



Infrastructure Health
& Safety Association™

Work Safe for Life

Ladder Safety

Safe Practice Guide

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Infrastructure Health & Safety Association

Safe Practice Guide

Ladder Safety

Foreword

This Guide designates the practices that should be followed by the member firms of the Infrastructure Health & Safety Association (IHSA) when using ladders. This Guide is not designed as a training manual, but contains information, best practices and general recommendations deemed appropriate to perform a job in a responsible and safe manner.

The contents of this Safe Practice Guide, including all advice, recommendations and procedures, are provided as a service by the Infrastructure Health & Safety Association. No representation of any kind is made to any persons whatsoever with regard to the accuracy, completeness or sufficiency of the information contained herein. Any and all use of or reliance on this Safe Practice Guide and the information contained herein is solely and entirely at the user's risk. The user also acknowledges that the safe practices described herein may not satisfy all requirements of Ontario law.

The Infrastructure Health & Safety Association wishes to express its appreciation to those who assisted in the preparation of this Guide.

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SECTION I GENERAL

100 SAFE EXECUTION OF WORK

The safe execution of ladder work requires:

- competent personnel
- the correct size and type of ladder
- a properly maintained ladder
- job planning
- work methods
- teamwork
- job considerations

101 COMPETENT PERSONNEL

Only competent personnel should be responsible for the use, inspection and care of ladders.

102 JOB PLANNING

As in all phases of telecommunications and utility work, job planning is of prime importance so that the work may be performed safely and efficiently.

103 WORK METHODS

Specific sections within the Electrical Utility Safety Rules (EUSR) and the Telecommunications Utility Operations Rule Book, apply to ladder work.

The methods to be used in ladder work should be reviewed thoroughly with the crew performing the work.

The methods used for a specific job should be followed as planned. Any deviation from these specifics should be communicated to and thoroughly under-

stood by everyone involved.

104 TEAMWORK

The best teams are made up of people who will work compatibly with one another. Good communication is essential while the work is being performed.

105 JOB CONSIDERATIONS

1. Do you have the personal protective equipment necessary for this particular job? *
2. Do you have the right ladder for the job?
3. Have you inspected the work site for hazards?
4. Is your ladder in a safe working condition?
5. Do you have adequate means for securing your ladder?
6. Are you competent to use a ladder?

* Personal protective equipment should include, as a minimum requirement, safety boots, approved head protection, fall protection equipment (body belt, pole strap or lanyard), eye protection, and hand protection.

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SECTION II

TYPES OF LADDERS AND STANDARDS

200 TYPES

Types of ladders considered in this guide include the following:

1. extension
2. step
3. single
4. sectional
5. vertical fixed position (maintenance hole & tower)
6. rolling ladder

201 MATERIALS

Ladders are mainly made of the following materials:

1. wood
2. fibreglass
3. aluminum
4. reinforced plastic
5. steel

202 CSA CERTIFIED

To ensure the ladder you use is manufactured to high standards and is of good quality, IHSA recommends that member firm employees use only ladders bearing the CSA Certification label.

203 ANSI AND CSA CLASSIFICATIONS (CAN 3-Z11-M81)

The American National Standards Institute (ANSI) and the Canadian Standards Association (CSA) classify portable ladders as follows:

ANSI	CSA	RATED USE	DUTY RATING
Grade 1A	N/A	Construction & Industrial	Extra Heavy (300 lbs.)
Grade 1	Type I	Trades & Farm	Heavy (250 lbs.)
Grade 2	Type II	Commercial	Medium (225 lbs.)
Grade 3	Type III	Household	Light (200 lbs.)

ANSI Type I and CSA Grade 1 ladders are recommended for use in the utility and telecommunication industries.

204 BENEFITS OF CERTIFICATION

Standards reflect a national consensus of producers and users including manufacturers, consumers, retailers, unions and professional organizations, and government. Standards are used widely by industry and commerce and often adopted by municipal, provincial and federal governments in their regulations, particularly in the fields of health and safety, building and construction and the environment. See Figure #1 and Tables 1 and 2 for ladder test examples. (For full test procedures see CSA 3-Z11-M81.)

TABLE 1 - RUNG TO RAIL SHEAR TEST

Ladder Grade		Test Load kg (lbs.)
ANSI	CSA	
I	1	450 (1,000)
II	2	410 (900)
III	3	360 (800)

TABLE 2 - RUNG & STEP BENDING TEST

Ladder Grade		Test Load kg (lbs.)
ANSI	CSA	
I	1	410 (900)
II	2	385 (850)
III	3	360 (800)

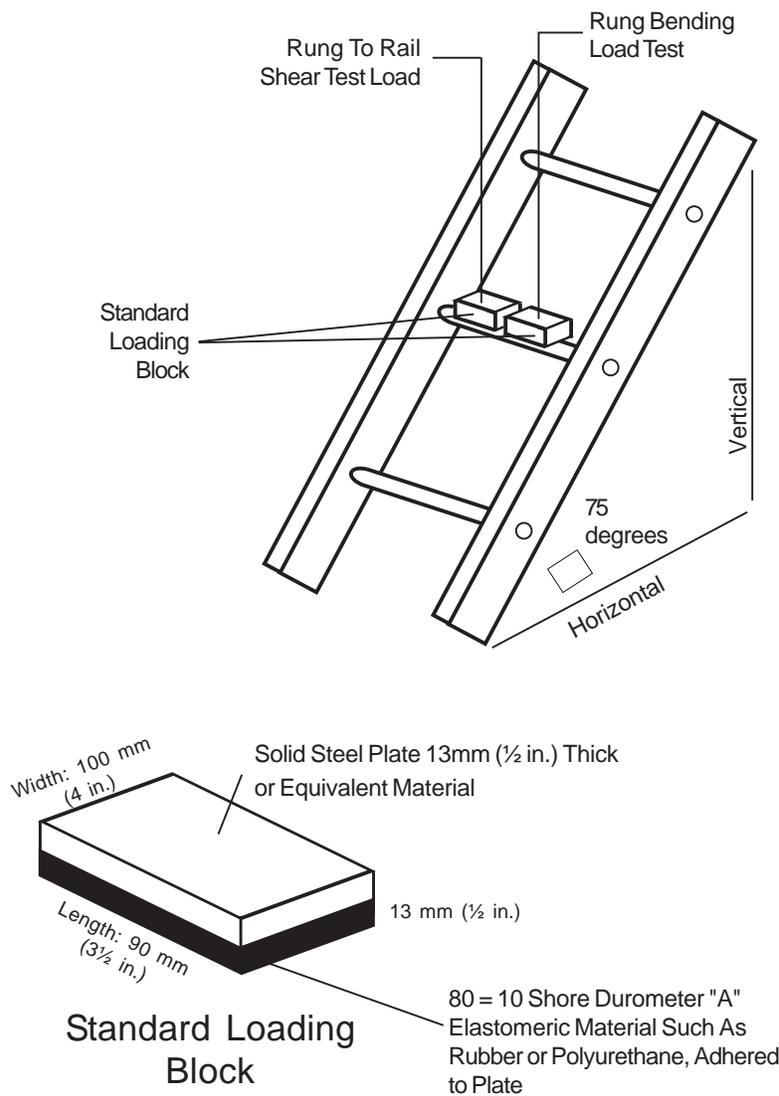


Figure #1

205 LADDER FEET

The bottom of the siderails should be outfitted with slip resistant material designed to function at the preferred angle of inclination and for the job at hand.

206 END CAPS

Except on wooden ladders, siderail ends should be equipped with end caps, to provide protection from sharp edges and damage to siderails. End caps must not be used as ladder feet as they will not allow for proper angle of inclination.

207 EXTENSION LADDERS

The upper sections of an extension ladder should not be used as a single ladder because the bottom ends of the siderails do not have non-slip feet.

LOCKS Locks may be any good functional design such as gravity, spring action, rope operated, or stationary types.

RUNGS Where there is a missing rung in the fly section of an extension ladder, to accommodate a locking device, the ladder should be assembled so that the fly section is on the rear side of the ladder away from the climber.

PULLEY The pulley should not be less than 32 mm (1¼ in.) in diameter.

ROPES For ladders up to and including 12 m (40 ft.) long, the rope used should be synthetic, not less than 6 mm (¼ in.) in diameter and have a minimum breaking strength of 250 kg (550 lbs.). For ladders longer than 12 m (40

ft.), the rope used with the pulley shall be synthetic, not less than 8 mm (⁵/₁₆ in.) in diameter and have a minimum breaking strength of 250 kg (550 lbs.).

208 STEP LADDERS

Step ladders are subjected to rigorous testing in order to comply with ANSI/CSA standards. These tests include:

- compression test
- siderail bending test
- step or platform bending test
- step to siderail shear strength test
- bucket shelf test
- stability test
- torsional stability test
- front rail and rear rail cantilever bending test
- stepladder racking test

NOTE: The bucket shelf is tested at only 25 kg (55 lbs.) for one minute. It can be seen that the bucket shelf is not designed to stand on. Other tests consist of varying amounts of weight placed in a variety of locations and configurations. Although the tests provide for generous safety factors, it is advisable to use the ladder for the purpose for which it is intended, namely, to be worked upon by one person in compliance with this guide.

209 SINGLE LADDERS

Single ladders are one-piece, nonjointed ladders available in a variety of lengths. They are often used when trenching and must be equipped with nonslip feet.

The same type of tests are performed on single ladders as on extension ladders.

210 SECTIONAL LADDERS

This type of ladder, assembled from short, even-length sections, usually 1.8 m (6 ft.), are joined together for use at the desired length. They are available in wood, fibreglass or metal. Sections are assembled by attaching one section to the top of another by means of special fittings. They are useful for work involving considerable transportation and limited storage space.

211 VERTICAL FIXED POSITION LADDERS

Toe room of at least 15 cm (6 in.) clearance should be provided between the ladder and the wall.

There should be at least 60 cm (24 in.) clearance on the climbing side.

Siderails should extend at least 90 cm (36 in.) above the top landing to provide secure mounting and dismounting of the ladder.

Spacing of adjacent rungs should be even and between 30 cm (12 in.) on centres.

There should be rest platforms at not more than 9 m (30 ft.) intervals.

The ladder should be offset at each rest platform.

Where the ladder extends over 3 m (10 ft.) above grade or a floor or landing, it should have a safety cage commencing not more than 2.2 m (7 ft.) above grade, or the floor or landing, and continuing at least 90 cm (36 in.) above the top landing with openings to permit

access by a person to rest platforms or to the top landing.

NOTE: Access ladders on a tower, water tank, chimney or similar structure do not require rest platforms or cages if they are equipped with a fall arrest system.

212 WOODEN LADDERS

Most wooden ladders manufactured today are equipped with steel supporters under each rung. Rods are threaded on each end and fastened with nuts and large washers. This makes it possible to tighten a ladder that has loosened under normal use.

All wooden ladder parts should be free of sharp edges and splinters and visually inspected to be free of shake, wane, loose knots, compression failures, decay or other irregularities.

NOTE: Steel reinforced siderails on wooden ladders should not be used around energized equipment as the reinforcing is a good conductor and could provide an electrical path to ground or potential difference. Metal rungs on fiberglass ladders and wire reinforced rungs on wooden ladders do not present the same hazard.

213 METAL/ALUMINUM LADDERS

A metal ladder should not be used near energized electrical equipment, due to the potential for serious injury or death in the event of electrical contact.

214 FIBREGLASS LADDERS

Never rely on the dielectric properties of fibreglass ladders when working near electricity.

PROS - do not conduct electricity

- resist corrosion

CONS - require extensive maintenance

- heat sensitive [should not be exposed to temperatures above 93° C (200° F)]

215 LADDER ACCESSORIES

GATE-ACCESS CONTROL-FIXED LADDERS

The use of fixed ladders by unauthorized personnel is hazardous. Gates preventing unauthorized access can be installed on watertank and communication tower ladders. The gates swing open to allow use and can be padlocked closed when not in use.

STABILIZER SIDERAIL BRACE

A number of siderail braces are available to prevent sideway slippage due to irregular surfaces or weight and strain from the user.

STRAND HOOKS

Metal hooks attached to the ends of ladders, designed to help prevent the ladder from moving horizontally. They are a safety feature when set up against telecommunication/utility conductor strand. The hooks should be slightly above the strand.

SELF-CENTERING TOP RUNG

This safety device prevents tilting or swaying of ladders used against trees, poles, corners of buildings, etc. A flexible rung is attached between the tops of the siderails and automatically adjusts to the contour of the surface. The strap is sometimes rubber-covered to

provide a good gripping surface. Other types of rungs include V-bars, which conform to the corners of buildings, etc.

LADDER LASH

Ladder lashes provide a vertical or horizontal anchor to poles, posts, etc., which are made of web bolting and snap locks which fasten to eyebolts on the ladder rails. The unit holds the ladder securely by encircling poles up to 40 cm (16 in.) in diameter. They are recommended when using single, sectional and extension ladders against poles.

LADDER SPIKES AND SPURS

Sharp metal spikes or semi-circular, jagged toothed railbottoms, may be bolted to the bottom of ladder rails for better security. The spikes prevent the ladder from sliding on gravel or other soft surfaces. They should be kept sharp and in good condition and are not a substitute for careful placement, lashing or holding of ladders.

NON-SLIP FEET

Rubber pads attached to the bottom of ladder feet, designed to provide good traction. In order to be effective, they should be inspected regularly, to ensure they are properly secured.

216 LEGISLATION

The Occupational Health and Safety Act and Regulations for Industrial Establishments and Construction Projects, as well as the Federal Canada Labour Code Part II, devote several sections to ladders. Reference these sections for legal responsibilities concerning ladders. For accurate reference, refer to the current official volumes.

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SECTION III

LADDER HANDLING AND SETUP

300 GENERAL

Ladders can play a big part in performing work and they can, if not used properly, be very dangerous. They can be a handy and useful tool, or an injury causing device. It's up to you!

There are some basic rules and procedures to follow when handling, setting up and working aloft on ladders.

If you adopt and apply them, it will result in a safer working environment.

301 EXTENSION LADDER

1. TRANSPORTING

In all cases, the extension ladder should be securely fastened to the roof rack. Never use wire to secure the extension ladder to a ladder rack. Use only approved tie downs that will hold the ladder firmly in place. This will prevent damage from road shock and stop the ladder from falling off the vehicle while in transit.

A recommended method for placing a ladder on a vehicle equipped with a ladder rack is to:

- (a) Place the base of the ladder, opposite the rear wheel, 45 cm (18 in.) from the vehicle in the vertical position.
- (b) Move the top portion of the ladder resting against the roof rack toward the front of the vehicle, until the ladder rests in an inclined position.

- (c) Grasp the ladder near the base end and lift it up onto the ladder rack.
- (d) Secure the ladder. Reverse the procedures to remove the ladder from the vehicle.

NOTE: Do not drop the base of the ladder to the ground, as this will damage the base and siderails of the ladder. Place the ladder gently onto the ground.

2. CARRYING

Tilt the ladder against the shoulder, bend the knees with the back straight and then straighten the knees, lifting the ladder bottom approximately 30 cm (1 ft.) off the ground. Keep a firm grip with one hand on the top siderail and the other on a rung located below shoulder height. This position will enable the employee to drive the bottom of the rail quickly into the ground and brace the body against the ladder should a sudden wind, slippery surface or uneven ground cause the employee to lose balance.

NOTE: Ensure the top section is fully retracted and secure the free end of the ladder rope.

Rotate the ladder hooks, if so equipped, into the plane of the rungs, before carrying the ladder.

3. SELECTING FOOTING AND SETUP

Set the ladder on solid level footing only. On uneven surfaces remove material, where appropriate, to level the ladder or build up with wooden planking. On cement, asphalt and steel surfaces, use nonslip pads.

When setting up on ice, snow, grass and similar surfaces, the spurs/spikes of the ladder should be used to prevent the base of the ladder from slipping.

NOTE: Ensure that ice is firmly frozen to the surface beneath. If it is not, remove the ice to ensure a firm grip.

Place the base of the ladder so distance B – from the base of the ladder to a line extended vertically from the top support – is approximately one-fourth of the length of the ladder, measured from the top support to the bottom support A – RATIO 4:1. (See Figures #2 and #3)

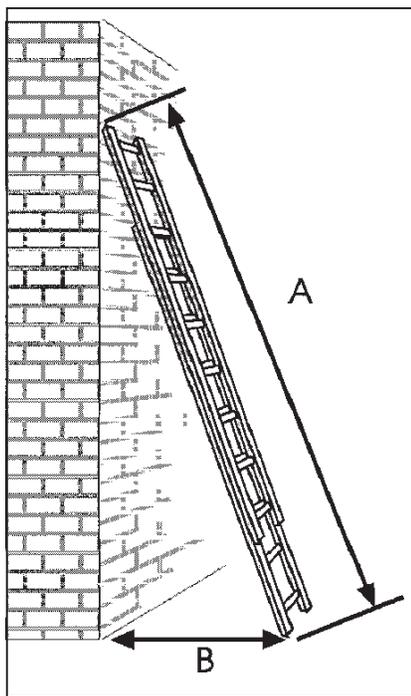


Figure #2

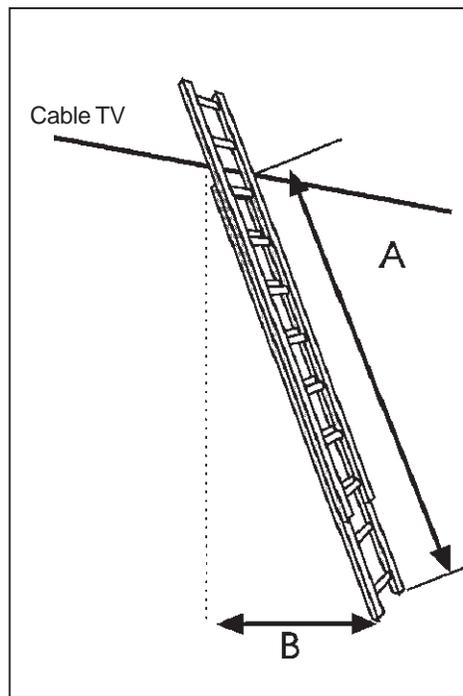


Figure #3

A method of verifying the correct angle is called the firefighter's method. Standing at the base of the ladder, extend your arms horizontally. The palms of your hands should be touching the outside of the siderails. (See Figure #4)

NOTE: IHSA has a decal available outlining the 4:1 ratio, which is placed on the right hand siderails of ladders.

4. RAISING AND LOWERING

RAISING AND LOWERING – ONE PERSON

Extension ladders up to 8.5 m (28 ft.) may be raised or lowered by one person. Secure the base in earth or place the base against a wall, pole or other secure object. Raise the top end over your head, and walk towards the base (See Figure #5) then set up using the 4:1 ratio.

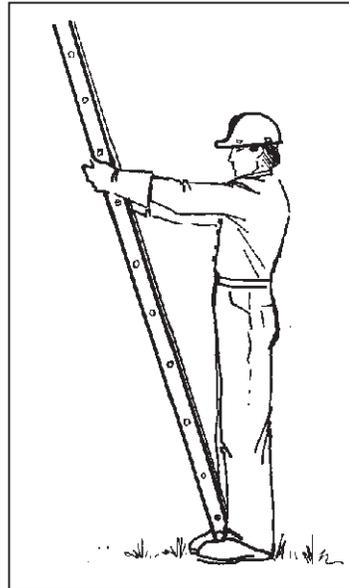


Figure #4

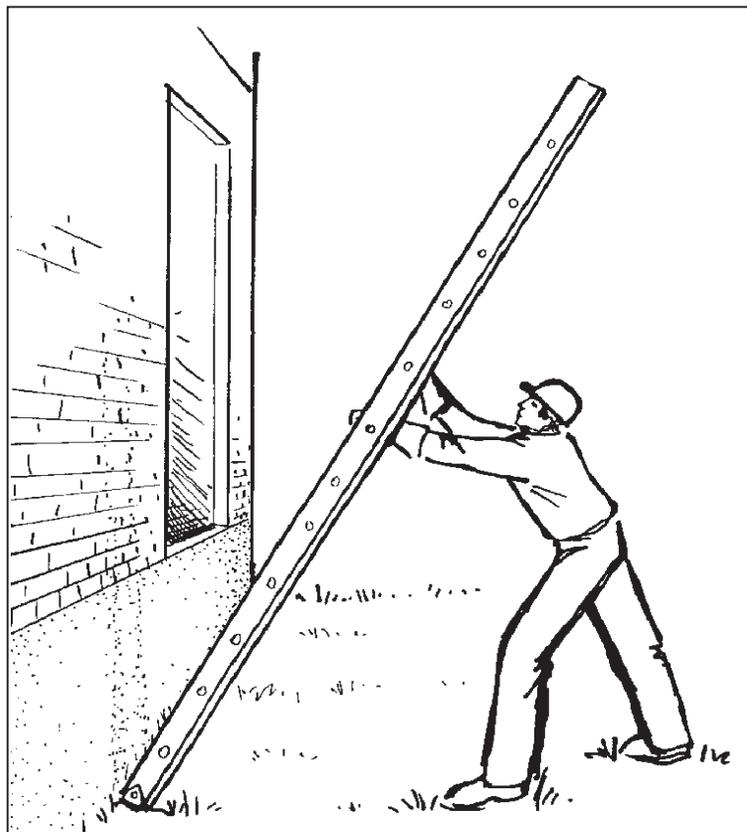


Figure #5

After the ladder is raised to an upright position, this method should be followed to raise the top section:

- (a) Place the ladder in an upright, balanced position.
- (b) Stand directly in front of the ladder, hands on the siderails.
- (c) Using a balanced position, block the base of the ladder with one foot.
- (d) Untie the ladder rope.
- (e) With one hand on one siderail, and the other on the rope, pull the ladder rope, keeping it midway between the siderails. (See Figure #6)
- (f) Raise the top section two or three rungs at a time until the desired height is reached. Ensure that the hand holding the siderails does not get caught between moving sections.
- (g) Engage the rung locks after each pull.
- (h) After locking the top section at the desired height, allow the ladder to move slowly toward the support.
- (i) Tie the ladder rope securely around the rungs of adjacent upper and lower sections.

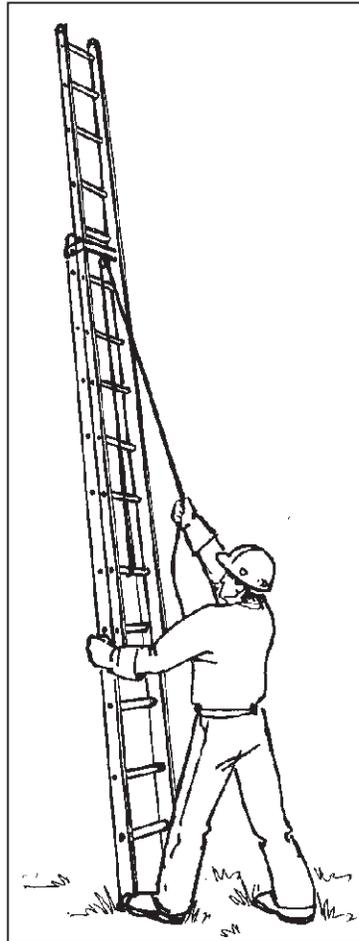


Figure #6

LOWERING

- (a) Untie the ladder rope.

- (b) Stand directly in front of the ladder.
- (c) Using a balanced position, block the base of the ladder with one foot.
- (d) Pull the top of the ladder slowly away from support to an upright, balanced position.
- (e) Pull on the rope, raising the top portion to release the ladder locks.
- (f) Using the rope, allow the upper section to descend slowly, taking care not to injure the hand on the siderail or allow the ladder to strike the ground sharply.

RAISING AND LOWERING – TWO PERSON

It is recommended that a 9.7 m (32 ft.) to 12 m (40 ft.) extension ladder be raised and lowered by two people, with the base of the ladder held securely by one, while the other raises the ladder up to a vertical position. (See Figure #7)

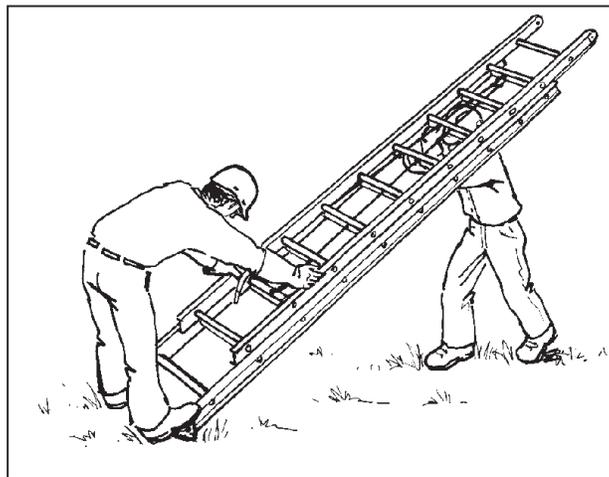


Figure #7

The person standing on the back side of the ladder should hold the siderails of the lower section, while the top section is being raised or lowered with the rope by

the other person, facing the front of the ladder.
(See Figure #8)

5. SECURING

Objects, against which the top of the ladder is placed, should be sufficiently rigid and have strength to support the ladder, the climber, plus any extra weight caused by the type of work being performed.

Prior to climbing a ladder on a strand having a fairly steep slope, the ladder should be secured as follows:

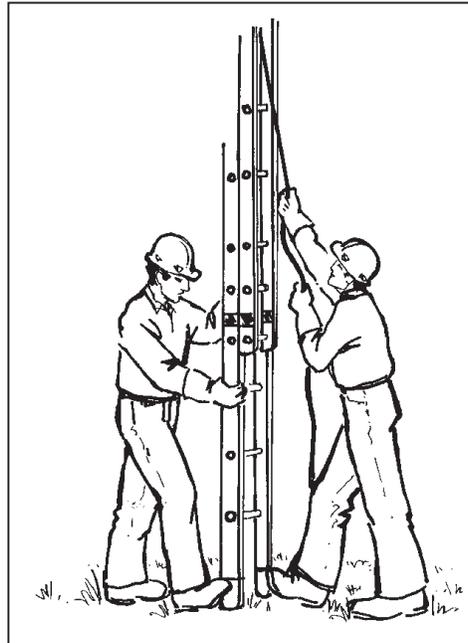


Figure #8

Before raising the ladder, throw a handline over the strand and secure one end of the handline to the second rung from the top. After placing the ladder on the strand, pull the other end of the handline and secure it to an adequate support on the uphill side of the ladder, such as a pole, tree or bar firmly placed in the ground. (See Figure #9)

NOTE: Never attempt this method when the hydro system is less than 3 m (10 ft.) from the telecommunications system.

When a ladder is placed against the strand, secure the ladder to the strand at all times. (See Figure #10)

A ladder equipped with strand hooks should be positioned so that when the climber is in the working position, the strand hooks are slightly above the strand. When setting up in mid-span, allow for move-

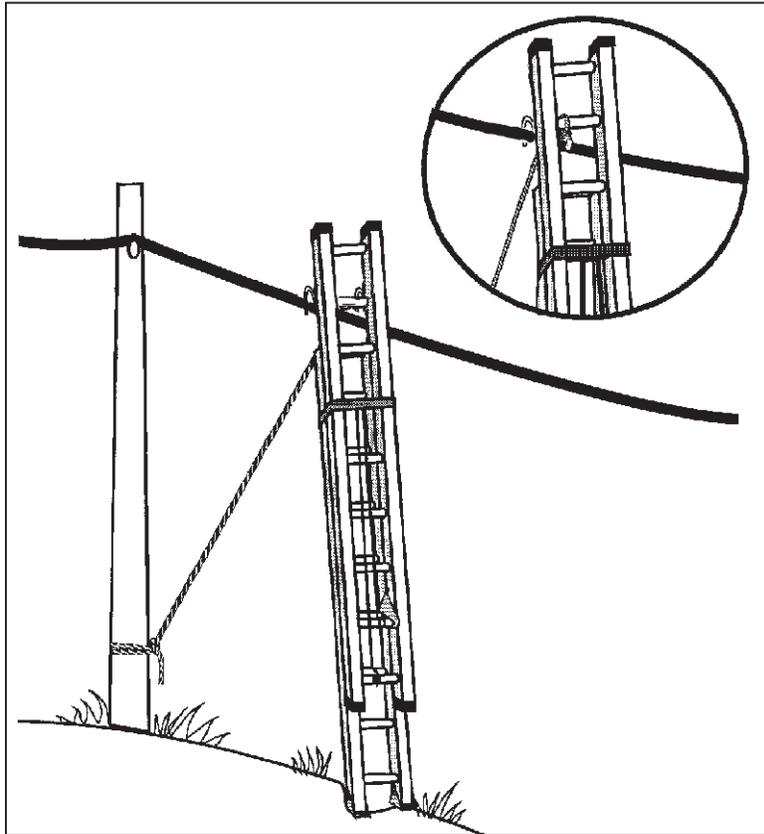


Figure #9

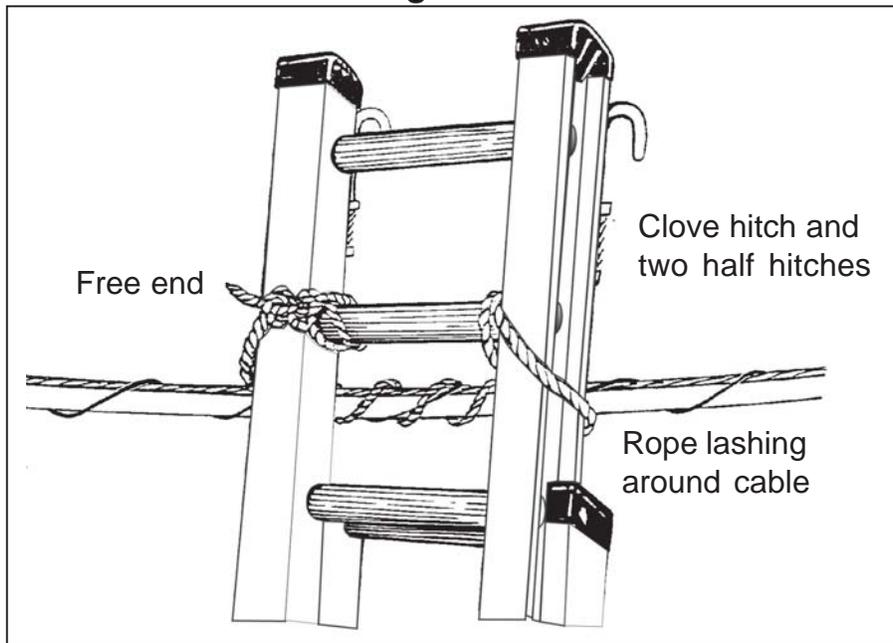


Figure #10

ment of the strand due to the weight of the ladder and climber. This movement could cause the sections of the ladder to separate or move the base of the ladder along the ground. Ensure that the strand is securely fastened in the hubbard before climbing the ladder. Where possible, place the ladder so that it is pushing the strand toward the pole.

When it is necessary to place the extension ladder on the strand at a drop wire attachment in mid-span, position the ladder so the climber will face the drop wire running to a building. Do not position the ladder inside the angle formed by a drop wire. (See Figure #11)

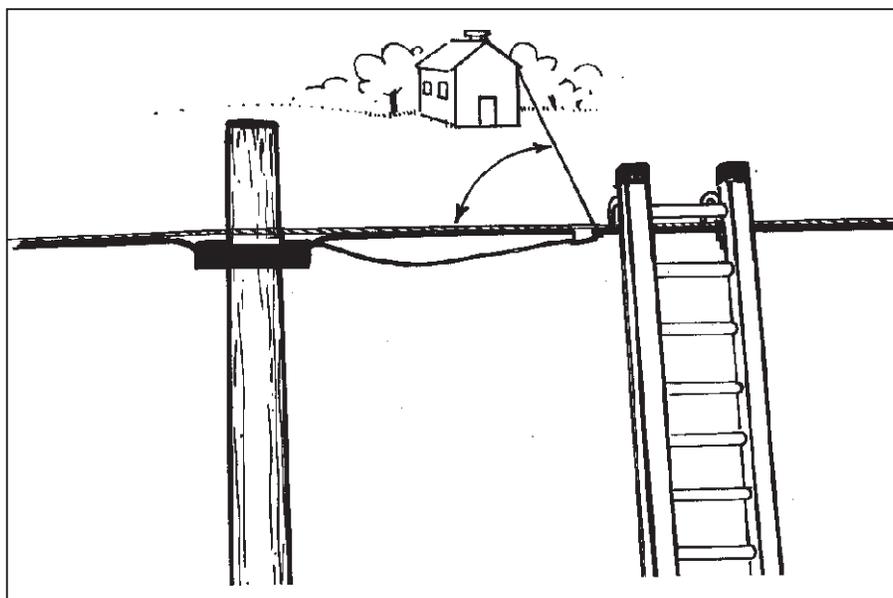


Figure #11

Extension ladders set up against poles, trees or corners of buildings should be equipped with V-bar or self-centering strap rungs to help stabilize the ladder.

An extension ladder placed against a pole can be secured from the ground without having to climb the ladder. One method is as follows:

- (a) Tie a handline to the top rung and pass it over the pole grip or V-bar to the back of the ladder.
- (b) Raise the ladder to the proper height and position.
- (c) Bring the handline around the back of the pole.
- (d) Flip the handline over the end of the opposite siderail.
- (e) Pass the loose end of the handline between two lower rungs, around a siderail, twice around the pole and back around the other siderail. (See Figure #12)

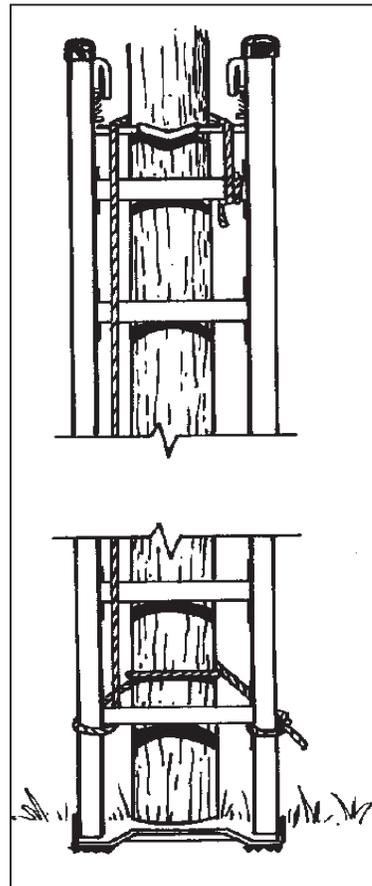


Figure #12

NOTE: The proper 4 to 1 ratio for ladder setup, as outlined in this guide, must be maintained.

An alternate method is to secure the base of the ladder first. (See bird's eye view in Figures #13 and #14)

When a ladder is used against the side of a building or to gain access to a roof, the ladder must be made secure before climbing.

If there is no means of lashing, two temporary rope guys should be used.

NOTE: As shown in Figure #15, the ladder must be extended at least three rungs above the landing platform, so the climber may grasp

the top rung while transferring from the ladder to the roof or platform.

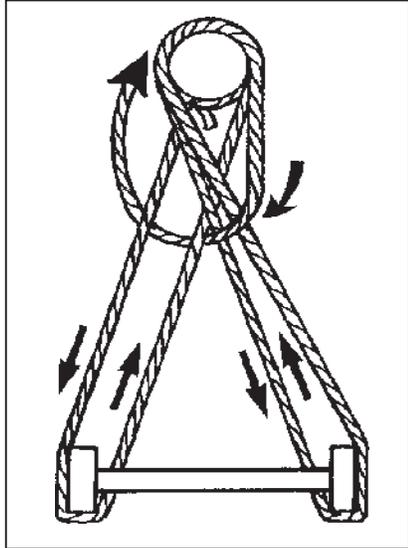


Figure #13

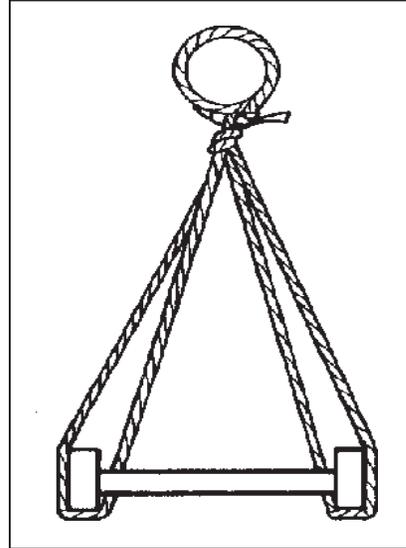


Figure #14

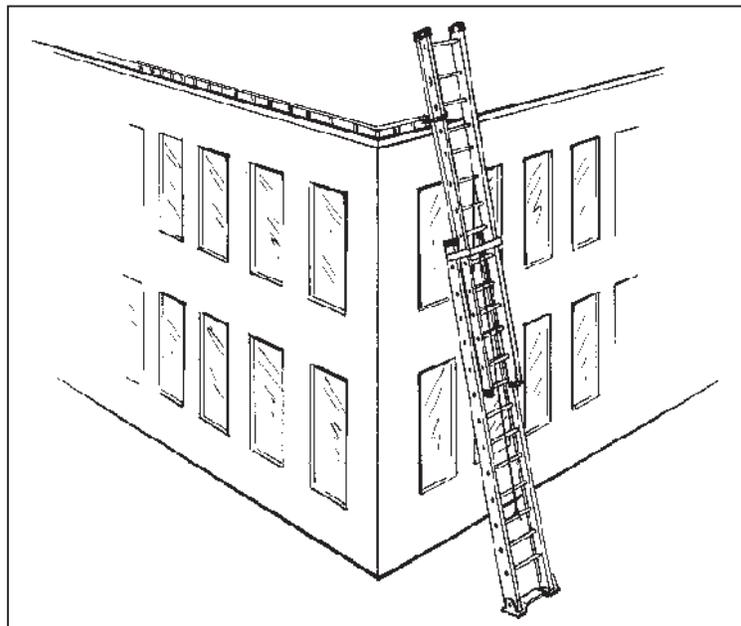


Figure #15

6. CLIMBING AND WORKING ALOFT

The following is a list of safe practices to follow when climbing and working aloft:

- (a) Ensure that the ladder is in good working condition as defined in Section 401 of this guide.
- (b) Ensure that the ladder is secure, at the proper 4:1 ratio, and is on solid footing.
- (c) Before climbing, ensure that the rungs of the ladder and the hands and shoes of the climber are free from slippery substances. Wear only footwear with heels when working from ladders.
- (d) Do not climb a ladder while wearing climbing spurs.
- (e) Only one person at a time is permitted on the ladder.
- (f) Face the ladder when ascending and descending, and take one step at a time. Do not hurry or jump from the ladder.
- (g) Do not climb up or down a ladder while carrying anything in your hands. Tools, equipment and material should be placed in a container and raised or lowered by a rope. Maintain three point contact: one hand/two feet or two hands/one foot.
- (h) Do not attempt to lean to the side so the centre of the chest is beyond the siderail when working from the ladder.
- (i) When working from the ladder, stand no higher than the fourth rung from the top support.
- (j) Do not allow anyone to stand or work under the ladder while work is being performed aloft.
- (k) When working aloft from a ladder, use an approved

fall protection device when working from a height of 3 m (10 ft.) or more.

- (l) If you are using a ladder to get to a rooftop or other high place, be particularly careful when getting back onto the ladder. Statistics show this manoeuvre causes the majority of ladder incidents.

7. WORK AREA PROTECTION

The location, time and environment will dictate the extent of work area protection required. Work area protection should meet the requirements of the Ministry of Transportation, Ontario Traffic Control Manual, Book 7.

When setting up on a sidewalk, traffic cones, or other suitable barriers, should be used to direct the public around the base of the ladder. If setting up a ladder in a driveway or behind a parked vehicle, notify the owner.

Whenever possible, avoid setting up a ladder on the travelled portion of the road. If this is impossible, use cones, signs and the vehicle to protect the base of the extension ladder. (See Figure #16)

REMEMBER: Turn the front wheels of the vehicle toward the curb, and apply the emergency brake. In the event of a collision, this should prevent the vehicle from travelling straight forward and striking the base of the ladder.

Another dangerous situation is a ladder set up in front of a doorway. When a ladder must be placed against a large overhead door, ensure that the door cannot be operated. Open the door wherever possible or lock the door shut. Notify the owner or the manager of the building before locking or blocking any door that could be used as a fire exit!

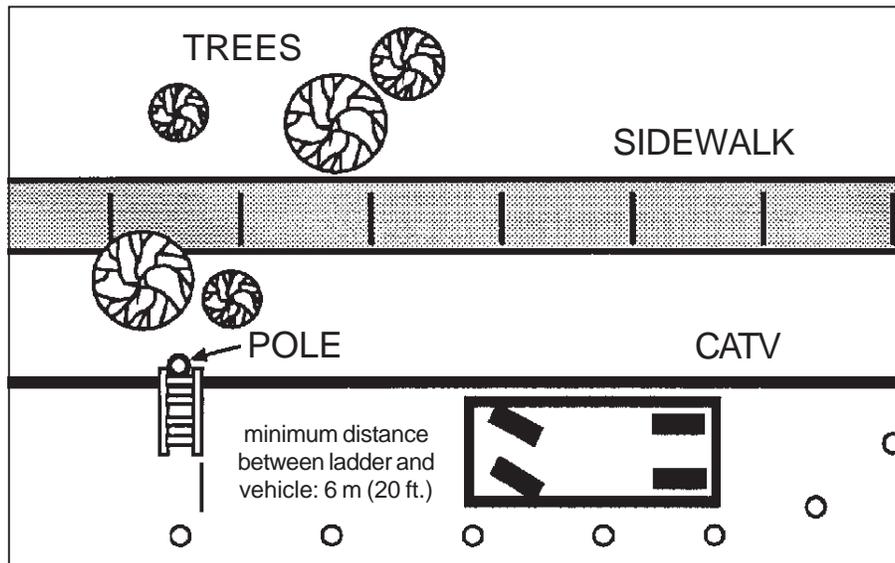


Figure #16

If you must leave the extension ladder erected and unattended for an extended period of time, ensure that the ladder is firmly attached to the support to prevent the ladder from falling accidentally. In addition, the bottom six rungs of the ladder should be covered to prevent the use of the ladder by unauthorized people.

302 STEP LADDER

1. TRANSPORTING

In all cases, the step ladder should be securely fastened in place, whether stored inside the vehicle or on the ladder rack. Never use wire for securing the step ladder to the ladder rack, use only approved tie downs that will hold the step ladder firm to the roof rack, to prevent damage from road shock.

2. CARRYING

Do not attempt to move a step ladder while the spreaders are fully extended and locked in place. Fold the step ladder and lower it parallel to the floor. Grasp the

siderails with both hands at the balance point. Carry the step ladder at arms length, keeping your back as straight as possible. Avoid dragging the bottom side.

3. SELECTING FOOTING

The four legs of the step ladder should be at the same level. If necessary, level the legs of the ladder with a wooden wedge or planking.

When it is not possible to avoid placing a step ladder on a surface where it might be unstable, the ladder should be held by another person or securely fastened to prevent it from moving.

4. SETUP

First, make certain that the sides are fully extended and locked in position, and the ladder is set on a secure footing before climbing. A properly placed ladder should not lean in any direction.

Before moving a step ladder, ensure it is free from tools and material on the steps or bucket shelf.

NOTE: A step ladder should never be used as a straight ladder.

5. CLIMBING AND WORKING ALOFT

The following is a list of safe work practices for climbing and working aloft:

- (a) Ensure that the step ladder is in good working condition as described in Section 401 of this guide.
- (b) Ensure that the ladder is stable and on solid footing.
- (c) Before climbing, ensure that the steps are clear of any tools or equipment and free of any slippery substances.

- (d) Have the use of both hands and maintain three point contact.
- (e) Only one person is permitted on the step ladder.
- (f) Face the ladder when ascending and descending, and take one step at a time. Do not hurry.
- (g) Do not lean so far out that the centre of the chest is beyond the siderail.
- (h) Keep the ladder close to your work. Avoid pushing or pulling off to the side of the ladder.
- (i) Do not stand with one foot on the step ladder and the other on another support.
- (j) Do not throw tools or equipment to the person on a step ladder.
- (k) On a 1.2 m (4 ft.) or less step ladder, the highest step the worker can work from is the first step from the top (the top is not considered a step). With step ladders over 1.2 m (4 ft.) the second step from the top is the highest step that can be worked from (the top is not considered a step).
- (l) Do not stand on the pail shelf as it is not intended to support body weight.

6. WORK AREA PROTECTION

Location, time and environment will dictate what protection is required. When working around doorways, in narrow halls and aisles, hazard markers or safety cones must be used. If setting up in front of a doorway, lock the door shut or, better yet, open the door wide in case it is used as a fire exit. Notify the owner or building manager if you block or lock any doors.

303 SINGLE LADDER

The handling and setup of the single ladder is basically the same as the extension ladder, covered in Section 301 of this guide. The following is a list of general things to remember when handling and setting up a single ladder:

1. Ensure that the ladder is fastened securely on the ladder rack or inside the vehicle during transportation.
2. The single ladder may be carried on the shoulder, like an extension ladder, or at arm's length beside the body.
3. Ensure that the single ladder is equipped with non-slip feet.

NOTE: Never use the top section of an extension ladder as a single ladder. This section is not equipped with non-slip feet.

4. Set the ladder on solid, level footing.
5. Place the ladder at the proper 4:1 ratio.
6. Secure the ladder by tying it off, or have another person hold the bottom of the ladder.
7. Before climbing, ensure that the rungs of the ladder and the hands and shoes of the climber are free from slippery substances.
8. Only one person is permitted on the ladder.
9. Face the ladder when ascending and descending. Take one step at a time. Do not hurry or jump from the ladder.
10. Do not climb up or down a ladder while carrying anything in your hands. Tools, equipment and material should be placed in a container and raised or lowered by a rope. Maintain three point

contact.

11. Do not attempt to lean to the side so that the centre of the chest is beyond the siderail.
12. When working from the ladder, the worker should stand no higher than the fourth rung from the top support.

Signs, cones or barricades should be used to direct pedestrian traffic around the base of the ladder. Take special precautions if the ladder must be set up in a doorway or in a driveway. Notify the owner or building manager of your intention.

304 SECTIONAL LADDER

The handling, setup and securing of a sectional ladder is basically the same as the extension ladder, covered in Section 301 of this guide.

The following is a list of things to remember when working with a sectional ladder:

1. Ensure that the bottom section is equipped with nonslip feet.

NOTE: Never use the top or middle section as the base. They are not equipped with non-slip feet.

2. Connect the sections together by inserting the male end into the female end. Then insert the locking pins to fasten the sections securely together.
3. The combined maximum length of a sectional ladder is 9 m (30 ft.).
4. When inspecting the ladder before use, check for cracks and loose rivets around the area where the male and female ends connect to the siderails.

5. Be careful not to damage the male and female connections of the ladder, as this could make it impossible to connect the two sections together.
6. To prevent undue stress on the ladder joints, remember the 4:1 ratio.

305 VERTICAL FIXED POSITION

1. MAINTENANCE HOLE

2. TOWER

Vertical fixed position ladders are used in maintenance holes and on towers, where the ladder is mounted permanently on a wall or structure. Although the handling, setup and securing of this type of ladder is eliminated, there are safety precautions that should be followed when using this type of ladder.

1. MAINTENANCE HOLE

- (a) Inspect the ladder for loose, worn and damaged rungs.
- (b) Ensure the ladder is mounted securely to the wall.
- (c) Report any defects promptly. Don't leave a hazardous condition for someone else.
- (d) Wait until the other person has exited before ascending or descending.
- (e) Don't carry tools or equipment in your hands while climbing. Maintain three point contact.
- (f) Workers are required to wear approved fall protection device when ascending or descending maintenance hole ladders over 3 m (10 ft.) in depth.

2. TOWER

Refer to Section 211 of this guide.

- (a) Inspect the ladder for loose, worn and damaged rungs.
- (b) Ensure that the ladder is mounted securely to the tower before climbing.
- (c) Report any defects promptly. Don't leave a hazardous condition for someone else.
- (d) Wait until the other person has exited before ascending or descending.
- (e) Don't carry tools or equipment in your hands while climbing. Maintain three point contact.
- (f) Use an approved fall protection system while ascending and descending the tower.
- (g) To prevent the general public from climbing the tower ladder, remove the temporary ladder or lock the ladder gate at the base of the ladder.
- (h) Check rungs for ice build-up during winter conditions.

NOTE: Falling ice could be hazardous to people on the ground. Post warning signs.

306 ROLLING LADDERS

Rolling ladders are usually made of lightweight, tubular metal and have a wide tread. Rolling ladders may or may not have spring-loaded casters that retract when climbers put their weight on the bottom step.

A two step to five step rolling ladder may or may not have handrails to aid in climbing. If the rolling ladder is over six steps, it should be equipped with a handrail for the added protection of the climber.

Rolling ladders over six steps should have positive locking casters, rather than the spring-loaded type usually found on the shorter rolling ladders.

Points to remember when moving, setting up and climbing are:

1. Ensure that the path is clear and wide enough to move the ladder.
2. Ensure that all tools and equipment are removed before moving.
3. Ensure there is enough clearance between the top of the ladder and the ceiling or lights.
4. Before climbing, apply brakes or wheel locks to prevent movement, and/or tie the rolling ladder to a rigid structure to help secure the ladder.
5. When stepping to and from the ladder, don't jump. Maintain three point contact.
6. Do not over reach the handrails. Move the ladder.
7. Employees must not work aloft higher than 3 m (10 ft.) without first adequately securing themselves with an approved fall protection device.
8. Do not climb higher than the top platform on the railing.
9. Do not stand with one foot on the ladder and the other on a different object, such as shelving.

**SECTION IV
CARE AND MAINTENANCE OF LADDERS**

- 400 PORTABLE LADDER INSPECTION**
- 401 INSPECTION CHECKLIST FOR
SINGLE AND EXTENSION LADDERS**
- 402 FIBREGLASS LADDER INSPECTION**
- 403 STEP LADDER INSPECTION**
- 404 ROLLING LADDER INSPECTION**
- 405 FIXED LADDER INSPECTION**
- 406 LADDER STORAGE ON VEHICLES**
- 407 LADDER STORAGE SHOP**
- 408 LADDER REPAIRS**

SECTION IV CARE AND MAINTENANCE OF LADDERS

400 PORTABLE LADDER INSPECTION

LADDERS CARRIED ON VEHICLES

Portable ladders should be inspected prior to use by the climber, taking into consideration that there is a tendency for bolts, nuts and rivets to loosen due to:

1. Vibration and jarring during road travel.
2. The jarring action the ladder receives when being removed from or placed on the vehicle ladder rack.
3. The actual setup of the ladder at the work site.
4. Dropping the ladder while loading or unloading from the ladder rack.

These factors can contribute to the ladder deteriorating.

Each component of a portable ladder is part of a system designed and built to support the weight of the climber. Any defect or damage to a component can critically affect the load-bearing capacity of the ladder. The ladder should be inspected regularly and, when necessary, the damaged or defective components should be repaired or replaced without delay. When this is not possible the ladder should be removed from service and tagged as defective.

401 INSPECTION CHECKLIST FOR SINGLE AND EXTENSION LADDERS

The following is a checklist of defects to look for during a daily ladder inspection (wood and fibreglass):

1. SIDERAILS

- splits, fractures, severe warp

2. RUNGS

- bent, broken, missing, worn, thin
- loose, or missing rivets

3. RUNG LOCKS

- broken, nuts or bolts missing, broken or missing rung lock trippers or rung lock tripper springs

NOTE: To safely support the climber's weight, both rung locks must fully engage the rung. They should operate freely and function properly. Lubricate when necessary. When a rung lock is broken, or otherwise defective, do not attempt to immobilize it by tying or taping it to the siderail – repair or replace it immediately or remove the ladder from service and tag it as being defective.

4. SAFETY FEET

- worn or missing slip resistant pads
- missing nuts or bolts
- broken or badly bent, missing or badly worn spurs

NOTE 1: Spur wheels can be rotated. The rule of thumb is:

- slip resistant pads for hard surfaces, such as concrete or asphalt
- spur wheels (spikes) for ice, snow and most non-pavement use
- lubricate as necessary

NOTE 2: On older style FEATHERLITE brand ladders, check to make sure the safety foot bar stops are present. (See Figure #17)

NOTE 3: On slippery asphalt or concrete surfaces, a vehicle may be used, where practical, to prevent the base of the ladder from slipping. Park the vehicle and remove the keys.

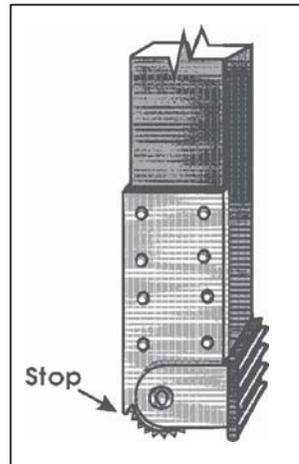


Figure #17

5. ROPE ASSEMBLY

- for extension ladders up to and including 12 m (40 ft.) in length, the lanyard (pulling rope) should be of synthetic material, should not be less than 6 mm (¼ in.) in diameter and should have a minimum breaking strength of 250 kg (550 lbs.). Replace badly worn rope and rope that has been degraded due to ultraviolet exposure, cuts or abrasion.

6. ROPE PULLEY

- securely attached and functional

7. EXTENSION

- broken or missing

8. LADDER ACCESSORIES

STRAND HOOKS

- bent, broken, missing, seized, loose

NYLON POLE STRAP

- frayed, cut, friction pad missing rivets, nuts or bolts missing

METAL V BRACKET

- bent or distorted, nuts or bolts missing

STABILIZER OR LEVELLER ATTACHMENTS

- check for missing or broken parts and that all parts function properly. Lubricate when necessary.

SLIDER PADS

- excessive wear, missing

402 FIBREGLASS LADDER INSPECTION

NOTE: The following information should be helpful in determining the condition of a fiberglass ladder for possible service. It is intended as a rule of thumb guide only.

1. CRACK

(a) A separation of the fiberglass lamination visible on both surfaces. (See Figure #18) The ladder should be removed from service for repair, if possible, or disposed of.

(b) A separation of material, but not visible on the opposite surface. (See Figure #19) The crack should be inspected regularly to ensure it does not deteriorate further.

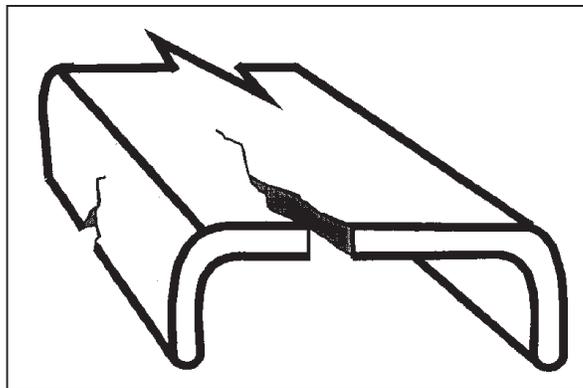


Figure #18

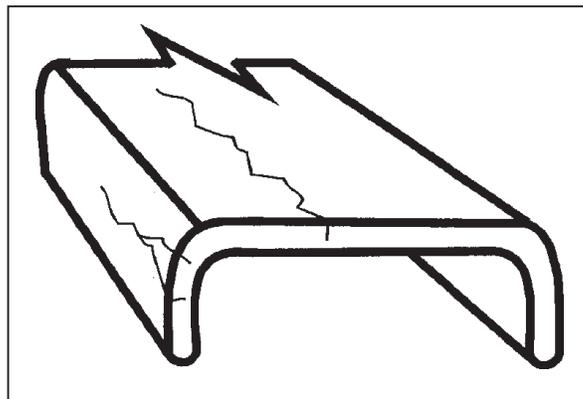


Figure #19

2. GOUGE (Hole)
Puncture of the material, visible on both sides.

(See Figure #20) The ladder should be removed from service for repair, if possible, or disposal.

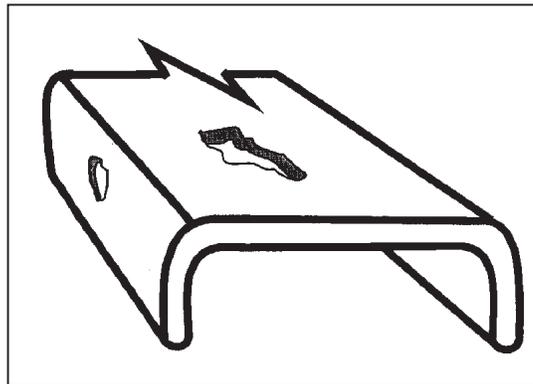


Figure #20

3. FRACTURE

Broken but not necessarily complete penetration to the opposite surface. (See Figure #21) The ladder should be removed from service for repair, if possible, or disposal.

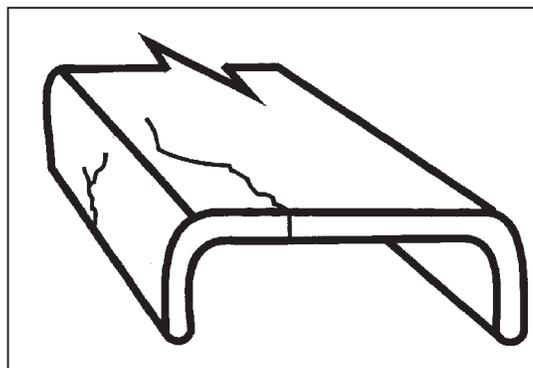


Figure #21

4. RESIN SURFACE CRACK

A surface crack that does not penetrate the laminated layer. (See Figure #22) Check regularly to ensure it has not expanded, especially into the underlying fibreglass laminate.

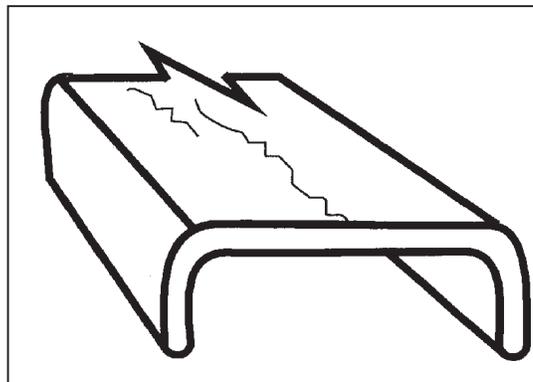


Figure #22

NOTE: All ladders should receive a careful inspection after a fall from the vertical

position, or any other situation where a severe impact has been sustained.

Any ladder, wood or fibreglass, found not safe for use, should be tagged defective. The tag should indicate the nature and location of the defect, the date the ladder was taken out of service and the name of the person applying the tag.

5. WEATHERING

This is a condition that is common to all fibreglass products and is generally referred to as “blooming.” It results when surface resin is eroded from exposure to constant wear through use, but primarily through exposure to the natural elements (eg. rain, sunshine, ultraviolet radiation, etc.). This condition is not usually considered a critical structural defect, but can cause a minor skin irritation to the user due to contact with the exposed glass fibres. Blooming can be virtually eliminated by refinishing the fibreglass components of the ladder (See Section 408-B of this guide).

403 STEP LADDER INSPECTION

Step ladders should be inspected regularly, taking into consideration frequency of use. The following is a check list for careful inspection of a step ladder (wood, aluminum or fibreglass):

1. SIDERAILS

- splits, cracks, separated laminations, splinters, decay, protruding nails

2. RUNGS

- cracks, decay, splinters, excessive wear or looseness

3. HARDWARE

- loose or missing rivets

- broken, loose or missing step or rung braces
- broken, loose or missing spreaders
- loose hinges
- broken or missing spreader locking device
- bottom of legs should be fitted with slip resistant material

4. STABILITY

- wobbly and unacceptable side to side movement when supporting the climber's weight

404 ROLLING LADDER INSPECTION

Regular inspection of rolling ladders should be performed to determine the condition of the ladder.

CHECK FOR:

- integrity of all welds
- broken or missing parts
- proper operation of braking devices
- condition of wheels

405 FIXED LADDER INSPECTION

Tower and maintenance hole ladders should be inspected prior to use to ensure they are in a safe condition.

CHECK FOR:

- signs of metal corrosion
- loose fasteners or anchoring devices
- missing rungs

NOTE: Tower ladder fall arresting devices should be inspected to ensure they are securely fastened to the tower and all system components are intact and functioning as intended.

Repairs and refurbishing should be completed as required.

406 LADDER STORAGE ON VEHICLES

The vehicle ladder rack serves two functions:

1. A means of adequately supporting the ladder so that the possibility of damage to the ladder is minimal during road travel.
2. To secure the ladder to the vehicle during road travel so that any possibility of the ladder falling off the vehicle is eliminated. This could occur during sudden stops, while accelerating, or from air stream action, especially at highway speed.

The vehicle-mounted ladder rack should be inspected regularly to ensure it is effectively secured to the vehicle, that all parts are in good condition and are functioning as intended, and that the devices used to secure the ladder to the rack are adequate.

NOTE: Scrap wire twisted to secure the ladder must not be considered as adequate. Step ladders, if carried on the vehicle, should be stored in such a manner so as to eliminate the possibility of damage from other material in the vehicle and uncontrolled movement.

Heavy objects should not be placed on a stored step ladder.

407 LADDER STORAGE (SHOP)

To avoid permanent warping or twisting of ladder siderails, care should be taken to ensure that if the ladder is stored horizontally on a rack or wall bracket, the supports should be spaced no more than 1.8 m (6 ft.) apart [e.g., three supports for a 7.3 m (24 ft.) ladder]. Ladders can be stored in a vertical position where space permits or stacked horizontally on the floor. Spacers should be used between the floor and the

bottom ladder and between ladders. For safety purposes, the number of ladders stacked horizontally should be limited to six.

408 LADDER REPAIRS

The replacement of defective ladder hardware, such as damaged rungs, rung locks, rope pulleys, safety feet, pulling rope, strand hooks, etc., can usually be done in-house, as long as the work is done only by a competent person. Fibreglass refinishing (refurbishing) can also be done "in-house", but repairs to the fibreglass laminate material should only be done by the ladder manufacturer or a ladder repair facility approved by the manufacturer.

NOTE: All repairs should be as good as, or better than, the appropriate ANSI/CSA standard for ladder construction.

<p>THIS IS INTENDED AS A GUIDELINE ONLY FOR FIBRE-GLASS FINISHING.</p>

Where weathering (blooming) is present, the fibreglass should be sanded with a non-metallic, abrasive material, such as scotch brite. Regular sandpaper or emery cloth may leave grit in the surface. The sanding should remove the prominent glass fibres. Wipe the surface with acetone, or equivalent, leaving no residue on the surface. Use a primer, followed by two coats of acrylic lacquer or polyurethane paint with ultra violet resistant additives. To restore the colour, apply a pigmented acrylic or polyurethane paint. This treatment will also help to restrict the ingress of moisture.

When it has been determined the ladder is damaged beyond repair, usable parts could be salvaged where practical, but the remaining defective ladder section

should be destroyed (rendered unusable).

Remember, if it's not safe enough to use on the job, it's not safe enough to use at home

NOTE: An undamaged fly section from one ladder could be matched with the undamaged bottom section of another ladder, as long as both ladders are from the same manufacturer and are compatible.

All wooden ladders should receive an application of a clear, non-conductive wood preservative. The frequency of application would depend on the amount of exposure to outdoor use. After a light sanding, a good quality spar varnish (exterior use) should be applied. This will help to prolong the life of the ladder and is an effective seal against the ingress of moisture. Do not paint wooden ladders as this tends to conceal any defects.

An example ladder inspection report form is shown at the end of this guide. It may be reproduced to assist in regular inspection and reporting of defects.

LADDER INSPECTION REPORT

TRUCK NO. _____

MAKE AND MATERIAL _____

LADDER NO. _____

TYPE: EXTENSION _____ SINGLE _____ STEP _____

DATE PURCHASED _____

ASSIGNED TO _____

DEPARTMENT _____

INDICATE "S" - SATISFACTORY "U" - UNSATISFACTORY

DATE OF INSPECTION D/M/Y _____

STEPS, RUNGS: S() U()

RUNG LOCKS: S() U()

ROPE AND PULLEY: S() U()

SAFETY FEET: S() U()

SIDERAILS: S() U()

HINGES: S() U()

SPREADERS: S() U()

UPRIGHTS: S() U()

VEHICLE LADDER STORAGE: S() U()

INSPECTED BY: (print name) _____

COMMENTS: _____

SIGNATURE: _____

Available Safe Practice Guides

- Bare Hand Live Line Techniques
- Conductor Stringing
- Entry and Work in a Confined Space
- Excavating with Hydrovacs in the Vicinity of Underground Electrical Plant
- High Voltage Rubber Techniques up to 36 kV
- Hydraulics
- Ladder Safety
- Line Clearing Operations
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