, studded walls, and various other permanent or temporary openings used for such travel.

Portable ladder - a ladder that can be readily moved or carried.

Riser height - the vertical distance from the top of a tread to the top of the next higher tread or platform/landing or the distance from the top of a platform/landing to the top of the next higher tread or platform/landing.

Single-cleat ladder - a ladder consisting of a pair of side rails, connected together by cleats, rungs, or steps.

Single-rail ladder - a portable ladder with rungs, cleats, or steps mounted on a single rail instead of the normal two rails used on most other ladders.

Tread depth - the horizontal distance from front to back of a tread (excluding nosing, if any).



VI. METHODS OF COMPLIANCE

A. Portable Ladders

Portable ladders are designed to support one person along with all necessary equipment (tools, materials, etc). Ladders are constructed under three general classes.

- Type I - Industrial: heavy-duty with a load capacity not more than 250 pounds.
- Type 1A – Extra-heavy industrial ladder that can support 300 lbs.
- Type II - Commercial: medium-duty with a load capacity not more than 225 pounds.
- Type III - Household: light-duty with a load capacity of 200 pounds.

1. General Rules

- a. The ladder chosen must be long enough to provide access to the work area without having the employees stand on the top 2 steps of a step ladder or the top 3 rungs of a straight ladder.
- b. When a straight ladder is used to gain access to a roof, the side rails should extend at least three feet above the support point at the eave, gutter, or roof line.
- c. Never connect short ladders to form a longer ladder.
- d. Always use ladders on level, stable surfaces (i.e. the ground).
- e. Do not use ladders on slippery surfaces.
- f. Use ladders only for their intended purpose (i.e. do not use as scaffolding, etc.)
- g. When working with electrical equipment, use only fiberglass or wooden ladders, never metal.
- h. Use the one-to-four (1:4) ratio when using a ladder. To do this, place the ladder so its base is one foot away from what it leans against for every four feet in height to the point where the ladder rests.
- i. Where possible, straight ladders should be secured with a rope or wire at the top and blocked at the bottom.



-
- j. Do not over-reach, jump or slide a ladder while on it. As a general rule, keep your belt buckle between the rails at all times when on a ladder. Never put one foot on the ladder and the other on an adjacent surface. Ladders shall not be moved, shifted, or extended while occupied.
 - k. Always face the ladder and Keep three points of contact on the ladder at all times (i.e. both hands and one leg or two legs and one hand)
 - l. Do not carry heavy loads up or down ladders. Tools or materials should be raised by means of a rope after the climber has reached the working position.
 - m. Barricades and warning signs should be posted when ladders are placed near doors or other locations where they could be struck.
 - n. Ladders should not be used by more than one person at a time unless they are designed for such use.
 - o. Do not use the bracing on the back of side rails for climbing.
 - p. Extension ladders must have proper overlap.
 - i. **Three ft** overlap for **32 foot** ladder
 - ii. **4 ft** overlap for **32 to 36 foot** ladder
 - iii. **Five ft** overlap for **36 to 48 foot** ladder
 - iv. **6 ft** overlap for **48 foot** ladder
 - q. Both automatic locks of the extension ladder are to be in proper position before ascending the ladder.
 - r. The area around the top and bottom of the ladder shall be kept clear at all times.

2. Inspection

Prior to use of any ladder, an inspection must be performed. Never use a defective ladder. If the ladder is found to be defective, tag or mark it so that it will be repaired or destroyed. Always refer to the manufacturer's specifications for further details on inspecting and maintaining ladders.



Please refer to the ladder inspection checklist in Appendix A. The following items should always be observed during visual inspections:

- a. Carefully examine the ladder for broken or missing rungs or cleats, broken side rails, and other damaged parts.
- b. All cleats, rungs, and side rails must be free of grease, oil, paint, or other slippery substances.
- c. The ladder should be equipped with feet that are secured in place.
- d. The joint between steps and side rails must be tight, and all hardware and fittings should be attached firmly. Movable parts should operate freely without binding.
- e. All wood parts must be free of sharp edges and splinters.
- f. Visually inspect the ladder to be free of warpage, decay or other irregularities.
- g. Metal ladders must be free of sharp edges, burrs and corrosion.
- h. Inspect for dents or bends in side rails, rungs or cleats.
- i. Check step to side rail connections, hardware connections and rivets.
- j. If a ladder tips over, inspect the ladder for damage before continuing work.

3. Maintenance

- a. Damaged ladders must be tagged or marked and withdrawn from service and either repaired or destroyed. Notify the supervisor immediately.
- b. Fiberglass ladders should have a surface coat of lacquer maintained. If it is scratched beyond normal wear, it should be lightly sanded before applying a coat of lacquer.
- c. Field repairs and the fabrication of improvised ladders are not permitted.
- d. Never use or try to straighten a bent or bowed ladder. Remove it from service immediately.



- e. Wood ladders should be protected with a clear sealer varnish, shellac, linseed oil or wood preservative. Wood ladders should not be painted because the paint could hide defects.
- f. If exposed to greases, oils or other slippery substances, the ladder must be cleaned. If the substance is cannot be completely removed, the ladder must be removed from service.

4. Storage

Ladders should be stored in areas free of known hazards, where they can be inspected easily and can be reached without causing accidents.

B. Fixed Ladders

All fixed ladders should be designed to withstand a single concentrated load of at least 200 lbs. If necessary, they should be painted or treated to prevent rust and deterioration depending on their location. The following rules apply to fixed ladders:

- Rungs of metal ladders must have minimal diameter of three quarters inch. Rungs must be at least 16 inches wide, be spaced 12 inches apart.
- The preferred pitch for a safe descent is 75 to 90 degrees. Ladders with a 90 degree pitch must have 2 ½ feet of clearance on the climbing side. There must be a 3 ft clearance on ladders with a 75 degree pitch.
- There must be at least a 7 inch clearance in back of the ladder to provide adequate toe space.
- There must be a clear width of 15 inches on each side of the center line of the ladder, unless the ladder is equipped with a cage or well.
- Fixed ladders must have cages if they are longer than 20 feet. Landing platforms must be provided on ladders greater than 20 feet long. A platform is required every 30 feet for caged ladders and every 20 feet for unprotected ladders.
- Side rails must extend at least 42 inches above the landing.



C. *Stairs*

1. *Fixed industrial stairs* *(The following applies to all stairs around equipment, machinery, tanks etc. They do not apply to stairs used for fire exits)*
 - a. Riser height and tread width of fixed industrial stairs should be uniform throughout any flight of stairs. All treads must be reasonably slip resistant. The minimum permissible width of a stairway is 22 inches.
 - b. The angle to the horizontal made by the stairs must be between 30 and 50 degrees.
 - c. All stairs should be adequately lighted.
 - d. If the tread is less than 9 inches wide the risers should be open.
2. *Embedded Stairs*
 - a. Individual steps used for access or egress, embedded in the walls of risers or the conical top sections of manholes must be safe, well constructed, and installed in accordance with good engineering practices.
 - b. Individual rungs or steps must be uniformly spaced from 12 to 16.5 inches.
 - c. The use of steps in personal access holes should be designed to prevent the foot from sliding off the end.
3. *Alternating Tread Stairs*
 - a. Alternating tread type stairs are permitted if they are installed, used, and maintained according to the manufacturer's recommendations:
 - b. The stair must be installed at an angle of 70 degrees or less
 - c. The stairs must be equipped with a handrail at each side to assist the workers in climbing or descending.

VII. TRAINING

Employees shall be trained on all of the rules and regulations pertaining to ladder and stair safety, including the proper installment, care, use and handling, and storage.

Additional training shall be conducted in response to the following circumstances:

- Whenever changes in the workplace or this procedure render previous training obsolete;
- When inadequacies in the employee's use and handling indicate that the employee has not retained the requisite understanding or skill; and
- When any other situations arise in which retraining appears necessary to ensure the proper installment, care, use and handling, and storage.
-



VIII. PROGRAM REVIEW AND CONTINUOUS IMPROVEMENT

The Department of Environmental Health and Safety shall review the Ladder Safety Program annually at a minimum to ensure that the procedure is current, practical, and compliant with all applicable regulatory requirements.



Appendix A

Ladder Inspection Checklist

Portable Ladders	Needs Repair	Condition O.K.	Date Repaired
Broken or loose rungs	☐	☐	
Rungs free of excess dirt and grease	☐	☐	
Side rails cracked, split, bruised, dry rot and loose nails	☐	☐	
Hardware and fittings securely attached	☐	☐	
Proper operation of locking device and safety feet	☐	☐	
Damaged or worn non-slip base	☐	☐	
Underwriter's label and proper markings legible	☐	☐	
Fixed Ladders			
Broken, corroded, or loose rungs	☐	☐	
Rungs free of excess dirt and grease	☐	☐	
Side rails corroded, fractured	☐	☐	
Side rails adequately anchored at the base and top connection	☐	☐	
All hardware and fittings securely attached	☐	☐	
Extension Ladders			
Loose, broken, or missing extension locks	☐	☐	
Defective locks that do not seat properly while extended	☐	☐	
Worn or rotted rope	☐	☐	

Remarks:

Inspector's Signature _____ Date _____