

Section:	Occupational Health and Safety Management System	Date of Issue:	2013.11.22
		Issued By:	Environment, Health & Safety
Part:	Hazard Identification and Assessment Hazard Control	Revision #:	1
		Revision Date:	2014.03.20
Pages:	13	Revised By:	JF

## Table of Contents

1. Purpose .....	2
2. Scope .....	2
3. Responsibilities .....	2
4. Training.....	3
5. Hazard Assessment.....	3
6. Restrictions and Prohibitions .....	3
7. Fixed Ladders .....	4
8. Portable Ladders.....	4
9. Safety Precautions.....	6
10. Maintenance .....	7
11. Securing and Positioning.....	7
12. Fall Protection .....	8
13. Definitions .....	9
14. Related Documents.....	11
15. References and Additional Resources .....	13

## 1. Purpose

This program has been developed with reference to Part 8 of the Alberta Occupational Health and Safety (OH&S) Code to establish guidelines to help eliminate incidents resulting from ladder use.

Ladders are practical and easy to use pieces of equipment with the ability to provide access to higher areas/levels where work is required. If used incorrectly or poorly maintained, ladders can also present hazards.

## 2. Scope

The Ladder Safety Program applies to all operational activities and persons responsible for the use, maintenance, and/or handling of any fixed or portable ladder under the auspices of, or on property belonging to, the University of Calgary.

## 3. Responsibilities

### Supervisors are responsible for:

- being familiar with the Ladder Safety Program;
- ensuring workers are familiar with and follow this Program;
- completing the Hazard Assessment and Control Form (HACF) prior to any work being undertaken;
- reviewing and updating the HACF post-incident or when changes to the operation are implemented (e.g. new equipment or process introduced);
- ensuring workers complete a Field Level Hazard Assessment (FLHA) prior to work activities, as required;
- maintaining training records in personnel files;
- ensuring workers inspect ladders before each use and report any defects;
- ensuring workers tag-out defective ladders, and ladders are removed from service immediately and repaired or replaced as required;
- maintaining an inventory of all equipment;
- keeping written records of regular ladder inspections; and
- ensuring that all employees who may be required to use a ladder have been trained and are competent to use fixed and/or portable ladders.

### Workers are responsible for:

- being familiar with and following this Program;
- participating in required training, reviewing the HACF, and reviewing the Ladder Safety Program;
- demonstrating competency;
- inspecting ladders before use and reporting any defects or hazards;
- tagging-out and removing defective ladders from service;
- following ladder use requirements and safe work practices;
- completing a FLHA prior to work activities, as required;
- ensuring that ladders are properly stored between and after each use; and
- following all health and safety standards, rules and regulations, and reporting all hazardous conditions to their Supervisor immediately.

## **Contractors are responsible for:**

- following the University's Ladder Safety Program where the requirements exceed a Contractor's Program and/or the OH&S Code;
- honouring the University's contractual requirements;
- employing competent and qualified workers;
- having documentation available to indicate that appropriate training has been received; and
- providing appropriate equipment to complete work activities. If a situation arises where the Contractor cannot provide appropriate equipment (with the exception of fixed ladders), written approval must be obtained from Risk Management prior to the use of any equipment owned by the University.

## **Environment, Health and Safety is responsible for:**

- periodically auditing recordkeeping;
- providing support to supervisors and workers; and
- reviewing and updating the Ladder Safety Program as necessary.

## **4. Training**

Training on the use of ladders is essential to ensure safety as well as to allow for consideration of the safest possible means of access or egress when ladders are used to gain access to higher areas/levels where work is required.

The University of Calgary Ladder Safety online training course is available to University personnel, and is required to be completed prior to working with ladders and at any time refresher training may be necessary. Contractors are responsible for providing appropriate training to their employees.

## **5. Hazard Assessment**

The HACF should be completed by the supervisor with participation from workers as necessary prior to any work activities. All workers should review the completed HACF and complete a FLHA (if required) prior to any work activities.

Common hazards associated with ladder use include:

- slippery surfaces;
- improper set up and unsafe worker positioning;
- overhead/underground power lines;
- traffic (e.g. vehicle and pedestrian);
- environmental conditions;
- equipment in poor working condition; and
- electrical hazards.

## **6. Restrictions and Prohibitions**

### **Access/Egress**

A ladder should not be used if another safe and recognizable option exists for entering or leaving an elevated or sub-level area such as stairs, ramps, etc.

### **Single Rail Ladders**

Single rail ladders are not allowed to be built or used at the University of Calgary as they can be unstable and unsafe for use.

## **Applied Finishes**

Only transparent, non-conductive finishes can be used on a ladder. A ladder that is painted can prevent the worker from properly assessing the condition of a ladder, and some applied finishes may allow for the transfer of electricity. Ladders should be kept free of waste products that can accumulate on a ladder such as drywall mud, cement, paint, adhesives, etc. as these can hide potentially unsafe conditions and affect operating mechanisms.

## **Electrical Conductivity**

Metal ladders and ladders with metal components must not be used during the servicing of energized or potentially energized electrical equipment. Ladders intended for use around energized equipment are to be kept clean and free of any conductive materials such as dirt, dust, grease, etc. as these materials can potentially create electric current pathways.

## **7. Fixed Ladders**

### **Fabrication and Installation**

Fixed ladders are a permanent part of a building or structure and must be fabricated and installed in accordance with Process Industry Practices (PIP) Standard STF05501 dimensional and strength requirements.

Steel is typically used in fixed ladder fabrication; however, aluminium or fibreglass may be used if the design is certified by a professional engineer to be as strong as or stronger than the PIP requirements.

### **Engineered Controls**

Where access to a fixed ladder is through a floor opening or platform, a guardrail and toe board is to be installed on all exposed sides, except at the entrance to the opening. At the entrance to the opening a self-closing double bar safety gate, or equally effective device, must be installed to prevent personnel from walking directly into the opening and falling.

### **Scaffold Systems**

Fixed ladders on scaffold systems are intended for workers to move up and down the scaffold, not for performing work. Fixed ladders must be secured to the scaffold in a position that is not leaning away from the scaffold, have evenly spaced rungs, and must extend at least 1 metre (m) above the uppermost working level.

If the fixed ladder is longer than 6.1m it must be equipped with a ladder cage that begins within 2.4m of the ground or working level. Circular or square fixed ladder cages must have inside dimensions no more than 760 millimetres (mm) x 760mm.

If a fall protection system is in place a fixed ladder can exceed 9.1m in length and a ladder cage is not required.

## **8. Portable Ladders**

### **Precautions**

The top two rungs, steps, or cleats of a portable ladder should never be used to work from unless their use is permitted in the manufacturer specifications. Portable ladders can easily become unstable or workers can lose their balance when working from this location.

The following should be abided by when working from and using a portable ladder:

- always face the ladder when ascending/descending
- do not use a stepladder for access to or from another work area
- do not lean to one side or overreach
- a portable ladder is not to be used as a support for a working platform
- visually inspect the portable ladder prior to use for any deficiencies
- do not place a portable ladder on other materials such as boxes, or scaffolds to gain height
- be aware of surroundings when setting up a portable ladder for potential situations where the ladder could be bumped by a vehicle, door, person, etc. and use barriers as appropriate
- place the portable ladder on a firm, flat surface and shim the base if necessary

An example of shimming a portable ladder base on uneven ground:



### **Constructed Portable Ladders**

A ladder that is constructed on site is referred to as a constructed portable ladder and is to be assembled as follows:

- constructed of lumber that is free of loose knots or knot holes
- for ladders  $\leq 5\text{m}$  long, side rails are not to be less than 38mm x 89mm
- for ladders  $> 5\text{m}$  long, side rails are not to be less than 38mm x 140mm
- side rails must not be notched, dapped, tapered, or spliced
- side rails are to be at least 500mm apart at the bottom
- rungs are to be not less than 21mm x 89mm
- rungs are to be held by filler blocks or secured with a continuous wire
- rungs are to be uniformly spaced at a centre to centre distance of 250mm to 300mm

A two-way constructed portable ladder that is wide enough to permit traffic in both directions at the same time must have a centre structural rail along the length of the ladder, be at least 1m wide, and constructed of materials that are substantial enough in size to accommodate the maximum intended load.

### **Manufactured Portable Ladders**

A manufactured portable ladder is to be constructed as per required design, performance, and test Standards (Canadian Standards Association [CSA] or American National Standards Institute [ANSI]) and classified into grades or types based on how the ladder is used. A manufactured portable ladder meeting Standard requirements will have markings indicating the grade or type, projected use, load or duty rating, and safety precautions.

CSA Grades and Maximum Ladder Lengths:

Grade	Projected Use	Load Rating	Extension Ladder Maximum Length	Single Ladder Maximum Length	Stepladder Maximum Length
1	Construction and Industrial	Heavy	18m (60ft) with 2 sections 22m (72ft) with 3 sections	9m (30ft)	6m (20ft)
2	Tradesman and Farm	Medium	15m (48ft) with 2 sections 18m (60ft) with 3 sections	7.5m (24ft)	3.6m (12ft)
3	Household	Light	9.5m (32ft) with 2 sections	5m (16ft)	2m (6.5ft)

\*ft = feet

ANSI Types:

Type	Projected Use	Duty Rating (Working Load)
IAA	Special duty work involving heavy workers in combination with heavy tools, equipment, or loads.	Special duty (170kg or 375lbs)
IA	Frequent extra heavy duty applications such as industry, utilities, contractors, etc.	Extra heavy duty (136kg or 300lbs)
I	Industry, utilities, contractors, etc.	Heavy duty (114kg or 250lbs)
II	Offices, light maintenance, etc. Must not be used with ladder jacks or scaffold planks.	Medium duty (102kg or 225lbs)
III	Light household use. Must not be used with ladder jacks or scaffold planks.	Light duty (91kg or 200lbs)

\*kg = kilogram; lbs = pounds

ANSI Maximum Ladder Lengths:

Ladder	Type	Maximum Length		
		Wood	Metal	Reinforced Plastic
Stepladder	IA, I	6m (20ft)		
	II	3.6m (12ft)		
	III	1.8m (6ft)		
Single	IA, I	9m (30ft)		
	II	6m (20ft)	7.3m (24ft)	
	III	4.2m (14ft)	4.9m (16ft)	
Extension	IA, I	18m (60ft)	21.8m (72ft)	
	II	12m (40ft)	18m (60ft)	
	III	8.5m (28ft)	9.7m (32ft)	

\*ft = feet

## 9. Safety Precautions

The majority of ladder falls are associated with portable ladders that move, tilt, or shift while a worker is ascending or descending. The primary reason that ladders move, shift, or tilt is the ladder being set up on an unstable or slippery surface. Other common events that can lead to a worker falling from a ladder include mis-stepping or foot slipping, loss of balance, overreaching, and the ladder being struck by a person, vehicle, or other object.

Ladders are often used incorrectly or are unsuitable for the work being completed. Common ladder misuses include:

- placing the base of the ladder too close or too far from the structure;
- not securing the top of the ladder section;
- placing the ladder so that it does not extend at least 1m above the landing surface;
- missing or broken ladder rungs;
- missing or broken stays on stepladders;
- working from a portable ladder on one of the top two rungs, steps, or cleats;
- incorrectly positioning the ladder on a slope; and
- inadequate ladder repairs.

Frequently inspecting and maintaining ladders, using the right ladder for the job, setting up ladders correctly, and ascending/descending correctly can all help to minimize the potential for falls.

## 10. Maintenance

All ladders whether fixed or portable should be inspected on a regular basis to identify any defects and ensure the ladder is in good working condition. If any defects are identified, the ladder should be tagged and removed from service until repairs can be made or the ladder replaced.

An example of an inspection checklist for a ladder is provided under Section 14: Related Documents. This checklist is intended to provide a demonstration of considerations and inspection criteria prior to ladder use. This information can be used as a starting point by the user to develop an appropriate checklist for the type(s) of ladders being inspected and based on the type of work being performed.

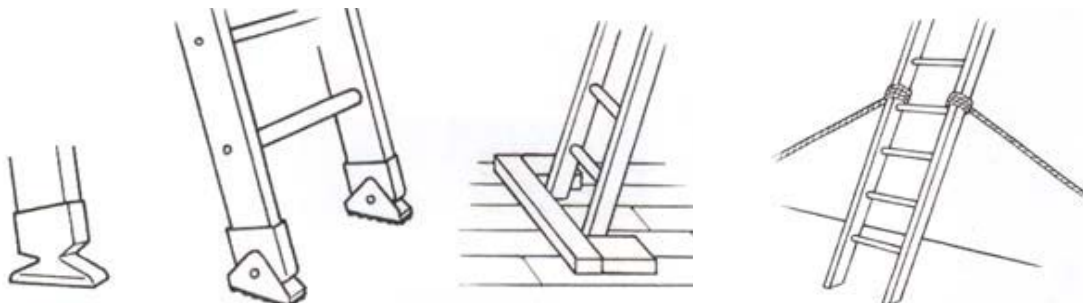
## 11. Securing and Positioning

A ladder should ideally be secured at both the upper and lower ends to prevent movement. For metal and reinforced plastic ladders, slip-resistant or rubber feet are considered sufficient to prevent movement if the ladder is placed on a firm, non-slip surface. If a wooden ladder is set-up on a firm, non-slip surface this is considered to meet the requirements of both CSA and ANSI; the feet of wooden ladders are not required to be equipped with slip-resistant material.

### Securing Ladder Bases

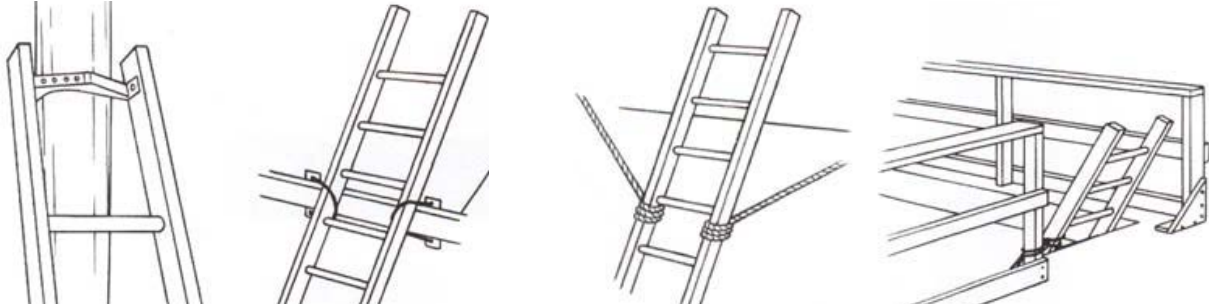
In cases where the base of the ladder is placed on a slippery surface or has the potential to move, then the base of the ladder must be secured. Examples of securing ladder bases include:

- driving spikes through the feet into the underlying surface;
- nailing cleats into the surface to prevent movement;
- tying ladder feet to stakes in the ground;
- placing a wooden board underneath the ladder base to prevent sinking;
- placing the ladder base against a fixed structure e.g. curb, wall, sandbag; and
- having a person support the ladder base by placing a foot on the lowest rung and holding a side rail in each hand.



## Securing Ladder Tops

At the top of a ladder, both rails should be supported. Examples of securing the tops of ladders include ladder ties and tie ropes or straps attached from the side rails to a fixed object.

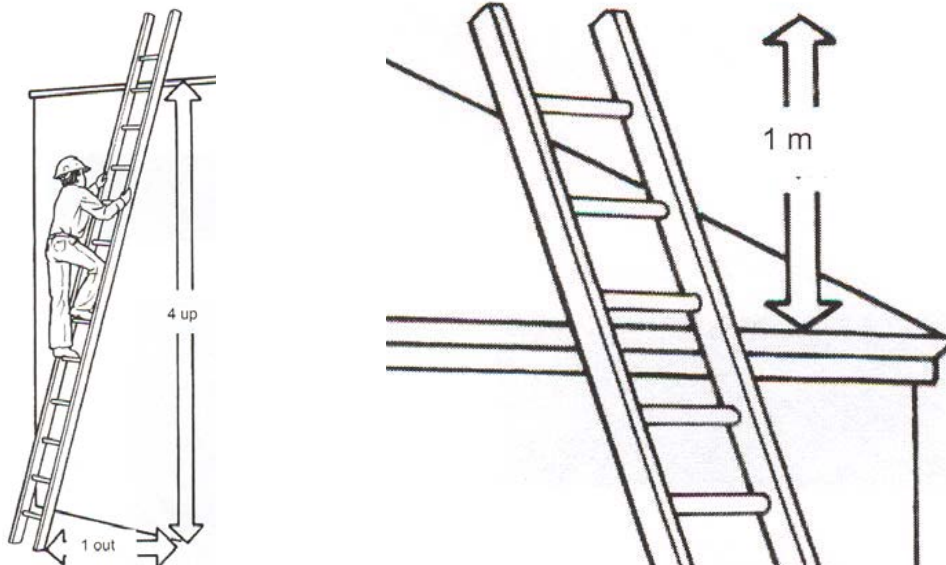


## Positioning

When positioning a ladder, the base must be 1m out from the structure for each 4m up. This 4-to-1 rule offers the best angle for the ladder to provide stability to the worker using it.

The side rails must extend at a minimum, 1m above any platform, landing or parapet where the ladder is used as a means of access. This extension above the access point allows for handholds to be available to the worker using the ladder.

For example, for a structure that is 8m high the ladder base must be 2m away from the structure, and extend at least 1m above the access/egress point.



## 12. Fall Protection




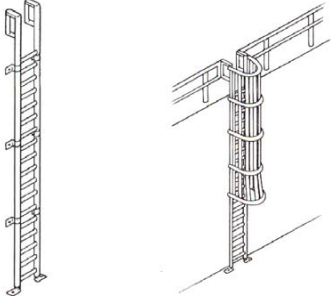

A personal fall arrest system is required for workers working from a portable ladder at a distance of 3m or more from the base, with the exception of moving up or down the ladder.


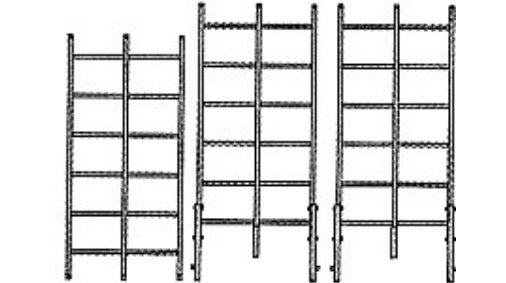

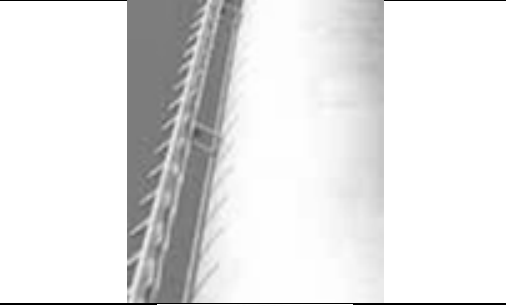


If it is not reasonably practicable to use a personal fall arrest system as determined by the completion of a FLHA, a worker may perform a light duty task such as painting or inspecting within a 15-minute time period, while maintaining the centre of gravity between the side rails of the ladder, and using 3-points of contact whenever an arm is extended beyond a side rail. If these conditions cannot be met then a personal fall arrest system is required.

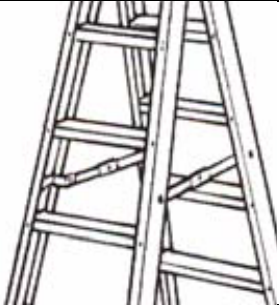

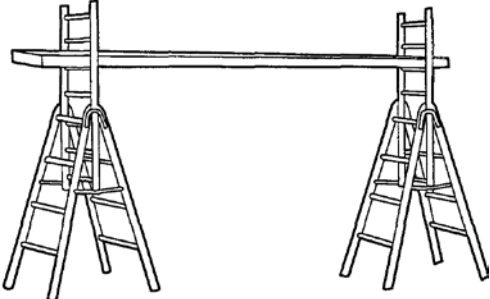


The University of Calgary has developed a Fall Protection Program that can be referred to for further information if a personal fall arrest system is required.

### 13. Definitions

<p>Combination Ladder</p>	<p>means a portable ladder that can be used either as a stepladder or a single ladder or an extension ladder.</p>	
<p>Extension Ladder</p>	<p>means a non-self-supporting portable ladder consisting of two or more sections travelling in interlocking rails, guides, or brackets to allow for length adjustment.</p>	
<p>Extension Trestle Ladder (similar to Trestle Ladder)</p>	<p>means a self-supporting portable ladder, adjustable in length, consisting of a trestle base and vertically adjustable extension section, with a means to lock the ladders together. Intended to be used in pairs to support planks or staging and the rungs are not intended to be used as steps.</p>	
<p>Fixed Ladder</p>	<p>means a ladder permanently attached to a structure, building, or equipment.</p>	
<p>Ladder Cage</p>	<p>means a guard or enclosure surrounding a fixed ladder intended to protect the worker.</p>	

Portable Ladder	means a ladder that can be readily moved or carried and usually consists of side rails joined at intervals by steps, rungs, or cleats.	
Sectional Ladder	means a non-self-supporting portable ladder, non-adjustable in length, consisting of two or more sections constructed so that the sections may be combined to function as a single ladder.	
Single Ladder	means a non-self-supporting portable ladder, non-adjustable in length, consisting of one section.	
Single Rail Ladder	means a ladder that has rungs, cleats, or steps mounted onto a single rail instead of two rails that are typically used for ladders.	
Special Purpose Ladder	means a ladder that represents either a modification or a combination of design and construction features of a general purpose ladder, in order to adapt to special or specific uses.	
Stepladder	means a self-supporting portable ladder, non-adjustable in length, having flat steps and a hinged back.	

<p>Stepladder Stay</p>	<p>means a device to prevent the stepladder from spreading (can also be a chain or cord).</p>	
<p>Step Stool</p>	<p>means a self-supporting, fixed or foldable, portable ladder non-adjustable in length, ≤800mm (32”) in overall size with flat steps and without a pail shelf. The ladder top cap is designed to be climbed on as well as all steps.</p>	
<p>Trestle Ladder (similar to Extension Trestle Ladder)</p>	<p>means a self-supporting portable ladder, non-adjustable in length, consisting of two sections, hinged at the top to form equal angles with the base. Trestle ladders are used in pairs to support planks or staging. The rungs are not intended to be used as steps. A trestle ladder cannot be longer than 6m (20ft).</p>	

## 14. Related Documents

- [Fall Protection Program](#)
- [Field Level Hazard Assessment \(FLHA\)](#)
- [Hazard Assessment and Control Form \(HACF\)](#)
- [Ladder Safety Online Training Course](#)
- [University's Hazard Assessment and Control Procedure](#)
- Example of a Pre-Use Inspection Checklist for Ladder Safety (see next page)

## Pre-Use Inspection Checklist – Ladder Safety

All ladders whether fixed or portable should be inspected on a regular basis to identify any defects and ensure the ladder is in good working condition. If any defects are identified, the ladder should be tagged and removed from service until repairs can be made or the ladder replaced.

The following is an example checklist intended to provide a demonstration of considerations and inspection criteria prior to ladder use. This information can be used as a starting point by the user to develop an appropriate checklist for the type(s) of ladders being inspected.

1)	Is using a ladder the safest and best way to do the work?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
2)	Is the ladder suitable for the type and height of work being conducted?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
3)	Is the ladder grade or type appropriate for the work being conducted?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
4)	Is the ladder constructed of material appropriate for other work site hazards?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
5)	Can the ladder be positioned close enough to the work area to prevent overreaching?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
6)	Can the ladder be secured at the top? at the bottom?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
7)	Is the surface supporting the base of the ladder firm and level?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
8)	Are non-slip feet worn, damaged, missing, etc.?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
9)	Are hinge spreaders tight, straight, and functioning correctly?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
10)	Are extension locks, pulleys, and other fittings functioning correctly?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
11)	Is rope frayed, worn, cut, burned, rotten, etc.?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
12)	Has the rope been replaced with an inferior material?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
13)	Are there any loose, cracked, or damaged rungs, steps, cleats, side rails, braces, etc.?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
14)	Are there any loose nails, screws, bolts, or other metal parts?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
15)	Is the ladder stable?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
16)	Is fall protection required?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
17)	Moveable parts operate freely?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
18)	Mud, oil, grease, paint, cement, other waste products accumulated on ladder?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
19)	Is the ladder painted?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
20)	Is the ladder wobbly?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
21)	Are treads clear of dirt and debris?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
22)	Are any metal components rusted?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
23)	Are there any makeshift repairs on the ladder?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
24)	Is the ladder twisted, warped, or bowed?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
25)	Is the ladder manufactured in accordance with CSA or ANSI standards?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
26)	Are identification labels legible?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
27)	Is the ladder secured and stored properly when not in use?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

## 15. References and Additional Resources

- Alberta Occupational Health and Safety Act, Regulation and Code  
<http://work.alberta.ca/occupational-health-safety/307.html>
- Alberta Occupational Health and Safety Code Explanation Guide  
[OHS Code Explanation Guide 2009 - Alberta Human Services - Government of Alberta](#)
- University of Calgary Occupational Health and Safety Policy  
<http://www.ucalgary.ca/policies/files/policies/Occupational%20Health%20and%20Safety%20Policy.pdf>
- Risk Management Email  
[riskmgmt@ucalgary.ca](mailto:riskmgmt@ucalgary.ca)
- EH&S Website  
[www.ucalgary.ca/safety](http://www.ucalgary.ca/safety)

### Legislation and Standards

Part 8 of the Alberta OH&S Code outlines requirements for safe ladder use. Standards that pertain to ladder use referenced in the OH&S code include:

- PIP Standard STF05501 (February 2002), *Fixed Ladders and Cages*, published by the Construction Industry Institute.
- CSA Standard CAN3-Z11-M81 (R2005), *Portable Ladders*.
- ANSI Standard A14.1-2007, *American National Standard for Ladders – Wood – Safety – Requirements*.
- ANSI Standard A14.2-2007, *American National Standard for Ladders – Portable Metal – Safety Requirements*.
- ANSI Standard A14.5-2007, *American National Standard for Ladders – Portable Reinforced Plastic – Safety Requirements*.