ASWP 03 R0
Ascending Trees

Arborist Industry
Safe Work Practices

Revision History

Version	Revision Date	Brief Description of Revisions
R0	February 2016	Document has been updated to new format.

ARBORIST SAFE WORK PRACTICES
DISCLAIMER

The contents of the **Arborist** Safe Work Practices (ASWP), including all advice, recommendations, and procedures are provided as a service by Workplace Safety & Prevention Services (formerly known as the Farm Safety Association of Ontario). No representation of any kind is made to any person whatsoever with regard to accuracy, completeness or sufficiency of the material. Any and all use of these practices, or anything found herein, is solely and entirely at the user's risk.

Workplace Safety & Prevention Services wishes to express its appreciation to those who have assisted in the preparation of the **Arborist SafeWorkPractices** guide.

Contents

1.0 Introduction

This document outlines the safe work practices for ascending trees and working at heights.

2.0 Hazards

The following hazards have been identified to aid in establishing and maintaining a safe work environment when ascending trees and working at heights:

Biotic Conditions
Chemical
Climatic Conditions
Electrical Conditions
Ergonomics
Gravity
Mechanical
Pedestrian Traffic
Vehicular Traffic

Note: The above list of hazards is not a complete list and a thorough job plan should be completed to identify existing hazards found at the work site.

3.0 Legislation / Safe Work Practices

The following information has been provided listing relevant arborist safe work practices and legislation requirements:

- ASWP01 General Legislation
- ASWP01 Work in a Safe Environment
- ASWP02 Protect Self and Others
- ASWP02 Arborist Job Planning

Legislation	RRO / RSO	Section Referenced
Construction	213 / 91	26

4.0 Mandatory Information / Work Practices

The following are the mandatory requirements for all fall protection systems for arborists ascending trees. In addition to these requirements, the work practice contains specific requirements that should also be followed.

- When ascending trees and working at heights the following must be considered as part of the Job Planning process to determine the appropriate Fall Protection System:
    - Job Planning
    - Risk Assessment
    - Hazard recognition
    - Appropriate training

    - Equipment specifications
    - Emergency Response Plan

- The use of an aerial device (refer to ASWP12 Aerial Device Operation), where practical, should be considered first before attempting to physically ascend the tree

- Those engaged in tree climbing shall be adequately trained or in the process of being trained in the following areas; job planning, perform pre-climb assessments/inspections, inspection of fall protection equipment, perform ascending methods, use work positioning techniques, descend from tree and Emergency Response Plan

- Arborists engaged in climbing trees shall be accompanied by at least one ground assistant

- At least one ground assistant at any given work site, where tree climbing is being performed, shall be trained in the Emergency Response Plan

- Conduct a review, practice, and document annually an Emergency Response Plan

- Prior to ascending a tree, all parts of the trees shall be inspected and assessed to ensure that they have the structural integrity to sustain the weight of the arborist and all potential loads (e.g. rigging or removing limbs)

Note: The arborist requires knowledge of tree structure, potential defects and species specific characteristics in order to safely assess the structural integrity of the tree and its components.

- Arborists shall inspect the Arborist Life Line, lanyards, and other climbing equipment for damage, cuts, abrasion, and/or deterioration before each use and shall remove them from service, if signs of excessive wear or damage are found. Refer to Appendix A for inspection techniques

- All appropriate Personal Protective Equipment (PPE) shall be worn while ascending trees and working at heights

- All Fall Protection Equipment shall meet the standard as set out in Appendix B

- Friction hitches used to secure the climber aloft must be from Appendix D

- The life line or friction saver shall be positioned around the main stem of the tree in its final anchor point

- All captive eye snaps and carabiners used as part of a fall protection system shall have a minimum of a triple action, double auto locking mechanism

- A figure’8’ knot shall be at the running end of the arborist life line

- Fall protection equipment used to secure an arborist in the tree or from the bucket shall not be used for anything other than its intended purpose

EXCEPTION: The arborist life line may be used to raise and lower tools.

- Rope ends shall be finished in a manner to prevent unraveling

- Arborist life lines and climbing equipment shall be stored and transported in such a manner as to prevent damage through contact with sharp tools, cutting edges, gas, oil, chemicals or ultraviolet light

- Arborist life lines shall never be left in trees unattended

- When working aloft (refer to ASWP 04 Working at Heights) or ascending the tree and using sharp tools (e.g. handsaw, chain saw, or pole pruner) you shall be tied in twice in a position which will prevent a fall if one of the means of securement is cut

- All fall protection components shall be compatible

  Note: If a knot used for fall protection other than found in Appendix D is desired; the proposed knot should be tested according to the Standards for Knot Testing protocol.

4.1 Job Planning

A thorough job plan shall be completed prior to ascending a tree. The following is a guideline of topics that should be discussed in the planning process. All crew members shall be party to the job planning process and job plans must be documented in writing (refer to ASWP 02 Job Planning).

Step	Action
Determine ascent route and work required within the crown of the tree	• Ascent route must consider hazards such as, electrical, structural integrity of the tree, insect or animals
Determine locations for interim anchor points	• Visually assess potential anchor points to ensure that they are strong enough to withstand the forces that will act on them • Look carefully for any structurally limiting defects that could lead to failure of the anchor point
Determine location of final anchor point	• The final anchor point location that will provide the best support and freedom of movement for the arborist is generally the highest, most centrally located point within the tree • Visually assess the structural integrity of this

	potential anchor point
Ensure Emergency Response Plan is in place	• Ensure a second person is available to initiate the emergency response plan • Ensure that emergency contact information is recorded on the job plan (e.g. emergency phone #s, directions to the work site*, etc.*)
Inspect immediate work site on ground and identify Drop Zone	Identify hazards related to: • Traffic conditions (pedestrian and vehicular) • Ground around tree (i.e. sloping or uneven terrain; general topography, buildings, sidewalks, fences, individual obstacles and other structures, etc.) • Environmental conditions such as: weather, temperature, light, visibility, animals (wild and domestic) and biotic conditions (poison ivy)
Determine appropriate barriers for the hazards identified	• Set up appropriate barriers for each hazard

4.2 Tree Structure Assessment

As part of the job planning process a thorough risk assessment of the structural integrity of the tree must be performed. The process allows a climber to determine whether the tree is safe to climb. This includes determining structural strength of the anchor locations.

Note: In arboriculture, diagnosing the structural strength of a tree is an inexact science. The arborist relies on knowledge and experience gained through formal training programs and related field experience to make a determination of the structural integrity of the tree.

Step	Action
Determine work to be performed	• During the assessment process, consideration must be given to the type of work to be performed (e.g. heavy loading of branches or the stem of the tree)
Assess root structure	Visually inspect root system for visible decay or indication of decay such as: • Fungal fruiting bodies • Grade changes • Extensive excavation • Circumferential soil cracking • Protruding root plate, etc.

	Note: Further assessment of the root system may be necessary. • Consider the history of the site to determine if there have been activities that could weaken the holding capacity of the root system (e.g. compacted soil creating rotting of roots)
Assess stem structure	Visually inspect stem for: signs or symptoms of wood decay such as: • Fungal fruiting structures • Conks • Cankers • Open wounds • Abnormally loose bark • Irregularities in trunk taper or normal round profile • Localized ridges or seams • Abrupt changes in normal linear configuration of trunk; whether the tree is alive or dead. Further assessment of the stem may be necessary **Note:** This may involve techniques such as trunk sounding or the use of special tools and devices. However, all of these methods require special training and may be beyond the scope of an entry level arborist and should be verified by a more experienced arborist prior to ascending.
Assess branches and crown of tree	Visually inspect the crown of the tree for: • Deadwood • Dieback • Stunted growth • Hanging or broken limbs • Weak unions • Splits • Cracks or missing sections
Assess proposed interim anchor points	• Assess anchor points for appropriate diameter, strength, and angle of attachment • Consider species of tree, current weather conditions, health of branch/stem and branching habit of tree • Anchor points must be able to withstand the anticipated load applied to them

Note: During the tree inspection, discovery of structural defects or potential hazards will require careful reconsideration of the methods originally selected for use. It may be necessary to select an alternative method for accessing the tree.

4.2.1 Anchor Strength Assessment

Many factors determine tree branch breaking strength. Listed below are descriptions of the most common conditions that could produce a limb failure.

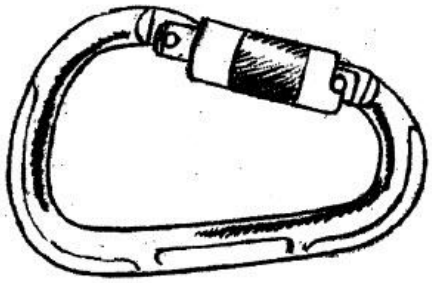
- Magnitude and type of load (e.g. dynamic vs. static) applied
- Type of loading (distance away from limb attachment to main stem)
- Other loads on the limb (foliage, snow, torque caused by limb length, weight distribution, etc.)
- Tree species
- Cross sectional area of solid wood (diameter of limb)
- Condition of wood (sound, decayed, hollow)
- Branch attachment relative to parent stem (angle, “V” or “U” shape)
- Season and temperature (winter versus summer)
- Stage of tree maturity
- Movement or rubbing between limbs

Assess the above conditions prior to using a limb as an anchor point. Some of the listed conditions can be scientifically proven without severing the limb from the tree. However, in most cases, combined knowledge and experience will prepare the arborist to determine whether the limb is safe to use as an *anchor point*. In the absence of adequate knowledge and/or experience, the arborist should request assistance from a more qualified person with respect to this decision.

In order to minimize the effect of leverage on the limb being used as an anchor, the arborist life line should be kept against the main stem of the tree while climbing. To facilitate this, limbs used as temporary anchor points must be horizontal or growing upwards.

5.0 Inspect Fall Protection Equipment

All fall protection equipment shall be inspected prior to ascending a tree (Refer to Appendix A).

Step	Action
Inspect fall protection equipment (e.g. Figure 1) Figure 1 	See Appendix A for a sample of fall protection equipment inspection: • Inspect fall protection equipment for defects and function before each use • Refer to manufacture's instructions for proper inspections • Fall protection equipment that arrests a fall must be immediately removed from service • Fall protection carabiners with more than 1 mm wear shall be removed from service • Arborist life line shall be used exclusively for climbing, except when raising or lowering hand tools

6.0 Placing Arborist Life Line in Tree

There are several methods used to place the life line into the appropriate anchor point.

From the ground, the worker may utilize a throw ball or bag, throwing knot or noose knot. Sling shot devices are being used increasingly to assist in getting a throw bag high into a tree.

Once within the tree, the worker may use a rope poking tool, pole pruner or throwing knot to advance the rope up the tree.

7.0 Ascending Techniques

The ASWP committee has suggested five techniques for ascending trees. The committee recognizes that there are several different methods and techniques and to list all would be impossible. However, the essentials of a fall protection system must be met regardless of what system is used. The five techniques for ascending a tree are; Belay Technique, Secured Foot Locking, Secured Body Thrust, Spurs and Ladders.

Each technique requires:

- A thorough inspection of the tree, the site and the equipment
- Adequate training in climbing techniques and Emergency Response Procedures.

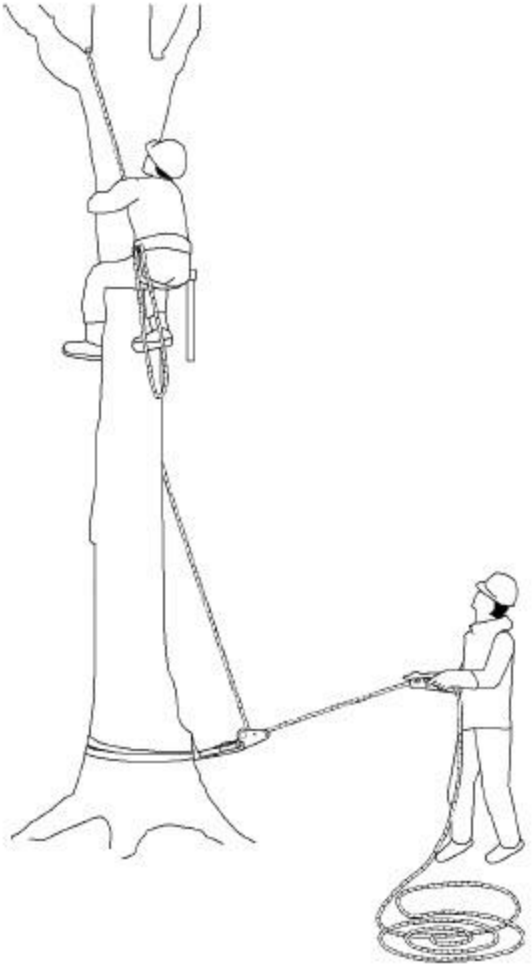
7.1 Belay Techniques

The Belay Technique (Figure 2) used by arborists is adopted from recreational rock climbing. The technique utilizes a worker on the ground to assist the arborist ascending the tree by securing the arborist to an anchor point on the ground, using either a mechanical fall arrestor or a friction hitch, through their life line.

As the arborist ascends, the ground worker removes the slack in the rope. If the arborist slips, the mechanical device or friction hitch attached to the anchor point prevents a fall.

Note: The anchor must be sufficient to support the forces generated by a worker in a fall occurs.

Figure 2



7.1.1 Ascent

Step	Action
Place arborist life line in tree at interim anchor location or if possible final anchor location	
Attach arborist life line to arborist	• Use a termination knot from Appendix D or a captive eye safety snap or carabiner
Secure the arborist to the belaying anchor point	• Use a mechanical arrester, or a friction hitch from Appendix D
Test belay to ensure it is secure	• Place weight into the system **Note**: If the arborist life line slips through the mechanical arrester or friction hitch, the system is not safe to use. Either retie the friction hitch or remove/inspect/re-install the mechanical arrester. Re-check the system.
Begin ascent	

7.1.2 Interim Anchor Point Repositioning Arborist Life Line

Once the arborist has climbed to an interim anchor point the following actions apply for continuing ascent.

Step	Action
Secure to tree using a work positioning lanyard	• Place work positioning lanyard around the main stem of the tree or a suitably strong limb and connect to side “D” rings of arborist belt
Ensure that the work positioning lanyard is secure	• Check snaps, place weight into lanyard
Communicate to Belayer	• Receive and confirm e.g. “On/Off Belay”
Reposition arborist life line to next interim anchor point	• The worker may use a rope poking tool or throwing knot to advance the rope up the tree.
Secure arborist life line to fall protection saddle	• Secure life line using a termination knot or connector to appropriate load rated attachment point of saddle or fall protection harness.
Test belay is secure	• Climber slowly places weight into system. • Belayer must ensure that the arborist is secured, there must be no movement of the arborist life line through the mechanical fall arrestor or a friction hitch • Belayer communicates that arborist is secured
Release work positioning lanyard	
Continue ascent	
Repeat interim anchor point process until reaching the final anchor point	

7.1.3 Final Anchor Point

The final anchor point is where the arborist will secure their arborist life line allowing the arborist mobility to work. The final anchor point is best situated as high in the tree as reasonable to allow mobility of the worker, similar to a pendulum. The final anchor point must meet the requirements of all anchor locations.

Step	Action
Secure to tree using a work positioning lanyard	• Place a work positioning lanyard around the main stem and over a sufficiently strong limb to secure to tree
Test lanyard is secured	• Place weight into lanyard to ensure it does not move
Communicate to Belayer	• Receive and confirm (e.g. “Remove Belay”)
Adjust arborist life line to meet work requirements	• Place arborist life line or friction saver around the main stem
Tie approved friction hitch from list in Appendix D	
Test friction hitch	• Gradually place weight into friction hitch to ensure it does not move
Release work positioning lanyard	

7.2 Secured Foot Locking Technique

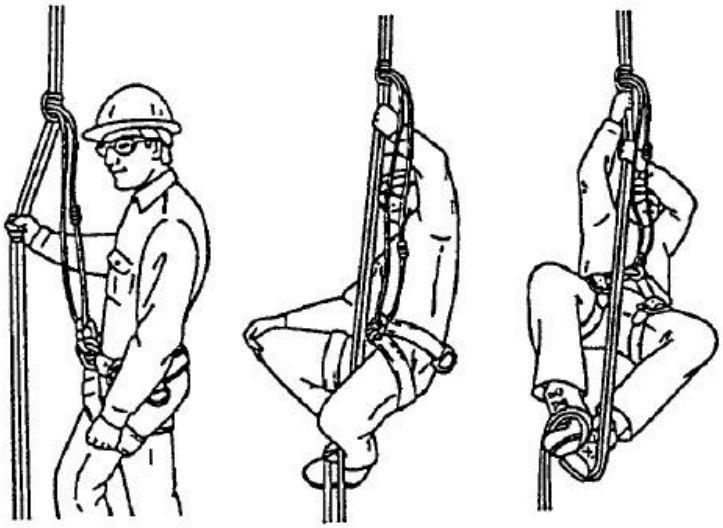
The secured foot locking technique replaces the need for a Belay person by securing him/herself to the arborist life line using an appropriate approved friction hitch from Appendix D.

Note: This system is for ascent only; in an emergency descent use an appropriate fall protection device or system.

While using the Foot Locking technique the following precautions must be adhered to (Figure 3):

- tie dress and set knot
- keep hands below the knot at all times
- used for ascent only
- avoid debris in knot,
- spread in rope 5:1; the knot must remain 5 times the diameter of the limb below the limb (e.g. for a limb that is 20 cm in diameter the knot must stay 100 cm below the limb to ensure the friction hitch does not fail).

Figure 3



7.2.1 Ascent

Step	Action
Place arborist life line in tree at first interim anchor point or final anchor point if possible	
Secure approved friction hitch from list in Appendix D around both legs of the arborist life line	
Secure friction hitch to arborist using a connecting device such as a carabiner	
Push friction hitch up the arborist life line to highest reach	
Test friction hitch	• Place weight into friction hitch • Slippage of friction hitch requires retying of hitch and retesting
Draw legs up and wrap arborist life line around one foot	
Straighten legs and stand up	
Slide friction hitch up arborist life line	
Grasp rope below friction hitch to support weight	
Draw legs up and wrap arborist life	

line around one foot	
Straighten legs and stand up	
Continue process until reaching interim anchor point or final anchor point	

7.2.2 Interim Anchor Point Repositioning Arborist Life Line

Once the arborist has climbed to an interim anchor point, the following Action applies for continuing ascent.

Step	Action
Secure to tree using work positioning lanyard	• Place work positioning lanyard around the main stem of the tree or a suitably strong limb
Ensure that lanyard is secure	• Check snaps, place weight into lanyard
Remove friction hitch	
Reposition arborist life line to next interim anchor point	• The worker may use a rope poking tool, pole pruner or throwing knot to advance the rope up the tree.
Secure arborist life line to arborist	
Tie and test friction hitch	• Slowly place weight into system. • Slippage of friction hitch requires redressing of hitch and retesting
Release work positioning lanyard	
Continue ascent	
Repeat interim anchor point process as required	

7.2.3 Final Anchor Point

The final anchor point is where the arborist will secure their life line allowing the arborist mobility to work. The final anchor point is best situated as high in the tree as possible to allow mobility of the worker, similar to a pendulum. The final anchor point must meet the requirements of all anchor locations.

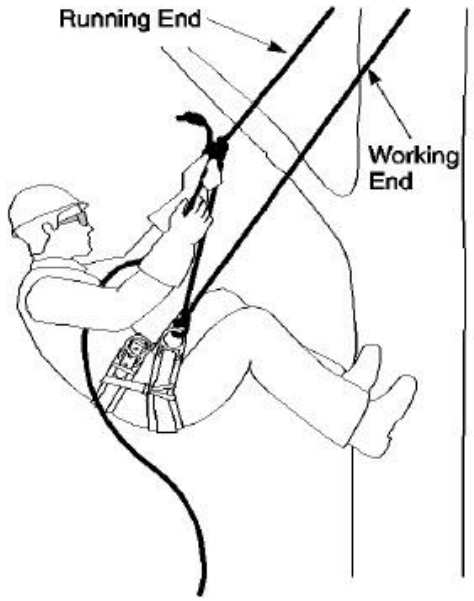
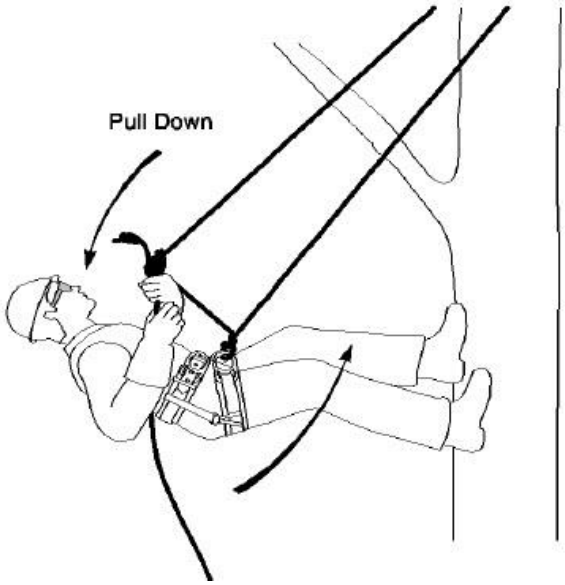
Step	Action
Secure to tree using a work positioning lanyard	• Place work positioning lanyard around the main stem of the tree or a suitably strong limb
Ensure that lanyard is secured	• Check snaps, place weight into lanyard
Remove friction hitch from life line	
Secure arborist life line around main stem of tree and over a suitably strong limb	
Secure rope to arborist using carabiner, termination knot or captive eye snap	
Tie friction hitch from approved list of friction hitches in Appendix D	
Adjust arborist life line to meet work requirements.	
Test friction hitch	• Slowly place weight into system. • Slippage of friction hitch requires redressing of hitch and retesting
Release work positioning lanyard	

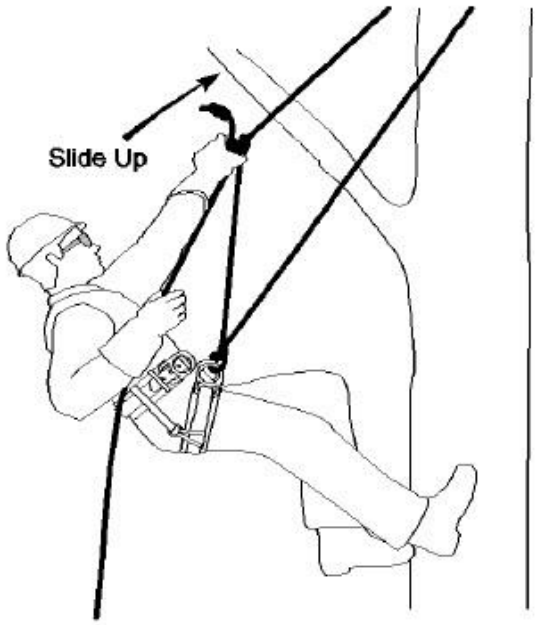
7.3 Secured Body Thrust Technique

The secured body thrust technique is sometimes called a self-belay technique. The following action applies for continuing ascent.

7.3.1 Ascent

Step	**Action**
Place arborist life line in tree at the first interim anchor point or final anchor point if available	
Secure arborist life line to arborist	• Use a termination knot, carabiner, captive eye snap
Secure arborist using a friction hitch (Figure 4) from the list of approved friction hitches in Appendix D	**Figure 4**

	
	Figure 5
Pull down (Figure 5) on the running end of the arborist life line, which will pull the arborist up the tree	
Slide Friction hitch up the arborist life line (Figure 6)	**Figure 6**

	
Repeat action until reaching the interim anchor point	

7.3.2 Interim Anchor Point Repositioning Arborist Life Line

Once the arborist has climbed to the interim anchor point, the following action applies for continuing ascent

Step	Action
Secure to tree using a work positioning lanyard	• Secure work positioning lanyard around the main stem of the tree or a suitably strong limb
Ensure work positioning lanyard is secure	• Check snaps and place weight into the work positioning lanyard
Remove friction hitch	
Reposition arborist life line to next interim anchor point	• The worker may use a rope poking tool, pole pruner or throwing knot to advance the rope up the tree.
Secure arborist life line to arborist	
Test and or tie friction hitch from list of approved hitches in Appendix D	• Slowly place weight into system • Re test split tail friction hitch • Tie and test friction hitch in conventional system
Release work positioning lanyard	
Continue ascent	
Repeat interim anchor point process as required	

7.3.3 Final Anchor Point

The final anchor point is where the arborist will secure their life line allowing the arborist mobility to work. The final anchor point is best situated as high in the tree as possible to allow mobility of the worker, similar to a pendulum. The final anchor point must meet the requirements of all anchor locations.

Step	Action
Secure to tree using a work positioning lanyard	
Ensure that lanyard is secured	• Check snaps, place weight into lanyard
Remove friction hitch	
Adjust arborist life line to meet work requirements	
Secure arborist life line around main stem of tree and over a suitably strong limb	
Secure arborist life line to arborist using carabiner, termination knot or captive eye snap	
Tie friction hitch from list of approved hitches in Appendix D	
Test friction hitch	• Slowly place weight into system. • Slippage of friction hitch requires redressing of hitch and retesting
Release work positioning lanyard	

7.4 Ascend with Spurs

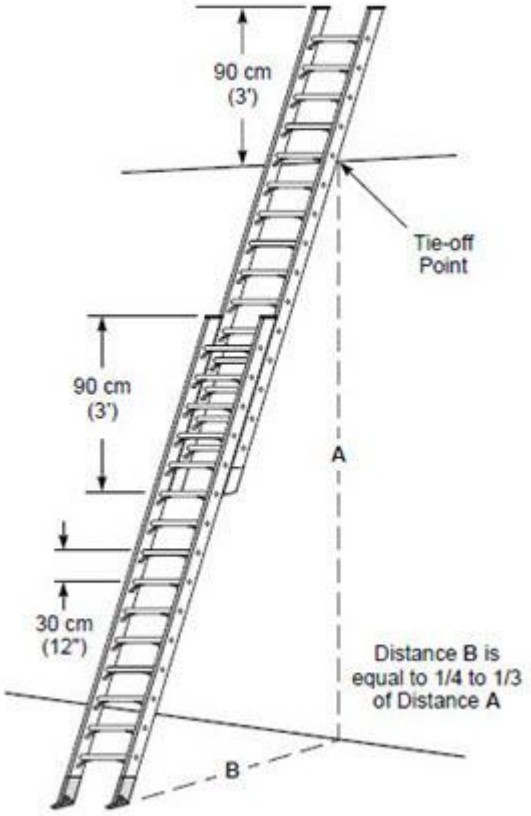
Note: A Fall Restricting system must be used when ascending a tree with spurs / climbers.

Step	Action
Inspect spurs	• Inspect spurs for sharpness, cracks and wear • Ensure gaff lengths are of sufficient length to penetrate the bark of the tree • Fit spurs appropriately **Note:** Follow manufacturer's directions.
Secure Fall Restricting System	• A fall restricting system must be used during tree ascent
Ascend tree	• Take small steps while ascending • Keep knees outward and back straight to prevent spurs from kicking out • Ensure spur is set into the wood of the tree before moving the next foot • Maintain a grip on the tree while ascending

7.5 Ascent with a Ladder

Note: A Fall Protection System must be used when working from a ladder.

Step	Action
Inspect ladder	Inspect for: • Cracks • Loose or missing rungs • Broken supports • Rotten sections • Missing parts • Broken welds **Note:** Do not paint wooden ladders. Paint can hide deformations and hazards. • Ensure the appropriate class of ladder is used for the circumstance

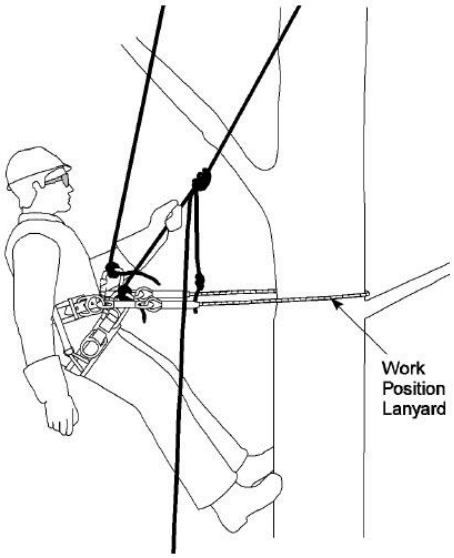
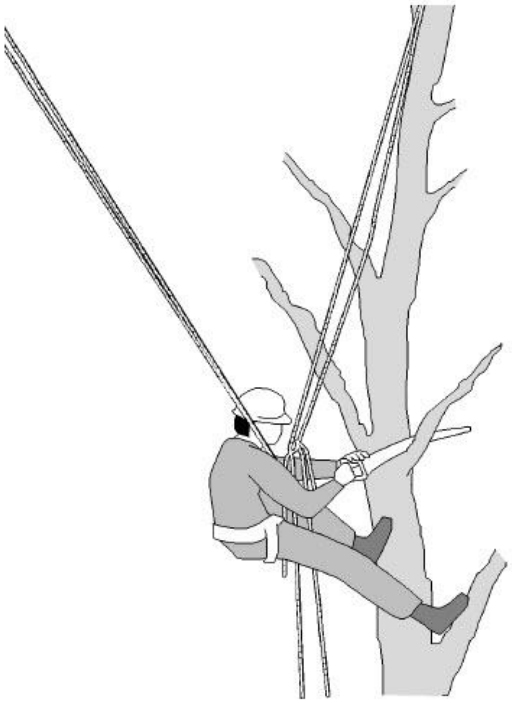
Position ladder to work	• Ensure ladder is positioned to a 4:1 ratio of vertical height to base distance (Example Figure 7 **Figure 7**  • Ensure that the feet of the ladder are securely set on the ground • Ensure that the ladder top is placed squarely on the tree or limb
Ascend ladder	• Utilize work-positioning lanyards as required • Ensure a ground person is available to hold the ladder during ascent and to warn people away from the base of the ladder
Secure using Fall Protection System	• While working from a ladder a Fall Protection System must be used • If climbing further, the life line can be placed into a suitable branch union from the top of the ladder

8.0 Work Positioning Technique

During the process of completing all work required in a tree, it is necessary for the arborist to move in the crown in order to access different work positions. However, the final anchor location may also be the first work position; in this case, the arborist must utilize a second point of attachment such as a work positioning lanyard.

8.1 Work Positioning Techniques

Step	Action
Move to work position	• Maintain a 3 point contact with tree to stabilize • Ensure that the arborist life line is tight at all times • Monitor the friction hitch throughout the climbing action to ensure the friction hitch does not loosen off • Inspect limb to be cut for defects
When using sharp tools a second point of attachment such as: • A work positioning lanyard (Figure 8) or • An arborist life line secured to a second anchor point (e.g. double tie in) (Figure 9)	• A second point of attachment must be used at all times when using a sharp tool that could cut the life line except in circumstances where the hazards of using a second point of attachment are greater than not using a second point of attachment **Note**: Every effort must be used to eliminate these hazards, so the worker can use a second point of attachment. **Figure 8**

	 **Figure 9** 
Perform work	
Release secondary attachment device to move to next work position	

9.0 Tree Descent Technique

Once all work is completed aloft, the arborist will ensure that all tools and severed limbs are removed from the tree. The arborist then descends from the tree; the following action applies for continuing descent.

Step	Action
Position arborist life line for descent	• Position arborist life line vertical to the descent route
Ensure friction hitch is dressed and set	
Control descent speed by pulling the friction hitch down the arborist life line	• Descend in a slow and controlled fashion

10.0 Emergency Response Plan

The following should be used as a guideline for developing your in-house Emergency Response Plan for a worker aloft. It is not intended to be used as a step by step procedure as each emergency situation will differ depending on the circumstances

Step	Action
Assess the Emergency	<u>Scene Observations</u> • Electrical Conductors/Contact **Note:** If there's electrical contact **DO NOT** proceed before calling the proper authorities. • Struck by limbs or tree sections, struck by lightning or victim pinned by tree structure etc. • Medical conditions (bug/animal bites, heat exhaustion, diabetes, etc. Identify and assess hazards such as: • Rigging systems in tension • Tangled ropes • Dangling limbs • Ground hazards • Suspended chain saws • Brush piles

	Tree hazards: • Root zone • Canopy • Trunk • Weather conditions • Availability of appropriate equipment and personnel
Assess Worker Condition	Try to communicate with the worker: • Verbally from the ground • Shaking of injured person's arborist life line • Are they able to descend by him/herself? • Are they unconscious? • Are they unresponsive? • Are they bleeding profusely?
Initiate Emergency Medical Systems (EMS) if required	Call EMS: • Use emergency phone numbers on Tailboard i.e. 911, Rural Fire and Rescue, High Angle Rescue Team (If available) • Utilize a third party to call and direct EMS to accident site Convey site information to EMS: • Municipal address • Rural fire number • Job site location e.g. backyard, bush, etc. • Worker condition e.g. unconscious or bleeding etc. • Other information EMS requires • Follow instructions from EMS
Assess Success of an Aerial Rescue	Determining whether to initiate an aerial rescue should be based on many factors including: • Electrical Conductors/Contact **Note:** If there's contact **DO NOT** proceed before calling the proper authorities • Safety of rescuer • Competency/abilities to perform an aerial rescue based on the Scene Observations, skill

	level of ground workers, need for assistance to conduct rescue etc. • Availability of equipment needed for the injuries e.g. advanced medical care for back or neck injuries • First Aid abilities and training • Need to assist EMS
Monitor the emergency	Communicate with the worker: • Verbally reassure help is on the way