
Part 8 Entrances, Walkways, Stairways and Ladders

Highlights

- Section 119 requires the employer to identify a secondary escape route for situations in which a worker could become isolated from a primary escape route.
- Section 127 requires employers to ensure that ladders used near energized equipment are non-conducting.
- Section 130 references Process Industry Practices (PIP) Standard STF05501 (February 2002), *Fixed Ladders and Cages*, for the design and construction of fixed ladders. An employer must ensure that a fixed ladder installed on or after April 30, 2004, meets the requirements of this standard.
- Section 131 references American Society for Testing and Materials (ASTM) Standard C478-02, *Standard Specification for Reinforced Concrete Manhole Sections*, for fixed ladders used in pre-cast reinforced concrete manhole sections. An employer must ensure that a fixed ladder used in pre-cast reinforced concrete manholes installed on or after April 30, 2004, meets the requirements of this standard.
- Section 135 recognizes both Canadian Standards Association (CSA) and American National Standard Institute (ANSI) Standards for portable ladders.

Entrances, Walkways, Stairways

Section 119 Safe entry and exit

Subsection 119(1)

Workers must be provided with a safe way of entering and leaving a work area. Safe entry and exit must take into account both normal operations and emergency situations. For example, a proper climbing device may provide safe access to a derrickman's working platform but safe exit from the platform in an emergency may be by way of an escape buggy. Based on the hazards present at the workplace or in a particular work area, multiple entry and exit points may be required to permit safe entry or exit under emergency conditions.

Subsections 119(2) and 119(3)

All means of entry or exit must be maintained in a good state of repair e.g. access ladders have all rungs in place, the hinges and panic bars on doors operate properly, the braking mechanism of an emergency escape buggy operates smoothly.

Means of entry and exit must be kept clear of materials, equipment, waste, and other obstructions. Doing so allows workers to safely move into and out of work areas, preventing slips, trips, and falls.

Subsection 119(4)

Multiple entry and exit points are required in situations where a worker could become isolated from a primary escape route and unable to return to it. A long trench for example, requires multiple access ladders in case a worker in the trench is unable to get back to the primary access ladder to leave the trench. A room in which an industrial process goes on involving dangerous chemicals may require multiple exit doorways so that workers can quickly leave the area in an emergency.

This secondary means of escape must be conveniently located, safe for use, maintained to be ready for use at all times (as in the case of the emergency escape buggy mentioned above), and must be kept free of obstructions. This subsection reminds employers that secondary doorways, stairways, ramps, emergency escape devices, etc. must be provided where necessary and cannot be forgotten.

Subsection 119(5)

Workers must be made aware of the escape routes they are expected to use.

Section 120 Doors

Subsection 120(1)

Doors must be appropriately selected and then maintained so that workers can open them without substantial effort. Doorways must be kept free of obstructions.

Subsection 120(2)

Enclosed areas may pose a hazard to workers entering them. Examples of enclosed areas include freezers, refrigerators, and rooms that present conditions hazardous to workers. The type of door and hardware used is left up to the employer.

The door must be kept in good working order and must be provided with a means of opening it from the inside. This is an obvious requirement for freezers and refrigerators. Enclosed areas that pose a hazard to workers also require doors that can be opened from the inside.

Section 121 Walkways, runways and ramps

Subsection 121(1)

Permanent and temporary walkways, runways and ramps must be

- (a) strong enough to support all expected loads,
- (b) at least 600 mm wide to permit the safe movement of equipment and workers, and
- (c) where applicable, be equipped with guardrails and toe boards. Guardrails must meet the requirements of section 315 and toe boards must meet the requirements of section 321.

Subsection 121(2)

Walkways, runways and ramps must provide workers with enough traction to prevent slipping. For walkways, runways and ramps located in a controlled environment, non-slip, abrasive surfaces may be adequate. For locations exposed to weather, or at workplaces where debris or materials damage or coat these non-slip

surfaces so that they are of little or no value, expanded metal or webbed metal should be used. This type of construction sheds ice, snow, and debris, providing reliable traction under a variety of conditions.

Section 122 Stairways

Subsection 122(1)

Throughout the length of a stairway, the width of the treads and the height of the rise must not change. This reduces the likelihood of workers tripping or stumbling due to unexpected changes as they move up or down the stairway. Treads must also be level.

Subsection 122(2)

Stairways with five or more risers must be equipped with a handrail meeting the requirements for handrails described in section 123. Handrails provide a handhold that helps workers to prevent falling.

A stairway having an open or unprotected side must not only have a handrail, but must also have an intermediate rail or equivalent safeguard e.g., filled in with expanded metal, solid plywood barricade, etc. In effect, a “guardrail” is being placed across the open or unprotected side of the stairway.

Subsection 122(3)

Temporary stairs must be at least 600 mm wide to permit the safe movement of equipment and workers.

Readers interested in design specifications for fixed industrial stairs should consult the following source (there are many others that could also prove useful):

 www.dir.ca.gov/title8/3234.html

California Code of Regulations, Title 8, Section 3234, Industrial Fixed Ladders

Section 3234 contains specifications for the safe design and construction of fixed general industrial stairs. This includes interior and exterior stairs around machinery, tanks, and other equipment, and stairs leading to or from floors, platforms, or pits.

Section 123 Handrails on stairways

This section lists the design requirements that apply to handrails on stairways having 5 or more risers.

Ladders — General

Section 124 Restriction on use

To enter or leave an elevated or sub-level area, a ladder should be used only if there is no other safe and recognizable way of doing so. Walking down an earthen ramp or walking up a set of stairs are preferred to using a ladder.

Section 125 Prohibition on single rail

Employers are responsible for making sure that ladders are used properly. This also means that employers must make sure that the correct type of ladder is used. Ladders made by fastening cleats or steps across a single rail or post must not be built, let alone used. Such a device is unstable and unsafe for use.

Section 126 Prohibition on painting

Paint and other coatings can prevent a person from seeing the condition of the wood of a wooden ladder. Only transparent, nonconductive finishes such as varnish, shellac, or a clear preservative should be used. A minimum amount of paint may be used for placing identifying information on a ladder. If this is done, the marking(s) should only appear on one face of the side rails.

In general, ladders should be kept free of any waste products such as drywall mud, cement, paint, adhesives or sealants. A build-up of these materials could cover up damage such as cracks and missing connecting hardware.

Section 127 Use near energized electrical equipment

Metal ladders and wooden ladders with side rail metal reinforcement wires must not be used during the servicing of energized or potentially energized electrical equipment. To maintain their non-conducting properties, ladders intended for use around energized electrical equipment need to be kept clean. All surface build-up of dirt, dust, grease, grime and other conductive materials needs to be removed. These materials may create a path for electrical current to travel along the surface of the ladder and endanger the person using the ladder.

Section 128 Ladders on extending booms

A ladder attached to an extending boom moves with the boom while the boom is being positioned. As a result, the ladder is an unsafe place for a worker to be because of the chance of losing balance and falling. With the exception of professional fire fighters working on fire fighting equipment, no worker is permitted to be on the ladder attached to an extending boom during boom motion.

Similarly, a boom-mounted ladder is an unsafe place to be until the powered mobile equipment to which the boom is attached is stable. If the equipment has outriggers, the outriggers must be set before a worker climbs the ladder.

Crawl Board or Roof Ladder

Section 129 Safe use

Figure 8.1 shows a roof ladder in use on a very steep roof. The bracket at the upper end of a crawl board or roof ladder should be deep enough to reach over the ridge of the roof and overlap the roof framing.

Eaves troughs must not be used to support a crawl board or roof ladder. An eaves trough may not be strong enough to support the combined weight of the crawl board or ladder and the worker using it.

Figure 8.1 Roof ladder in use on very steep roof



Fixed Ladders

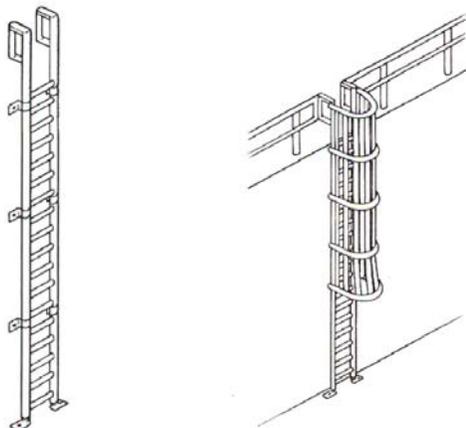
Section 130 Design criteria

Subsection 130(1)

A fixed ladder is a ladder that is an integral part of a building or structure. It is usually vertical but can be as much as 15° from the vertical. A fixed ladder cannot lean back. Figure 8.2 shows a fixed ladder with a walkthrough at the top, and a similar ladder equipped with a ladder cage.

A ladder cage is a permanent structure attached to a ladder to provide a barrier between the worker and the surrounding space. It serves to support a worker if the worker needs to rest against a barrier. A ladder cage is not a means of fall protection.

Figure 8.2 Fixed ladder with walkthrough at top (left); same ladder with cage(right)



Process Industry Practices (PIP) Standard STF05501 (February 2002), *Fixed Ladders and Cages*, published by the Construction Industry Institute, specifies the design details for fabrication and installation of typical fixed ladders for structures, miscellaneous platforms, and vessels for regular operational entry and exit. These details are intended to be issued to fabricators supplying these ladders and to the erectors for use in installations.

A sample copy of the Standard can be viewed at the following Web site address:

 <http://www.pip.org/downloads/Sample-STF05501.pdf>

Table 8.1 summarizes some of the most important differences between the requirements of the PIP Standard and the fixed ladder requirements that were in effect prior to when the first edition of the OHS Code went into effect on April 30, 2004. The requirement to comply with the PIP Standard is not retroactive to fixed ladders installed prior to the effective date of the first edition of the OHS Code.

Subsection 130(2)

The PIP standard referenced in this section is intended to be used as a design standard i.e. one which can be directly referenced by an employer or owner. A fabricator can then fabricate the fixed ladder as described in the standard's mechanical drawings. To comply with the OHS Code, all the dimensional and strength requirements of the PIP standard must be met.

Some fabricators and employers have liberally interpreted subsection 130(2) of the OHS Code, suggesting that the PIP standard functions as no more than a design *guideline*. These parties have chosen to interpret the subsection as meaning that as long as "established engineering principles" are followed, the dimensions specified in the PIP standard need not be met. This is an incorrect interpretation of the words.

The phrase "established engineering principles" refers to the "material and process standards" referenced in the PIP standard. The reason for using this phrase is that the PIP Standard refers to material and process standards that reflect practices followed in the U.S. These standards may not be appropriate for use in Alberta. As a result, an employer may use applicable Canadian material and process standards.

There have been a couple of cases in which a minor dimensional difference has been discovered during commissioning following installation of a fixed ladder. In these cases employers have requested an "acceptance ". This is a letter granted to the employer by Workplace Health and Safety stating that the ladder in question "functionally" complies with the OHS Code. In each case the employer had to prove

that the ladder with the dimensional error provided workers with a level of protection that was equal to or greater than that provided by a ladder meeting all of the PIP standard's dimensional requirements.

In each case to date the dimensional difference was minor and did not compromise worker safety. An acceptance was granted in each case. One of these acceptances resulted in the addition of paragraph 130(2)(b) to this edition of the OHS Code. Recognizing that larger workers and workers wearing safety or rescue equipment may have difficulty passing through the ladder cage hoops, the allowable hoop dimension has been increased. The inside diameter of a cage hoop can now be as much as 760 mm. The existing dimensions shown in Section B-B of the PIP standard limit the width to 686 mm and the depth to 696 mm. If an employer uses the 760 mm dimension, then other dimensional measurements associated with the fixed ladder may need to be altered to accommodate the larger cage hoops.

Subsection 130(3)

The PIP Standard specifies that the fixed ladder must be made of steel. Situations may arise in which steel is not the preferred material of choice e.g. exposure to chemicals. Fixed ladders made of aluminum or fiberglass are available. If a fixed ladder is made of a material other than steel, the employer must ensure that the design is certified by a professional engineer as being as strong as or stronger than that required by PIP Standard STF05501.

Subsections 130(4) and 130(5)

Ladderway floor openings and platforms are normally guarded by a standard guardrail and toe board on all exposed sides, except at the entrance to the opening (see subsection 321(5)). A self-closing double bar safety gate or equally effective means must be provided at the opening to prevent persons from walking directly into the opening and falling.

A safety gate is not required at landings.

Subsection 130(6)

An access ladder attached to a scaffold is subject to the requirements of section 327, not the requirements of section 130.

Table 8.1 Comparison of selected fixed ladder design requirements

Requirement	Requirements Prior to April 30, 2004	PIP Standard
Rung spacing	250 millimetres min, 305 millimetres max	300 millimetres
Clearance between ladder rungs and structure to which ladder is affixed (hand and toe clearance)	150 millimetres min	178 millimetres; when distance to any unavoidable object, including insulation, is less than 178 millimetres, the minimum clearance is 39 millimetres
Platform spacing intervals and dimensions	6.5 metres (21.5 feet); 760 millimetres x 760 millimetres (platforms not required if the ladder incorporates a fall arrest system)	9.1 metres (30 feet); 762 millimetres x 762 millimetres (platforms not required if the ladder incorporates a fall arrest system)
Ladder cage	Required if the ladder is more than 6.5 metres (21.5 feet) long (cage not required if the ladder incorporates a fall arrest system)	Required on ladder having a minimum unbroken length of 6.1 metres (20 feet); (cage not required if the ladder incorporates a fall arrest system)
Ladder length	Not specified	Max unbroken length of 9.1 metres (30 feet) unless ladder incorporates a fall arrest system
Lowest point of ladder cage	No more than 3 metres (10 feet) above landing or ground	Within 2.1 metres (7 feet) to 2.4 metres (8 feet) of the walking surface
Ladderway opening	Not specified	Requires safety gate or equivalent means
Width of rungs between rails	Not specified	450 millimetres

Section 131 Fixed ladders in manholes

ASTM Standard C478-07, *Standard Specification for Reinforced Concrete Manhole Sections*, includes requirements for the design of steps and ladders installed in pre-cast reinforced concrete manholes used in sewer and water works. These requirements include the dimensions of steps and rungs and appropriate clearance distances.

Section 132 Rest platform exemption

Because of the distance and number of times a worker may climb a fixed ladder on a drilling rig or service rig, and the impracticality of providing platforms on a rig, workers are permitted to use an assist device, often counterbalanced, to ascend and descend the ladder. This assist device does not replace the need for a fall arrest system or ladder cage, as appropriate.

Portable Ladders

Section 133 Prohibition

Unless permitted by the manufacturer's specifications, a worker must never work from the top two rungs, steps, or cleats of a portable ladder. Unless designed to permit such use, portable ladders can become unstable or workers can lose their balance for lack of siderails to hold while working from the top two rungs, steps, or cleats.

CSA Standard CAN3-Z11-M81 (R2005), *Portable Ladders*, recognizes step stools of a particular type as being a portable ladder. With that particular type of step stool, workers are permitted to stand on any rung, including the top plate.

The following safety precautions should be followed when using a stepladder:

- Never work from the top two treads of a stepladder unless permitted to do so by the manufacturer's specifications (see Figure 8.3).

Figure 8.3 Safely working from a stepladder



- Always face the stepladder treads when using a stepladder.
- Never use a stepladder for entry to or exit from another work area.
- Never lean to one side or overreach while using a stepladder.
- Unless permitted by the stepladder manufacturer, never use a stepladder as a support for a working platform as the ladder is too unstable.
- Always visually inspect the ladder before each use.
- Always place a stepladder on a firm, flat surface.
- Do not place a stepladder on boxes or scaffolds to gain extra height.
- Always take care when positioning a stepladder in corridors or driveways where it could be hit by a person or vehicle. Set up suitable barriers where necessary.
- Set base on secure, even surface. Shim the base if necessary (see Figure 8.4)

Figure 8.4 Example of shimming the ladder base on uneven ground



For more information

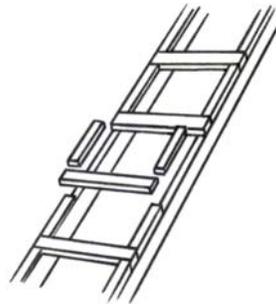
 www.cbs.state.or.us/external/osha/pdf/pubs/3083.pdf
Portable Ladders – Types, Use & Care (Oregon OSHA)

Section 134 Constructed portable ladder

Many falls happen when a proper ladder is unavailable at a job site and a makeshift ladder is constructed. Accidents happen when workers throw something together quickly in order to reach a roof, climb in or out of a foundation, or get from one level to another before stairs are installed.

A ladder constructed on site, known as a “constructed portable ladder”, can solve the problem. The ladder can be built as single- or double-width. Figure 8.5 shows some of the construction details of a constructed ladder.

Figure 8.5 Design details of a single-width constructed ladder



Section 135 Manufactured portable ladder

Section 135(a)

CSA Standard CAN3-Z11-M81 (R2005), *Portable Ladders*, specifies design and performance requirements and tests for common types of portable ladders. CSA defines a portable ladder as one that can be readily moved or carried and usually consists of side rails joined at intervals by steps, rungs, cleats or rear braces.

The Standard classifies portable ladders into one of three grades based on how the ladder is used. The grades are shown in Table 8.2.

Table 8.2 CSA grades of portable ladders

Grade	Projected use	Load rating
1	Construction and industrial	Heavy
2	Tradesman and farm	Medium
3	Household	Light

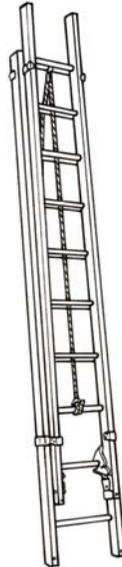
A ladder approved to the Standard bears markings indicating the grade, projected use, load rating of the ladder, and numerous safety precautions in both words and symbols. If certified by CSA, the ladder bears the CSA monogram. Section 135 does not require manufactured portable ladders to be certified.

The following types of portable ladders are covered by the Standard:

- *Combination ladder* – a portable ladder capable of being used either as a stepladder or a single or extension ladder. It may also be capable of being used as a trestle ladder or a stairwell ladder. Its components may be used as single ladders.
- *Extension ladder* – a non-self-supporting portable ladder consisting of two or more sections travelling in interlocking rails, guides, or brackets so arranged as to permit length adjustment (see Figure 8.6). The maximum length of an extension ladder is the sum of the lengths of the side rail of each section. The maximum length of the extension ladder depends on its grade as follows:
 - Grade 1 18 metres (60 feet) with 2 sections; 22 metres (72 feet) with 3 sections
 - Grade 2 15 metres (48 feet) with 2 sections; 18 metres (60 feet) with 3 sections
 - Grade 3 9.5 metres (32 feet) with 2 sections

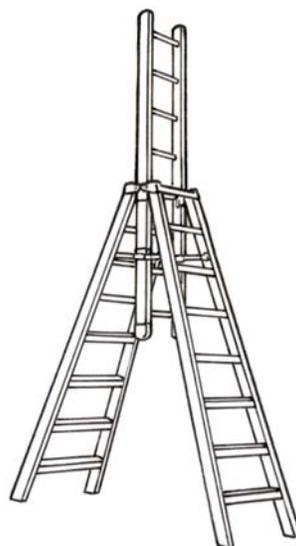
Because ladder sections must overlap by at least 1.5 metres (5 feet), the overall maximum extended length of the longest extension ladder is 19 metres (63 feet). Inclined at the recommended 75° angle (“4 up – 1 out”), with 1 metre of the ladder extending above the upper landing area and assuming the worker to be 2 metres tall, the worker’s maximum height above ground would be approximately 15.5 metres (51 feet).

Figure 8.6 Example of extension ladder



- *Extension trestle ladder* – a self-supporting portable ladder, adjustable in length, consisting of a trestle ladder base and a vertically adjustable extension section, with a suitable means for locking the ladders together (see Figure 8.7). Trestle ladders are used in pairs to support planks or staging. The rungs are not intended to be used as steps. The extension section and base section of a trestle ladder cannot be more than 6 metres (20 feet) long.

Figure 8.7 Extension trestle ladder



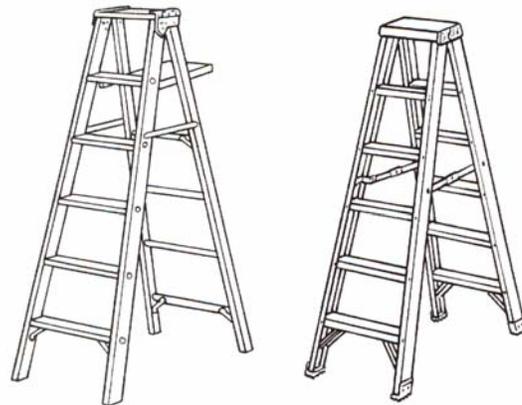
- *Sectional ladder* – a non-self-supporting portable ladder, non-adjustable in length, consisting of two or more sections, so constructed that the sections may be combined to function as a single ladder.
- *Single ladder* – a non-self-supporting portable ladder, non-adjustable in length, consisting of one section only (see Figure 8.8). Single ladders may be either step- or rung-type. The maximum length of a single ladder depends on its grade as follows:
 - Grade 1 9 metres (30 feet)
 - Grade 2 7.5 metres (24 feet)
 - Grade 3 5 metres (16 feet)

Figure 8.8 Example of a single ladder



- *Special-purpose ladder* – a ladder that represents either a modification or a combination of design or construction features of a general-purpose ladder, in order to adapt to special or specific uses.
- *Stepladder* – a self-supporting portable ladder, non-adjustable in length, having flat steps and hinged back (see Figure 8.9). The back section consists of either a single ladder or some other supporting device. The maximum length of a stepladder depends on its grade as follows:
 - Grade 1 6 metres (20 feet)
 - Grade 2 3.6 metres (12 feet)
 - Grade 3 2 metres (6.5 feet)

Figure 8.9 Standard stepladder (left) and two-way stepladder (right)



- *Step stool* – a self-supporting, fixed or foldable, portable ladder non-adjustable in length, 800 millimetres (32 inches) or less 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. The side rails may continue above the top cap.
- *Trestle ladder* – 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 more than 6 metres (20 feet) long.

Sections 135(b) through 135(d)

ANSI Standard A14.1-2007, *American National Standard for Ladders – Wood – Safety Requirements*, establishes minimum requirements for the construction, testing, labelling, care, and use of common types of portable wood ladders. ANSI Standard A14.2-2007, *American National Standard for Ladders – Portable Metal – Safety Requirements*, does the same for portable metal ladders and ANSI Standard A14.5-2007, *American National Standard for Ladders – Portable Reinforced Plastic – Safety Requirements*, does the same for portable ladders made of reinforced plastic. The Standards classify portable ladders into one of five types based on how a ladder is used. The types are shown in Table 8.3. Table 8.4 summarizes the maximum lengths of selected ladders as permitted by the standards.

Portable ladders meeting the requirements of the standards are labelled with their type or duty rating and a statement that they comply with ANSI Standard A14.1, ANSI Standard A14.2 or ANSI Standard A14.5. Section 135 does not require manufactured portable ladders to be certified.

Table 8.3 Portable ladder types according to ANSI Standards

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

Table 8.4 Maximum ladder lengths permitted by ANSI ladder standards

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

Ladders

Ladder safety precautions

The ladder is an extremely useful, simple device that is not always used correctly. Climbing a ladder is usually easy, but descending can sometimes be quite hazardous. The types of injuries sustained from falling or slipping from a ladder can be quite horrendous. A fall from even a short distance can result in a person suffering severe injuries leading to disability or death.

In general, most ladder falls involve portable ladders that move, tilt, or shift while a worker is climbing or descending. Unstable or slippery base surfaces are the primary reasons ladders fail. Other reasons include a misstep or a slip of the foot, loss of balance, an overreach, and the ladder being struck by a vehicle or other object.

Too many ladders are not suitable for the job or are used incorrectly. During work site inspections, the most commonly observed problems with ladders are:

- base of ladder placed too close or too far away from the structure
- ladder not secured at the top
- ladder not extending 1 m above the upper landing surface
- missing or broken rungs
- missing or broken stays on stepladders
- working from a stepladder on the top tread
- ladder positioned incorrectly on a slope
- inadequate ladder repairs

Workers and employers can reduce ladder falls by doing the following:

- (a) frequently inspect and maintain ladders;
- (b) use the right ladder for the job. Ladders come in a variety of types and many special-purpose ladders are available. Examples include trolley, side-rolling, shaft, and manhole ladders. A worker and employer are likely to save time, energy, and reduce the risk of injury by using the right ladder for the job;
- (c) set up ladders correctly; and
- (d) climb and descend ladders properly

Employers are responsible for training workers so that they understand these safe work practices. Employers are also responsible for making sure that the safe work practices are followed.

Maintenance

All ladders should be checked regularly to make sure they are fit for use and to identify any defects. Any repairs should be done immediately or the ladder removed from service until the repairs are made. If the ladder cannot be repaired, it should be discarded and replaced.

Is a ladder the best choice?

Before using any ladder, the following questions should be asked:

- | | | |
|---|------------------------------|-----------------------------|
| (1) Is using a ladder the safest and best way to do the job? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| (2) Is the ladder in good condition and suitable for the type and height of work? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| (3) Can the ladder be positioned close enough to the work area so that the worker using it won't overreach? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| (4) Can the ladder be secured at both the top and bottom? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| (5) Is the surface supporting the ladder at its base firm and level? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |

If the answer to any of these questions is No, consider another method of gaining access to the work area.

Section 136 Securing and positioning

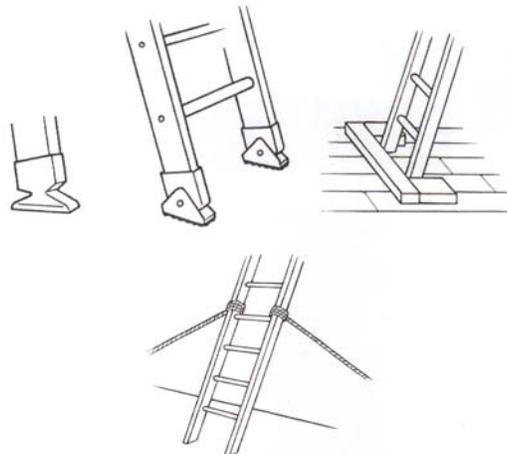
Section 136(a)

A portable ladder can be secured against movement in many ways. Because it can move at both its upper and lower ends, ideally it should be secured at both ends (see Figures 8.10 and 8.11). Slip-resistant or rubber safety feet at the bottom of a metal or reinforced plastic ladder are considered to offer securement if they rest on a firm, non-slippery surface. Neither CSA or ANSI requires the feet of wooden ladders to be equipped with slip-resistant material. If the feet of a wooden ladder rest securely on a firm, non-slippery surface, then the intent of the requirement is met.

If the surface that the ladder rests on is slippery or it is possible for the base of the ladder to move, then the ladder must be secured. Examples of acceptable securement methods include

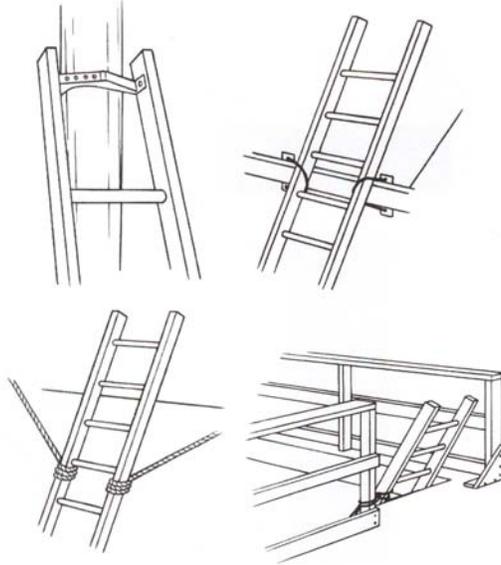
- (a) spikes driven through the feet into the surface upon which the ladder base rests;
- (b) cleats nailed into the surface to prevent movement;
- (c) tying the feet of the ladder to stakes in the ground to stop it from slipping (place a large flat wooden board underneath to help prevent it sinking);
- (d) butting the base of the ladder against a fixed structure such as a curb or wall, heavy blocks, or sandbags;
- (e) having a person stand at the base, one foot on the lowest rung, holding a side rail in each hand.

Figure 8.10 Examples of securing the base of a ladder (rubber safety feet, cleats nailed to the floor, tying off to stakes in the ground)



At the top of the ladder, both rails should be supported unless the ladder has a single support attachment. Ladder ties to the support at the top are often used. An alternative might be to tie ropes or straps from the side rails (not the rungs) to a fixed object.

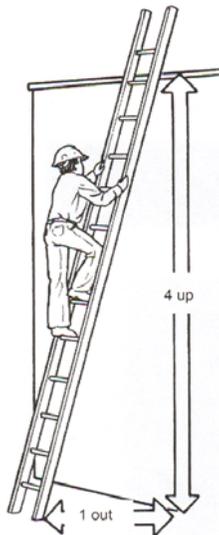
Figure 8.11 Examples of securing a portable ladder at the top



Section 136(b)

Ladders must be set up so that the base is out 1 metre for each 4 metres up (see Figure 8.12). “4 up – 1 out” gives the right slope – approximately 75° from the horizontal. This position offers the ladder, and the worker standing on it, the greatest stability.

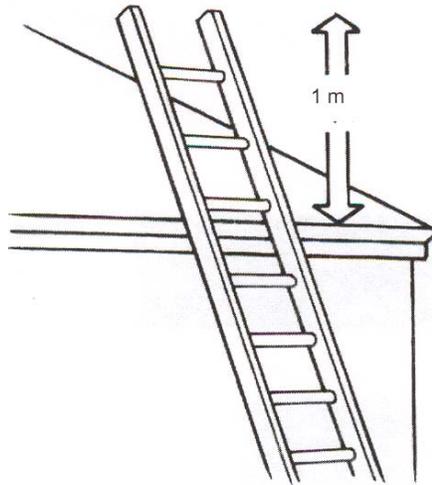
Figure 8.12 Proper placement of ladder



Section 136(c)

The side rails of a portable ladder must extend at least 1 metre (3 feet) above any platform, landing or parapet where the ladder is used as a means of access to the platform, landing or parapet (see Figure 8.13). Doing so provides the worker using the ladder with handholds for getting on and off the ladder.

Figure 8.13 Top of ladder extending above access level



Section 137 Fall protection

Under normal circumstances, workers are required to use some type of fall protection system e.g. guardrails, nets, personal fall arrest system, etc., whenever they can fall a distance of 3 m or more. This section permits a worker to move up or down a portable ladder without having to use a personal fall arrest system.

This section also permits a worker to work from a ladder without using a personal fall arrest system in circumstances where it is not reasonably practicable to do so. The most common example of such a situation is when an anchor of sufficient strength is unavailable or too impracticable to use. This easement of the fall protection requirements is subject to several conditions:

- (1) the work must be a "light duty task", such as inspection or painting. The work done at each spot where the ladder is set up must be less than approximately 15 minutes in length;
- (2) while doing the task, the worker must keep his or her centre of gravity (indicated by the belly button) between the side rails of the ladder; and

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- (3) the worker must maintain three points of contact whenever the worker extends an arm beyond a side rail.

If any one of these three conditions cannot be met, some form of fall arrest protection is required.

The maximum length of a three-section extension ladder is 22 metres (72 feet). Because ladder sections must overlap by at least 1.5 metres (5 feet), the overall maximum extended length of the longest extension ladder is 19 metres (63 feet). Inclined at the recommended 75° angle ("4 up – 1 out"), with 1 m of the ladder extending above the upper landing area and assuming the worker to be 2 metres tall, the worker's maximum height above ground would be approximately 15.5 metres (51 feet).

Being 15.5 metres above the ground is a considerable height. An extension ladder extended to its full-length bows and tends to be less stable than when it is only partially extended. It tends to vibrate and shake in strong winds and while a person ascends or descends it. Whenever an extension ladder must be extended to near its full limits, questions should be asked as to whether a ladder is the best choice for doing the work. Alternate approaches, such as the use of a manlift, boatswain's chair, or scaffolding may be safer and more efficient ways of doing the work.