SUMMARY:

This program covers the minimum requirements for the care and use of portable and fixed ladders to ensure proper and safe usage.

POLICY:

I. LADDER SAFETY PROGRAM

The purpose of the policy is to provide reasonable safety for life, limb and property in regards to ladder usage. The safety of all students, employees and contractors is the foremost objective and requirement of this policy as set forth by the University and as defined by OSHA General Industry Standards 29 CFR 1910.25, 29 CFR 1910.26, 29 CFR 1910.27 and OSHA Construction Standards 29 CFR 1926.1053 Subpart X.

A. Scope

This program covers the minimum requirements for the care and use of portable and fixed ladders in order to ensure safety under normal conditions of usage. The most common type of portable ladders are: wooden, metal, and fiberglass or reinforced plastic ladders. It is not the purpose of this program to specify all the details of construction for all the portable ladders. The scope is to provide policy on the most common types of ladders used at CCU. Detailed portable ladder specification requirements are provided in the American National Standard Institute, ANSI A14.1-1994 and ANSI A14.2-1990.

B. Minimum Ladder Care and Use of Ladders Requirements

To insure student, employee and contractor safety and ladder serviceability, the following precautions on the care of ladders shall be observed:
1. Metal and wooden portable ladders are generally **NOT** allowed to be used at CCU, only fiberglass or reinforced plastic portable ladders are to be used. Fiberglass and reinforced plastic ladders must follow the OSHA and the ANSI Standard A14.5-1992 requirements for ladders. Exceptions will be allowed on a case by case basis through the EHS Department.

2. All portable ladders used at CCU should have a duty rating of a Type 1A rating (300 lb. load rating).

3. Manufacturer’s label (marking) must be intact on each portable ladder and legible. Any ladder not meeting this requirement must be removed from service and either repaired back to manufacturers specification by a competent person or destroyed. Care should be taken to prevent damage to labels.

4. Each portable ladder will have an identification number assigned by the EHS Department. The ID number should be marked on the ladder and a current inventory of ladders kept by the EHS Department and the department who owns the ladder.

5. Portable ladders will have an Inspection Label attached in a manner not to interfere with any manufacturer’s labels. Labels will be replaced monthly by the department who owns the ladder. A supply of Inspection Labels will be available through the EHS Department.

6. All portable ladders shall be visually inspected prior to each use by the employee using the ladder. The employee will record on the inspection label by placing their initials on appropriate date line on the label.

7. At minimum ladder inspections are performed monthly when the inspection labels are replaced.

8. If a ladder is involved in any of the following, immediate inspection is necessary:
   
   a. If a ladder tips over, inspect ladder for side rails dents or bends or excessively dented rungs. Check all rung-to-side-rail connections; check hardware connections and rivets for shear.
   b. If ladders are exposed to oil and grease, equipment should be cleaned of oil, grease or slippery materials. This can easily be done with a solvent or steam cleaning.

9. Ladders with broken or missing steps, rungs or cleats, broken side rails, or other damage shall not be used. The ladder must immediately be taken out of service and repaired to OSHA and manufacturer’s specifications by a competent person. Improvised repairs shall not be made.
10. A ladder that cannot be properly repaired must be destroyed in a manner to prevent reuse.

11. Ladders shall not be used in a horizontal position as platforms, runways or scaffolds. Ladders shall not be used as guys, braces or skids, or for other than their intended purpose.

12. Ladders shall be maintained in good condition at all times, the joint between the steps and side rails shall be tight, all hardware and fittings securely attached, and the movable parts shall operate freely without binding or undue play.

13. Ladders shall not be placed in front of doors opening unless the door is blocked open, locked, and/or guarded.

14. Ladders shall not be placed on boxes, barrels or other unstable bases to obtain additional height.

15. Short ladders shall not be spliced together to provide long sections.

16. Portable ladders should be equipped with nonslip bases when there is a hazard of slipping. Nonslip bases are not intended as a substitute for care in safely placing, lashing or holding a ladder that is being used upon oily, metal, concrete or slippery surface.

17. Ladders which are designed for one person shall not be used by more than one person at a time. Specially designed ladders with larger dimensions and capacity must be used when use by more than one person at the same time is anticipated.

18. When ascending or descending, the climber must face the ladder and maintain at least three points of bodily contact (legs and arms) with the ladder.

C. Safe Use of Ladders on or Around Electrical Equipment

1. Safety-related work practices shall be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts when work is performed near or on equipment or circuits which are or may be energized. The specific safety-related work practices shall be consistent with the nature and extent of the associated electrical hazards. Further information is found in OSHA 29 CFR 1910.333 and the Electrical Related Hazards Program in the SHEA Safety Manual, Section 2.06.00.

2. Metallic or metal type ladders shall NOT be used at CCU around any sources of electrical hazards.

3. Portable ladders shall have nonconductive side rails if they are used where the employee or the ladder could contact exposed energized parts.
D. General Specifications for Extension Ladders

A simple rule for setting up an extension ladder at the proper angle is to place the base a distance from the vertical wall equal to one-fourth (¼) the working length of the ladder. For a twelve (12) foot high wall, the ladder base should be placed three (3) feet from the wall.

The following safety precautions shall be observed in connection with the use of extension ladders:

1. Safety feet and other auxiliary equipment shall be kept in good condition to ensure proper performance.

2. Extension ladders shall be so placed that the side rails have a secure footing. The top rest for portable ladders shall be rigid and shall have ample strength to support any applied load.

3. Portable ladders with reinforced rails shall be used only with the metal reinforcement on the underside.

4. No ladder should be used to gain access to a roof unless the top of the ladder extends at least three (3) feet above the point of support, at eave, gutter or roofline.

5. On two-section extension ladders the minimum overlap for the two (2) sections in use shall be as follows:

<table>
<thead>
<tr>
<th>Size of ladder (feet)</th>
<th>Overlap (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to and including 36</td>
<td>3</td>
</tr>
<tr>
<td>Over 36 up to and including 48</td>
<td>4</td>
</tr>
<tr>
<td>Over 48 up to and including 60</td>
<td>5</td>
</tr>
</tbody>
</table>

Access to heights greater than 36 feet, the use of a mechanical lifting device is highly recommended

6. The bracing on the back legs of step ladders is designed solely for increasing stability and not for climbing.

7. The ladder base section must be placed with a secure footing.
8. The top of the ladder must be placed with the two (2) rails supported unless equipped with a single support attachment.

9. Ladders must not be tied or fastened together to provide longer sections. They must be equipped with the hardware fittings necessary, if the manufacturer endorses extended uses.

10. Metal bearings of locks, wheels, pulleys, etc., shall be frequently lubricated.

11. Ladders with frayed or badly worn rope shall be taken out of service until rope is replaced.

E. General Specifications for Step Ladders

The length of a stepladder is measured by the length of the front rail. To be classified as a standard length ladder, the measured length shall be within plus or minus one-half (½) inch of the specified length.

1. Stepladders shall not exceed 20 feet in length.

2. The bottoms of the four (4) rails must be equipped with insulating non-slip footing material for the safety of the user.

3. The spreader bar (ladder section locking device) should be of good repair and not excessively loose, bent or twisted.

4. The top and the last step (rung) of the stepladder shall not be used as a step or seat.

5. A stepladder shall not be used for a straight ladder, it must have both sections securely footed on the ground with the spreader bar fully extended.

F. Protection of Ladders from Deterioration

1. Metal fixed 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 an atmosphere, individual metal rungs shall have a minimum diameter of one (1) inch or shall be painted or otherwise treated to resist corrosion and rusting.

2. Fiberglass or plastic reinforced portable ladders should be protected from ultraviolet (UV) radiation damage from the sun.

3. When different types of materials are used in the construction of a ladder, the materials used shall be so treated as to have no destructive effect upon the other.
G. Fixed Ladders

1. The minimum design live load shall be a single concentrated load of 300 pounds.

2. The number and position of additional concentrated live load units of 300 pounds each as determined from anticipated usage of the ladder shall be considered in the design.

3. 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.

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

5. All rungs shall have a minimum diameter of three-fourths (¾) inch for metal ladders.

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

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

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

9. Individual-rung ladder shall be so designed that the foot cannot slide off the end.

10. Side rails which might be used as a climbing aid shall be of such cross- sections as to afford adequate gripping surface.

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

12. All splices made by whatever means shall meet design requirements as noted in OSHA 29 CFR 1910.27(a). All splices and connections shall have smooth transition with original members and with no sharp or extensive projections.

13. No welding shall be allowed on any metal ladders.

14. The preferred pitch of fixed ladders shall be considered to come in the range of 75° and 90° with the horizontal.

15. Fixed ladders shall be considered as substandard if they are installed within the substandard pitch range of 60° and 75° 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.

16. This section covers only fixed ladders within the pitch range of 60° and 90° with the horizontal. Ladders having a pitch in excess of 90° with the horizontal are prohibited.

17. Ladders made by fastening cleats across a single rail shall not be used.

H. Clearance and the Climbing Side of Ladders

1. 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°, and 30 inches for a pitch of 90°, with minimum clearances for intermediate pitches varying between these two limits in proportion to the slope.

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.

3. 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 seven (7) inches, except when unavoidable obstructions are encountered.

4. 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 four (4) inches. Grab bars shall not protrude on the climbing side beyond the rungs of the ladder which they serve.

5. Step-Across Distance: The step-across distance from the nearest edge of ladder to the nearest edge of equipment or structure shall not be more than 12 inches or less than 2½ inches.

6. Hatch Cover: Counterweighted hatch covers shall open a minimum of 60° 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.

I. Special Requirements for Cages or Wells

1. Cages or wells (except on chimney ladders) shall be built as shown on the applicable drawings, covered in detail in OSHA 29 CFR 1910.27(d)(1).

2. Cages or wells conforming to the dimensions for OSHA 29 CFR
1910(d)(1)(ii) shall be provided on ladders of 20 feet to a maximum unbroken length of 30 feet.

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

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

5. Cages shall not extend less than 27 inches nor more than 28 inches from the centerline of the rungs of the ladder. Cages 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° around the circumference of the cage; this will give a maximum spacing of approximately 9½ inches, center to center.

6. 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.

J. Special Requirements for Landing Platforms

1. 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.

2. Where a person 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 ½ inches.

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

4. One (1) 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.
K. Ladder Extensions

1. The side rails of through or side-step ladder extensions shall extend 3½ feet above parapets and landings. For through ladder extensions, the rungs shall be omitted from the extension and shall have no less than 18 inches nor more than 24 inches clearance between rails.

2. 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 3½ feet minimum.

L. 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.

M. Ladder Safety Devices

1. 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.

2. All ladder safety devices, such as those that incorporate life belts, friction brakes and sliding attachments, shall meet the design requirements of the ladders which they serve.

II. DEFINITIONS

NOTE: The most pertinent definitions for all ladder types are shown below. For the most comprehensive list refer to ANSI Definitions found in Standards ANSI A14.1-1994, ANSI A14.2-1990, ANSI A14.4-1992, ANSI A14.5-1992; 29 CFR 1910.21, .25, .26 and .27.


Back leg (rear rail): The support members of a self-supporting portable ladder back section. The back legs are joined by rungs, bars, rear braces or other bracing to form the back section.

Cage: An enclosure that is fastened to the side rails of the fixed ladder or to the structure to encircle the climbing space of the ladder for the safety of the person who must climb the ladder. Also referred to as a cage or basket guard.

Cleats: Cleats are ladder crosspieces of a rectangular cross-section placed on edge on which a person may step in while ascending or descending.
Combination ladder: A portable ladder capable of being used either as a stepladder or as a single or extension ladder.

Double front ladder: A self-supporting ladder, non-adjustable in length, consisting of two (2) sections intended for climbing on both sides.

Duty rating: The combination of factors, including but not limited to, ladder type and design features which imply service capability:

Type I, Industrial Stepladder: Designed for heavy duty work, such as utilities, contractors, and industrial use.

Type II, Commercial Stepladder: Designed for medium duty work, such as offices, and light industrial use.

Type III, Household Stepladder: Designed for household use.

Extension ladder: A non-self-supporting portable ladder adjustable in length. It consists of two (2) or more sections traveling in guides or brackets so arranged as to permit length adjustment. Its size is designated by the sum of the lengths of the sections measured along the side rails.

Fastenings: A device to attach a ladder to a structure, building or equipment.

Fiberglass Ladder: A ladder whose side rails are constructed of fiberglass. The crosspieces, called steps, rungs or cleats, may be constructed of metal, reinforced plastics or other suitable materials. This term does not denote the absence of all metallic elements because even in ladders with side rails and crosspieces manufactured of fiberglass, the hardware and fasteners may be metallic.

Fixed ladder: A ladder permanently attached to a structure, building or equipment.

Grab bars: Individual handholds placed adjacent to or as an extension above ladders for the purpose of providing access beyond the limits of the ladder.

Individual-rung ladder: A fixed ladder, each rung of which is individually attached to a structure, building or equipment.

Inside clear width: The distance between the inside flanges of the side rails of a ladder.

Ladder: A ladder is an appliance usually consisting of two (2) side rails joined at regular intervals by crosspieces called steps, rungs or cleats, on which a person may step while ascending or descending.

Ladder foot, shoe or skid-resistant bearing surface: That component of ladder support that is in contact with the lower supporting surface.
Ladder safety device: Any device, other than a cage or well, designed to eliminate or reduce the possibility of accidental falls, and which may incorporate such features as life belts, friction brakes and sliding attachments.

Marking: Any sign, label, stencil or plate of a primary hazard or informational character or both, affixed, painted, burned, stamped or embossed on the ladder surface.

Maximum extended length or maximum working length: The total length of the extension ladder when the middle or intermediate and top or fly sections are fully extended (maintaining the required overlap).

Permanent deformation (set): That deformation remaining in any part of a ladder after all loads have been removed.

Pitch: The included angle between the horizontal and the ladder, measured on the opposite side of the ladder from the climbing side.

Railings: Any one or a combination of those railings constructed in accordance with OSHA 29 CFR 1910.23. A standard railing is a vertical barrier erected along exposed edges of floor openings, wall openings, ramps, platforms and runways to prevent falls of persons.

Rail ladder: A fixed ladder consisting of side rails joined at regular intervals by rungs or cleats and fastened in full length or in sections to a building, structure or equipment.

Reinforced plastic ladder: A ladder whose side rails are constructed of reinforced plastics. The crosspieces, called steps, rungs or cleats, may be constructed of metal, reinforced plastics or other suitable materials. This term does not denote the absence of all metallic elements because even in ladders with side rails and crosspieces manufactured of reinforced plastics, the hardware and fasteners may be metallic.

Rungs: Rungs are ladder crosspieces of circular or oval cross-section on which a person may step while ascending or descending.

Side-step ladder: A ladder from which a person getting off at the top must step sideways from the ladder in order to reach the landing.

Stepladder: A stepladder is a self-supporting portable ladder, nonadjustable in length, having flat steps and a hinged back. Its size is designated by the overall length of the ladder measured along the front edge of the side rails.

Single ladder: A single ladder is a non-self-supporting portable ladder, nonadjustable in length, consisting of but one (1) section. Its size is designated by the overall length of the side rail.
Special-purpose ladder: A portable ladder which represents either a modification or a combination of design or construction features in one of the general-purpose types of ladders previously defined, in order to adapt the ladder to special or specific uses.

Steps: Steps are the flat crosspieces of a ladder on which a person may step while ascending or descending.

Step stool (ladder type): A self-supporting, foldable, portable ladder, nonadjustable in length, 32 inches or less in overall size, with flat steps and without a pail shelf, designed so that the ladder top cap as well as all steps can be climbed on. The side rails may continue above the top cap.

Through ladder: A ladder from which a person getting off at the top must step through the ladder in order to reach the landing.

Visual damage: Damage evident by visual inspection.

Visual inspection: Inspection by the eye without recourse to any optical devices except prescription eyeglasses.

Well: A permanent complete enclosure around a fixed ladder which is attached to the walls of the well. Proper clearances for a well will give the person who must climb the ladder the same protection as a cage.

Working load: The maximum applied load, including the weight of the user, materials and tools, which the ladder is to support for the intended use.