



STAIRWAY AND LADDER SAFETY PROGRAM		
Issue Date: Original	Issued By : CWRU EHS Department	Change Level: Revision
Revision Date: 3/12/12	Author: Bill DePetro	Approved By: Marc Rubin, Director of EHS
Review Date: 4/16/14	Reviewed By: Brandon Kirk	Approved By: Tom Merk, Asst. Director of EHS

STANDARD PRACTICE INSTRUCTION

SUBJECT: Stairways and Ladders Safety Program.

REGULATORY STATUTES: 29 CFR 1910.24 Fixed Industrial Stairs.
1910.25 Portable Wood Ladders.
1910.26 Portable Metal Ladders.
1910.27 Fixed Ladders.

BASIS: Stairways and ladders are a major source of injuries and fatalities. OSHA estimates that there are approximately 25,000 injuries and as many as 35 fatalities each year due to falls from stairways and ladders. Most of these accidents can be prevented if proper safety precautions are initiated. This poses a serious problem for exposed workers and their employer. The OSHA Standards governing Stairs and Ladders establish uniform requirements to ensure that the hazards existing in U.S. workplaces are evaluated, safety procedures implemented to avoid accidents, and that the proper hazard information is transmitted to all affected workers.

GENERAL: Case Western Reserve University(CWRU) will ensure that all potential hazards from use of Stairways and Ladders within our facility(s) are evaluated. This standard practice instruction is intended to address comprehensively the issues of evaluating and identifying potential deficiencies in stairway and ladder use, evaluating the associated potential hazards, communicating information concerning these hazards, and establishing appropriate procedures, and protective measures for employees.

RESPONSIBILITY: The Case Western Reserve University Directors of EHS or their designees are solely responsible for all facets of this program and has full authority to make necessary decisions to ensure success of the program. The Directors of EHS are the sole persons authorized to amend these instructions and are further authorized to halt any operation where there is danger of serious personal injury.

Contents

Case Western Reserve University Stairways and Ladders Safety Program

- 1. Written Program.**
- 2. General Requirements.**
- 3. Company Fixed Industrial Stairs Safety Policy.**
- 4. Fixed Industrial Stairs.**
- 5. Company Wooden Ladders Safety Policy.**
- 6. Portable Wooden Ladders.**
- 7. Company Metal Ladders Safety Policy.**
- 8. Portable Metal Ladders.**
- 9. Fixed Ladders**
- 10. Definitions.**
- 11. Procurement and Disposal of Ladders.**

Case Western Reserve University Stairways and Ladders Safety Program

1. Written program. Case Western Reserve University, Environmental Health and Safety Department, (EHS), will review and evaluate these standard practice instruction on an annual basis, when changes occur to the governing regulatory statutes that prompt revision of this document, or when facility operational changes occur that require a revision of this document. Effective implementation requires a written program for job safety, health, that is endorsed and advocated by the highest level of management within this company and that outlines our goals and plans. This written program will be communicated to all required personnel. It is designed to establish clear goals, and objectives.

2. General requirements. All facilities and equipment owned by this University will be maintained in safe condition and healthful manner. Certain environments within the facility(s) of Case Western Reserve University may harbor conditions that increase the probability that injury may occur, if not prevented by proper maintenance and procedural supervision. Case Western Reserve University shall do all possible, to ensure the safety of our employees. No employee shall knowingly be subjected to a hazardous condition unless protective measures are first implemented. Measures for the control of toxic materials are considered to be outside the scope of this instruction.

3. Company Fixed Industrial Stairs Safety Policy.

3.1 All stairways shall be kept clean, orderly, and free of known hazards.

3.2 Cleaning requirements. To facilitate cleaning, all stairways shall be kept free from protruding nails, splinters, holes, or loose boards or other hindrances that would prevent efficient maintenance.

3.3 Stairways leading to work stations shall be maintained in a clean and, so far as possible, a dry condition. Where wet processes are used, drainage shall be maintained, and false floors, platforms, mats, or other dry standing places will be provided where practicable.

3.4 Stairways leading to emergency exit doors will be kept free of obstacles at all times. Any employee finding an emergency route blocked should immediately report the condition for correction. Exit lights and signs must also be maintained in proper condition at all times, and immediately reported if obscured or not operating properly.

3.5 Illumination. Sufficient illumination will be provided in all areas at all times especially in areas where stairways and ladders are to be use. Employees discovering lighting deficiencies must report them for correction before initiating work projects in the area.

3.6 Ladder maintenance. Supervisors will ensure that ladders under their control are properly maintained in good service condition and are kept in a clean and orderly manner.

4. Fixed Industrial Stairs

Fixed stairs shall be provided for access from one structure level to another where operations necessitate regular travel between levels, and for access to operating platforms of any equipment routinely requiring attention during operations. Fixed stairs shall also be provided where access to different elevations is required daily or at each shift for such purposes as gauging, inspection, regular maintenance, etc., where work in the area expose employees to acids, caustics, gases, or other harmful substances, tools or equipment must routinely be carried by hand.

4.1 Spiral stairways. Spiral stairways shall not be constructed or used except for special limited usage or for secondary access situations where it is not practical to provide a conventional stairway.

4.2 Stair strength. Fixed stairways shall be designed and constructed to carry a load of five times the normal live load anticipated but never of less strength than to carry safely a moving concentrated load of 1,000 pounds.

4.3 Stair width. Fixed stairways shall have a minimum width of 22 inches.

4.4 Angle of stairway rise. Fixed stairs shall be installed at angles to the horizontal of between 30 and 50 degrees. Any uniform combination of rise/tread dimensions may be used that will result in a stairway at an angle to the horizontal within the permissible range. Table D-1 (29 CFR 1910.24) gives rise/tread dimensions that will produce a stairway within the permissible range, and states the angle to the horizontal produced by each combination. However, the rise/tread combinations are not limited to those given in Table D-1 (29 CFR 1910.24) .

Table D-1 (29 CFR 1910.24)

Angle to horizontal	Rise (in inches)	Tread run (in inches)
30 35'	6 1/2	11
32 08'	6 3/4	10 3/4
33 41'	7	10 1/2
35 16'	7 1/4	10 1/4
36 52'	7 1/2	10
38 29'	7 3/4	9 3/4
40 08'	8	9 1/2
41 44'	8 1/4	9 1/4
43 22'	8 1/2	9
45 00'	8 3/4	8 3/4
46 38'	9	8 1/2
48 16'	9 1/4	8 1/4
49 54'	9 1/2	8

4.5 Stair treads. All stair treads must be reasonably slip-resistant and the nosings shall be of nonslip finish. Welded bar grating treads without nosings are acceptable as long as the leading edge of the stair can be readily identified by personnel descending the stairway and provided the tread is serrated or is of definite nonslip design. Rise height and tread width should be uniform throughout any flight of stairs including any foundation structure used as one or more treads of the stairs.

4.6 Stairway platforms. Stairway platforms shall be no less than the width of a stairway and a minimum of 30 inches in length measured in the direction of travel.

4.7 Railings and handrails. Standard railings must be provided on the open sides of all exposed stairways and stair platforms. Handrails must be provided on at least one side of closed stairways preferably on the right side descending. Stair railings and handrails should be installed in accordance with the provisions of 29 CFR 1910.23.

4.8 Vertical clearance. Vertical clearance above any stair tread to an overhead obstruction shall be at least 7 feet measured from the leading edge of the tread.

5. Company Wooden Ladders Safety Policy

To insure safety and serviceability the following precautions concerning the care and use of wooden ladders shall be observed:

5.1 Care, wooden ladders. The following safety precautions shall be observed in connection with the care of wooden ladders:

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

5.1.2 Metal bearings of locks, wheels, pulleys, etc., must be frequently lubricated.

5.1.3 Frayed or badly worn rope must be replaced.

5.1.4 Safety feet and other auxiliary equipment must be kept in good condition to insure proper performance.

5.1.5 Ladders must be inspected frequently and those which have developed defects shall be withdrawn from service for repair or destruction and tagged or marked as "Dangerous, Do Not Use."

5.1.6 Rungs should be kept free of grease and oil.

5.2 Use. The following safety precautions shall be observed in connection with the use of wooden ladders:

5.2.1 Portable rung and cleat ladders shall, where possible, be used at such a pitch that the horizontal distance from the top support to the foot of the ladder is one-quarter of the working length of the ladder (the length along the ladder between the foot and the top support). The ladder must be so placed as to prevent slipping, or it must be lashed, or held in position. Ladders must not be used in a horizontal position as platforms, runways, or scaffolds.

5.2.2 Ladders for which dimensions are specified should not be used by more than one man at a time nor with ladder jacks and scaffold planks where use by more than one man is anticipated. In such cases, specially designed ladders with larger dimensions of the parts should be procured.

5.2.3 Portable ladders shall be so placed that the side rails have a secure footing. The top rest for portable rung and cleat ladders must be reasonably rigid and must have ample strength to support the applied load.

5.2.4 Ladders shall not be placed in front of doors opening toward the ladder unless the door is blocked, locked, or guarded.

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

5.2.6 Ladders with broken or missing steps, rungs, or cleats, broken side rails, or other faulty equipment must not be used; improvised repairs must not be made.

5.2.7 Short ladders cannot be spliced together to provide long sections.

5.2.8 Ladders made by fastening cleats across a single rail must not be used.

5.2.9 Ladders must not be used as guys, braces, or skids, or for other than their intended purposes.

5.2.10 Tops of the ordinary types of stepladders must not be used as steps.

5.2.11 On two-section extension ladders the minimum overlap for the two sections in use shall be as follows:

Size of ladder (feet)	Overlap (feet)
Up to and including 36	3
Over 36 up to and including 48	4
Over 48 up to and including 60	5

5.2.12 Portable rung ladders with reinforced rails shall only be used with the metal reinforcement on the under side.

5.2.13 No ladder should be used to gain access to a roof unless the top of the ladder extends at least 3 feet above the point of support, at eaves, gutter, or roofline.

5.2.14 Middle and top sections of sectional or window cleaner's ladders should not be used for bottom section unless they are equipped with safety shoes.

5.2.15 All portable rung ladders must 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 surfaces.

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

6. Portable Wooden Ladders

In order to insure safety under normal conditions of usage, Case Western Reserve University will purchase and maintain portable wood ladders that conform with the following minimum requirements for the construction, care, and use of common types of portable wood ladders. Other types of special ladders, fruitpicker's ladders, combination step and extension ladders, stockroom step ladders, aisle-way step ladders, shelf ladders, and library ladders are not specifically addressed by this instruction.

6.1 General requirements.

6.1.1 Materials. All wood parts will be maintained free from sharp edges and splinters; sound and free by accepted visual inspection from shake, wane, compression failures, decay, or other irregularities. Low density wood shall not be used.

6.1.2 Step spacing. A uniform step spacing must be employed that is not more than 12 inches. Steps must be parallel and level when the ladder is in position for use.

6.1.3 Side rail width. The minimum width between side rails at the top, inside to inside, shall be not less than 11 1/2 inches. From top to bottom, the side rails must spread at least 1 inch for each foot of length of stepladder.

6.1.4 Metal spreaders/locking devices. A metal spreader or locking device of sufficient size and strength to securely hold the front and back sections in open positions must be properly maintained for each stepladder. The spreader shall have all sharp points covered or removed to protect the user. For Type III ladders, the pail shelf and spreader may be combined in one unit (the "shelf-lock ladder").

6.2 Portable stepladders. Stepladders longer than 20 feet must not be used. Stepladders of one of the following types specified may be used:

6.2.1 Type I--Industrial stepladder, 3 to 20 feet for heavy duty use (e.g. utilities, contractors, and industrial use).

6.2.2 Type II--Commercial stepladder, 3 to 12 feet for medium duty use (e.g. painting offices and other light industrial use).

6.2.3 Type III--Household stepladder, 3 to 6 feet for light duty (e.g. supply a light equipment access).

6.3 Portable rung ladders.

6.3.1 Single ladder. Single ladders longer than 30 feet will not be used at Case Western Reserve University.

6.3.2 Two-section ladder. Two-section extension ladders longer than 60 feet will not be used. Before purchase all ladders of this type will be determined to consist of two sections, one to fit within the side rails of the other, and arranged in such a manner that the upper section can be raised and lowered.

6.3.3 Sectional ladder. Assembled combinations of sectional ladders longer than lengths specified in this subdivision shall not be used.

6.3.4 Trestle and extension trestle ladder. Trestle ladders, or extension sections or base sections of extension trestle ladders longer than 20 feet will not be used.

6.4 Special-purpose ladders.

6.4.1 Painter's stepladder. Painter's stepladders longer than 12 feet will not be used.

6.4.2 Mason's ladder. A mason's ladder is defined as a special type of single ladder intended for use in heavy construction work. Mason's ladders longer than 40 feet will not be used.

6.4.3 Trolley and side-rolling ladders. Trolley ladders and side-rolling ladders longer than 20 feet will not be used.

7. Company Metal Ladders Safety Policy.

To insure safety and serviceability the following precautions concerning the care and use of metal ladders shall be observed:

7.1 Care, metal ladders. The following safety precautions shall be observed in connection with the care of metal ladders:

7.1.1 Ladders must be maintained in good usable condition at all times.

7.1.2 If a ladder is involved in any of the following, immediate inspection is necessary:

7.1.2.1 If a ladder tips over, inspect the ladder for side rails dents or bends, or excessively dented rungs; check all rung-to-side-rail connections; check hardware connections; check rivets for shear.

7.1.2.2 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.

7.1.3 Ladders with defects are to be marked and taken out of service until repaired by either the maintenance department or the manufacturer.

7.2 Use, metal ladders. The following safety precautions shall be observed in connection with the use care of metal ladders:

7.2.1 A simple rule for setting up a ladder at the proper angle is to place the base a distance from the vertical wall equal to one-fourth the working length of the ladder.

7.2.2 Portable ladders are designed as a one-man working ladder based on a 200-pound load.

7.2.3 The ladder base section must be placed with a secure footing.

7.2.4 The top of the ladder must be placed with the two rails supported, unless equipped with a single support attachment.

7.2.5 When ascending or descending, the climber must face the ladder.

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

7.2.7 Ladders should not be used as a brace, skid, guy or gin pole, gangway, or for other uses other than those for which they are intended, unless specifically recommended for such use by the manufacturer.

7.2.8 See 29 CFR 1910.333 for work practices to be used when work is performed on or near electric circuits.

8. Portable Metal Ladders

8.1 General Requirements. Case Western Reserve University will purchase only ladders without structural defects or potential accident hazards such as sharp edges, burrs, etc.

8.1.2 Rung spacing. The spacing of rungs or steps must be on 12 inch centers.

8.1.3 Rungs and steps must be corrugated, knurled, dimpled, coated with skid-resistant material, or otherwise treated to minimize the possibility of slipping.

8.2 Straight and extension ladders.

8.2.1 The minimum width between side rails must be 12 inches.

8.2.2 The length of single ladders or individual sections of ladders will not exceed 30 feet.

8.2.3 Two-section ladders will not exceed 48 feet in length and over two-section ladders shall not exceed 60 feet in length.

8.2.4 Based on the nominal length of the ladder, each section of a multisection ladder shall overlap the adjacent section by at least the number of feet stated in the following:

Normal length of ladder (feet)	Overlap (feet)
Up to and including 36	3
Over 36, up to and including 48	4
Over 48, up to 60	5

8.2.5 Extension ladders shall be equipped with positive stops that will insure the overlap specified in the table above.

8.3 Step ladders.

8.3.1 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 must be within plus or minus one-half inch of the specified length. Stepladders shall not exceed 20 feet in length.

8.3.2 The bottoms of the four rails will be purchased with insulating nonslip material for the safety of the user.

8.3.3 A metal spreader or locking device of sufficient size and strength to securely hold the front and back sections in the open position shall be a component of each stepladder. The spreader shall have all sharp points or edges covered or removed to protect the user.

8.4 Trestles and extension trestle ladders.

8.4.1 Trestle ladders or extension sections or base sections of extension trestle ladders shall be not more than 20 feet in length.

8.5 Platform ladders.

8.5.1 The length of a platform ladder shall not exceed 20 feet. The length of a platform ladder will be measured along the front rail from the floor to the platform.

9. Fixed Ladders

Where fixed ladders are used within our facility the following design requirements will be adhered to:

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

9.2 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.

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

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

9.5 Rungs and cleats.

9.5.1 All rungs shall have a minimum diameter of three-fourths inch for metal ladders, and a minimum diameter of 1 1/8 inches for wood ladders.

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

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

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

9.5.5 The rungs of an individual-rung ladder must be so designed to keep the foot from sliding off the end.

9.6 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.

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

9.8 Splices.

All splices made by whatever means shall meet design requirements as noted in paragraph (a) of this section. All splices and connections must have smooth transition with original members and with no sharp or extensive projections.

9.9 Electrolytic action.

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

9.10 Welding.

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

9.12 Protection from deterioration.

9.12.1 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 must have a minimum diameter of 1 inch or must be painted or otherwise treated to resist corrosion and rusting.

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

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

9.13 Clearance.

9.13.1 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 must be 36 inches for a pitch of 76 degrees, and 30 inches for a pitch of 90 degrees, with minimum clearances for intermediate pitches varying between these two limits in proportion to the slope.

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

9.13.3 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 7 inches, except when unavoidable obstructions are encountered, minimum clearances as shown in 29 CFR 1910.27, figure D-3 shall be provided.

9.13.4 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 4 inches. Grab bars must not protrude on the climbing side beyond the rungs of the ladder which they serve.

9.13.5 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 (29 CFR 1910.27, fig. D-4).

9.13.6 Hatch cover. Counterweighted hatch covers must 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 will 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 29 CFR 1910.27, figure D-5. The relationship of a fixed ladder to an

acceptable counterweighted hatch cover is illustrated in 29 CFR 1910.27, figure D-6.

9.14 Special requirements.

9.14.1 Cages or wells.

9.14.1.1 Cages or wells (except on chimney ladders) shall be built, as shown on the applicable drawings, covered in detail in 29 CFR 1910.27, figures D-7, D-8, and D-9, or of equivalent construction.

9.14.1.2 Cages or wells conforming to the dimensions shown in 29 CFR 1910.27, figures D-7, D-8, and D-9 must be provided on ladders of more than 20 feet to a maximum unbroken length of 30 feet.

9.14.1.3 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.

9.14.1.4 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.

9.14.1.5 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.

10. Definitions

10.1 Fixed industrial stair terms.

- (1) Handrail. A single bar or pipe supported on brackets from a wall or partition to provide a continuous handhold for persons using a stair.
- (2) Nose, nosing. That portion of a tread projecting beyond the face of the riser immediately below.
- (3) Open riser. The air space between the treads of stairways without upright members (risers).
- (4) Platform. An extended step or landing breaking a continuous run of stairs.
 - (5) Railing. A vertical barrier erected along exposed sides of stairways and platforms to prevent falls of persons. The top member of railing usually serves as a handrail.
 - (6) Rise. The vertical distance from the top of a tread to the top of the next higher tread.
 - (7) Riser. The upright member of a step situated at the back of a lower tread and near the leading edge of the next higher tread.
 - (8) Stairs, stairway. A series of steps leading from one level or floor to another, or leading to platforms, pits, boiler rooms, crossovers, or around machinery, tanks, and other equipment that are used more or less continuously or routinely by employees, or only occasionally by specific individuals. A series of steps and landings having three or more risers constitutes stairs or stairway.
- (9) Tread. The horizontal member of a step.
 - (10) Tread run. The horizontal distance from the leading edge of a tread to the leading edge of an adjacent tread.
 - (11) Tread width. The horizontal distance from front to back of tread including nosing when used.

10.2 Portable wood ladders terms.

(1) Ladders. A ladder is an appliance usually consisting of two side rails joined at regular intervals by cross-pieces called steps, rungs, or cleats, on which a person may step in ascending or descending.

(2) 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.

(3) Single ladder. A single ladder is a non-self-supporting portable ladder, nonadjustable in length, consisting of but one section. Its size is designated by the overall length of the side rail.

(4) Extension ladder. An extension ladder is a non-self-supporting portable ladder adjustable in length. It consists of two 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.

(5) Sectional ladder. A sectional ladder is a non-self-supporting portable ladder, nonadjustable in length, consisting of two or more sections of ladder so constructed that the sections may be combined to function as a single ladder. Its size is designated by the overall length of the assembled sections.

(6) Trestle ladder. A trestle ladder is a self-supporting portable ladder, nonadjustable in length, consisting of two sections hinged at the top to form equal angles with the base. The size is designated by the length of the side rails measured along the front edge.

(7) Extension trestle ladder. An extension trestle ladder is a self-supporting portable ladder, adjustable in length, consisting of a trestle ladder base and a vertically adjustable single ladder, with suitable means for locking the ladders together. The size is designated by the length of the trestle ladder base.

(8) Special-purpose ladder. A special-purpose ladder is 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.

(9) Trolley ladder. A trolley ladder is a semifixed ladder, nonadjustable in length, supported by attachments to an overhead track, the plane of the ladder being at right angles to the plane of motion.

(10) Side-rolling ladder. A side-rolling ladder is a semifixed ladder, nonadjustable in length, supported by attachments to a guide rail, which is generally fastened to shelving, the plane of the ladder being also its plane of motion.

(11) Wood characteristics. Wood characteristics are distinguishing features which by their extent and number determine the quality of a piece of wood.

(12) Wood irregularities. Wood irregularities are natural characteristics in or on wood that may lower its durability, strength, or utility.

(13) Cross grain. Cross grain (slope of grain) is a deviation of the fiber direction from a line parallel to the sides of the piece.

(14) Knot. A knot is a branch or limb, imbedded in the tree and cut through in the process of lumber manufacture, classified according to size, quality, and occurrence. The size of the knot is determined as the average diameter on the surface of the piece.

(15) Pitch and bark pockets. A pitch pocket is an opening extending parallel to the annual growth rings containing, or that has contained, pitch, either solid or liquid. A bark pocket is an opening between annual growth rings that contains bark.

(16) Shake. A shake is a separation along the grain, most of which occurs between the rings of annual growth.

(17) Check. A check is a lengthwise separation of the wood, most of which occurs across the rings of annual growth.

(18) Wane. Wane is bark, or the lack of wood from any cause, on the corner of a piece.

(19) Decay. Decay is disintegration of wood substance due to action of wood-destroying fungi. It is also known as dote and rot.

(20) Compression failure. A compression failure is a deformation (buckling) of the fibers due to excessive compression along the grain.

(21) Compression wood. Compression wood is an aberrant (abnormal) and highly variable type of wood structure occurring in softwood species. The wood commonly has density somewhat higher than does normal wood, but somewhat lower stiffness and tensile strength for its weight in addition to high longitudinal shrinkage.

(22) Low density. Low-density wood is that which is exceptionally light in weight and usually deficient in strength properties for the species.

10.3 Portable metal ladder terms.

(1) Ladder. A ladder is an appliance usually consisting of two side rails joined at regular intervals by cross-pieces called steps, rungs, or cleats, on which a person may step in ascending or descending.

(2) Step ladder. A step ladder 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.

(3) Single ladder. A single ladder is a non-self-supporting portable ladder, nonadjustable in length, consisting of but one section. Its size is designated by the overall length of the side rail.

(4) Extension ladder. An extension ladder is a non-self-supporting portable ladder adjustable in length. It consists of two 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.

(5) Platform ladder. A self-supporting ladder of fixed size with a platform provided at the working level. The size is determined by the distance along the front rail from the platform to the base of the ladder.

(6) Sectional ladder. A sectional ladder is a non-self-supporting portable ladder, non-adjustable in length, consisting of two or more sections so constructed that the sections may be combined to function as a single ladder. Its size is designated by the overall length of the assembled sections.

(7) Trestle ladder. A trestle ladder is a self-supporting portable ladder, non-adjustable in length, consisting of two sections, hinged at the top to form equal angles with the base. The size is designated by the length of the side rails measured along the front edge.

(8) Extension trestle ladder. An extension trestle ladder is a self-supporting portable ladder, adjustable in length, consisting of a trestle ladder base and a vertically adjustable single ladder, with suitable means for locking the ladders together. The size is designated by the length of the trestle ladder base.

(9) Special-purpose ladder. A special-purpose ladder is 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.

10.4 Fixed ladder terms.

(1) Ladder. A ladder is an appliance usually consisting of two side rails joined at regular intervals by cross-pieces called steps, rungs, or cleats, on which a person may step in ascending or descending.

(2) Fixed ladder. A fixed ladder is a ladder permanently attached to a structure, building, or equipment.

(3) Individual-rung ladder. An individual-rung ladder is a fixed ladder each rung of which is individually attached to a structure, building, or equipment.

(4) Rail ladder. A rail ladder is 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.

(5) Railings. A railing is any one or a combination of those railings constructed in accordance with 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.

(6) Pitch. Pitch is the included angle between the horizontal and the ladder, measured on the opposite side of the ladder from the climbing side.

(7) Fastenings. A fastening is a device to attach a ladder to a structure, building, or equipment.

(8) Rungs. Rungs are ladder cross-pieces of circular or oval cross-section on which a person may step in ascending or descending.

(9) Cleats. Cleats are ladder cross-pieces of rectangular cross-section placed on edge on which a person may step in ascending or descending.

(10) Steps. Steps are the flat cross-pieces of a ladder on which a person may step in ascending or descending.

(11) Cage. A cage is a guard that may be referred to as a cage or basket guard which is 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.

(12) Well. A well is 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.

(13) Ladder safety device. A ladder safety device is 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.

(14) Grab bars. Grab bars are individual handholds placed adjacent to or as an extension above ladders for the purpose of providing access beyond the limits of the ladder.

(15) Through ladder. A through ladder is one from which a man getting off at the top must step through the ladder in order to reach the landing.

(16) Side-step ladder. A side-step ladder is one from which a man getting off at the top must step sideways from the ladder in order to reach the landing.

11. Procurement and Disposal of Ladders

All procurement and disposal of ladders will be performed through or with the knowledge of Case Western Reserve University Department of Environmental Health & Safety. Ladders will be destroyed beyond use prior to disposal to prevent further use by anyone. Procurement of ladders will be accomplished based on the type of work anticipated to be performed and in accordance with this Standard Practice Instruction and applicable OSHA Regulations.