Dartmouth College
Environmental Health and Safety
Occupational Health and Safety Program (2009)

Working at Heights Policy

Prepared in compliance with 29 CFR 1910 Subpart D, Subpart F
29 CFR 1926 Subpart L, Subpart M, Subpart X

Table of Contents

Attachments

DARTMOUTH COLLEGE

Working at Elevation

Introduction: OSHA has written several standards that pertain to fall protection. Dartmouth College has addressed the need for fall protection by writing standard operating procedures (SOP), educating and training employees, actively auditing work practices for compliance and safe work practices.

Purpose: To remove the potential for falls while working at heights.

Scope: The Dartmouth College Fall Protection Policy applies to all Dartmouth College employees who work at heights over 6'. It also includes the use of aerial work platforms, man lifts, or on scaffolding at 10' or more above the floor or ground below. The following standards apply--

General Industry (29 CFR 1910)

- 1910 Subpart D, Walking-working surfaces
- 1910 Subpart F, Powered platforms, man lifts, and vehicle-mounted work platforms

Construction Industry (29 CFR 1926)

- 1926 Subpart L, Scaffolds
- 1926 Subpart M, Fall protection
- 1926 Subpart X, Ladders

The Five Key Requirements @ Dartmouth College:

1. Fall protection required at heights over 6'
2. All new buildings must be equipped with fall protection devices
3. All Scissor or Aerial lift operators must be trained
4. Competent person required on site when working from a scaffold
5. Portable ladders must be fiberglass,1A, extra heavy duty/industrial use

Responsibilities: Departments requiring workers to work at heights above 6' work from scaffolding over 10', conduct work utilizing ladders, or from aerial work platforms must inform their employees of the policy and procedures as well as any training requirements.

Department Supervisor

- Review work requirements, if employee is working at heights over 6', is utilizing lift equipment, or scaffolding ensure employee has had appropriate training.
- Ensure all equipment is in good working order. Inspect all equipment prior to use.
- Determine who "owns" the equipment. Owners bear distinct responsibilities and must be accountable for meeting these responsibilities.
- Other than personal protective equipment, assess the value of leasing equipment as an option to owning the equipment.

Employee

- Attend training as directed
- Follow all rules and regulations
- Use safe work practices
- Ensure equipment being used is in good working order
- Report any problems with compliance to your supervisor

EHS

- Coordinate training
- Review policy
- Write operating procedures
- Audit program

Planning Design and Construction

- Ensure that all new buildings are equipped with the means by which workers will be protected from falls while working at heights over 6'. For example: guard rails, anchor points, hatch covers, guards, etc.

Facilities Operations and Management

- Routinely inspect fall protection systems and equipment which has been affixed to buildings
- Adequately maintain existing fall protection devices affixed to buildings
- Provide fall protection in areas where it is needed for the maintenance of buildings

Program Responsibilities: The effectiveness of the program will be evaluated on a regular basis and as needed by Environmental Health & Safety.

Definitions:

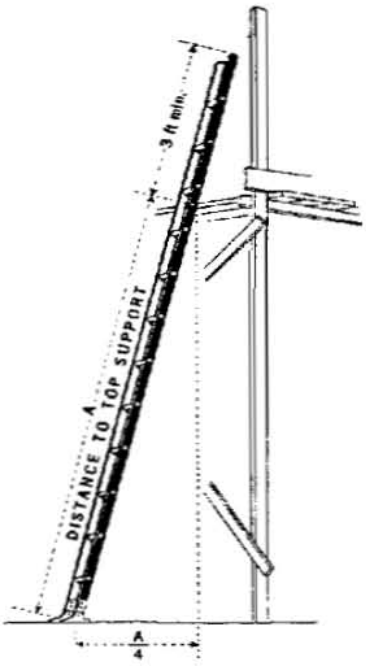
- Aerial device-any vehicle-mounted device, telescoping or articulating, or both, which is used to position personnel.
- Competent Person- has been trained and is familiar with all procedures required for the safe use of the lift. The competent person must have the **ability** to recognize hazards **and** have the **authority** to take corrective action immediately.
- Fall Arrest Equipment-components of Fall Arrest Equipment include a full body harness, shock absorbing lanyard or self-retractable lifeline and locking snap hooks, all of which must meet Occupational Safety & Health Administration (OSHA) criteria. Anchor points must be approved for a static load of 5000 pounds or engineered to meet a 2:1 safety factor.
- Fall Prevention-a structural design which limits a fall to the same level (guardrails, aerial lifts with work platforms).
- Fall Protection system-a system designed to protect employees from the risk of a fall when working at heights of 6' or more. Fall protection may include: guardrails, personal fall arrest systems, positioning device systems, safety monitoring systems, safety net systems, warning line systems or covers.
- Genie Lift- a manually propelled elevating aerial platform (Genie brand or other similar type of lift which is manually moved into position).
- Scissor Lift-a type of platform which can usually only move in the vertical plane.

In the event of a fall, employees must have a plan of rescue.

Employees exposed to fall hazards will be included in EHS organized training programs.

Portable Ladders (29 CFR 1910.25 and .26)

1. Ladder Use
    - All ladders must be used as intended by the manufacturer.
    - Training on ladder safety will be provided to all employees periodically throughout their work history at Dartmouth College and at any time deemed necessary due to the observance of improper use of a ladder.
    - In order to make certain the ladder is in good working order each user must inspect the ladder prior to using it and at anytime it could have sustained damage.(attachment 1A)
    - Set firmly on ground or floor surface.
    - Set base of single or multiple section ladders 1' out for every 4' of rise.
    - The top of the ladder must be positioned with both rails supported unless outfitted with a single support attachment.



- Observe weight limits posted on ladders.
- Face the ladder when ascending or descending.
- Step ladders must be used on even surfaces, fully opened & locked, and can not exceed 20'.
- When accessing a roof, the ladder shall extend 3' above the point of contact with the building.
- The length of single ladders or individual sections of extension ladders shall not exceed 30 feet.
- Two-section extension ladders shall not exceed 48 feet in length and over two-section extension ladders shall not exceed 60 feet in length. Each section of an extension ladder shall overlap the adjacent section by at least the number of feet stated in the following:

Normal length of ladder	**Overlap**
Up to and including 36'	3'
Over 36, up to and including 48'	4'
Over 48, up to 60'	5'

- Extension ladders shall not be separated and the sections used independently.
- Manufacturer labels and postings must remain on the ladders. Follow all manufacturer recommendations.
- Review SOP #15 on ladders. (Attachment 1)

2. Ladder Requirements

- Use non-conductive ladders for all electrical work.
- Manufacturer labels and postings must remain on the ladders. Follow all manufacturer recommendations
- Purchase Criteria for new ladders:
    - ✓ All new ladders will have a duty rating of 1A, extra heavy duty/industrial use for loads up to 300 lbs.
    - ✓ Ladders will be constructed of fiberglass.

Fixed Ladders (29 CFR 1910.27 outlines design criteria when building fixed ladders. Appendix B.)

Rung spacing

- The distance between a fixed ladder and the landing must be between 2 ½" and 12".
- There should be 7" clearance between the center of the ladder rung and the surface behind it.
- Rungs shall be no more than 12" apart and uniformly spaced.

Cages

- Cages or wells shall be provided on ladders of more than 20 feet to a maximum unbroken length of 30 feet.
- The top of the cage must extend 42" above the landing. The bottom of the cage must be between 7' and 8' above the bottom of the ladder.
- Ladder safety devices may be used on tower, water tank, and chimney ladders over 20 feet in unbroken length in lieu of cage protection. (Ski lift towers are covered by appendix A in this policy).

Extensions

- The side rails of through or side-step ladder extensions shall extend 3 1/2 feet above parapets and landings.
- For through ladder extensions, the rungs shall be omitted from the extension and shall have not less than 18 or more than 24 inches clearance between rails.
- For side-step or offset fixed ladder sections, at landings, the side rails and rungs shall be carried to the next regular rung beyond or above the 3 1/2 feet minimum.

Inspections

- All ladders shall be maintained in a safe condition.
- All ladders shall be inspected regularly, with the intervals between inspections being determined by use and exposure.

Scaffolding (OSHA 29 CFR 1926 subpart L)

When scaffolding is being used a competent person must be present at all times. The competent person is anyone who has attended an EHS approved scaffold user's course as well as additional training if scaffold is more than 4 times higher than the minimum base dimension. Fall protection for workers above 10' is required and will be determined by the competent person as well as the feasibility of fall protection for erectors and dismantlers.

1. Competent person must inspect and oversee the set up of the scaffolding.
2. Employees must have completed EHS approved training.
3. Supervisors must ensure employees working on scaffold have been trained.
    - Review the SOP #3 on scaffolding. (attachment 2)
4. Basic Guidelines
    - Do not alter or move while in use
    - Protect workers on scaffolds from overhead hazards
    - If higher than 10 ft., use guardrails, midrails and toe boards
    - Use wire mesh between the toe board and guardrail if people work or pass underneath
    - Must be equipped with access ladder or equivalent
    - Must be capable of supporting four times the maximum intended load

Genie Lifts

All lift users must have completed an EHS approved training program.

- Employees must inspect the lift prior to use and report any malfunction or damage. Remove the lift from service until repairs are complete.
- The owner's manual and operating instructions must be located on the lift at all times. Follow ALL operating instructions provided with the lift.
- A person on the ground to act as spotter is required.
    - The spotter must watch the bubble level, the person in the lift for signs of heat stress, fatigue or dizziness, and for pedestrian or motor traffic in the area of the lift.
- Review SOP #3A on Genie Lifts. (Attachment 3)

Scissor Lifts, Aerial Lifts & Cherry Picker (29 CFR 1910.66-.68, 29 CFR 1926.450-.454)

Any operator must be trained as a "competent" person by attending an EHS approved training program. A competent person is someone who has been trained and is familiar with all procedures required for the safe use of the scissor lift and must manage the activities involving the lift, while the lift is in use. In addition, Cherry Picker operators are required to have a CDL license.

- Equipment must always be inspected by the user before it is used.
- The manual must be located on the lift and all manufacturer recommendations must be followed.
- Lift use out of doors is prohibited if there are winds or lightning.
- Operators must report any malfunction, defects or damage and the lift must be taken out of service until repairs are complete.
- A minimum of 10' must be maintained between the lift basket and any electrical lines or power conductors.
- A person on the ground to act as spotter is required.
  - The spotter must watch for pedestrian or motor traffic in the area of the lift and to alert pedestrians or overhead hazards.
- Barricades should be used to prevent pedestrians from walking below the work area.
- Review SOP #3B on Scissor Lifts. (Attachment 4)
- Review SOP #3C on Aerial Lifts. (Attachment 5)

Skylights (29 CFR* 1910.23(a) (4))

Every skylight floor opening and hole shall be guarded by a standard skylight screen or a fixed standard railing on all exposed sides. If a skylight is located 6' or more above the next lower level and the skylight is strong enough to support at least twice the weight of employees, equipment, and materials that may be imposed on it without failing then the skylight itself meets the requirements for a hole cover and would be acceptable by OSHA as protection from a fall. If the strength of the skylight is not known or it does not meet this criterion then other means of fall protection are required. Guardrails, protective covers or fall arrest systems must be used.

Work in Trees (ANSI Z133-1)

- Only persons deemed to be competent in tree care are qualified to work in trees.
  - A competent person is someone who has been trained and who has demonstrated the ability and knowledge required to perform tree care operations safely.
  - Training in proper climbing techniques will be coordinated through the Grounds Department Supervisor.
- Tree workers will conduct a safety review prior to starting work.
  - Assess fall protection requirement
  - Inspect all equipment

    - Locate power lines.
    - Check clearances from buildings, vehicles, and pedestrian paths.
    - Determine the need for barricades or other warning signs.
- Notify Safety and Security, Town Police, Parking Operations when cutting will impact streets, parking lots, walkways or any area involving the general public.
- An attendant with a 2-way radio must be present during any overhead work.
- First Aid kits must be available at the work site.
- Tree Workers shall have First Aid and CPR training. (Contact EHS for training)
- In the event of an emergency involving the elevated worker, the ground person will radio dispatch to make a 911 call. The ground person will stay in contact with dispatch until rescue arrives. If work is not during regular business hours then communication with the Power Plant or a cell phone is required.

Note: OSHA is currently working on a standard for Arborists.

Aerial Rescue

Aerial Rescue Plans must be developed by departments who have employees working at heights. EHS can assist in developing these plans. (See attachment 8 & 9 for examples). In the event that a worker falls, there must be a plan already in place to quickly get the worker safely lowered to the ground. A rescue plan will cover the following:

- When should a rescue be attempted
- Who should attempt the rescue
- What are the procedures to be used in the rescue using safe practice
- How - Training guidelines and rescue drills when & where applicable

Any time a worker falls, 911 must be called. Medical evaluation is essential. Any equipment involved in a fall must be removed from service immediately.

February 2009

Standard Operating Procedures for Portable Ladders

Purpose: To maximize the service-ability and safety of all ladders and to eliminate unnecessary damage, all ladder users must employ safe work practices.

Specific requirements that must be taken into consideration when using a ladder are clearly defined in 29 CFR 1910.25, 29 CFR 1910.26, 29 CFR 1910.27 and 29 CFR 1926.1053.

Scope: This procedure applies to all employees using a ladder.

Responsibilities: Supervisors must inform employees of procedures for safe use of ladders and take action when they are not being followed. Supervisors must also replace or repair damaged ladders prior to instructing an employee to use it. The employee is responsible for following these procedures when using a ladder.

Procedure:

- Each time a ladder is used it must be examined by the user.
  - √ All manufacturers' labels must remain on the ladder.
  - √ Rungs must be in good condition.
  - √ Ladders equipped with non-slip pads must have all pads in place.
  - √ Uprights and extensions must not be twisted or split.
  - √ Oil and grease must be cleaned off any component of a ladder.
  - √ Ladders found to be in need of repair will be brought back to the employees shop and replaced immediately with a new fiberglass ladder with a 1A rating. If this is not feasible the ladder must be tagged "Dangerous, DO NOT USE" along with the name and date of the employee and the supervisor it was reported to and replaced as soon as possible. (see SOP 15A – inspection sheet)

- Select the proper ladder for the job.
  Non conductive ladders must be used for all electrical work.
  Step type ladders must be used on even surfaces, fully opened & locked
  Never use closed.
  Extension ladders must not be separated and the sections used independently.
  Make certain that worker and tools do not exceed the weight limit established by the manufacturer for that ladder.
- Ladders must be erected such that the base of the ladder is one quarter the length of the ladder away from the wall or upward support and placed to prevent slipping.
- Ladders used to gain access to a roof should extend 3' above the point of contact with the building.

Standard Operating Procedures for Ladder Inspection

- The top of the ladder must be positioned with both rails supported.
- The climber must face the ladder when ascending or descending.
- Ladders must only be used as the manufacturer intended them to be used.
- Portable ladders must be capable of supporting at least 4 times the maximum intended load. Never exceed the load rating on the ladder.
- Ladders must not be tied or fastened together to create longer sections.
- If the ladder tips over during use then a re-inspection is necessary. Be sure to inspect for dents, sheared rivets, loosened hardware, rung to side rail connections and bending.

Purchase Criteria for new ladders:

- ❖ All new ladders will have a duty rating of 1A, extra heavy duty/industrial use for loads up to 300 lbs.
- ❖ Ladders will be constructed of fiberglass.

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Brenda Freeland
Occupational Hygienist, EHS

_____

Frank Roberts
Associate Director, FO&M

Dec. 1997
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Rev. 2/04
Rev. 2008

Standard Operating Procedures for Ladder Inspection

Purpose: To maximize the service-ability and safety of all ladders and to eliminate unnecessary damage, good safe practices must be employed by all ladder users.

Specific requirements that must be taken into consideration when using a ladder are clearly defined in 29 CFR 1910.25, 29 CFR 1910.26 and 29 CFR 1910.27.

Scope: This procedure applies to all employees using a ladder.

Responsibilities: Supervisors must inform employees of procedures for safe use of ladders and take action when they are not being followed. Supervisors must also replace or repair a damaged ladder prior to instructing an employee to use it. The employee is responsible for following these procedures when using a ladder.

Procedure:

- Each time a ladder is used it must be examined by the user.
  - √ All manufacturers labels must remain on the ladder.
  - √ Rungs must be in good condition.
  - √ Ladders equipped with non slip pads must have both pads in place.
  - √ Uprights and extensions must not be twisted or split.
  - √ Oil and grease must be cleaned off any component of a ladder.
  - √ If there is any damage to the ladder the ladder must be tagged "Dangerous, DO NOT USE" along with the name and date of the employee and the supervisor it was reported to until it can be repaired or destroyed.
  - √ If there is any question as to the condition or safety of a ladder a "Do Not Use Ladder" tag is to be put on ladder and a supervisor called to check it out.
  - √ Residential Life supervisors are required to inspect each ladder every six months and write down date of inspection and initials on inspection tag attached to the ladder.

Standard Operating Procedures for Ladder Inspection

- Select the proper ladder for the job.
  Non conductive ladders must be used.
  Step type ladders must be used on an even surface, fully opened locked -- never use closed.
  Extension ladders must not be separated and the sections used independently.
- Ladders must be erected such that the base of the ladder is one quarter the length of the ladder away from the wall or upward support and placed to prevent slipping.
- Ladders used to gain access to a roof should extend 3' above the point of contact with the building.

- The top of the ladder must be positioned with both rails supported.
- The climber must face the ladder when ascending or descending.
- Ladders must only be used as the manufacturer intended them to be used.
- Portable ladders are designed as a one-man working ladder based on a 200 lb. load.
- Ladders must not be tied or fastened together to create longer sections.
- If the ladder tips over during use then a re-inspection is necessary. Be sure to inspect for dents, sheared rivets, loosened hardware, rung to side rail connections and bending.

Purchase Criteria for new ladders:

- ❖ All new ladders will have a duty rating of 1A, extra heavy duty/industrial use for loads up to 300 lbs.
- ❖ Ladders will be constructed of fiberglass.

Brenda Freeland
Occupational Hygienist, EHS

Catherine Henault
Associate Director, ORL

Feb. 2002
Rev. 2008

Ladder Inspection Form

Provided by Werner Co.

Company Name: _____
Please Print

Ladder Reference Number: _____ Dept. _____

Inspector _____ Date. _____

❑ Stepladder

Size _____ ft.

❑ Fiberglass ❑ Aluminum ❑ Wood

Circle Areas of Damage

		Yes	No
Steps:	Loose, Cracked, Bent or Missing	❑	❑
Rails:	Cracked, Bent, Split or Frayed	❑	❑
	Rail Shields	❑	❑
Labels:	Missing or Not Readable	❑	❑
Pail Shelf:	Loose, Bent, Missing or Broken	❑	❑
Top:	Cracked, Loose or Missing	❑	❑
Spreader:	Loose, Bent or Broken	❑	❑
General:	Rust, Corrosion or Loose	❑	❑
Other:	Bracing, Shoes, Rivets	❑	❑

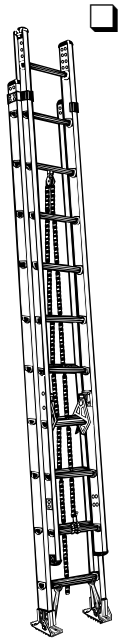
Actions: ❑ Ladder tagged as damaged & removed from use

❑ Ladder is in good condition

❑ Extension Ladder

Size _____ ft.

❑ Fiberglass ❑ Aluminum



Circle Areas of Damage

		Yes	No
Rungs:	Loose, Cracked, Bent or Missing	❑	❑
Rails:	Cracked, Bent, Split or Frayed	❑	❑
Labels:	Missing or Not Readable	❑	❑
Rung Locks:	Loose, Bent, Missing or Broken	❑	❑
Hardware:	Missing, Loose or Broken	❑	❑
Shoes:	Worn, Broken or Missing	❑	❑
Rope/Pulley:	Loose, Bent or Broken	❑	❑
Other:	Bracing Rivets	❑	❑
General:	Rust, Corrosion or Loose	❑	❑

Actions: ❑ Ladder tagged as damaged & removed from use

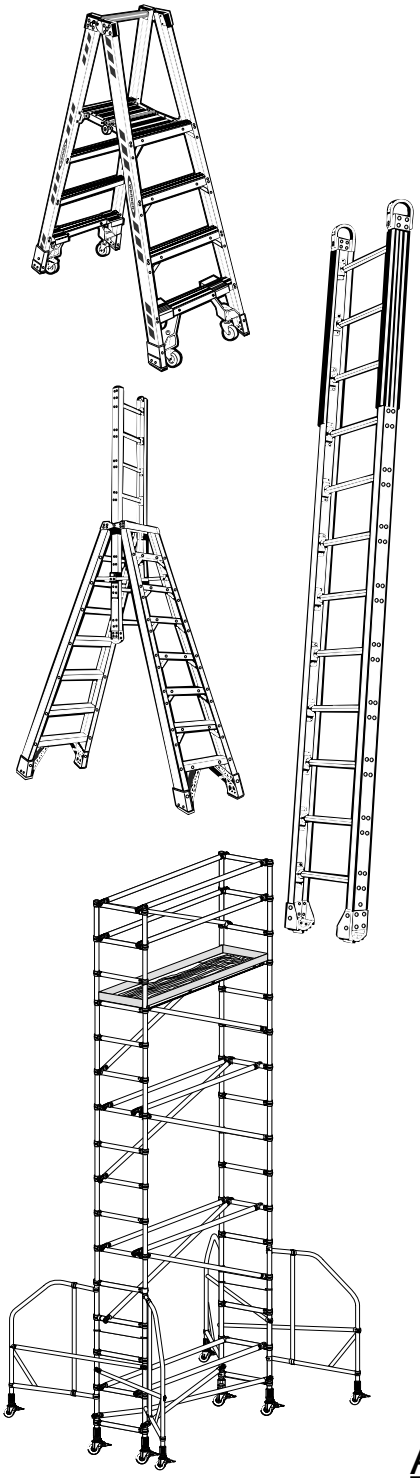
❑ Ladder is in good condition

Ladder Inspection Form **Provided by Werner Co.**

❑ **Specialty Ladder**

❑ Fiberglass ❑ Aluminum ❑ Wood

Model Number: _____



Mark all that apply

		Yes	No
Steps/Rungs:	Loose, Cracked Bent or Missing	❑	❑
Rails:	Cracked, Bent, Split or Frayed	❑	❑
Labels:	Missing or Not Readable	❑	❑
Hardware:	Missing, Loose or Broken	❑	❑
Fasteners:	Rust, Corrosion, Loose or Missing	❑	❑
Top:	Cracked, Loose, or Missing	❑	❑
Spreader:	Loose, Bent or Broken	❑	❑
Outriggers:	Missing, Rust, Corrosion or Loose for scaffolding	❑	❑
General:	Rust, Corrosion or Loose	❑	❑
Hinges:	Loose, Bent or Missing	❑	❑
Locks:	Loose, Bent, Broken or Missing	❑	❑
Bracing Front,Rear:	Loose, Bent, Broken or Missing	❑	❑
Rivets:	Rust, Corrosion, Loose, Missing	❑	❑
Shoes:	Worn, Broken or Missing	❑	❑
Platform:	Loose, Bent, Broken or Missing	❑	❑
Rail Shield:	Missing or Loose	❑	❑
Shoulder Bolt:	Rust, Corrosion or Loose	❑	❑
Casters:	Rust, Corrosion or Loose for scaffolding	❑	❑

Actions:

❑ Ladder tagged as damaged & removed from use

❑ Ladder is in good condition

Regulations (Standards - 29 CFR)

Fixed ladders. - 1910.27

Regulations (Standards - 29 CFR) - Table of Contents

- **Part Number:** 1910
- **Part Title:** Occupational Safety and Health Standards
- **Subpart:** D
- **Subpart Title:** Walking-Working Surfaces
- **Standard Number:** 1910.27
- **Title:** Fixed ladders.

1910.27(a)

"Design requirements" -

1910.27(a)(1)

Design considerations. All ladders, appurtenances, and fastenings shall be designed to meet the following load requirements:

1910.27(a)(1)(i)

The minimum design live load shall be a single concentrated load of 200 pounds.

1910.27(a)(1)(ii)

The number and position of additional concentrated live-load units of 200 pounds each as determined from anticipated usage of the ladder shall be considered in the design.

1910.27(a)(1)(iii)

The live loads imposed by persons occupying the ladder shall be considered to be concentrated at such points as will cause the maximum stress in the structural member being considered.

1910.27(a)(1)(iv)

The weight of the ladder and attached appurtenances together with the live load shall be considered in the design of rails and fastenings.

1910.27(a)(2)

"Design stresses." Design stresses for wood components of ladders shall not exceed those specified in 1910.25. All wood parts of fixed ladders shall meet the requirements of 1910.25(b).

For fixed ladders consisting of wood side rails and wood rungs or cleats, used at a pitch in the range 75 degrees to 90 degrees, and intended for use by no more than one person per section, single ladders as described in

1910.25(c)(3)(ii) are acceptable.

..1910.27(b)

1910.27(b)

"Specific features" -

1910.27(b)(1)

"Rungs and cleats."

1910.27(b)(1)(i)

All rungs shall have a minimum diameter of three-fourths inch for metal ladders, except as covered in paragraph (b)(7)(i) of this section and a minimum diameter of 1 1/8 inches for wood ladders.

1910.27(b)(1)(ii)

The distance between rungs, cleats, and steps shall not exceed 12 inches and shall be uniform throughout the length of the ladder.

1910.27(b)(1)(iii)

The minimum clear length of rungs or cleats shall be 16 inches.

1910.27(b)(1)(iv)

Rungs, cleats, and steps shall be free of splinters, sharp edges, burrs, or projections which may be a hazard.

1910.27(b)(1)(v)

The rungs of an individual-rung ladder shall be so designed that the foot cannot slide off the end. A suggested design is shown in figure D-1.

FIGURE D-1. - Suggested design for rungs on individual-rung ladders.
(For Figure D-1, Click Here)

1910.27(b)(2)

"Side rails." Side rails which might be used as a climbing aid shall be of such cross sections as to afford adequate gripping surface without sharp edges, splinters, or burrs.

1910.27(b)(3)

"Fastenings." Fastenings shall be an integral part of fixed ladder design.

..1910.27(b)(4)

1910.27(b)(4)

"Splices." All splices made by whatever means shall meet design requirements as noted in paragraph (a) of this section. All splices and connections shall have smooth transition with original members and with

no sharp or extensive projections.

1910.27(b)(5)

"Electrolytic action." Adequate means shall be employed to protect dissimilar metals from electrolytic action when such metals are joined.

1910.27(b)(6)

"Welding." All welding shall be in accordance with the "Code for Welding in Building Construction" (AWSD1.0-1966).

1910.27(b)(7)

"Protection from deterioration."

1910.27(b)(7)(i)

Metal ladders and appurtenances shall be painted or otherwise treated to resist corrosion and rusting when location demands. Ladders formed by individual metal rungs imbedded in concrete, which serve as access to pits and to other areas under floors, are frequently located in an atmosphere that causes corrosion and rusting. To increase rung life in such atmosphere, individual metal rungs shall have a minimum diameter of 1 inch or shall be painted or otherwise treated to resist corrosion and rusting.

1910.27(b)(7)(ii)

Wood ladders, when used under conditions where decay may occur, shall be treated with a nonirritating preservative, and the details shall be such as to prevent or minimize the accumulation of water on wood parts.

..1910.27(b)(7)(iii)

1910.27(b)(7)(iii)

When different types of materials are used in the construction of a ladder, the materials used shall be so treated as to have no deleterious effect one upon the other.

FIGURE D-2. - Rail Ladder With Bar Steel Rails and Round Steel Rungs
(For Figure D-2, Click Here)

1910.27(c)

"Clearance" -

1910.27(c)(1)

"Climbing side." On fixed ladders, the perpendicular distance from the centerline of the rungs to the nearest permanent object on the climbing side of the ladder shall be 36 inches for a pitch of 76 degrees, and 30 inches for a pitch of 90 degrees (fig. D-2 of this section), with minimum clearances for intermediate pitches varying between these two limits in proportion to the slope, except as provided in subparagraphs (3) and (5)

of this paragraph.

1910.27(c)(2)

"Ladders without cages or wells." A clear width of at least 15 inches shall be provided each way from the centerline of the ladder in the climbing space, except when cages or wells are necessary.

1910.27(c)(3)

"Ladders with cages or baskets." Ladders equipped with cage or basket are excepted from the provisions of subparagraphs (1) and (2) of this paragraph, but shall conform to the provisions of paragraph (d)(1)(v) of this section. Fixed ladders in smooth-walled wells are excepted from the provisions of subparagraph (1) of this paragraph, but shall conform to the provisions of paragraph (d)(1)(vi) of this section.

..1910.27(c)(4)

1910.27(c)(4)

"Clearance in back of ladder." The distance from the centerline of rungs, cleats, or steps to the nearest permanent object in back of the ladder shall be not less than 7 inches, except that when unavoidable obstructions are encountered, minimum clearances as shown in figure D-3 shall be provided.

Minimum Ladder Clearances

FIGURE D-3. - Clearance for Unavoidable Obstruction at Rear of Fixed Ladder
(For Figure D-3, Click Here)

1910.27(c)(5)

"Clearance in back of grab bar." The distance from the centerline of the grab bar to the nearest permanent object in back of the grab bars shall be not less than 4 inches. Grab bars shall not protrude on the climbing side beyond the rungs of the ladder which they serve.

1910.27(c)(6)

"Step-across distance." The step-across distance from the nearest edge of ladder to the nearest edge of equipment or structure shall be not more than 12 inches, or less than 2 1/2 inches (fig. D-4).

FIGURE D-4. - Ladder Far from Wall
(For Figure D-4, Click Here)

..1910.27(c)(7)

1910.27(c)(7)

"Hatch cover." Counterweighted hatch covers shall open a minimum of 60 degrees from the horizontal. The distance from the centerline of rungs or

cleats to the edge of the hatch opening on the climbing side shall be not less than 24 inches for offset wells or 30 inches for straight wells. There shall be no protruding potential hazards within 24 inches of the centerline of rungs or cleats; any such hazards within 30 inches of the centerline of the rungs or cleats shall be fitted with deflector plates placed at an angle of 60 degrees from the horizontal as indicated in figure D-5. The relationship of a fixed ladder to an acceptable counterweighted hatch cover is illustrated in figure D-6.

1910.27(d)

"Special requirements" -

1910.27(d)(1)

"Cages or wells."

1910.27(d)(1)(i)

Cages or wells (except on chimney ladders) shall be built, as shown on the applicable drawings, covered in detail in figures D-7, D-8, and D-9, or of equivalent construction.

1910.27(d)(1)(ii)

Cages or wells (except as provided in subparagraph (5) of this paragraph) conforming to the dimensions shown in figures D-7, D-8, and D-9 shall be provided on ladders of more than 20 feet to a maximum unbroken length of 30 feet.

FIGURE D-5. - Deflector Plates for Head Hazard
(For Figure D-5, Click Here)

FIGURE D-6. - Relationship of Fixed Ladder to a Safe Access Hatch
(For Figure D-6, Click Here)

1910.27(d)(1)(iii)

Cages shall extend a minimum of 42 inches above the top of landing,unless other acceptable protection is provided.

1910.27(d)(1)(iv)

Cages shall extend down the ladder to a point not less than 7 feet nor more than 8 feet above the base of the ladder, with bottom flared not less than 4 inches, or portion of cage opposite ladder shall be carried to the base.

..1910.27(d)(1)(v)

1910.27(d)(1)(v)

Cages shall not extend less than 27 nor more than 28 inches from the centerline of the rungs of the ladder. Cage shall not be less than 27 inches in width. The inside shall be clear of projections. Vertical bars shall be

located at a maximum spacing of 40 degrees around the circumference of the cage; this will give a maximum spacing of approximately 9 1/2 inches, center to center.

1910.27(d)(1)(vi)

Ladder wells shall have a clear width of at least 15 inches measured each way from the centerline of the ladder. Smooth-walled wells shall be a minimum of 27 inches from the centerline of rungs to the well wall on the climbing side of the ladder. Where other obstructions on the climbing side of the ladder exist, there shall be a minimum of 30 inches from the centerline of the rungs.

FIGURE D-7. - Cages for Ladders More Than 20 Feet High
(For Figure D-7, Click Here)

FIGURE D-8. - Clearance Diagram for Fixed Ladder in Well
(For Figure D-8, Click Here)

FIGURE D-9. - Cages-Special applications.
(For Figure D-9, Click Here)

1910.27(d)(2)

"Landing platforms." When ladders are used to ascend to heights exceeding 20 feet (except on chimneys), landing platforms shall be provided for each 30 feet of height or fraction thereof, except that, where no cage, well, or ladder safety device is provided, landing platforms shall be provided for each 20 feet of height or fraction thereof. Each ladder section shall be offset from adjacent sections. Where installation conditions (even for a short, unbroken length) require that adjacent sections be offset, landing platforms shall be provided at each offset.

1910.27(d)(2)(i)

Where a man has to step a distance greater than 12 inches from the centerline of the rung of a ladder to the nearest edge of structure or equipment, a landing platform shall be provided. The minimum step-across distance shall be 2 1/2 inches.

..1910.27(d)(2)(ii)

1910.27(d)(2)(ii)

All landing platforms shall be equipped with standard railings and toeboards, so arranged as to give safe access to the ladder. Platforms shall be not less than 24 inches in width and 30 inches in length.

1910.27(d)(2)(iii)

One rung of any section of ladder shall be located at the level of the landing laterally served by the ladder. Where access to the landing is through the ladder, the same rung spacing as used on the ladder shall be used from the landing platform to the first rung below the landing.

1910.27(d)(3)

"Ladder extensions." The side rails of through or side-step ladder extensions shall extend 3 1/2 feet above parapets and landings. For through ladder extensions, the rungs shall be omitted from the extension and shall have not less than 18 nor more than 24 inches clearance between rails. For side-step or offset fixed ladder sections, at landings, the side rails and rungs shall be carried to the next regular rung beyond or above the 3 1/2 feet minimum (fig. D-10).

FIGURE D-10. - Offset Fixed Ladder Sections
(For Figure D-10, Click Here)

1910.27(d)(4)

"Grab bars." Grab bars shall be spaced by a continuation of the rung spacing when they are located in the horizontal position. Vertical grab bars shall have the same spacing as the ladder side rails. Grab-bar diameters shall be the equivalent of the round-rung diameters.

..1910.27(d)(5)

1910.27(d)(5)

"Ladder safety devices." Ladder safety devices may be used on tower, water tank, and chimney ladders over 20 feet in unbroken length in lieu of cage protection. No landing platform is required in these cases. All ladder safety devices such as those that incorporate lifebelts, friction brakes, and sliding attachments shall meet the design requirements of the ladders which they serve.

1910.27(e)

"Pitch" -

1910.27(e)(1)

"Preferred pitch." The preferred pitch of fixed ladders shall be considered to come in the range of 75 degrees and 90 degrees with the horizontal (fig. D-11).

FIGURE D-11. - Pitch of Fixed Ladders
(For Figure D-11, Click Here)

1910.27(e)(2)

"Substandard pitch." Fixed ladders shall be considered as substandard if they are installed within the substandard pitch range of 60 and 75 degrees with the horizontal. Substandard fixed ladders are permitted only where it is found necessary to meet conditions of installation. This substandard pitch range shall be considered as a critical range to be avoided, if possible.

1910.27(e)(3)

"Scope of coverage in this section." This section covers only fixed ladders

within the pitch range of 60 degrees and 90 degrees with the horizontal.

1910.27(e)(4)

"Pitch greater than 90 degrees." Ladders having a pitch in excess of 90 degrees with the horizontal are prohibited.

1910.27(f)

"Maintenance." All ladders shall be maintained in a safe condition. All ladders shall be inspected regularly, with the intervals between inspections being determined by use and exposure.

Next Standard (1910.28)

Regulations (Standards - 29 CFR) - Table of Contents

Back to Top www.osha.gov www.dol.gov

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Occupational Safety & Health Administrations
200 Constitution Avenue, NW
Washington, DC 20210

Standard Interpretations

06/02/1999 - Fixed ladder requirements for ski lift towers.

Standard Interpretations - Table of Contents

- **Standard Number:** 1910.27; 1910.27(d)(1)(ii); 1910.27(d)(5)

OSHA requirements are set by statute, standards and regulations. Our interpretation letters explain these requirements and how they apply to particular circumstances, but they cannot create additional employer obligations. This letter constitutes OSHA's interpretation of the requirements discussed. Note that our enforcement guidance may be affected by changes to OSHA rules. Also, from time to time we update our guidance in response to new information. To keep apprised of such developments, you can consult OSHA's website at http://www.osha.gov.

June 2, 1999

Mr. Michael Berry, President
National Ski Areas Association
133 S. Van Gordon St.
Lakewood, Colorado 80228

Dear Mr. Berry:

This letter is in response to several issues your organization has raised about how certain Occupational Safety and Health Administration (OSHA) safety regulations apply when ski area employees are required to climb ski lift towers.

We understand you were specifically concerned about the requirements for ladder cages on all fixed ladders as they apply to ski lift towers, and the specific dimensions and clearances for ladder rungs on those towers.

Clarification of Ladder Cage Requirement

The current OSHA regulation for ladders (29 CFR 1910.27) requires that fixed ladders over 20 feet in length be equipped with cages or ladder safety devices. On several previous occasions, the National Ski Areas Association has pointed out to the agency that, on ski lift towers, the presence of cages presents a significant hazard to riders using the ski lifts, as their skis are likely to become entangled in the cage structure. In addition, in bad weather, the possibility of ice accumulation on the cage creates an unacceptable potential for structural failure. OSHA agrees with your assessment that these conditions create situations where using cages for compliance with the current standard may prove infeasible or may create a "greater hazard."

Paragraphs 29 CFR 1910.27(d)(1)(ii) and 1910.27(d)(5) require cages or ladder safety devices on ladders more than 20 feet in length. Accordingly, the current OSHA standard allows for an alternative to cages for fixed ladders, as long as the employer provides for 100% fall protection during ascent or descent of the ladder. One example of such a system that would address your specific concerns for maintenance or other operations which require the ascending and descending of towers, would be a fall protection system consisting of a climbing belt or harness equipped with two short lanyards that incorporate snaphooks on the end of the lanyard. The climber would use the system by alternately attaching to the ladder rungs during the climb up or down. Once in place to do work, OSHA would require the climber to be "tied off" or otherwise be protected from falling.

In the event of an emergency or other similar situation where the required use of a ladder climbing device, such as a double clipping lanyard system would delay a rescue or otherwise endanger lives, OSHA would allow climbs for workers complying with the "Qualified Climber" requirements set forth in paragraph 1910.32(b)(5) of OSHA's Walking and Working Surfaces and Personal Fall Protection Proposal, dated April 10, 1990. In addition, the worker would be required to be "tied off" once they reached their work position. Of course, it would incumbent upon the employer to demonstrate that an actual emergency situation existed.

Clarification on Dimensions and Clearances of Ladder Rungs

The current fixed ladder regulation also specifies that the length (distance from side to side) of a ladder rung shall not be less than 16 inches and that the toe clearance from the centerline of the rungs to obstructions behind the ladder (or ski tower) be at least 7 inches. The National Ski Area Association has pointed out many of the ski towers in the United States are less than 16 inches in diameter. For those towers, a 16 inch long ladder rung would create an unacceptable hazard for passing skiers, whose skis may become entangled in that portion of the rung that protrudes beyond the sides of the ski tower. Likewise, for these towers, the requirement for a 7 inch toe clearance tends to create a similar hazard. OSHA acknowledges that, for towers of 16 inches or less in diameter, neither the 16 inch long ladder rung requirement nor the 7 inch toe clearance requirement is feasible.

For ski towers equipped with ladders that do not meet these minimum requirements, a ladder climbing device, such as the double clip harness system described as an alternative to the ladder cage requirement would be deemed an acceptable alternative safety procedure, as long as instruction was provided to all workers reasonably expected to climb towers. The instruction should be part of the training required in the "Qualified Climber" program, and should identify the specific towers at the ski area that have inadequate toe clearance and ladder widths and must be climbed using proper fall protection. In the event of an emergency, a qualified climber, in compliance with the proposed 1910.23 and 1910.32(b)(5) standard, may climb the tower without fall protection.

OSHA believes that the procedures outlined above will provide for the safety of the workers involved in climbing operations without creating unnecessary hazards for skiers or other users of the ski areas. The OSHA field offices have been made aware that the procedures described in this letter constitute an acceptable alternative to ladder cages and other fall protection hazards associated with the ascent and descent of ski towers. A copy of this interpretation has also been provided to the 23 states that operate OSHA-approved State plans. They will be encouraged to adopt similar compliance policies.

If you have any remaining questions concerning these issues, please contact [OSHA's Directorate of Education and Analysis] at (202) 693-2400, or the [Directorate of Enforcement Programs], at (202) 693-2100.

Sincerely,

R. Davis Layne
Deputy Assistant Secretary for Enforcement

[Corrected 4/4/2005.

Note: On April 10, 1990 OSHA published proposed revisions to Walking and Working Surfaces; Personal Protective Equipment (Fall Protection Systems); Notices of Proposed Rulemaking; Slips; Falls; Trips in Federal Register 55:13360-13441. It is available electronically only as an abstract. On May 2, 2003 OSHA reopened the rulemaking record on the proposed revisions to Walking and Working Surfaces and Personal Protective Equipment (Fall Protection Systems). It was re-published in its entirety in Federal Register 68:23527-23568 and is available electronically.]

Standard Interpretations - Table of Contents

Back to Top www.osha.gov www.dol.gov

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Occupational Safety & Health Administrations
200 Constitution Avenue, NW
Washington, DC 20210

FOM/EHS #3

Standard Operating Procedure for using stationary pin & pole Scaffolding

Purpose: This standard operating procedure (SOP) applies to all scaffolding **at a height less than 4 times the minimum base dimension**. For example, a unit with a 5′ minimum base dimension could be no more than 20′ high. OSHA 29 CFR 1926 subpart L requires that when scaffolding is being used that a competent person be present at all times. The competent person for this application is anyone who has attended an EHS approved scaffold users course. The competent person must have additional training when using scaffold more than 4 times higher than the minimum base dimension.

Scope: All Dartmouth College Employees who use scaffolding.

Responsibilities:

1. Competent person must inspect and oversee the set up of the scaffolding.

2. Employees must have completed EHS approved training.

3. Supervisors must ensure employees working on scaffold have been trained.

4. EHS will recommend training programs, keep records of trained employees and review program as necessary.

Procedure:

Each time scaffolding is erected, used or dismantled a competent person will ensure that:

- Scaffold components are in good condition
- Scaffold will set on a firm, stable and level base
- Sills and base plates will be solid and substantial (no bits and pieces)
- Scaffolding is plumb and level
- Cross braces are in place
- Top rails (2″x4″) and middle rails (1″x6″), toe boards (2″X4″) are in place and secure
- Planking is scaffold grade or equal

Standard Operating Procedure for using stationary pin & pole Scaffolding

refer to tables in Appendix A to subpart L (see attached)

- Plank overhangs are proper =<10′: 6″-12″, =>10′: 6″-18″ unless secured
- Plank overlap must be >12″ unless secured over frame
- Platforms must be at least 18″ wide & <14″ from adjacent work (building)
- Distance from power lines complies with minimum clearances guidelines (minimum 10′)
- Loading of planks must be a max. of 250 lbs./plank
- Ladders or stairs have been installed for access for height differences >2′
- Determine fall protection for workers above 10′ and the feasibility of fall protection for erectors and dismantlers

_____

Michael Blayney, Ph.D.
Director, EHS

_____

John P. Gratiot
Associate Director, FO&M

Prepared 6/98

FOM/EHS # 3A

Standard Operating Procedures for Genie Lift use

Purpose: To insure that the Genie Lift is used properly to prevent personal injuries and accidents. Written in compliance with ANSI /SIA A92.3-2006.

Scope: This procedure applies to all employees or contractors using a manually propelled elevating aerial platform (Genie, or other similar type of lift which is manually moved into position).

Definitions:

Operator – a qualified person who controls the movement of an aerial platform.
User – the person or entity that has care, control or custody of the aerial platform.
Owner- a person or entity that has possession of the lift by virtue of proof of purchase.

Responsibilities:

Supervisors:

Ensure that the lift is the right piece of equipment for the job
Employees have received training prior to assigning employees work using any lift equipment.

Operator/employee:

Must attend lift training which will cover the use, inspection and hazards associated with the lift.
Must perform required inspections of the lift and surrounding area.
Must verify that the manufacturers' operations and maintenance manual and ANSI A92.3-2006 are located in the weatherproof compartment on the lift.
Manages the activities involving the lift, while the lift is in use.
Must adhere to all scissor lift safety requirements.
Must report any malfunction, defects or damage.
The lift must be taken out of service until repairs are complete.
Documentation of repairs must be maintained for a period of 4years or more.

User:

Ensure the lift is being inspected at predetermined intervals.
Ensure an annual maintenance inspection by a qualified mechanic is being preformed.
Ensure all safety requirements are being followed.
Disallow the use of the lift when work is outside and the weather includes high winds or lightning.
Provide necessary support for the operator.
Require proof of training when allowing contractors access to Dartmouth owned lifts.
Maintain all records on the equipment. Records must be kept on site for a period of 4years. Routine inspections, maintenance and repair records must be on site and accessible for audits and investigations.

EHS:

Provide training compliant with ANSI A92.3-2006 or identify a suitable trainer to train users. Training must be administered by an EHS approved trainer and cover all applicable OSHA and ANSI rules and

regulations as well as manufacturer recommendations.
Assist users in establishing inspection criteria and guidelines.
Periodically audit lift safety programs.

Departments using the lift must:
Ensure that the manually propelled elevating aerial platform is appropriate for the task.
Ensure that each lift operator has been trained and is familiar with all procedures required for the safe use of the lift. The operator must have the ability to recognize hazards and take immediate corrective action.

Contractors:
Must be approved by the Director of Operations at FO&M or through Occupational Safety at EHS. Evidence of properly trained employees is required.

Procedure:

- Make certain the Genie Lift is the best tool for the job.
- Each time a Genie Lift is used the user must inspect it.
- Operating instructions must be kept with the lift.
- Follow ALL operating instructions provided with the lift.
- Properly install outriggers according to instructions with the machine.
  - Adjust leveling jacks.
  - The standard outrigger pattern is an "X".
  - Outriggers can fully support the weight of the lift and occupant(s)or the base of the lift can remain sitting on the floor/ground with the outriggers in place.
  - The ONLY exception is when the lift is positioned next to a wall that extends the FULL HEIGHT of the lift.
  - All leveling jacks must be adjusted (watch bubble level on base).
  - Some models require stabilizer to be attached to all outriggers
  - Attach stabilizer by securing all locking pins and tighten all knobs.
- An additional person on the ground will act as a spotter.
- Spotters responsibilities are to watch: bubble level, the person in the lift for signs of heat, stress, fatigue or dizziness, pedestrian or motor traffic in the area of the lift.
- Personal fall protection is only required if the railings/sides are removable. If sides are removed then the user must tie off to the lift. This should be a fall arrest system to prevent the user from being capable of actually falling over the edge.

Brenda Freeland
Occupational Hygienist, EHS

Frank Roberts
Director of Operations, FO&M

10/1/03
Rev. 2/8/08

FOM/EHS # 3B

Standard Operating Procedures for Scissor Lifts

Purpose: To facilitate compliance with OSHA 29 CFR 1910.66 through 1910.67 and 29 CFR 1926.450 through 29 CFR 1926.454 and ANSI A92.6-1999. All manufacturer recommendations must be followed.

Scope: This procedure applies to all employees, students, guests or contractors using a scissor lift.

Responsibilities

Departments using the lift must:

- Ensure that the scissor lift is appropriate for the task.
- Appoint a competent person who has been trained and is familiar with all procedures required for the safe use of the scissor lift. The competent person must have the ability to recognize hazards and have the authority to take corrective action immediately.

  Competent Person:
  - ✓ Has attended competent person lift training.
  - ✓ Will make certain anyone using the lift has been trained and can use the lift safely.
  - ✓ Will perform required inspections of the lift and surrounding area.
  - ✓ Will report any malfunction, defect or damage and remove the lift from service until repairs are complete.
  - ✓ Must manage the activities involving the lift, while the lift is in use.
- Ensure the lift is being inspected at predetermined intervals.
- Ensure an annual maintenance inspection by a qualified mechanic is being preformed.
- Ensure all safety requirements are being followed.
- Disallow the use of the lift when weather includes high winds or lightning.
- Provide necessary support for the competent person.
- Maintain all records on the equipment. Records must be kept on site for a period of 4years. Routine inspections, maintenance and repair records must be on site and accessible for audits and investigations.

EHS:

- Assist in identifying a suitable trainer to train users and competent persons on scissor lift safety. Training must be administered by an EHS approved trainer and cover all applicable OSHA and ANSI rules and regulations as well as manufacturer recommendations.
- Assist competent person in establishing inspection criteria and guidelines.
- Periodically audit scaffold safety program.

Operators:

- Must attend scissor lift training which will cover the use, inspection and hazards associated with the lift.
- Must verify that the manufacturers' machine manual is located in the weatherproof compartment on the lift.
- Must adhere to all scissor lift safety requirements.
- Must report any malfunction, defects or damage and the lift must be taken out of service until repairs are complete.
- Documentation of repairs must be maintained for a period of 4years or more.

Procedure:

Pre-use requirements:

- Always survey the work area and inspect the equipment prior to use.
- A minimum of 10' must be maintained between the lift basket and any electrical lines or power conductors.
- Operating instructions must be kept with the lift.
- All manufacturers operating instructions must be followed.

Fall Hazards:

- All guardrails must be secured in place and the gate closed.
- Never operate the lift on a slope with the platform elevated.
- Never use ladders, scaffolding or elevated platforms on the lift platform.
- Never sit, stand or climb on guard rail or mid rail.
- Never climb down the elevated assembly with the platform elevated.

Moving the lift:

- Never drive the lift while elevated unless on a firm, level surface. Interiors of buildings with intact floors constitute firm level surfaces. Athletic fields; perimeters of buildings; unpaved, sloping or heaving parking lots are not firm, level surfaces.

Lift controls:

- Lift controls must be tested prior to use.

Basket Loads:

- The manufacturers boom and basket maximum intended loads must not be exceeded at any time.
- Never attach overhanging loads or increase basket size.

When Not in use:

- Platform must be lowered.
- Equipment must be parked on level ground.
- Remove key from equipment and place in a lock box or other secure location.

_____ _____

Brenda Freeland
Occupational Hygienist, EHS

Cynthia Crutchfield
Director of Operations, DCAD

_____

Frank Roberts
Director of Operations, FO&M

Attachment A

Scissor Lift- Periodic Inspection checklist

Lift inspection must be conducted periodically by qualified maintenance personnel.
Example: Pre and post season in the Athletic department.

N/A	adequate	Items to check	needs attention
√	√	**place check mark in appropriate column**	√
		Oil Level	
		Fuel Level	
		Coolant Level	
		Tire Pressure	
		Hydraulic Pressure	
		Leaks	
		Check Operations:	
		Horn	
		Gauges	
		Brakes	
		Lights	
		Steering	
		Back up Alarm	
		PLATFORM	
		Controller	
		Switches	
		Placards & Decals	
		Control Tags	
		Handrails & Chains	
		CHASSIS	
		Batteries	
		Battery Charger	
		Hydraulic Pump/Motor	
		Valves	
		Hydraulic Hoses & Tubing	
		Hydraulic Oil Tank	
		Lift Cylinder	
		Limit Switch	
		Placards & Decals	
		Wheel & Tire Assemblies	
		Steer Cylinder	
		Steer Components	
		Scissor Arms	
		Safety Prop	
		Pivot Pins/Bolts	
		Switches, Ground Control	
		Control Tags	
		Hose & Cable	
		Tire Pressure/condition	

Record any problems, malfunctions, or damage on reverse side of this form. Give as much detail as possible.

Attachment B

Pre-Start Inspection Checklist

Equipment make & model: _____
(for example "UpRight SL 26 Scissor Lift")

- ☐ Review procedures for raising the lift from lowered position to upright position.
- ☐ Visually inspect machine for damage or missing parts.
- ☐ Check tire pressure (40 psi for 26X12.00-12 NHS, RT Models)
- ☐ Test emergency decent valve.
- ☐ Check Hydraulic fluid level with platform fully lowered.
- ☐ Check battery fluid levels. (eye protection required)
- ☐ Verify operators' manual is on lift.
- ☐ Check that all guardrails are in place and secured with fasteners.
- ☐ Ensure lift gate latches securely.
- ☐ Test controls.
- ☐ Assess work area hazards:
  - _ Working Surface is level and sturdy.
  - _ Holes or drop offs are identified.
  - _ Obstructions, debris or bumps are located.
  - _ Power lines are 10' away, minimum.
  - _ Weather conditions are evaluated at platform working height.
  - _ Unauthorized people are kept out of the area, barricade if necessary.
- ☐ Ground person for emergency descent must be knowledgeable of procedures.
- ☐ When finished, lower lift to stowed position.
- ☐ Remove ignition key and place in secure location.
- ☐ Report any problems with the lift to your supervisor and to maintenance.
- ☐ Return Daily Checklist to record keeper.

Since rental equipment will vary, it is the user's responsibility to verify that all manufacturers' pre-start requirements are followed. These requirements are in the manual that must be located on the lift.

Signature: _____

Date of inspection: _____ Time of inspection: _____

FOM/EHS # 3C

Standard Operating Procedures for Aerial Lifts

Purpose: To facilitate compliance with OSHA 29 CFR 1910.67, OSHA 29 CFR 1926.453 and ANSI A92.2 – 1969. All manufacturer recommendations must be followed.

Scope: This procedure applies to all employees, students, guests or contractors using an aerial lift.

Responsibilities

Departments using an owned or rented aerial lift must:

- Ensure that the aerial lift is appropriate for the task.
- Appoint a competent person who has been trained and is familiar with all procedures required for the safe use of the lift. The competent person must have the ability to recognize hazards and have the authority to take corrective action immediately.

  Competent Person:
  - ✓ Has attended competent person aerial lift training.
  - ✓ Will make certain anyone using the lift has been trained and can use the lift safely.
  - ✓ Will perform required inspections of the lift and surrounding area.
  - ✓ Will report any malfunction, defect or damage and remove the lift from service until repairs are complete.
  - ✓ Must manage the activities involving the lift, while the lift is in use.
- Ensure the lift is being inspected at predetermined intervals.
- Ensure an annual maintenance inspection by a qualified mechanic is being preformed.
- Ensure all safety requirements are being followed.
- Disallow the use of the lift when weather includes high winds or lightning.
- Provide necessary support for the competent person.
- Maintain all records on owned equipment for a period of 4 years. Routine inspections, maintenance and repair records must be on site and accessible for audits and investigations.

EHS:

- Assist in identifying a suitable trainer to train users and competent persons for lift safety. Training must be administered by an EHS approved trainer and cover all applicable OSHA and ANSI rules and regulations as well as manufacturer recommendations.
- Assist competent person in establishing inspection criteria and guidelines.
- Periodically audit lift safety programs.

Operators:

- Must attend aerial lift training which will cover the use, inspection and hazards associated with the lift.
- Must verify that the manufacturers' machine manual is located in the weatherproof compartment on the lift.
- Must adhere to all aerial lift safety requirements.
- Must report any malfunction, defects or damage and the lift must be taken out of service until repairs are complete.
- Documentation of repairs must be maintained for a period of 4 years or more.

Procedure:

Pre-use requirements:

- Always survey the work area and inspect the equipment prior to use.
- A minimum of 10' must be maintained between the lift basket and any electrical lines or power conductors.
- Operating instructions must be kept with the lift.
- All manufacturers operating instructions must be followed.

Fall Hazards:

- All guardrails must be secured in place and the gate closed.
- Always wear a fall protection harness and tie off to the platform.
- Never operate the lift on a slope with the platform elevated.
- Never use ladders, scaffolding or elevated platforms on the lift platform.
- Never sit, stand or climb on guard rail or mid rail.
- Never climb down the elevated assembly.

Moving the lift:

- Never move lift with the platform elevated in a working position and people in the basket.
- Inspect and cradle boom, stow outriggers prior to moving.

Lift controls:

- Lift controls must be tested prior to use.
- Never operate lift from lower level controls without permission of employee(s) in the lift except in an emergency.

Basket Loads:

- The manufacturers boom and basket maximum intended loads must not be exceeded at any time.
- Never attach overhanging loads or increase basket size.

When Not in use:

- Platform must be lowered, boom cradled and outriggers stowed.
- Equipment must be parked on level ground.
- Remove key from equipment and place in a lock box or other secure location.

Brenda Freeland	Frank Roberts
Occupational Hygienist, EHS	Director of Operations, FO&M

Attachment A

Aerial Lift- Periodic Inspection checklist

Lift inspection must be conducted periodically by qualified maintenance personnel.
Example: Pre and post season in the Athletic department.

N/A	adequate	Items to check	needs attention
√	√	**place check mark in appropriate column**	√
		Oil Level	
		Fuel Level	
		Coolant Level	
		Tire Pressure	
		Hydraulic Pressure	
		Leaks	
		Check Operations:	
		Horn	
		Gauges	
		Brakes	
		Lights	
		Steering	
		Back up Alarm	
		PLATFORM	
		Controller	
		Switches	
		Placards & Decals	
		Control Tags	
		Handrails & Chains	
		CHASSIS	
		Batteries	
		Battery Charger	
		Hydraulic Pump/Motor	
		Valves	
		Hydraulic Hoses & Tubing	
		Hydraulic Oil Tank	
		Lift Cylinder	
		Limit Switch	
		Placards & Decals	
		Wheel & Tire Assemblies	
		Steer Cylinder	
		Steer Components	
		Scissor Arms	
		Safety Prop	
		Pivot Pins/Bolts	
		Switches, Ground Control	
		Control Tags	
		Hose & Cable	
		Tire Pressure/condition	

Record any proble
ms, malfunctions, or damage on reverse side of this form. Give as much detail as possible.

Date of inspection: _____ Time of inspection: _____

Skiway Qualified Climber and Incapacitated Worker from heights Training
Requires Classroom and field demonstration

Qualified climbers have been trained in fall protection and have demonstrated their ability to climb while maintaining 100% fall protection. Initial training with retraining every 3 years will be required.

Competent rescuer is an individual who has been informed that he/she is the competent rescuer and who has training, knowledge and experience to supervise and monitor the Dartmouth Fall Protection Rescue program, Has successfully complete CPR/First Aid training. Training and experience is ongoing.

Authorized rescuer is anyone who is assigned and trained to perform fall protection rescue. Rescuer must already be a Qualified Climber and has successfully complete CPR/First Aid training. Field Training every 6 months – may be coordinated with ski patrol training.

Before the fall

Identify:

- rescue service – Hanover and Lyme Rescue
- location of areas where fall hazard exists
  - towers
  - top of bull wheel
  - working from work basket
  - roofs
  - interior architectural 'roof' detail in kitchen
  - use of ladders
- anchor points
- fall distances
- equipment needed for rescue
- number of people needed for rescue
- circumstances under which rescue should be attempted
  - Fallen person can not self-rescue
  - Conditions do not present a hazard to rescuer
  - Rescuer has been trained
  - Rescue equipment is appropriate for conditions
  - Rescuer is comfortable with performing rescue
- means of/ procedure for communication
  - notify Safety & Security before starting work when working at heights
  - call Hanover Rescue or 911
  - call/radio coworkers for help
- training, training and more training

After the fall

- Call Hanover Dispatch or 911
- Call/radio for help from co-workers
- *Evaluate employee's condition (bleeding, conscious, alert, etc)
- Assess if it is safe for you to rescue the fallen worker
- verify lock out tag out (LO/TO) has been done
- Devise a rescue plan based on the conditions
- Maintain 100% fall protection during rescue
- Effect transport & transition to EMS

* verify with HFD when this should be done

ATTACHMENT 9A

In the event of a fall from the catwalks or grid:

Take this sheet with you

- Time is critical.
- Note the time of the fall and any injuries.
- Call 911 and get additional help. Do not attempt a rescue alone.
- Call a Manager.
- Make sure power distro panels # 1, 2, and 3 are turned off. Leave on power distro panel #4 (house lights).
- Retrieve rescue gear: Blue Bag & Extension Pole - from Wire Grid vestibule
- Secure yourself to the Lifeline if it is safe or to another anchor point.
- If victim is *conscious*, instruct them to use their Step Straps.
- Locate appropriate Horizontal or Vertical I-Beam or Lifeline to attach Rescue Positioning Device (RPD) to, utilizing the Yellow Tie-Off Adapter or Yellow Span Set if needed.
- After RPD is attached to anchor point, drop rope to floor to Ground Rescuer.
- If victim is *conscious*, lower snap hook on RPD to them and have them attach it to their Front D ring.
- If victim is *unconscious*, use Extension Pole with Snap Hook Adapter to attach snap hook on RPD to victim's Dorsal (back) D ring.
- When RPD attached, instruct Ground Rescuer to pull on the rope and raise victim to your reaching height.
- NEVER cut the victim's lanyard.
- Unhook lanyard snap hook from victim's Dorsal D ring.
- Instruct Ground Rescuer to slowly lower victim to the ground – MAINTAIN UPRIGHT!

- If victim is *unconscious and breathing*, keep holding upright while seated until medical assistance arrives.
- If victim is *unconscious but NOT breathing*, lay them down and begin CPR.
- If victim is *conscious*, do NOT allow them to lie down upon rescue. This is critical because death can still occur after the rescue due to the abrupt re-supply of blood to the heart and brain. It should take 30 to 40 minutes to move the victim from standing, to kneeling, to sitting, to horizontal.

ATTACHMENT 9B

In the event of a fall from the catwalks or grid:

Take this sheet with you

- Time is critical.
- Note the time of the fall and any injuries.
- Call 911 and get additional help. Do not attempt a rescue alone.
- Call a Manager.
- Make sure power distro panels # 1, 2, and 3 are turned off. Leave on power distro panel #4 (house lights).
- Air Rescuer will retrieve rescue gear: Blue Bag & Extension Pole - from Wire Grid vestibule
- Air Rescuer will instruct *conscious* victim to use their Step Straps.
- Air Rescuer will attach Rescue Positioning Device (RPD) to an I-Beam or Lifeline.
- After RPD is attached to anchor point, Air Rescuer will drop rope to floor.
- If victim is *conscious*, Air Rescuer will lower snap hook on RPD to victim.
- If victim is *unconscious*, Air Rescuer will use Extension Pole with Snap Hook Adapter to attach snap hook on RPD to victim's Dorsal (back) D ring.
- When RPD attached, Air Rescuer will instruct you to pull on the rope and raise victim to his/her reaching height.
- NOTE – do not pull up so high that RPD jams.
- NEVER cut the victim's lanyard.
- Air Rescuer will unhook lanyard snap hook from victim's Dorsal D ring.
- Air Rescuer will instruct you to slowly lower victim to the ground – MAINTAIN UPRIGHT!

- If victim is *unconscious and breathing*, keep holding upright while seated until medical assistance arrives.
- If victim is *unconscious but NOT breathing*, lay them down and begin CPR.
- If victim is *conscious*, do NOT allow them to lie down upon rescue. This is critical because death can still occur after the rescue due to the abrupt re-supply of blood to the heart and brain. It should take 30 to 40 minutes to move the victim from standing, to kneeling, to sitting, to horizontal.

ATTACHMENT 9C

In the event of a fall from the catwalks or grid:

POST at top of ladder

- Time is critical.
- Note the time of the fall and any injuries.
- Call 911 and get additional help. Do not attempt a rescue alone.
- Call a Manager.
- Make sure power distro panels # 1, 2, and 3 are turned off. Leave on power distro panel #4 (house lights).
- Retrieve rescue gear: Blue Bag & Extension Pole - from Wire Grid vestibule
- Secure yourself to a safe anchor point.
- If victim is *conscious*, instruct them to use their Step Straps.
- Attach Rescue Positioning Device (RPD) to SRL anchor point victim is suspended from, utilizing the Yellow Span Set if needed.
- After RPD is attached to anchor point, drop rope to floor to Ground Rescuer.
- If victim is *conscious*, lower snap hook on RPD to them and have them attach it to their Front D ring.
- If victim is *unconscious*, and you can safely climb down to them, manually attach the snap hook on the RPD to the victim's Dorsal (back) D ring.
- If victim is *unconscious*, and you can NOT safely climb down to them, use the Extension Pole with Snap Hook Adapter to attach snap hook on RPD to victim's Dorsal (back) D ring.
- When RPD attached, instruct Ground Rescuer to pull on the rope and raise victim to your reaching height.
- NEVER cut the victim's lanyard.
- Unhook lanyard snap hook from victim's Dorsal D ring.
- Instruct Ground Rescuer to slowly lower victim to the ground – MAINTAIN UPRIGHT!

- If victim is *unconscious and breathing*, keep holding upright while seated until medical assistance arrives.
- If victim is *unconscious but NOT breathing*, lay them down and begin CPR.
- If victim is *conscious*, do NOT allow them to lie down upon rescue. This is critical because death can still occur after the rescue due to the abrupt re-supply of blood to the heart and brain. It should take 30 to 40 minutes to move the victim from standing, to kneeling, to sitting, to horizontal.

ATTACHMENT 9D

DRAFT – needs review 5/10/07
Dartmouth College
Hopkins Center Production

Moore Theater Rescue & Fall Protection SOP

In the event of a fall from the catwalks or ladders in the Spaulding Auditorium:

The following must be observed:

- Time is critical. If the fallen person is suspended upright, the chances of losing consciousness and death are increased.
- Note the time of the fall and any injuries that may have occurred with the fall: hitting one's head. This will help the 911 rescuers with appropriate medical care.
- Get help. Do not attempt a rescue alone.
- Do not leave the victim alone if it can be avoided.
- If you are performing the rescue, keep yourself safe. Wear your own harness and properly secure yourself to the lifeline or an anchor point.
- Do NOT allow the victim to lie down upon rescue. This is critical because death can still occur after the rescue due to the abrupt re-supply of blood to the heart and brain. It should take approximately 30 to 40 minutes to move the victim from standing, to kneeling, to sitting, to horizontal.

If you are in the catwalk, safely return to ground and begin the following steps:

1) Stay calm.

2) Call 911. Explain that a person has fallen in a harness and is suspended. Note the time of the fall, they will need to know this. Clearly explain which venue and where rescue personnel should come (which doors are open).

3) Call a Manager. Preferably the Manager on Duty, but any one will do. Pass on the same information as above.

4) Designate ONE person to be in charge of the rescue – the Air Rescuer. This will make communication more efficient. It should be a manager, or the person with the most experience in this space. Do this quickly.

5) Try to keep the person calm. Encourage them to breathe slowly, remind them that help is coming. If they need to be left alone for ANY amount of time, be sure to tell them where you are going and how long you'll be. It is very important that they stay

as relaxed as possible. If they are able to prop their feet anywhere to take some weight, or if they can prop their feet to raise them even slightly, encourage them to do so.

6) Retrieve the Rescue Positioning Device (RPD) and bag and place on the floor below where the person has fallen. These will be kept in a RED box near the Time Clock through the stage left door. Break the seal.

7) Put on your own harness and follow all safety procedures for climbing and personal safety.

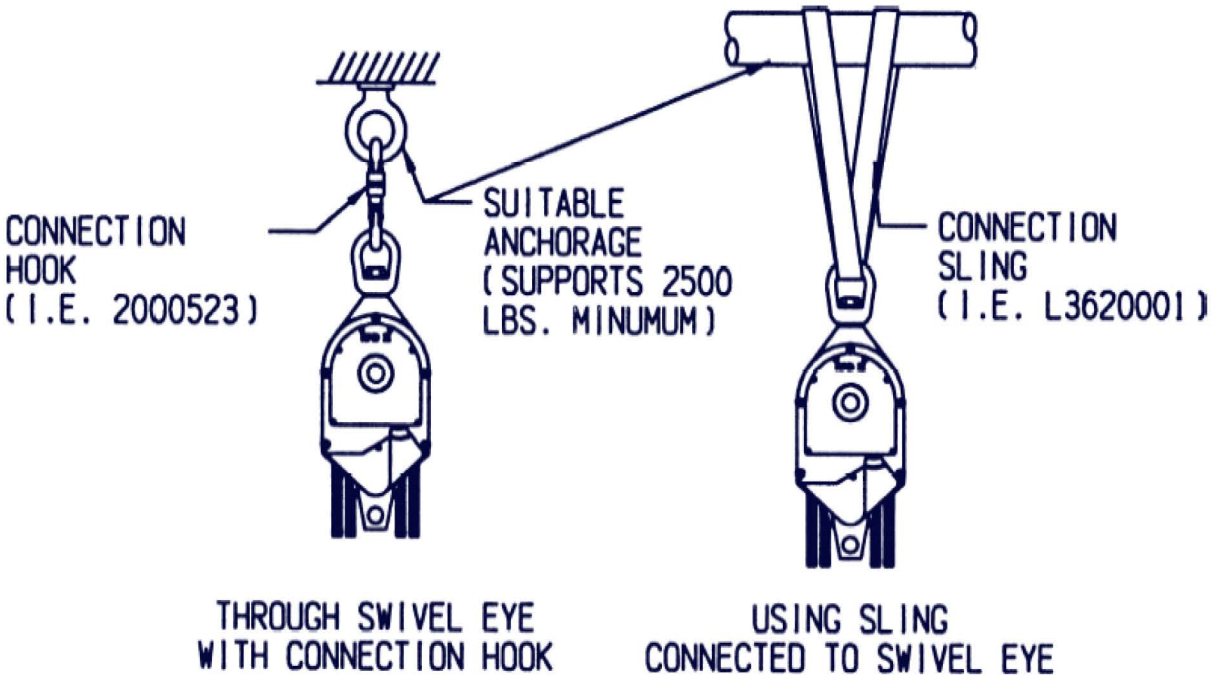
8) Following typical safety procedures for climbing, position your self on the catwalk directly over the fallen person. Be sure to have a drop line with you.

9) When help is available, have them securely attach the RPD, the blue bag, and retrieval pole to the drop line. Pull these up to you on the catwalk.

10) Seek out an acceptable anchor point. An anchor point must be rated to support 3600 lbs; ideally, an I-beam. If there are no anchor points convenient, use the horizontal lifeline.

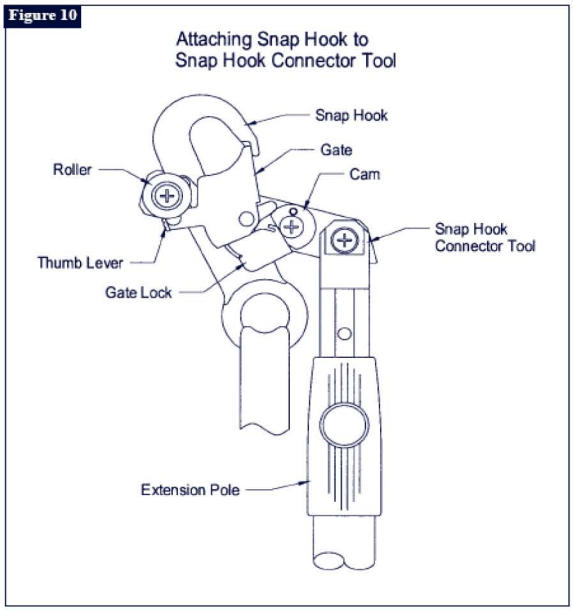
11) If you use an I-Beam, use the yellow Tie-Off Adapter in the blue bag as follows:
    i. Choose an anchor point that is directly over the person so as to minimize swing and that will allow the rope of the Rescue Positioning Device (RPD) to travel without hindrance from any structure, and is free from contact with sharp edges.
    ii. Lay the adapter over the I-beam with the labels facing out.
    iii. Pass the small D ring through the large O ring.
    iv. Slide the O ring up and pull the D ring down to pull out any slack.
    v. The adapter should be tightly wrapped around the beam with the D ring hanging freely.
    vi. Connect the RPD to the D ring using the attached Self-Locking Carabiner.
    vii. Do NOT connect both rings to the RPD (do NOT basket the adaptor).
    viii. Note: The Tie-Off Adapter is rated for 310 lbs with a breaking strength of 5000 lbs.
    ix. If the Tie-Off Adapter seems too long, use the shorter span set creating a ‘basket’ with the ends using a Self-Locking Carabiner. The angle created by the Carabiner and span set ends needs to be 90˚ or smaller.

12) If you are near a ladder, use……
    i. ….

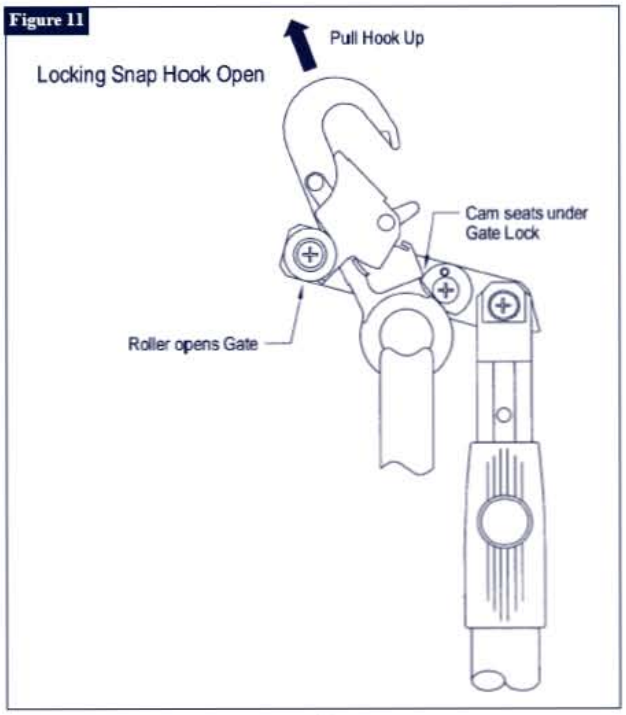


13) If you can't reach the person's harness, get the Extension Pole and Snap Hook Connector Tool from the bag. To attach the tool to the pole, depress the snap buttons on either side of the pole and insert to tool into the open end of the pole. Be sure the tool is locked in to the pole.

14) Attach the RPD Snap Hook to the connector tool using the diagram below:



The thumb lever must be in contact with the roller, and the gate lock must be in contact with the cam. Grasp the hook in one hand and pull up. This will cause the cam to push back the gate lock and the gate to be held open. Continue to pull until the cam rotates and seats under the gate lock.



15) Extend the pole to the correct length and lower the pole toward the D ring on the back of the harness. Hold the Lifeline against the pole as you extend the hook. A small amount of tension helps ensure the snap hook doesn't unintentionally detach and fall.

16) Hook the snap hook through the D ring. To close the snap hook, pull on the lifeline, and twist the extension pole counter-clockwise while pushing up slightly. The snap hook should close over the D ring and release the connector tool.

17) Retract the connector tool and pole and place safely on the catwalk. The RPD is now attached to the victim. Double check all connections at this point.

18) The person on the ground should be ready to pull down on the rope to raise the fallen person sufficiently to unhook them from the lanyard or SRL. The Rope Grip Tool may be used if it assists in this:

19) Pull back on the spring loaded jaw and insert the rope. Pull up or down as needed.

20) The tool will need to be repositioned often and may slow down the rescue.

IMPORTANT: Do NOT wrap the rope around your hands or wrists to gain leverage. Get help if you are not able to raise or lower the rope safely and under control by yourself.

21) Raise the person enough to release the tension on the lanyard or SRL, whichever they were using at the time of the fall:
   i. If they were using a lanyard, you may unclip it from the anchor point. The person is now attached ONLY by the RPD and is ready to be lowered. Be sure the lanyard won't snag anything as you lower them.
   ii. If they were using an SRL (over the ladders), you will need to unclip the snap hook from the D ring on the back of the harness before lowering them. Raise the person enough to reach the D ring on the back of the harness by hand or with the extension pole. Use the extension pole with the connector tool the same way you did to attach the RPD snap hook.

IMPORTANT: Do whichever is faster and causes no additional harm to the person who has fallen. Do not spend too much time thinking about this. Make a decision and act on it.

22) In the lowering mode, an ORANGE indicator flag will show on the face of the unit. A SILVER flag indicates that the unit is locked and can be raised. The person on the catwalks should be in a position to see this.

IMPORTANT: Do not raise the 'load' on the RPD too close to the unit. This will cause the unit to lock and can't be unlocked until the load is removed. This will add a tremendous amount of time to this rescue.

23) Be very cautious of the person's extremities, especially if they are unconscious at this point. Try not to hit their head while raising them to unhook the lanyard. He or she will not be able to assist you or communicate what hurts.

24) Once you have freed the harness, the help on the ground should pull down slightly to release the brake. Allow to the rope to travel upwards, under control, and without catching the brake, until the victim is near the ground.

25) Be sure there are people on the ground to 'catch' the person as their feet touch the ground. You should have a minimum of two.

26) Take note of the time the person is on the ground again. This will help paramedics when they arrive.

27) If you are on the ground, support the person from both sides. Do NOT let them collapse or lie down. Loosen the harness from around the legs. If they are conscious, keep them calm and try to walk them around slowly. If they are not conscious but they are still breathing, try to keep them upright as much as possible. If you can't keep them standing, lowering them to a kneeling position may be easier.

28) If the person is unconscious and unresponsive, check for a carotid pulse using two fingers on the neck for 10 seconds. If there is no pulse and no breathing, you will need to begin CPR immediately:

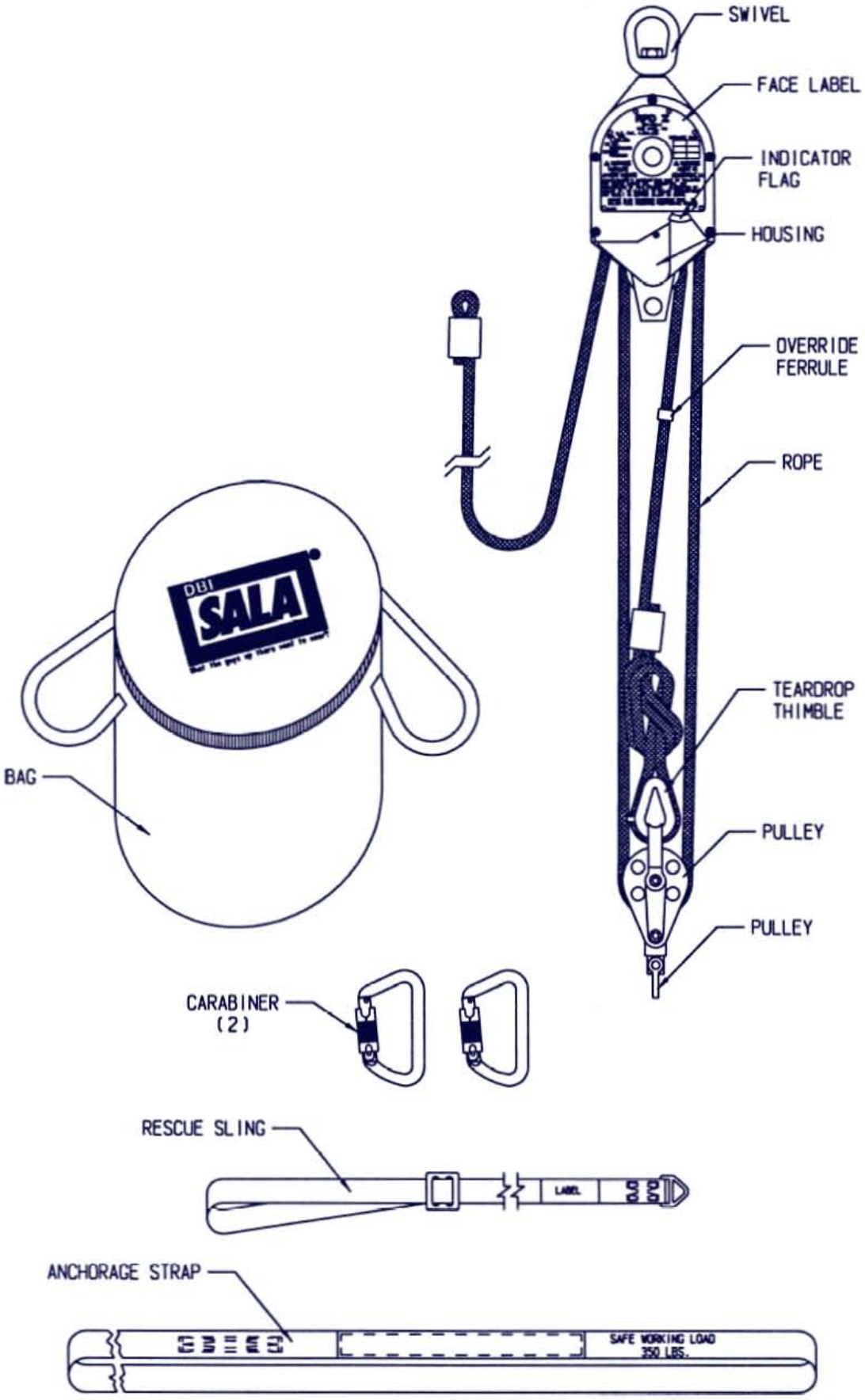
i. Lay them down gently on a hard surface and loosen any obstructive clothing: the harness, belts. Check for *normal* breathing: look & listen. If no signs are present, open the airway and deliver 2 rescue breaths.
ii. Check for signs of circulation. If there is no circulation, begin chest compressions. Do not take more than 10 seconds to determine if this is necessary.
iii. Provide 15 compressions and 2 rescue breaths. Check for circulation after each 4 cycles of 15 & 2.
iv. If there is circulation but no breathing, continue the rescue breaths every 5 seconds.
v. Continue CPR until Emergency Medical Help arrives.
vi. Communicate to the Emergency personnel exactly what has been one, what time CPR was started, and for how long.

IMPORTANT: This text is only meant to be a guide for starting CPR. Please allow the most qualified person present to take over at this point.

29) Allow paramedics to take over as soon as they are present.

30) In the catwalk: disconnect the RPD, the SRL if it was involved, any extensions you may have used, and lower them to the ground using a drop line.

31) All the equipment used will need to be recertified: RPD, rope, SRL, harness, extension, steel or span set, and all hardware. If a specific anchorage point was involved, that point can NOT be used again until it is recertified.


SWIVEL
FACE LABEL
INDICATOR FLAG
HOUSING
OVERRIDE FERRULE
ROPE
TEARDROP THIMBLE
PULLEY
PULLEY
DBI SALA
BAG
CARABINER (2)
RESCUE SLING
LABEL
ANCHORAGE STRAP
SAFE WORKING LOAD 350 LBS.

ATTACHMENT 9E

In the event of a fall from the catwalks:

Take this sheet with you

- Time is critical.
- Note the time of the fall and any injuries.
- Call 911 from the Projection Booth Phone and get additional help. Do not attempt a rescue alone. If someone is on the ground, have them call 911.
- Call a Manager from Projection Booth phone or have the ground person call.
- If there is an obvious electrical shock hazard, make sure stage power breaker panels are turned off.
- Retrieve rescue gear: Rescue Winch & Extension Pole - from track at East end of Bays 2, 3 & 4.
- Secure yourself to the Lifeline if it is safe or to another anchor point.
- If victim is *conscious*, instruct them to use their Step Straps.
- Locate appropriate Horizontal or Vertical I-Beam or Lifeline to attach Rescue Winch to, utilizing the Yellow Tie-Off Adapter or Yellow Span Set if needed.
- If victim is *conscious*, lower snap hook on Rescue Winch to them and have them attach it to their Front D ring.
- If victim is *unconscious*, use Extension Pole with Snap Hook Adapter to attach snap hook on Rescue Winch to victim's Dorsal (back) D ring.
- When Rescue Winch attached, engage winch handle and raise victim to your reaching height.
- NEVER cut the victim's lanyard.
- Unhook lanyard snap hook from victim's Dorsal D ring.
- When free, slowly winch victim to the ground – MAINTAIN UPRIGHT!

- If victim is *unconscious and breathing*, keep holding upright while seated until medical assistance arrives.
- If victim is *unconscious but NOT breathing*, lay them down and begin CPR.
- If victim is *conscious*, do NOT allow them to lie down upon rescue. This is critical because death can still occur after the rescue due to the abrupt re-supply of blood to the heart and brain. It should take 30 to 40 minutes to move the victim from standing, to kneeling, to sitting, to horizontal.

In the event of a fall from the catwalks or grid:

Take this sheet with you

- Time is critical.
- Note the time of the fall and any injuries.
- Call 911 and get additional help. Do not attempt a rescue alone.
- Call a Manager.
- If there is an obvious electrical shock hazard, make sure stage power breaker panels are turned off.
- Air Rescuer will retrieve rescue gear: Rescue Winch & Extension Pole - from East end of Bays 2, 3 & 4.
- Air Rescuer will instruct *conscious* victim to use their Step Straps.
- Air Rescuer will attach Rescue Winch to an I-Beam or Lifeline.
- If victim is *conscious*, Air Rescuer will lower snap hook on Rescue Winch to victim.
- If victim is *unconscious*, Air Rescuer will use Extension Pole with Snap Hook Adapter to attach snap hook on Rescue Winch to victim's Dorsal (back) D ring.
- When Rescue Winch attached, Air Rescuer will engage winch handle and raise victim to his/her reaching height.
- NEVER cut the victim's lanyard.
- Air Rescuer will unhook lanyard snap hook from victim's Dorsal D ring.
- Air Rescuer will slowly winch victim to the ground – MAINTAIN UPRIGHT!

- If victim is *unconscious and breathing*, keep holding upright while seated until medical assistance arrives.
- If victim is *unconscious but NOT breathing*, lay them down and begin CPR.
- If victim is *conscious*, do NOT allow them to lie down upon rescue. This is critical because death can still occur after the rescue due to the abrupt re-supply of blood to the heart and brain. It should take 30 to 40 minutes to move the victim from standing, to kneeling, to sitting, to horizontal.